Western Association of Fish and Wildlife Agencies

GREATER SAGE-GROUSE COMPREHENSIVE CONSERVATION STRATEGY

National Sage-grouse Conservation Planning Framework Team

December 2006

The overall goal of the range-wide Strategy is to maintain and enhance populations and distribution of sage-grouse by protecting and improving sagebrush habitats and ecosystems that sustain these populations.

The overall strategy for the management and conservation of greater sage-grouse is to develop the partnerships needed to design and implement actions to support robust populations of sage-grouse and the landscapes and habitats upon which they depend.

5400 Bishop Blvd., Cheyenne, Wyoming 82006, 307-777- 4569, www.wafwa.org

Greater Sage-grouse Comprehensive Conservation Strategy

Acceptance and Support

We, the undersigned designated officials, do hereby recognize that: "***The overall goal of the Greater Sage-grouse Comprehensive Conservation Strategy (Strategy) is to maintain and enhance populations and distribution of sage-grouse by carefully managing populations and by protecting and improving sagebrush habitats and ecosystems that sustain these populations***". We acknowledge that: ***"The overall strategy for the management and conservation of greater sage-grouse is to develop and maintain the partnerships needed to design and implement actions that support robust populations of sage-grouse and the landscapes and habitats upon which they depend."***

We acknowledge the efforts of hundreds of volunteers, and agency personnel in formulating and implementing local, state and provincial, and agency plans to conserve sage-grouse and sagebrush habitats. We thank them for their tireless efforts and ask them to continue partnering with us in implementing sage-grouse conservation efforts.

By our signatures below we accept and transmit this Strategy to the United States Fish and Wildlife Service as per our contractual agreement (Contract # 1448-60181-02-J589; DCN: 60181-2-J589). We also pledge the active support of our agencies in accomplishing the overall goal and objective of the Strategy:

[redacted]
President, Western Association of Fish and Wildlife Agencies

01/07/07
Date

[redacted]
Alberta Environmental Protection, Fish and Wildlife Services

7/02/07
Date

[redacted]
California Department of Fish and Game — 02/21/07 Date

[redacted]
Colorado Division of Wildlife — 1/7/07 Date

[redacted]
Idaho Department of Fish and Game — 1/7/07 Date

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Montana Department of Fish, Wildlife, and Parks — 1-7-07 Date

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Nevada Department of Wildlife — 1-7-2007 Date

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This report should be cited as:

Stiver, S.J., A.D. Apa, J.R. Bohne, S.D. Bunnell, P.A. Deibert, S.C. Gardner, M.A. Hilliard, C.W. McCarthy, and M.A. Schroeder. 2006. Greater Sage-grouse Comprehensive Conservation Strategy. Western Association of Fish and Wildlife Agencies. Unpublished Report. Cheyenne, Wyoming.

Sage-grouse photos - James Yule

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San retired in 2003, after 30 years as a biologist for the Nevada Division of Wildlife. He is currently employed by the National Sage-Grouse Conservation Planning Framework Team. San received his B.S. from the University of Montana in 1974. He has been a member of the Wildlife Society since 1971 and was a member of the Western Sage and Columbian Sharp-tailed Grouse Technical Committee from 1981 – 2003. San has been involved in national and international wildlife conservation issues since 1985. He has worked on sage-grouse as a field biologist, researcher and staff biologist for 30 years.

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Joe received a B.S degree in Wildlife Biology from the University of Massachusetts in 1970 and received a Master Degree in Wildlife Biology from the University of Montana in 1974. Joe worked for Montana Fish Wildlife and Parks as a temporary biologist in Missoula before starting with the Wyoming Game and Fish Department as a wildlife biologist in 1978. He has worked for the WGFD for 29 years in Wheatland, Laramie and Jackson as a wildlife biologist, regional wildlife coordinator, and staff biologist (current position). Joe represents Wyoming on the Western States Sage and Columbian sharp-tailed grouse Technical Committee, the WAFWA National Sage-grouse Team, is vice-chair of the internal WGFD Sage-grouse Working Group and is the agency lead on the Jackson Hole Local Sage-grouse Working Group. Joe has worked on sage-grouse management and conservation issues for his entire career in Wyoming in addition to work on big game, upland game, and waterfowl management.

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For as the last four and one half years Dwight has served as Coordinator for the National Sage-Grouse Conservation Planning Framework Team. Dwight retired from the Utah Division of Wildlife Resources in 2002 after over 32 years of service with DWR. During his career he served as Conservation Officer, Regional Biologist, Upland Game Program Coordinator, Asst. Chief of Game Management, Chief of Game Management, Lands Program Coordinator, and Habitat Council Coordinator. Dwight received a B. S. from the University of Utah and a M. S. in Wildlife Ecology from the University of Idaho.

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Scott is the sage-grouse coordinator for the California Department of Fish and Game. He has worked on sage and Columbian sharp-tailed grouse conservation and research for the past 15 years and he is currently serving as Chairman of the Western Sage and Columbian Sharp-tailed Grouse Technical Committee. Scott received a B.S. in Ecology from the State University of New York at Plattsburgh and a M.S. in Wildlife Resources from the University of Idaho.

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Acknowledgments

The Greater Sage-grouse Comprehensive Conservation Strategy (Strategy) is a product of over fifty years of intense study and countless hours of effort by biologists and other concerned individuals. The authors acknowledge that the Strategy would not have been produced without the direction and guidance of the Western Association of fish and Wildlife Agencies (WAFWA) and dedication and perseverance of WAFWA's species experts that make up the Western States Sage and Columbian Sharp-tailed Grouse Technical Committee (Technical Committee). We thank Terry Crawforth (retired Director of the Nevada Division of Wildlife) and Bruce McCloskey (Director of the Colorado Division of Wildlife) for their leadership and direction as National Sage-grouse Conservation Planning Framework Team liaisons to WAFWA.

Chapters of this report were written by members of the National Sage-grouse Conservation Planning Framework Team (Tony Apa, Joe Bohne, Pat Deibert, Scott Gardner, Mark Hilliard, Clint McCarthy and Mike Schroeder) and by the Team Coordinator, Dwight Bunnell and Wildlife Coordinator, San Stiver. San Stiver served as lead author/editor in producing the Strategy document. We thank Lisa Lang-Stoner for preparing the figures. Celia Bunnell formatted the document, prepared several of the tables and otherwise assisted with document preparation.

We thank the U.S. Bureau of Land Management, U.S. Fish and Wildlife Service, and U.S. Forest Service for financially supporting production of the Strategy including salary costs. Additionally, we appreciate the salary support that was provided by California Department of Fish and Game, Colorado Division of Wildlife, Washington Department of Fish and Wildlife, Wyoming Department of Game and Fish, U. S. Fish and Wildlife Service, Bureau of Land Management, U. S. Forest Service, Multi-state Grant WY M-5-C: Sage-grouse Interstate Working Group Coordinator and the National Biological Information Infrastructure.

The Strategy would not have been possible had it not been for the amazing efforts of the several thousand participants in community-base conservation planning and state and provincial planning. These Local Working Groups form the foundation of the conservation effort and the state and provincial efforts help guide the efforts. We thank each participant.

We also acknowledge the contributions and direction provided by members of the Greater Sage-Grouse Range-wide Issues Forum: Clait E. Braun, Grouse, Inc., John Brenner, Western Governors' Association, Jim Burruss, PacifiCorp, Tom Clayson, Anadarko Petroleum, Leta Collord, Northeastern Nevada Stewardship Group John Dahlke, N. American Grouse Partnership/Wyoming Wildlife/local working group, Bob Davison, Wildlife Management Institute, Ben Deeble, National Wildlife Federation, Paul Dresler, U.S. Geological Survey – Biological Resources Division ,Connie Eissinger, McCone County Commissioner, MT, Dale Eslinger, Sustainable Resource Development - Government of Alberta, Canada, Shawn Espinosa, Sage-Grouse Technical Committee, Jeff Foss, U.S. Fish & Wildlife Service, Randall Gray, Natural Resources Conservation Service, Margaret Soulen Hinson, American Sheep Industry, Alison Lyon Holloran, National Audubon Society, Chris Jauhola, The Nature Conservancy, Kate Kitchell, U.S. Geological Survey – Forest and Rangeland Ecosystem Science Center, Paul Makela, Idaho Department of Fish & Game, Bruce McCloskey, Western Association of Fish & Wildlife Agencies, Cal McCluskey, Bureau of Land Management, Ron McNeil, LandWise (Alberta, CN), Dave McNinch, Wildlife Commissioner (NV), Terry Messmer, Utah State University, Steve Monsen, Western Ecological Consulting / Society for Range Management, Barry Noon, Colorado State University, John O'Keeffe, National Cattlemen's Beef Association/ Landowner-Rancher, Martin Raphael, U.S.D.A. Forest Service – Pacific Northwest Research Station, David Redhorse, U.S. Fish & Wildlife Service Tribal Liaison, Kerry Reese, University of Idaho, Mark Salvo, Sagebrush Sea Campaign, Lowell Suring, USDA Forest Service, Robert Szaro, U.S. Geological Survey – Biological Resources Division, Western Thayer, Shoshone-Arapahoe Tribes, and Jeff White, Newmont Mines.

Technical support, information, and data were provided by Technical Committee and the member agencies supporting this group. We thank past and current members of the committee. Current members of the committee include: Tony Apa (CO), Joe Bohne (WY), Jack Connelly (ID), Pat Deibert (USFWS), Dale Eslinger (AB), Shawn Espinosa (NV), Scott Gardner (Chairman) (CA), Christian Hagen (OR), Mark Hilliard (BLM), Jerry Kobriger (now retired) (ND), Sue McAdam (SK), Clint McCarthy (USFS), Dean Mitchell (UT), Rick Northrup (MT), Mike Schroeder (Past Chairman) (WA), and John Wrede (Past Chairman) (SD). In 1994 the Technical Committee initiated the effort leading to this Strategy. We also acknowledge the leadership to the Western Association of Fish and Wildlife Agencies in bringing together a coalition of 1l states, 2 provinces and 3 federal agencies to produce the Strategy which constitutes the second phase of the first complete Conservation Assessment for Greater sage-grouse. Phase one of the assessment was published in 2004 (Connelly et al. 2004).

This document was substantially improved by reviews provided by five anonymous referees selected by the Ecological Society of America. We thank Elizabeth Stallman for coordinating this review process. This assessment was also improved by reviews provided by California Department of Fish and Game, Colorado Division of Wildlife, Idaho Department of Fish and Game, Montana Department of Fish, Wildlife and Parks, Nevada Department of Wildlife, Oregon Department of Fish and Wildlife, South Dakota Department of Game, Fish, and Parks, Wyoming Game and Fish Department, Alberta Fish and Wildlife Service, Saskatchewan Environment, the Bureau of Land Management, U. S. Forest Service, U. S. Fish and Wildlife Service, and the National Resource Conservation Service. We appreciate the comments that were received during the public review process. Particularly we thank the following groups or organizations, National Audubon Society, Bitter Creek Pipeline L.L.C., Devon Energy, Fidelity Exploration and Production Co., Idaho Cattlemen's Association, Oregon Department of Fish & Wildlife, Kent Christopher, Glenn Hockett, Terry Rich, Public Land Advocacy, Public Land Council, North Eagle-South Routt County Greater Sage-grouse Working Group, Saskatchewan Environment, Shoshone-Paiute Tribes, Teton

Regional Land Trust, Utah State University Extension, University of Wyoming Cooperative Extension, Washington Department of Fish and Wildlife, Williston Basin Interstate Pipeline Co., and Wyoming Game and Fish Department.

ACRONYMS

AM	Adaptive Management
BIOS	Biogeographic Information and Observation System
BLM	Department of Interior, Bureau of Land Management
BLM Habitat Strategy	BLM National Sage-grouse Habitat Conservation Strategy
BMP	Best Management Practices
CA	Conservation Assessment or Phase 1
Canadian Strategy	Canadian Sage Grouse Recovery Strategy
CBCP	Community-based Conservation Specialists
CBMZ	Columbia Basin Management Zone
CPMZ	Colorado Plateau Management Zone
CRP	Conservation Reserve Program
CWPPs	Community Wildfire Protection Plans
DOD	Department of Defense
DOE	Department of Energy
EAs	Environmental assessments
EISs	Environmental impact statements
ESA	Endangered Species Act
ESR	Emergency stabilization and rehabilitation
Forum	The Greater Sage-grouse Range-wide Issues Forum
Forum Report	Greater Sage grouse Range-wide Conservation Issues Forum Report
FRESC	Forest Rangeland and Ecosystem Science Center
FSA	USDA Farm Service Agency
FTE	Full time equivalent
GIS	Geographic Information System
GPMZ	Great Plains Management Zone
GPS	Global Positioning System
Guidelines	Guidelines to Manage Sage-grouse Populations and their Habitats
GRSG	Greater sage-grouse *Centrocurcus urophasianus*
GUSG	Gunnison sage-grouse *Centrocurcus minimus*
JV	Habitat Joint Ventures
IMJV	Intermountain Joint Venture
In reach	Communication and information within agencies
INL	Idaho National Lab
IQA	The Information Quality Act (Data Quality Act)
Local Plans	Community-based Conservation Plans
LWG	Local Working Group
MOU	Memorandum of Understanding
NABCI	North American Bird Conservation Initiative
NACWC	North American Colonial Water bird Conservation Plan
NASECA	North American Sagebrush Ecosystem Conservation Act
NASECA Council	North American Sagebrush Ecosystem Conservation Act Council
NAWCA	North American Wetlands Conservation Act

NAWP	North American Waterfowl Plan
NBII	National Biological Information Infrastructure
NDOW	Nevada Division of Wildlife
NEPA	National Environmental Policy Act
NFP	National Fire Plan
NGBMZ	Northern Great Basin Management Zone
NGO's	Non-governmental organizations
NOAA	National Oceanic and Atmospheric Administrations
NRCS	USDA Natural Resources Conservation Service
O&M	Operation and Maintenance
Partners	Signatories, along with WAFWA states, to the 2000 Interagency MOU (USFWS, USFS, BLM), additionally, groups or organizations participating in sage-grouse conservation.
PECE	Policy for Evaluation of Conservation Efforts
Phase I Conservation Assessment (Assessment)	Connelly, J. W., S. T. Knick, M. A. Schroeder, and S. J. Stiver 2004. Conservation Assessment of Greater Sage-grouse and Sagebrush. Western Association of Fish and Wildlife Agencies Unpublished Report. Cheyenne, Wyoming
Phase II (Strategy)	Greater Sage-grouse Comprehensive Conservation Strategy (this document)
PIF	Partners in Flight
PIT	Passive-integrated-transponders
PRS	Progress Reporting System
RCP	Range-wide Conservation Plan
RIEC	WAFWA Resources Information and Education Committee
S&G	Standards and Guidelines
SAGEMAP	Sagebrush and Grassland Ecosystem Map Assessment Project
SARA	Species at Risk Act
SCC	Sagebrush Conservation Council
SGBMZ	Southern Great Basin Management Zone
SGIN	WAFWA Sage-grouse Information Network
SGMZ	Sage Grouse Management Zone
SGRP	Sage-grouse Restoration Project
SOCC	Species of Conservation Concern
SPA	States, Provinces and Agencies
State/Provincial Plans	State and Provincial Conservation Strategies and Plans
Team	The Sage-grouse Conservation Planning Framework Team
Technical Committee	The Western Agencies Sage and Columbian Sharp-tailed Grouse Technical Committee
TNC	The Nature Conservancy
Tribal Plans	Tribal Conservation Strategies and Plans
U.S. Institute	U.S. Institute for Environmental Conflict Resolution
USFS	Department of Agriculture, United States Forest Service
USFWS	Department of Interior, United States Fish and Wildlife Service
USGS	US Geological Survey

USSCP	U.S. Shore bird Conservation Plan
WA	SGIN Website Administrator
WAFWA	Western Association of Fish and Wildlife Agencies
WBMZ	Wyoming Basin Management Zone
WGA	Western Governors Association
YTC	Yakima Training Center

Executive Summary

EXECUTIVE SUMMARY

"The overall goal of the Greater Sage-grouse Comprehensive Conservation Strategy (Strategy) is to maintain and enhance populations and distribution of sage-grouse by protecting and improving sagebrush habitats and ecosystems that sustain these populations. This Strategy outlines the critical need to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens to design and implement cooperative actions to support robust populations of sage-grouse and the landscapes and habitats upon which they depend. The justification for this effort is widespread concern for declining populations and reduced distribution of sage-grouse.

Background

Sage-grouse are currently found in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming in the United States and Alberta and Saskatchewan in Canada. The current range has been estimated to be a reduction of 44% from the historically occupied range. In addition, populations in most or the range have been demonstrated to have declined from 1965-2003, the period where data was collected most intensively. Between May 1999 and December 2003, eight petitions were filed with the U.S. Fish and Wildlife Service (USFWS) to have sage-grouse protected under provisions of the Endangered Species Act (ESA). In 2001 the USFWS determined that greater sage-grouse in the Columbia Basin of Washington state warranted protection under provisions of the ESA. In 2005 the USFWS determined that the greater sage-grouse did not warrant protection in the remainder of the range, but encouraged continued and enhanced conservation efforts. Greater sage-grouse in Canada are listed as Endangered under provisions of the Species at Risk Act (SARA).

In 1954 the Western Association of Fish and Wildlife Agencies (WAFWA) formed a technical committee to monitor the distribution and abundance of sage-grouse. WAFWA formalized a program of interstate coordination and cooperation in 1995 to address the issues of sage-grouse population losses and degradation of sagebrush ecosystems in order to: *1) Maintain the present distribution of sage grouse and 2) Maintain the present abundance of sage-grouse.* In 1999 WAFWA amended the objectives to: *1) Maintain and increase where possible the present distribution of sage grouse and 2) Maintain and increase where possible the present abundance of sage grouse.* The Bureau of Land Management, USFWS, and U.S. Forest Service formally joined with WAFWA in range-wide conservation efforts in 2000.

WAFWA entered into a contract with the USFWS in 2002 to produce a complete conservation assessment for greater sage-grouse and its habitat. WAFWA choose to produce the assessment in two phases: Phase I is a 2004 assessment of greater sage-grouse populations and sagebrush habitats upon which they depend ('Assessment', senior author J. C. Connelly; http://sagemap.wr.usgs.gov/conservation_assessment.htm) and Phase II ('Strategy', this document) is a conservation strategy for greater sage-grouse and sagebrush habitats. The Assessment demonstrated that approximately 99% of the current population of greater sage-grouse is found in the United States, while the remaining 1% is located in Canada. Federal lands make up about 72% of the total range of the species making federal land management agencies primarily responsible for habitat management. However, privately owned lands provide critical seasonal habitats for many populations and their importance to conservation may greatly exceed their ownership percentage. Throughout their range, sage-grouse populations are located on lands that overlap significant natural resources such as oil and gas resources, water resources, wind power sites, mineral deposits, agricultural, and recreational areas. Sage-grouse are also found in habitats that are at significant risk of change due to exotic weeds, fire, and conifer encroachment.

In 2000 the Gunnison sage-grouse (*Centrocercus minimus*) was officially recognized as a separate species, based on morphological, genetic, and behavioral differences from the greater sage-grouse (*C. urophasianus*). This Strategy deals with greater-sage grouse, but portions of the Strategy (Chapter 6) make reference to, and are applicable to, Gunnison sage-grouse. The strategy for Gunnison sage-grouse conservation is outlined in the Gunnison Sage-grouse Range-wide Conservation Plan which is available for download at the Colorado Division of Wildlife website (http://wildlife.state.co.us.).

Strategy Guiding Principles

The Strategy incorporates seven guiding principles: 1) Inclusion and mutual respect, 2) Local, state, agency and group initiative and leadership, 3) Commitment to monitoring and adaptive management, 4) Commitment to continued cooperation and coordination, 5) Commitment to functional and productive landscapes, 6) Inclusion of the best science and maintaining scientific integrity, and 7) Commitment to the Range-wide Issues Forum suggestion that the Strategy should strive to: a) protect what we have, b) retain what we are losing, and c) restore what has been lost.

Seven sage-grouse management zones are established based on populations within floristic provinces (detailed description in Assessment). The success of conservation actions will be judged on the basis of long-term population trends in each of the seven Management Zones. The overall goal of the range-wide Strategy is to maintain and enhance populations and distribution of sage-grouse by protecting and improving sagebrush habitats and ecosystems that sustain these populations. The overall objective of the range-wide Strategy is to produce and maintain neutral or positive trends in populations and to maintain or increase the distribution of sage-grouse in each Management Zone. Therefore, the future distribution, trend, and abundance of sage-grouse populations will be the ultimate indicators of the Strategy's success.

The Strategy is designed to augment and facilitate other conservation plans and strategies. The Strategy references local, state, provincial, and agency conservation strategies and adds regional and range-wide strategies. Local, state and provincial, federal agency and other sage-grouse and sagebrush conservation plans are not diminished or changed by this Strategy.

Strategy Outline

The Strategy is outlined in 7 sub-strategies: 1) Conservation actions, 2) Monitoring the effectiveness of conservation actions, 3) Monitoring the implementation of conservation actions, 4) Research and technology, 5) Funding, 6) Communications, and 7) Adaptive management.

Conservation Actions:

WAFWA initiated a public process in October 2005 to develop range-wide conservation strategies to benefit greater sage-grouse. Informed and committed individuals representing a wide breadth of experience and involvement with sage-grouse across western North America were invited to participate in a series of meetings known as the Sage-grouse Forum (Forum). The goal of the Forum was to facilitate collaborative development of approaches that address issues, needs, opportunities, and partnerships related to conservation of greater sage-grouse and sagebrush habitats at the range-wide scale. Forum participants identified three essential resources needed to take the Strategy forward: 1) Funding; 2) Leadership committed to organizing, supporting and guiding a long-term effort; and 3) Appropriate organizational structure to sustain conservation actions over time.

The Strategy also involves hundreds of citizens and resource professionals with disparate backgrounds who participate in Local Working Groups scattered throughout sage-grouse range. Due to many individual circumstances, and agency personnel changes, the makeup of working groups will change over time. Therefore, consistent and reliable monitoring data must provide a common language for sage-grouse conservation temporally and spatially.

Monitoring:

The Strategy repeatedly stresses the need for appropriate types of monitoring to provide the information required to make educated decisions and to adaptively manage resources. Monitoring provides the 'currency' necessary to evaluate management decisions and to assess progress or problems. Adequate monitoring should be considered an integral and inseparable component of all management actions, and therefore, not optional. Lack of proper monitoring will undoubtedly hinder this large-scale conservation effort.

Research and Technology:

Research and technology are fundamental components of an effective conservation strategy. Research is considered here as a broad categorization of many topics including, inventory, monitoring, and evaluation of specific questions related to the understanding or management of greater sage-grouse. Even though some monitoring and evaluation activities can be considered research, they are also important components of management and therefore are essential to the success of the Strategy.

Funding:

Funding is needed to implement conservation actions and is critical to success of the Strategy at the local, regional and range-wide level. The Funding Sub-strategy addresses two elements: funding and appropriate administrative structure. The basic premise of the Strategy is that additional conservation capacity must be developed at all levels (local, state and agency, and range-wide) for both the short-term (first 3-5 years) and for the long term. The Funding Sub-strategy proposes implementation of the North American Sagebrush Ecosystem Conservation Act (NASECA), modeled on the North American Waterfowl Management Plan, to provide funding and structure for sage-grouse conservation. WAFWA and its partners, through a broadly-based Implementation Team, will continue to provide leadership and guidance to implement the Strategy.

Communications:

WAFWA's sage-grouse conservation program is largely dependent upon groups staffed by volunteers who need continuing support through recognition of their efforts, reimbursement of out-of-pocket expenses, and continuing outreach by the states, provinces, and agencies. There is a continuing and growing need for communication of unbiased, up to date technical information to guide on-the-ground projects. This need is addressed by the Strategy through development of a consortium of conservation experts.

As sage-grouse conservation efforts move forward, there is a need for continuing communication to establish and maintain broad-based support for the Strategy. Public education, outreach, and in reach (communication within agencies and groups to increase understanding) about sage-grouse conservation can be more effective through partnerships between states, federal agencies, non-government organizations, and citizens. The Strategy has a primary message to the public that, "Greater sage-grouse and sagebrush habitats are of critical importance. The Greater Sage-grouse Comprehensive Conservation Strategy has been prepared as a roadmap for the long-term conservation of sage-grouse and their habitats and the Strategy needs your support to be successful ."

Conclusion

There are three essential resources needed to ensure successful implementation of the Strategy: 1) Significant and sustained funding; 2) Leadership committed to organizing, supporting, and guiding a long-term effort; and 3) Appropriate organizational structure to sustain range-wide conservation through time. A basic premise of the Strategy is that additional conservation capacity must be developed at all levels (local, state and agency, and range-wide) for both the short-term (first 3-5 years) and for the long term. The Strategy proposes the development and implementation of the North American Sagebrush Ecosystem Conservation Act (NASECA) to provide the funding and organizational structure needed to sustain a long-term range-wide conservation effort. WAFWA and its partners must remain strongly committed to providing the leadership and guidance needed to implement the Strategy over time.

Chapter 1
Introduction

CHAPTER 1

Introduction

Greater sage-grouse are widely considered in scientific and public arenas to be a species of significant conservation concern (Connelly and Braun 1997, Schroeder et al. 1999, Schroeder et al. 2004). In response to those concerns, states and provinces that are occupied by sage-grouse have implemented extensive conservation efforts. The U.S. Fish and Wildlife Service (USFWS) has determined that greater sage-grouse warrant protection under provisions of the Endangered Species Act (ESA) in the Columbia Basin of Washington state and do not warrant protection in the remainder of the range. (U.S. Fish and Wildlife Service, 2001, 2005) However, the USFWS 2005 "not warranted" finding for the remainder of the species' range encouraged the continued and enhanced conservation efforts for greater sage-grouse (U.S. Fish and Wildlife Service, 2005). An ESA listing for greater sage-grouse would have serious economic, cultural and societal consequences across much of the western United States. In Canada the species is federally listed as Endangered under the Species at Risk Act (SARA).

Recognizing the risk to sage-grouse, the Western Association of Fish and Wildlife Agencies (WAFWA) began extensive conservation efforts to arrest the decline in the species and its habitat. Since these efforts began, the Gunnison Sage-grouse (*Centrocercus minimus*) has been recognized as a separate species apart from the greater sage-grouse (*Centrocercus urophasianus*). The Strategy deals principally with greater-sage grouse but portions of the Strategy (see Chapter 6 for example) make reference to, and are applicable to, Gunnison Sage-grouse. Unless otherwise noted all reference in the Strategy refer to greater sage-grouse. This strategy outlines efforts that are underway today and develops a roadmap for efforts that need to be conducted into the future and at population and range-wide scales that have not been addressed by ongoing sage-grouse and sagebrush conservation efforts. This strategy further develops a series of sub-strategies that will facilitate sage-grouse conservation at each scale. Due to history and current federal regulations (ESA for example), the Strategy focuses on greater sage-grouse but it is anticipated that the Strategy forms the basis for future planning for many sagebrush obligate and dependent species.

Background

The presettlement distribution of potential habitat for greater Sage-Grouse includes an area of currently occupy approximately 668,412 km_2 (258,000 $mi^{2)}$ of habitat in western North America (Schroeder et al. 2004). The current range of greater sage-grouse consists of approximately 56% of the estimated potential habitat available prior to European settlement (Fig.1.1) Sage-grouse are currently found in California, Colorado, Idaho, Montana, Nevada, North Dakota, Oregon, South Dakota, Utah, Washington and Wyoming in the United States and in Alberta and Saskatchewan in Canada (Schroeder et al. 2004). Approximately 99% of the current population is found in the United States, while the remaining 1% is located in Canada. Federal lands make up about 72% of the total range of the species (Connelly et al. 2004) making federal land management agencies primarily responsible for habitat management. However, privately owned lands provide critical seasonal habitats for many populations and their importance to conservation may greatly exceed the percentage of ownership within a population's range. Throughout their range, sage-grouse populations are located on lands that overlap significant natural resources such as oil and gas resources, water resources, wind power sites, mineral deposits, agricultural and recreational areas. Sage-grouse are also found in habitats that are at significant risk of change due to exotic weeds, fire and conifer encroachment (Connelly et al. 2004).

Sage-grouse are a landscape-scale species in the sense that they are seasonally mobile and annually they often have an extremely large home range. To maintain genetic flow and opportunities for dispersal, populations need to be connected which requires large expanses of sagebrush habitat. Due to the large expanses of habitat this species require, a single population can span multiple jurisdictions. The need for connected habitats requires coordination between management authorities, private landowners and land management agencies. Conservation of the species requires that healthy populations be maintained across the range of the species.

In the early 1990s the Western States Sage and Columbian Sharp-tailed Grouse Technical Committee (Technical Committee) recognized that sage-grouse populations were declining throughout their range. In 1994, the Technical Committee reported to the WAFWA directors that sustained range-wide declines in sage-grouse numbers and distribution were occurring. The Technical Committee further expressed concern about the continuing decline in the quality and quantity of sagebrush habitat. The WAFWA directors responded by signing the first of a series of MOUs committing sage-grouse and sagebrush states to a coordinated conservation effort. The initial MOU (WAFWA, 1995) was updated in 1999 (WAFWA, 1999). Specific objectives listed in the WAFWA 1999 MOU are to:

1. Maintain and increase where possible the present distribution of sage grouse.
2. Maintain and increase where possible the present abundance of sage grouse.
3. Develop strategies using cooperative partnerships to maintain and enhance the specific habitats used by sage grouse throughout their annual cycle.
4. Conduct management experiments on a sufficient scale to demonstrate that management of habitats can stabilize and enhance sage grouse distribution and abundance.
5. Collect and analyze population and habitat data throughout the range of sage grouse for use in preparation of conservation plans.

In 2000, the WAFWA directors further committed to inter-jurisdictional coordination with the signing of an interagency sagebrush/sage-grouse conservation MOU with the United States Department of Agriculture, Forest Service (USFS), United States Department of Interior, Fish and Wildlife Service (USFWS) and the United States Department of Interior Bureau of Land Management (BLM) (WAFWA, 2000). Specific objectives of the interagency MOU are to:

1. Maintain, and increase, where possible, the present distribution of sage grouse.
2. Maintain, and increase, where possible, the present abundance of sage grouse.
3. Identify the impacts of major land uses and hunting on sage grouse, and determine the primary causes for declines in sage grouse populations.
4. Develop a Range-wide Conservation Framework to provide for cooperation and integration in the development of Conservation Plans to address conservation needs

across geographic scales as appropriate.

5. Develop partnerships with agencies, organizations, tribes, communities, individuals and private landowners to cooperatively accomplish the preceding objectives.

The 2000 Interagency MOU established the Sage-grouse Conservation Planning Framework Team (Team). The Team consists of 4 state biologists and 3 federal biologists. The Team is responsible for providing a framework for sage-grouse and sagebrush conservation planning across the range of sage-grouse and between jurisdictions within the range of sagebrush. In 2002, WAFWA signed a contract with the USFWS and assigned the team to produce a Conservation Assessment (CA) for greater sage-grouse.

The Team produced the greater Sage-grouse Conservation Assessment in two Phases: a conservation assessment and a conservation strategy. Phase I of the conservation assessment, *Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats* (Assessment), was completed and delivered to the USFWS in June 2004 (Connelly et al. 2004). Phase II of the CA is the Conservation Strategy (this document).

Strategy

The overall strategy for the management and/or conservation of greater sage-grouse is to develop the associations among local, state, provincial, tribal, and federal agencies, non-governmental organizations, and individual citizens necessary to design and implement cooperative actions to support robust populations of sage-grouse and the landscapes and habitats upon which they depend. The Strategy proposes establishment of seven biologically based sage-grouse and sagebrush management zones which typically cross jurisdictional boundaries and require continued collaboration and coordination (Figs.1.2-1.4). This Strategy is a multi-faceted approach to greater sage-grouse conservation and is built on a foundation of 50 years of cooperation and coordination. This document contains a series of conservation issues, concerns or risks that confront the species at various scales. Development and implementation of conservation strategies and actions occurs at numerous scales including Local Working Groups (LWG), state/provincial conservation and management planning efforts, and range-wide conservation efforts involving cooperation among states, provinces, federal agencies, and any group interested in the range-wide management of sage-grouse and their habitats. Although each scale of management/conservation action tends to focus on specific areas of interest and/or relevance (i.e., LWGs tend to concentrate on conservation actions at the allotment or local area level), there is by necessity a broad area of overlap. For example, states are required by law to set the laws concerning harvest regulations, which ultimately must be incorporated into LWG and range-wide planning efforts. The identification of conservation issues is only one part of a successful conservation effort. To that end a series of sub-strategies have been identified. Sub-strategies that will facilitate the successful completion of the overall conservation strategy include:

Monitoring the implementation of conservation actions. Implementation of management and conservation activities is necessary to achieve the population and habitat goals. This sub-strategy outlines the steps necessary to monitor what conservation activities are occurring, where they are occurring, the goals and objectives of the action and the partners involved.

***Monitoring the effectiveness (outcomes) of conservation action**s*. Successful management will require an effective monitoring program for both sage-grouse and their habitats. The sub-strategy to monitor or to develop monitoring techniques for both sage-grouse and sagebrush habitats will provide managers and decision makers with information to evaluate the effects of treatments and conservation efforts and to adaptively manage sage-grouse conservation.

Adaptive Management. Adaptive management is an effective and important component of management. Adaptive management recognizes, and plans for, uncertainties in conservation efforts and actively proposes hypotheses that can then be tested via monitoring and recalibration of these efforts. This sub-strategy encourages the use of outcome-based management. Conservation actions as well as the administration of the conservation efforts are designed or encouraged to have pre-determined measure outcomes. The actual outcome will be evaluated against the expected outcomes and subsequent management will be adapted following the evaluation of the action.

***Research needs and technolog**y*. During the last 50 years the science community has conducted research into many questions regarding sage-grouse and western rangelands. However, many important management questions remain unanswered and need to be addressed on a priority basis. In addition, this sub-strategy takes into account the need to use innovative and emerging technologies that can provide more cost effective and rigorous information.

Communication and outreach. Improved, coordinated and cooperative communication efforts will enhance support for conservation and avoid duplication of efforts. Western stakeholders value personal independence and initiative and locally-based solutions to local problems. Many urban residents of the sagebrush biome are not familiar with the complexity of the problems, opportunities and values within the sagebrush ecosystem. In the case of sagebrush and sage-grouse conservation, there is good reason to believe that a more informed public will be a more supportive and involved public; especially when people learn that individuals in their own community are actively engaged in the process.

Funding. This sub-strategy outlines a framework for short and long-term funding opportunities. Several state and local conservation plans identified hundreds of conservation actions without a funding mechanism to build capacity to successfully accomplish the outlined goals. The funding opportunities outlined in this sub-strategy, if implemented, would provide a consistent and predictable funding stream to implement this Range-wide Comprehensive Strategy as well as state and local conservation plans. The funding strategy also includes an infrastructure to encourage, coordinate and guide conservation efforts.

Guiding Principles

The overall goal of the range-wide Strategy is to maintain and enhance populations and distribution of sage-grouse by protecting and improving sagebrush habitats and ecosystems that sustain these populations. WAFWA and its partners envision a continuation of coordinated, cooperative range-wide sage-grouse and sagebrush conservation resulting in productive sage-grouse populations and habitats that are highly valued by society as sage-grouse habitat and because of their biological, open-space, aesthetic and other intrinsic values. It is further envisioned that this will be accomplished through long-term, coordinated and cooperative efforts which welcomes all stakeholders into the process. Progress will be guided by the following principles and values (not listed in order of priority):

1. Inclusion and Mutual Respect.

All interested and affected parties, groups, individuals, and organizations (stakeholders) are welcomed as partners in achieving sage-grouse and sagebrush conservation through a process that is committed to understanding and respecting a diversity of opinions and values among stakeholders.

2. Local, State, Agency and Group Initiative and Leadership.

The principle of acting locally is the foundation of this Strategy and is fundamental to sage-grouse and sagebrush conservation. Perspectives, needs, abilities, and resources differ across the range and between the parties involved in sage-grouse and sagebrush conservation. It is important for each group and individual to be informed about range-wide goals and objectives and then to take the initiative to find and commit resources to achieve local conservation goals.

3. Commitment to Monitoring and Adaptive Management.

Progress towards long-term population and habitat distribution goals can only be evaluated if projects and activities are accurately monitored over time. It is incumbent upon all entities involved in sage-grouse and sagebrush conservation to establish goals and objectives for each activity and to establish effective monitoring programs concurrent with each project. Over time, monitoring results will provide the information needed to adapt activities, protocols and, processes to effectively and efficiently achieve established goals. It is incumbent upon all entities to not only collect monitoring information but also to then appropriately adapt programs based on monitoring data.

4. Commitment to Continued Cooperation and Coordination.

Cooperation and coordination between agencies, states, and groups has enabled unprecedented accomplishments in sage-grouse and sagebrush conservation planning. An example is the publication of the range-wide conservation status assessment. All parties involved in sage-grouse and sagebrush conservation are committed to continued cooperation and coordination and are willing to consider inclusion of new groups and organizations as full partners in conservation.

5. Functional and Productive Landscapes.

Although this Strategy is specific to sage-grouse, 350 species of flora and fauna occupy the sagebrush ecosystem (Connelly et al. 2004). Unfortunately a high proportion of these species are endemic and imperiled species (Connelly et al. 2004). Although sage-grouse conservation is the force behind this conservation effort, the success of this effort is dependent upon the success of sagebrush ecosystem conservation. Successful sagebrush ecosystem conservation must incorporate the values and functions of all the species of flora and fauna and all ownerships, which contribute to the stability and productivity of sagebrush ecosystems. To that end, sage-grouse will serve as a surrogate species for the conservation of sagebrush ecosystems (Appendix A).

6. Best Science and Scientific Integrity.

The conservation community is the beneficiary of over 50 years of scientific inquiry dealing with sage-grouse and the relationship of sage-grouse to sagebrush systems. It is incumbent upon the implementers of this Comprehensive Strategy to use knowledge to guide conservation actions and to direct future research. Conservation efforts must be firmly based in sound science or the "Best Available Science." Conservation activities should be grounded in the use of science reported in a variety of: peer-reviewed publications (e.g., Journal of Wildlife Management, Journal of Range Management, Ecology, Auk, Condor, etc.) Implementation can also refer to (in descending order of precedence) dissertations and thesis, peer-reviewed papers/reports; non-peer-reviewed papers/reports and finally popular literature. Conservation efforts should be framed as a management experiment with careful collection of data and evaluation of the effectiveness of these experiments so these efforts can add to the body of science.

7. Range-wide Issues Forum

The Range-wide Issues Forum suggests that the guiding principle of sage-grouse and sagebrush conservation should be to: 1) protect what we have, 2) retain what we're losing, and 3) restore what has been lost: ranked in descending order of importance because it is easier, cheaper and success is more likely to be achieved if conservation involves protection of existing habitat and populations than it is to restore populations and habitat that have been lost.

Measures of Success

Range-wide Management

Sage-grouse conservation goals and range-wide management are guided by the delineation of sage-grouse management into seven distinct Management Zones. These Management Zones were determined by sage-grouse populations and sub-populations identified within seven floristic provinces (Fig. 1.2) (Connelly et al. 2004). Forty-one sage-grouse populations are distributed across seven floristic provinces. Greater and Gunnison sage-grouse management are encompassed in one Management Zone. (Fig.1.3). Floristic provinces (Connelly et al. 2004) were used to delineate Management Zones because they reflect ecological and biological issues and similarities, not political boundaries. In addition, the vegetation communities found in the floristic provinces, as well as the management challenges, within a Management Zones are similar and sage-grouse and their habitats are likely responding similarly to environmental factors and management actions.

The Management Zones include:

Management Zone I: Great Plains Management Zone (GPMZ)
- *Includes the states and provinces of Montana, Wyoming, North Dakota, South Dakota, Saskatchewan, and Alberta.*

Management Zone II: Wyoming Basin Management Zone (WBMZ)
- *Includes the states of Idaho, Wyoming, Utah, and Colorado*

Management Zone III: Southern Great Basin Management Zone (SGBMZ)
- *Includes the states of Utah, Nevada, and California*

Management Zone IV: Snake River Plain Management Zone (SRPMZ)
- *Includes the states of Idaho, Utah, Nevada, and Oregon*

Management Zone V: Northern Great Basin Management Zone (NGBMZ)
- *Includes the states of Oregon, California and Nevada*

Management Zone VI: Columbia Basin Management Zone (CBMZ)
- *Includes only the state of Washington*

Management Zone VII: Colorado Plateau Management Zone (CPMZ)
- *Includes the states of Colorado and Utah and considers greater and Gunnison sage-grouse.*

Management Zones I, II, IV, and V encompass the core populations of greater sage-grouse and have the highest reported densities (Fig. 1.4) (Connelly et al. 2004). Management Zone VII includes Gunnison and greater sage-grouse. Management Zone III encompasses lower densities in the Columbian Basin while dispersed numbers exist in Management Zone VI. Gunnison sage-grouse are partitioned from small greater sage-grouse populations associated in the Colorado Plateau.

Definition of Success

Connelly et al. (2004) conducted an assessment of current population distribution and long-term maximum counts for males on active greater sage-grouse strutting grounds from 1965 – 2003 for each Floristic Province (Management Zone). Their analyses suggested significant long-term declines for 5 of the 7 Management Zones (Management Zones I, II, III, IV, and VI) (Table 1.1). The remaining 2 Management Zones (V and VII) remained statistically unchanged (Connelly et al. 2004). The Strategy treats the Assessment analysis as a reference period upon which future analyses of population trends will be compared. This reference period was selected for the following reasons: 1) this was the interval used in the analyses of Connelly et al. (2004) and as such has an established record of evaluation; 2) a broad time interval reduces the potential problems that selection of a specific and/or “unusual baseline year” would cause in future analyses; and 3) the selection of a relatively large baseline period incorporates ‘natural’ variability of populations. Therefore, the overall objective of the range-wide Strategy is to produce and maintain neutral or positive trends (Table 1.1) in populations and maintain or increase the distribution of sage-grouse in each Management Zone.

The Strategy foresees coordinated and cooperative implementation of actions within each Management Zone that will, over time, alter the slope (Table 1.1) of each Management Zone population trend line in a positive manner. Each Management Zone will define success based on the data from that zone. Definitions of success within a specific Management Zone may change over time as population monitoring techniques or management status change. As population trends within each Management Zone respond long-term success can be judged based on comparisons with data from the 1965-2003 period for that specific Management Zone.

This strategy recognizes that local and/or statewide plans may have more or less ambitious goals than this, perhaps with accompanying efforts to establish and/or expand populations to pre-1965 levels. Consequently, the overall goal of the range-wide Strategy should be considered 'minimal' and not necessarily 'optimal'. Although an optimal range-wide goal would consider population and/or distribution targets that predate the 1965-2003 reference period, there are many range-wide realities such as 'permanent' habitat loss, which would preclude this type of recovery and/or make it unrealistic on a scale this large.

Periodic assessment periods for analysis of the Strategy will occur at 5, 10, 15, 20, 25, and 30 years following publication. Periodic assessments will require an analysis of data using the same methods as Connelly et al. (2004). In addition, this Strategy encourages the use of new or more sophisticated population monitoring or trend analyses techniques developed in the future.

Gunnison sage-grouse are included in Management Zone VII, but were not used in the regression analyses provided by Connelly et al. (2004). The Gunnison Sage-grouse Range-wide Conservation Plan (RCP) offers a rationale for conservation targets for each Gunnison sage-grouse population. Recommended strategies are provided for habitat protection, habitat improvement, and population management. Local conservation targets were established by analyzing the modeled population capacity (Table 1.2). These conservation targets were accepted cooperatively by the agencies that developed the RCP.

Organization and Format

The strategy is organized into 9 chapters. Chapter 1 serves as the introduction to the Strategy and includes background information, a vision statement, a listing of guiding principles, information on organization and format and a list of acronyms used in the report. Chapter 2 summarizes community, state, agency and range-wide conservation strategies. Chapter 3 outlines strategies and protocols for effective monitoring of populations and habitat to determine the effects of conservation activities and projects. Chapter 4 deals with monitoring the implementation of conservation strategies. Chapter 5 addresses research priorities and the needs and opportunities for incorporating improved technology in sagebrush and sage-grouse conservation and management. Chapter 6 sets forth both short-term and long-term funding strategies. Chapter 7 deals with effective communication as an aid to conservation. Adaptive management protocols are discussed in Chapter 8 and the schedule for conservation activities is outlined in Chapter 9.

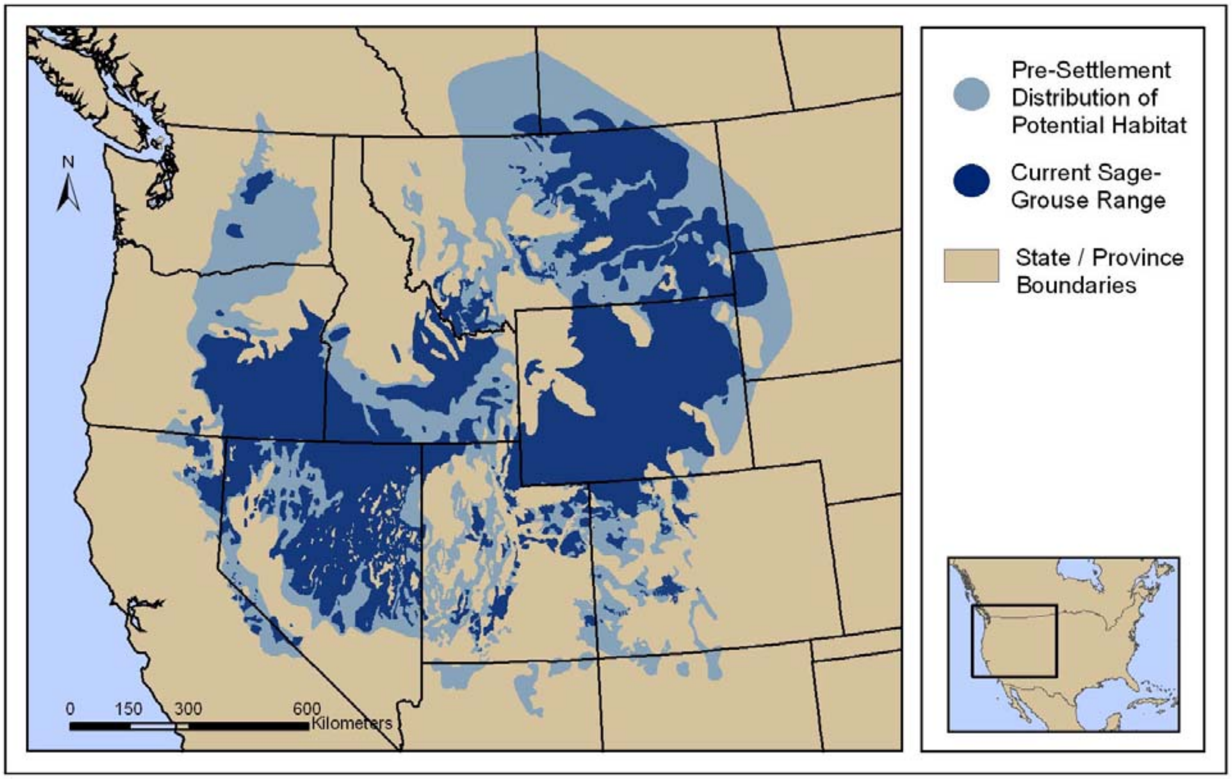


Fig. 1.1 Current distribution of sage-grouse and pre-settlement distribution of potential habitat in North America (Schroeder et al. 2004). For reference, Gunnison sage-grouse in southeastern Utah and southwestern Colorado are shown.

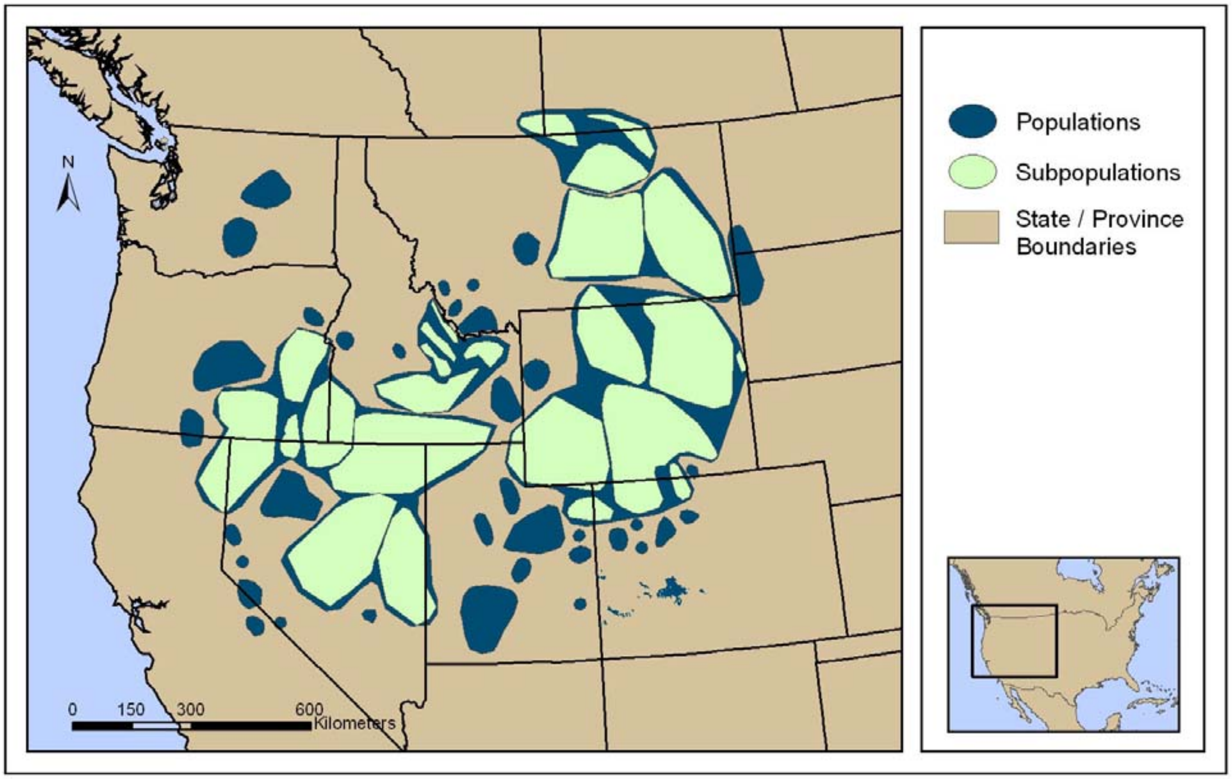


Figure 1.2. Greater sage-grouse population and subpopulations identified in Connelly et al. (2004).

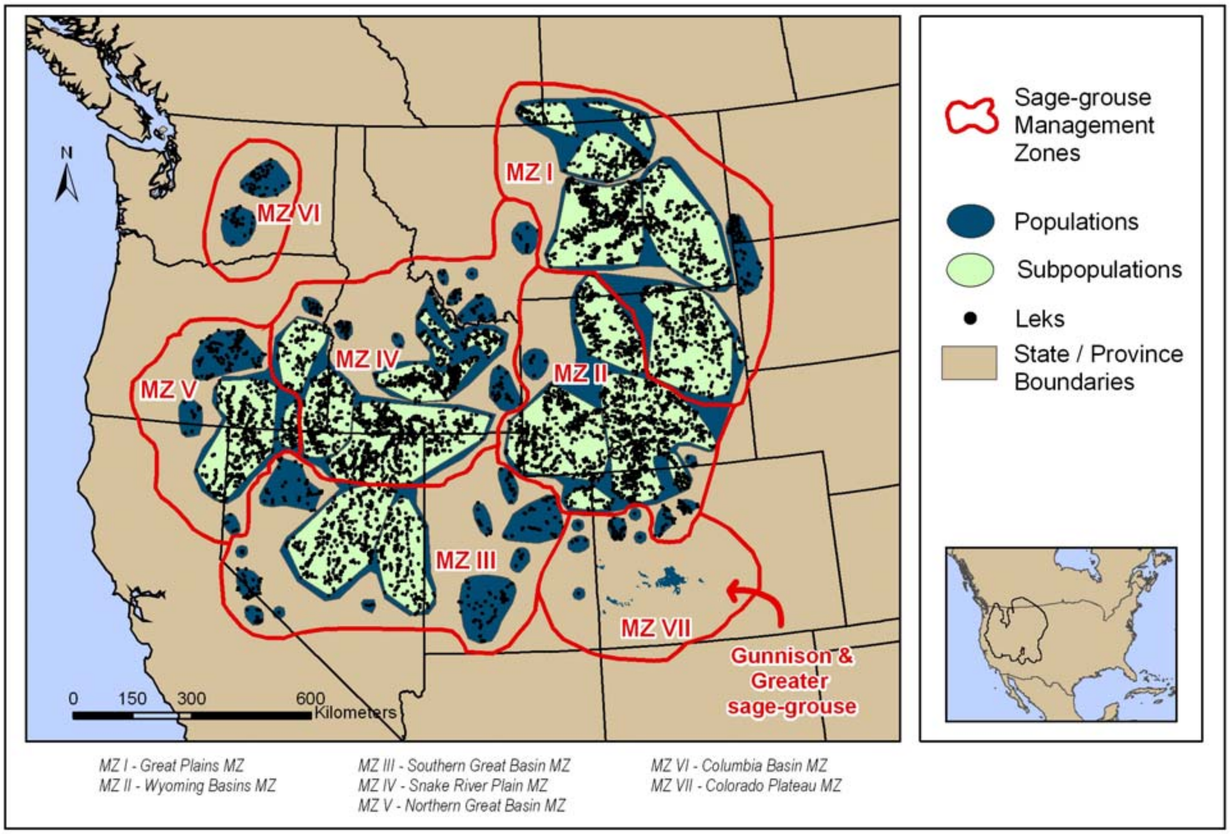


Figure1.3. Greater and Gunnison sage-grouse Management Zones outlined in North America.

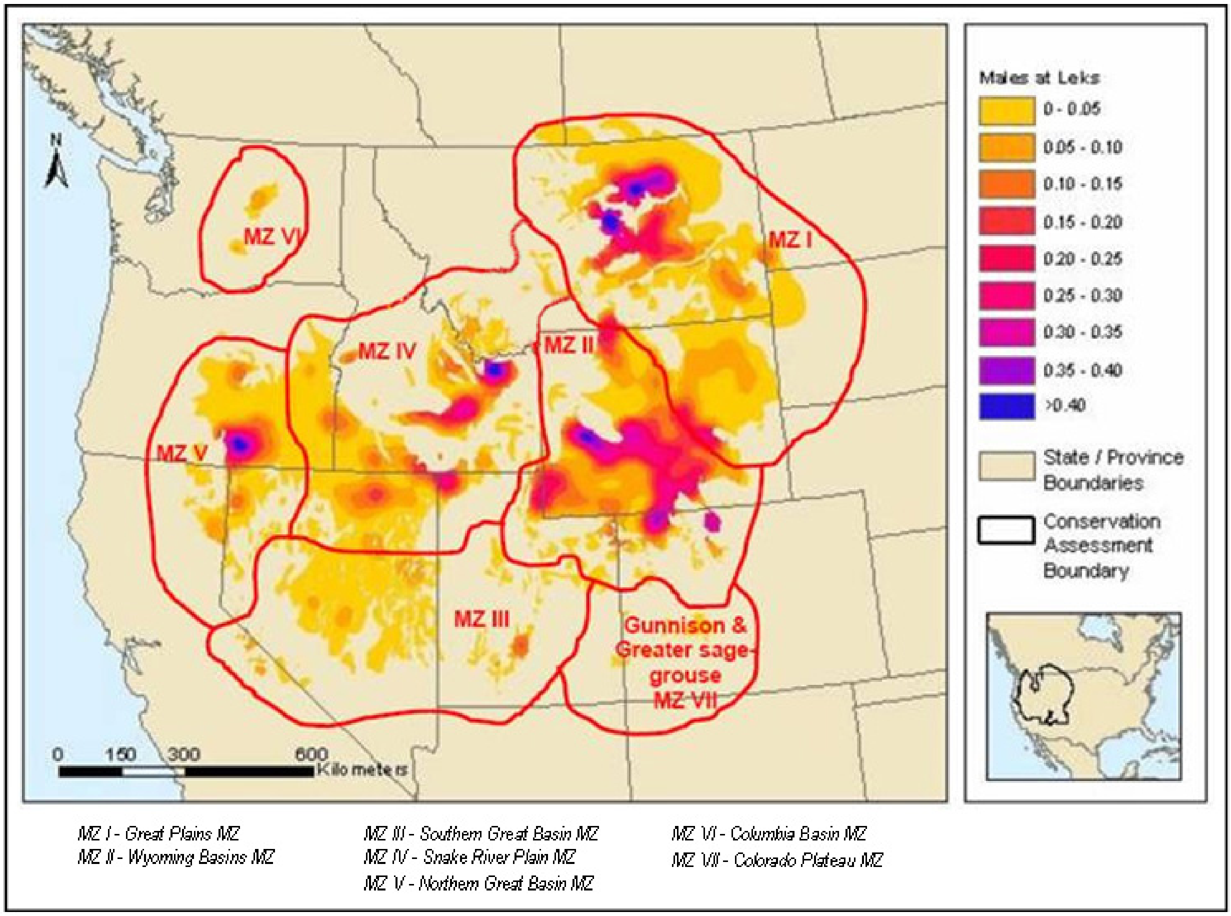


Figure 1.4. Greater and Gunnison sage-grouse Management Zones outlined in North America with associated strutting male densities.

Table 1.1 from Connelly et al. 2004 and Table 6.23 in Gunnison Sage-grouse Range-wide Plan (Gunnison Sage-grouse Range-wide Steering Committee. 2005.) Summary table for regression analysis of maximum counts for active leks between 1965 and 2003 by floristic region. Significant slopes are in **bold** type**.**						
Floristic Region	Management Zone	Intercept	Slope	*r2*	***F***	*P*
Great Plains	**MZ I**	**284.68**	**-0.133**	**0.006**	**43.174**	**< 0.001**
Wyoming Basin	**MZ II**	**823.28**	**-0.400**	**0.021**	**267.520**	**< 0.001**
Snake River Plain	**MZ IV**	**1042.85**	**-0.510**	**0.038**	**275.509**	**< 0.001**
Columbia Basin	**MZ VI**	**421.31**	**-0.201**	**0.012**	**6.404**	**0.018**
Northern Great Basin	MZV	35.62	-0.004	0.000	0.004	0.950
Southern Great Basin	**MZ III**	**509.30**	**-0.245**	**0.013**	**46.438**	**< 0.001**
Colorado Plateau	MZ VII	-239.63	0.126	0.014	1.904	0.170

Table 1.2. Table 32 in Gunnison Sage-grouse Range-wide Plan (Gunnison Sage-grouse Range-wide Steering Committee. 2005 See http://wildlife.state.co.us/wildlife/speciesofconcern/birds/gunnisonconsplan.htm)
Occupied, vacant, and potential habitat, modeled population capability, recent population size, and future population target, by GUSG population.

Population	**Occupied [3]**	**Vacant [4]**	**Potential [5]**	**Occupied [6]**	**Occupied + Vacant**	**Occupied + Vacant + Potential**	**Males**	**Total**	**Future Target**
Gunnison	530,464	22,879	157,240	(620) 3,039	(647) 3,174	(836) 4,099	605	2,968	3,000
Crawford	34,908	18,136	61,848	(25) 122	(47) 229	(121) 593	40	196	275
San Miguel	85,999	41,360	61,783	(86) 423	(136) 666	(210) 1,030	62	304	450
Dove Creek	26,907	52,747	237,492	(15) 75	(79) 385	(364) 1,783	30	147	200
Monticello, UT	59,579	56,824	75,285	(54) 267	(123) 602	(213) 1,045	37	182	300
Piñon Mesa	24,185	63,584	136,361	(12) 59	(88) 433	(252) 1,236	26	128	200
Poncha Pass	14,781	0	27,794	(1) 4	(1) 4	(34) 167	8	39	75
Cerro Summit - Cimarron - Sims	37,145	4,874	20,462	(28) 35	(33) 164	(58) 284	7	34	TBD

[1]Estimated from regression of occupied habitat vs. population estimate derived from high count of males.

[2] Based on multiple-year average of lek counts with comparable sampling effort; time period for each population same as habitat model (see pp. 186-187).

[3] Acreage of habitat within each population thought to be occupied by sage-grouse, as delineated by local biologists. Vegetation classes that are used by grouse were selected by local biologists within occupied range boundary.

[4]Acreage of apparently suitable habitat that is not currently known to be occupied habitat, as delineated by local biologists.

[5] Acreage of habitat that could, with intensive management, be suitable for sage-grouse, as delineated by local biologists.
[6] Population estimate converted from average of recent lek counts as: (average number of males/0.53) + [(average number of males/0.53)*(1.6)]; (see pg. 45).

Chapter 2
Conservation Planning Sub-Strategy

CHAPTER 2

Conservation Planning Sub-Strategy

Introduction

The long-term conservation of greater sage-grouse requires the integration and implementation of several completed and on-going conservation planning efforts. This chapter outlines these key conservation planning efforts, including the results from the Range-wide Greater Sage-grouse Issues Forum. This chapter also identifies a range of options for some specific conservation needs. Specific strategies are not detailed, as local conditions will necessarily dictate workable options. However, these general strategies will assist in outlining objectives and courses of actions, and offer specific examples were available.

The Conservation Sub-strategy is comprised of multiple conservation planning documents that articulate specific actions considered necessary to conserve greater sage-grouse. These include the following:

- Community-based Conservation Plans (Local Plans)
- State and Provincial Conservation Strategies and Plans (State/Provincial Plans)
- Canadian Sage Grouse Recovery Strategy (Canadian Strategy)
- Greater Sage-grouse Range-wide Conservation Issues Forum Report (Forum Report)
- BLM National Sage-grouse Habitat Conservation Strategy (BLM Habitat Strategy)
- Tribal conservation strategies and plans (Tribal Plans)
- Facilitating Objectives

The Forum Report, BLM Habitat Strategy, Canadian Strategy and most State/Provincial Plans have been completed and are in various stages of implementation. Colorado's greater sage-grouse conservation plan is projected for completion in June 2007, South Dakota's for January 2008. Many Local Plans are still in development. Most are expected to be completed by December 31, 2008. Known completion dates for all Local Plans are shown as part of Table 2.1.

The Facilitating Objectives supplement, and are tiered to, the objectives developed by the Forum. They represent additional actions necessary to meet conservation needs, or provide additional details, that are not specified in the previous documents, or for which conservation measures still need to be identified. In this document, the Facilitating Objectives are located Appendix C3A. Each Facilitating Objective was developed using the same Issue/Problem Statement template employed in the Forum process.

Many actions described in this and the other Sub-strategies are already being implemented. Some, such as certain management framework actions set forth under Goal 1 of the BLM Habitat strategy, have already been completed. Others, particularly long-term repetitive needs such as budget development, policy coordination within and across agencies, habitat and population monitoring and evaluation, and information sharing, will be long-term commitments. Tracking the implementation and status of all of these actions is covered in the Implementation Monitoring Sub-strategy.

Defining and Ranking Issues

Since the mid-1990s, when substantial concerns began to emerge regarding sage-grouse population trends, a spectrum of issues potentially affecting sage-grouse was identified. Subsequent analysis and planning efforts determined that, although some issues may be significant at one scale, they may not necessarily be significant at one or more other scales. Using predation as an example, some local conservation plans have identified predation as a significant threat to population persistence. However at the range-wide scale, the Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats (Connelly et al., 2004), as well as the expert panel convened by the Fish and Wildlife Service to address threats identified in ESA listing petitions, determined that predation is not a significant threat to sage-grouse. Similarly, although livestock grazing occurs throughout the range of sage-grouse, it is not possible to categorically characterize its effects on sage-grouse on a range-wide basis.

As a consequence, no attempt was made to rank the range-wide issues analyzed in the Conservation Assessment, the Forum report, nor this document. Ranking of issues identified in local and regional plans needs to be based on local data and information. However, the same issues discussed by the expert panel and detailed in the January 2005 greater sage-grouse listing decision made by the U.S. Fish and Wildlife Service were ranked in a range-wide and an East-West regional context (western - Management Zones III, IV, V, and VI and eastern - Management Zones I, II, and VII), and readers may want to review those rankings (Appendix D).

Issues that were not developed in detail by the Forum, or are not appropriate for range-wide or regional recommendations are discussed in further detail under Facilitating Objectives.

Relationship of State/Provincial Plans, Local Plans, and the Range-wide Strategies

Sage-grouse conservation planning efforts are being implemented at multiple levels (range-wide, state, and local). The variety of planning efforts and the similarity of terms used to describe these efforts have resulted in some confusion over the relationships among these efforts. The following is intended to provide some clarification.

Local Plans are the foundation for range-wide conservation of greater sage-grouse. It is through implementing the actions in Local Plans that projects and other actions of most immediate benefit to sage-grouse will accrue. State/Provincial plans provide a supporting framework that facilitates the development and implementation of Local Plans. State plans identify threats, issues, opportunities and other considerations to consider in local conservation planning and State/Provincial plans address issues and needs that cannot adequately (because of scale limitations) be considered at the local scale. Range-wide strategies address issues and needs that cannot be adequately addressed at local, state, and provincial scales, and include consideration of sub-populations, populations, and eco-regional scale issues involving more than one state or province.

Existing Conservation Strategies

Local Plans

The formalization of locally-based conservation planning had its beginnings in the 1996 sage-grouse conservation MOU among WAFWA member agencies (Appendix B), wherein one of the objectives of the MOU was to "develop strategies using cooperative partnerships to maintain and enhance the specific habitats used by sage grouse throughout their annual cycle." Among the suggested actions in the MOU was the "development of cooperative partnerships with private, state, and federal land managers." The cooperative partnerships objective was restated in a 1999 WAFWA MOU that strengthened 1996 MOU objectives and actions, including "continuation of the development of Conservation Plans based on the local working group concept."

Local Plans encompass logical population or subpopulation units of sage-grouse, and generally contain site-specific provisions for managing activities and land uses within sage-grouse habitat. They provide the foundation for making decisions of the most immediate consequence to sage-grouse and their habitats at local scales. Depending upon configurations, over 50 distinct planning areas will eventually be covered by Local Plans (Table 2.1).

Local plans are primarily developed as action or tactical plans. The participants in these efforts were tasked with developing projects or conservation efforts that would address proximal conservation concerns. Therefore, although considerable strategic thinking is embedded in the local conservation efforts, strategies are not necessarily formally identified.

No formal guidelines for conducting the development of either Local Plans or State/Provincial Plans were developed under the MOU, and each WAFWA State or Province engaged in a process it felt appropriate for the task. One result of such a variable approach is that direct comparison of issues and related specific actions among plans is not always possible. (Table 2.2).

State/Provincial Plans

Like Local Plans, the range-wide development of State/Provincial Plans had its genesis in the 1996 MOU, which called for "Preparation of Conservation Plans." Saskatchewan does not have a Provincial plan, but is operating under the provisions of the Canadian Sage Grouse Recovery Strategy and the Alberta Greater Sage-grouse Recovery Plan. Colorado and Utah have completed a Gunnison sage-grouse range-wide plan. When all State/Provincial Plans for greater sage-grouse have been completed, they will encompass all greater sage-grouse habitat within their respective State/Provincial boundaries. Because greater sage-grouse inhabit limited areas of California that are contiguous with sage-grouse habitat in Nevada, and grouse move between Nevada and California, a Bi-State plan was prepared to address the conservation needs of the bi-state populations.

Conservation strategies developed by states, provinces and local working groups are articulated in the specific plans. Table 2.2 identifies issues and corresponding plans containing strategies to address those issues.

Canadian Strategy

In July 2001, the Canadian Sage Grouse Recovery Strategy (Canadian Strategy) was released. The stated goal of the Canadian Strategy is "… to recommend measures which will enable the sage grouse population in Alberta and Saskatchewan to recover to self-sustaining levels so that the species is not threatened or endangered."

The following is excerpted from the Preface to the Canadian Strategy:

> *The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) listed sage grouse in Canada as threatened in 1997 and, after further review, changed the status to endangered in 1998. The provinces of Saskatchewan and Alberta jointly formed a Sage Committee (RENEW) process in November 1997. The Recovery Team is composed of representatives from government (provincial and federal), land managers, landowners, conservation organizations and industry from Saskatchewan and Alberta. Although outside of the RENEW process, the Recovery Team adopted the evolving RENEW concept for development of recovery plans. This Recovery Strategy reviews the background and status of sage grouse in Canada, establishes goals and objectives and provides recommended strategies for population recovery.*

Prior to release of the Canadian Strategy, the Canadian Sage Grouse Recovery Team "initiated the formation of Working Groups to develop Action Plans to convert recommended strategies into initiatives and activities directed at accomplishing recovery goals and objectives."

U. S. Federal Government Agencies

Three federal agencies, the USDI Bureau of Land Management (BLM), USDI Fish and Wildlife Service, and USDA Forest Service formally engaged in range-wide sage-grouse conservation planning efforts in 2000 by entering into a Memorandum of Understanding with WAFWA. Since 2000, the USDA Natural Resources Conservation Service, and Farm Service Agency, and USDI Geological Survey, USDI National Park Service, Department of Defense, and USDI Bureau of Reclamation have become active participants in sage-grouse conservation activities, contributing financial and technical resources. The BLM is the only federal agency that has prepared a formal strategy to address sage-grouse conservation for lands and programs it administers. However, as noted in the discussion in Chapter 5, the Conservation Reserve Program (administered by the Farm Service Agency) has been shown to be important for sage-grouse in localized areas. Given the universality of this program throughout the range of the species, this program may provide expanded conservation opportunities in the future.

BLM National Sage-grouse Habitat Conservation Strategy. The Bureau of Land Management manages over half of all remaining sagebrush habitat in North America (Figure 2.1), and slightly less than half of all remaining sage-grouse habitat. That the proportion of sagebrush and sage-grouse habitat administered by the BLM is approximately half of each is coincidental, because clearly not all sagebrush habitats are sage-grouse habitat. Geographically, sage-grouse habitats administered by the BLM span all 11 states in which greater sage-grouse occur, putting BLM in the position of having the greatest management influence throughout a substantial part of the species range. Because of having such a key role in managing sagebrush inhabited by sage-grouse, the BLM developed its National Sage-grouse Habitat Conservation Strategy to guide future actions for conserving sagebrush habitats, and to enhance BLM's ongoing conservation efforts.

The BLM Habitat Strategy was issued in November 2004, and provides for conservation efforts by setting out broad goals and specific actions to meet the goals. Integral to the BLM Habitat Strategy are guidance documents to help ensure that sage-grouse conservation measures are incorporated into all ongoing BLM programs and activities, including land use planning, grazing, mineral leasing, and other programs.

The BLM Habitat Strategy articulates four main goals. Each goal specifies tiered strategies and actions the BLM will take 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.

In addition to meeting internal management and administration needs, many products resulting from the BLM Habitat Strategy have much broader application for sagebrush and therefore sage-grouse conservation, generally, and are the result of partnership endeavors. Examples include broad and mid-scale mapping of sagebrush communities, ecoregional assessments, procedures for describing sage-grouse habitat at multiple scales, and best management practices (BMP) for managing resource use and development in sage-grouse habitats.

The BLM Habitat Strategy notes that 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. It recognizes that sagebrush conservation requires national level policy, national and local program commitment, and local and regional knowledge and support. Annually, the BLM reviews progress being made in implementing the strategy and uses the information in support of budget development, work planning, and accomplishments reporting.

Tribal Strategies

Tribal participation in the sage-grouse conservation effort has been encouraged since the formation of the first local conservation working groups. Tribal participation was originally envisioned through participation and coordination with local working groups and with the state and provincial planning groups. The various tribes with sage-grouse resources have participated to varying degrees in these efforts, based upon individual tribal interests. Some tribes have participated in the formal LWG process and state or provincial processes but have interest in developing their own sage-grouse conservation plans. At the present time WAFWA is not aware of any tribe specific plans that have been completed. However several tribes have working drafts and are in the process of having these plans endorsed by their respective governments.

Native American participation in the overall sage-grouse planning effort has been significant. Tribal and individual perspectives regarding sage-grouse transcend basic demographic values and encompass deeply held cultural and historical values.

Greater Sage-grouse Range-wide Issues Forum

The Greater Sage-grouse Range-wide Issues Forum (Forum) was convened in November 2005 to facilitate collaborative approaches in addressing issues, needs, opportunities, strategies and partnerships related to the conservation of greater sage-grouse and sagebrush habitats at the range-wide scale. The Forum was sponsored by the Western Association of Fish and Wildlife Agencies.

In an effort to ensure the Forum was neutral and impartial, and to facilitate effective interaction among a diverse representation of stakeholder interests, WAFWA contracted with the U.S. Institute for Environmental Conflict Resolution (U.S. Institute) to organize and convene the Forum. The U.S. Institute is an independent federal agency that assists parties in resolving environmental, natural resource, and public lands conflicts through assisted negotiation and mediation. A Forum Facilitation Team comprised of the U.S. Institute's Dr. Larry Fisher and Susan Hayman, of North Country Resources, Inc., designed, facilitated, and documented the Forum process.

Thirty-five people were selected by the Facilitation Team to participate in the Forum process, representing the broad array of perspectives related to greater sage-grouse conservation. Participants were chosen based on their experience, background, and knowledge of greater sage-grouse conservation issues, their interest and willingness to participate in this intense process, and their ability to work collaboratively and constructively in developing strategies to address range-wide issues. Participants were not selected to be formal representatives of individual organizations or constituencies, and were not expected to be official signatories to the Forum report or recommendations. However it was understood that, throughout the Forum process, participants were expected to provide ongoing communication and exchange of information and ideas with people or groups that share similar interests

The Forum deliberations addressed greater sage-grouse and related sagebrush habitat issues at the range-wide scale, dealing with issues at scales that cannot be adequately addressed at local, state, and provincial scales. By definition for this process, the range-wide scale may include sub-population, population, and eco-regional scales when these scales involve multiple jurisdictions. The Forum's range-wide findings are consistent with, and may be informative to, conservation actions identified in the other plans, described above. The Forum report in its entirety can be found in Appendix C.

Defining Range-wide Issues

Once the issue categories and the sub-issues within them were identified by Forum participants, work groups for each issue category were established. Forum work groups developed problem statements for each sub-issue that helped define the scope of the issue for strategy development. Range-wide strategies developed by work groups included, to the extent possible, desired conditions, goals, objectives, implementation, and monitoring information. Preliminary draft strategies were vetted with all Forum participants and refined as appropriate within the allotted time. A summary of the issues addressed by the work groups follows (also see the complete Forum Report, Appendix C and Appendix C2). To facilitate working through the long list of sub-issues identified as potential concerns, the Forum grouped the sub-issues into separate categories. Although several sub-issues spanned more than one category, all facets of the sub-issue are discussed. As an example, fire was addressed under habitat restoration, but the impacts of fire suppression were also considered.

Habitat Conservation and Land Use. Greater sage-grouse currently occupy approximately 56 percent of the historically occupied range of the species (Connelly et al. 2004). The loss of 44 percent of greater sage-grouse range and the fragmentation/habitat degradation of remaining range poses great challenges for the perpetuation of the species.

Sub-issues identified by the Forum:

- Conservation and protection of habitats.
- Invasive plant species.
- Livestock grazing.
- Agricultural lands.
- Fences.
- Surface hydrology.
- Energy corridors.
- Roads and railroads.
- Tall structures (*e.g.*, transmission lines, wind turbines, communication towers, etc.).
- Urban/exurban development.
- Dispersed recreation.
- Non-renewable energy (including oil, gas, coal-bed methane, geothermal, and metallic and non-metallic minerals)

Habitat Restoration. Critical elements of the effort to ensure continued existence of greater sage-grouse are the conservation of important habitat and the technical capability of reliably restoring degraded habitat. This capability includes not only ecologically sound treatment techniques and management practices, but also the production and availability of genetically appropriate plant materials.

Sub-issues identified by the Forum:

- Conifer encroachment.
- Range-wide habitat restoration assessment and planning.
- Native seed availability.
- Planting expertise.
- Fire.

Science, Data Management, and Information. The *Conservation Assessment* and the *12-Month Finding* identified numerous instances where lack of definitions, data and metrics pose great difficulties for identifying greater sage-grouse needs and ways to recover their habitat and populations. In addition to the lack of data and information, there is currently no mechanism for efficiently housing and distributing information among the many agencies, organizations, and individuals involved in greater sage-grouse conservation.

Sub-issues:

- Standardized vegetation and other data layer base map and access system.
- Definition of success for greater sage-grouse conservation.
- Evaluating social and economic effects of human activities on greater sage-grouse and habitat persistence.
- Ability to predict population outcomes/habitat as a result of vegetation change.
- Range-wide research and monitoring collaboration and coordination.

Regulatory Mechanisms. It may be difficult to effectively implement conservation actions for greater sage-grouse due to inconsistent and inadequate application of regulations within and among agencies. Emerging science also suggests that some regulations result in unforeseen or unwanted impacts on greater sage-grouse and their habitat (e.g., regulations that address specific habitat desired conditions or methods to achieve them). Incentive-based conservation solutions are limited.

Sub-issues:

- Inconsistent and inadequate application of existing regulations and policies.
- Adequacy of regulations.

Integration and Coordination across Range and Jurisdictions. Lack of coordination of policies, programs and regulations to address issues related to greater sage-grouse within and among agencies at national, regional, state, and local levels has adversely affected greater sage-grouse conservation. Current approaches do not facilitate coordinated planning, and implementation and evaluation of plans that integrate the issues and address cumulative effects. There are currently insufficient opportunities to share scientific findings, management information, and lessons learned among local working groups and other greater sage-grouse stakeholders. This condition could impede implementation of actions that benefit greater sage-grouse.

Sub-issues:

- Current approaches.
- Insufficient opportunities to share scientific and management information and learning among local working groups and other sage-grouse stakeholders.
- Inconsistency in policy and coordination across jurisdictional boundaries.

Forum Identification of Critical Needs

A six-member "Integration Team" comprised of a diverse set of volunteers from the Forum helped synthesize the extensive output from the working groups and identify highest priority actions. The Integration Team identified seven goals as high priority/critical needs for the immediate investment of resources range-wide:

- Create long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate greater sage-grouse conservation actions throughout the range.
- Locate and protect important and/or intact greater sage-grouse habitats ("save the best")
- Identify locations of priority areas on which to focus conservation actions to maintain the function of sagebrush ecosystems ("retain what we're losing").
- Institutionalize and expand long term existing natural resource information portals (e.g., SAGEMAP) for greater sage-grouse and sagebrush ecosystems to provide easy and dependable access to useful information. The information should include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, greater sage-grouse information, surface geology and hydrology data, guidelines, techniques, best management practices, and other critical data and information for greater sage-grouse and sagebrush conservation through an accessible central repository.
- Develop and implement a coordinated program of research and monitoring projects integrated within the context of the landscape. Monitoring efforts should address the effects of human activities and natural events on greater sage-grouse and sagebrush habitat. Monitoring results can then provide the foundation for adaptive management.
- Develop and implement grazing systems and management practices that maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community to address long-term needs of greater sage-grouse and other sagebrush associated species.
- Create a mechanism for sharing information among LWGs and all levels of those involved in sage-grouse conservation to enable measurement of cumulative effects on sage-grouse habitats.

Additional goals were identified as regionally important for the western (Management Zones III, IV, V, and VI) and eastern (Management Zones I, II, and VII) regions of the range, respectively.

West

- Contain and suppress wildfires in important greater sage-grouse habitats.
- Manage dispersed recreational activities to avoid, reduce and, where possible, eliminate displacement of greater sage-grouse or negative impacts to greater sage-grouse habitat.
- Identify known locations, and areas of future risk, for the top priority invasive plant species.

East

- Provide for non-renewable resource development and utilization with the assurance of 'no net loss' of sagebrush habitat or greater sage-grouse populations at appropriate spatial and temporal scales.
- Develop and use consistent criteria and management guidelines to locate/site, energy corridors, and operate and maintain new and existing facilities within energy corridors in a manner that minimizes impacts to greater sage-grouse and sagebrush habitat.
- Develop and implement technologies and practices that offset, reduce and/or minimize disturbance to greater sage-grouse and their habitat associated with non-renewable resource recovery activities.
- Develop and implement best management practices and appropriate mitigation measures that can be implemented for siting and operation and maintenance activities associated with energy corridors.

The Forum participants finally identified three essential resources needed to take this work forward: (1) funding, (2) leadership committed to organizing, supporting and guiding a long-term effort, and (3) the appropriate organizational structure to sustain it.

Forum participants agreed that the first critical step was to request the Western Governor’s Association (WGA) and appropriate federal, state, and local agency heads with budget authority to include significant funding for greater sage-grouse strategy implementation in their 2008 budgets. Members of the forum independently contacted the WGA and appropriate agency leaders and requested that funds be allocated, in the next budget cycle, for sage-grouse conservation efforts identified by the forum. The second critical step toward successful implementation of a range-wide strategy for greater sage-grouse is to establish an executive committee of federal, state, and local agency heads who have the authority to make decisions regarding allocation of resources for strategy implementation, such as funding, personnel and priorities. Lastly, the third critical step is to convene, on a regular basis, a group of representatives of diverse interests to provide counsel and advice to the executive committee regarding strategy implementation.

Unresolved Conservation Issues

Information about these issues provided by the Conservation Assessment was an important factor in the Forum's decision to not develop more in-depth recommendations to address the following issues. Given the complexity and variability of these issues across the range of greater sage-grouse, range-wide prescriptions for these issues cannot be developed. However, the following information is presented as a tool to increase understanding of these issues, and to direct users of these documents to on-going efforts and references that will facilitate the development of local plans.

As with all land management activities, regardless of land ownership, project planning needs to consider the local, landscape and cumulative effects of those activities on sage-grouse and sagebrush habitats. Early project planning should consider not only the amount of habitat affected, but changes to habitat quality, resulting fragmentation (if any), impacts to seasonal habitats and migratory pathways, effects of human presence and structures, noise levels, and other relevant considerations, with every effort made to design the project so as to minimize these impacts to the species and its habitat. Once designed, these project specifications must be enforced to realize any benefit to the species. Although project planning efforts and implementation, including compliance enforcement, will likely be a local responsibility, in many cases it will be appropriate to consider both the short and long-term impacts and effects of projects at larger scales, including the management zone level.

Reclamation of sagebrush habitats is an important component of this strategy. For clarity, reclamation is defined here to mean returning disturbed sagebrush habitats to a condition that will sustain sage-grouse populations either year-round or seasonally, as appropriate. Although an overall prescription for reclamation cannot be made here because soil types, weather patterns, topography, and other factors will dictate reclamation procedures and timing, several general principles can be identified here, such as the need to develop and provide a mechanism for distribution of native seed mixes, and sharing of technical information in reclamation practices. Some of these reclamation issues are shared with habitat restoration issues (e.g. seed sources for restoration of sagebrush after a large wildfire), and associated potential solutions are identified in the Range-wide Forum Report (Appendix C).

Energy Development:

Impacts of energy development were identified in the Conservation Assessment (Connelly et al. 2004). Data collected and made available to WAFWA since the release of the Conservation Assessment provides further information and are briefly summarized here. More detailed information is provided in Chapter 5, and the following referenced publications. Sage-grouse near natural gas fields moved twice as far as birds from undeveloped leks in search of undisturbed nesting habitat (Lyon and Anderson 2003), and nest initiation rates were lower. Unlike nests in disturbed landscapes (Lyon and Anderson 2003), distributions of sage-grouse nests in areas free of gas development were spatially related to lek location (Holloran and Anderson 2005). Closely spaced nests had lower success than isolated nets, suggesting that predation risk decreases the quality of otherwise suitable habitat when birds are forced to crowd nests into smaller areas to avoid energy development (Holloran and Anderson 2005). Male lek attendance decreased with distance to the nearest drilling rig (Holloran 2005). Male lek attendance also decreased as traffic volume from energy development increased. Number of males also declined when the lek was located downwind from a drilling rig, indicating that noise from energy development was likely a contributing factor. An analysis of male lek attendance rates suggests that extirpation of leks near energy development is the result of avoidance and decreased survival (Holloran 2005). In areas being developed for coal-bed natural gas, adjacent or concurrent leks showed lower population trends than leks with minimal or no development (Naugle et al. 2006a). Data analyses also indicated that sage-grouse in otherwise suitable winter habitat avoid energy development.

The above summarized information suggests that current temporal strategies to mitigate impacts of coal-bed natural gas development on wintering sage-grouse populations, and potentially breeding and nesting birds, may not be sufficient. Re-consideration of temporal strategies may be appropriate if supported by local information. Also, spatially explicit habitat prioritization tools that were produced in Naugle et al. (2006b), when coupled with local knowledge of bird movement and active lek locations, can provide a biological basis for decision-makers to formulate an effective conservation strategy for sage-grouse in areas undergoing energy development. Precluding development in refugia of identified and connected seasonal habitats may also present a viable strategy. As more information becomes available regarding the specific mechanisms affecting sage-grouse survival and productivity in and around energy development are identified, it should be incorporated into design of mitigation measures for greater sage-grouse.

Issue: Conserving sage-grouse populations in areas of energy development while continuing research to better understand effects of energy development on greater sage-grouse and sagebrush habitats		
Objective: Implement measures to protect greater sage-grouse and sagebrush habitats while facilitating research to better determine short- and long-term impacts of energy development on the species and its habitats.		
Conservation Strategy	Who (lead agency is in bold)	When
Utilize the most current scientifically-credible information available to develop and implement protective stipulations	**WAFWA**, BLM, USFS, State land agencies, NGO's, private landowners, local working groups	Ongoing
When making energy leasing and development decisions, utilize local greater sage-grouse information to assist in identifying areas to be	**BLM**	Immediately

protected from development		
Encourage and support future research on impacts of energy development on greater sage-grouse and apply adaptive management as appropriate	WAFWA, BLM, USFS, USFWS, NGO's, local working groups	Immediately
Encourage and support future research on habitat reclamation for greater sage-grouse, including seed mix development, for habitats affected by energy development and apply adaptive management as appropriate	**WAFWA**, USGS, BLM, USFW, State wildlife agencies, Cooperative extension offices,	Immediately

Hunting:

Since greater sage-grouse are under the management of state wildlife agencies hunting seasons are established independently in each state. The potential impacts of hunting on greater sage-grouse populations are discussed in the Conservation Assessment (Connelly et al. 2004). In general, hunting is not considered an additive mortality factor in areas where habitat is of sufficient quality and quantity. However, hunting may be additive where habitat is limited or degraded, or where other factors are limiting the population (e.g. West Nile virus outbreak). However, the determination on whether hunting should continue within a population must be made on a local level using biological data. The reader should reference the discussion in the Conservation Assessment for further detail.

Issue: Hunting should be managed to be a compensatory and not an additive source of mortality		
Objective: Identify where hunting should be restricted based on local population and/or habitat data		
Conservation Strategy	Who (lead agency is in bold)	When
Using local data, evaluate hunting strategies to determine if the resulting mortality and wounding losses are additive or compensatory to the populations. Apply adaptive management as needed based on these assessments.	**State Wildlife Agencies,** WAFWA	Ongoing

Livestock Grazing:

As detailed in the Conservation Assessment (Connelly et al. 2004), there are no definitive data that summarize the effects of livestock grazing on greater sage-grouse or sagebrush habitats on a range-wide basis. Regional effects vary according soil types, precipitation zones, elevation, etc., and local analyses of impacts must include stocking rates, type of livestock, season of use, grazing system, presence and use of an area by wild ungulates and wild horses, etc. Therefore, strategies for addressing potential affects of grazing on greater sage-grouse must be developed at the regional, and perhaps more effectively, local levels (and coordinated regionally).

One regional strategy that may provide a useful reference is the current and on-going development of grazing best management practices (BMPs), by the Western Association of Fish and Wildlife Agencies (WAFWA) and the Bureau of Land Management (BLM). The presentation of this information here does not imply endorsement of specific BMPs, but rather is presented as a potential tool that may be adapted for local purposes.

WAFWA and the BLM have agreed to work collaboratively in efforts to promote healthy rangelands and support both robust sage-grouse populations and sustainable livestock grazing. Because habitat conditions and land use issues may vary greatly in different regions of the west, sage-grouse managers decided that information would be more applicable if synthesized by ecoregion of floristic zones matching the sage-grouse management zones in the Strategy. The pilot project for this initiative is the Wyoming Basin and Southern Rocky Mountains ecoregions and was adapted from the Wyoming Basins Ecoregional Assessment study area and corresponds to Management Zone 2 in the Strategy (Figure xx). This area includes portions of Wyoming, Colorado, Utah, Idaho and Montana. The Wyoming Basin – Southern Rocky Mountains was chosen because it contains several large populations of sage-grouse. The pilot project area includes sagebrush communities and other areas within seasonal sage-grouse ranges across the ecoregion. These efforts are proposed to be expanded to the rest of the range of sage-grouse pending the success of this project. Primary cooperators in this effort include the Western Association of Wildlife Agencies, the Bureau of Land Management, and the Wyoming Department of Agriculture.

A literature review of livestock grazing effects in sagebrush ecosystems has been developed by the BLM National Science and Technology Center (NSTC) and will serve as the basis for a synthesis of the information for the Wyoming Basin and Southern Rocky Mountains to support sage-grouse conservation. The technical document will identify a menu of options for vegetation and grazing treatments grouped by seasonal habitat components for sage-grouse. The goal of the project is to consider livestock impacts on sagebrush ecosystems and associated livestock management actions, as identified in the literature, and provide reference tools that local working groups and land managers can utilize when making grazing recommendations to maintain and improve sage-grouse habitats, including riparian and upland areas. When completed, the synthesis and reference tool will be available to sage-grouse local working groups, wildlife managers, range managers and other land managers to assist in developing grazing management recommendations and in the case of landowners, voluntary grazing management actions.

A local effort being implemented by the State of Colorado within the range of the Gunnison sage-grouse incorporates creative grazing practices with the cooperation of both private and federal land managers. The effort is through a Candidate Conservation Agreement with Assurances (CCAA), and allows private landowners to incorporate conservation measures for Gunnison sage-grouse. These conservation measures are being carried to federal grazing leases via a Memorandum of Understanding between the BLM and private ranchers.

Issue: Livestock grazing impacts on sage-grouse habitat are not uniform across the range of greater sage-grouse and reflect local livestock grazing practices.		
Objective: Develop recommended livestock grazing practices that can maintain and enhance sage-grouse habitat and that reflect, as appropriate, local and regional concerns.		
Conservation Strategy	Who (lead agency is in bold)	When
Utilize the most current scientifically-credible information available to develop and implement livestock grazing practices that reflect local and regional conditions.	**WAFWA**, BLM, USFS, State agricultural and land management agencies (including extension offices), NGO's, private landowners, local working groups	Ongoing
Conduct research to further understand the effects of livestock grazing practices on sage-grouse habitats. Apply adaptive management as needed.	**WAFWA**, BLM, USFS, State agricultural and land management agencies (including extension offices), NGO's, private landowners, local working groups	Continuing

Incorporation of Private Lands into Conservation Efforts

Private land assurances, such as CCAAs, provided through the U.S. Fish and Wildlife Service (USFWS) present another option in developing efforts for greater sage-grouse where conservation on adjacent, intertwined, or otherwise connected lands and seasonal habitats is necessary to local population conservation. A CCAA is a voluntary agreement between USFWS and a non-Federal landowner. Through the CCAA development process conservation actions are identified to ensure a "net conservation benefit" to the species in question. In many, if not most cases a landowner's normal activities are incorporated into the CCAA agreement. If a species addressed under a CCAA is ever listed under the Endangered Species Act (ESA), the landowner's land use practices are not subject to ESA regulation as long as the agreement is in place. However, the CCAA program is a good mechanism to provide a landowner an incentive for sustaining or engaging proactive on-the-ground conservation actions on their property. Despite its name, a CCAA can be developed for those species which are not currently candidates for listing under ESA, but which are at risk throughout all or part's of its range. The legal mechanism by which a CCAA works is a Section 10 permit under ESA. Such a permit documents how a landowner is legally protected, or excepted, from ESA regulation.

An "umbrella" approach may be used to develop a CCAA. This provides for one group, such as a state agency or a conservation district, for example to hold the Section 10 permit, with the permit holder, not the Service, signing up landowners under their permit. This has been done successfully with other species. The advantages of this umbrella approach are that: (1) the Service processes the necessary legal and internal and public review documentation only once,

(2) the landowner is exposed to a relatively small amount of bureaucracy and the agreement and process is relatively straightforward and simple.

All of the examples detailed above emphasize the need for strong coordination and communication between private, state and federal partners. Development of partnerships and good lines of communication between all affected parties are essential for the success of any conservation effort, and should be the first step in developing these regional and local strategies.

Issue: There is an incomplete suite of incentive and other mechanisms for conserving sage-grouse on private lands.		
Objective: In cooperation with private landowners, local working groups and others, develop additional incentives and other mechanisms that promote sage-grouse conservation on private lands.		
Conservation Strategy	Who (lead agency is in bold)	When
Establish sage-grouse habitat conservation as a priority for CRP programs	**USDA, FSA**	2007
Explore other options for conserving sage-grouse and sagebrush habitats on private lands, such as conservation easements with willing landowners, etc.	**State wildlife agencies**, County extension offices, Conservation Districts	Immediately and ongoing

Issue: There is a substantial lack of knowledge of existing mechanisms for conserving sage-grouse on private lands		
Objective: Increase private landowner and local working group awareness of existing options for conserving sage-grouse on private lands.		
Conservation Strategy	Who (lead agency is in bold)	When
Through a variety of mechanisms, including printed materials, electronic media, personal contacts, and workshops, increase private landowner and agency personnel knowledge about existing conservation options for private lands	**USFWS, USDA-FSA**	Immediately
Explore and develop opportunities for developing CCAA's on private lands for sage-grouse conservation	**WAFWA**, USFWS	Initiate in 2007

Emerging Conservation Issues

The sage-grouse conservation partnerships that have developed conservation plans and efforts to conserve the species have considered a broad array of issues that affect population growth and distribution. Most of the issues identified have strategies to mitigate the negative effects of the issues. However, some issues have yet to be discovered, impacts unknown or underestimated or will emerge in the future. Examples of emerging threats include the spread of West Nile virus into sage-grouse habitat and the unknown impact of the current strain of bird flu on the species. Strategies must be developed that will address issues in a timely manner; depending upon the immediacy of the issue. The Forum recommended that WAFWA's Sage and Columbian Sharp-tailed grouse Technical Committee and Management Zone Teams to develop a process to address emerging risks to sage-grouse and sagebrush habitats, including alternatives for addressing risks that pose an immediate threat and risks that can be addressed in a structured review.

Recommendation for Off-Site Mitigation:

Off-site mitigation for greater sage-grouse is widely and consistently discussed across the species range as an option where land uses will likely result in any loss of sage-grouse habitat, regardless of whether the loss is short-term or permanent. This Conservation Strategy recommends that a range-wide off-site mitigation policy be developed and consistently applied using the following outline.

Off-site mitigation should occur within the same population area and within the state or province where the impact is realized due to the difficulty of re-establishing self-sustaining populations once they are extirpated (Reese and Connelly 1997) and state and provincial wildlife conservation laws. Additionally, losses of entire populations may result in the loss of genetic information that may not be re-captured through re-introductions from other areas (Oyler-McCance et al. 2005). Off-site mitigation should be focused on improving existing areas, and not simply protecting existing "refugia". Once the affected land area has been reclaimed to the point of supporting all seasonal needs of the local grouse population, additional lands may be developed. However, it is essential that this not occur before the successful reclamation and re-population of that reclamation. However, on a case by case basis, a state or provincial wildlife agency may choose to apply mitigation within state but out of population area when the state or provincial agency determines that a decision to apply mitigation out of population is in the best interest of sage-grouse.

If adequate refugia cannot be accomplished within an existing sage-grouse population area, then off-site mitigation should occur within the same Management Zone in which the affected population occurs. In this situation, mitigation should occur either geographically if the success of population re-establishment is the greatest and genetics are not an issue, or genetically if that is an important issue.

Off-site mitigation should not occur outside the management zone from which the affected population occurs due to the concern with genetic issues, and the recommendation of no net loss of habitat, as recommended by the Forum.

Translocations for management purposes may cross management zone boundaries when they are determined to be in conformance with prairie grouse translocation guidelines developed under the Facilitating Objective in this Strategy for such guidelines (Appendix C3A, Integration and Coordination Across Range and Jurisdictions, Current approaches, Facilitating Objective 1.2). The goal of translocation efforts should be to produce viable and free-ranging populations that require minimal long-term management intervention (IUCN 1998). There generally are three basic types of translocations; population introduction, population reestablishment, and population augmentation (IUCN 1998, Prairie Grouse Technical Council 1999). Population introduction refers to the placement of individuals outside their historical distribution, but within appropriate habitat. This has been tried in the past, but it is not a recommended strategy for prairie grouse. The only exception to this would potentially be when there is no remaining habitat left within a species' historical range (IUCN 1998). Although some of these introductions outside the historical distributions were deliberate, some were accidental (e.g., greater sage-grouse into the range of Gunnison sage-grouse in Utah and New Mexico; Reese and Connelly 1997). A more subtle variation of this type of introduction is the translocation of individuals of one subspecies into the range of a different subspecies. This type of translocation is generally not recommended (Benedict et al. 2003, Palkovacs et al. 2004).

The most common type of translocation is an effort to reestablish a population in a formerly occupied portion of a species' historical range (Rodgers 1992). Although this type of effort appears self-explanatory, it is not always simple to determine the extent of a species' historical range (Schroeder et al. 2004) or whether a species is actually absent from an area prior to the translocation. From a mitigation perspective, this would certainly offer some potential for expanding the range of sage-grouse into currently unoccupied areas.

The third type of translocation is augmentation of existing populations. There are different reasons to augment a population with one of the more common reasons being to address the adverse effects of genetic drift in relatively small and isolated populations (Bouzat et al. 1998; Westemeier et al. 1998; Bellinger et al. 2003; Bouzat et al. 2005*a*, *b*; Olyler-McCance et al. 2005). It is also possible that population augmentations could be used to bring small populations up to a threshold level where breeding success is sufficient to compensate for adverse stochastic events that can drive a small population to extinction

Figure 2.1. Land ownership within occupied sage-grouse range.

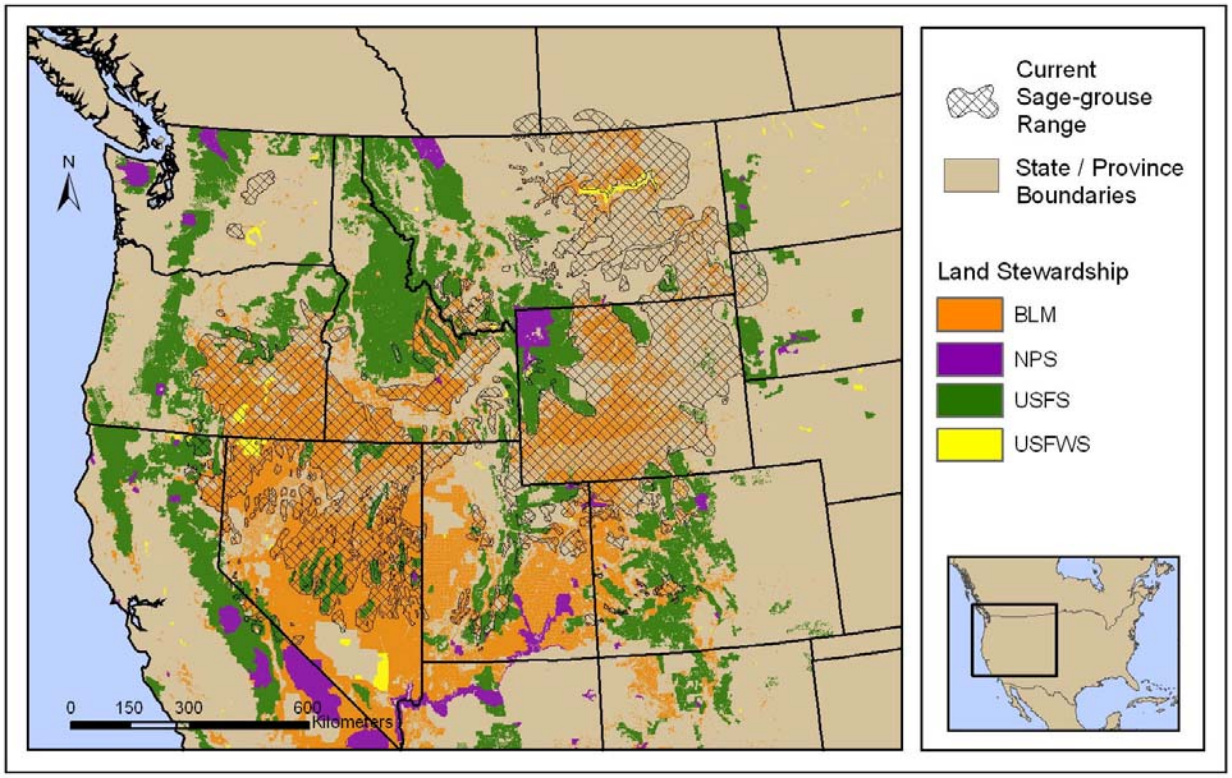


Table 2.1. Status of Planning Efforts and Conservation Plans.

Planning Group	State Province	Species	Initiation	Completion	Reference Location
Range-wide Forum	All	GRSG	2005	2006	Forum Report: http://sagegrouse.ecr.gov/pdf/FinalReport.pdf
Range-wide Forum	All	GRSG	2005	2006	Forum Strategies: http://sagegrouse.ecr.gov/pdf/Appendix_2_Final_Forum_Strategies.pdf
Range-wide Forum	All	GRSG	2005	2006	Forum Goals & Objectives: http://sagegrouse.ecr.gov/pdf/Appendix_3_Goals_and_Objectives.pdf
Range-wide Forum	All	GRSG	2005	2006	Forum Rated Synthesized Goals: http://sagegrouse.ecr.gov/pdf/Appendix_4_Rated_Synthesized_Goals.pdf
Canada	AB	GRSG		2001	http://www.srd.gov.ab.ca/fw/speciesatrisk/pdf/sagegrouseplan.pdf
BLM	All	Both	2004	2004	http://www.blm.gov/nhp/spotlight/sage_grouse/docs/Sage-Grouse_Strategy.pdf
Alberta	AB	GRSG	2002	2005	http://www.srd.gov.ab.ca/fw/speciesatrisk/pdf/Alberta_Greater_Sage_Grouse_Recovery_Plan_2005-2010_final.pdf http://www.srd.gov.ab.ca/fw/speciesatrisk/pdf/Sage_grouse_web_update.pdf
California	CA		2001	2004	http://ndow.org/wild/conservation/sg/plan/SGPlan063004.pdf
Colorado	CO		2006	2007	Plan not complete
Idaho	ID		2004	2006	http://fishandgame.idaho.gov/cms/hunt/grouse/conserve_plan/Sage-grousePlan.pdf
Montana	MT			2005	http://fwp.mt.gov/fwppaperapps/wildthings/SGFinalPlan.pdf
Nevada	NV		2000	2004	http://ndow.org/wild/conservation/sg/plan/SGPlan063004.pdf
North Dakota	ND		2004	2005	http://gf.nd.gov/conservation/docs/sage-gr-entire-plan.pdf
Oregon	OR		2004	2005	http://www.dfw.state.or.us/wildlife/sagegrouse/pdf/sage_grouse_plan.pdf
Saskatchewan	SK			2005	http://www.srd.gov.ab.ca/fw/speciesatrisk/pdf/Alberta_Greater_Sage_Grouse_Recovery_Plan_2005-2010_final.pdf http://www.srd.gov.ab.ca/fw/speciesatrisk/pdf/Sage_grouse_web_update.pdf
South Dakota	SD		2004		Plan not complete
Utah	UT			2002	http://www.wildlife.utah.gov/uplandgame/pdf/2002manplan.pdf
Washington	WA			2004	http://wdfw.wa.gov/wlm/diversty/soc/recovery/sage_grouse/final_sage_grouse_recovery.pdf
Wyoming	WY		2000	2003	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse.asp
Baker	OR				Organizing, Prioritizing projects
Bates Hole Shirley Basin	WY		2004	2006	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/BatesHoleShirleyBasin/index.asp
Big Desert	ID			2008	Group to form by Sep 2006
Big Horn Basin	WY		2004	2007	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/BighHornBasin/index.asp
Bi-State	CA		2002	2004	http://ndow.org/wild/conservation/sg/plan/SGPlan063004_L.pdf
Bi-State	NV		2002	2004	http://ndow.org/wild/conservation/sg/plan/SGPlan063004_L.pdf
Burns	OR				Organizing, Prioritizing projects
Cache/East Box Elder	UT			2006	http://www.cnr.usu.edu/cbcp/cache.htm
Castle Country	UT		2005	2006	http://www.cnr.usu.edu/cbcp/carbon_emery.htm
Challis	ID			2006	Writing plan

Planning Group	State Province	Species	Initiation	Completion	Reference Location
Color Country	UT		2001	2006	http://www.cnr.usu.edu/cbcp/color.htm
Crawford	CO			1998	http://wildlife.state.co.us/NR/rdonlyres/72278533-3174-4DC4-94E1-04AD72CF421E/0/GunnisonSageGrouseLocalPlan_Crawford.pdf
Curlew	ID			2006	Draft plan ready for approval
Dillon	MT			2005	Working from MT State Conservation Plan; Identifying local issues
Dove Creek	CO			1998	http://wildlife.state.co.us/NR/rdonlyres/955AD064-5E76-4936-AEBE-A7F76B229A57/0/GunnisonSageGrouseLocalPlan_DoveCreek.pdf
Duck Valley Indian Reservation	ID,NV		2001	2006	Plan approved by Tribal Council
East Idaho Uplands	ID			2008	Group to form by Sep 2006
East Magic Valley	ID			2008	Group to form by Sep 2006
Foster Creek Conservation District	WA		2000	2007	A draft will be available soon, http://www.fostercreek.net/hcpmain.html
Garfield and Rio Blanco County	CO	GRSG			
Glasgow	MT	GRSG		2005	Working from MT State Conservation Plan; Identifying local issues
Gunnison Basin	CO	GUSG		1997	http://wildlife.state.co.us/NR/rdonlyres/30FDBAF5-1C11-48F9-A797-9827CA6181CF/0/GunnisonSageGrouseLocalPlan_GunnisonBasin.pdf
Jackson Hole	WY	GRSG	2004	2007	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/JacksonHole/index.asp
Jarbidge	ID	GRSG		2006	Draft plan ready for approval
Lakeview	OR	GRSG			Organizing, Prioritizing projects
Lincoln	NV	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/lwp/draft_plan070103.pdf
Middle Park	CO	GRSG	1999	2001	http://wildlife.state.co.us/NR/rdonlyres/1C7D89E6-E34A-4199-ADB9-C0AE7A2D79D8/0/MiddlePark.pdf
Miles City/Forsyth	MT	GRSG		2005	Working from MT State Conservation Plan; Identifying local issues
Morgan/Summit	UT	GRSG	2005	2006	http://www.cnr.usu.edu/cbcp/morgan_summit.htm
Mountain Home	ID	GRSG		2008	Group to form by April 2006
NE NV Stewardship	NV	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/ne/elkostrategy.pdf
North Park	CO	GRSG	1998	2001	http://wildlife.state.co.us/NR/rdonlyres/7036F69D-F480-45C9-A6EC-4008066E40B1/0/NorthPark.pdf
North-Central	NV	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/nc/pmu/eastrange/071403plan.pdf
Northeast	WY	GRSG	2004	2006	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/Northeast/index.asp
Northern Eagle Southern Routt	CO	GRSG	1998	2004	http://wildlife.state.co.us/NR/rdonlyres/5B7987D0-AA69-4C66-84C6-45E16B11E5F2/0/Eagle_SoRoutt.pdf
Northwest	CO	GRSG	1996	2006	
Owyhee	ID		1995	2005	http://fishandgame.idaho.gov/cms/hunt/grouse/conserve_plan/owyhee_workplan.pdf

Planning Group	State Province	Species	Initiation	Completion	Reference Location
Parker Mountain	UT	GRSG	1998	2006	http://www.cnr.usu.edu/cbcp/assets/pdf/PARMdraftplan.doc
Piceance, Parachute, Roan	CO	GUSG	2006	2006	Planning in progress
Pinon Mesa	CO	GUSG		2000	http://wildlife.state.co.us/NR/rdonlyres/7A010669-C9FE-4AB1-86BD-AEB65BA1795D/0/GunnisonSageGrouseLocalPlan_PinyonMesa.pdf
Poncha Pass	CO	GUSG		2000	http://wildlife.state.co.us/NR/rdonlyres/A62D53B9-A23B-46F5-B981-39A9AE020D0A/0/GunnisonSageGrouseLocalPlan_PonchaPass.pdf
Prineville	OR	GRSG			Organizing, Prioritizing projects
Rich County	UT	GRSG		2006	http://www.cnr.usu.edu/cbcp/rich.htm
San Juan	UT	GUSG	1996	2000	http://www.wildlife.utah.gov/uplandgame/pdf/gsgcp.pdf
San Miguel Basin	CO	GUSG		1998	http://wildlife.state.co.us/NR/rdonlyres/B19BA1CA-4B4C-489D-8542-8CF41FD271B3/0/GunnisonSageGrouseLocalPlan_SanMiguelBasin.pdf
Shoshone Basin	ID	GRSG		2006	Draft plan ready for approval
So. Magic Valley	ID	GRSG		2008	Group to form by Sep 2006
South-Central	NV	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/meetings/index.shtm#sc
South-Central	WY	GRSG	2004	2007	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/SouthCentral/index.asp
Southwest Desert	UT	GRSG	2003	2006	http://www.cnr.usu.edu/cbcp/southwest.htm
Southwest Wyoming	WY	GRSG		2007	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/SouthWest/index.asp
Strawberry Valley	UT	GRSG	2003	2006	http://www.cnr.usu.edu/cbcp/assets/pdf/SVARM_final_draft_plan.pdf
Uintah Basin	UT	GRSG	2003	2006	http://www.cnr.usu.edu/cbcp/assets/pdf/ubarmsagrplan.pdf
Upper Green River	WY	GRSG	2004	2007	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/UpperGreenRiver/Index.asp
Upper Snake	ID	GRSG		2006	Draft plan ready for approval
Vale	OR	GRSG			Organizing, Prioritizing projects
Washoe/Modoc	CA	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/meetings/index.shtm#wm ; Plans by PMU
Washoe/Modoc	NV	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/meetings/index.shtm#wm ; Plans by PMU
West Box Elder	UT	GRSG		2006	http://www.cnr.usu.edu/cbcp/box_elder.htm
West Central	ID	GRSG		2007	Writing plan
West Desert	UT	GRSG	2003	2006	http://www.cnr.usu.edu/cbcp/west_desert.htm
West Magic Valley	ID	GRSG		2008	Group forming Apr 2006
White Pine	NV	GRSG	2001	2004	http://www.nevadawildlife.org/wild/conservation/sg/lwp/draft_plan070103.pdf
Wind River – Sweet River Basin	WY	GRSG	2004	2007	http://gf.state.wy.us/wildlife/wildlife_management/sagegrouse/WindRiversweetwater/index.asp

Table 2.2 Sage-grouse conservation issues by plan

Table 2.2: Summary of issues addressed in completed State greater sage-grouse conservation plans as of September 01, 2006. Plans completed since that date may be accessed through the greater sage-grouse working group locator (http://greatbasin.nbii.gov/lwg/index.asp) If a state is not listed under an issue, it did not address/discuss the issue. The column labeled "Plan includes strategy to address issue" indicates whether or not the plan provided specific items to address issues (yes), or provided general guidance/discussion only (no). (NV 1 – Washoe, Lassen, Modoc; NV 2 – Elko County; NV 3 – North Central; NV 4 - White Pine; NV 5 - South Central; NV 6 - Lincoln; NV 7 - NV Bi-State Plan; NV 8 - NV/CA Plan; CO 1 - North Park; CO 2 - Middle Park; CO 3 – Eagle & South Routt).

Issue	Sub-Issue	Identified in Conservation Plan	Plan includes strategy for issue
Habitat Loss	General	NV 1, NV 3	Yes
		NV 2, WY, CO 3	No
	Allow no net loss	UT, OR	Yes
		NV 7, WA, MT	No
	Changing Land Uses	NV 3, CO 1	Yes
		NV 2, NV 5, NV 7, NV 8, WA	No
	Mining	NV 1 , NV 3	Yes
		NV 2, NV 5, NV 7	No
	Urban expansion	WY, ID, OR, CO 3	Yes
		NV 1, NV 7,	No
	Water development	NV 4, CO 3	No
Habitat Degradation	Agricultural impacts	WY, ID	Yes
		WA, UT	No
	Conversion - conifer encroachment	NV 1 , NV 3, NV 4, NV 6, CO 2, MT, ID, OR, CO 3	Yes
		NV 2, NV 5, NV 7, WY, UT, WA	No
	Conversion - loss of seasonal habitats	NV 1, NV 3, CO 2, CO 3, WY	Yes
		NV 2, NV 5, WA	No
	Conversion - temporary	NV 1	Yes
	Fences	NV 1, CO 2, WY	Yes
		NV 4, NV 6, NV 7, NV 8, WA, ND	No
	Fire	NV 1, NV 3, WY , UT, MT, OR , ID, CO 3	Yes
		NV 2 NV 4, NV 5, NV 6, NV 7, NV 8, WA, ND	No
	Lack of Fire	NV 1, NV 3, NV 4, NV 6	Yes
	Fragmentation	NV 1	Yes
		NV 2, NV 4, NV 5, NV 7, NV 8, WY, OR, UT	No
	Grazing	NV 1, NV 3, NV 6, CO 1, CO 2, CO 3, WY, WA , MT, OR	Yes
		NV 2, NV 4, NV 7, NV 8, ND, ID, UT	No
	Insect suppression of forbs	NV 4, NV 5, NV 6	No
	Lack of water	NV 4, NV 6, NV 7, CO 2	Yes
		UT	No

Issue	Sub-Issue	Identified in Conservation Plan	Plan includes strategy for issue
Habitat Degradation (continued)	Loss of habitat function	NV 1, CO 2, CO 3, ND	Yes
		NV 7, WY	No
	Mineral/Energy development	WY, MT, ND, ID	Yes
		WA, AB UT	No
	Noxious weeds	NV 1 , NV 3, CO 2, WY, MT, ND, OR, ID	Yes
		NV 2, NV 4, NV 5, NV 6, NV 7, WA, CO 3	No
	Railroads	ID	No
	Range improvements	NV 1, NV 3, NV 7, CO 1, OR	Yes
		WY	No
	Roads	NV 1, NV 3, CO 1, CO 2, MT, ND, ID	Yes
		NV 4, NV 7, NV 8, WA, OR	No
	Sagebrush control	NV 1, OR, UT	Yes
		WA	No
	Transmission lines	NV 1, MT, ND, ID, OR, CO 1, CO 3	Yes
		NV 6, NV 7, NV 8, WA	No
	Wild horse management	NV 3, WA	Yes
		NV 1, NV 2, NV 4, NV 6, NV 7, NV 8, WY, OR	No
	Wild ungulate competition	CO 2, UT, OR	Yes
		NV 6, NV 7, WY, WA, MT	No
	Windpower development	MT, OR, WA	Yes
		NV 3, NV 4, NV 6, NV 7, ID	No
Disturbance	Aerial gunning for predators	NV 1	Yes
	Dispersed recreation	NV 1, CO 1, CO 2, CO 3, WY, MT, OR	Yes
		NV 2, NV 4, NV 5, NV 6, NV 7, WA, ND, ID	No
	Increased human access	NV 5	No
	Increased predator attraction	NV 1	Yes
		NV 2, NV 5	No
	Lek viewing	NV 1 , NV 3, CO 1, CO 3, WY, WA, UT, MT, ND, OR, ID	Yes
	Military activities/impacts	NV 3, WA	Yes
		ID	No
	OHV use	NV 1, NV 3, OR, ID	Yes
		NV 4, NV 5, NV 6, NV 7	No
	Private land activities	NV 3	Yes
		NV 4, WA	No

	Road kill	NV 1, ID	Yes
Issue	**Sub-Issue**	**Identified in Conservation Plan**	**Plan includes strategy for issue**
Habitat acquisition/ easements		CO 1, CO 2, UT	Yes
		WA	No
Habitat enhancement/ maintenance		NV 3, CO 1, CO 2, WY, UT, OR	Yes
		AB	No
Habitat mitigation		NV 3	Yes
		CO 1, NV 2	No
Habitat restoration	General	NV 3, NV 7, CO 1, CO 2, WY, UT, ID	Yes
		NV 4, NV 6, WA	No
	Restore connectivity	NV 3, CO 2, CO 3	Yes
	Encourage restoration on Federal lands	NV 6, UT	No
Hunting		NV 3, CO 1, CO 2, CO 3, WY, UT, MT, ND, ID, OR	Yes
		NV 1, NV 5, NV 2, NV 6, NV 7, NV 8, AB, WA	No
	Poaching	NV 1, NV 6, NV 7, NV 8	No
Predation		NV 3, NV 6, CO 1, CO 2, CO 3, WY, MT, ND, ID, OR	Yes
		NV 4, NV 7, NV 8, UT	No
Disease		NV 2, NV 7, NV 8, WY, UT, OR, ID, CO 3	No
Regulatory needs	Identify limiting regulations regarding habitat restoration	NV 3	Yes
	Address grouse at early NEPA stages	NV 3	Yes
		NV 4	No
	Lack of data for good decisions	NV 7	No
	Incorporate sage-grouse needs at planning stage	CO 1	Yes
Adaptive Management	Implement	CO 2	Yes
Climate change		ID	Yes
		NV 2, NV 7, NV 8	No
Life history	Population cycles	NV 2, NV 5, NV 7, NV 8	No
	Low population numbers	NV 5, AB, ID	No
	Genetic diversity	NV 1, NV 6, NV 7, WA	Yes
		WA	No
	Monitor population status	OR, ID	Yes

Pesticides		NV 3, NV 7, WY, UT, ID	Yes
		WA, NV 1, NV 8, MT, ND, CO 3	No
Issue	**Sub-Issue**	**Identified in Conservation Plan**	**Plan includes strategy for issue**
Population enhancement	Translocations	WA, OR	Yes
		NV 4, AB	No
	Work with Native Americans	NV 4	No
Private Lands	Habitat management on private lands	CO 2, UT, ND	Yes
		NV 6, WA	No
Public Education	Value of resource	NV 3, CO 1, CO 2, CO 3, WA, UT, MT, ND, OR	Yes
		NV 4, NV 6, NV 7, AB	No
	Source of impacts	NV 3, NV 7, CO 1, CO 2, CO 3, WA, UT, ND, OR	Yes
		NV 4, NV 6, AB	No
	Education of Federal employees	CO 1, CO 3, WA, UT	Yes
		NV 4, NV 6	Yes
Research needs	Lack of information on existing habitats	NV 3, NV 6, CO 2, CO 3, WY, UT	Yes
		NV 4, NV 7	No
	Lack of population information	NV 3, NV 6, NV 7, NV 8, CO 1, CO 2, CO 3, UT	Yes
		NV 4, WA	No
	Cost effective rehabilitation of habitats	NV 3, UT	Yes
	Population/habitat monitoring	CO 1, WY, UT, NV 8, NV 4,	Yes
		WA	No
	Captive breeding	CO 1	Yes
	Mapping habitats/populations	WY, WA, UT	Yes
Sagebrush obligates	Incorporate into management plan for grouse	CO 2, UT, OR	Yes
Weather	Drought	WY, UT, NV 8, CO 2	No
Work with Native Americans	Habitat management	NV 1, NV 6, NV 7, UT	No

Chapter 3
Monitoring
Conservation Actions

CHAPTER 3

Monitoring Conservation Actions

Introduction

The distribution, trend, and abundance of sage-grouse populations are the ultimate indicators of success of the conservation strategies presented in this document. Therefore, reliable and comparable methods for estimating populations are critical to evaluate effectiveness of conservation actions implemented across the landscape. The importance of monitoring sage-grouse populations and sagebrush habitats cannot be overemphasized. Monitoring will provide the data needed to measure the long term success of the greater sage-grouse Comprehensive Conservation Strategy and will provide the basis for adapting management and adopting techniques to take advantage of newly acquired information. Monitoring data will answer the future questions of why we were successful or unsuccessful in our conservation efforts and how do we sustain that success.

Monitoring is a key component of adaptive management (Walters 1986), requiring repeated measures of sage-grouse populations that provide reliable information for evaluation and possible alteration of tactical actions to meet desired management objectives. Two factors that complicate the monitoring of sage-grouse and their habitats are time and distance. Sage-grouse range over large landscapes which often include multiple jurisdictions. Sagebrush ranges, absent manipulation or fire, tend to change slowly over a period of decades and, if disturbed, sage ranges are relatively slow to respond or recover. Changes in sagebrush ranges may be so subtle and slow that they are overlooked. The Strategy is based on a process that involves hundreds of citizens with disparate backgrounds, resource professionals who may or may not be involved next year and who likely will be replaced by the next decade when the final results of a project need to be evaluated and processes adapted and on data that will be measured in multiple jurisdictions. Consistent and reliable, monitoring data must provide a common language over time and space.

Sage-grouse are resident species in each of the states and provinces and each state and province has ultimate responsibility for the conservation of sage-grouse within its jurisdiction. However, over 70% of all sagebrush rangeland is owned or managed by federal agencies with a variety of management goals. There is a long history of communication and cooperation among jurisdictions responsible for sage-grouse and their habitats. However, there has not been a coordinated conservation effort across the range of the species prior to this Strategy. Although some level of consistency in sage-grouse monitoring has been achieved, the conservation assessment points out the fact that there are still problems of consistency in methods and efforts that need to be addressed (Connelly et al. 2004). A range-wide strategy also offers opportunities to develop and implement new protocols and new and better technologies in monitoring both grouse and their habitats.

This chapter discusses monitoring approaches for greater sage-grouse populations and habitats. Sage-grouse populations and habitats have been studied for many years, and the literature is relatively rich for this species. The Conservation Assessment of Greater Sage-

Grouse and Sagebrush Habitats (Connelly et al. 2004) summarize limiting factors for both populations and habitats. The variables used to address population performance and habitat quality used in the assessment form a logical basis for assessment and monitoring.

In 2005, the Western Sage-grouse and Columbian Sharp-Tailed Grouse Technical Committee organized a sub-committee to develop or update protocols for assessing greater sage-grouse populations. Also in 2005, the Bureau of Land Management began a process to identify appropriate habitat features for assessing and monitoring sage-grouse habitats at multiple scales. These protocols will be the means by which sage-grouse and their habitats are evaluated and monitored across the species range. Ultimately, a primary goal is to link habitat changes to vital population metrics (e.g. population size and trend), though the development of such models may take several years.

Monitoring Sage-grouse Populations

Background

Concern over the status and trend of greater sage-grouse populations dates to at least the early 1900s (Hornaday 1916). In the decades that followed, numerous other investigators voiced similar concerns (Girard 1937, Patterson 1952, Rogers 1964, Autenrieth 1981) and sage-grouse hunting seasons were often curtailed because of fears that populations were low (Autenrieth 1981). Because of these concerns, biologists began to develop systematic monitoring techniques to assess population trends of sage-grouse. The purpose of this section is to review common population analysis methods for sage-grouse and discuss the efficacy of these with the understanding that a more formal population monitoring strategy is currently being developed. State agencies have the responsibility to collect and analyze population data. However, coordination with land management agencies plays an important role in this monitoring.

Lek data. For more than 50 years, sage-grouse breeding populations have been monitored across the species’ range by counting the number of males attending leks during the breeding season (Connelly et al. 2003). Unfortunately, early monitoring efforts were not uniform and different techniques were often employed by various agencies, making comparisons among areas and agencies difficult. Sage-grouse populations are currently monitored separately by 11 states and 2 provinces. Although lek data are collected in all states and provinces, the quantity and quality of the data differs among agencies and inferences are made about populations using a variety of methods and analyses (Connelly et al. 2004), hence population assessments across the species range are difficult to discern.

Wing data. In addition to lek count data, information has been collected from hunter-harvested birds for more than 50 years (Connelly et al. 2004) in many states. Most states have hunting seasons for sage-grouse and thus monitor harvest of the species. As with lek counts, individual efforts for collection and analysis of wing data are employed by each state. Various techniques are used to collect harvest data and in the process, wings from harvested birds are often collected, providing information on the age and sex composition of the harvest. These data are used to estimate production. The number of successfully nesting females is also often determined based on primary feather molt sequence (Connelly et al. 2003). Obviously, this method is not suitable for populations that are not hunted or are hunted later in the fall (Wyoming) when wing feather molt is advanced and differences in successful/unsuccessful nesters can not be reliably determined. Brood surveys are still used in some areas where hunting sage-grouse is restricted, and there is a need to estimate production. Brood surveys were a popular method for estimating annual production of sage-grouse historically. However, most states do not collect this information any more, preferring the use of wing data (Connelly et al. 2003, Connelly et al. 2004). Brood surveys may also be useful for delineating brood-rearing habitat, which is an important consideration for land use and project planning.

Radio-telemetry data. Radio-transmitters have been used to mark individual sage-grouse for more than 30 years (Connelly et al. 2003). Radio-marked birds are used to monitor seasonal ranges, population demographics, and habitat use/selection. Demographic parameters of survival and reproduction are often related to habitat conditions in order to determine fitness of grouse to their habitats. Although quite useful, these types of studies typically involve small sample sizes and because demographic rates are naturally variable, interpretation of fitness can be difficult in the short term. Additionally, radio-telemetry was recently quite useful in determining the impacts of West Nile Virus to sage-grouse in portions of their range (Naugle et al. 2005, Naugle et al. 2004, Walker et al. 2004).

Banding Data. Leg bands are usually attached to captured sage-grouse (Connelly et al. 2003). Serial numbered aluminum leg bands are most commonly used to mark grouse as a method of identifying individual birds when they recovered or recaptured. Colored leg bands have also been used to allow identification of individual birds in the field. Such methodology has been useful particularly in studying lek attendance when the bands can be seen, but has limited value because sage-grouse are often found in heavy cover (Connelly et al. 2003). Some studies have used banding data to estimate movements, survival, and harvest rates (Zablan et al. 2003). Banding data could also be used to estimate population size if enough birds are marked and recaptured, but relatively large sample sizes have largely precluded the use of such techniques (Connelly et al. 2003). Radio-telemetry data has been the preferred method of studying sage-grouse populations to date. However, ongoing work in Nevada is investigating the usefulness of band data in a long term study of sage grouse populations and harvest (J. Sedinger pers. commun.).

Genetics. Recently, information regarding genetics has been collected and there is some indication that individuals can be identified through DNA sampling. Genetic-based population analysis techniques have great promise in the future. More research is needed in this area and as discussed in Chapter 5.

Current Approaches: Strengths and Limitations

Male Lek Attendance. Current monitoring for greater sage-grouse populations provides information useful at local, regional (typically states or provinces), and range-wide scales. However, most monitoring programs are not designed at a scale broader than states or provinces. Connelly et al. (2004) were able to draw inferences about sage-grouse population trends range-wide by using data regarding lek attendance, which is collected throughout the species' range.

These data use the common theme of male attendance at leks, but they are gathered with differing methodologies, producing various biases in interpretation of population trends.

Batterson and Morse (1948) and Patterson (1952) popularized the use of lek attendance as a basis for population monitoring based on the belief that male sage-grouse regularly attend leks during the breeding season. Later research supported these methods, demonstrating that most male sage-grouse attend leks sometime during the breeding season, and that peak male attendance lagged behind peak female attendance by 3-5 weeks with most birds on leks around sunrise (Jenni and Hartzler 1978, Emmons and Braun 1984). Based on this information, the authors suggested that peak numbers of males can be estimated to within 90% with 3-4 counts between ½ hour before and 1 ½ hours after sunrise 3-5 weeks after the peak of breeding.

Patterson's (1952) method for monitoring of leks remains the basic model for estimating population trend used today. Connelly et al. (2003, 2004) described the main types of lek monitoring methods currently being conducted, including lek surveys, lek counts, and lek censuses. Most states and provinces use combinations of all of these methods (Connelly et al. 2004).

Lek Surveys. Lek surveys are the most basic form of lek monitoring, whereby lek locations are opportunistically identified and monitored over time for activity, typically classified as active or inactive in a given year. Emmons and Braun (1984) indicated that the number of active leks increases with an increasing population, suggesting that knowledge of the number of leks may be the most useful information to track population trends. However, because this method does not involve quantification of the size of individual leks, it may be less sensitive than other lek counting techniques -particularly to short-term changes in population size (Connelly et al. 2003). Lek surveys have the advantage that they may be conducted from the ground and the air and the opportunity to conduct surveys may be greater than other methods that attempt to quantify the size of the lek as discussed below.

Lek Counts. Lek counts are the most basic attempt to quantify changes in the size of a given lek, group of leks, or sample of leks over time. Several counts are usually conducted during the breeding season to estimate the largest number of male sage-grouse attending a lek that year (Jenni and Hartzler 1978, Emmons and Braun 1984). Typically, individual leks are monitored over time and used to estimate trends in the overall population. However, because lek size may be density dependent, and can be affected by weather, proximity of predators or livestock and other disturbance factors, concerns have been expressed that the trend in a given lek may yield biased estimates of population trend.

Lek Routes/Censuses. Lek routes or censuses involve counts of several leks in a given area that represent all or part of a breeding population. This method reduces bias associated with counts of individual leks by attempting to quantify the number and size of leks in a given area. Routes are typically conducted several times each year by an individual observer. In Mono County, CA, individual observers are placed on each lek in a given area on the same day and the maximum count for the composite leks is used as that year's count, this technique reduces potential biases associated with counting individual leks.

Limitations of Lek Data. Several assumptions are made when making inferences about the population from lek count data and little empirical data exists to address the assumptions (Walsh et al. 2004). Beck and Braun (1980) noted that little information was available to address high variability in lek counts, including attendance patterns of adult and yearling males, inter-lek movements, and the number of leks in an area. Emmons and Braun (1984) demonstrated extensive inter-lek movements, suggesting that knowledge of the number of leks was needed in addition to size to understand changes in population size. Walsh et al. (2004) suggested that male lek attendance and visibility of males on leks may be considerably lower than previously thought.

Lek data are sometimes used to estimate population size. Beyond the limitations associated with estimating the number of males, little empirical information exists regarding the relationship of counts of male lek attendance to the female segment of the population (Walsh et al. 2004). Information regarding sex-ratios in sage-grouse currently available comes primarily from hunter-harvested wings, which will be biased if harvest is differential.

Sampling of sage-grouse leks using current methodologies is scientifically problematic. Although sage-grouse tend to use lek sites traditionally, leks may shift, locations or become inactive and new leks may appear. The gradual shifting of a lek's location during a period of many years can influence a lek count. A lek count may be further complicated by the formation of satellite leks that may develop near a large lek during years with relatively high populations (Connelly et al. 2004). Leks are usually counted based on tradition or convenience of access to the site, and counts are not typically taken from a random sample. Most states or provinces use a group of leks that have been counted over time as an index of population trend. Because the number of leks and lek size are thought to be density-dependent (Emmons and Braun 1984), this type of convenience sampling may bias inferences made from population trend data. Furthermore, little sampling occurs in marginally-occupied areas where population numbers are low and extrapolation of lek count data across one broad strata is inappropriate.

Strengths of Lek Data. Some of the basic assumptions with the rational and protocol for conducting lek surveys have been assessed with the aid of simulated populations (Connelly et al. 2004; Schroeder et al., in prep.). The results suggested that the proportion of males observed on leks and the number of leks regularly monitored are the most important factors in the analysis of trends; more important than the number of years and the size of leks (Schroeder et al., in prep.). Although the number of males attending a single lek may never be known precisely, it is clear that an increase in the number of surveys/lek and the number of leks surveyed (as recommended by Connelly et al. 2003) can improve precision dramatically. Lek count data are the most widespread information available to monitor greater sage-grouse populations and with improvements in consistency of data collection, it appears that lek count data can provide defendable information on long-term trends in populations.

Need

Although lek counts remain the primary method for population monitoring today, concern about their usefulness has been expressed since the early 1980's (Beck and Braun 1980) and more recently (Walsh et al. 2004). Concerns expressed in the literature strongly suggest a need for more rigorous scientific methods to improve current knowledge of sage-grouse population dynamics and methods for determining population trends. However, information available in the literature is highly disparate and based on short-term local studies. In addition to improved sampling methods, longer-term studies are needed in a variety of locations to better understand sage-grouse population dynamics.

Despite the scientific concerns previously discussed, counting sage-grouse on leks appears to be the most reliable current method for determining population trends over time (Connelly et al. 2004, Schroeder et al. in prep) and all state or provincial wildlife agencies base their surveys on this approach. Individual efforts will continue to be employed by each state and province, based on differing levels of resources, and there is a need to use these data to make inferences about populations across political boundaries. This Strategy calls for analysis of population trends by management zones compared to the analysis conducted in the Conservation Assessment in 2003 (Connelly et al. 2004). To accomplish this, consistent data will need to be available from each state or province that is comparable to the data collected for the 2003 assessment.

Each year, across the range of the species, a great deal of effort is put into monitoring greater sage-grouse populations. More than 50,000 male sage-grouse were counted on leks in 2003 (Connelly et al. 2004). However, not all agencies employ similar techniques and sampling efforts may vary widely among agencies and years. In addition to information regarding population trends, a systematic method is needed to monitor sage-grouse populations. Therefore, this strategy calls for the development of a consistent and scientifically defensible method for determining population distribution and estimating trends across the species' range. Resources available for population monitoring vary among states and provinces, and this strategy will call for methods that designed to improve the efficiency of current efforts and to allow for varying levels of effort and differing methodologies while producing information that is comparable across sage-grouse range. Additionally, this Strategy calls for methods to integrate existing data sets with new information to allow for long-term analyses of population trends.

Population Monitoring Objectives. Sage-grouse monitoring efforts are usually conducted to determine one or more of the following categories: distribution, trend, abundance, and fitness. Data collected for these efforts provides information at multiple spatial and temporal scales. In addition to needs to monitor populations across the range over the long term, there is a need to monitor local populations for response to particular conservation actions. In some cases, data that are collected are useful for monitoring population response at multiple scales over short-time frames (Table 3.1). A combination of monitoring components may be needed to monitor effectiveness of conservation actions in both the short and long term. For instance, the monitoring program for a treatment designed to improve sage-grouse nesting cover may include both a radio-telemetry study, which will directly assess nest success in the short term, and monitoring of local leks to determine population trend over the long term. If nest success responds positively, but population trends do not, other factors may be limiting the population and alternate management strategies are needed with additional monitoring.

Table 3.1. Summary of sage-grouse monitoring objectives, associated methods, and scale of inference.

	Population Monitoring Objectives			
Method	Distribution	Trend	Abundance	Fitness
Lek Surveys	RW – LT			
Lek Counts		RG – LT	RG – LT	
Wing Analyses		RG – LT	RG – LT	RW – LT
Radio-Telemetry	RW – ST			SS - ST
Genetics[1]	RW – LT?		RW – LT?	

Spatial Scale: SS = site-specific; RG = regional; RW = range-wide
Temporal Scale: ST = Short Term; LT = Long Term

[1]Recent and proposed future research suggests that genetics can be used to identify individuals.

Sage-grouse Forum. The Sage-grouse Forum identified several needs for coordination of research and monitoring for sage-grouse populations (cf. Forum SUB-ISSUE: Range-wide research and monitoring collaboration and coordination, including:1) A framework to encourage data consistency, quality and compatibility, 2) A coordinated program of site-specific research and monitoring projects integrated within the context of the landscape, and 3) Identification **of** metrics to define success or failure of conservation actions for sage-grouse at multiple spatial and temporal scales. This strategy calls for the development of: 1) A coordinated effort among agencies in the development, experimentation, and implementation of monitoring programs for sage-grouse and 2) The development of expertise to aid local agencies in the design of monitoring programs at the local, regional, and range-wide level.

Research Needs. Several assumptions underlie current inferences made about sage-grouse populations based on lek attendance data. Attempts to quantify the parameters used in population estimation and trend analyses have produced varying results (Emmons and Braun 1984, Walsh et al. 2004). This range of values may represent differences among populations or biases associated with methodologies. Information on sage-grouse population parameters is needed to improve methods for monitoring population trends in a variety of conditions throughout sage-grouse range. This strategy will call for a framework for management experiments comparable across sage-grouse range. This information will be used in an adaptive management framework concurrently with improved survey methods to improve population monitoring over time.

Lek attendance rates. Throughout the species' range, populations of sage-grouse have been monitored and trends assessed by counting males attending leks during the spring breeding season (Beck and Braun 1980). In general, there is a gradual increase in lek attendance by males as females arrive on leks (Eng 1963). Following peak hen attendance, more subadult (yearling) males appear with peak male attendance normally occurring about 3 weeks after peak hen attendance (Patterson 1952, Eng 1963, Jenni and Hartzler 1978, Emmons and Braun 1984). Population trends are based on these peak male counts and lek routes are designed so that $\geq$1 count will occur during this period.

As previously indicated, the lek count method has been criticized for several reasons (Beck and Braun 1980, Walsh et al. 2004) but thus far an alternative monitoring technique has not been developed. In part, these criticisms arose because of some apparent confusion over using lek counts for population estimates rather than to monitor trends (Walsh et al. 2004). Additionally, conflicting data have been published on lek attendance patterns. Emmons and Braun (1984) observed that mean lek attendance was 86% for yearling males and 92% for adult males. They also indicated that 90% of radio-marked yearling male sage-grouse and 94% of radio-marked adult male sage-grouse attended leks during the period of high male counts. In contrast, Walsh et al. (2004) reported that adult male sage-grouse had an average daily attendance rate of 42% while the daily attendance rate for yearlings was 19%. Both studies were conducted in northern Colorado. Reliable knowledge of lek attendance rates is a fundamental piece of information that is needed to estimate sage-grouse population trends and abundance.

Sex ratios. Actual reported sex ratios (males:females) of sage-grouse during autumn vary from 1:1 to 1:2.6 (Patterson 1952, Dalke et al. 1963, Beck and Braun 1978, Autenerieth 1981.) However, much of the information available on sex ratios in greater sage-grouse comes from hunter harvested birds (Autenrieth 1981, Autenrieth et al. 1982). Recent research suggests that adult males and females are not equally vulnerable to hunting, thus sex ratio estimates obtained from harvest data may not be reliable (Connelly et al. 2000, Wik 2002).

Beck (1977) and Connelly (1982) provided some information on sex ratios during winter, suggesting that there may be considerably more females than males in the population. It is also likely that sex ratios may vary among years and areas. However, Beck (1977) reported that sex ratios during winter in North Park, Colorado were 1:1.6 in both years of his study.

Some information is also available, at least indirectly, from research on juvenile sage-grouse. Research on juvenile sage-grouse in eastern Idaho indicated that juvenile sex ratios were very close to 1:1 for birds captured in late summer (n = 58, J. W. Connelly personal communication). However, over 3 seasons, Wik (2002) indicated that the sex ratio (n = 52) for juveniles captured in western Idaho was 1:1.7 (males:females) and varied from 1:1.4 to 1:2.7. Clearly, sex ratios may vary between age groups and possibly among years and areas. Reliable knowledge of sage-grouse sex ratios will allow development of reasonable population estimates based on rigorous lek surveys.

Population Monitoring Workshops. The Sage and Columbian Sharp-tailed Grouse Technical Committee (Technical Committee) held three population workshops beginning in January 2002, The workshops included leading experts in sage-grouse biology, population dynamics, statistical analysis, and conservation planning/implementation. Consensus from these workshops indicated needs to improve sage-grouse population monitoring in the following areas:

- Monitoring Techniques
- Sampling Approaches
- Data Collection and Storage
- Data Analysis
- Research on Population Dynamics

Under the advice of these workshops, the Technical Committee is currently in the process of developing recommendations for a range-wide population monitoring program. At the broad scale, the Technical Committee will develop recommendations for a uniform sampling method that produces unbiased estimates of population distribution, characteristics, and trends, given differing levels of effort. This protocol will be done by the end of 2007. These broad scale efforts represent the minimum information necessary to monitor populations across the species range. Broad-scale objectives are to:

(a) Monitor distribution of breeding populations in a consistent manner.
(b) Monitor relative abundance and trend of breeding populations in a consistent manner.
(c) Monitor harvest in a consistent manner
(d) Standardize key fields across the range in databases used for monitoring populations.
(e) Standardize understanding of terms and concepts used in monitoring populations

At a fine scale, the Technical Committee will propose a framework for conducting management experiments to improve estimation of population parameters, with objectives to:

(a) Estimate sex ratio of breeding population and its variability.
(b) Document lek attendance patterns by male sage-grouse.
(c) Estimate size of breeding population.
(d) Explore/identify alternate or additional methods for monitoring populations.
(e) Assess sample size necessary for wing collections to adequately characterize harvested populations of interest.
(f) Determine the detectability of leks by lek size and observation platform (ground, fixed wing, helicopter)

Habitat Inventory and Monitoring

Introduction

Recovery or maintenance of sage-grouse habitats and populations is contingent on implementation of land management practices that contribute to sage-grouse habitat quality and quantity. Federal and state agencies are preparing a consistent assessment framework that recognizes the cumulative effects of habitat changes at multiple scales, and implications for the conservation and management of greater sage-grouse habitats. Ideally, this framework will be used to evaluate spatial and temporal variation of important components of sage-grouse habitats. The resulting analysis can then be utilized for developing long-term (e.g. land use plans) and short-term (e.g. project proposals) habitat objectives. The Framework should be completed in 2007, and will undergo a separate agency and science review process.

Goals

To complement and facilitate these efforts, a scientifically-based sage-grouse habitat assessment process would allow land managers to:

1. Identify, evaluate, and document existing sage-grouse habitat, habitat suitability, and needed habitat improvements.
2. Evaluate land use proposals on public and private lands that may influence sage-grouse habitat conditions or habitat improvement efforts.
3. Monitor the results of habitat treatments to determine if management actions have achieved the desired affects and that sage-grouse habitat needs have been adequately addressed.
4. Monitor the status of sage-grouse habitat at appropriate scales to assure habitat requirements for sage-grouse populations are being considered across jurisdictional boundaries.
5. Evaluate pertinent land use plan objectives and BLM Standards for Rangeland Health to assure sage-grouse habitat requirements are met when these objectives are addressed.
6. Provide a consistent framework for qualifying and quantifying sage-grouse habitats across state and federal jurisdictions.
7. Develop appropriate map layers to spatially depict habitat conditions for sage-grouse at multiple scales (e.g. improve sagebrush-stitched map, incorporate anthropogenic features) for range-wide analysis purposes.

Connelly et al. (2000) and Connelly et al. (2003) identify key habitat assessment and monitoring issues. However, there is a recognized need to specifically define these and monitoring methodologies that can be consistently applied across agency and state jurisdictions at multiple scales. The Bureau of Land Management, in collaboration with other federal and state agencies, WAFWA, academic institutions, and affected NGOs, has undertaken the task of developing the methodology and protocol for this habitat assessment and monitoring process in its *Framework for Describing Greater Sage-Grouse Habitat* (Framework). When complete (Spring 2007), the Framework will provide federal agencies with technical guidance and procedures to describe existing sage-grouse habitat, and defines common terms and descriptions. Connelly et al. (2003) emphasizes that sage-grouse habitat assessments are needed to: (1) document current or baseline conditions, (2) evaluate success of a habitat restoration program, (3) evaluate effects of potential land treatments, and (4) determine whether an area can support a reintroduced population. Sage-grouse are distributed over large landscapes. Therefore, general procedures are being developed and implemented that describe these habitats at multiple geographic or spatial scales (Connelly et al. 2003). Habitat descriptions needed for federal agency land use plans are much different than those needed at the site or project level. In addition, information collated at a broad scale is often helpful for finer scale descriptions (Quigley et al. 1997, Wisdom et al. 2000, Connelly et al. 2003).

The Framework will be composed of several sections. These sections include standardized habitat terms and descriptions, attributes of sage-grouse habitat suitability for specific scales of interest needed for applying the Framework, integration of information from the various scales for broader or more refined application, detailed procedural steps for describing habitat at mid-, fine, and site-level scale, suggested application of the Framework for land use planning, environmental assessments and monitoring, a Glossary, and Appendices with forms and field procedures.

The Framework is being developed by experienced wildlife biologists from multiple federal and state agencies, universities and conservation organizations, working closely with rangeland and landscape ecologists and botanists. There is a great deal of flexibility provided in the assessment procedure; however a certain degree of professional judgment is required in its application, hence the need for experience. Population and distribution data are limited for many sage-grouse populations in the west, and users of the assessment procedure will frequently be required to use broader scale data, other scientific references, and local information to help describe existing sage-grouse habitat.

There are several excellent references for more detailed information concerning life history or status of sage-grouse or sagebrush ecosystems (Schroeder et al. 1999, Connelly et al. 2000, Miller and Eddleman 2000, Connelly et al. 2003, Connelly et al. 2004). “Guidelines to Manage Sage-Grouse Populations and their Habitats” (hereafter referred to as Guidelines) (Connelly et al. 2000) and “Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats” (Connelly et al. 2004) are the primary syntheses of biological information regarding sage-grouse habitat requirements and needs.

Intended Application

The Framework is designed to provide standardized procedures and documentation formats for describing existing habitat for greater sage-grouse. Habitats are described at the time of the assessment, and are not intended to evaluate site potential or succession. Baseline habitat descriptions are necessary for habitat inventory and monitoring purposes and are the first step to predict future conditions under defined scenarios and assumptions.

The approach in this technical reference is designed to:

- Provide standardized terms and procedures for describing existing habitat.
- Describe sage-grouse habitat relative to site potential, using the best scientific information available.
- Describe existing habitat at various geographic scales (coarse, mid- and fine scales) important for BLM land use planning and management.
- Spatially depict habitats at multiple scales to facilitate analyses at coarse, mid and fine scales.
- Be flexible so that local environmental conditions can be considered.
- Be used by knowledgeable and experienced wildlife biologists in coordination with other specialists.
- Facilitate communication among program disciplines within BLM and interested parties concerning sage-grouse habitat needs.
- Provide a efficient data collection protocol for assessing sage-grouse habitats

The approach described in this technical reference is <u>not</u> designed to:

- Identify the cause(s) of current or baseline sage-grouse habitat conditions.
- Assess sage-grouse population management factors such as predation, hunting or disease.
- Describe existing or baseline habitat conditions for other sagebrush obligate wildlife species, although same procedural steps could be used.

The Framework can be used for a variety of applications; from qualitative descriptions that use habitat suitability worksheets, to long-term monitoring projects that incorporate scientific rigor. Definitions, recommended data collection methods and general suitability descriptions for important habitat indicators at the various scales are presented. All of this is intended to aid in communications concerning sage-grouse habitat and its suitability for sustaining productive populations. In this section some of the applications of the Framework with recommendations concerning the types of data needs are discussed.

Land Use Planning

The Framework provides the tools necessary for describing sage-grouse habitat for all land use planning efforts that may affect habitat. This application extends from land use plans to a 500-acre fuels management project. Baseline habitat Information derived from using the Framework would be included as part of the Existing Environment section of all environmental assessments (EAs) and environmental impact statements (EISs). Baseline information is needed to predict future conditions as a result of proposed management under certain alternatives.

Land Use Plans. Mid-scale habitat indicators can be used to help describe existing and desired future conditions for the planning area. Habitat availability, average patch size, patch isolation, area to edge ratio, edge effect and internal patch disturbances are indicators that would help describe habitat for a land use planning area. The most important mid-scale indicators used for describing existing habitat will vary between BLM field offices. In addition, current trends for the important mid-scale habitat indicators would be helpful for describing desired future conditions for the various alternatives.

Activity and Project-Level Planning. The Framework can be used to describe sage-grouse habitat and predict changes under the alternatives for all activity- or project-level plans and NEPA documents. Quantitative data at this scale is important if adaptive management is part of the project and and is needed to quantify changes in sage-grouse habitat. In these cases quantitative data should be collected to measure habitat changes as part of a monitoring protocol.

Standards and Guidelines Assessments for Rangeland Health. The Framework can be used for standards and guidelines at any level of precision desired and should follow general procedures described in Pellant et al. (2005).

Inventory, Monitoring and Adaptive Management

Habitat Inventory. The habitat description process outlined in the Framework is synonymous with the definition of wildlife habitat inventory (Cooperider et al. 1986). It is the initial habitat descriptive effort for an area from which future conditions are predicted and then assessed through monitoring. First time use of the Framework for an area of concern is therefore a habitat inventory work element and not a monitoring effort. Habitat inventory will include the development and integration of spatially explicit information that allows analysis across multiple scales.

Monitoring. Wildlife habitat monitoring consists of repeated measurements of habitat indicators over time to detect habitat changes and in many cases the cause of the changes (Cooperider et al.1986). Habitat monitoring is usually done for two primary reasons:

1. Measure effects on habitat as a result of a land use that may affect species of concern and its habitat. Monitoring is associated with a specific land use project and indicators sensitive to project-related effects should be measured.
2. Measure habitat change over time for a particular area of concern, irrespective of individual land uses. Monitoring is associated with detecting long-term changes on the landscape.

The Framework can be used to describe baseline habitat conditions for mid- through site-scales and then repeated in the future to evaluate habitat change over time for either of the above reasons. Habitat monitoring will include spatially explicit information that allows analysis across multiple scales, and how these change over time.

Adaptive Management. Adaptive management incorporates monitoring and research into land use planning and implementation. It integrates project implementation with monitoring and research to test project planning assumptions. This kind of management assumes that projects will be changed if monitoring and research data indicate that future conditions were wrongly predicted. The degree of precision and sampling rigor used to describe habitat will be determined by the purpose of the project. However, habitat measurements and repeatability are a prerequisite for adaptive management to detect change. Quantitative data should be collected, particularly for those indicators that will be sensitive to the land use change being proposed.

Conservation Strategies

Implementing Habitat Monitoring

ISSUE: There currently is no consistent methodology for describing sage-grouse habitat for all land use planning activities at various scales which may affect sage-grouse habitats. A standardized process is needed to inventory and monitor sage-grouse habitats and that process should be capable of being modified in an adaptive manner if more information becomes available or if land use planning assumptions change		
Sub-Issue: Develop a habitat assessment framework that can be used consistently across state and federal agency jurisdictions to inventory and monitor sage-grouse habitats.		
OBJECTIVE 1: Develop techniques to describe and assess sage-grouse habitats to be used in habitat inventory and monitoring efforts at multiple scales that support land use planning activities and project implementation.		
Conservation Strategy	**Who** (lead agency is in bold)	**When**
Incorporate Habitat Assessment Framework mid-scale analyses into Land Use Plan Revisions	**BLM, USFWS, USFS, Park Service, NRCS, USGS-BRD, State wildlife agencies**	At revision or amending of land use plans
Incorporate Habitat Assessment Framework fine scale analyses into project planning and implementation		Project assessments and decisions
Insure consistency of habitat framework assessment and rangeland health guidelines		Land Use Plans and Project assessments and decisions
Inventory - Utilize habitat framework assessment for evaluating amount and distribution of sage-grouse habitats at population scale		Complete within 5 years
Monitoring - Utilize habitat framework assessment for evaluating trends of sage-grouse habitats at population scale		Every 5 years following inventory
Inventory Feedback - Insure incorporation of inventory data from habitat framework assessment is incorporated into land use planning and project level decisions		As inventories are completed – within 5 years; incorporate inventory findings into management guidance
Monitoring Feedback - Insure incorporation of monitoring data from habitat framework assessment is incorporated into land use planning and project level decisions		Every 5 years, change management as appropriate based on monitoring feedback

ISSUE: There is currently no standardized and statistically rigorous method to monitor the status and trend of sage-grouse populations at local regional and range-wide scales.

SUB ISSUE: Sage-grouse population monitoring

OBJECTIVE 1: Develop techniques to monitor greater sage-grouse populations to detect changes in their populations at local, regional, and range-wide scales.

Conservation Strategy	**Who** (lead agency is in bold)	**When**
Develop standardized methods for monitoring distribution, trend, and abundance of sage-grouse populations.	**WAFWA, Sage and Columbian Sharp-tailed Grouse Technical Committee**	1st quarter 2007
Develop sampling strategies that reduce biases associated with current monitoring techniques.		2nd quarter 2007
Develop population monitoring accuracy goals (ability to detect differences or changes) over biologically significant time periods.		2nd quarter 2007
Develop consistent data collection standards and definitions that are used across the range of the species.		3rd quarter 2007
Develop a process by which data collection and analyses is coordinated for sage-grouse management zones.		3rd quarter 2007
Develop a list of recommended research needs to improve uncertainties in the underlying assumptions in current monitoring techniques.		4th quarter 2007
Produce a techniques manual that outlines the results.		4th quarter 2007

ISSUE: There is need to implement new population monitoring techniques through a scientific process including peer-review and experimentation so that the techniques meet a highest possible scientific standards.

OBJECTIVE 1: Facilitate the review, experimentation, and implementation of the techniques manual.

Conservation Strategy	**Who** (lead agency is in bold)	**When**
Once the techniques manual is developed, conduct a peer review of its contents and scientific quality	**WAFWA, Sage and Columbian Sharp-tailed Grouse Technical Committee**	1st quarter 2008
Implement new techniques on an experimental basis and validate		2008-2009
Revise techniques as appropriate and implement range-wide		2010

ISSUE: There is a need to develop metrics to evaluate effectiveness of conservation actions to sage-grouse populations at local, regional, and range-wide scales.

OBJECTIVE 1: Provide information and expertise to local agencies and working groups to help evaluate the effectiveness of on-the-ground conservation and management actions to sage-grouse populations;

Conservation Strategy	**Responsible Parties** (lead agency is in bold)	**Timeline**
Produce recommended metrics for monitoring sage-grouse populations	**Consortium[1]/Technical Committee**	Begin 2008
Provide expertise to local agencies and biologists for monitoring sage-grouse populations		

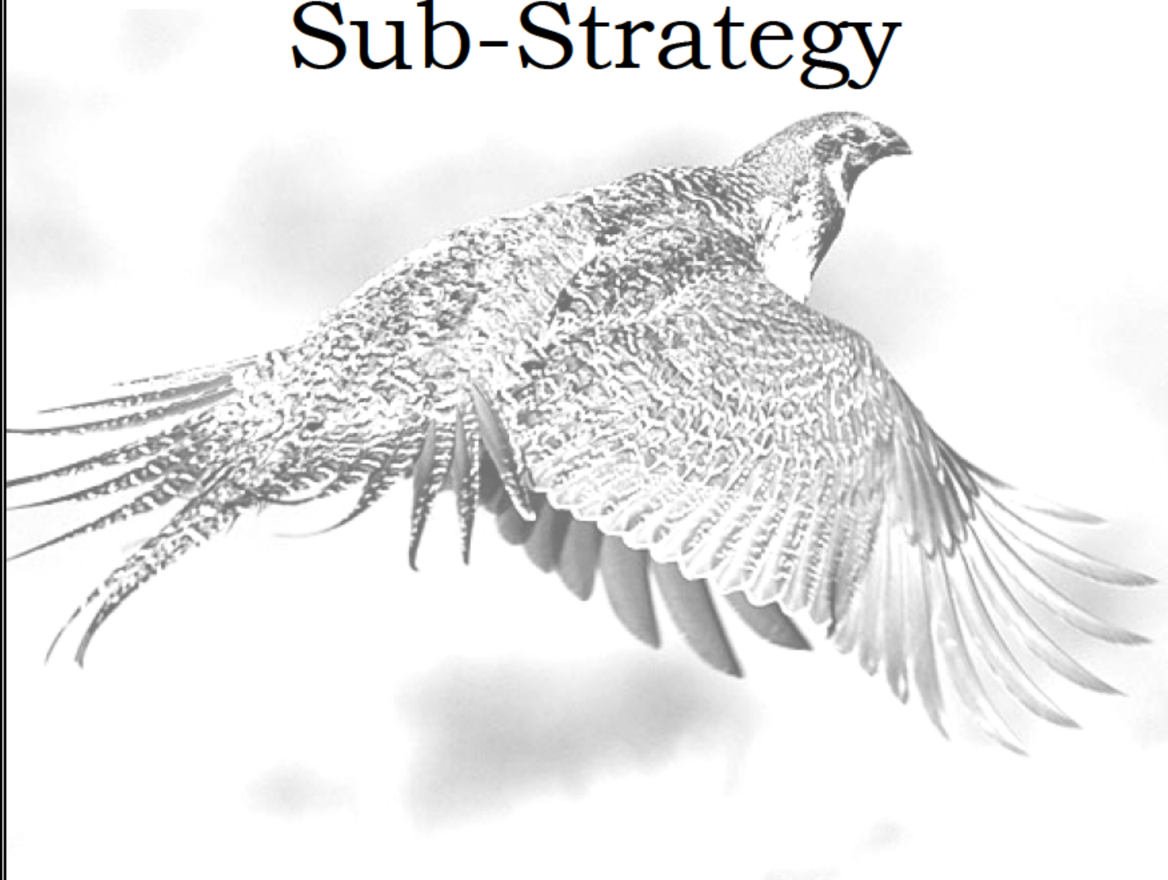
[1] Refer to Chapter 7 which discusses the role of the consortium

ISSUE: There is a need for infrastructure/resources to complete, implement, and evaluate new population monitoring techniques
and provide biological expertise on monitoring to local agencies and working groups

OBJECTIVE 1: Develop infrastructure/resources to complete, implement, and evaluate new population monitoring techniques
and provide biological expertise on monitoring to local agencies and working groups

See Chapter 6

Chapter 4
Implementation Monitoring Sub-Strategy



CHAPTER 4

Implementation Monitoring Sub-Strategy

Background

The success of the greater sage-grouse conservation effort is dependent upon a series of actions that monitor not only the responses of habitat, sage-grouse and other wildlife species to treatments, but the actual commitments to conservation planning, action plans and implementation of those efforts by responsible parties. The implementation monitoring sub-strategy provides strategies and products for reporting activities for evaluating implementation progress.

The U.S. Fish and Wildlife Service (USFWS) and National Oceanic and Atmospheric Administration's (NOAA) 2003 Policy for Evaluation of Conservation Efforts (PECE) identifies the need to monitor implementation of conservation efforts. PECE is an important component of the evaluation protocols used by the USFWS in their deliberation on merits of listing species. The policy explicitly identifies nine points of consideration to determine the likelihood that a conservation action will be implemented. These nine points of consideration include,

> *"1) The conservation effort, the party(ies) to the agreement or plan that will implement the effort, and the staffing, funding level, funding source, and other resources necessary to implement the effort are identified. 2. The legal authority of the party(ies) to the agreement or plan to implement the formalized conservation effort, and the commitment to proceed with the conservation effort are described. 3. The legal procedural requirements (e.g. environmental review) necessary to implement the effort are described, and information is provided indicating that fulfillment of these requirements does not preclude commitment to the effort. 4. Authorizations (e.g., permits, landowner permission) necessary to implement the conservation effort are identified, and a high level of certainty is provided that the party(ies) to the agreement or plan that will implement the effort will obtain these authorizations. 5. The type and level of voluntary participation (e.g., number of landowners allowing entry to their land, or number of participants agreeing to change timber management practices and acreage involved) necessary to implement the conservation effort is identified, and a high level of certainty is provided that the party(ies) to the agreement or plan that will implement the conservation effort will obtain that level of voluntary participation (e.g., an explanation of how incentives to be provided will result in the necessary level of voluntary participation). 6. Regulatory mechanisms (e.g., laws, regulations, ordinances) necessary to implement the conservation effort are in place. 7. A high level of certainty is provided that the party(ies) to the agreement or plan that will implement the conservation effort will obtain the necessary funding. 8. An implementation schedule (including incremental completion dates) for the conservation effort is provided. 9. The conservation agreement or plan that includes the conservation effort is approved by all parties to the agreement or plan."*

In addition to the PECE evaluation, WAFWA members need a tool to better evaluate the activities and implementation schedules of the greater sage-grouse conservation efforts. An implementation monitoring program provides an inventory of performance. The program will also identify the geographical extent and types of treatments as well as gaps in conservation efforts while providing data for PECE.

Data Considerations

The combined greater sage-grouse conservation efforts generate, use and evaluate significant quantities of data. Conservation efforts or treatments often require review and evaluation of information from various sources and data of variable quality. The evaluation of effectiveness of a conservation effort requires the collection, storage and analysis of data in an objective and scientifically credible treatment.

Data Quality Act (The Information Quality Act (IQA). The IQA, sometimes referred to as the Data Quality Act, was enacted in December 2000 as Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001 (P.L. 106-554).) The Act in its entirety:

> *(a) IN GENERAL. — The Director of the Office of Management and Budget shall, by not later than September 30, 2001, and with public and Federal agency involvement issue guidelines under sections 3504(d)(1) and 3516 of title 44, United States Code, that provide policy and procedural guidance to Federal agencies for ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by Federal agencies in fulfillment of the purposes and provisions of chapter 35 of title 44, United States Code, commonly referred to as the Paperwork Reduction Act.*
>
> *(b) CONTENT OF GUIDELINES. — The guidelines under subsection (a) shall (1) apply to the sharing by Federal agencies of, and access to, information disseminated by Federal agencies; and (2) require that each Federal agency to which the guidelines apply (A) issue guidelines ensuring and maximizing the quality, objectivity, utility, and integrity of information (including statistical information) disseminated by the agency by not later than 1 year after the date of issuance of the guidelines under subsection (a); (B) establish administrative mechanisms allowing affected persons to seek and obtain correction of information maintained and disseminated by the agency that does not comply with the guidelines issued under subsection (a); and (C) report periodically to the Director (i) the number and nature of complaints received by the agency regarding the accuracy of information disseminated by the agency; and (ii) how such complaints were handled.*

Provisions of the IQA have been applied to deliberations regarding federal sage-grouse decision-making in the past. We anticipate that sage-grouse management data will continue to be evaluated using the IQA. The standards identified in the IQA should be fully considered when using data in support of conservation efforts.

Metadata. The primary functions of metadata, which is defined as information about data, include the facilitation of the retrieval, integrity, and management of records. Further, metadata allows an evaluation of the context, structure, and content of data. Finally, metadata provides a record of the history and veracity of the data record. Data gathered and stored by the sage-grouse conservation partnership are widely distributed geographically and by ownership. Metadata strategies ideally will allow users to find, retrieve and evaluate data from all of the partners. Partners collecting data from conservation activities should collect and archive metadata to provide the maximum utility of the data.

Data Ownership. Data are collected by nearly all parties conducting greater sage-grouse conservation efforts. Most of these data are proprietary and control, access, and ownership belong to the collecting partner. Range-wide data management strategies must be sensitive to ownership issues including Freedom of Information Act or comparable data access laws or regulations. Some datasets, particularly those involving projects on private lands, may be difficult to collect because of privacy issues. The strategies should be sensitive to those issues and develop alternatives to account for these projects. Inventory of existing datasets and emerging datasets has been difficult because of the number of data collectors, format, and storage of these data. Currently, most datasets reside within the collecting agency. Some datasets have been shared in data portals such as SAGEMAP (http://sagemap.wr.usgs.gov/).

Scope of Activity Reporting

One important component of successful implementation of the Strategy is the commitment to conservation at multiple scales. A challenge of the Strategy is to encompass what is being done at state and local scales, recognizing the contributions made by private, state, and federal land owners, state, provincial and federal wildlife agencies, NGOs, tribal entities, and private stake-holders, while at the same time provide guidance and feedback from a range-wide perspective. The approach to conservation efforts varies among and within each state or province. The conservation planning documents and management guidelines created by these partners are in various stages of completion and come in a variety of formats. Additionally, the protocols for reporting and transferring information pertaining to their conservation efforts are also quite diverse. The ability to keep track of planning and implementation schedules, as well as outcomes from the actions and where potential data gaps may exist, is facilitated by the use of well organized and consistent data.

Scope of Conservation Efforts. Currently nine of the eleven states have state-wide conservation or recovery plans including: California (joint with Nevada), Idaho, Montana, North Dakota, Nevada, Oregon, Utah, Washington, and Wyoming. Colorado recently completed a similar effort for Gunnison Sage-grouse and expects to have a plan completed for greater sage-grouse in July, 2007. South Dakota is also in the process of completing a state-wide conservation plan. Most state and provincial plans are strategic in nature; however, most plans have identified some conservation efforts that are appropriate for their respective jurisdiction.

Community-based Local Working Groups (LWG) have become an integral part of sage-grouse conservation in many of the western states. LWGs represent a wide variety of stake-holders including: federal and state agencies, tribal and local governments, private landowners, livestock and energy industries, and conservation groups. LWGs are addressing conservation concerns specific to their area and are developing local planning documents in tandem with the state-based plans. To date, 52 LWGs have been established range-wide, 39 of which already have (or expect to have) local conservation plans in place by December, 2006 (Table 4.1). Another two are expected by December, 2007, and six by December 2008. The LWG model has not been employed in three of the states (i.e. Washington, North Dakota, and South Dakota), nor Saskatchewan, where sage-grouse populations are relatively small and somewhat isolated. Instead, they have formed a single state-wide sage-grouse team or operate under the Canadian Sage Grouse Recovery Team respectively, to plan and direct conservation efforts. Many of the LWG conservation plans are two-pronged, in that their “strategic” goal-oriented statements are complemented with a “tactical” list of actions designed to achieve those goals. (Table 4.1)

Federal agencies including: the Bureau of Land Management, U.S. Forest Service, U.S. Fish and Wildlife Service, Department of Energy, Department of Defense, and numerous tribal nations control more than 70% of all sage-grouse habitat. These agencies and nations may initiate sage-grouse conservation efforts that fall outside the efforts of states, provinces or LWGs. The remaining 30% of sage-grouse habitat largely falls within the private domain. These private lands are critically important to sage-grouse and sage-grouse conservation efforts, because of their inherent productivity, water and relationship with federal lands. Non-governmental organizations, Natural Resources Conservation Service (NRCS), and Farm Services Agency (FSA) work directly with private landowners. Sage-grouse conservation efforts by these parties can affect the sage-grouse habitat on private lands, but are not necessarily reported through traditional reporting processes.

Greater sage-grouse conservation treatments form the cornerstone of the primary goals of the Strategy. The number of stakeholders involved in the prescription and administration of treatments, conservation efforts, and research exceed 100 parties. The treatments vary greatly in geographical and temporal scales, goals, objectives, funding, partners, and monitoring. The number of sage-grouse conservation efforts, with a mature conservation program, will likely be numbered in the thousands. Every conservation effort has value and it is important to tally what is being done, where it is being done, why it is being done, and who is doing it. The vision of this Strategy is to have states, agencies, and partners establish and maintain a long-term coordinated system that will inform biologists and other decision makers of the progress being made on implementation of strategies designed to preserve and, where possible, enhance sage-grouse populations by protecting and developing healthy sagebrush ecosystems.

Reporting Progress

A synthesis of range-wide conservation information requires a well-coordinated comprehensive approach to ensure that certain core data are collected from all entities working with sage-grouse. These data should be reported in a timely and cost effective manner so a thorough and relatively seamless range-wide report can be supported. The creation of a range-wide database will be used to identify gaps in information and geographic coverage of conservation efforts. Moreover, it will provide a consistent and timely means to keep track of conservation planning updates and project implementation. The end product will be a semi-automated, spatially explicit reporting tool that biologists and policy-makers can use to make informed decisions. The database will be provide users the ability to “ad hoc” query and produce time certain reports.

Computer-based Spatially Oriented Query Database. One goal of this Strategy is to present information about conservation planning and project implementation geographically. This requires that project information be provided with the appropriate spatial information as either a location description or a Geographic Information System (GIS) file. Using a standard internet browser, conservation planning information will be made so that it is spatially oriented, readily accessible, easy to use, and provides solid information that can be incorporated into decision-making. This web-based inquiry system will enable periodic updates on conservation planning and implementation progress including: identification of specific conservation issues and goals, project descriptions, implementation schedules, dollars spent, and project partners for any state, province, LWG, or other responsible reporting entity. The semi-automated reporting mechanism will meet another important goal of the Strategy to help individual groups keep track of their conservation planning schedules and conservation actions.

A recently developed web-based project that meets some of these objectives is the Sage-grouse Local Working Group Locator (http://greatbasin.nbii.gov/lwg/index.asp) (Figure 4.1). The LWG Locator provides the structure of a geographic database and a range-wide communication network; however it would need to be developed further to be capable of handling the full-scale objectives of the Implementation Monitoring Sub-strategy. The tracking of implementation schedules and outcomes, funding sources, and reporting tools, would require further development. The site was designed for and about LWGs but has the potential to expand and include a broader collection of partners (e.g. universities, federal agencies, tribal entities, non-government agencies, etc). The National Biological Information Infrastructure (NBII) provided the base funding for this project, which is being served in conjunction with the Great Basin Information Project (http://greatbasin.nbii.gov/) and SAGEMAP (http://sagemap.wr.usgs.gov/).

Program Generation. The generation of range-wide reports will require three primary steps: 1) the data must be collected from the various planning groups; 2) that information must be integrated into the regional database; and 3) the web-based spatially oriented reporting tool must be created and made available for use. Some of the factors to determine how best to collect and disseminate this information include: what core variables are needed, when and how the data requests and updates are made, who maintains the database over time, and what are the possibilities of reporting styles.

All projects typically involve a federal, state, or provincial agency in the form of financial support, personnel, or land base. The representative agency is a valuable resource that can facilitate the information exchange between the planning group and Intermountain Joint Ventures. For instance, LWGs report to their state or provincial sage-grouse coordinator. Federal agencies have various reporting protocols, but if planning and project information could be funneled to a key contact or state-level reporting node (i.e. field offices to the state office), this would help centralize and streamline their information for integration into the range-wide database.

One strategy for obtaining information from designated contacts may be a periodic email survey (e.g. Survey Monkey), where questionnaires are sent out requesting the most recent updates to current reports and planning activities. Alternatively, the planning and project information could be uploaded directly by project managers to an on-line database, provided that certain quality control measures are in place to protect the integrity and consistency of the data. A third option would be to have each reporting entity (i.e. state, province, LWG, etc.) include a "recent updates" section on their respective websites, which would be accessible as a downloadable file.

The web-based reporting tool will allow users to query by location (i.e. "clicking and dragging" over an area of interest) or by planning entity (i.e. select from a list of planning entities) to download information including conservation reports, planning timelines, and project information. The reporting program will be designed as a semi-automated and self-sustaining mechanism that is readily accessible, intuitive, and adjustable to meet future needs and interests. Where issues of confidentiality are involved, some data may be limited to authorized users only. Ideally, new planning and project information will be uploaded directly and routinely so that the regional database remains current and complete. An example of how this might work is the National Wildlife Habitat Project Registry (http://geodataservicesinc.com/nwhpr/), an interactive website created by Geodata Services, Inc. provides habitat project information for multiple species nation-wide.

Data Host. The range-wide database and web-based reporting system will require the stability of a long-term data host. A likely candidate is the U.S. Geological Survey (USGS) because of their well established commitment to sage-grouse and sagebrush issues, technical expertise, and non-regulatory status as an agency. In addition, many are familiar with the USGS website, Sagebrush and Grassland Ecosystem Map Assessment Project or SAGEMAP (http://sagemap.wr.usgs.gov/), which currently hosts the Range-wide Sage-grouse Conservation Assessment and all associated spatial datasets used in the assessment. The Range-wide Sage-grouse Conservation Strategy would fit neatly into the framework of SAGEMAP.

Another potential host is the National Wildlife Habitat Project Registry (see description above). Geodata Services, Inc. was granted funding from the National Fish and Wildlife Foundation and Anheuser-Busch Companies, Inc. along with support from multiple other founding partners to develop a central clearinghouse where potential partners can share project information and cooperatively leverage funds for future conservation efforts. The site allows the user to: 1) upload new project information along with a spatial reference; 2) search previously recorded projects by location or by management entity; and 3) generate reports with project information such as the project description, who donated time and funding, and local recognition. One primary benefit of the Wildlife Habitat Project Registry is the database infrastructure has already been created and is in use for multiple wildlife species, many of which occur within the range of sage-grouse.

In light of the many partners and potential data hosts, to ensure the greatest economic and mechanical efficiency, the Implementation Monitoring Sub-strategy requires a fully integrated semi-automated system that draws upon existing resources, while effectively channeling that information into a usable and replicable format. The personnel, computing resources, and networking capabilities will need to be clearly identified. Ideally, each reporting entity will designate a single point of contact who will work closely with the party responsible for assembling, filtering, posting, and managing the database. Long-term data storage requirements and issues pertaining to data ownership will also need to be addressed. Each reporting entity will directly benefit from having a formalized information collection and reporting process by assisting them to keep track of their own implementation schedules and progress as well as identify the different elements required to meet PECE standards. Decision-makers will have improved access to specific information based on geographic area of interest through the queriable database. Ultimately, the success of the reporting system will be dependent on the flexibility, cooperation, and commitment of all partners.

Conservation Strategy

Issue: Develop a short-term (until NASECA passage) commitment to develop, implement and house the implementation monitoring database.		
Objective: Meet with partners that have a been involved with the implementation monitoring strategy and develop a commitment for program development and resource needs		
Conservation Strategy	**Who (lead agency is in bold)**	**When**
Convene a meeting with partners to determine commitments and resource needs.	**WAFWA**, Utah State University, USGS (SAGEMAP) and Wildlife Habitat Registry	1st Quarter 2007
Develop software to capture and display implementation data and reporting system. Provide secure housing for data.	**Partner,** WAFWA	3rd Quarter 2007
Develop a system to populate the database with input from the conservation action implementers	**Partner**	3rd Quarter 2007
Report implementation monitoring progress	**Partner**, WAFWA	3rd Quarter 2007, "Ad Hoc" , sub-strategy progress reports and annual reports

Table 4.1. Survey of planning schedules and progress by LWGs range-wide.

State/Province	Lead Agency*	State/Provincial Plan Complete Date (completed or anticipated)	Single State-wide or Provincial Group	Number LWGs currently in place	Number LWGs with completed Plans	Number LWGs with Plans anticipated by Dec 2006	Number LWGs implementing projects**	Number LWGs planning projects or in draft stages of Plan	Number LWGs in early phases of group development; Meeting
CA	CDFG/BLM	Jun-04		3 (2 shared with NV, 1 wi h OR & NV)	(2 shared with NV	1	2 (2 shared with NV)		
CO	CDOW	Jul-07		5	3	1	3	2	
ID	IDFG	Jul-06		10	1	5	0	6	4
MT	MDFWP	Feb-05		3	working from state plan	0	0		3
ND	ND DGF	Jul-05	yes	n/a	working from state plan	n/a	1		
NV	NDOW	Jun-04		7 (2 shared with CA)	7 (2 shared with CA)	0	6 (2 shared with CA)	1	
OR	ODFW	Aug-05		5	working from state plan	0	5	5	
SD	SD DGFP	in progress	yes	n/a	will work from state plan	n/a	0		
UT	UDWR/UT's CBCP	Jun-02		12 (1 = Gun SG)	1	11	10	11	1
WA	WDFW	May-04	yes	n/a	working from state plan	n/a	1		
WY	WDGF	Jul-03		8	0	8	8	8	
Alberta	**ADFW**	Dec-06	yes	1	working from national plan	1	1		
Saskatchewan	SERM	Jul-01	yes	n/a	working from national plan	n/a	1		
TOTALS:				51	12	26	36	33	8

* CDFG/BLM = California Department of Fish & Game/Bureau of Land Management; CDOW = Colorado Division of Wildlife; IDFG = Idaho Department of Fish & Game; MDFWP = Montana Department of Fish, Wildlife & Parks; ND DGF = North Dakota Department of Game & Fish; NDOW = Nevada Division of Wildlife; ODFW = Oregon Department of Fish & Wildlife; SD DGFP = South Dakota Department of Game, Fish & Parks; UDWR/UT's CBCP = Utah Division of Wildlife Resources/Utah's Community-based Conservation Program; WDFW = Washington Department of Fish & Wildlife; WDGF = Wyoming Department of Game & Fish; AFWD = Alberta Fish & Wildlife Division; ADFG = A berta Division of Fish & Wildlife; SERM = Saskatchewan Environment and Resource Management.

** Projects identified in Conservation Plans (or draft Plans).

Figure 4.1. The Sage-grouse Local Working Group Locator home page.

Chapter 5
Research and Technology

CHAPTER 5

Research and Technology

Introduction

Effective management of greater sage-grouse and their habitats is dependent on accurate information on populations, demography, behavior, habitat quality, habitat distribution, and many other factors (Connelly et al. 2004). Effective management also should be adaptable as new information is obtained or the effects of previous management actions monitored and evaluated. This 'new' information should be applied to subsequent management actions, a concept described as 'adaptive management' (Aldridge et al. 2004).

Research is a fundamental component of an effective adaptive management strategy (Aldridge et al. 2004, Appendix C). Research is considered here as a broad categorization of many topics including, inventory, monitoring, and evaluation of specific questions related to the understanding or management of greater sage-grouse. Research should provide the baseline data to initiate management strategies, as well as the information to evaluate past and ongoing management actions (Connelly et al. 2004). Many of the research topics presented below have been addressed in general or in detail by many other plans, reports, or publications (e.g., Patterson 1952, Braun 1987, 1988, 1996; Connelly and Braun 1997; Rowland and Wisdom 2002; Knick et al. 2003; Connelly et al. 2004). Many of the topics have also been identified by the greater Sage-grouse Range-wide Issues Forum, directly, or in conjunction with recommended management activities (Appendix C).

The following recommendations for research are based on current perceptions of needs and recommendations, including those provide by the Greater Sage-grouse Range-wide Issues Forum (Appendix C). The Forum focused on 5 major issues including: 1) habitat conservation and land use; 2) habitat restoration; 3) science, data, and information; 4) regulatory mechanisms; and 5) integration and coordination across range and jurisdictions. The role of research and technology is important with all the previously listed issues, but particularly with the first three issues. The Forum also listed numerous specific research and/or monitoring goals that are associated with the general issues including: 1) Conservation of important and/or intact habitats; 2) Identification and mapping of invasive species including conifers; 3) Management of grazing to maintain a properly functioning sagebrush community; 4) Evaluation of direct and indirect impacts of fencing; 5) Determination of the effects of water management on the sagebrush biome; 6) Evaluation of effects of energy corridors and associated facilities; 7) Evaluation of effects of roads, trails, and railroads; 8) Evaluation of impacts of tall structures; 9) Evaluation of dispersed recreation; 10) Evaluation of numerous BMPs related to development and agriculture; 11) Development and evaluation of control measures for invasive species; 12) Evaluation of restoration techniques to insure their effectiveness; and 13) Evaluation and development of techniques for reestablishing native plant communities. In addition, the Forum recommended improved networks for dissemination and exchange of consistently collected data. It is also important to consider that all research needs are not known at this time. As research and management are conducted, additional research needs are likely to be illuminated. Some of these may be emerging issues (i.e., West Nile Virus; Naugle et al. 2004) that cannot be predicted in advance. In addition, management needs in the future, that are as yet unknown, may require a research response. Hence, research itself needs to have an adaptive component.

Technology

Remote Sensing

Remote sensing technology, such as Geographical Information Systems (GIS), is a rapidly evolving field. Techniques for evaluating and mapping habitat are constantly being improved as well as the precision of the underlying imagery or photography. The same is true with potential techniques for monitoring sage-grouse such as precision photography or infra-red photography (i.e., forward-looking infra-red). Although there are many promising areas of GIS research, one of the most promising and useful is the application of GIS in the mapping of seasonal habitats and in the monitoring of long-term changes in habitat quantity and quality across the range of sage-grouse (Homer et al. 1993, Jacobson and Snyder 2000). These long-term changes can include infestation by noxious weeds, encroachment by conifers, development, and restoration progress (Miller and Eddleman 2000, Hemstrom et al. 2002, Rowland and Wisdom 2002). This type of research would have significant ramifications in virtually every area of sage-grouse management (Dobkin 1995, Edelmann et al. 1998, Schroeder et al. 2004) and would address recommendations of the Forum (Appendix C).

Telemetry

Technology has also evolved rapidly in the field of population research (Boag 1972, Biggins and Pitcher 1978, White and Garrott 1990). This technology includes, but is not limited to, radio telemetry. The design of radio transmitters has constantly been improved with respect to attachment techniques, weight, design, and functionality. Despite the improvements, additional opportunities remain for development and application of improved techniques and technology including satellite transmitters, GPS transmitters (Weimerskirch et al. 2002), and transmitters capable of recording physiological data (Mech and Barber 2002, Weimerskirch et al. 2002).

Genetics

Although genetic technology has rapidly advanced, there is clearly room for additional advancements, not only in techniques, but in application. This potential includes the consideration of parentage, inbreeding, outbreeding, and relationships between genetics and behavior and fitness. For example, new techniques can be applied that permit the remote examination of genetics (without capturing the sage-grouse) in such a way that the results can be used to estimate population size, monitor and evaluate genetic drift or change, and consider the effects of habitat alteration (Oyler-McCance and Leberg 2005).

Monitoring

Habitat

Connelly et al. (2003:3) provided four basic reasons to assess habitat including: “1) to document current condition and trend of habitat; 2) to evaluate impacts of a land treatment; 3) to assess the success of a habitat restoration program; and 4) to evaluate the ability of habitat to support a reintroduced population.” All four of the above reasons have a stated or underlying assumption that research will be done to assess current conditions as well as to monitor long-term changes. Chapter 3 provided a similar list of habitat monitoring goals including: 1) Identify and evaluate habitat; 2) Evaluate land use proposals on public and private lands that may influence habitat conditions; 3) Monitor the results of habitat treatments to determine if management actions are achieving the desired affects; 4) Monitor habitat at appropriate scales to assure habitat requirements for sage-grouse are being met; and 5) Evaluate pertinent land use objectives. Habitat monitoring standards are currently being developed for the BLM and the overall range of sage-grouse (Chapter 3).

Habitat monitoring research has become increasingly important, but has often depended on dramatically variable sets of data, requiring substantial interpretation (Knick 1999, Knick and Rotenberry 1997, Anderson and Inouye 2001, Connelly et al. 2004). Unfortunately, despite improving technology, there is still a shortage of established habitat monitoring techniques available to monitor long-term change in habitats, as well as to monitor habitat change in relation to designed management activities (Herrick et al. 2005*a*, *b*). Without this established protocol, monitoring of habitat will continue to depend on the careful interpretation and painstaking data manipulation necessary to compare disparate sets of data (Connelly et al. 2004). Improved technology (i.e., GIS and models), as well as data management systems, are needed to improve the process of habitat monitoring. These data management systems should ultimately insure that data across the range is being collected in comparable ways and that this data are available for interpretation by a wider audience of scientists and managers (Forum, Appendix C).

Lek Surveys and Counts

Monitoring of males on leks is a fundamental component of sage-grouse monitoring and therefore is extremely important (Autenrieth 1981, Crawford and Lutz 1985, Schroeder et al. 2000, Connelly et al. 2003, Aldridge and Brigham 2003, Connelly et al. 2004, Walsh et al. 2004, Strohm 2005). The current protocol for monitoring populations of greater sage-grouse has been outlined earlier in this document (Chapter 3). Unfortunately, the accuracy of monitoring efforts is affected by many unknowns such as: 1) the attendance rates of males; 2) the attendance rates of females; 3) variation in attendance due to age, time of day, time of year, and relationship with the peak of female nesting; 4) variation in the technology used to capture and mark birds for monitoring; and 5) observational biases associated with observer, habitat, region, and topography (Emmons and Braun 1984, Jenni and Hartzler 1978, Walsh 2002, Connelly et al. 2004, Walsh et al. 2004, Strohm 2005). There are many other unanswered questions. For example, what data are necessary to estimate attendance rates? Can lek attendance rates be used to provide an indication of the previous year's productivity? Are there other techniques that can be applied to the issue such as infra-red photography, GPS transmitters, active transponders, and passive-integrated-transponders (PIT tags)? Can female attendance provide useful information related to the timing of nesting, male visitation, habitat condition, and estimation of sex ratio?

If the basic lek surveys can be shown to be reliable, are the existing protocols that have been established (Beck and Braun 1980, Connelly et al. 2003, Chapter 3) sufficient to insure the consistent collection of data throughout the range? Perhaps the largest unknown is whether these surveys can be used to estimate population size or population trends reliably and with confidence intervals (Anderson 2001, Connelly et al. 2004). If lek counts or surveys cannot be demonstrated to be reliable, it is possible that new techniques for capturing and monitoring sage-grouse will have to be considered and evaluated (Giesen et al. 1982, Walsh et al. 2004). The primary information used to verify lek count techniques through this date has been the comparison of lek count results with other types of survey data, the downward trend of lek counts for populations that eventually were extirpated, and the examination of lek count assumptions with simulated data (Connelly et al. 2004). These comparisons are all more complicated as a result of the 'normal' population fluctuations apparently exhibited by sage-grouse (Crawford et al. 2004), sometimes referred to as cycles (Rich 1985).

Established techniques for monitoring sage-grouse rely on the observability of males (Connelly et al. 2003, Chapter 3). The sex ratio in a population is sometimes used or estimated so that the total population can be estimated based on the count of males (Beck and Braun 1980), but the reliability of this technique for estimating populations has been questioned (Connelly et al. 2004, Walsh et al. 2004). The sex ratio may also offer important insight into the estimation of effective population size, and hence may have ramifications on population viability (Stinson et al. 2004). Unfortunately there is little information supporting an established sex ratio for sage-grouse, in part because it may vary by year, region, management (i.e., harvest rate), and population trend. The data needed to accurately estimate sex ratio and the potential techniques to provide a reliable estimate of sex ratio are not clear.

Brood Surveys

Brood surveys are an established technique in some areas designed to provide an indication of abundance and distribution as well as an index of productivity (chicks/female), but particularly Oregon (Willis et al. 1993). Do brood surveys or routes provide useful information that can be applied to the long-term monitoring of sage-grouse populations or to the identification of critical habitat? With regards to this question, it would be useful to know how the results from brood surveys compare with the results of other surveys including lek and harvest surveys (Connelly et al. 2003). Furthermore, if the results of brood surveys vary by year, region, weather, date, or observer, it is important that this variation be controlled.

Harvest surveys

In states where sage-grouse are legally harvested, there is a responsibility to monitor the harvest in some way (Connelly et al. 2005). Ideally, this monitoring will enable an evaluation of both the harvest and the population(s) supporting the harvest (Connelly et al. 2003, 2004). The three most common techniques for monitoring harvest include hunter questionnaires or surveys, wing collections (Braun 2002), and bag counts. The most traditional technique is the bag count. By directly contacting the hunter, biologists are able to ask questions, thus obtaining information on harvest rates, success rates, and hunter behavior. Nevertheless, bag counts are difficult to conduct over a broad area with the consistency necessary to making sweeping assessments of both hunters and the harvested species. Consequently, surveys of hunters by telephone or mail have been used to standardize the survey effort and improve the quantification of the results. Two downsides of questionnaires are that it is difficult to survey a suitable number of sage-grouse hunters and the harvested birds are not examined. The third technique, wing collection, allows birds to be examined (enough to determine sex and age, Beck et al. 1975), but can be limited with regard to the information collected from hunters and the lack of standardization among hunters and regions. It is for this reason, that wing collections are sometimes combined with other techniques (i.e., mailed in envelopes) so that the quality of the data can be improved.

For all harvest surveys, there is often a lack of information providing quantifiable comparisons with other types of techniques (i.e., lek surveys). Consequently, it is difficult to verify the reliability or useful of the results obtained with these techniques. If harvest surveys are going to be used in the future, it is clear that their reliability should be assessed and the techniques improved, if possible. These improvements should include considerations of sample size, stratification, randomization, and repeated measures.

Other Techniques

There should be a continuing effort to design, improve, or adapt new techniques that can be used to provide more reliable, accurate, precise, or economical data. However, when new techniques are attempted, it is important that the results from these techniques be compared with the results of other established techniques (i.e., lek surveys). Two additional techniques to be considered include the use of genetic samples from pellets or feathers to monitor population size or trends and or the use of pellets to survey for abundance or presence/absence of sage-grouse.

Natural History

Genetics

Research on the genetic characteristics of sage-grouse has expanded rapidly in recent years. This research has included assessments of speciation, range-wide variation, population structure and connectivity, and genetic drift (Hupp and Braun 1991, Young et al. 2000, Benedict et al. 2003, Oyler-McCance et al. 2005). Because these assessments are only beginning, there is certainly more to learn in this area. In particular, the relationship between genetics and behavior (dispersal) and management (population size or landscape fragmentation) remain relatively unexplored. For example, can genetics be used as a standard technique to monitor and evaluate population structure, spatial configuration, and health?

Behavior

Although many might think that the behavior of the greater sage-grouse is well understood, there is much fundamental information that is lacking. This lack of information can include basic information such as vocalizations and other specific behaviors, food habits, characteristics and causes of dispersal and migration, territoriality, seasonal site fidelity, and differences in behavior and productivity by sex, age, and region (Simon 1940, Knowlton and Thornley 1942, Scott 1942, Leach and Hensley 1954, Eng 1963, Klebenow and Gray 1968, Peterson 1970, Wallestad and Pyrah 1974, Wallestad et al. 1975, Browers and Flake 1985, Dunn and Braun 1985, Remington and Braun 1985, Dunn and Braun 1986*a*, Dunn and Braun 1986*b*, Gibson and Bradbury 1986, Gibson and Bradbury 1987, Connelly et al. 1988, Hartzler and Jenni 1988, Welch et al. 1988, Gibson 1989, Vehrencamp et al. 1989, Johnson and Boyce 1990, Gibson et al. 1991, Gibson 1992, Niemuth and Boyce 1995, Gibson 1996*a*, Gibson 1996*b*, Schroeder et al. 1999). It is sometimes difficult to understand how something as basic as a vocalization can have ramifications on management, but playbacks of female calls in some grouse species can be used as a survey technique (Schroeder and Boag 1989). Dispersal and migration can have dramatic implications on the movement of genetic material between populations, and hence on genetic drift. How does movement vary by sex, age, region, habitat, landscape, weather, and management (Dunn and Braun 1985)? Are there other behaviors in sage-grouse that can have relevance to improved survey methodologies, productivity, survival, and management?

Breeding behavior and productivity are clearly some of the most important behaviors in sage-grouse and likely play a large role in driving populations (Bergerud 1988*a, b*). Does productivity vary by age, region, habitat, weather, predation pressure and management (Rasmussen and Griner 1938, Bean 1941, Nelson 1955, Gill 1966, Petersen 1980, Wakkinen 1990, Gregg et al. 1994, Coggins 1998, Wik 2002)? For example, how do the different parameters (nest likelihood, clutch size, renesting likelihood, nest success, hatchability) associated with productivity compare across regions (Schroeder 1997, Aldridge 2000, Aldridge and Brigham 2001, Crawford et al. 2004)? Previous research has shown that nutrition, and consequently the quality of the habitat, can be related to breeding success (Barnett 1992, Barnett and Crawford 1994). How do aspects of productivity fit into a sensitivity/elasticity analysis (Wisdom and Mills 1997, Mills et al. 1999, Wisdom et al. 2000)? A sensitivity analysis has potential to identify which life history stage has the greatest influence on population change (Rowland and Wisdom 2002). This type of analysis can focus research and management attention, and in the long run save resources.

Habitat

To a certain degree, habitat use by sage-grouse is one of the more understood aspects of their natural history (Gill 1966, Schoenberg 1982, Drut 1992, Hanf et al. 1994, Apa 1998, Schroeder et al. 1999, Connelly et al. 2000*c*, Hausleitner 2003, Connelly et al. 2004, Crawford et al. 2004). Despite this, there are still uncertainties about potential differences in habitat selection associated with sex, age, season, management, region, weather, breeding success, survival (Klebenow 1969; Oakleaf 1971; Wallestad 1971; Eng and Schladweiler 1972; Wallestad and Schladweiler 1974; Klott and Lindzey 1990; Gregg 1991; Pyle 1992; DeLong 1993; Gregg et al. 1993; Drut et al. 1994*a*, *b*; Pyle and Crawford 1994; DeLong et al. 1995; Sveum 1995; Fischer et al. 1996*b*; Sveum et al. 1998*a*, *b*; Holloran 1999; Wirth 2000; Connelly et al. 2004, Braun et al. 2005). For example, does habitat selection by sage-grouse vary in winter because of annual variation in weather and should these weather-related differences be considered in management (Beck 1977; Hupp and Braun 1989; Connelly et al. 2000*c*, 2004)? Additional questions involve the age, vigor, or health of sagebrush ecosystems and the subsequent impacts on sage-grouse (Braun et al. 2005).

Despite the extensive amount of research on habitat use by sage-grouse and the design of management guidelines (Connelly et al. 2000*c*), there is still controversy regarding some of the basic information on habitat use (Schultz 2004, Hagen et al. 2006). One reason for this controversy appears to be misinterpretation in the data used to design the original management guidelines (Connelly et al. 2000), as well as a lack of understanding of the role variance and scale play in observations of grouse at specific use sites versus the decisions land managers make (discussion in Hagen et al. 2006). In any case, it is clear that additional research is needed, particularly with regard to linking both the habitat and landscape requirements of sage-grouse with the protocols of land managers.

Survival

Although some of the basics of survival are known, information on variation in survival due to age, sex, region, habitat, and management is not always clear (June 1963, Swenson 1986, Zablan 1993, Schroeder and Baydack 2000, Zablan 2003, Connelly et al. 2004, Crawford et al. 2004). This has been particularly important for the survival of chicks, particularly during the first 3 weeks, as indicated by research and sensitivity analyses (Gregg 2005, Wisdom et al. 2000). The relationship between survival and habitat condition is only beginning to be explored with sufficient rigor (Huwer 2004).

Perhaps one of the most significant unanswered questions relating to survival is whether predation impacts survival in a compensatory or density-independent way (Connelly et al. 2000*a*). Many have suggested that predator control can increase survival and productivity and consequently have a positive impact on populations (Batterson and Morse 1948). However, much of this information is not clear, including the impacts of predator control on the survival of juveniles, the survival of adults, and the potential for compensation during the breeding season. For example, can the effects of predation be mitigated by habitat management, and would this approach be more efficient or effective than controlling predators (Cote and Sutherland 1997, Connelly et al. 2000*a*, Schroeder and Baydack 2000, Slater 2003)? Furthermore, how do different species of predators interact with each other and how is this inter-relationship influenced by predator control?

Many of the same questions that apply to predation also apply to harvest. For example, does harvest have a compensatory or density-independent effect on populations, or does the effect depend on the level of harvest (Crawford 1982, Braun and Beck 1985, Zunino 1987, Bergerud 1988*a*, Johnson and Braun 1999, Connelly et al. 2000*a*)? Variation in harvest by region, sex, age, and habitat are often implied (Zablan 2003), but usually poorly understood. For example, it may be possible that acceptable harvest rates are different for males than for females. However, the harvest rate is rarely known in populations, much less whether it varies by sex. It is also possible that there is an economical and biological tradeoff between the use of habitat management or harvest management for the purpose of improving populations of sage-grouse; which is more approach is more efficient or should they both be used?

Many sources of mortality, in addition to predation, have been identified, but they remain largely unquantified. These include collisions with vehicles, fences, and transmission lines, death due to pathogens and parasites (i.e., West Nile Virus), and poisoning by pesticides (Johnson 1987, Blus et al. 1989, Connelly and Blus 1991) and other chemicals used in their environment. Many of these factors may have indirect effects on health and fitness, in addition to the obvious effects on survival. These indirect effects can include injuries or diseases that reduce the physical capabilities of the individual as well as reducing its likelihood of breeding successfully. It would also be useful to know if relatively minor sources of mortality are somewhat cumulative and whether they combine to have a notable impact on populations.

Landscape and Habitat Management

General Considerations

Although there are many specific reasons for the alteration of the sagebrush-dominated ecosystem, the fact that there have been long-term changes is little in doubt (Braun et al. 1976, Hann et al. 1997, Miller and Eddleman 2000, Knick et al. 2003, Connelly et al. 2004). Some of these changes have been easy to document, such as the conversion of native sagebrush-dominated habitat to cropland, and the subsequent effects on sage-grouse (Yocom 1976, Swenson et al. 1987, Schroeder et al. 2000). In fact, some types of changes may be somewhat natural (or at least difficult to attribute to specific causes) such as those relating to long-term changes in weather (Brown and Davis 1995). It is also clear that most research associated with landscape and habitat management needs to be considered spatially (Forum, Appendix C). Many issues, such as encroachment by conifers, are only important in a specific context.

Grazing and Other Competition for Resources

The predominant management activity on lands occupied by sage-grouse is grazing by livestock (Klebenow 1982, Call and Maser 1985, Beck and Mitchell 2000, Connelly et al. 2004, Crawford et al. 2004). The importance of grazing pressure, rest, and rotation on the condition of sagebrush-dominated habitats and the capability of sagebrush-dominated habitats to support sage-grouse is not fully understood (Neel 1980). One reason for the incomplete knowledge is that there is a lack of experimental research in general, as well as research that considers variation such as livestock species, habitat type, region, weather, and past management practices (Beck and Mitchell 2000, Connelly et al. 2004). Infrastructure and rangeland 'improvements' associated with livestock also have not been fully considered, including fences, water provision, and the removal of sagebrush (either mechanically or with fire or chemicals) (Martin 1965; Carr 1967; Schneegas 1967; Vale 1974; Beardell and Sylvester 1976; Braun and Beck 1976, 1977, Hulet 1983; Fischer 1994; Fischer et al. 1996*a*; Connelly et al. 2000*b*, Nelle et al. 2000). The potential for livestock to trample nests has been considered, but not fully; particularly in light of certain grazing systems that encourage short, but intensive use by livestock (Paine et al. 1996). Another reason for the lack of complete knowledge is that livestock grazing may have different effects on sage-grouse depending on which stage of their life history is being considered; nesting, brood rearing, and wintering. These observations and any associated research are further complicated by the 'normal' population fluctuations of sage-grouse, possible cycles, variation in weather, and the potential for lag effects by sage-grouse in response to alterations in habitat management (Rich 1985, Crawford et al. 2004).

The complexity of grazing-related issues is due in part to the indirect nature of many of the potential effects. These effects include, but are not limited to, encroachment by noxious weeds and alteration in fire risk. Encroachment by weeds and fire risk are clearly inter-related issues; increased abundance of weeds such as cheatgrass can increase the risk of fire, which can subsequently increase the prevalence of cheatgrass (Billings 1994). This fire-cheatgrass cycle is particularly difficult to manage because of the difficulties in reducing the prevalence of cheatgrass. The increasing frequency and extent of fires in the range of sage-grouse has resulted in a general decline in the prevalence of big sagebrush, with corresponding declines in populations of sage-grouse (Connelly et al. 2000*b*, 2004). Although fire has increased in most areas of the sage-grouse range, fire has decreased in localized areas with a resulting increase in encroachment by conifers. Despite all these observations there is still a paucity of information on the relationship between location, frequency, and intensity of fire in relation to management activities (Martin 1990, McDowell 2000, Byrne 2002, Baker 2006).

Although grazing by livestock is justifiably considered to be the most important grazing-related issue, it is not the only grazing-related issue. Most areas occupied by sage-grouse are also by other species including mule deer, white-tailed deer, elk, pronghorn, bison, and free-roaming horses and burros. The direct and indirect relationship between these species and their respective habitats has been considered in some cases (i.e., wild horses; Beever 2003), but not with most species. This is particularly important when management for one species such as elk is in potential conflict with sage-grouse (e.g. removal of big sagebrush for improvement of elk range).

Some of the same considerations with grazing may apply to management directed at other game birds such as ring-neck pheasants, chukar, and gray partridge. For example, if gallinaceous guzzlers are built to supply free water in normally arid habitats, do they provide a net benefit to sage-grouse or are the potential benefits countered by potential negative consequences such as: 1) increased competition from other species that are benefited from guzzlers; 2) new water sources for mosquitoes carrying West Nile Virus; and 3) attraction of predators with an associated increase in predation risk. Likewise, does the stocking of pen-reared birds, such as ring-necked pheasants have potential to adversely impact wild populations of sage-grouse? Additional sources of potential disturbance include dog trials, snowmobiles, bird watching, and military training activities. All may be important, but there has been little research on their effects.

Energy and Mineral Extraction and Transportation

Extraction and transportation of energy and minerals is dramatically increasing in portions of the sage-grouse range (Lyon and Anderson 2003, Connelly et al. 2004, Holloran 2005). Early research has shown that there are significant impacts of energy development on sage-grouse (Lyon and Anderson 2003, Holloran 2005, Holloran and Anderson 2005, Aldridge and Boyce 2006). These impacts include numerous observations near energy developments such as: 1) Longer movements from capture locations; 2) Avoidance behavior; 3) Lower nest initiation rates; 4) Lower lek attendance of males; and 5) Population declines.

Although the general impacts of energy development are clearly negative (Holloran 2005), many of the specifics are poorly known. For example, will the impacts vary by energy type such as coal-bed methane, strip mining, oil wells, and wind turbines, or will impacts vary by size of the development 'footprint', the applied development 'set-backs', and the sex, life history stage, habitat, and region for the targeted population of sage-grouse (Lyon 2000, Braun et al. 2002, Lyon and Anderson 2003, Holloran 2005)? Although there are many general issues (e.g., development is bad for sage-grouse, at least on a local level), in reality, management is based on specifics such as the necessary buffers (set-backs) between development and key sage-grouse habitats. Many of these necessary buffers are not adequately understood, either the appropriate set-backs or the ramifications of insufficient set-backs. Likewise, the key sage-grouse habitats in need of buffering are often difficult to define. It is critical that the mechanisms for impacts be understood (e.g., indirect avoidance of disturbance such as noise or vertical structures or direct mortality due to collisions or predation so that appropriate management protocols can be applied.

Other Development

Infrastructure such as roads, fences, power lines, and pine lines are significant considerations in any development (Ellis 1987, Connelly et al. 2004). Can these structures be built or configured in such a way that the negative impacts to sage-grouse are minimized? Does disturbance associated with these infrastructures have a negative impact on sage-grouse and what is the mechanism of that impact (i.e., visual impacts, collision risk, disturbance intensity, disturbance frequency)? As with energy development, there is little information to describe necessary buffers. Likewise, if structures such as fences, power lines, roads, and houses can be built so that the direct and indirect impacts on sage-grouse can be minimized, these potential methodologies need to be researched.

Landscape Considerations

Because sage-grouse depend on high-quality habitats that are relatively vast in nature, they are often used as an indicator of the health of a broader ecosystem of sagebrush-dependent species (Rich and Altman 2001, Knick et al. 2003, Braun 2005, Rowland et al. 2006). Although there is substantial information considering the use of sage-grouse as an umbrella or indicator species for this general suite of sagebrush-dependent species, information confirming these relationships is often lacking. For example, which regional species are positively correlated with the abundance of sage-grouse and which are negatively correlated and how do these negative and positive correlations relate to potential management (Paige and Ritter 1999; Fleishman et al. 2000, 2001; Reinkensmeyer 2001). If other species such as mule deer or elk are treated as umbrella species for sage-grouse, how are sage-grouse effected and is this effect dependent on region, habitat, or other factors?

The optimal size and configuration of habitat patches occupied by sage-grouse and the effects of habitat fragmentation on sage-grouse are not clearly understood. The reason for this partial understanding is that fragmentation has potential to have a variety of impacts including direct impacts on habitat selection and movement and indirect impacts on genetic interchange and extinction risk (Schroeder 1994). There is little information available showing the type of habitat ‘barrier’ or how much distance between occupied sub-populations is needed to effectively restrict the movement of sage-grouse (Schroeder 1997*a*). For example is there a difference between natural and unnatural fragmentation? It is likely that a careful assessment of this issue will require an examination of both behavior and genetics.

Landscape and Habitat Restoration

General Considerations

Restoration of habitat and landscapes is increasingly an issue for sage-grouse (Bunting et al. 2003; Forum, Appendix C). Restoration efforts can either be active (deliberate and applied management) or passive (e.g. removal of livestock, noise, or infrastructure) (McIver and Starr 2001). Although passive management is the easiest to apply conceptually, there is little evidence showing that passive efforts are more effective than active methods, or visa versa. In either case, there may be negative financial consequences of restoration that need to be mitigated. The restoration potential within the sage-grouse distribution has been evaluated and the modeling effort can provide cost-effective directions for restoration activities, as well as by providing comparisons of alternate approaches (Wisdom et al. 2002*a*, *b*).

Livestock

The use of livestock management to improve range condition is an established research topic, but not often in respect to improvement of conditions specific to sage-grouse (Evans 1986). There are many complexities to this issue including management history, grazing intensity, the amount of rest, rotation strategies, and the type of livestock involved. One example of the complexity is the need for additional fencing for intensively managed grazing systems and the potential increases in mortality of sage-grouse due to the additional fences.

Herbicides, Fire, and Mechanical Treatments

Herbicides, fire, and mechanical treatments have been recommended as range-improvement tools to decrease the cover of noxious weeds, to reduce the cover of sagebrush, and to increase the cover of herbaceous plant species. Although all of these treatments have been shown to be effective in certain situations, there is uncertainty in whether the negative aspects of herbicides, fires, and mechanical treatments (reduced sagebrush cover) are compensated for by the positive aspects (increased herbaceous cover, reduced conifer cover, and reduced fire risk) (Robertson 1991, Miller and Rose 1995, Commons et al. 1999, Miller and rose 1999, Gedney et al. 1999, Wrobleski 1999, Connelly et al. 2004). Variability associated with region, weather, and habitat is also unclear.

Conservation Reserve Program

There are many Farm Bill conservation programs, but the Conservation Reserve Program (CRP) is clearly the largest. CRP has been shown to be important for sage-grouse in specific areas, such as Washington, particularly when compared with alternate habitats such as cropland (Schroeder et al. 2000, Stinson et al. 2004, Schroeder and Vander Haegen 2006). The potential for CRP is particularly high in areas where private agricultural lands are adjacent to native sagebrush-dominated habitats (Schroeder and Vander Haegen 2006). Are there characteristics of CRP (field age, species planted, and configuration with native habitat, field size, and region) that are important for sage-grouse and can be applied over broad regions? Can a national priority area be designated for CRP that prioritizes placement in such a way that there is an increased positive effect on sage-grouse? Do other farm programs have a positive impact on sage-grouse and can they be extended and expanded?

Seeding of Native Habitat

The use of seed in restoration activities is a critical issue in sage-grouse management. Re-seeding of vegetation is a common practice following soil disturbance (e.g., energy development, fire response, roadsides). However, the higher cost and lower availability of native seed has resulted in non-native seed being used in many situations where native seed might be preferred (Connelly et al. 2004). A better understanding of the ecological ramifications of seed type is clearly needed. These considerations of seed type should include seed viability and germination as well as the importance of seeds adapted to the local environment. For example, should programs be developed to produce or encourage production of native seeds for rehabilitation efforts, preferably seeds of 'local' origin? In addition to the type of seed planted and the techniques for re-vegetation also need research. For example, can inter-seeding be used to re-establish specific types of vegetation in native habitat or CRP? What are the most successful techniques to re-establish vegetation and how do these techniques differ by basic habitat type, region, soil type, and landscape configuration?

Refuge Considerations

With widespread alteration of the historical range of sage-grouse, there is increased interest in the setting aside specific areas for the protection of localized sage-grouse populations. Because of the vast amount of public land in the range of sage-grouse, this concept is relatively new. In any case, there is little research supporting the location, size, configuration, or management of refuge areas that would be needed to support a viable population of sage-grouse. Whether this concept could be built upon the foundation of existing refuges such as the Hart Mountain National Antelope Refuge and Sheldon National Wildlife Refuge could also be considered.

Population Restoration

Restoration of sage-grouse populations generally focuses on habitat management, but also considers direct management to the population including translocations and predator control (Cote and Sutherland 1997, Bunnell 2000, Schroeder and Baydack 2000). There is increasing attention directed toward the re-introduction of sage-grouse into formerly occupied portions of their range and the augmentation of existing populations of sage-grouse with birds from different populations (Reese and Connelly 1997). The purposes of these two activities differ, but the techniques are largely the same. Most information on past translocations has been based on the accumulation of largely anecdotal information, with little designed research to evaluate the effects of translocation protocols or accomplishment of the designed objectives. However, as the need for translocation efforts increases, it is increasingly important that future efforts employ a rigorous scientific protocol whenever possible.

Conclusion

Some monitoring and evaluation research is, and needs to be, firmly intertwined with ongoing management activities (Forum, Appendix C). Even though these monitoring and evaluation activities can be considered research, they are also an important component of management and therefore are not optional. Some research is designed to improve the quality and usefulness of this type of information. Other research may be needed to improve management activities, provide additional insight into the causes and remedies of past management associated with declining populations or habitat, and to adapt to emerging threats. It should also be noted that most research topics are interdependent with other research topics. For example, development and implementation of technology has a close association with the types of research that can be attempted. Likewise, improved knowledge of life history has a close relationship with research on monitoring and evaluation techniques.

One of the most difficult issues in addressing management considerations is the potential for cumulative impacts. By themselves, roads, powerlines, fences, and noxious weeds may have an impact that is difficult to quantify, but as a group they may have cumulative impacts that can reduce the viability of sage-grouse populations. This type of impact is difficult to assess, but clearly deserves additional attention.

Because of the inter-relatedness of the different topics, it is often difficult to know exactly which research topic has the highest priority. Nevertheless, available information on sage-grouse populations and associated habitat uses suggests that the highest priority research topics revolve around the major themes of: 1) development and implementation of accurate monitoring programs; 2) evaluation of habitat management activities such as grazing by livestock and extraction and transportation of resources and energy; and 3) and habitat restoration (consistent with recommendations by the Forum, Appendix C). The second and third topics dealing with broad-scale habitat management and restoration are critical because they have ramifications throughout the range of sage-grouse. Even so, habitat cannot be adequately addressed without accurate procedures to monitor populations and habitats.

Conservation Strategy

ISSUE: There is a lack of consistent range-wide sage-grouse priorities and standardized research protocol.

OBJECTIVE: Prioritize sage-grouse research and develop consistent research protocol.

Conservation Strategy	**Responsible Parties (if there is a lead entity, it is in bold)**	**Timeline**	**Cost**
WAFWA select a 5-10 member unpaid research advisory board (RAB) to identify and develop sage-grouse research priorities.	WAFWA	One year from beginning of the program	No Cost
The RAB develops and sets standardized research protocol and guidelines for funding proposals.	Research Advisory Board	6 months after establishment of RAB	No Cost
RAB serves with the Sage and Columbian Sharp-tailed Grouse Technical Committee as technical advisors to review research funding proposals.	Research Advisory Board and Sage and Columbian Sharp-tailed Grouse Technical Committee	Ongoing	No cost if electronically done.

Chapter 6
Funding Sub-Strategy

CHAPTER 6

Funding Sub-Strategy

Introduction

Three elements are necessary for the Strategy to be successfully implemented: funding**,** leadership, and appropriate administrative structure. The funding sub-strategy addresses two of those elements: funding and appropriate administrative structure. A review of local, state, and agency plans confirms that all were written with the acknowledgement that (1) new capacity was needed to accomplish range-wide conservation within the sagebrush type but no such funding was available at the time, and (2) a completed plan was necessary before funding needs and mechanisms could be identified. Although not all of the conservation plans are complete, there is sufficient information to reasonably judge range-wide needs for funding new conservation capacity and appropriate administrative structure.

Current State and Provincial Greater Sage-Grouse Plan Funding Strategies

Of the 11 Western states, eight Conservation Plans and one Recovery Plan (Washington) for greater sage-grouse have been completed. One plan is currently being developed (Colorado) and the final plan has not been completed (South Dakota). Within Canada, the Canadian Sage Grouse Recovery Strategy was completed for Alberta and Saskatchewan. This document does not meet the 1995 requirement of the Federal Species at Risk Act (SARA) and is currently being revised.

The identification of funding is critical for the successful conservation of greater sage-grouse and their habitats. Of the 10 plans reviewed (8 state, 1 Canadian and 1 Federal) the words “fund” or “funding” is mentioned 225 times, but none of the plans specifically outline a strategy to obtain funding that facilitates the implementation of statewide or provincial or federal strategies/plans. It is recommended that state and local planning and implementation activities initiate a process for the development of cost estimates for sage-grouse conservation. Nearly all of the plans recommend working within current budget limitations or recommend pursuing funding from outside federal agencies (specifically the Bureau of Land Management (BLM) or Natural Resources Conservation Service (NRCS)). The BLM National Sage-Grouse Habitat Conservation Strategy mentions funding 4 times, but does not specifically outline a strategy to obtain funding that facilitates the implementation of the Strategy. Although not available for this document, the BLM has developed internal cost estimates to fully implement the BLM Strategy. In addition, BLM has received additional funding in federal fiscal years 2005 and 2006 to implement the BLM Strategy.

State and Provincial plans also recommend coordinating funding efforts and identifying opportunities to fund conservation strategies, but only 1 plan even identifies and provides cost estimates (Washington). No state or local plan, or even this Strategy, attempts to quantify the millions of dollars associated with the volunteer efforts by private citizens as well as agency employees. In addition, no cost estimates are generated for any “in-kind” contributions by private landowners and citizens for any implementation projects. The following is a brief overview of funding discussions in each state or provincial plan:

California. The California greater sage-grouse conservation plan (June 2004) was completed in cooperation with Nevada. Although the need for additional funding is outlined in the plan no specific funding strategy is identified. The Plan specifically states that "Implementation of the Plan will be incorporated into agency annual budgets and work plans where possible." (Nevada Department of Wildlife, California Department of Fish and Game 2004)" Opportunistic funding was to be found in conjunction with:

- National Fire Plan
- BLM – Rangeland Improvement Program
- Great Basin Restoration Initiative
- Wildfire Support Group
- Eastern Nevada Landscape Coalition
- Northeastern Nevada Stewardship Group
- White Pine County Coordinated Resource Management Group
- Lincoln County Coordinated Resource Management Group
- Mine land reclamation plans

Following completion of the first edition, an implementation supplement was developed. No additional funding opportunities were identified, although funding sources were included in the Project-Conservation Action Worksheets. Currently the State of California Fish and Game Department is completing a Conservation Plan independent of Nevada.

Colorado. The statewide conservation plan for greater sage-grouse is not complete and is expected in 2007. The Gunnison sage-grouse Range-wide Conservation Plan (RCP) was completed in April 2005 (Gunnison Sage-grouse Range-wide Steering Committee 2005). No specific funding strategy was identified. However, Appendix C of the RCP, ("Available Funding Opportunities for Gunnison sage-grouse Habitat Conservation") specifically outlines 27 funding opportunities, eligible lands, the length of the agreement, easement opportunity, cost share requirements, applicant obligations and contact information. In addition, $400,000.00 of operational dollars have been allocated for each of the next 9 years for sagebrush ecosystem related issues.

Idaho. The statewide conservation plan was released in July 2006 (Idaho Sage-grouse Advisory Committee 2006). No specific funding strategy was identified in the Plan. The Plan states that, "Specific project proposals as developed locally, public education efforts, habitat/population assessment and monitoring efforts, research, and staff participation in Local Working Groups (LWG) will be routinely incorporated into agency annual budgets and work plans, as appropriate, and contingent on funding. Agencies, LWGs, and other cooperators are also expected to pursue partnership opportunities, to leverage available funding to the greatest extent possible."

Montana. The Final Draft Plan for greater sage-grouse in Montana was completed in March 2004 (Montana Sage Grouse Work Group 2004). No funding strategy was identified in the Montana Plan although the word "funding" is mentioned in various context 47 times. The Plan identifies some limited funding opportunities. However, it primarily focuses on working with Federal land management agencies to cooperate and seek funds to hire a statewide coordinator for Plan implementation. In addition, several sources of funds will be identified to provide funding for local working groups for 2-3 years. At the conclusion of the introductory period the local working groups will be self funded.

Nevada. The Nevada greater sage-grouse conservation plan was completed in cooperation with California (2004; see above discussion) (Nevada Department of Wildlife, California Department of Fish and Game 2004).

Although the word "funding" was used 29 times in the document, no specific funding strategy is identified in this Plan. The Plan specifically states that "Implementation of the Plan will be incorporated into agency annual budgets and work plans where possible." The Plan will be funded and implemented in conjunction with:

- National Fire Plan
- BLM – Rangeland Improvement Program
- Great Basin Restoration Initiative
- Wildfire Support Group
- Eastern Nevada Landscape Coalition
- Northeastern Nevada Stewardship Group
- White Pine County Coordinated Resource Management Group
- Lincoln County Coordinated Resource Management Group
- Mine land reclamation plans

The Nevada Division of Wildlife (NDOW) will seek funding from federal grants or state programs including, but not limited to, Wildlife Restoration Funds, State Wildlife Grants, Nevada Question 1, the Wildlife Heritage Trust Account, and the Nevada Wildlife Foundation to implement the strategic actions and research projects that pertain to NDOW set forth in the Nevada-California Plan.

North Dakota. The State of North Dakota, North Dakota Game & Fish Department completed its Conservation Plan in July 2005 (McCarthy and Kobriger 2005). No funding strategy was identified in this Plan, although the word "funding" is mentioned throughout the document 12 times.

Implementation of the North Dakota Plan will require both interagency cooperation and public input. Agencies and organizations, private companies, work groups or individuals that become involved in conservation planning and projects will need to assess funding towards those projects. The Plan provides the following list of funding opportunities through conservation programs by state and federal agencies:

1. North Dakota Game and Fish Department
    a. Cost Share with Landowner Incentive Program (USFWS)
    b. Cost Share with Conservation Reserve Program
    c. Working Lands
    d. Habitat Plots
2. United States Forest Service
    a. The High Plains Partnership
3. Natural Resources Conservation Service
    a. Conservation Practices
    b. Prescribed Grazing (528)
    c. Restoration of Declining Habitats (643)
    d. Environmental Quality Incentive Program
    e. Grassland Reserve Program
    f. Wildlife Habitat Incentive Program
4. Farm Service Agency
    a. Conservation Reserve Program

Oregon. The State of Oregon, Oregon Department of Fish and Wildlife completed its conservation plan in August 2005 (Hagen 2005). No specific funding strategy was outlined in the Oregon Plan. This Plan outlines its Implementation and Monitoring Section as: “Implementation of conservation measures outlined in this Plan will be guided by local implementation groups comprised of land managers and land owners. These groups will also be responsible for establishing: appropriate timelines, overseeing treatments and monitoring, and facilitating the funding of projects.”

South Dakota. To date, the State of South Dakota, South Dakota Game Fish and Parks, has not developed a greater sage-grouse conservation plan.

Utah. The State of Utah, Division of Wildlife Resources, completed a conservation plan for sage-grouse in June 2002 (State of Utah Department of Natural Resources Division of Wildlife Resources 2002). The word “funding” is mentioned 2 times, and there is no specific funding strategy outlined in the document. However, funding for implementation of sagebrush and other conservation needs are included in Utah’s “Watershed Restoration Initiative” In 2005, the first year of the conservation initiative, $8 million was committed to restore more than 120,000 acres of public and private land in 22 counties. The Utah Legislature allocated $2 million in support of the state's ongoing watershed conservation program. The BLM has taken the lead on public lands in Utah by allocating more than $3.5 million to range restoration, mostly through their fuel load reduction program. The Natural Resources Conservation Service has taken the lead on private lands by making $1.5 million in matching funds available to landowners through various Farm Bill programs. At the current time the program is focused on sagebrush and pinyon-juniper ranges.

Washington. The State of Washington, Washington Department of Fish and Wildlife completed a state recovery plan in May, 2004, for greater sage-grouse (Stinson et al. 2004). The Plan uses the term “funding” 9 times, but in contrast to most other plans, the Washington Recovery Plan provides a limited strategy for the acquisition of funding. An annual cost estimate throughout the first 5 years of Plan implementation is provided. Strategies are outlined by task priorities and estimates of annual expenditures. Priorities are defined as follows:

"Priority 1: First priority actions include those necessary to prevent further decline or extirpation of the species from Washington, including preventing further habitat loss or declines in habitat quality, and monitoring of the population.

Priority 2: Second priority actions are those necessary to increase the population such as reintroductions, and assessment, restoration, and acquisition of habitat.

Priority 3: All other actions necessary to meet recovery objectives, such as interagency coordination, education activities, and some research activities."

Some of the strategy estimates were not determined at the completion of the Washington Recovery Plan, but the Plan estimates that to implement Priority Level 1 tasks, the estimate cost is at least $289,000/year. Priority 2 and 3 tasks were estimated to cost at least $592,000 and $90,000 (much to be determined) per year, respectively.

Wyoming. The State of Wyoming, Wyoming Game and Fish Department completed a statewide conservation plan in June 2003. The Plan does not provide a specific funding strategy. This Plan is largely reliant on implementation by local working groups. The Plan's reference to funding states, "Funding for sage-grouse conservation should not be limited to revenue from hunters, anglers and other traditional funding sources." Wyoming has access to federal Shrub-Steppe Restoration funding that could be used to initiate planning efforts. In addition, other state and federal land management agencies are allocating resources to sage-grouse conservation, and grant funding is becoming available nationwide."

Alberta. The Province of Alberta Sage-grouse recovery plan was completed by the Alberta Sustainable Resource Department, Fish and Wildlife Division in December 2005 and was completed in cooperation with Saskatchewan (Canadian Sage Grouse Recovery Team. 2001). The Recovery Plan is titled, "Alberta Greater Sage-Grouse Recovery Plan 2005-2010." The Recovery Plan mentions funding 3 times. The Recovery Plan identifies a timetable for the implementation from 2005-2010. The total estimated cost of implementation is $1,215,000.00. This cost estimate includes actual cost and in-kind.

Saskatchewan. The Province of Saskatchewan has developed a sage-grouse recovery strategy in cooperation with Alberta.

Funding Approach

Successful Strategies for Avian Species

One of the most successful bird conservation plans developed and implemented to date is the 1984 North American Waterfowl Management Plan (NAWMP). The successful implementation of the NAWMP would not have been possible without the passage of the North

American Wetlands Conservation Act (NAWCA) in 1989. NAWCA provided federal matching funds to public-private partnerships (Joint Ventures) for wetland habitat conservation projects in North America. The funds for the NAWCA come from a number of sources that include general appropriations (federal tax revenue); interest earned on various federal accounts, federal excise taxes, and Migratory Bird Treaty Act fines. The success of the NAWMP and subsequent passage of NAWCA forged an integral partnership between private and governmental interests to fund and implement conservation strategies to reverse the decline in waterfowl numbers and wetland acreage. This success set the stage for a series of conservation initiatives for North American birds that include Partners in Flight (PIF), the U.S. Shorebird Conservation Plan (USSCP), the North American Colonial Waterbird Conservation Plan (NACWC), the Neotropical Migratory Bird Conservation Act (NMBCA), and the North American Bird Conservation Initiative (NABCI). NABCI is the overarching entity that facilitates the linkages among the individual initiatives both within and among the United States, Mexico, and Canada.

The success of NAWCA was reported in "A Programmatic Evaluation of the North American Wetlands Conservation Act (NAWCA) in the United States and Canada Report Series." Results provided in an opinion survey of NAWCA Stakeholders reports that respondents rated the overall success of NAWCA "very high." Positive ratings were also received for the success of NAWCA in achieving its purposes and objectives in the U.S. and Canada. In addition, stakeholders responded that the major agencies implementing NAWCA were successful and that U.S. Joint Ventures received funding fairly and equitably.

A more sobering evaluation of the success of NWWMP is found in the Continental Progress Assessment of the NAWMP. This report is available in draft form in September 2006. (The Assessment Steering Committee 2006: 4). The report concludes that, although the NAWMP has "marked 20 years of conservation achievement…" and the NAWMP "…has been a cohesive force, bringing focus to waterfowl and wetland conservation and management efforts in North America.", the NAWMP needs improved techniques in tracking and evaluating on-the-ground accomplishments and estimating changes in important areas with improved methods to provide the metrics to connect habitat activities with the response in waterfowl populations. Therefore, this Comprehensive Strategy wants to stress the importance of adopting the measures of success outlined in Chapter 1 and linking that success with active monitoring activities that will successfully link on-the-ground habitat activities (Chapter 3-Habitat Monitoring) with a response in sage-grouse populations (Chapter 3-Population Monitoring).

Sage-Grouse Funding Approach

An essential resource needed for the conservation of sage-grouse is the acquisition or the allocation of short and long-term funding resources. This is critical so that agencies can build the necessary capacity to implement local, state, and range-wide conservation strategies. For the purpose of this funding sub-strategy, short-term funding timeframe is defined as 1 – 5 years post-completion of the comprehensive range-wide strategy (calendar years 2007 through 2011). The long-term timeframe is considered 6 – 10 years (5 total years) (calendar years 2011 through 2015). The most significant portion of this funding sub-strategy is the development of the long-term funding source. This sub-strategy proposes a funding source approach that, if implemented, could provide the necessary funding to successfully implement and complete this range-wide strategy by providing a new and additional funding source that is outside current state and federal budgetary constraints.

Short-Term Funding Approach (1-5 years) Estimates of resources needed to implement the comprehensive range-wide strategy in the short-term are extracted from the Greater Sage-grouse Range-wide Issue Forum Final Report (Report) (Appendix C) (Table 6.1). Many of the recommended resources identified by the Forum Participants were typically identified in a 1 – 3 year timeframe, although there were some research aspects that extended to a 5 year timeframe. Specific project proposals were not provided. The best available professional judgment by the Forum participants was used to make the best possible cost estimates (Table 6.1).

The Report identified funding as the first essential resource needed to take the work of sage-grouse conservation forward. It suggests that the Western Governor's Association could be a viable tool to assist with the allocation and dedication of funds at the appropriate federal, state and local level, with budget authority to include significant funds in the immediate future. The Report identified a concern regarding the time lag from the completion of the Report (May 2006) to the completion of the Strategy (January 2007). Therefore, the Report suggests that likely funding for implementation would not be available until the 2008 Federal Budget process. Forum participants propose to work on influencing the 2008 Federal budget process before the Range-wide Comprehensive Strategy is completed.

Most Federal agencies typically function through the fiscal year budgetary process and develop budgets at least 2 years prior to the current fiscal year. For example, at the time of release of this range-wide strategy, the BLM has finalized its 2008 budget, and it will have been submitted to the Department of Interior. The Bureau of Land Management will finalize its 2008 budget in August of 2006 and the final budget will be sent to the Office of Management and Budget in September of 2006. Therefore, this strategy will have its first fiscal considerations in the spring of 2007 when the BLM, USFWS, USFS, and NRCS are preparing their 2009 budget requests. In addition, the NRCS can provide short-term funding opportunities in federal fiscal year 2006 while leveraging significant amounts of non-federal match. In contrast, many state and/or local budgetary process typically use an annual budgeting process, although each state and/or local government will likely used the most appropriate process to provide sage-grouse conservation funding.

Although there are numerous competitive sources for relatively small amounts of funding available to implement this Strategy (e.g. National Fish and Wildlife Foundation, etc.), there are no significant funds outside the current Federal, state and NGO process at this time. If a significant level of funding is presented to WAFWA in support of this Strategy in the next 1-5 years, this section of the funding sub-strategy outlines a process to house and distribute those funds and evaluate implementation proposals.

It is recommended that any funding provided to WAFWA for implementation of the Strategy be directed towards a central depository ("bank") such as the National Fish and

Wildlife Foundation (NFWF) or a similar organization (Fig 6.1). It is further recommended that if the NFWF is used to facilitate the implementation of this short-term funding process that a separate sub-committee (Sage-Grouse Funding Committee) be established (Fig. 6.1). This sub-committee would be charged to specifically focus on implementation of this Strategy (Figure 6.3).

A similar but separate process is recommended for the review of implementation proposals (Fig. 6.1). Any project proposals would be submitted to a 7 member Sage-Grouse Management Zone Team. There would be 1 member representing each of the 7 Sage-Grouse Management Zones. Management Zone Team members would solicit technical reviews of the proposals from the Sage and Columbian Sharp-tailed Grouse Technical Committee and any other technical experts (Fig. 6.1). The Management Zone Team would forward the proposals identified for funding to the WAFWA Directors (Fig. 6.1). The WAFWA Directors would use their formal committee process to approve worthy proposals. Worthy proposal will then be forwarded to NFWF for dispersal of funds (Fig. 6.1).

Regarding funding estimates from the Forum Report, some issue and sub-issue goals in the Forum report identified funding needs (Table 6.1). Participants estimated a specific dollar estimate for some tasks, but in other cases only staff time or no resources were identified. For the purposes of this Strategy, the funding estimates reported here are at the goal level. Refer to the Report (Appendix C) for funding estimates by objective.

Long-Term Approach (Minimum of 5 years). For the aforementioned bird conservation initiatives, nearly all of the bird species being considered are migratory and/or are protected under the provisions of the Migratory Bird Treaty Act. In contrast, sage-grouse is a resident upland game bird managed under state regulations, with no Federal oversight.

The overarching goal of this long-term funding approach is to provide a new and consistent funding source to implement the Comprehensive Conservation Strategy. An ideal model for long-term funding development is NAWMP and NAWCA. A similar appropriation of new Federal funds to help leverage non-Federal resources would provide the ideal long-term funding source for this Strategy. Specifically, the appropriated funds will be acquired through the enactment of legislation entitled the "North American Sagebrush Ecosystem Conservation Act (NASECA) (Fig. 6.2). The precise details of NASECA would be outlined and developed by the Western Governors' Association's, Sagebrush Conservation Council (SCC) with WAFWA leading the development. It would also be within the purview of the SCC and WAFWA to find and secure the appropriate political support in the west and nationally.

All funds generated from NASECA should have a nonfederal match, with the precise cost-share ratio outlined in the law. Matches may be cash or in-kind resources. Special consideration should be given to states that have small financial resources and/or significant sage-grouse conservation issues. Funds should be administered by an appropriate fiduciary entity. This entity can be an existing organization or can be created in the law.

NASECA funds should be allocated judiciously among the sub-strategies of the Comprehensive Strategy. For example, approximately 20% of the NASECA funds would be dedicated to assist states and provinces with the Effectiveness Monitoring and Research & Technology Sub-strategies, 10% would be divided among the Communications/Outreach, Implementation, and Adaptive Management Sub-strategies. The remaining 70% would be dedicated towards the Conservation Sub-strategy for implementation of range-wide, state, and local plans.

NASECA would create North American Sagebrush Ecosystem Conservation Act Council (NASECA Council) that consists of 11 unpaid members (Fig. 6.2). Additional members can be added through the development of the NASECA. The NASECA Council would have final authority regarding the allocation of funds generated from the NASECA. The NASECA Council Chair would be selected by the WAFWA President. The 10 remaining NASECA Council members would be selected by the Chair and could represent the following groups (Fig. 6.2):

1 Seat – Chairman
4 Seats – WAFWA Directors (or their designee) (1 Provincial Director)
1 Seat – WGA – Sagebrush Conservation Council Chairman or designee
1 Seat – Fiduciary Entity
1 Seat – NABCI-US Representative
1 Seat – Bureau of Land Management
1 Seat – Open seat for NGO involved in sagebrush/sage-grouse conservation
1 Seat – Local Government Representative

Term assignments and duration, function and operating protocol will be developed by the NASECA Council. All tactical funding mechanisms and processes would be developed by the NASECA Council. The Sage and Columbian sharp-tailed Grouse Technical Committee and other invited experts would serve as the technical advisors for the NASECA Council. Funding and proposal development and review would follow a process similar to the flowchart in Figure 6.3.

The success of the Comprehensive Strategy is dependent upon significant resources and a range-wide perspective in implementation and management. For the purpose of the strategy, an estimate of funding need was developed to insure implementation. Funding estimates were generated from an informal survey of the Western Sage and Columbian sharp-tailed Grouse Technical Committee. Estimates were compiled into broad categories (Table 6.2). Although funding estimates were compiled and reported initially by state or province, the emphasis of the Strategy is range-wide and estimated funding levels were reapportioned (Table 6.3) into Management Zones (Table 6.2). The initial long-term funding estimate was generated for a 5-year period (2010 – 2014) and summarized (Table 6.2). This approach provides for a range-wide perspective towards sage-grouse conservation. The reapportionment of funding for states and provinces to the Management Zones was based upon management challenges and size of sage-grouse population. Further, the funding reallocation process to the Management Zone level was based upon the proportion of each state within its respective Management Zone (Table 6.3). For example, 100% of the Alberta sage-grouse population is located in Management Zone I and therefore all funds allocated to this province were reapportioned to Management Zone I due to common management challenges with other sage-grouse populations in the same Zone. In contrast, Utah sage-grouse are located in 5 Management

Zones. Approximately 70% of the Utah sage-grouse population is located in Management Zone III, 5% is in Management Zone II, 20% is in Management Zone IV, and 5% is in Management Zone VII for greater sage-grouse. Utah also has a funding allocation for Gunnison sage-grouse for Management Zone VII – GUSG. Funding for Utah was reapportioned to the appropriate Management Zones.

Table 6.1. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Cost Estimates For Each Issue And The Appropriate Goal Identified from Issues Forum Report		Cost per Year	Years to Implement	Total Cost
Sub-Issue	**Goal**			
Habitat Conservation and Land Use				
Conservation and protection of habitats	**Goal:** Locate and protect important and/or intact sage-grouse habitats ("save the best")			
Invasive Plant Species	**Goal 1:** Maintain a range-wide list of invasive species posing the greatest risk to sage-grouse habitats.			
Invasive Plant Species	**Goal 2:** Identify known locations, and areas of future risk, for the top priority invasive plant species.			
Invasive Plant Species	**Goal 3:** Develop and implement guidelines for coordinated prevention and control of invasive plant species throughout sage-grouse habitat.			
Livestock Grazing	**Goal 1**: Provide for livestock grazing with the assurance of 'no net loss' of sagebrush habitat or sage-grouse populations at an appropriate spatial and temporal scales.			
Livestock Grazing	**Goal 2:** Develop and implement grazing systems and management practices that maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community to address the long-term needs of sage grouse and other sagebrush associated species.			
Agricultural Lands	**Goal 1:** Identify locations of prioritized agriculture lands that provide the greatest habitat value for sage-grouse.	$ 50,000.00	1	$ 50,000.00
Agricultural Lands	**Goal 2:** Develop and implement management practices for agriculture lands to protect or minimize harm to sage-grouse in conjunction with landowners.			
Agricultural Lands	**Goal 3:** Encourage the retention and restoration of sagebrush habitat in conjunction with landowners.			
Fences	**Goal 1:** Summarize or quantify the direct and indirect effects of fences on sage-grouse.	$ 25,000.00	1	$ 25,000.00

Table 6.1 con't. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Habitat Conservation and Land Use, Continued		Cost per Year	Years to Implement	Total Cost
Fences	**Goal 2:** Compile all known efforts regarding fence design, siting or modifications that have been used to mitigate the potential effect of fences on sage-grouse.	$ 25,000.00	1	$ 25,000.00
Fences	**Goal 3:** Implement and evaluate/monitor the effectiveness of proposed fence design, siting and modifications on mitigation direct and indirect impacts on sage-grouse.	$100,000.00	per location	$ 100,000.00
Surface Hydrology	**Goal:** Develop and implement guidelines to manage surface water to increase the productivity of sagebrush ecosystems and enhance sage-grouse populations.			
Infrastructure: Energy Corridors	**Goal 1:** Evaluate effects of existing energy corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.			
Infrastructure: Energy Corridors	**Objective:** Review existing research studies and monitoring data for effects of energy corridors and associated facilities on sage-grouse or sagebrush habitat.	$100,000.00	1	$ 100,000.00
Infrastructure: Energy Corridors	**Objective:** Design and conduct additional research and monitoring studies to determine effects of existing and proposed energy corridors and associated facilities on sage-grouse and sagebrush habitat.	$500,000.00	5	$ 2,500,000.00
Infrastructure: Energy Corridors	**Goal 2:** Based on research and monitoring data, develop consistent criteria and management guidelines to locate energy corridors and operate and maintain facilities within energy corridors that cross critical sage-grouse habitat in a manner that minimizes impacts to sage-grouse and sagebrush habitat.	$ 30,000.00	1	$ 30,000.00
Infrastructure: Energy Corridors	**Goal 3:** Cooperatively develop and adopt appropriate mitigation measures and best management practices (BMP) for constructing new facilities within energy corridors and conducting operation and maintenance activities associated with facilities within energy corridors that will minimize impacts to sage-grouse and sagebrush habitat.	$ 30,000.00	1	$ 30,000.00

Table 6.1 con't. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Habitat Conservation and Land Use, Continued		Cost per Year	Years to Implement	Total Cost
Infrastructure: Energy Corridors	**Goal 3:** Cooperatively develop and implement appropriate monitoring plans to assess effects of new facilities within energy corridors on sage-grouse and sagebrush habitat and adjust mitigation measures and BMP based on monitoring results.	$500,000.00	5	$ 2,500,000.00
Infrastructure: Roads & Railroads	**Goal 1:** Evaluate effects of existing roads, trails and railroad corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.	$ 30,000.00	5	$ 150,000.00
Infrastructure: Roads & Railroads	**Goal 2:** Develop consistent criteria and management guidelines to locate, construct, maintain or close roads and railroads, to minimize impacts to sage-grouse and sagebrush habitat.	$ 30,000.00	1	$ 30,000.00
Infrastructure: Roads & Railroads	**Goal 3:** Implement appropriate mitigation measures or BMP for constructing and maintaining roads and railroads within sagebrush habitat that will minimize impacts to sage-grouse and sagebrush habitat.	$ 50,000.00	1	$ 50,000.00
Infrastructure: Roads & Railroads	**Goal 4:** Cooperatively develop monitoring plans to assess the effects roads and railroads and to measure effectiveness of BMP's and mitigation measures in minimizing effects of roads on sage-grouse and sagebrush habitat.	$100,000.00	5	$ 500,000.00
Infrastructure: Tall Structures	**Goal 1:** Compile and evaluate existing published research on effects to sage-grouse due to direct impacts of existing tall structures.	$ 30,000.00	1	$ 30,000.00
Infrastructure: Tall Structures	**Goal 2:** Develop research protocols for conducting new studies to assess direct impacts of tall structures.	$ 30,000.00	1	$ 30,000.00
Infrastructure: Tall Structures	**Goal 3:** Develop scientific and consistent sitting and Operation & Maintenance (O&M) criteria for tall structures in sage-grouse habitat that will minimize negative impacts on sage-grouse.	$ 60,000.00	1	$ 60,000.00

Table 6.1 con't. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Habitat Conservation and Land Use, Continued		Cost per Year	Years to Implement	Total Cost
Infrastructure: Tall Structures	**Goal 4:** Develop BMP and appropriate mitigation measures that can be implemented for sitting and O&M activities associated with tall structures.	$ 30,000.00	1	$ 30,000.00
Infrastructure: Urban/Exurban Development	**Goal 1:** Avoid or minimize incursion of urban and exurban development into greater sage-grouse habitats.	$ 80,000.00	1	$ 80,000.00
Dispersed Recreation	**Goal:** Manage dispersed recreational activities to avoid, reduce and, where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.	$900,000.00	1	$ 1,200,000.00
Non-Renewable Energy	**Goal 1**: Provide for non-renewable resource development and utilization with the assurance of 'no net loss' of sagebrush habitat or sage-grouse populations at an appropriate spatial and temporal scales.			
Non-Renewable Energy	**Goal 2:** Develop and implement technologies and practices that off-set, reduce and/or minimize disturbance to sage-grouse and their habitat associated with non-renewable resource recovery activities.			
Subtotal				$ 7,520,000.00
Habitat Restoration				
Conifer Encroachment	**Goal 1:** Identify the locations of areas of current extent and future threat of conifer encroachment within prioritized sage-grouse habitat.	$ 50,000.00	2	$ 100,000.00
Conifer/Pinyon-Juniper Encroachment	**Goal 2:** In order to support defensible and well-informed resource management decisions to benefit sage-grouse, synthesize information on the habitat relationships of wildlife associated with pinyon-juniper and other conifers which have invaded sagebrush habitats.	$ 37,500.00	2	$ 75,000.00
Conifer/Pinyon-Juniper Encroachment	**Objective:** Conduct research and/or monitoring to understand the effects of management actions on the species of concern and their habitats.	$ 37,500.00	4	$ 150,000.00
Conifer/Pinyon-Juniper Encroachment	**Goal 3:** Develop and implement control measures for encroaching conifer species within sage-grouse habitat.	$500.00/acre	200,000 acres	

Table 6.1 con't. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Habitat Restoration, Continued		Cost per Year	Years to Implement	Total Cost
Range-wide habitat restoration assessment & planning	**Goal 1**: Implement management practices and policies, including post-treatment management that stabilizes or recovers sagebrush steppe habitat.			
Range-wide habitat restoration assessment & planning	**Goal 2:** Identify and restore a realistic extent (acres and/or percentage of historic) of range to support the needs of sage-grouse.			
Range-wide habitat restoration assessment & planning	**Goal 3:** Ensure that restoration techniques are ecologically sound and practicable.			
Native seed availability	**Goal:** Develop a regional assemblage of species that are site adapted and in quantities needed to implement restoration priority projects/. Increase the availability of seed and restoration methods/expertise to restore plant communities.	$100,000.00	5	$ 500,000.00
Planting expertise	**Goal 1:** Plan and conduct research to increase knowledge about restoration methods and their effects in the full range of habitat types and degrees of disturbance.	$ 50,000.00	3	$ 150,000.00
Planting expertise	**Goal 2:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish range-wide restoration goals & priorities.	$ 50,000.00	3	$ 150,000.00
Fire	**Goal 1:** Approach management of wildland fire and fuels management in greater sage-grouse habitat in an integrated and coordinated fashion with local, state, and federal agencies and private entities.			
Fire	**Goal 2:** Containing and suppressing wildfires in important greater sage-grouse habitats receives top priority.			
Fire	**Goal 3:** Manage habitat mosaics and fuels in greater sage-grouse habitat to improve habitat and reduce the possibility of damaging wildfires.			
Subtotal				$ 1,125,000.00

Table 6.1 con't. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Science, Data, and Information Management		Cost per Year	Years to Implement	Total Cost
Standardized vegetation and other data layer base map and access system	**Goal 1**: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, a and hydrology data.	$100,000.00	3	$ 300,000.00
Definition of success for sage-grouse conservation.	**Goal 1:** Establish and apply a definition and metrics for success or failure of conservation actions for sage grouse including population estimates	$100,000.00	1	$ 100,000.00
Evaluating social and economic effects of human activities on sage grouse and habitat persistence.	**Goal:** Understand the role of social and economic factors that influence human actions and decisions on the potential persistence of sage grouse and its habitat.			
Ability to predict population outcomes/habitat as a result of vegetation change	**Goal 1:** Develop a tool kit for manager to model habitat to understand and predict sage-grouse response to management actions.			
Range-wide research and monitoring collaboration and coordination	**Goal 1:** Create and implement an institutional framework that supports collaborative efforts for funding, research, monitoring and management.			
Subtotal				$ 400,000.00
Regulatory Mechanisms				
Inconsistent and inadequate application of existing regulations and policies.	**Goal:** Uniformly apply existing regulations, regulatory mechanisms, and policies within and among agencies.	$300,000.00	2	$ 600,000.00
Adequacy of regulations	**Goal:** Provide a regulatory framework that maintains and enhances sage-grouse habitat and populations.	$300,000.00	2	$ 600,000.00
Subtotal				$ 1,200,000.00

Table 6.1 con't. Issue, sub-issue, and appropriate goals identified by the Range-wide Issues Forum participants. Where costs were identified by Forum participants, cost estimates per year, the number of years to implement and the total cost of implementation are identified.

Integration and Coordination Across Range and Jurisdictions		Cost per Year	Years to Implement	Total Cost
Current Approaches	**Goal:** Create long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.			
Sharing scientific and management information	**Goal 1:** Share scientific information, lessons learned and effective management practices effectively and efficiently among LWGs and at all levels of those involved in sage-grouse conservation.	$ 50,000.00	1	$ 50,000.00
Inconsistency in policy and coordination across jurisdictional boundaries.	**Goal 1:** Resolve inconsistencies among federal, state, local, provincial, and tribal policies that may inhibit sage-grouse conservation.	$ 50,000.00	2	$ 100,000.00
Inconsistency in policy and coordination across jurisdictional boundaries.	**Goal 2:** Ensure that federal, state, and LWG practices meet PECE guidelines.	$ 50,000.00	1	$ 50,000.00
Subtotal				$ 200,000.00
Grand Total				**$10,445,000.00**

Figure 6.1. Outline of the **short-term funding** process for funding and proposals generated by WAFWA for implementation of the Strategy.

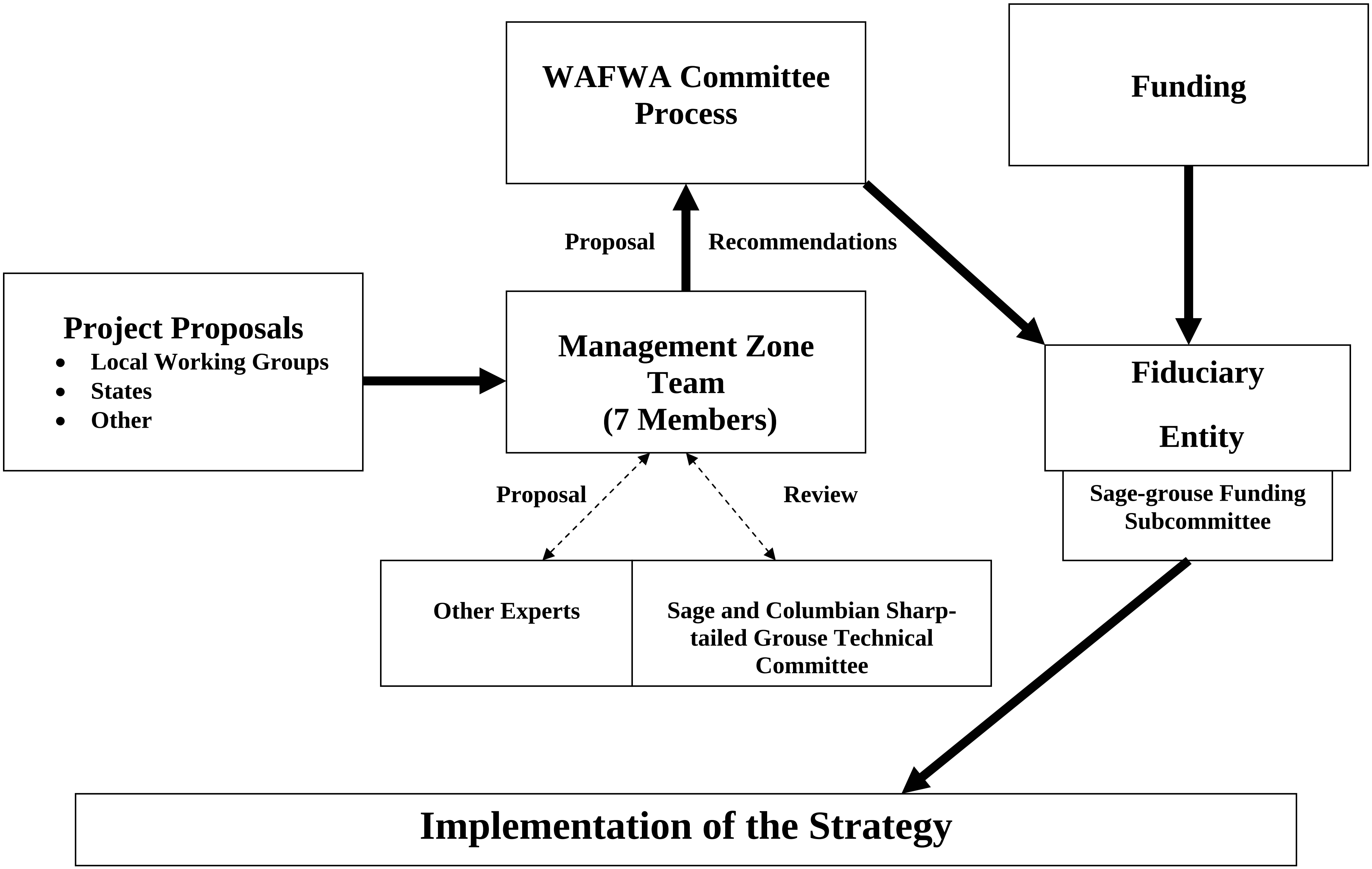


Figure 6.2. Timeline for development of the North American Sagebrush Ecosystem Conservation Act and structure of the North American Sagebrush Ecosystem Conservation Act Council.

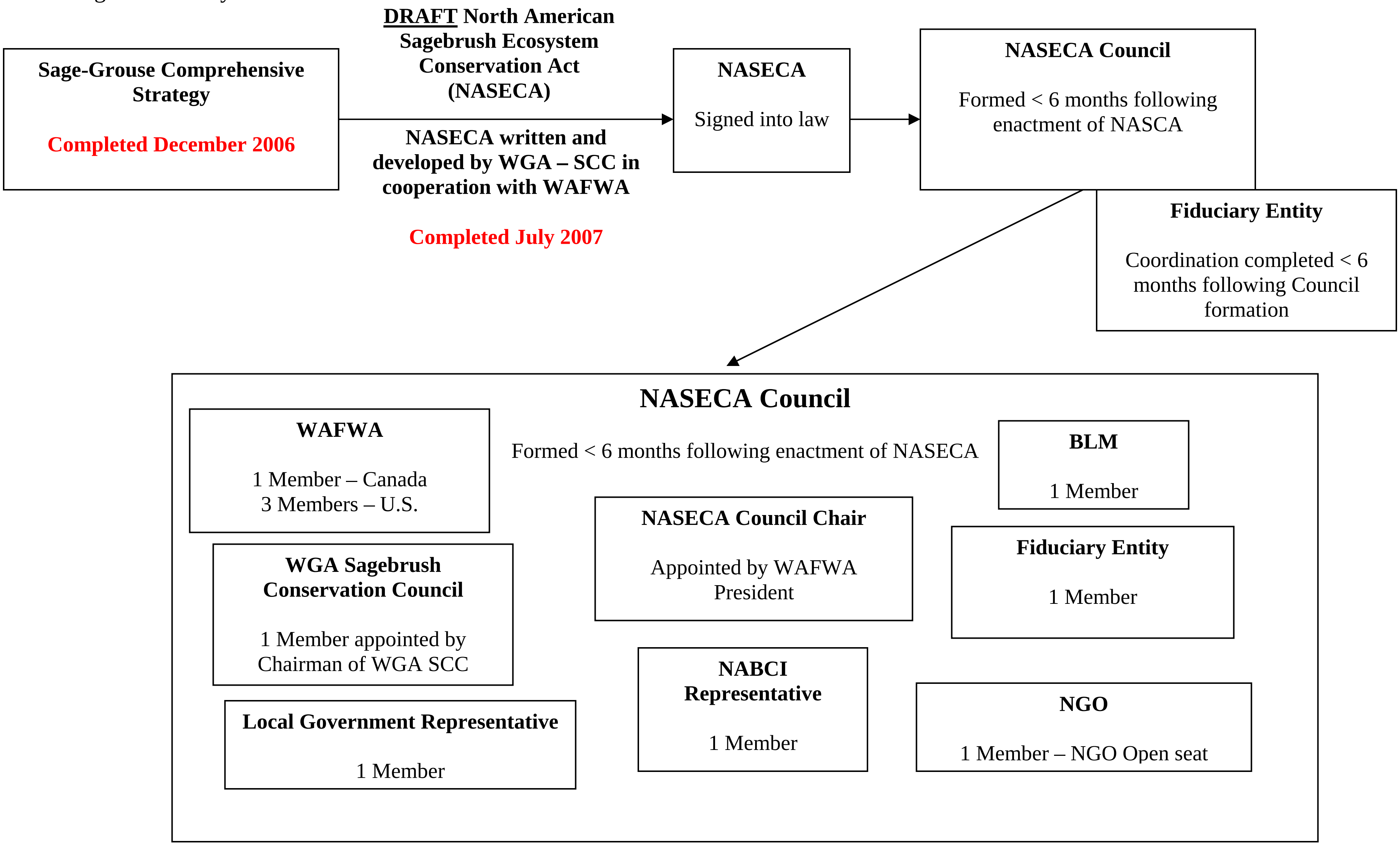


Figure 6.3. Proposed funding and project/research proposal process for resources generated from the North American Sagebrush Ecosystem Conservation Act (NASECA) or other funding sources.

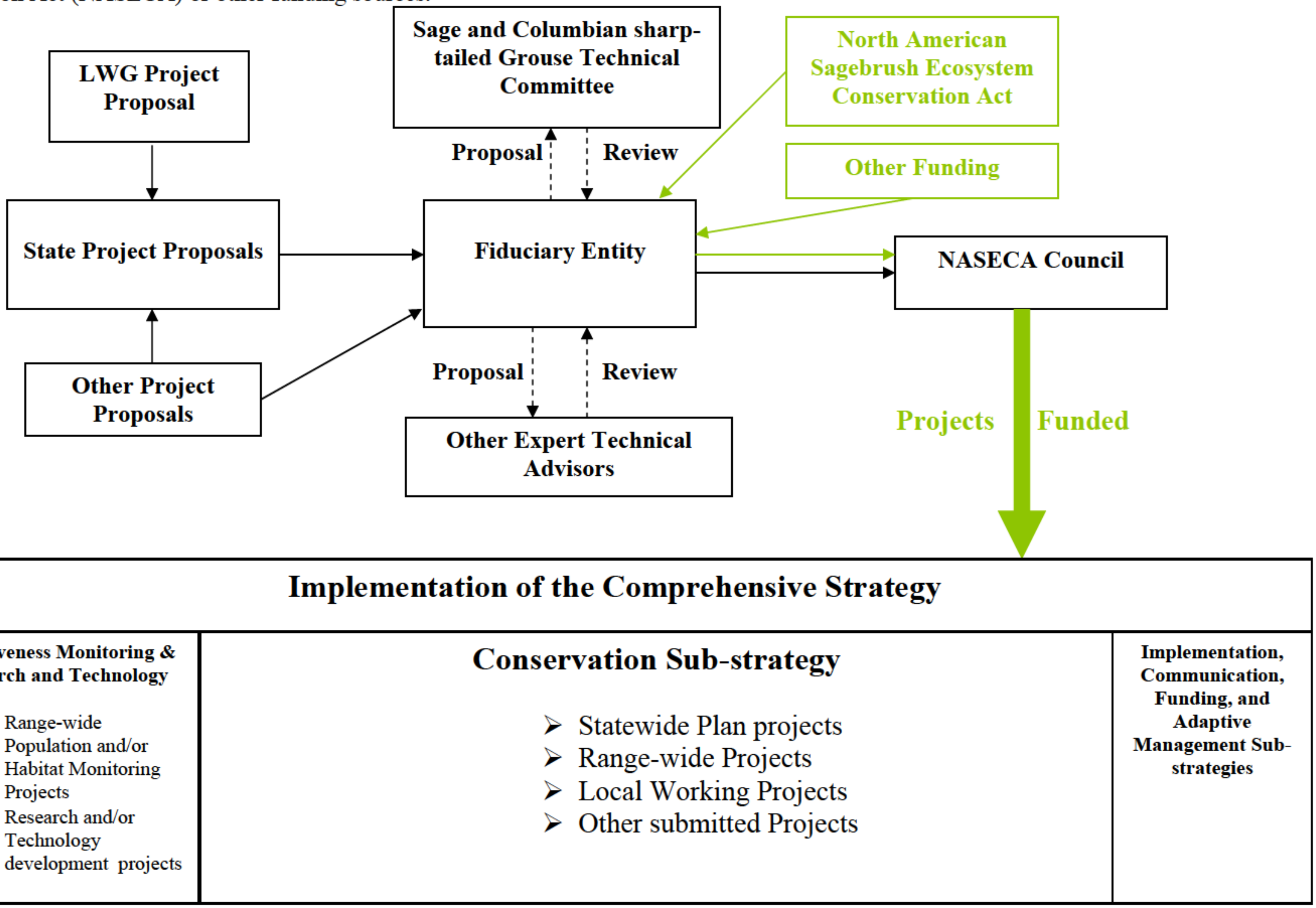


Table 6.2. Projected financial cost estimate for implementation of the Range-wide Strategy for 5 years by conservation action description and Management Zone.

Projected Cost For Implementation of the Comprehensive Range-wide Strategy January 2010 - December 2014				Total Cost
Description	**Management Zone**			
Communications Sub-strategy				
• Implementation of the Sage-grouse Information Network with a full–time Web-site. • Development and Operations for the Western Shrub and Grassland Science Information and Management Consortium (Provide support for LWGs and distribute science information)	Management Zone I			$ 6,300,000.00
	Management Zone II			$ 5,050,000.00
	Management Zone III			$ 7,800,000.00
	Management Zone IV			$ 8,900,000.00
	Management Zone V			$ 6,400,000.00
	Management Zone VI			$ 1,000,000.00
	Management Zone VII - greater sage-grouse			$ 550,000.00
	Management Zone VII - Gunnison sage-grouse			$ 1,500,000.00
Subtotal				**$ 37,500,000.00**
Implementation Monitoring Sub-strategy				
• Develop spatially explicit software and programs to catalog conservation efforts. • Develop computer resources. • Enter conservation data. • Develop reporting protocols	Management Zone I			$ 315,000.00
	Management Zone II			$ 232,500.00
	Management Zone III			$ 195,000.00
	Management Zone IV			$ 185,000.00
	Management Zone V			$ 150,000.00
	Management Zone VI			$ 50,000.00
	Management Zone VII - greater sage-grouse			$ 22,500.00
	Management Zone VII - Gunnison sage-grouse			$ 75,000.00
Subtotal				**$ 1,225,000.00**

Table 6.2 con't. Projected financial cost estimate for implementation of the Range-wide Strategy for 5 years by conservation action description and Management Zone.

Conservation Planning Sub-Strategy				Total Cost
Conservation Planning • Completion and development of remaining state and local working group plans. • This may include, but is not limited to supplying funds for plan coordinators, LWG public meetings, State and LWG annual meetings or workshops, etc.	**Management Zone I**			$ 925,000.00
	Management Zone II			$ 720,000.00
	Management Zone III			$ 500,000.00
	Management Zone IV			$ 585,000.00
	Management Zone V			$ 470,000.00
	Management Zone VI			$ 50,000.00
	Management Zone VII - greater sage-grouse			$ 50,000.00
	Management Zone VII - Gunnison sage-grouse			$ 250,000.00
Subtotal - Conservation Planning				**$ 3,550,000.00**
Habitat Improvements & Restoration • Funds for this portion of the sub-strategy, could include, but are not limited to invasive weed control, restoration projects that are at risk of being overtaken by exotic weeds. • This also includes funds for habitat restoration by stochastic events or vegetation succession.	**Management Zone I**			$ 6,300,000.00
	Management Zone II			$ 5,050,000.00
	Management Zone III			$ 7,800,000.00
	Management Zone IV			$ 8,900,000.00
	Management Zone V			$ 6,400,000.00
	Management Zone VI			$ 1,000,000.00
	Management Zone VII - greater sage-grouse			$ 550,000.00
	Management Zone VII - Gunnison sage-grouse			$ 1,500,000.00
Subtotal - Habitat Improvement & Restoration				**$ 37,500,000.00**

Table 6.2 con't. Projected financial cost estimate for implementation of the Range-wide Strategy for 5 years by conservation action description and Management Zone.

Conservation Planning Sub-Strategy				Total Cost
Land Maintenance - Easement and/or Fee Title • Funding is provided for conservation easements that benefit sage-grouse. • Funds can also be used to purchase critical sage-grouse habitat via fee title.	Management Zone I			$ 52,750,000.00
	Management Zone II			$ 46,250,000.00
	Management Zone III			$ 26,600,000.00
	Management Zone IV			$ 37,450,000.00
	Management Zone V			$ 26,200,000.00
	Management Zone VI			$ 15,000,000.00
	Management Zone VII - greater sage-grouse			$ 3,750,000.00
	Management Zone VII - Gunnison sage-grouse			$ 7,000,000.00
Subtotal - Land Maintenance - Easements and/or Fee Title				**$ 215,000,000.00**
Land and Species Protection • These funds can be used, but are limited to, protection of lands using a variety of other incentive based techniques. • Some techniques could include modified grazing strategies, green stripping of sagebrush communities, or grass banks to encourage wise grazing management.	Management Zone I			$ 4,300,000.00
	Management Zone II			$ 3,675,000.00
	Management Zone III			$ 2,850,000.00
	Management Zone IV			$ 3,400,000.00
	Management Zone V			$ 3,000,000.00
	Management Zone VI			$ 500,000.00
	Management Zone VII - greater sage-grouse			$ 275,000.00
	Management Zone VII - Gunnison sage-grouse			$ 1,500,000.00
Subtotal - Land and Species Protection				**$ 19,500,000.00**
Subtotal - Entire Conservation Sub-strategy				**$ 275,550,000.00**

Table 6.2 con't. Projected financial cost estimate for implementation of the Range-wide Strategy for 5 years by conservation action description and Management Zone.

Effectiveness Monitoring Sub-Strategy				Total Cost
Habitat • Complete habitat assessment and monitoring protocol. • Collect, store and analyze sage-grouse habitat data.	Management Zone I			$ 15,837,500.00
	Management Zone II			$ 13,743,750.00
	Management Zone III			$ 9,125,000.00
	Management Zone IV			$ 12,437,500.00
	Management Zone V			$ 8,712,500.00
	Management Zone VI			$ 4,125,000.00
	Management Zone VII - greater sage-grouse			$ 1,143,750.00
	Management Zone VII - Gunnison sage-grouse			$ 3,750,000.00
Subtotal - Effectiveness Monitoring (Habitat)				**$ 68,875,000.00**
Populations • Complete population monitoring protocol. • Collect, store, and analyze population data.	Management Zone I			$ 1,150,000.00
	Management Zone II			$ 1,322,500.00
	Management Zone III			$ 820,000.00
	Management Zone IV			$ 1,067,500.00
	Management Zone V			$ 740,000.00
	Management Zone VI			$ 75,000.00
	Management Zone VII - greater sage-grouse			$ 75,000.00
	Management Zone VII - Gunnison sage-grouse			$ 150,000.00
Subtotal - Effectiveness Monitoring (Populations)				**$ 5,400,000.00**
Subtotal of Effectiveness Monitoring				**$ 74,275,000.00**

Table 6.2 con't. Projected financial cost estimate for implementation of the Range-wide Strategy for 5 years by conservation action description and Management Zone.

Adaptive Management Sub-strategy				Total Cost
• Implement adaptive management protocols at the range-wide, state, LWG, provincial, and agency scales. • Evaluate and adaptively manage overall conservation program. • Apply "lessons learned."	Management Zone I			$ 1,375,000.00
	Management Zone II			$ 925,000.00
	Management Zone III			$ 800,000.00
	Management Zone IV			$ 875,000.00
	Management Zone V			$ 750,000.00
	Management Zone VI			$ 200,000.00
	Management Zone VII - greater sage-grouse			$ 75,000.00
	Management Zone VII - Gunnison sage-grouse			$ 700,000.00
Subtotal - Adaptive Management				**$ 5,700,000.00**

Table 6.2 con't. Projected financial cost estimate for implementation of the Range-wide Strategy for 5 years by conservation action description and Management Zone.

Research & Technology Sub-strategy				Total Cost
Basic Management Oriented Research • Funding could be applied toward any research opportunities outlined in the Research & Technology. • Emphasis will be placed on range-wide questions with standardized research techniques that apply across the range of the species.	**Management Zone I**			$ 4,500,000.00
	Management Zone II			$ 6,300,000.00
	Management Zone III			$ 3,400,000.00
	Management Zone IV			$ 4,950,000.00
	Management Zone V			$ 3,200,000.00
	Management Zone VI			$ 1,000,000.00
	Management Zone VII - greater sage-grouse			$ 450,000.00
	Management Zone VII - Gunnison sage-grouse			$ 1,300,000.00
Subtotal - Basic Research				**$ 25,100,000.00**
Emerging and Unforeseen Issues • Funding would be allocated towards any new and/or threatening issue (e.g. West Nile Virus, Avian Influenza, etc.). • If there are not emerging unforeseen issues, these funds could be allocated toward any of the other sub-strategies.	**Management Zone I**			$ 1,575,000.00
	Management Zone II			$ 925,000.00
	Management Zone III			$ 800,000.00
	Management Zone IV			$ 875,000.00
	Management Zone V			$ 750,000.00
	Management Zone VI			$ 500,000.00
	Management Zone VII - greater sage-grouse			$ 75,000.00
	Management Zone VII - Gunnison sage-grouse			$ 750,000.00
Subtotal - Emerging Issues in Research				$ 6,250,000.00
Subtotal - Research and Technology				**$ 37,050,000.00**
Grand Total		**$**		**425,600,000.00**

Table 6.3. Funding dispersal matrix based on proportions of states and provinces located in a particular Sage-Grouse Management Zone.

State Allocation	Zone I	Zone II	Zone III	Zone IV	Zone V	Zone VI	Zone VII GRSG	Zone VII GUSG
Alberta	1	0	0	0	0	0	0	0
California	0	0	0.5	0	0.5	0	0	0
Colorado	0	0.9	0	0	0	0	0.1	0
Idaho	0	0.1	0	0.9	0	0	0	0
Montana	0.9	0.05	0	0.05	0	0	0	0
Nevada	0	0	0.4	0.3	0.3	0	0	0
North Dakota	1	0	0	0	0	0	0	0
Oregon	0	0	0	0.3	0.7	0	0	0
Saskatchewan	1	0	0	0	0	0	0	0
South Dakota	1	0	0	0	0	0	0	0
Utah	0	0.05	0.7	0.2	0	0	0.05	0
Washington	0	0	0	0	0	1	0	0
Wyoming	0.25	0.75	0	0	0	0	0	0
Colorado-GUSG	0	0	0	0	0	0	0	1
Utah-GUSG	0	0	0	0	0	0	0	1

Conservation Strategies

ISSUE: Lack of sufficient short-term (1-5 years) funding to implement the Sage-grouse Comprehensive Conservation Strategy.		
OBJECTIVE: Identify short-term funding resources to assist in the implementation of the Sage-grouse Comprehensive Conservation Strategy.		
Conservation Strategy	**Responsible Parties (lead agency is in bold)**	**Timeline**
Meet with appropriate congressional representatives to add funding to federal budget appropriations to federal land management agency budgets.	WAFWA, WMI, Forum Stakeholder Participants	1st quarter 2007
Work with federal land management agencies to identify short-term funding opportunities to fund the implementation of the Comprehensive Conservation Strategy.	WAFWA, BLM, USFS	1st quarter 2007
Work with federal land management agencies to develop specific budget items for implementation of the Sage-grouse Comprehensive Conservation Strategy for the Fiscal Year 2009 budget process.	WAFWA, BLM, USFS	1st & 2nd quarter 2007
Coordinate state funding efforts and budget processes among the western states to implement the Sage-grouse Comprehensive Conservation Strategy.	WAFWA	2007
Coordinate state funding efforts with private funding efforts to leverage the acquisition of funding for implementation of the Sage-grouse Comprehensive Conservation Strategy.	WAFWA and Private Industry and Stakeholders	2007

ISSUE: Lack of sufficient organizational structure to implement short-term (1-5 years) funding strategy or review proposals for Strategy implementation if funding is acquired.		
OBJECTIVE: Develop an organizational structure to review Strategy implementation proposal and coordinate any financial resources.		
Conservation Strategy	**Responsible Parties (lead agency is in bold)**	**Timeline**
Have organizational meeting to outline process, contracts, and organizational protocol.	WAFWA, Joint Venture Board Members	1st quarter 2007
Select Sage-Grouse Management Zone Team members.	WAFWA, BLM, USFS	1st quarter 2007
Develop proposal process, guidelines.	Management Zone Team	2nd & 3rd quarters 2007
Select representatives from LWG and States within each Management Zone.	Management Zone Team	2007

ISSUE: Lack of any long-term (5+ years) funding needed to implement the Sage-grouse Comprehensive Conservation Strategy.		
OBJECTIVE: Prepare draft legislation for the North American Sagebrush Ecosystem Conservation Act (NASECA) that will fund implementation of the Sage-grouse Comprehensive Conservation Strategy.		
Conservation Strategy	**Responsible Parties (lead agency is in bold)**	**Timeline**
Draft legislation for NASECA.	WAFWA, WGA-SCC	1st & 2nd quarter 2007
Present draft legislation to WGA annual meeting.	WAFWA, WGA-SCC	2007
Work with appropriate federal congressional representatives and staff to achieve passage of NASECA.	WAFWA, USFS	2007 & 2008
Form the NASEC Council.	WAFWA	6 months following passage of NASECA
Coordinate project implementation and proposal development for states and LWGs with Habitat Joint Ventures.	WAFWA, Habitat Joint Ventures	6 months following passage of NASECA
First NASEC Council meeting.	NASEC Council	9 months following passage of NASECA
Development of charter, organizational process, funding allocation, and implementation of Sage-grouse Comprehensive Conservation Strategy.	NASEC Council	1 year following passage of NASECA

Chapter 7
Communications and Outreach Sub-Strategy

CHAPTER 7

Communications and Outreach Sub-strategy

Introduction

Sage-grouse and sagebrush conservation can greatly benefit from increased public knowledge and support. Western citizens have many and variable opinions concerning wildlife and wildlife habitat but generally support conservation and highly value native species (Teel et al. 2005). Sagebrush ecosystems, like all natural ecosystems, are complex and it is challenging to understand or appreciate the complexity of the problems, opportunities and values within the sagebrush ecosystem. Some individuals have no opinion about the sagebrush ecosystem or even consider landscapes dominated by sagebrush as nothing more than “undeveloped” and therefore “unproductive land.” Outside of western North America, knowledge of and concern for the sagebrush biome and sage-grouse can be expected to be generally superficial. More than 70% of all sagebrush and sage-grouse habitat is on public lands and is administered by public agencies for public benefit (Connelly et al. 2004). The 30% of sage-grouse habitat that is owned privately is critical to the lifecycle of many sage-grouse populations. Therefore, we all have a vested interest in sage-grouse and sagebrush conservation and can benefit from increased knowledge. The purpose of this sub-strategy is to improve the dissemination of knowledge through increased coordination, cooperation and information sharing among the states, agencies and other groups involved in and concerned with sage-grouse conservation and by elevating the priority of communication and outreach efforts.

In response to a proposal presented by the Nevada Department of Wildlife through the Resource Education and Information Committee at the Business Meeting of the 2004 WAFWA Annual Meeting, the directors approved the organization of the Sage Grouse Information Network (SGIN). SGIN gives WAFWA a good tool for fostering interstate and interagency coordination and cooperation in developing and disseminating communications, outreach and inreach (communication within agencies and groups to increase understanding) materials and programs. Since SGIN was organized WAFWA’s website has been expanded and it can now serve as host for the SGIN website. Many elements of this sub-strategy tier off of SGIN.

Public education, outreach, and inreach about sage-grouse conservation can become more effective through development of strong partnerships between states and federal agencies, non-government organizations, and citizens. For example, Project Wild has successfully educated school-aged students who then acquire lifelong knowledge and share their newly acquired knowledge and understanding with their guardians at home; thus building a solid base of understanding for future generations and helping to inform current generations. Project Wild offers opportunities to educate a large number of students about conservation needs and opportunities in the sagebrush biome and the partnerships that created it can serve as a model for creating awareness and knowledge about sagebrush conservation issues and opportunities. A collaboration effort between SGIN and Project Wild could create many powerful tools for educating school children and their families about sagebrush biome conservation.

Project Wild is a product of partnerships and could not have been developed or supported on a strictly local basis. Partners in Flight (PIF) is another example of a successful, cooperative program. PIF was initiated in 1990 because of concerns with declines of migratory birds. It gained support from many governments, agencies, professional societies, conservation groups, and industries that now cooperate to conserve habitats and monitor populations of terrestrial land-birds in the western hemisphere. NBII and SAFEMAP are effective programs dependent on cooperation and coordination. As a result of initiatives by conservation groups, Utah has adopted a wetlands component into their 4th grade curriculum. Similar initiatives in other states could yield significant long term benefits for sagebrush and sage-grouse. Also, interpretive exhibits/information about sage-grouse developed in any one state or by an agency could be adapted for use throughout the range of sage-grouse. Sage-grouse and sagebrush conservation will benefit as SGIN and other communication initiatives are expanded and strengthened using these successful models.

It is essential to keep local governments and landowners and land managers informed about sagebrush ecosystem conservation and to provide public and private land managers with information on effective tools and techniques that can be used to achieve conservation goals. Landowner and local government information and education programs developed in one part of the sagebrush country or by one agency could, when made available through SGIN, be adapted and used in other areas and/or agencies.

The WAFWA Sage-grouse Conservation effort is largely dependent upon local volunteers and local agency personnel. To varying degrees, many members of LWGs volunteer their own time and other resources because of their commitment to the future of sagebrush ecosystems. It is important that these significant public service acts are recognized and that agencies and organizations provide continuing support to LWG members and help assure that their efforts are successful and productive.

The sagebrush biome and associated wildlife species in the western United States and Canada are currently the focus of intensive management efforts. There is a clear need for improved communication, coordination, and consultation among various stakeholders. It is proposed that WAFWA and Partners establish a Western Shrub Science Information and Management Consortium (Consortium). The Consortium will empower Local Working Groups and other Strategy implementers with current information, validated science, and conservation tools in order to aid in the conservation and management of the sagebrush biome and associated wildlife (See Chapter 6 and Appendix D)

Mission Statement

It is the mission of the Communications Sub-strategy and SGIN to provide tools and services that facilitate state and agency efforts to provide information to all the stakeholder publics and implementers that promotes conservation of sage-grouse and sage-grouse habitat, and motivates groups and individuals to be involved in local conservation efforts.

Message

Conservation of the greater sage-grouse and sagebrush habitats is of critical importance. The Greater Sage-grouse Comprehensive Conservation Strategy provides a roadmap for the long-term conservation of the sagebrush biome. The Strategy promotes cooperative conservation involving local working groups, local governments, state and federal agencies, NGO's, and all other stakeholders within the sagebrush ecosystem. The success of the Strategy is dependent on the commitment and participation of many diverse groups.

Objectives

The objectives of this sub-strategy are to use SGIN and other currently existing and available tools:

To improve the dissemination of knowledge through increased coordination, cooperation and information sharing among the states, agencies and other groups involved in and concerned with sage-grouse conservation,

To elevating the priority of communication and outreach efforts,

To provided to national, state and local government decision makers, agency personnel, special interest groups, NGOs and the general public to motivate each of these groups to actively support implementation of the Strategy, and

To establish a consortium of state, agency and other resources to provide implementers, volunteers and agency personnel with a reliable source for the latest information on all aspects of sage-grouse and sagebrush conservation.

Audiences

- National, state and local govt. (decision makers)
- General public and landowners (resource owners)
- Landowners, LWG members, agency and state personnel (Implementers)
- National conservation groups (Implementers)
- Special Interest groups (Implementers)

Goal

The goal of the Communication and Outreach Sub-strategy is to assist states, agencies and other groups in their efforts to provide governments, agency personnel, local working group members, stakeholders in the sagebrush ecosystem, including the general public, with factual information about the conservation needs of sage-grouse and sagebrush, and the information and tools needed to meet those needs. This will involve cooperating and coordinating with existing programs in developing, gathering, maintaining and distributing technical information, educational resources, and other tools and services to assist states, agencies and working groups in their efforts to enlist support for sage-grouse and sagebrush conservation.

Approach

Communications will be improved through expanding and strengthening the partnerships between states and agencies (primarily using SGIN), by developing new capacity, and by employing new technologies and tools. The partnerships are designed to increase total communications capacity and efficiency. Communications specialists will target each communication effort to reach and influence a specific audience(s) with a specific pre-defined message(s) emanating from LWG and state plans and this Strategy. SGIN will provide a more efficient and effective method for gathering information from specialists (biologists, managers, etc.) and distributing it to the communications staff and from them to the public, thereby alleviating one often frustrating and limiting link in effectively communicating especially the technical portions of our message. A consortium of states, agencies and partners will be established to provide reliable technical information to all implementers of the Strategy.

Conservation Strategies

Objective 1: Complete development and implementation of SGIN and ensure a process for monitoring the effectiveness of sage-grouse communications strategies. Provide annual updates to WAFWA, partners and other interested stakeholders.

Target Audience: WAFWA directors, agency representatives and other interested stakeholders.

Approach: Develop a process to administer SGIN, coordinate sage-grouse communications activities, prepare reports, and provide recommendations to the directors.

Activity	Who	When
Develop a SGIN Administration Process.	WAFWA	Spring 07
Develop Needs Assessment to support SGIN on a continuing basis and submit proposal for funding and implementation	WAFWA and SGIN	July-Dec. 07
Establish SGIN Website and initiate administrative process	WAFWA	Prior to 1 July 07
Update Communications Sub-strategy every third year beginning 2009	SGIN -RIEC	2009
Announce availability of information and products as they are developed	SGIN	Ongoing beginning Sept. 07

Objective 2: Develop an electronic toolbox that will provide states, agencies, local working groups, and others with a broad array of range-wide data and information, and real-time information sharing capability through a chat room, list server, net meetings, etc. for sage-grouse workers to use for sharing information, ideas etc.		
Target Audience: Agency personnel, LWG members, and the media		
Approach: Use SGIN website		
Activity	**Who**	**When**
Incorporate NBII Science Locator Program into the SGIN	NBII (Lisa Stoner)	Prior to Feb. 07
Summarize and report current and planned activities by agencies involved in S-g conservation on SGIN website	SGIN	Complete summary by March 07, post avail. information ASAC
List contact Info. for agency and state SGIN representatives on WAFWA website	SGIN	Prior to end of Jan. 07
Compile and post list of LWG contacts/ Update annually	SGIN	July 07
Continue to Publish *Sage Sense* quarterly/ emphasizing progress in implementation of the Strategy on website	SGIN	Spring, Summer, Fall and Winter annually
Provide LWGs with an outlet/source of information from other working groups through a sage-grouse chat room (password protected), list server, etc.	SGIN using WAFWA website	Aug 07

Objective 2.1: Gather, catalog and make available internal (inreach) communication and information tools that have been and are developed by states, agencies and other groups and provide convenient and efficient means of distributing these tools.		
Target Audience: State and federal agency and NGO personnel.		
Approach: Ask states and agencies that have in-reach products and programs already developed to post e-copies of their materials on SGIN and request each state to develop one new inreach product to use and share.		
Activity	**Who**	**When**
Request States, Provinces and Agencies (SPA)to prepare and provide e-copies of inreach materials	SGIN	At RIEC Meeting in Flagstaff (July 07).
Gather materials produced by Framework Team and post these materials on the SGIN	SGIN, WAFWA Secretary	Spring 07
Negotiate with SPA to have each organization develop a specific inreach product and share it with SGIN members	SGIN	2007

Objective 2.2: Link to existing resources (SAGEMAP, NBII, BLM National Monitoring Strategy, etc) and gather, catalog and make available information other products for "Targeted Interest Groups" such as landowners, local governments and the media, and provide materials for each target group. Develop convenient and efficient means of distributing these tools using SGIN, SAGEMAP, etc.		
Target Audience: Specified interest groups important to sage-grouse and sagebrush conservation and the media.		
Approach: Gather and disseminate information from existing resources and ask each state and agency to select one important interest group to target and to prepare and share that information with other states.		
Activity	**Who**	**When**
Quarry SPA to develop a list of target audiences	SGIN	July 07 (REIC Meeting)
Prepare a list of National Target Groups with contact information	SGIN	July 07 (REIC Meeting)
Gather e-copies of "targeted" information available from states and agencies and post on SGIN	SGIN	Aug-Dec. 07
Query SPA to identify needed "targeted Information Products".	SGIN	Aug.-Dec 07

*brochure, Power Point presentation, camera-ready ads, press releases, public service announcements, event invitations and surveys, websites, newsletters, and research information

Objective 2.3: Gather, catalog and make available a list of financial resources that are available to implementers for funding sage-grouse and sagebrush projects.		
Target Audience: Private landowners, state agencies and LWG		
Approach: Ask each federal agency, NGO, and state agency to prepare a catalog of available resources or websites outlining these resources.		
Activity	**Who**	**When**
Request that agency, states and NGOs provide information on potential funding sources.	SGIN	Sept. 07
Post funding information on SGIN	SGIN	Nov. 07
Review and update Available Funding information	SGIN	Annually after Federal Budgets are Approved

Objective 2.4: Develop and maintain on the SGIN a catalog of "local, state, and range-wide success stories" that can be shared among groups and disseminated to the general public on a regular basis to keep sagebrush and sage-grouse conservation before the public and to demonstrate successes.

Target Audiences: The general public, targeted groups and the media

Approach: Contact states, agencies and local working groups to find new success stories demonstrating the successes that are taking place throughout Sagebrush Country.

Activity	Who	When
Request that SPA catalog sage-grouse planning and conservation success stories that can be shared on the SGIN website	SGIN	Aug. 07
Request SPA to each prepare one new success story each six-months and post on website	SGIN	July 07 (REIC meeting)
Organize and maintain (by adding new items) a catalog of success stories emphasizing success in implementing sage-grouse and sagebrush conservation plans.	SGIN	Ongoing after Sept. 07

Objective 3: Work with Project WILD personnel to develop specific lessons dealing with sagebrush and sage-grouse conservation including citizen science projects and work with Project WILD to develop a series of interactive educational tools designed to illustrate the interrelationships of sage-grouse, sagebrush and other elements of sagebrush ecosystems and to demonstrate the cultural, biological, recreational, and economic importance of the Sagebrush Biome. Consider initiating efforts in individual states to include Sagebrush Ecology into the primary school curriculum.

Target Audience: Elementary, secondary and high school students

Approach: Approach Project WILD and work with them to develop sage-grouse and sagebrush elements for their programs

Activity	Who	When
Establish contact with Project Wild and propose joint development of Sagebrush curriculums and materials	SGIN	August 07
Gather information from Utah and ideas from other states to develop a strategy and materials for states to use in efforts to add Sagebrush Ecology to primary school curriculums in sage-grouse and sagebrush states.	WAFWA Resource Information & Education Committee	August 08

Objective 4: Develop programs that celebrate the unique nature of the sagebrush communities and motivate people to become familiar with the sagebrush environment. Develop data protocols for use by adults and schools to measure components of the sagebrush ecosystem and to report that data to a government agency.		
Target Audience: Suburban and rural westerners		
Approach: Contact rural counties and/or communities with offers to assist them in developing and marketing unique programs to draw people to sagebrush areas, projects and programs sponsored by the community and supported by the state wildlife agency. Support communities that are currently sponsoring sage brush centered activities.		
Activity	**Who**	**When**
Contact and provide support to communities already involved in sagebrush events	SGIN	2007
Visit these events and gather materials and information	SGIN	2007
Recruit communities to become involved in Sagebrush Festivals	SGIN	2008

Objective 5: Develop a program and materials to support LWG volunteers and for recruitment, retention and training of volunteers. Highlight Local Working Group concept and continuing need for volunteers.		
Target Audience: Local volunteers throughout Sage Country		
Approach: Contact each state and gather materials that each state uses to recruit, support and train volunteers - Post materials on SGIN and augment these materials as necessary.		
Activity	**Who**	**When**
Gather and post existing LWG volunteer training and support materials from SPA.	SGIN	2007
Request SPAs to produce specific training and recruitment materials	SGIN	2007
Discuss training and retention of LWG volunteers at Sage Biome Communicators Workshop	SGIN	2008

Objective 6: Organize bi-annual regional or range-wide meetings for resource and communications experts to meet for information exchange, to encourage collaboration across administrative boundaries, and to receive real time updates about research, monitoring, and inventory.		
Target Audience: State, agency and NGO communication specialists and other media specialists.		
Approach: Ask the Resource Information and Education Committee to organize bi-annual conferences by creating a "Sage Biome Communicators Workshop".		
Activity	**Who**	**When**
Find short-term Funding for volunteers	WAFWA/SGIN	Fall 07
Provide a "How To" Guideline Book on what is required to implement conservation actions on 1) private lands 2)public lands	SGIN	Fall 07
Develop Volunteers Trust Fund to support per diem and mileage for volunteers who are involved with "cooperative conservation"	WAFWA/Funding Team/SGIN	Fall 08
Provide training sessions for Volunteers	Shrub Consortium/Technical Team/SGIN	Fall 08

Objective 7: Provide a reliable source of information relating to sage-grouse and sagebrush conservation including the latest management techniques and protocols, research results and the use and implications of that research, restoration of ranges and populations, monitoring of populations and habitats, etc.		
Target Audience: All who are involved in implementing the Strategy		
Approach: Establish a consortium of WAFWA and partner resources		
Activity	**Who**	**When**
Have Representative(s) of the group who formulated the Consortium proposal make a presentation at WAFWA Summer Meeting and seek go ahead to begin	WAFWA to issue the invitation	July ,2007
Establish the National Service Team	WAFWA and Partners	Begin Spring 2008
Begin Consortium Operation	National Service Team, WAFWA and partners	FY 2009

Chapter 8
Adaptive Management

CHAPTER 8

Adaptive Management

Introduction

This chapter describes how adaptive management (AM) principles and techniques apply to greater sage-grouse conservation and management at multiple scales. Adaptive management is the process by which management practices and assumptions can be evaluated relative to their efficacy for sage-grouse. Adaptive management recognizes that there may be inherent uncertainties in assumptions used in greater sage-grouse conservation. If we recognize these assumptions as hypotheses, then we can test them. In essence, adaptive management is a feedback loop that insures we evaluate assumptions used in the conservation and management of greater sage-grouse and changes these as new information is acquired through monitoring and other feedback mechanisms.

Sage-grouse conservation is implemented at three scales that can be analyzed using AM principles. The finest scale conservation takes place at the LWG level. These efforts often involve the direct manipulation of habitat or the application of fine scale conservation measures. The second scale of conservation efforts generally applies to political jurisdictions including tribes, states, provinces, or major land managers (BLM, USFS, USFWS, DOD, and NRCS). Conservation efforts at mid-scale often promulgate broader landscape management guidelines and management policies. Hunting season regulations, fire suppression plans and land-use plans are some of the efforts that can be evaluated using adaptive management techniques. The broadest conservation scale is at a level of sub-populations, populations, eco-regions or range-wide management efforts can also be evaluated using adaptive management. Conservation efforts at these scales often transcend jurisdictions and involve issues including population genetics, range fragmentation, disease, and sagebrush conversion. Finally, adaptive management principles can be applied to the policies, administration and implementation of this strategy.

Need

Application of adaptive management for sage-grouse is an essential element of conservation actions in the 2003 Policy for Evaluation of Conservation Efforts (PECE) (U.S. Fish and Wildlife Service and National Oceanic and Atmospheric Administration 2003). PECE defines adaptive management as “a method for examining alternative strategies for meeting measurable biological goals and objectives, and then, if necessary, adjusting future conservation management actions according to what is learned.” The adaptive management approach is an appropriate technique for the monitoring and management of the sage-grouse conservation effort because it is flexible, improves management over-time, adapts to uncertainty, includes the human component in the ecosystem, and essential in evaluating the effectiveness of conservation actions.

The primary tenets of adaptive management are variously described as “Large-scale Management Experiments and Learning by Doing”, (Walters and Holling 1990: page 2060) or “polices are experiments; learn from them” (Lee 1993: page 9). Salafsky et al. (2001) identified six conditions that warrant an adaptive management approach. These conditions include 1) conservation takes place in a complex system, 2) the world is a constantly and unpredictably changing place, 3) "competitors" are changing or adapting, 4) immediate action is required, 5) there is no such thing as complete information, and 6) we can learn and improve. Conservation efforts that use large scale treatments, with sequential treatments over a long project lifetime, directly and indirectly involve residents of the project area, span multiple jurisdictions, and involve substantial uncertainty are ideal efforts for an adaptive management application. Additionally, management experiments that deal with multiple species are good candidates for adaptive management. This Strategy and associated conservation efforts are ideally positioned to be adaptively managed.

Traditional wildlife management approaches by western wildlife agencies failed to detect widespread declines in greater sage-grouse numbers and distribution, and subsequently failed to identify or address the causes for these declines. The Conservation Assessment (Connelly et al. 2004) concluded that the populations of greater sage-grouse declined most precipitously from 1965-85, the decline was not addressed until 1995, ten years after the decline abated. Management must establish a better track record.

Challenges of an Adaptive Management process

The conceptual and intuitive appeal of adaptive management has increased with the number of conservation projects using the technique over the past 20+ years (Walters 1997). In spite of a number of well funded and well intentioned efforts, the numbers of successful applications of adaptive management are rare (Stankey 2002). Lee (1999: online) reports that "adaptive management has been more influential as an idea rather than as a practical means of gaining insight into the behavior of ecosystems utilized and inhabited by humans." Stankey (2002: page 159), evaluating the performance AM in the Northwest Forest Plan, suggests that the reasons for the poor track record for adaptive management are "complex and multi-faceted, transcending obvious culprits such as insufficient funding or intransigent bureaucrats." He identified a number of technical barriers that impede successful implementation, including factors that create an unwillingness to experiment or accept new ways of learning. Some of these factors are structural or organizational, social-psychological, political, and legal. Many of the barriers appear to be related to an aversion of risk taking, and an unwillingness to recognize uncertainty by agencies and their personnel.

Lee (1999) points out that adaptive management is difficult to initiate and to sustain. Further, he questions whether adaptive management is affordable However; he also suggests that adaptive management may be essential in the search for a durable and sustainable relationship between our environment and humans.

The application of AM at each level of conservation is confronted by a variety of challenges that are both unique to scale and universal to the entire effort. Fine scale challenges include collecting data that are robust and that can be evaluated scientifically. These fine scale evaluations tend to have wide variances and may not provide enough resolution to determine whether an effort is successful or unsuccessful. Conservation efforts at larger scales often depend upon explicit objectives developed, and monitoring data collected at fine scales. Consequently, all adaptive management models need significant commitment and rigorous application of technique so managers can "learn by doing" at each conservation scale.

Clearly, large numbers of individual conservation actions will be undertaken over the next several decades by the many partners engaged in the larger greater sage-grouse conservation. Though not all actions taken may be fully successful, all conservation partners should avail themselves of every opportunity to "learning," and to share what they have learned, along the way.

Application of Adaptive Management

The application of adaptive management principles in a conservation effort is essential given the magnitude and scale of these conservation efforts. Local working groups can apply AM at the project level to determine how effective their projects have been in meeting the design objectives for specific projects. States, provinces, tribal nations and agencies can apply AM for the evaluation of conservation efforts that are identified in their conservation plans, strategies, and policies. The management authority (WAFWA) should use AM to determine if the organizational structure, funding, strategy and leadership objectives are meeting conservation needs. The Range-wide Sage-grouse Issues Forum participants form an independent association of stakeholders that are ideally situated to provide WAFWA and the conservation community with a short-term AM authority and to provide long-term analysis of the overall conservation effort.

The literature clearly indicates that the application of adaptive management for delivering conservation products is in it infancy. Management authorities that intend to use adaptive management need to commit to the effort at each level of application. The commitment includes not only the periodic evaluation of effectiveness, but also consistent coordination and active management of the process, itself. The management authorities need to insure that AM and all of the components of AM are funded and implemented at each level of conservation.

Conservation Strategy

Table 8.1

ISSUE: To be successful Adaptive Management must be a full-time commitment of the Management Authorities. AM should be applied at all levels of conservation efforts with appropriate support for applying AM.		
OBJECTIVE: Build the organizational support structure for AM.		
Strategy	**Who (lead agency is in bold)**	**Timeline**
Identify the need for a full-time AM component in infrastructure to manage the Strategy.	WAFWA, **Management Zone Team**	Spring 2007
Develop an AM support program at the fine scale, mid-scale and on a range-wide scale.	**WAFWA**	Fall 2007
Develop an AM program to evaluate the effectiveness of the entire sage-grouse/sagebrush biome conservation effort using an outside referee at five year intervals. The evaluator should be a neutral third-party contractor.	WAFWA, **Contractor**	Start winter 2012, report the following WAFWA summer meeting.

Table 8.2

ISSUE: Many conservation plans at various levels identify using AM as a management technique or imply that they will "comply with PECE" and therefore adopt AM. Some plans, recognize that they do not have AM components in place and do not make provisions for the development of AM. In practice, few conservation plans written to date provide details or a strategy on their particular plan will apply adaptive management. Most plans have elements for monitoring and setting measurable objectives. These elements provide the baselines for AM. To successful adaptively manage a project, AM components need to be in place in the beginning of the effort.		
OBJECTIVE: Develop an explicit strategy for the implementation of AM at each planning level. Provide support for developing AM at each conservation scale.		
Conservation Strategy	**Who (lead agency is in bold)**	**When**
In partnership, with all conservation planning groups, develop an explicit plan to adaptively manage conservation efforts undertaken by that group. The plans should include objectives, monitoring efforts, timelines for evaluation, evaluation techniques, reporting, and stakeholder interactions.	**WAFWA**, LWGs, State/Provincial planners, Agency planner.	Start winter 2008 On going effort.

Chapter 9
Strategies, Schedules and Responsibilities

CHAPTER 9

Strategies, Schedules and Responsibilities

Introduction

The purpose of this chapter is to identify suggested conservation actions, time frames for action, and responsibilities for the sage-grouse stakeholders. The associated State, Provincial, Tribal and Agency plans and strategies are not identified in this chapter since these documents stand on-their-own and have their own schedule of responsibility and timelines.

This document identifies over 275 tasks from each sub-strategy and the Range-wide Issues Forum. The Forum identified approximately 188 tasks that were distributed among 56 goals in 29 sub-issues. We have referenced appendices and tables that identify tasks, schedules and responsibilities; however, we have also distilled selected groups of strategies in order to provide some organization to the array of activities.

The Forum Report provides the conservation partnership with a significant tool for prioritizing issues and sub-issues by the eastern and western portions of the species range (Appendix C, Pg 12). Each goal was rated based upon the Forum's key principles and a subjective "cost-effectiveness" rating. (Appendix C, pg 7 and Appendix C4. This rating system can be adapted by any LWG or conservation partner for evaluation of actions that they may consider.

Local Working Groups

Local Working Groups have been and are implementing conservation actions to address issues that have been identified in their conservation plans. This strategy provides guidance, support and suggests actions to LWGs in several areas of interest. First, this strategy provides guidance in identifying conservation issues that are significant at a range-wide or management zone scale. These issues are found in the Forum Report and associated Appendices. Further, the Forum Report provides LWGs with several criteria for prioritizing conservation actions based upon the Forum's expert opinion. Secondly, the Strategy provides significant support to LWGs in accomplish their mission. The support involves increased funding, increased LWG capacity, increased agency capacity, technical support, adaptive management, communications and outreach. Finally, the Strategy also identifies components that may require actions from LWGs. Local Working Groups conservation efforts form the core conservation across the range of the species. The Strategy identifies monitoring activities for implementation and effects, conservation actions or issues that may be best addressed by LWGs and finally evaluation through adaptive management.

Local Working Groups should continue the following actions:

1) Evaluation of conservation issues and risks within their area of responsibility.
2) Building their inventory of action plans that address significant issues and risks. These plans should include efforts that are currently beyond the capacity of the LWG and partners as well as efforts that are within current capacity.
3) Making sure that all conservation action plans include a mandatory monitoring provision.

States, Provinces and Tribes

State, Provincial and Tribal conservation actions, like the efforts of LWGs, have been or are in the process of being implemented. This strategy encourages states, provinces and Tribes to continue implementing their conservation plans and to continue to expand conservation actions to meet the needs of sage-grouse. When this strategy is fully implemented states, provinces and tribes should be prepared to build their capacity to implement conservation actions and help facilitate LWG conservation efforts.

Range-wide Facilitating Actions

The Forum identified three “essential resources” required to move conservation efforts forward: 1) funding, 2) leadership committed to organizing, supporting and guiding a long-term effort, and 3) the appropriate organizational structure to sustain it. The Forum further suggested actions that would facilitate developing these “essential resources”. Successful implementation of these goals is critical to the success of the conservation strategy.

Table 9.1. Range-wide facilitating strategies.

Goal	Action	Responsible Party	Time-Frame
Funding (Short-term)	Contact WGA, Agency heads for current funding	WAFWA, WMI, & Forum Participants	1st Quarter 2007
Funding (Long-term)	Funding Sub-strategy, Chapter 6	WAFWA, SCC, WGA, and partners	1st & 2nd quarter 2007
Leadership	Establish an Executive Leadership Committee (Interim to NASECA or other council)	WAFWA to convene a meeting of the conservation partners	1st & 2nd quarter 2007
Leadership	Leadership Advisory Council (Forum)	WAFWA to empanel the Council	3rd quarter 2007

Goal	Action	Responsible Party	Time-Frame
Leadership	Advisory Council meeting. Evaluate implementation progress to date.	Advisory Council	4^{th} quarter 2007, 4^{th} quarter 2008, 4^{th} quarter 2009, 4^{th} quarter 2010, 4^{th} quarter 2015, 4^{th} quarter 2020, and 4^{th} quarter 2025.
Organizational Structure (Short-term)	Establish a team or employ an organization that can direct the elements of the Strategy before the passage of NASECA.	WAFWA and partners	2^{nd} quarter 2007
Organizational Structure (Long-term)	Develop provisions in NASECA for an appropriate operations organization.	WAFWA, SCC, and WGA	2^{nd} quarter 2007
Implementation Team	Organize and empanel a sage-grouse Comprehensive Conservation Implementation Team	WAFWA	1^{st} quarter 2007

Range-wide Conservation Actions

Range-wide conservation strategies are presented in four tiers in this document. The first tier includes strategies developed in each of the sub-strategies in this document. Generally, these strategies aid the implementation, completion or evaluation of conservation actions from LWG projects to range-wide projects (Chapters 3-8). The second tier strategies were distilled by the Range-wide Conservation Forum from their entire suite of issues and ranked by importance and priority and are found in full in Appendix C4. The third tier includes the entire array of goals and tasks identified by the Range-wide Forum (Table 9.2 and Appendix C2 and C3). Implementation of these tasks may involve a number of stakeholders, but the range-wide nature of the tasks dictates that a Federal Agency or regional organization like WAFWA direct the efforts to implement and track the tasks. The final strategies facilitate conservation strategies (Appendix C3A).

Table 9.2 First tier conservation actions. Strategies generated in Chapters 3 – 8.

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-3, Pg 14	ISSUE: There currently is no consistent methodology for describing sage-grouse habitat for all land use planning activities at various scales which may affect sage-grouse habitats. A standardized process is needed to inventory and monitor sage-grouse habitats and that process should be capable of being modified in an adaptive manner as more information becomes available or as land use planning assumptions change	OBJECTIVE 1: Develop techniques to describe and assess sage-grouse habitats to be used in habitat inventory and monitoring efforts at multiple scales that support land use planning activities and project implementation.	BLM, FWS, FS, Park Service, NRCS, USGS-BRD, State wildlife agencies	Variable
C-3, Pg 15	ISSUE: There is currently no standardized and statistically rigorous method to monitor the status and trend of sage-grouse populations at local regional and range-wide scales.	OBJECTIVE 1: Develop techniques to monitor greater sage-grouse populations to detect changes in their populations at local, regional, and range-wide scales.	WAFWA, Sage and Columbian Sharp-tailed Grouse Technical Committee	1st Quarter 2007
C-3, Pg 16	ISSUE: There is need to implement new population monitoring techniques through a scientific process including peer-review and experimentation so that the techniques meet a highest possible scientific standards.	OBJECTIVE 1: Facilitate the review, experimentation, and implementation of the techniques manual.	WAFWA, Sage and Columbian Sharp-tailed Grouse Technical Committee	1st Quarter 2008

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-3, Pg 17	ISSUE: There is a need to develop metrics to evaluate effectiveness of conservation actions to sage-grouse populations at local, regional, and range-wide scales.	OBJECTIVE 1: Provide information and expertise to local agencies and working groups to help evaluate the effectiveness of on-the-ground conservation and management actions to sage-grouse populations;	Western Shrub and Grassland Science Information and Management Consortium and Sage and Columbian Sharp-tailed Grouse Technical Committee	Begin 2008 Consortium to begin with NASECA or with outside funding.
C-3, Pg 18	ISSUE: There is a need for infrastructure/resources to complete, implement, and evaluate new population monitoring techniques and provide biological expertise on monitoring to local agencies and working groups	OBJECTIVE 1: Develop infrastructure or resources to complete, implement, and evaluate new population monitoring techniques and provide biological expertise on monitoring to local agencies and working groups.	Various - Detailed in Chapter 6	
C-4, Pg 7	Issue: Develop a short-term (until NASECA passage) commitment to develop, implement and house the implementation monitoring database.	Objective: Meet with partners that have been involved with the implementation monitoring strategy and develop a commitment for program development and resource needs.	**WAFWA**, Utah State University, USGS (SAGEMAP) and Wildlife Habitat Registry	1st Quarter 2007
C-5, Pg 14	**ISSUE:** There is a lack of consistent range-wide sage-grouse priorities and standardized research protocol.	OBJECTIVE: Prioritize sage-grouse research and develop consistent research protocol.	WAFWA	One year from beginning of Strategy

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-6, Pg 27	ISSUE: Lack of sufficient short-term (1-5 years) funding to implement the Sage-grouse Comprehensive Conservation Strategy.	OBJECTIVE: Identify short-term funding resources to assist in the implementation of the Sage-grouse Comprehensive Conservation Strategy.	WAFWA, WMI, Forum Stakeholder Participants	1st quarter 2007
C-6, Pg 28	ISSUE: Lack of sufficient organizational structure to implement short-term (1-5 years) funding strategy or review proposals for Strategy implementation if funding is acquired.	OBJECTIVE: Develop an organizational structure to review Strategy implementation proposal and coordinate any financial resources.	WAFWA, BLM, USFS	1st quarter 2007
C-6, Pg 29	ISSUE: Lack of any long-term (5+ years) funding needed to implement the Sage-grouse Comprehensive Conservation Strategy.	OBJECTIVE: Prepare draft legislation for the North American Sagebrush Ecosystem Conservation Act (NASECA) that will fund implementation of the Sage-grouse Comprehensive Conservation Strategy.	WAFWA, WGA-SCC	1st & 2nd quarter 2007
C-7, Pg 4	Objective 1: Complete development and implementation of SGIN and ensure a process for monitoring the effectiveness of sage-grouse communications strategies. Provide annual updates to WAFWA, partners and other interested stakeholders.	Approach: Develop a process to administer SGIN, coordinate sage-grouse communications activities, prepare reports, and provide recommendations to the directors.	WAFWA	2nd Quarter 2007

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-7, Pg 7	Objective 2: Develop an electronic toolbox that will provide states, agencies, local working groups, and others with a broad array of range-wide data and information, and real-time information sharing capability through a chat room, list server, net meetings, etc. for sage-grouse workers to use for sharing information, ideas etc.	Approach: Use SGIN website	Various	1st & 2nd Quarter 2007
C-7, Pg 7	Objective 2.1: Gather, catalog and make available internal (inreach) communication and information tools that have been and are developed by states, agencies and other groups and provide convenient and efficient means of distributing these tools.	Approach: Ask states and agencies that have in-reach products and programs already developed to post e-copies of their materials on SGIN and request each state to develop one new in-reach product to use and share.	SGIN	At RIEC Meeting in Flagstaff (July 07).
C-7, Pg 6	Objective 2.2: Link to existing resources (SAGEMAP, NBII, BLM National Monitoring Strategy, etc) and gather, catalog and make available information other products for "Targeted Interest Groups" such as landowners, local governments and the media, and provide materials for each target group. Develop convenient and efficient means of distributing these tools using SGIN, SAGEMAP, etc.	Approach: Gather and disseminate information from existing resources and ask each state and agency to select one important interest group to target and to prepare and share that information with other states.	SGIN	July 07 (REIC Meeting)
C-7, Pg 6	Objective 2.3: Gather, catalog and make available a list of financial resources that are available to implementers for funding sage-grouse and sagebrush projects.	Approach: Ask each federal agency, NGO, and state agency to prepare a catalog of available resources or websites outlining these resources.	SGIN	Sept. 07

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-7, Pg 7	Objective 2.4: Develop and maintain on the SGIN a catalog of "local, state, and range-wide success stories" that can be shared among groups and disseminated to the general public on a regular basis to keep sagebrush and sage-grouse conservation before the public and to demonstrate successes.	Approach: Contact states, agencies and local working groups to find new success stories demonstrating the successes that are taking place throughout Sagebrush Country.	SGIN	Aug. 07
C-7, Pg 7	Objective 3: Work with Project WILD personnel to develop specific lessons dealing with sagebrush and sage-grouse conservation including citizen science projects and work with Project WILD to develop a series of interactive educational tools designed to illustrate the interrelationships of sage-grouse, sagebrush and other elements of sagebrush ecosystems and to demonstrate the cultural, biological, recreational, and economic importance of the Sagebrush Biome. Consider initiating efforts in individual states to include Sagebrush Ecology into the primary school curriculum.	Approach: Approach Project WILD and work with them to develop sage-grouse and sagebrush elements for their programs.	SGIN & WAFWA	3rd Quarter 2007
C-7, Pg 8	Objective 4: Develop programs that celebrate the unique nature of the sagebrush communities and motivate people to become familiar with the sagebrush environment. Develop data protocols for use by adults and schools to measure components of the sagebrush ecosystem and to report that data to a government agency.	Approach: Contact rural counties and/or communities with offers to assist them in developing and marketing unique programs to draw people to sagebrush areas, projects and programs sponsored by the community and supported by the state wildlife agency. Support communities that are currently sponsoring sage brush centered activities.	SGIN	2007

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-7, Pg 8	Objective 5: Develop a program and materials to support LWG volunteers and for recruitment, retention and training of volunteers. Highlight Local Working Group concept and continuing need for volunteers.	Approach: Contact each state and gather materials that each state uses to recruit, support and train volunteers - Post materials on SGIN and augment these materials as necessary.	SGIN	2007
C-7, Pg 9	**Objective 6:** Organize bi-annual regional or range-wide meetings for resource and communications experts to meet for information exchange, to encourage collaboration across administrative boundaries, and to receive real time updates about research, monitoring, and inventory.	**Approach:** Ask the Resource Information and Education Committee to organize bi-annual conferences by creating a "Sage Biome Communicators Workshop".	SGIN & WAFWA	Fall 2007
C-7, Pg 9	**Objective 7:** Provide a reliable source of information relating to sage-grouse and sagebrush conservation including the latest management techniques and protocols, research results and the use and implications of that research, restoration of ranges and populations, monitoring of populations and habitats, etc.	**Approach:** Establish a consortium of WAFWA and partner resources	WAFWA to issue the invitation	July 2007
C-8, Pg 4	ISSUE: To be successful, Adaptive Management must be a full-time commitment of the Management Authorities. AM should be applied at all levels of conservation efforts with appropriate support for applying AM.	OBJECTIVE: Build the organizational support structure for AM.	WAFWA, **Management Zone Team**	1st Quarter 2007

Chapter Page	Issue	Objective	Responsible Parties	Timeline
C-8, Pg 5	**ISSUE:** Many conservation plans at various levels identify using AM as a management technique or imply that they will "comply with PECE" and therefore adopt AM. Some plans, recognize that they do not have AM components in place and do not make provisions for the development of AM. In practice, few conservation plans written to date provide details or a strategy on their particular plan that will apply adaptive management. Most plans have elements for monitoring and setting measurable objectives. These elements provide the baselines for AM. To successful adaptively manage a project, AM components need to be in place in the beginning of the effort.	**OBJECTIVE:** Develop an explicit strategy for the implementation of AM at each planning level. Provide support for developing AM at each conservation scale.	**NFWF**, LWGs, State/Provincial planners, Agency planner.	Start winter 2008 On going effort.

Table 9.3. Third tier conservation actions. These tasks were developed by the Range-wide Issues Forum. The full texts of the strategies are found in Appendix C2. The Range-wide Forum provides synthesized rated goals in Appendix C4. This Appendix provides the Forum's priorities.

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Habitat Conservation and Land Use					3
Conservation and Protection					3
Objective 1 - Id, Prioritize and Map important conservation areas				No Cost Estimate	3
Action 1 - Develop Criteria/Protocol for assessing & Priority Habitat for Conservation	USGS, BLM, LWG, DOW, NGOs	Dates to be determined		No Cost Estimate	3
Action 2 - Determine scale to be identified.	USGS, BLM, LWG, DOW, NGOs	Dates to be determined		No Cost Estimate	3
Action 3 – Mapping	USGS, BLM, LWG, DOW, NGOs	Dates to be determined		No Cost Estimate	3
Objective 2 - Protect quality SG habitat					3
Action 1 - Ensure Fed. LMA plans address SG and SG Habitat	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 2 - Implement projects that aid in the protection of quality SG Habitat	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 3 - Complete range-wide approval of herbicides	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 4 - Continue imple. Strat. Plan for Coordinated Intermountain Restoration Project	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 5 - Landowner incentives - SG protection and conservation efforts	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 6 - Financial & Tech assistance to private landowners	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 7 - Consult & Work with Native American Tribes	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	3
Action 8 - Increase Federal funding for wildfire suppression.	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	4
Action 9 - Ensure grazing strats are conducive to healthy sagebrush habitats	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	4
Action 10 - Establish range-wide standardized guideline for renewable and non-renewable energy development	BLM,USFS,USFWS,NRCS,DOW,TR BES	Dates to be determined		No Cost Estimate	4
Objective 3 - Ensure that Mgmt is geared toward maintaining or recovery of sagebrush habitat					4
Actions 1 - 6	Coop Ext, USFS, USFWS, NRCS, DOW, USGS, BLM, UNIV, TRIBES	Dates to be determined		No Cost Estimate	4
Objective 4 - Establish monitoring program, protocols and methods - habitat					5
Actions 1-3	BLM, USFS, USGS, DOW, NGOs	Dates to be determined		No Cost Estimate	5
Invasive Plant Species					6
Goal 1 - List of invasive plants		1/1/07	12/31/08		6
Objective 1.1 - Id and prioritize species and risk		12/31/07	12/31/07	No Cost Estimate	6
Objective 1.2 - Review & Modify noxious plant lists for funding control measures		1/1/07	12/31/08	No Cost Estimate	6
Goal 2 - Id & Map threat of invasive species		7/2/07	7/1/10		6
Objective 2.1 - Spread vector analysis of current & future risk		1/1/09	7/1/09	No Cost Estimate	6
Objective 2.2 - Develop range-wide and geographic zone maps of distribution of invasive species		7/2/07	7/1/10	No Cost Estimate	6
Objective 2.3 - Develop and implement detection surveys for finding new outbreaks		7/2/07	7/1/08	No Cost Estimate	6
Goal 3 - Id knowledge gaps and develop guidelines for control of invasive plants		1/1/07	7/1/08		6
Objective 3.1 - Create methods for prioritizing invasive species control based upon restoration		7/2/07	7/1/08	No Cost Estimate	6

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Objective 3.2 - Compile or identify and implement integrated invasive species control in ecoregions		1/1/07	7/1/08	No Cost Estimate	7
Objective 3.3 - Compile or identify and implement BMPs		1/1/07	7/1/08	No Cost Estimate	7
Goal 4 - Reduce the risk of new infestations		1/1/07	7/1/08		7
Objective 4.1 - Compile or ID and implement guidelines for containing existing infestations		1/1/07	7/1/08	No Cost Estimate	7
Objective 4.2 - Compile or ID and implement BMPs pertinent to livestock/wildlife to prevent spread		1/1/07	7/1/08	No Cost Estimate	7
Objective 4.3 - Compile or ID and implement BMPs pertinent to access, vehicles, equipment to prevent spread		1/1/07	7/1/08		7
Objective 4.4 - Develop & implement plans for treated areas with appropriate seeds		1/1/07		No Cost Estimate	7
Objective 4.5 - Anticipate infestations of new invasive species to prevent establishment		1/1/07	Continuing	No Cost Estimate	7
Goal 5 - Integrate and coordinate invasive species mgmt throughout SG habitat		7/2/07	9/1/08		7
Objective 5.1 - Develop partnerships among regional public and private land management to develop & implement objectives		7/2/07	7/1/08	No Cost Estimate	7
Objective 5.2 - Involve local weed mgmt specialist, private landowners, wildlife biologists, and range ecologists to share knowledge		7/2/07	7/1/08	No Cost Estimate	7
Objective 5.3 - Supplement existing invasive species control programs with materials specific to the benefits of proactive mgmt	BLM, USFS, USFWS, USGS, DOW, WEEDDIST	7/2/07	9/1/08	No Cost Estimate	8
Livestock Grazing					9
Goal 1 - Manage grazing to maintain a properly functioning sagebrush system		Dates to be determined			9
Objective 1.1 - Use scientific and historical information to establish baseline information	NRCS,BLM, USFS, UNIV, DOW, LWG	Dates to be determined		No Cost Estimate	9
Objective 1.2 - Use WAFWA habitat guidelines where achievable and rangeland health standards to implement appropriate grazing systems	LANDOWNERS,BLM,USFS,NRCS,DOW,LWG	Dates to be determined		No Cost Estimate	9
Objective 1.3 - Develop or adopt monitoring programs that show effects of grazing management treatments	LANDOWNERS,BLM,USFS,NRCS,DOW,STATE LANDS,UNIV,COOP EXT,LWG,USFWS	Dates to be determined		No Cost Estimate	9
Objective 1.4 - Encourage the coordination of landscape management to provide benefits to sage-grouse	AGENCIES, TRIBES, LANDOWNERS, NGOs, LWG, STATE SAGE-GROUSE WORK NG GROUPS	Dates to be determined		No Cost Estimate	10
Objective 1.5 - Offer incentives when and where appropriate to achieve sage-grouse habitat objectives	USDA, USFWS, NGOs, STATE AGENCIES, NDUSTRY, BIA, STATE TECHNICAL COMMITTEES	Dates to be determined		No Cost Estimate	10
Objective 1.6 - Review current land management agencies' grazing programs to ensure consistency and compatibility with the Comprehensive Strategy	BLM, USFS, DOW, WAFWA	Dates to be determined		No Cost Estimate	10
Agriculture Lands					11
Goal 1 - Identify where agriculture lands are associated with sage-grouse habitat					11
Objective 1.1 - Identify and prioritize agricultural lands that provide the greatest habitat value for sage-grouse	NRCS, USFS, USGS, BLM, DOW	1/1/07	12/31/09	$50,000.00	11
Goal 2 - Implement management practices on agricultural lands that protect or minimize harm to sage-grouse					11
Objective 2.1 - Encourage spot treatment of weeds instead of whole field/pasture chemical treatment	NRCS, COOP EXT, LWG, SCD	Within one year of the Strategy		No Cost Estimate	12
Objective 2.2 - Provide information and incentives to minimize application of insecticides in hayfields	NRCS, COOP EXT, LWG, SCD	Within one year of the Strategy		No Cost Estimate	12
Objective 2.3 - Provide agricultural producers informaton and incentives on harvesting techniques that reduce bird mortality	NRCS, COOP EXT, LWG, SCD	Within one year of the Strategy		No Cost Estimate	12
Objective 2.4 - Identify the extent to which agricultural water management and infrastructure contributes to the threat of West Nile virus	UNIV, APHIS, ARS	Within one year of the Strategy		No Cost Estimate	12

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Goal 3 - Adjust incentives to encourage the retention and restoration of sagebrush habitats					13
Objective 3.1 - Identify incentives that are counter-productive to the retention of sagebrush habitat	NRCS, FSA, COOP EXT, SCD, NGOs, LWG	Within one year of the Strategy		No Cost Estimate	13
Objective 3.2 - Modify and fund existing programs to encourage the retention of sage-grouse habitat	NRCS, FSA, COOP EXT, SCD, NGOs, LWG	Within one year of the Strategy		No Cost Estimate	13
Objective 3.3 - Prioritize re-enrollment of CRP lands providing habitat or adjacent to existing sage-grouse populations or other sensitive or declining species	FSA,COOP EXT,SCD,LWG	Within one year of the Strategy		No Cost Estimate	13
Fences					14
Goal 1 - Summarize or quantify the direct & indirect effect of fences on SG		1/1/07	1/1/08	$25,000.00	14
Objective 1.1 - Compile & analyze direct & indirect impacts of fences on SG or similar species	WAFWA TEAM, UNIV, Consultants	1/1/07	1/1/08	$25,000.00	14
Goal 2 - Compile all known efforts regarding fence design, siting, modifications to mitigate effect of fences		5/2/07	1/1/08	$25,000.00	14
Objective 2.1 - Compile & analyze known anecdotal observations, research, case studies siting, design, mods to mitigate effect	WAFWA TEAM, UNIV, Consultants	5/2/07	1/1/08	$25,000.00	14
Goal 3 - Implement & evaluate/monitor the effectiveness of proposed fence design, siting & mods on mitigation impacts on SG		7/2/07	7/1/10	$100,000.00	15
Objective 3.1 - Conduct site specific evaluation of fence designs, D in 1.5.1.1 - Five Sites	WAFWA TEAM, UNIV, Consultants	7/2/07	7/1/10	$100,000.00	15
Goal 4 - Disseminate the results of the work conducted.		7/1/10	7/4/11		15
Objective 4.1 - Publish "Fencing BMPs"	WAFWA TEAM, UNIV, Consultants	7/1/10	12/31/10	No Cost Estimate	15
Objective 4.2 - Promote "Fence BMPs" using 1.5.1.1; 1 5.2.1; 1 5.3.1	WAFWA TEAM, UNIV, Consultants	1/3/11	7/4/11	No Cost Estimate	15
Surface Hydrology					16
Goal 1 - Determine effects of water management on sagebrush biome					16
Objective 1.1 - Assess climate records and other data for impacts on sage-grouse and sagebrush	USGS, NOAA, UNIV, Environment Canada	Dates to be determined		No Cost Estimate	16
Objective 2 -- Test hypothesis how water management can increase sage-grouse/sagebrush productivity	USGS, UNIV, ARS, Environment Canada	Dates to be determined		No Cost Estimate	16
Energy Corridors				$3,160,000.00	17
Goal 1 - Evaluate effects of existing corridors				$2,600,000.00	17
Objective 1.1 - Review existing studies and monitoring data.	WAFWA TEAM, WAFWA Directors, Industry, WEEDDIST, BLM, USFS, USGS, NRCS, DOE, UNIV	8/31/07	10/31/07	$100,000.00	17
Objective 1.2 - Design and conduct additional research and monitoring studies to determine effects of energy corridors	WAFWA TEAM, WAFWA Directors, Industry, WEEDDIST, BLM, USFS, USGS, NRCS, DOE, UNIV	1/1/08	12/30/11	$2,500,000.00	18
Goal 2 - Develop criteria and management guidelines		10/31/07	11/28/08	$30,000.00	19
Objective 2.1 - Develop criteria and guidelines	WAFWA TEAM,WAFWA Directors, Industry, WEEDDIST, BLM, USFS, USGS, NRCS, DOE, UNIV	10/31/07	11/28/08	$30,000.00	19
Goal 3 - Develop and adopt appropriate mitigation measures and BMPs for new facilities		7/2/07	6/30/08	$30,000.00	20
Objective 3.1 - Develop mitigation and BMPs for construction and operation of new facilities	WAFWA TEAM,WAFWA Directors, Industry, WEEDDIST, BLM, USFS, USGS, NRCS, DOE, UNIV	7/2/07	6/30/08	$30,000.00	20

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Goal 4 - Develop and implement monitoring plans and adjust practices		1/1/07	6/29/12	$2,500,000.00	21
Objective 4.1 - Develop and implement monitoring plans	UNIV,WAFWA Directors, Industry, WEEDDIST, BLM, USFS, USGS, NRCS, DOE, WAFWA TEAM	7/2/07	6/29/12	$2,500,000.00	21
Objective 4.2 - Adaptively manage BMPs and Mitigation	BLM, USFS, DOE, Industry	1/1/07	6/30/25	$0.00	21
Roads & Railroads					23
Goal 1 - Evaluate effects of existing corridors and facilities on Sage-grouse/sagebrush habitats		8/31/07	6/29/12	$150,000.00	23
Objective 1.1 - Review existing published research and monitoring data for effect.	WAFWA Directors, WAFWA TEAM, State DOT, Cnty Roads, BLM, USFS, USGS, NRCS, DOE, UNIV, WEEDDIST, WAFWA Grassland Coordinator, LWG	8/31/07	5/30/08	$75,000.00	23
Objective 1.2 - Design and implement additional research and monitoring studies	WAFWA Directors, WAFWA TEAM, State DOT, Cnty Roads, BLM, USFS, USGS, NRCS, DOE, UNIV, WEEDDIST, WAFWA Grassland Coordinator, LWG	7/1/08	6/29/12	$75,000.00	23
Goal 2 - Develop criteria and guidelines		5/30/08	5/29/09	$30,000.00	25
Objective 2.1 - Cooperatively develop management guidelines or BMPs	WAFWA Directors, WAFWA TEAM, BLM, USFS, USGS, DOE, State DOT, Cnty Roads, UNIV, LWG, WAFWA Grassland Coordinator	5/30/08	5/29/09	$30,000.00	25
Goal 3 - Implement mitigation or BMPs for construction and maintenance of new facilities		7/30/07	5/30/08	$50,000.00	25
Objective 3.1 - Implement mitigation measures or BMPs	WAFWA Directors, WAFWA TEAM, BLM, USFS, USGS, DOE, State DOT,Cnty Roads, UNIV, LWG, WAFWA Grassland Coordinator, WEEDDIST	7/30/07	5/30/08	$50,000.00	25
Goal 4 - Develop and implement monitoring program		7/2/07	6/29/12	$500,000.00	27
Objective 4.1 - Develop monitoring plans to measure effectiveness of BMPs and Mitigation actions	WAFWA Directors, WAFWA TEAM, BLM, USFS, USGS, DOE, State DOT, Cnty Roads, UNIV, LWG, WAFWA Grassland Coordinator	7/2/07	2/28/08	$500,000.00	27
Objective 4.2 - Adaptively manage	BLM, USFS, DOE	7/1/08	6/29/12	No Cost Estimate	27
Tall Structures				$120,000.00	29
Goal 1 - Compile and evaluate existing information		6/1/07	9/28/07	$30,000.00	29
Objective 1.1 - Evaluate adequacy of existing research information	Industry, DOW, Federal Agencies	6/1/07	9/28/07	$30,000.00	29
Goal 2 - Develop protocols for new studies		10/1/07	10/31/08	$60,000.00	29
Objective 3.1 - Compile existing siting and O&M criteria	Scientific Research Team	10/1/07	11/1/07	$30,000.00	30
Objective 3.2 - Develop consistent siting guidelines	Industry, BLM, USFS, USFWS, LWG, Consultants, UNIV	10/1/07	10/31/08	$30,000.00	30
Goal 4 - Develop BMPs and mitigation measures		10/1/07	10/31/08	$30,000.00	31
Objective 4.1 - Cooperatively develop BMPs and Mitigation measures	Industry, BLM, USFS, USFWS, LWG	10/1/07	10/31/08	$30,000.00	31
Urban/Exurban development					32

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Goal 1 - Avoid or minimize incursion of urban and exurban development into sage-grouse habitat		4/2/07	12/31/08	$ 80,000	32
Objective 1.1 - Identify sage-grouse habitats most at risk to urban and exurban development	Federal Agencies, Consultants, Counties, LWG, DOW, UNIV	4/2/07	2/28/08	No Cost Estimate	32
Objective 1.2 - Promote efforts to maintain ecologically sustainable private lands and econ. viable ranches	Federal Agencies, Landowners, Conservation/Environmental NGOs, LWG, Local Officials, DOW, Land Trusts	6/2/08	12/31/08	No Cost Estimate	33
Objective 1.3 - Develop and implement governmental land management agency land tenure policies to acquire SG lands	Federal Agencies, Counties, LWG, Elected officials	7/2/07	6/30/08	$0.00	33
Dispersed Recreation				$1,200,000.00	35
Goal 1 - Manage dispersed recreation to avoid, reduce or eliminate displacement of sage-grouse or impact habitat		10/2/06	10/1/08	$1,200,000.00	35
Objective 1.1 - Review what is known about impacts of dispersed recreation of sage-grouse	WAFWA Directors, WGA, WAFWA TEAM, BLM, USFS, NRCS, SCD, TRIBES, Local Officials, LWG, Consultants	10/2/06	12/31/07	$300,000.00	35
Objective 1.2 - Review known effects	WAFWA Directors, WGA, WAFWA TEAM, BLM, USFS, NRCS, SCD, TRIBES, Local Officials, LWG, Consultants	10/2/06	12/31/07	$300,000.00	35
Objective 1.3 - Develop management practices to avoid, reduce or eliminate disturbance from recreation	WAFWA Directors, WGA, WAFWA TEAM, BLM, USFS, USFWS, NRCS, SCD, TRIBES, Local Governments, LWG, Consultants	2/1/08	7/1/08	$300,000.00	36
Objective 1.4 - Implement management practices to avoid, reduce or eliminate disturbance from recreation	WAFWA Directors, WGA, WAFWA TEAM, BLM, USFS, USFWS, NRCS, SCD, TRIBES, Local Governments, LWG, Consultants	10/2/06	10/1/08	$300,000.00	37
Non-Renewable Resources					38
Goal 1 - Enhanced habitats and populations with assurance of "no net loss" of habitat or populations & provide development		6/1/06	6/29/12		38
Objective 1.1 - Develop no "net loss" criteria and assessment protocols, consistent across the range.	WAFWA Directors, UNIV, Industry, NRCS, Consultants, USFWS, BLM, USFS, USGS, DOW, TR BES, LWG, NGOs, WSGSIMC	6/1/06	5/1/07	No Cost Estimate	38
Objective 1.2 - Synthesize existing and develop new technologies and BMPs	WAFWA Directors, UNIV, Industry, NRCS, Consultants, USFWS, BLM, USFS, USGS, DOW, TR BES, LWG, NGOs, WSGSIMC	6/1/06	5/1/07	No Cost Estimate	39
Objective 1.3 - Develop and implement voluntary incentive programs	WAFWA Directors, UNIV, Industry, NRCS, Consultants, USFWS, BLM, USFS, USGS, DOW, TR BES, LWG, NGOs, WSGSIMC	7/2/07	6/29/12	No Cost Estimate	40
Habitat Restoration				$100,275,000.00	42
Conifer Encroachment					43
Goal 1 - (ST) Identify and map current distribution and composition of conifers in SG habitat		7/2/07	12/31/09	$100,000.00	44
Objective 1.1 - (ST) Develop Maps	USFS, BLM, USGS, NPS, TNC, DOW, State Forestry, State Lands, Natural Heritage Programs, Coop Ext	7/2/07	12/31/09	No Cost Estimate	44

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Objective 1.2 - (ST) Model estimates of risk	USFS, BLM, USGS, Coop Ext, DOW, State Forestry, State Lands	7/2/07	12/31/08	No Cost Estimate	44
Goal 2 - Synthesize information on habitat relationships of species of concern in invading conifers.		7/2/07	12/31/10	$75,000.00	45
Objective 2.1 - (ST) Evaluate species of concern habitat needs in invading conifers	USFS,BLM,USGS,UNIV	7/2/07	12/31/08	$75,000.00	45
Objective 2.2 - (ST) Fill-in information gaps found in 2.1	USFS, BLM, USGS, DOW, State Forestry, Partners in Flight, Audubon	1/1/09	12/31/10	No Cost Estimate	46
Objective 2.3 - (ST) Incorporate results of these studies into plans	BLM, USFS, USGS, DOW, LWG	7/2/07	12/31/10	No Cost Estimate	46
Objective 2.4 - (ST) Initiate research and monitoring to evaluate the effects of management	USFS, BLM, USGS, DOW, State Forestry, UNIV, Natural Heritage Program, Partners in Flight, Audubon	7/2/07	12/31/10		47
Goal 3 - Develop and implement control measures for encroaching conifer species		7/2/07	12/31/10	$100,000,000.00	48
Objective 3.1 - (ST) Identify sites with conifer encroachment with adequate understories	BLM, USFS, USFWS, DOW, State Forestry, LWG	7/2/07	12/31/10	$100,000,000.00	48
Objective 3.2 - (ST) Identify sites with conifer encroachment without adequate understories	USFS, BLM, DOW, State Forestry	7/2/07	12/31/10	No Cost Estimate	48
Objective 3.3 - (MT) Initiate research to identify effective integrated treatment methods and apply		7/2/07	12/31/10	No Cost Estimate	49
Objective 3.4 - (ST) Refine and implement guidelines for reducing negative impacts of conifer control on sage grouse		7/2/07	12/31/07	No Cost Estimate	49
Goal 4 - Develop and implement an effectiveness monitoring program		7/2/07	12/31/15	No Cost Estimate	49
Objective 4.1 - (LT*) Develop common protocols and standardized procedures for recording treatments and results		1/1/08	12/31/15	No Cost Estimate	49
Objective 4.2 - (ST*) Develop range-wide database for recording completed and ongoing conifer control projects	USGS, BLM, USFS, DOW, State Forestry, LWG	7/2/07	12/31/07	No Cost Estimate	50
Goal 5 - Integrate and coordinate conifer control efforts		7/2/07	12/31/15	No Cost Estimate	50
Objective 5.1 - (ST) Develop partnerships with regional public and private land managers, develop and implement objectives	BLM, USFS, NPS, USFWS, DOW, State Forestry, State Lands, Natural Heritage Program, TNC, Sierra Club, Audubon, Intermountain Joint Venture, Coop Ext	7/2/07	12/31/08	No Cost Estimate	50
Objective 5.2 - (ST) Develop and conduct training on management of conifers	Agencies, Experiment Stations, WEEDDIST	12/31/08	12/31/15	No Cost Estimate	51
Goal 6 - Increase the efficiency/efficacy of conducting conifer removal		7/2/07	12/31/15	No Cost Estimate	51
Objective 6.1 - (MT*) Develop incentives for contractors to remove encroaching conifers	Agencies, Experiment Stations, WEEDDIST, Industry	7/1/10	12/31/15	No Cost Estimate	51
Objective 6.2 - (MT) Expand and promote incentives for conifer removal on private lands		7/1/10	12/31/15	No Cost Estimate	52
Objective 6.3 - Increase availability of equipment.		7/2/07	12/31/09	No Cost Estimate	52
Objective 6.4 - Promote programmatic integration of fire & fuels management planning & implementation with conifer treatment at all scales		7/2/07	12/31/15	No Cost Estimate	52
Objective 6.5 - (ST) Improve federal management agency environmental and archaeological mandates to review projects.		7/2/07	12/31/08	No Cost Estimate	52
Goal 7 - Streamline procurement and contracting procedures to facilitate timely and effective interagency control efforts		7/2/07	12/31/08	No Cost Estimate	52
Objective 7.1 - Evaluate and modify existing procedures to streamline procurement & contracting between agencies		7/2/07	12/31/08	No Cost Estimate	52
Objective 7.2 - Increase procurement and contracting staffs		7/2/07	12/31/08	No Cost Estimate	52
Objective 7.3 - Increase field staff to serve as contract administrators, inspectors and contracting officer representatives		7/2/07	12/31/08	No Cost Estimate	52
				No Cost Estimate	
Range-wide Habitat Restoration				No Cost Estimate	53
Goal 1 - Establish a realistic extent of range that can be restored		6/1/06	12/29/06	No Cost Estimate	53
Objective 1.1 - (ST) Standardized a protocol for characterizing the restoration potential	BLM, USFS, USGS, NRCS	6/1/06	12/29/06	No Cost Estimate	53
Objective 1.2 - (ST) Determine area of historic range that is "unlikely" to be restored without substantial cost	BLM, USFS, USGS, NRCS, DOW, LWG	6/1/06	12/29/06	No Cost Estimate	53

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Objective 1.3 - Determine range that is likely to be restored at minimal cost	BLM, USFS, USGS, NRCS, DOW, LWG	6/1/06	12/29/06	No Cost Estimate	54
Goal 2 - Ensure that restoration techniques are ecologically sound and attainable		7/2/07	12/31/15	No Cost Estimate	55
Objective 2.1 - (ST) Determine desired future conditions	Agencies, USGS, UNIV	7/2/07	6/30/08	No Cost Estimate	55
Objective 2.2 - (ST) Establish a user guide to restoring sagebrush habitats	Agencies, DOW, Consultants	7/2/07	6/30/08	No Cost Estimate	56
Objective 2.3 - (LT) Support technical assistance and workshops that demonstrate restoration efforts	Agencies, Coop Ext, NGOs, UNIV	7/2/07	12/31/15	No Cost Estimate	56
Objective 2.4 - (MT) Establish a research and monitoring program to evaluate effectiveness.	NGOs, Audubon, Partners in Flight, BLM, USFS, DOW, USGS, Coop Ext, LWG	7/2/07	12/31/15	No Cost Estimate	57
Goal 3 - Restore number of acres or percentage of range from Goal 1		7/2/07	12/31/30	No Cost Estimate	57
Objective 3.1 - (ST) Determine a prioritized list of sites from the exercise in Goal #1 to restore	WAFWA TEAM, Agencies, LWG, USGS	7/2/07	12/31/10	No Cost Estimate	57
Objective 3.2 - (ST) With LWGs develop restoration work plans to implement restoration in priorities	Management Agencies, Landowners, LWG	7/2/07	12/31/10	No Cost Estimate	58
Objective 3.3 - (LT) Restore degraded sites on public, private and tribal lands where feasible	NRCS, Farm Bureau, DOW, Coop Ext	7/2/07	12/31/30	No Cost Estimate	58
Objective 3.4 - (LT) Optimize post-fire restoration efforts so that goals/objectives include restoring sagebrush/SG habitat needs	BLM, USFS, USFWS, NRCS, TRIBES, Coop Ext	7/2/07	12/31/15	No Cost Estimate	59
Objective 3.5 - (ST) Establish post-rehab treatment management guidelines to ensure success		7/2/07	12/31/08	No Cost Estimate	59
Objective 3.6 - (ST) Evaluate current agency policies for fire rehabilitation and modify as needed in support of restoration actions.		7/2/07	12/31/08	No Cost Estimate	59
Goal 4 - Develop and implement coordinated and targeted restoration efforts		7/2/07	12/31/15	No Cost Estimate	60
Objective 4.1 - Based upon work plans, coordinate plans across state and regional boundaries	WAFWA	7/2/07	12/31/15	No Cost Estimate	60
Goal 5 - Develop and implement long-term monitoring		7/2/07	12/31/08	No Cost Estimate	60
Objective 5.1 - Develop common protocols and standardized procedures for recording treatments and monitoring	WAFWA	7/2/07	12/31/08	No Cost Estimate	60
Objective 5.2 - Develop a common database by 2007, to record completed and ongoing fire & fuel management projects	WAFWA	7/2/07	12/31/07	No Cost Estimate	60
Objective 5.3 - Develop common protocols and standardized procedures to conduct post-fire reviews of management and revise operating procedures	WAFWA	7/2/07	12/31/08	No Cost Estimate	60
				No Cost Estimate	
Native Seed				No Cost Estimate	61
Goal 1 - Develop a regional assemblage of species that are site adapted and in quantity		7/2/07	12/30/11	$500,000	61
Objective 1.1 - Establish regionally-based research programs to develop procedures to grow and produce seed	NRCS, USDA Research, BLM, USFS, Seed industry, Consultants, Industry, USGS, UNIV	7/2/07	12/31/10	No Cost Estimate	61
Objective 1.2 - Define specific species and quantities needed.	Agencies, Coop Ext, USGS, NRCS, TNC, Native Plant Society, UNIV, TWS, SRM, SER, Seed industry	7/2/07	12/31/09	No Cost Estimate	62
Objective 1.3 - Develop and facilitate commercial outlets for seed	Coop Ext, State agencies, Federal Agencies, Seed industry	7/2/07	12/31/10	No Cost Estimate	62
Objective 1.4 - Develop regional seed warehousing	Coop Ext, State agencies, Federal Agencies, Seed industry	7/2/07	12/30/11	No Cost Estimate	63
				No Cost Estimate	
Planting Expertise				$300,000	64
Goal 1 - Plan and conduct research to increase knowledge about restoration methods		5/10/06	5/10/06	$150,000	64
Objective 1.1 - Produce and maintain synthesis of research and information about restoration methods and effects		5/10/06	5/10/06	No Cost Estimate	64
Objective 1.2 - Implement monitoring, research, and development program to test, refine, and apply improved planting technique		5/10/06	5/10/06	No Cost Estimate	64

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Objective 1.3 - Design restoration projects to incorporate research questions		5/10/06	5/10/06	No Cost Estimate	64
Goal 2 - Develop the human resources with knowledge & expertise to plan, implement and monitor treatments.		5/10/06	5/10/06	$150,000	64
Objective 2.1 - Inventory & assess current human resources knowledge & capability & Id gaps & priorities		5/10/06	5/10/06	No Cost Estimate	64
Objective 2.2 - Develop dedicated cadres of restoration specialists at a regional level to provide technical assistance		5/10/06	5/10/06	No Cost Estimate	64
Objective 2.3 - Provide training to field-level resource agency personnel on restoration ecology, methods & monitoring		5/10/06	5/10/06	No Cost Estimate	64
Objective 2.4 - Develop university & vocational programs to train restoration professional & practitioners		5/10/06	5/10/06	No Cost Estimate	65
Objective 2.5 - Promote private sector capability to provide contract services		5/10/06	5/10/06	No Cost Estimate	65
Goal 3 - Obtain and manage specialized equipment to meet restoration goals in strategic locations		5/10/06	5/10/06	No Cost Estimate	65
Objective 3.1 - Inventory current specialized equipment and compare with projected needs		5/10/06	5/10/06	No Cost Estimate	65
Objective 3.2 - Acquire equipment to address shortages & promote private sector inventory & availability		5/10/06	5/10/06	No Cost Estimate	65
Objective 3.3 - Coordinate with established seed banks to co-locate equipment		5/10/06	5/10/06	No Cost Estimate	65
Objective 3.4 - Implement monitoring, research and development program to test, refine and apply improved equipment		5/10/06	5/10/06	No Cost Estimate	65
Goal 4 - Refine and develop mechanism to facilitate range-wide information sharing		5/10/06	5/10/06	No Cost Estimate	65
Objective 4.1 - Produce tools which make best available knowledge accessible		5/10/06	5/10/06	No Cost Estimate	65
Objective 4.2 - Establish a central information clearinghouse for people seeking current knowledge about restoration		5/10/06	5/10/06	No Cost Estimate	65
Objective 4.3 - Utilize regional restoration cadres for technical assistance & technology transfer		5/10/06	5/10/06	No Cost Estimate	65
				No Cost Estimate	
Fire				No Cost Estimate	66
Goal 1 – Coordinate fire and fuels management between all responsible agencies		7/2/07	12/31/08	No Cost Estimate	66
Objective 1.1 - Develop & implement integrated policy and plans for protection and rehabilitation	Agencies	7/2/07	12/31/08	No Cost Estimate	66
Objective 1.2 - Broaden partnerships among regional public and private landowners to develop and implement fire management strategies	BLM, USFS, NPS, USFWS, DOW, State Forestry, State Lands, Natural Heritage Program, Fire departments, TNC, Sierra Club, Audubon, Intermountain JV, Coop Ext	7/2/07	12/31/08	No Cost Estimate	67
Goal 2 - Place top priority on containing and suppressing wildfires in sage-grouse habitat		7/2/07	12/31/08	No Cost Estimate	67
Objective 2.1 - Develop criteria for determining where and how to contain and suppress wildlife		7/2/07	12/31/07	No Cost Estimate	68
Objective 2.2 - Develop and apply area-specific fire suppression plans		1/1/08	12/31/08	No Cost Estimate	68
Objective 2.3 - Ensure a coordinated county, fire district, and federal response to wildlife in these areas	NIFC	7/2/07	12/31/07	No Cost Estimate	68
Objective 2.4 - Provide agencies with adequate resources and equipment to control wildfire.	BLM, USFS, State Forestry, Contractors	7/2/07	6/30/08	No Cost Estimate	68
Goal 4 - Manage habitat mosaics and fuels in sage-grouse habitat to improve habitat and reduce the possibility of damaging fire		1/1/07	12/31/10	No Cost Estimate	68
Objective 4.1 - Describe desired habitat conditions for sage-grouse to provide a template for management actions		1/1/07	12/31/07	No Cost Estimate	68
Objective 4.2 - Develop criteria for managing fuels in sage-grouse habitat		1/1/07	12/31/07	No Cost Estimate	68
Objective 4.3 - Promote programmatic integration of sage-grouse habitat protection and improvement into fuels management planning and implementation		7/2/07	12/31/08	No Cost Estimate	69
Objective 4.4 - Use prescribed burns, chemicals and mechanical treatments to improve habitat and reduce wildlife		7/2/07	12/31/10	No Cost Estimate	69
Objective 4.5 - Manage wildfire as a tool to improve sage-grouse habitats		7/2/07	12/31/10	No Cost Estimate	69
Objective 4.6 - Strategically place and maintain green strips and fire breakswithin or adjacent to sage-grouse habitat		7/2/07	12/31/10	No Cost Estimate	69
Goal 5 - Develop and implement a long-term monitoring program		7/2/07	12/31/08	No Cost Estimate	70

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Objective 5.1 - Develop common protocols and standardized procedures for recording treatments and results of monitoring efforts		7/2/07	12/31/08	No Cost Estimate	70
Objective 5.2 - Develop a common database to record completed and ongoing fire & fuel management projects		7/2/07	12/31/07	No Cost Estimate	70
Objective 5.3 - Develop common protocols and standardized procedures to conduct post-fire reviews		7/2/07	12/31/08	No Cost Estimate	70
				No Cost Estimate	
Science, Data Management and Information				No Cost Estimate	71
				No Cost Estimate	
Standard – Data layers		1/1/07	12/31/09	No Cost Estimate	71
Goal 1 - Develop a comprehensive database		1/1/07	12/31/09	$300,000	71
Objective 1.1 - Develop a map-based locator on SAGEMAP for past and current research and monitoring projects	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Focus on SAGEMAP as the clearing house	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop partnerships	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop real-time information on WNv through Wildlife Disease Information Node	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Objective 1.2 - Develop an information-dissemination framework to enable coordinated information exchange		1/1/07	12/31/09	No Cost Estimate	71
Focus on SAGEMAP as the clearing house	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop partnerships	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop real-time information on WNv through Wildlife Disease Information Node	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Objective 1.3 - Produce data layers for use in ecoregional assessments		1/1/07	12/31/09	No Cost Estimate	71
Focus on SAGEMAP as the clearing house	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop partnerships	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop real-time information on WNv through Wildlife Disease Information Node	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Objective 1.4 - Develop a natural resource information portal for sagebrush and sage-grouse		1/1/07	12/31/09	No Cost Estimate	71
Focus on SAGEMAP as the clearing house	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop partnerships	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop real-time information on WNv through Wildlife Disease Information Node	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Objective 1.5 - Share data and information on sagebrush habitat and sage-grouse disease		1/1/07	12/31/09	No Cost Estimate	71
Focus on SAGEMAP as the clearing house	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
Develop partnerships	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Develop real-time information on WNv through Wildlife Disease Information Node	Agencies, TR BES, UNIV, NGOs, LWG, Local Officials	1/1/07	12/31/09	No Cost Estimate	71
				No Cost Estimate	
Definition of Success				$100,000	73
Goal 1 - Develop definition & Metrics for success or failure of conservation actions		1/1/07	12/31/07	No Cost Estimate	73
Objective 1.1 - Produce a synthesis of information on the methods, results, effectiveness, & short-term impacts of improvement projects		1/1/07	12/31/07	No Cost Estimate	73
Identify key metrics using the conservation assessment as the baseline	UNIV, USGS, Agencies, TR BES ,LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Commission a synthesis of information on methods, results, effectiveness, & short-term impacts of habitat improvement projects & other managemetn activities	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Objective 1.2 - Develop range-wide standards for sustainable SG populations with sustainable harvest		1/1/07	12/31/07	No Cost Estimate	73
Identify key metrics using the conservation assessment as the baseline	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Commission a synthesis of information on methods, results, effectiveness, & short-term impacts of habitat improvement projects & other managemetn activities	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Objective 1.3 - Determine priorities for which areas to focus conservation actions to maintain the functioning of sagebrush ecosystems.		1/1/07	12/31/07	No Cost Estimate	73
Identify key metrics using the conservation assessment as the baseline	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Commission a synthesis of information on methods, results, effectiveness, & short-term impacts of habitat improvement projects & other managemetn activities	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Objective 1.4 - Develop an annual region-wide score-card		1/1/07	12/31/07	No Cost Estimate	73
Identify key metrics using the conservation assessment as the baseline	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
Commission a synthesis of information on methods, results, effectiveness, & short-term impacts of habitat improvement projects & other managemetn activities	UNIV, USGS, Agencies, TR BES, LWG, North American Grouse Partnership	1/1/07	12/31/07	No Cost Estimate	73
				No Cost Estimate	
Social and Economic Factors				No Cost Estimate	74
Goal 1 - Understand social & economic factors that influence human actions & decisions on sage-grouse & its habitat		9/29/06	12/31/07	No Cost Estimate	74
Objective 1.1 - Ascertain cost/benefit analysis of status quo		9/29/06	12/31/07	No Cost Estimate	74
Incorporation of key data sets within the data clearinghouse	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	74
Develop social models for resolving wildlife-human conflicts in a multiple stakeholder environment.	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	74
Surveys to determine limits of social acceptability of conservation measures & economic trade-offs.	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	74
Objective 1.2 - Determine social benefits of status quo		9/29/06	12/31/07	No Cost Estimate	74
Incorporation of key data sets within the data clearinghouse	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	74
Develop social models for resolving wildlife-human conflicts in a multiple stakeholder environment.	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	74
Surveys to determine limits of social acceptability of conservation measures & economic trade-offs.	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	74
				No Cost Estimate	
Predict outcomes from Vegetative Changes				No Cost Estimate	75
Goal 1- Develop tool kit for managers		9/29/06	12/31/07	No Cost Estimate	75

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Objective 1.1 - Develop predictive models for risk assessment		9/29/06	12/31/07	No Cost Estimate	75
Assess & adapt current models	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Build models as needed & collect &/or simulate data	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Objective 1.2 - Model the cumulative effect of human activities on wildland systems		9/29/06	12/31/07	No Cost Estimate	75
Assess & adapt current models	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Build models as needed & collect &/or simulate data	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Objective 1.3 - Determine multi-scale changes in land cover composition & configuration in sagebrush ecosystems		9/29/06	12/31/07	No Cost Estimate	75
Assess & adapt current models	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Build models as needed & collect &/or simulate data	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Objective 1.4 - Validate all models to document their effectiveness in predicting outcomes		9/29/06	12/31/07	No Cost Estimate	75
Assess & adapt current models	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
Build models as needed & collect &/or simulate data	WAFWA, Agencies, TRIBES, UNIV	9/29/06	12/31/07	No Cost Estimate	75
				No Cost Estimate	
Research & Monitoring Coordina ion				No Cost Estimate	76
Goal 1 - Develop a institutional framework to create collaborative effort for funding, research, monitoring & management		1/1/07	12/31/07	No Cost Estimate	76
Objective 1.1 - Provide a framework to encourage data consistency, quality & compatibility		1/1/07	12/31/07	No Cost Estimate	76
Follow FGDC standards	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
WAFWA & Federal Agencies form science council	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Research needs are prioritized & assigned &/or offered	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Promote peer review of study plans & products	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Objective 1.2 - Develop a coordinated program of site-specific research & monitoring		1/1/07	12/31/07	No Cost Estimate	76
Follow FGDC standards	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
WAFWA & Federal Agencies form science council	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Research needs are prioritized & assigned &/or offered	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Promote peer review of study plans & products	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Objective 1.3 - Develop a coordinated effort for securing funds for research within the sagebrush ecosystem.		1/1/07	12/31/07	No Cost Estimate	76
Follow FGDC standards	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
WAFWA & Federal Agencies form science council	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Research needs are prioritized & assigned &/or offered	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Promote peer review of study plans & products	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Objective 1.4 - Annual inventory of research & data information needs.		1/1/07	12/31/07	No Cost Estimate	76
Follow FGDC standards	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
WAFWA & Federal Agencies form science council	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Research needs are prioritized & assigned &/or offered	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Promote peer review of study plans & products	WAFWA, Federal Agencies, UNIV, NGOs, Industry, TRIBES	1/1/07	12/31/07	No Cost Estimate	76
Regulatory Mechanisms				$1,200,000.00	77
Inconsistent & Inadequate Application				$600,000.00	77
Goal 1 - Uniformly apply existing regulations, regulatory mechanisms, & policies within & among agencies		1/1/07	1/30/09	$600,000.00	77
Objective 1.1 - Complete a comprehensive range-wide analysis		1/1/07	12/31/07	$300,000.00	77
Identify scope of analysis, methods, etc.	WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	3/30/07	No Cost Estimate	77
Secure funding & political support for analysis	WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	6/15/07	No Cost Estimate	77
Select investigator/vendor	WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	7/18/07	No Cost Estimate	77
Complete analysis and report to agencies and public	WAFWA Directors, WGA, WAFWA TEAM, BLM,NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	12/31/07	$300,000.00	77
Objective 1.2 - Agencies implement corrective action plans		1/1/07	1/30/09	$300,000.00	78
Agencies meet with investigators to discuss report findings	WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	2/1/08	No Cost Estimate	78
Agencies respond publicly to analysis/report to identify and resolve inconsistencies	WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD,TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	10/1/08	No Cost Estimate	78
WAFWA & agencies amend MOU	WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	1/30/09	$300,000.00	78
Adequacy of Regulations		1/1/07	1/1/10	$600,000.00	80
Goal 1 - Provide regulatory framework to maintain & enhance habitat & populations		1/1/07	1/1/10	$600,000.00	80
Objective 1.1 - Evaluate the adequacy of existing regulations		1/1/07	12/31/07	$300,000.00	80

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Entities/agencies initiate analysis of existing regulations through GAO or other independent group	GAO, WAFWA Directors, WGA, WAFWA TEAM, BLM, NRCS, SCD, TR BES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	1/15/07	No Cost Estimate	80
Complete analysis & report to agencies & public	GAO, WAFWA Directors, WGA, WAFWA TEAM,BLM,NRCS, SCD, TRIBES, Local Governments, LWG, Agency investigators, Contractors	1/1/07	12/31/07	$300,000.00	80
Objective 1.2 - Propose recommendations for regulatory change		1/1/07	12/31/07	$300,000.00	80
Blue Ribbon panel make recommendations based on Objective 1, 2, & other information	WAFWA TEAM, BLM, NRCS, SCD, TRIBES, Local Government, LWG	1/1/07	12/31/07	$300,000.00	80
Objective 1.3 - Agency implementation		1/1/07	1/1/10	No Cost Estimate	81
Integration and Coordination				No Cost Estimate	82
Current approaches				No Cost Estimate	82
Goal 1 - Long-term shared leadership & commitment		Date to be determined		No Cost Estimate	82
Objective 1.1 (short-term) - Facilitate coordinated, integrated conservation planning across the range		Date to be determined		No Cost Estimate	82
Gather exampes of successful coordination & integration and learn from them	Forum, WAFWA TEAM, NGOs, Fire Learning Network, Other agencies	Date to be determined		No Cost Estimate	82
Compile information profile suitable for local & state working groups.	Other agencies, WAFWA TEAM, Fire Learning Network, NGOs, Forum	Date to be determined		No Cost Estimate	82
Share information with local & state working groups	Forum, WAFWA TEAM, Fire Learning Network, NGOs, Other agencies	Date to be determined		No Cost Estimate	82
Develop a mechanism to facilitate & sustain planning at among the working groups	Forum, WAFWA TEAM, NGOs, Fire Learning Network, Other agencies	Date to be determined		No Cost Estimate	82
Goal 2 - Insure cumulative effects are addressed		Date to be determined		No Cost Estimate	82
Objective 2.1 - Identfiy mechanisms to assess & address cumulative effects across the range		Date to be determined		No Cost Estimate	82
Gather examples of successful cumulative effects and learn from them.	Forum, WAFWA TEAM, NGOs, Fire Learning Network, Other agencies	Date to be determined		No Cost Estimate	82
Gather examples of successfully addressing cumulative effects and learn from them.	Forum, WAFWA TEAM, Fire Learning Network, NGOs, Other agencies	Date to be determined		No Cost Estimate	85
Compile information profile suitable for local & state working groups.	Forum, WAFWA TEAM, Fire Learning Network, NGOs, Other agencies	Date to be determined		No Cost Estimate	82
Share information with local & state working groups.	Forum, WAFWA TEAM, NGOs, Fire Learning Network, Other agencies	Date to be determined		No Cost Estimate	82
Develop mechanism to facilitate coordination among working groups & land management agencies.	Forum, WAFWA TEAM, Fire Learning Network, NGOs, Other agencies	Date to be determined		No Cost Estimate	82
Integration & coordination across range & jurisdictions - Sharing information				$50,000	83
Goal 1 - Conduct a needs assessment of local working groups		5/10/06	4/30/08	No Cost Estimate	83
Objective 1.1 - Complete survey of LWG		5/10/06	4/30/08	No Cost Estimate	83

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Identify lead individual or body to implement Objective	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	1/1/07	6/29/07	No Cost Estimate	83
Develop Survey Questionnaire	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	1/1/07	9/28/07	No Cost Estimate	83
Conduct outreach to LWG on need for a survey	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	1/1/07	12/31/07	No Cost Estimate	83
Distribute Questionnaire to LWG	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	1/1/07	12/31/07	No Cost Estimate	83
Create report of questionnaire findings	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	1/1/07	4/30/08	No Cost Estimate	83
Implement information sharing/education mechanisms	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	Date to be determined		No Cost Estimate	83
Identify actions to address needs.	LWG, State Sage-grouse Lead Biologists, WGA, WAFWA TEAM, Surveyor developer	Date to be determined		No Cost Estimate	83
Objective 1.2 - Enhance existing &/or develop mechanisms by which information can be stored, shared and utilized.		Date to be determined		No Cost Estimate	84
Identify the expertise needed	WAFWA TEAM, USGS, Other entities w/pertinent expertise	Date to be determined		No Cost Estimate	84
Generate an inventory of available & potential mechanisms to facilitate information sharing among LWGs		Date to be determined		No Cost Estimate	84
Develop or enhance mechanisms for shared learning		Date to be determined		No Cost Estimate	84
Measures of success/monitoring responsibilities		Date to be determined		No Cost Estimate	84
Agree to engage this in the timeframe noted.		Date to be determined		No Cost Estimate	84
Integration & coordination across range & jurisdiction / Policy & coordination				$100,000	85
Goal 1 - Coordinated policies that enhance sage-grouse conservation efforts at multiple levels		1/1/07	12/31/08	No Cost Estimate	85
Objective 1.1 - Complete an analysis of land management policies & plan directions		1/1/07	7/30/08	No Cost Estimate	85
Prepare proposal to identify scope of analysis, methods	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	7/30/07	No Cost Estimate	85
Secure support for analysis	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	10/30/07	No Cost Estimate	85
Select investigator/vendo	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	12/31/07	No Cost Estimate	85
Complete analysis and report to agencies & public	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	7/30/08	No Cost Estimate	85
Objective 1.2 - Agencies & LWGs act to resolve inconsistencies that may inhibit sage-grouse conservation		1/1/07	12/31/08	No Cost Estimate	85
Federal, tribal, & state agencies meet with investigators to discuss report	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	7/30/08	No Cost Estimate	85

Issues, Tasks and Actions	Primary Implementation Parties	Start Date	End Date	Project Cost	Appendix C2 Page No.
Federal, tribal, & state agencies respond publicly to analysis/report	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	12/31/08	No Cost Estimate	85
WAFWA & Federal agencies amend MOU	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	1/1/07	12/31/08	No Cost Estimate	85
Establish a representative management level team to meet annually	WAFWA, BLM, USFS, WAFWA Directors, TR BES, LWG, NRCS, USFWS, Soil & Water Conservation Districts, Agency investigators	Date to be determined		No Cost Estimate	85
Goal 2 - Federal, state, and LWG practices will meet PECE guidelines		1/1/07	7/30/07	$50,000	87
Objective 2.1 - Federa, state, & LWG demonstrate how elements of PECE are being implemented.		1/1/07	7/30/07	No Cost Estimate	87
Agencies & LWGs agree to publish annual reports	WAFWA, BLM, WAFWA Directors, LWG, USFWS	1/1/07	4/30/07	No Cost Estimate	87
Amend MOU to make joint commitment	WAFWA, BLM, WAFWA Directors, LWG, USFWS	1/1/07	7/30/07	No Cost Estimate	87

* ST = Short-term, MT = Mid-term, LT=Long-term.

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Literature Cited

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Appendices

Appendix A

Sage-grouse as a Sagebrush Ecosystem Surrogate

Appendix A

The Greater Sage-grouse Range-wide Conservation Strategy is a single species strategy focused on the recovery of this species. There are a number of other species dependent on sagebrush ecosystems that are also considered at-risk. It is not feasible to develop conservation strategies for each of these species. The following is an initial discussion on the potential use of sage-grouse as a surrogate and/or landscape-scale species. These concepts need to be more fully developed outside of the scope of the conservation strategy.

Sage-grouse as a Surrogate Species

Because of our inability to individually address needs of every species, the use of surrogate species has become increasingly popular in recent years. Surrogate species act as a proxy for addressing needs of a wider suite of species potentially using similar habitats. Hunter et al. (1988) recommended utilizing a “coarse filter” approach that focuses on higher levels of ecological representation and recognizes the importance of communities as biological entities. He further recommends that the conservation of representative biological communities is one way of maintaining species diversity. The overall purpose for coarse-filter conservation may be best characterized as maintenance of ecological integrity at an ecoregional scale (Noss 2000). Coarse-filter goals focus on representation of ecological variability and environmental gradients and seek to provide representation and redundancy of these components across landscapes. Noon et al. (2003) and Noon et al. (2005) suggest that the use of an ecosystem approach to species conservation may be efficient and cost effective in assessing species distributions, but is likely unsuitable for addressing species where viability is a concern. Several authors advocating an ecosystem approach to conservation argue for: 1) a process that evaluates both the biotic and abiotic environment, and 2) the need for a fine filter process that addresses species that may not be captured in an ecosystem conservation approach (Noss 1987, Groves et al. 2002, Noon et al. 2003).

Lambeck (1997) recommends the use of a set of species whose ecological requirements define attributes that must be present if a landscape is to meet the requirement of all species that occur there. Thus the needs of these focal species can be used to develop management guidelines for the amount, composition and pattern of habitats that will result in the conservation of the total set of species. The use of surrogates has been controversial in the literature. Landres et al. (1988) suggest the use of “indicators” may be inappropriate, but offers recommendations for selection of indicators when these are considered necessary.

Caro and O’doherty (1998) recommend caution when using surrogates and further identify five types of surrogate species (health indicators, population indicators, biodiversity indicators, umbrella species and flagship species) that may be appropriate if key assumptions are met between the surrogates and the species that they represent. Noon et al. (2003) suggest the use of focal species as a means for assessing groups of rare species. Fine-filter analyses should include rare species, indicator species (i.e. species that reflect the state of an ecosystem) and focal species (i.e. species that play a significant role in the function of an ecosystem). Focal species include keystone (transfer of matter and energy) and engineers (creating niches for other species) species. Formal PVAs may be important for a small group of species that are imperiled or critical to the functioning of the ecosystem. The total number of species evaluated may be between 10 and 50 species.

Wisdom et al. (2000) utilized a focal species approach in evaluating species-of-conservation-concern (SOCC) in the Columbia River Basin. SOCC were grouped into families and groups based on source habitats they were associated with, and focal species were selected as a means of assessing changes in habitats and associated implications for these suites of species. A similar approach was used for evaluating threats in Great Basin sagebrush ecosystems relative and SOCC associated with these ecosystems (Wisdom et al. 2005). One chapter in the book evaluates the efficacy of Greater Sage-grouse as an umbrella species for sagebrush dominated communities (Rowland et al. 2005a) and is discussed below.

Rowland et al. (2005b) compares coarse scale land cover associations and spatial (distributional) overlap of Greater sage-grouse and 39 other vertebrate species of conservation concern in the Great Basin. Correlation coefficients (phi) averaged 0.40 for species considered "sagebrush obligate" species, suggesting that sage-grouse could offer conservation coverage obligate species. However, this paper also cautions use of sage-grouse as an umbrella species for several reasons: 1) Territories for many of the species considered under a sage-grouse umbrella are much smaller, 2) Declines of sage-grouse populations may not correlate with declines of species with finer scale habitat requisites, 3) There may be differences in the way that species respond to habitat loss and fragmentation.

Caro et al. (2005) identify the considerable assumptions required to utilize substitute species in conservation planning. They suggest three criteria in evaluating the efficacy of a substitute species: 1) the relationship between disturbances and substitute species vital demographic rates must be documented. 2) Key traits affecting demographic viability in the substitute <u>and</u> target species needs to be identified and corroborated. 3) The relationship between the key demographic trait values and disturbance threshold must be established for the substitute species.

Sage-grouse as a Landscape Species

Sage-grouse are considered a landscape species (Connelly et al. 2004, Crawford et al. 2004). Connelly et al. (2000) identifies habitat requisites for various seasonal uses (winter, breeding, and brood-rearing). The scale necessary to meet these requisites can be in the 1,000s of hectares, particularly if the population is migratory. Substantial habitat loss or disruption for any of these life history requisites could result in the extirpation of populations.

Apfelbaum and Chapman (1997) evaluated changes in Great Plains fauna associations as a result of the Euro-American settlement and the large-scale loss and fragmentation of the tallgrass prairie ecosystem. As Great Plains ecosystems were lost, average prairie patches declined from millions to tens of acres (Fig. Al.1).

There was a corresponding loss of faunal communities beginning with species requiring large areas to meet life requisites (e.g. predators, ungulates) to species that can meet life requisites in small patches (e.g. insects). Species requiring large landscapes to meet life requisites are likely more at-risk than species requiring small landscapes, particularly when species requiring large landscapes are also habitat specialists.

Connelly et al. (2004) evaluated the effects of the human footprint on the integrity of sage-grouse populations across the species range. An evaluation of areas that have undergone significant degradation as the result of human uses also showed a corresponding loss of greater sage-grouse populations (Fig. A1.2). Species with smaller home range sizes (e.g. Brewer’s sparrow, sage sparrow) that share habitats with sage-grouse may persist longer because their habitat requisites can be met at finer scales. It seems logical that greater sage-grouse could be an indicator of broad-scale system changes in sagebrush dominated ecosystems.

Because sage-grouse are highly specialized sagebrush obligates, it is impossible to discuss sage-grouse conservation without also considering conservation of sagebrush. Although sage-grouse remain a focus of this conservation strategy, the fact that sage-grouse use many different species of sagebrush across their range, have differing seasonal habitat requirements for their annual life cycle and the fact that grouse populations range over broad landscapes, means that the conservation of sage-grouse year long habitat over the range of the species basically includes the conservation of the sagebrush ecosystem in general and that conservation of sage-grouse can provide a logical starting point for multi-species conservation across the sagebrush ecosystem.

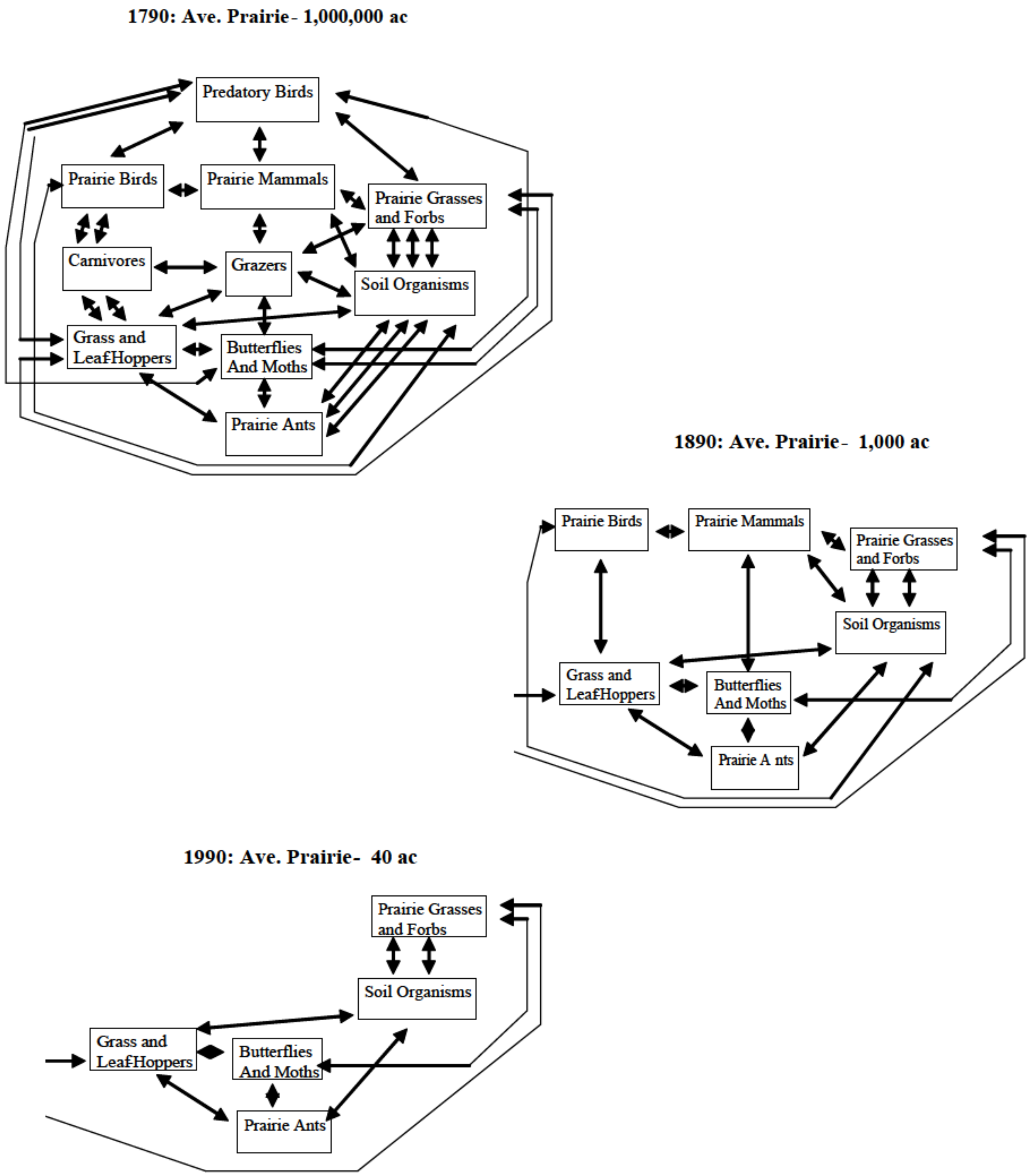

Figure A1.1. Changes in Prairie Ecosystems from presettlement to present (from Apfelbaum and Chapman 1997)

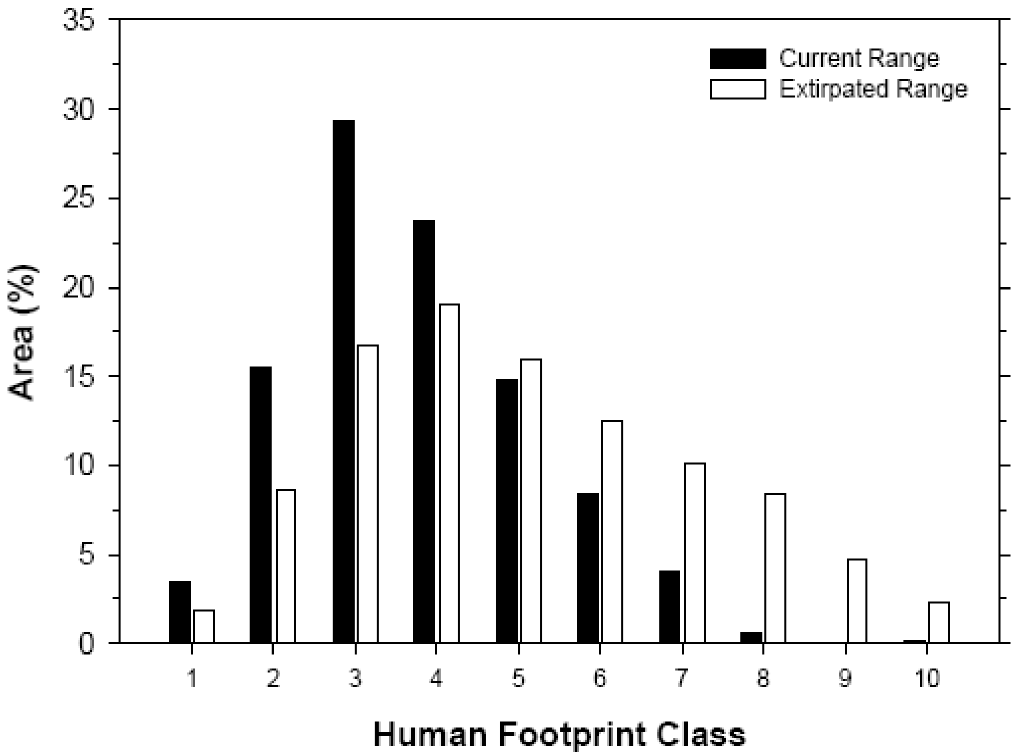

Figure A1.2. Percent area of influence within each of the 10 human footprint classes versus current and extirpated ranges of sage-grouse. Human footprint classes range from 1 (lowest human footprint influence) to 10 (highest human footprint influence) (from Connelly et al. 2004).

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APPENDIX B

Sage-grouse Memorandums of Understanding

CONSERVATION AND MANAGEMENT OF SAGE GROUSE IN NORTH AMERICA
WESTERN ASSOCIATIONS OF FISH AND WILDLIFE ASSOCIATIONS
1995

CONSERVATION AND MANAGEMENT OF SAGE GROUSE IN NORTH AMERICA
WESTERN ASSOCIATIONS OF FISH AND WILDLIFE ASSOCIATIONS
1999

WESTERN ASSOCIATION OF FISH AND WILDLIFE AGENCIES
U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE
U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT
U.S. DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE
2000

#2

MEMORANDUM OF UNDERSTANDING

AMONG

MEMBERS OF WESTERN ASSOCIATION OF

FISH AND WILDLIFE AGENCIES

Conservation and Management of Sage Grouse in North America

I. Purpose

The purpose of this Memorandum of Understanding (MOU) is to provide guidance for conservation and management of sage grouse (*Centrocercus urophasianus*) and sagebrush (*Artemisia* spp., primarily *A. tridentata tridentata*, *A. t. vaseyana*, *A. t. wyomingensis*, *A. tripartita*) shrub-steppe habitats upon which the species depends. Sage grouse historically occurred in at least 15 states and 3 provinces. This species has become extirpated in at least 3 states (Nebraska, New Mexico, Oklahoma) and 1 province (British Columbia). The current distribution of sage grouse is reduced throughout the species' historic range. Reasons for the reduction in area occupied from presettlement periods relate to habitat loss, habitat degradation, and habitat fragmentation. The current and long-term trend in sage grouse abundance appears to be downward. The members of the Western Association of Fish and Wildlife Agencies agree that cooperative efforts are necessary to collect and analyze data on sage grouse and their habitats so that cooperative plans may be formulated and initiated to maintain the broadest distribution and greatest abundance possible within the fiscal realities of the member agencies and cooperating partners.

II. Objectives

All member agencies agree that sage grouse are an important natural component of the sagebrush shrub-steppe ecosystem. As such, sage grouse serve as an indicator of the overall health of this important habitat type in western North America. Further, the presence and abundance of sage grouse reflects humankind's commitment to maintaining all natural components of the sagebrush shrub-steppe ecosystem so that all uses of this type are sustainable over time. Specific objectives are:

1. Maintain the present distribution of sage grouse.
2. Maintain the present abundance of sage grouse.
3. Develop strategies using cooperative partnerships to maintain and enhance the specific habitats used by sage grouse throughout their annual cycle.
4. Conduct management experiments on a sufficient scale to demonstrate that management of habitats can stabilize and enhance sage grouse distribution and abundance.

III. Suggested Actions

It is the intent of the members of the Western Association of Fish and Wildlife Agencies to sustain and enhance the distribution and abundance of sage grouse through responsible collective management programs. These programs should include:

1. Identification of the present distribution of sage grouse in each member state/province.
2. Standardization of data collection on abundance throughout the range of sage grouse.
3. Preparation of Conservation Plans.
4. Development and testing of habitat evaluation models.
5. Development of population sustainability models including estimates of minimum area required to maintain a viable population.
6. Development of cooperative partnerships with private, state, and federal land managers.

IV. Responsibilities

1. Each state/province will collect data as recommended by the Western States Sage Grouse Technical Committee within the constraints of their budgetary process.
2. All member states/provinces will work cooperatively to maintain and enhance sage grouse and their habitats.

V. Approval

We, the undersigned designated officials, do hereby approve this Memorandum of Understanding as recommended by resolution at the Midwinter Directors Meeting of the Western Association of Fish and Wildlife Agencies in San Diego, California on 7 January 1995.

Approved ______________________ Date ______________
Alberta Environmental Protection, Fish and Wildlife Services

Approved Duane L. Shroufe Date 9-11-95
Arizona Game and Fish Department

Approved C. J. Rupbrook Date 1/6/96
British Columbia Ministry of Environment

Approved ______________________ Date ______________
California Department of Fish and Game

Approved Perry D. Olson Date 9-11-95
Colorado Division of Wildlife

Approved Jerry M. Conley Date 9/11/95
Idaho Department of Fish and Game

Approved Patrick J. Graham Date 9/11/95
Montana Department of Fish, Wildlife, and Parks

Approved William A. Molini Date 9/12/95
Nevada Division of Wildlife

Approved [illegible] Date 9/11/95
New Mexico Game and Fish Department

Approved Keith [illegible] Date 9/11/95
North Dakota Game and Fish Department

Approved Rudolph A. Rosen Date 9/11/95
Oregon Department of Fish and Wildlife

Approved Douglas R. Hansen Date 9/11/95
South Dakota Department of Game, Fish and Parks

Approved R. Valentine Date 12 Sep 95
Utah Division of Wildlife Resources

Approved Robert Turner Date 12-19-95
Washington Department of ~~Wildlife~~ Fish and Wildlife

Approved John Talbott Date Sept 11, 1995
Wyoming Game and Fish Department

MEMORANDUM OF UNDERSTANDING

AMONG

MEMBERS OF WESTERN ASSOCIATION OF

FISH AND WILDLIFE AGENCIES

Conservation and Management of Sage Grouse in North America

I. Purpose

The purpose of this Memorandum of Understanding (MOU) is to provide guidance for conservation and management of sage grouse (Centrocercus spp.) and sagebrush (Artemisia spp., primarily A. tridentata tridentata, A. t. vaseyana, A. t. wyomingensis, A. tripartita) shrub-steppe habitats upon which the species depends. Sage grouse historically occurred in at least 15 states and 3 provinces. This species has become extirpated in 5 states (Arizona, Kansas, Nebraska, New Mexico, Oklahoma) and 1 province (British Columbia). The current distribution of sage grouse is reduced throughout the species' historic range. Reasons for the reduction in area occupied from presettlement periods relate to habitat loss, habitat degradation, and habitat fragmentation. The long-term trend in sage grouse abundance is downward. The members of the Western Association of Fish and Wildlife Agencies agree that cooperative efforts are necessary to collect and analyze data on sage grouse and their habitats so that cooperative plans may be formulated and initiated to maintain the broadest distribution and greatest abundance possible within the fiscal realities of the member agencies and cooperating partners.

II. Objectives

All member affected agencies agree that sage grouse are an important natural component of the sagebrush shrub-steppe ecosystem. As such, sage grouse serve as an indicator of the overall health of this important habitat type in western North America. Further, the presence and abundance of sage grouse reflects humankind's commitment to maintaining all natural components of the sagebrush shrub-steppe ecosystem so that all uses of this type are sustainable over time. Specific objectives are:

1. Maintain and increase where possible the present distribution of sage grouse.
2. Maintain and increase where possible the present abundance of sage grouse.
3. Develop strategies using cooperative partnerships to maintain and enhance the specific habitats used by sage grouse throughout their annual cycle.

4. Conduct management experiments on a sufficient scale to demonstrate that management of habitats can stabilize and enhance sage grouse distribution and abundance.
5. Collect and analyze population and habitat data throughout the range of sage grouse for use in preparation of conservation plans.

III. Actions

It is the intent of the members of the Western Association of Fish and Wildlife Agencies to sustain and enhance the distribution and abundance of sage grouse through responsible collective management programs. These programs will include:

1. Identification of the present distribution of sage grouse in each member state/province.
2. Collection of sage grouse population data following standardized protocols throughout the range of the species..
3. Continuation of development of Conservation Plans based on the local working group concept.
4. Validation of habitat evaluation models.
5. Completion of genetic analyses across the range of sage grouse to more effectively define and manage individual populations.
6. Development of cooperative partnerships with interested individuals, and private, state, and federal land managers.
7. Support and implement the revised sage grouse population and habitat management guidelines.

IV. Responsibilities

1. Each state/province will collect data as recommended by the Western States Sage Grouse and Columbian Sharp-tailed Grouse Technical Committee within the constraints of their budgetary process.
2. All member states/provinces will work cooperatively to maintain and enhance sage grouse and their habitats.

V. Approval

We, the undersigned designated officials, do hereby approve this Memorandum of Understanding as recommended by resolution at the Summer Meeting of the Western Association of Fish and Wildlife Agencies in Durango, Colorado on 14 July 1999.

MEMORANDUM OF UNDERSTANDING

AMONG

WESTERN ASSOCIATION OF FISH AND WILDLIFE AGENCIES

and

U.S. DEPARTMENT OF AGRICULTURE, FOREST SERVICE

and

U.S. DEPARTMENT OF THE INTERIOR, BUREAU OF LAND MANAGEMENT

and

U.S. DEPARTMENT OF THE INTERIOR, FISH AND WILDLIFE SERVICE

I. Purpose

The purpose of this Memorandum of Understanding (MOU) is to provide for cooperation among the participating state and federal land and wildlife management agencies in the development of a rangewide strategy for the conservation and management of sage grouse (Centrocercus spp.) and their sagebrush (Artemisia) habitats. The sage grouse is an obligate sagebrush habitat species that requires large tracts of sagebrush habitat for its survival. Sage grouse historically occurred in at least 16 states and three provinces. This species has been extirpated in five states (Arizona, Kansas, Nebraska, New Mexico, and Oklahoma) and one Canadian province (British Columbia). Its current range includes portions of California, Oregon, Washington, Nevada, Idaho, Utah, Montana, Wyoming, Colorado, North Dakota and South Dakota. The long-term trend in sage grouse abundance is downward throughout its range.

Member state agencies ("State Agencies") of the Western Association of Fish and Wildlife Agencies (WAFWA) have signed a "Memorandum of Understanding Among Members of the Western Association of Fish and Wildlife Agencies for the Conservation and Management of Sage Grouse in North America." That MOU, signed in July of 1999, and attached hereto as Appendix A, outlines the purpose, objectives, actions and responsibilities for cooperation among WAFWA States.

The Bureau of Land Management, United States Department of the Interior (BLM), the Forest Service, United States Department of Agriculture (FS) and the Fish and Wildlife Service, U.S. Department of the Interior (FWS), and WAFWA, (collectively, "the Parties") herein agree that cooperative efforts among the Parties, consistent with the applicable statutory requirements, are necessary to conserve and manage the nation's sagebrush ecosystems for the benefit of sage grouse and all other sagebrush dependent species.

II. Objectives

The Parties agree that sage grouse are an important natural component of the sagebrush ecosystem. Sage grouse serve as an indicator of the overall health of this important ecosystem in Western North America. Providing for the presence and abundance of sage grouse reflects the Parties commitment to maintaining all natural components and ecological processes within sagebrush ecosystems. Specific objectives are to:

1. Maintain, and increase, where possible, the present distribution of sage grouse.
2. Maintain, and increase, where possible, the present abundance of sage grouse.
3. Identify the impacts of major land uses and hunting on sage grouse, and determine the primary causes for declines in sage grouse populations.
4. Develop a Rangewide Conservation Framework to provide for cooperation and integration in the development of Conservation Plans to address conservation needs across geographic scales as appropriate.
5. Develop partnerships with agencies, organizations, tribes, communities, individuals and private landowners to cooperatively accomplish the preceding objectives.

III. Actions

The States will convene Working Groups to develop State or Local Conservation Plans. Working Groups will be comprised of representatives of local, state, federal and tribal governments, as appropriate. Participation will be open to all other interested parties. Federal participation in working groups will operate in a manner consistent with the Federal Advisory Committee Act. Working groups will be convened within 60 days of the effective date of this agreement.

The Parties will establish a Conservation Planning Framework Team consisting of four (4) representatives from WAFWA and one (1) representative each from BLM, FS and FWS. The Framework Team will develop a Range-wide Conservation Framework and provide recommendations and guidance to the working groups concerning the contents of State and Local Conservation Plans.

The Parties will collect, analyze and distribute sage grouse population and habitat data to the working groups for conservation planning. These data include, at a minimum: data on fire history, habitat composition and trend, known wintering and nesting habitat, and lek locations. Population data will be collected as recommended by the Western States Sage Grouse and Columbian Sharptailed Grouse Technical Committee.

Each State Conservation Plan will provide recommendations:

1. To protect and improve important sage grouse sagebrush habitats.
2. To actively manage to improve degraded sagebrush ecosystems.
3. To reduce the fragmentation and isolation of sagebrush habitats.
4. To address non-habitat issues, such as hunting, if such issues are identified to limit sage grouse populations in an area.
5. For desired population levels, distribution and habitat conditions.

The BLM, FS and FWS will provide for habitat protection, conservation and restoration, as appropriate, consistent with the National Environmental Policy Act and other applicable laws, regulations, directives and policies. In doing so, the BLM, FS, and FWS will consider the WAFWA Guidelines for Management of Sage Grouse Populations and Habitats, State and Local Conservation Plans, and other appropriate information in their respective planning processes.

Parties to this agreement will work together to identify research needs and strategies and conduct joint assessments, monitoring and research.

IV. Authorities

This MOU is among the FWS, BLM, FS, and WAFWA under the provisions of the following laws:

Federal Land and Policy Management Act of 1976 (43 U.S.C. 1701 et seq.)
Fish and Wildlife Act of 1956 (16 U.S.C. 742 et seq.)
Fish and Wildlife Coordination Act (16 U.S.C. 661-667)
Multiple-Use Sustained-Yield Act [of 1960] (16 U.S.C. 528-531)
Forest and Rangeland Renewable Resources Research Act of 1978 (16 U.S.C. 1641-48)
National Forest Management Act of 1976 (16 U.S.C. 1600 et seq.)
Endangered Species Act of 1973 (16 U.S.C. 1531 et seq.)
National Wildlife Refuge Administration Act of 1966, as amended by the National Wildlife Refuge System Improvement Act of 1997 (16 U.S.C 668dd et seq.)

V. Approval

It is mutually agreed and understood by and between the Parties that:

1. This MOU is neither a fiscal nor a funds obligation document. Nothing in this

agreement may be construed to obligate Federal Agencies or the United States to any current or future expenditure of resources in advance of the availability of appropriations from Congress. Any endeavor involving reimbursement or contribution of funds between the Parties to this MOU will be handled in accordance to applicable regulations, and procedures including those for federal government procurement and printing. Such endeavor will be outlined in separate agreements that shall be made in writing by representatives of the Parties and shall be independently authorized in accordance with appropriate statutory authority. This MOU does not provide such authority.

2. This MOU in no way restricts the Parties from participating in similar activities with other public or private agencies, organizations and individuals.

3. This MOU is executed as of the last date shown below and expires five years from the execution date, at which time it will be subject to review, renewal or expiration.

4. Modifications within the scope of this MOU shall be made by the issuance of a mutually executed modification prior to any changes being performed.

5. Any party to this MOU may withdraw with a 60-day written notice.

6. Any press releases with reference to this MOU, the Parties, or the relationship established between the Parties of this MOU, shall be reviewed and agreed upon by all of the Parties.

7. In any advertising done by any of the Parties, this MOU should not be referred to in a manner that states or implies that any Party approves of or endorses unrelated activities of any other.

8. During the performance of the MOU the participants agree to abide by the terms of Executive Order 11246 on nondiscrimination and will not discriminate against any person because of race, age, color, religion, gender, national origin or disability.

9. No member of, or delegate to Congress, or resident Commissioner, shall be admitted to any share or part of this agreement, or to any benefit that may arise from, but these provisions shall not be construed to extend to this agreement if made with a corporation for its general benefits.

10. The Parties agree to implement the provisions of this MOU to the extent personnel and budgets allow. In addition, nothing in the MOU is intended to supercede any laws, regulations or directives by which the Parties must legally abide.

IN WITNESS THEREOF, the parties hereto have executed this Memorandum of Understanding as of the last written date below.

APPENDIX C

FINDINGS AND RECOMMENDATIONS
Final Report of the
Greater Sage-grouse Range-wide Issues Forum

Findings and Recommendations

Final Report of the Greater Sage-grouse Range-wide Issues Forum

Photo by Mark Gocke at markgocke.com

Presented to the

Western Association of Fish & Wildlife Agencies

May 2006

U.S. Institute for **Environmental Conflict Resolution**
Morris K. Udall Foundation

Preface

The Greater Sage-grouse Range-wide Issues Forum (Forum), sponsored by the Western Association of Fish and Wildlife Agencies,[1] is one of several important processes contributing to development of the *Greater Sage-grouse Comprehensive Conservation Strategy*[2]. The *Final Forum Report* presents the findings and recommendations from the collaborative work of this 35-member working group.

Significant cooperative conservation planning began in July 1995 with the signing of the WAFWA Memorandum of Understanding (MOU), designed to sustain and enhance the distribution and abundance of greater sage-grouse through responsible, collaborative management programs. Cooperative conservation was further confirmed through the MOU of August 2000, when the U.S. Department of Agriculture (Forest Service) and the U.S. Department of the Interior (Bureau of Land Management and the U. S. Fish and Wildlife Service) joined with WAFWA to conserve and manage sagebrush ecosystems to benefit greater sage-grouse and other sagebrush dependent species.

In August 2002, the U.S. Fish & Wildlife Service contracted with WAFWA to prepare a scientific assessment of greater sage-grouse and their related sagebrush habitat, followed by development of a comprehensive conservation strategy. Accordingly, the *Conservation assessment of greater sage-grouse and sagebrush habitats*[3] was completed in 2004. In 2005, WAFWA began work on a conservation strategy.

WAFWA envisioned the use of a group of diverse stakeholders to contribute towards development of the comprehensive conservation strategy. The Forum, sponsored by WAFWA, was convened in November 2005 and managed through a facilitated process. The goal of the Forum was to contribute to the development of a range-wide conservation strategy that would *maintain or, where possible, increase the present distribution and abundance of greater sage-grouse and sagebrush habitat.* The Final Forum Report describes the integration and coordination of management approaches to range-wide issues that can provide a reference for Local Working Groups (LWG), state/provincial, tribal, and agency conservation planning processes. Forum participants worked to develop a flexible and dynamic strategy to guide planning processes into the future, acknowledging LWG, state/provincial, tribal, and agency plans and their importance to the implementation phase of greater sage-grouse conservation.

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[1] WAFWA is the association of fish and wildlife agency directors from the western United States and Canada. WAFWA contracted with the U.S. Fish & Wildlife Service to prepare and deliver, with assistance from the Framework Team, the *Greater-Sage Grouse Comprehensive Conservation Strategy* to conserve greater sage-grouse and sagebrush habitat. WAFWA was the primary funding source for the Forum.

[2] The *Comprehensive Strategy* will describe approaches to funding, communication, monitoring, implementation, research and conservation for the greater sage-grouse at the range-wide scale.

[3] 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, USA.

The Forum process identified the natural complexity of the sagebrush steppe ecosystem and the complicating factors associated with past and current land use. Participants recognized that, without increased conservation efforts, the increasing human population and uses in greater sage-grouse landscapes would continue to compromise greater sage-grouse abundance and distribution. Forum participants also agreed there are immense challenges involved in fostering successful cooperative conservation. A multitude of resources - social, economic, and scientific/environmental - will be needed to achieve reconciliation of the range of issues associated with balancing human needs with values of the natural system.

The approach to conservation of greater sage-grouse within a collaborative and comprehensive vision is an encouraging step, but much work remains to be done because of the human and ecological uncertainties involved. The history and success of managing sagebrush ecosystems has, at best, been mixed. Federal, state and provincial land and resource management agencies have often failed to sufficiently and meaningfully involve citizens in an integrated planning process. Even in those instances when citizen involvement has occurred, there is often insufficient resolve by the agencies to bring about any real change that benefits greater sage-grouse and sagebrush habitat. A cooperative conservation approach will require individual and collective integrity, and dedication of time, funds, shared responsibilities, and continued learning using adaptive management.

The Forum challenges all readers to become engaged in the process at the appropriate scale to accomplish the shared vision to *maintain or, where possible, increase the present distribution and abundance of greater sage-grouse and sagebrush habitat.*

Table of Contents

Introduction

Background

The Greater Sage-grouse Range-wide Issues Forum (Forum) was convened in November 2005 to facilitate the collaborative development of approaches to address issues, needs, opportunities, and partnerships related to the conservation of greater sage-grouse and sagebrush habitats at the range-wide scale. The Forum was sponsored by the Western Association of Fish and Wildlife Agencies (WAFWA[4]).

The Forum deliberations addressed greater sage-grouse and related sagebrush habitat issues at the range-wide scale (which, by definition for this process, also includes sub-population, population, and eco-regional scales) that cannot be adequately addressed at local, state, and provincial scales. The range-wide component will be integrated with approaches already developed at the local working group, state/province, tribal, and agency levels to form the *Greater Sage-grouse Conservation Sub-strategy.* This component, along with six other sub-strategies, will form *the Greater Sage-grouse Comprehensive Conservation Strategy (Comprehensive Strategy).* The Forum's work at the range-wide scale will be integrated with other sub-strategy components (Figure 1) by the National Greater Sage-grouse Conservation Planning Framework Team[5] (Framework Team), enlisted by WAFWA to coordinate preparation of the *Comprehensive Strategy*.

In an effort to ensure the Forum was neutral and impartial, and to facilitate effective interaction among a diverse representation of stakeholder interests, WAFWA asked the U.S. Institute for Environmental Conflict Resolution (U.S. Institute) to organize and convene the Forum. The U.S. Institute is an independent federal agency that assists parties in resolving environmental, natural resource, and public lands conflicts through assisted negotiation and mediation. A Forum Facilitation Team – comprised of the U.S. Institute's Larry Fisher and Susan Hayman, of North Country Resources, Inc. – worked to design, facilitate, and document the Forum process.

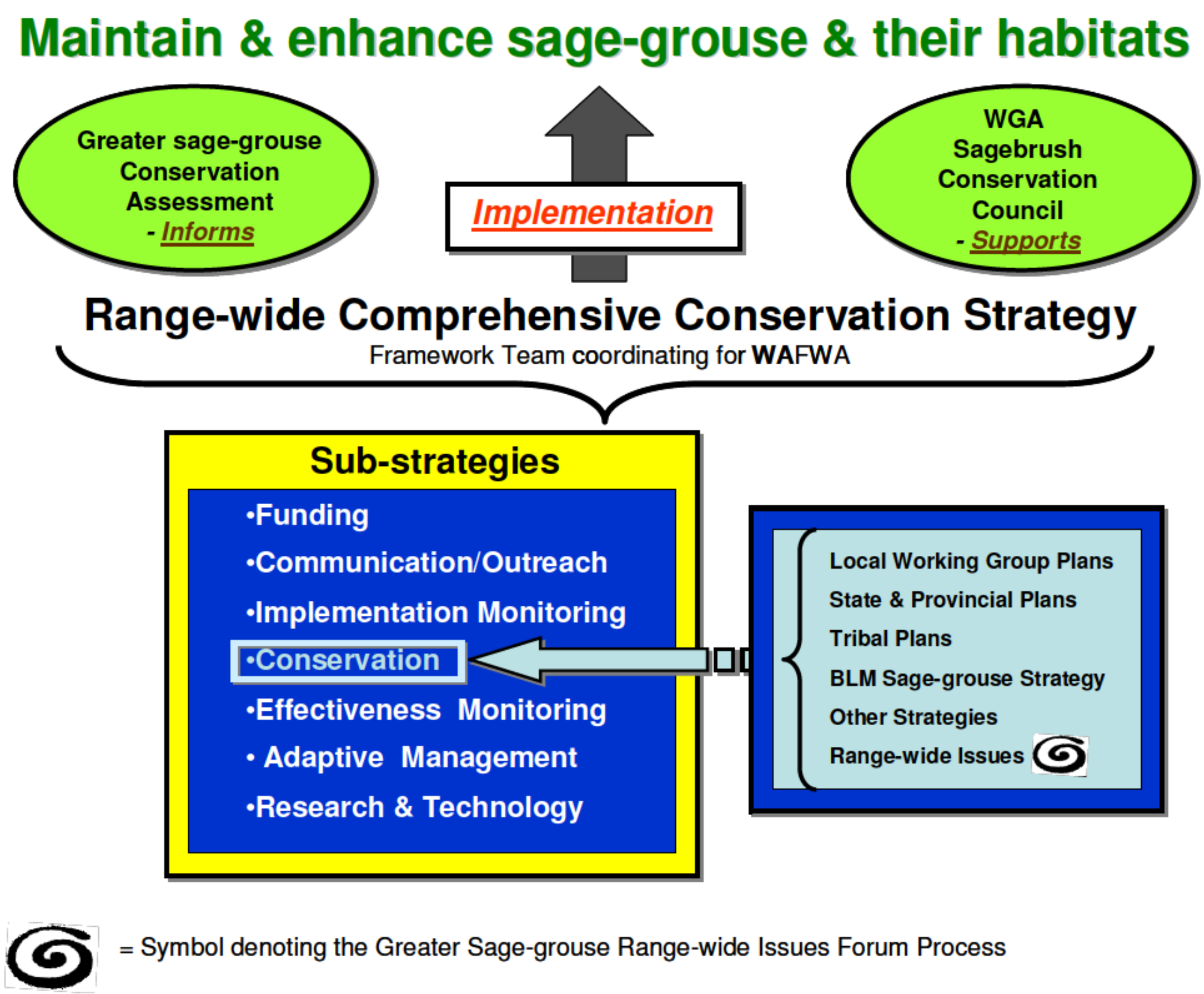
Thirty-five people participated in the Forum process (Appendix 1). The Facilitation Team selected participants to represent the broad array of perspectives related to greater sage-grouse conservation. Forum participants were chosen based on their experience, background, and knowledge of greater sage-grouse conservation issues, their interest and willingness to participate in this intense process, and their ability to work collaboratively and constructively on development of strategies to address range-wide issues. Participants were not viewed as formal

[4] WAFWA is the association of fish and wildlife agency directors from the western United States and Canada. Its role in this process is that of a contractor with the U.S. Fish & Wildlife Service to prepare and deliver, with assistance from the Framework Team, the *Greater-Sage Grouse Comprehensive Strategy* to conserve Greater sage-grouse and sagebrush habitat. WAFWA was the primary funding source for the Forum

[5] The Framework Team is comprised of four state wildlife agency representatives, two WAFWA staff, and a representative from each of the following federal agencies: Bureau of Land Management, U.S.D.A. Forest Service, and U.S. Fish and Wildlife Service. Their role is to prepare and deliver, in coordination with WAFWA, a comprehensive strategy to conserve greater sage-grouse and sagebrush habitat. They are the primary technical experts responsible for developing the *Greater Sage-grouse Comprehensive Conservation Strategy*.

representatives of individual organizations or constituencies, and they were not expected to be official signatories to the Forum's report or recommendations. It was understood, however, that participants would provide ongoing communication and exchange with people or groups that share similar interests throughout the Forum process.

Figure 1: Comprehensive Conservation Strategy Flow-chart



Over the five months of deliberations, three formal workshops were held:

- Workshop #1: Salt Lake City, UT, November 29 – December 1, 2005
- Workshop #2: Boise, ID, January 30 – February 1, 2006
- Workshop #3: Phoenix, AZ, February 27 – March 1, 2006

In addition to these three face-to-face workshops, participants continued to work in between the meetings individually and via conference calls and e-mail exchanges. Periodic electronic questionnaires administered by the Facilitation Team helped augment the discussion by providing important feedback to the dialogue. A dedicated website, accessible to the public, offered regular access to background materials about the Forum.

This report was compiled by Susan Hayman and Larry Fisher. It is based on Forum discussions and written products of Forum work groups. A six-member "integration team," composed of a diverse set of volunteers from the Forum helped synthesize the extensive output from the work groups and identify highest priority actions.

An initial draft of the report was shared with Forum participants for their review and comment. This final version of the report has sought to incorporate, as far as practicable, comments from participant reviewers. The authors have tried to reconcile occasional contradictory comments to reflect the overall perspective of Forum participants.

Forum Principles and Values

Forum participants identified conservation issues significant throughout the range of greater sage-grouse, and cooperatively developed conservation strategies to address these issues. In the process of doing so, they identified and articulated a set of shared principles and values regarding the conservation of greater sage-grouse and their habitat:

- Greater sage-grouse and sagebrush habitats have intrinsic cultural, ecological and symbolic values emblematic of the Western lifestyle and environment.
- Greater sage-grouse and sagebrush habitats are currently in decline due to expanding human population and human uses in greater sage-grouse landscapes.
- There are many persons, agencies and policies responsible for the decline. Therefore, a cooperative effort is necessary for the recovery and sustainability of greater sage-grouse and sagebrush habitat.
- Greater sage-grouse persistence is dependent on the presence of quality sagebrush habitat. Thus, we should protect and enhance what we have and recover what we can.
- Principles of adaptive management should be used to document actions, evaluate impacts/benefits, adjust practices, and integrate human needs and values to achieve success.
- The best available science (with a commitment to continually add to the science base) should be used to plan and implement conservation actions and evaluate the effects of conservation actions.

- Successful conservation of greater sage-grouse and sagebrush habitat will require identification of responsibilities for implementing the *Comprehensive Strategy*, and establishment of measures of accountability to insure that conservation goals are achieved.

Forum participants recognized the value of existing federal, tribal, state/provincial and local plans and conservation agreements, and their importance to cooperative conservation of greater sage-grouse and their habitat. They also agreed on the importance of informing the public about ways to conserve and enhance greater sage-grouse populations and sagebrush habitats.

Range-wide Issues

Forum participants generally defined "range-wide issues" as those that:

- exist at the range-wide, ecoregion, population or sub-population scale;
- are characterized by factors or situations that may adversely affect the ability to implement effective conservation actions or achieve conservation success at one or more scales, and;
- either cannot be addressed at the state/provincial or local scale, or are most efficiently addressed at the range-wide scale.

Methods

Following this general agreement on a definition, participants identified the issues critical to the conservation and enhancement of populations of greater sage-grouse and their habitats by:

- reviewing the issues summarized from the *Conservation Assessment* and the *12-Month Finding*[6];
- brainstorming additions or deletions from this initial set of range-wide conservation issues (Workshop Summary #1), and
- grouping the remaining issues into five broad categories: Integration and coordination across range and jurisdictions, regulatory mechanisms, habitat restoration, habitat conservation and land use, and science/data management/information.

The individual issues nested within these five categories became the "sub-issues" addressed in strategy development. The issue categories and sub-issues are listed below.

[6] 12-Month Finding for Petitions to List the Greater sage-grouse; Federal Register / Vol. 70 / No. 8 / Wednesday, January 12, 2005

Defining Range-wide Issues

Once the issue categories (and the sub-issues within them) were identified, work groups for each issue category were established. Forum participants self-selected the work group in which they wished to participate. In several instances, people participated in more than one work group. Work groups were provided breakout time at each workshop. In addition, most work group participants continued to work individually and through e-mail or conference call conversations between workshops.

Forum work groups developed problem statements for each subissue that helped define the scope of the issue for strategy development. Range-wide strategies developed by work groups included, to the extent possible, desired conditions, goals, objectives, implementation, and monitoring information. Preliminary draft strategies were vetted with all Forum participants and refined as appropriate within the allotted time. A summary of the issues addressed by the work groups is presented below. Appendix 2 (a separate document to this Report) contains the complete text of the Forum Strategies presented to the Framework Team for further refinement and integration into the *Comprehensive Strategy*.

Habitat Conservation and Land Use: Greater sage-grouse currently occupy approximately 56 percent of the historically occupied range of the species[7]. The loss of 44 percent of greater sage-grouse range and the fragmentation/habitat degradation of remaining range poses great challenges for the perpetuation of the species.

Sub-issues:

- Conservation and protection of habitats.
- Invasive plant species.
- Livestock grazing.
- Agricultural lands.
- Fences.
- Surface hydrology.
- Energy corridors.
- Roads and railroads.
- Tall structures.
- Urban/exurban development.
- Dispersed recreation.
- Non-renewable energy.

[7] 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, USA.

Habitat Restoration: Critical elements of the effort to ensure continued existence of greater sage-grouse are the conservation of important habitat and the technical capability of reliably restoring degraded habitat. This capability includes not only ecologically sound treatment techniques and management practices, but also the production and availability of genetically appropriate plant materials.

Sub-issues:

- Conifer encroachment.
- Range-wide habitat restoration assessment and planning.
- Native seed availability.
- Planting expertise.
- Fire.

Science, Data Management, and Information: The *Conservation Assessment* and the *12-Month Finding* identified numerous instances where lack of definitions, data and metrics pose great difficulties for identifying greater sage-grouse needs and ways to recover their habitat and populations. In addition to the lack of data and information, there is currently no mechanism for efficiently housing and distributing information among the many agencies, organizations, and individuals involved in greater sage-grouse conservation.

Sub-issues:

- Standardized vegetation and other data layer base map and access system.
- Definition of success for greater sage-grouse conservation.
- Evaluating social and economic effects of human activities on greater sage-grouse and habitat persistence.
- Ability to predict population outcomes/habitat as a result of vegetation change.
- Range-wide research and monitoring collaboration and coordination.

Regulatory Mechanisms: It may be difficult to effectively implement conservation actions for greater sage-grouse due to inconsistent and inadequate application of regulations within and among agencies. Emerging science also suggests that some regulations result in unforeseen or unwanted impacts on greater sage-grouse and their habitat (e.g., regulations that address specific habitat desired conditions or methods to achieve them). Incentive-based conservation solutions are limited.

Sub-issues:

- Inconsistent and inadequate application of existing regulations and policies.
- Adequacy of regulations.

Integration and Coordination across Range and Jurisdictions: Lack of coordination of policies, programs and regulations to address issues related to greater sage-grouse within and among agencies at national, regional, state, and local levels has adversely affected greater sage-grouse conservation. Current approaches do not facilitate coordinated planning, and implementation and evaluation of plans that integrate the issues and address cumulative effects. There are currently insufficient opportunities to share scientific findings, management information, and lessons learned among local working groups and other greater sage-grouse stakeholders. This condition could impede implementation of actions that benefit greater sage-grouse.

Sub-issues:

- Current approaches.
- Insufficient opportunities to share scientific and management information and learning among local working groups and other sage-grouse stakeholders.
- Inconsistency in policy and coordination across jurisdictional boundaries.

Critical Needs

Methods

A six-member "Integration Team" comprised of a diverse set of volunteers from the Forum helped synthesize the extensive output from the working groups and identify highest priority actions.

The first task of the Integration Team was to refine decision criteria synthesized from the Phoenix workshop, and apply these to the goals synthesized from the Forum Strategies (Appendices 3 and 4). Based on discussion, the Integration Team concluded it was best to rate the goals spatially according to geography; i.e. one set of ratings for the western portion of the range, and one set of ratings for the eastern portion of the range[8] (as mapped in the *12-Month Finding*, pg. 2250, Federal Register, Jan 12, 2005).

They then applied a three-point scale (with '3' being high) reflecting the Forum's key principles.

- Protect what we have (3)
- Retain what we're losing (2)
- Restore what has been lost (1)

(For goals that stated both 'retain' and 'restore', they assumed the highest and best use.)

Finally, they applied a three-point 'intuitive' cost-effectiveness rating:

- High (3)
- Medium (2)
- Low (1)

[8] Appendix 4 contains the synthesized, rated goals and an explanation of the rating process. It is important to note that the purpose of the rating by the Integration Team was simply to identify those goals that most Forum participants felt an immediate need to address. The rating was not intended to create an absolute ranking of the goals.

The Integration Team noted that geography would have a critical role in ultimately integrating range-wide strategies with strategies at the state and local levels. While they agreed that a set of criteria used to identify geographic priorities would be useful, they were uncomfortable developing the criteria to be used in making these choices. A Forum recommendation to the Framework Team is to consider convening an expert panel to develop these criteria and/or identify priority locations to implement conservation actions that benefit greater sage-grouse and its habitat.

Defining Critical Needs

Each of the goals and subsequent strategies identified by the Forum participants make an important contribution to *maintain or, where possible, increase the present distribution and abundance of greater sage-grouse and sagebrush habitat* across the range. Forum participants realized, however, that some goals were essential to address impending needs for greater sage-grouse and its habitat. The Integration Team identified seven goals as high priority/critical needs for the immediate investment of resources range-wide:

- Create long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate greater sage-grouse conservation actions throughout the range.
- Locate and protect important and/or intact greater sage-grouse habitats ("save the best")
- Identify locations of priority areas on which to focus conservation actions to maintain the function of sagebrush ecosystems ("retain what we're losing").
- Institutionalize and expand long term existing natural resource information portals (e.g., SAGEMAP) for greater sage-grouse and sagebrush ecosystems to provide easy and dependable access to useful information. The information should include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, greater sage-grouse information, surface geology and hydrology data, guidelines, techniques, best management practices, and other critical data and information for greater sage-grouse and sagebrush conservation through an accessible central repository.
- Develop and implement a coordinated program of research and monitoring projects integrated within the context of the landscape. Monitoring efforts should address the effects of human activities and natural events on greater sage-grouse and sagebrush habitat. Monitoring results can then provide the foundation for adaptive management.
- Develop and implement grazing systems and management practices that maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community to address long-term needs of greater sage-grouse and other sagebrush associated species.
- Create a mechanism for sharing information among LWGs and all levels of those involved in sage-grouse conservation to enable measurement of cumulative effects on sage-grouse habitats.

Additional goals were identified as regionally important for the western and eastern regions of the range, respectively.

West

- Contain and suppress wildfires in important greater sage-grouse habitats.
- Manage dispersed recreational activities to avoid, reduce and, where possible, eliminate displacement of greater sage-grouse or negative impacts to greater sage-grouse habitat.
- Identify known locations, and areas of future risk, for the top priority invasive plant species.

East

- Provide for non-renewable resource development and utilization with the assurance of 'no net loss' of sagebrush habitat or greater sage-grouse populations at appropriate spatial and temporal scales.
- Develop and use consistent criteria and management guidelines to locate/site, energy corridors, and operate and maintain new and existing facilities within energy corridors in a manner that minimizes impacts to greater sage-grouse and sagebrush habitat.
- Develop and implement technologies and practices that offset, reduce and/or minimize disturbance to greater sage-grouse and their habitat associated with non-renewable resource recovery activities.
- Develop and implement best management practices and appropriate mitigation measures that can be implemented for siting and operation and maintenance activities associated with energy corridors.

Forum participants strongly recommend the *Comprehensive Strategy* emphasize these range-wide and regional goals in the short term, and integrate accomplishment of the remaining identified goals according to their identified relative importance as additional resources become available. A number of the identified goals may also be more appropriately included in other sub-strategies (e.g., monitoring, funding, communication, science) as they are integrated into the *Comprehensive Strategy*.

Other Perspectives / Remaining Concerns

Despite the variety of perspectives and interests represented by Forum participants, there was considerable agreement about core values, preliminary strategies and critical, priority actions.

Nevertheless, given the Forum's broad, range-wide mandate and somewhat limited time frame, there remain differing perspectives and concerns that deserve acknowledgement and, in some cases, further follow up action. Most prominent among these concerns are those related to livestock grazing and energy development, as well as concerns regarding implementation of regulatory mechanisms. The Facilitation Team recommends that WAFWA undertakes steps to continue discussions on these concerns as the Framework Team develops the *Comprehensive Strategy*.

The following summarizes the unresolved issues either noted by Forum participants during the Forum process, or highlighted in comments received on the initial draft of this Final Report:

Forum Principles and Values
Some expressed concern- over the emphasis on adaptive management in the Forum strategies, including its identification as a Forum principle and value. This concern is based on the perceived lack of demonstrated success of adaptive management, and uncertainty about agencies' commitment to follow through with the monitoring and associated response that would be required under a truly adaptive management approach.

Critical Needs
Although the concurrence among the Integration Team in synthesizing and prioritizing critical issues reflected a broad diversity of perspectives, some Forum participants disagreed with their conclusions. In particular, some participants felt that strategies related to energy development should be a range-wide priority, not just a priority for the eastern region of the range. Other participants felt that expansion of pinyon-pine/juniper woodlands into historic sagebrush habitats should be a priority in the western region of the range.

Some participants expressed concern that goals related to regulatory mechanisms did not surface as critical needs. Some participants also felt that regulatory mechanisms were more of a tool than goals unto themselves.

Since not all Forum participants were involved in the final determination of the critical, high priority needs, there was no opportunity to achieve full support for these priorities.

Livestock-Grazing
The management of livestock grazing on greater sage-grouse habitat areas was a concern for several Forum participants. Some felt that the strategies reflected a presumption that grazing would occur, rather than defining where, when and how grazing could be compatible with the habitat needs of greater sage-grouse.

It was noted that Forum strategies could have included a voluntary federal grazing permit buy-out program, providing livestock grazing permittees the opportunity to sell their federal grazing permits rather than incur the socio-economic impacts of agency actions to conserve sage-grouse.

Non-Renewable Resources
Some participants felt the Forum strategies did not adequately address the increasing intensity and extent of impacts to greater sage-grouse and their habitats due to exploration and development of non-renewable resources. Others felt that the 'no net loss' principle should not apply solely to non-renewable energy development; it should be applied equally to all authorized resource uses range-wide. Further, some participants requested that the strategies include language that a *de-minimus* level of development or impact to habitat would be allowed to occur without application of 'no net-loss'.

Disappointment was expressed that the non-renewable resources strategies failed to identify the creation of sagebrush reserves as a means to mitigate the negative impacts of energy development on sage-grouse populations.

Sage-grouse and other sagebrush obligate species
A concern was noted about the lack of strategies for identifying distinct population segments of greater sage-grouse to help inform better management decisions for sage-grouse. It was also suggested that the public interest would have been better served had the Forum addressed other sagebrush obligate/dependent species rather than the greater sage-grouse alone, especially in terms of additional research, monitoring and protections.

Other Plans
A concern was raised about existing federal, state/provincial and local plans and conservation agreements, and the need was reiterated to analyze the accomplishments of these plans under the U.S. Fish and Wildlife Agencies Policy for Evaluation of Conservation Efforts, rather than allowing groups to self-report their progress.

Appendix 2 – General
Several participants were unsatisfied with portions of Appendix 2. Some would like to have had more time to further clarify or consolidate goals and objectives, and articulate the strategies in a more compelling way. Some wanted additional time to make further progress in identifying implementation actions, critical players, monitoring and projected costs.

While participants understood and accepted the time constraints that prevented additional work on Appendix 2, those with this particular concern suggested that strategies listed in Appendix 2 would benefit from additional fine-tuning as the Framework Team integrates them into the *Comprehensive Strategy*.

Implementation/Next Steps

Forum participants identified three essential resources needed to take this work forward: (1) funding, (2) leadership committed to organizing, supporting and guiding a long-term effort, and (3) the appropriate organizational structure to sustain it.

Forum participants agreed the first critical step is notifying the Western Governor's Association and appropriate federal, state, and local agency heads with budget authority to include significant funding for greater sage-grouse strategy implementation in their 2008 budgets. Deadlines for submitting budget requests are quickly approaching, and it is critical to identify and set aside funding for this purpose. Forum participants have taken responsibility for this action by preparing a letter for concurrence by the Forum that will be delivered to the Western Governor's Association and other appropriate federal, state and local agency heads.

Forum participants agreed the second critical step toward successful implementation of a range-wide strategy for greater sage-grouse is to establish an executive committee of federal, state, and local agency heads who have the authority to make decisions regarding allocation of resources (such as funding, personnel, work priorities, etc.) for strategy implementation. The executive committee would include a designated lead person who would be responsible for the maintenance, facilitation, and institutional memory of the executive committee.

The Forum participants agreed the third critical step would be to convene a group of people representing diverse interests on a regular basis to provide counsel and advice to the executive committee regarding strategy implementation. One suggestion by Forum participants was to maintain the Forum as a continuing structure to retain the strong relationships, collective knowledge, and collegiality developed throughout the Forum process. Whatever its structure, such a group would also be useful to support and ensure accountability for strategy implementation, and to be a vehicle to communicate key messages regarding greater sage-grouse and sagebrush habitat to their constituents. The group would require a structural mechanism to be convened, as well as resources to support their ongoing work.

Forum Communication Strategy

Forum participants recognize the interest of their constituents and the general public in the strategies they developed during the workshop process, critical needs they identified, unresolved concerns, and implementation suggestions. While the recommendations from the Forum will be incorporated to the fullest extent possible in the *Comprehensive Strategy*, participants advise the Framework Team and WAFWA of the importance to provide a mechanism to broadly share the Final Forum Report with interested persons, organizations, and agencies. To the extent it is individually possible, Forum participants agreed to share the Forum findings and recommendations with their colleagues, agency leadership and elected officials.

Appendix C-1

Forum Participants

FORUM PARTICIPANTS

1. Clait E. Braun, Grouse, Inc.
2. John Brenner, Western Governors' Association
3. Jim Burruss, PacifiCorp
4. Tom Clayson, Anadarko Petroleum
5. Leta Collord, Northeastern Nevada Stewardship Group
6. John Dahlke, N.American Grouse Partnership/Wyoming Wildlife/local working group
7. Bob Davison, Wildlife Management Institute
8. Ben Deeble, National Wildlife Federation
9. Paul Dresler, U.S. Geological Survey – Biological Resources Division
10. Connie Eissinger, McCone County Commissioner, MT
11. Dale Eslinger, Sustainable Resource Development - Government of Alberta, Canada
12. Shawn Espinosa, Sage-Grouse Technical Committee
13. Jeff Foss, U.S. Fish & Wildlife Service
14. Randall Gray, Natural Resources Conservation Service
15. Margaret Soulen Hinson, American Sheep Industry
16. Alison Lyon Holloran, National Audubon Society
17. Chris Jauhola, The Nature Conservancy
18. Kate Kitchell, U.S. Geological Survey – Forest and Rangeland Ecosystem Science Center
19. Paul Makela, Idaho Department of Fish & Game
20. Bruce McCloskey, Western Association of Fish & Wildlife Agencies
21. Cal McCluskey, Bureau of Land Management
22. Ron McNeil, LandWise (Alberta, CN)
23. Dave McNinch, Wildlife Commissioner (NV)
24. Terry Messmer, Utah State University
25. Steve Monsen, Western Ecological Consulting / Society for Range Management
26. Barry Noon, Colorado State University
27. John O'Keeffe, National Cattlemen's Beef Association / Landowner-Rancher
28. Martin Raphael, U.S.D.A. Forest Service – Pacific Northwest Research Station
29. David Redhorse, U.S. Fish & Wildlife Service Tribal Liaison
30. Kerry Reese, University of Idaho
31. Mark Salvo, Sagebrush Sea Campaign
32. Lowell Suring, USDA Forest Service
33. Robert Szaro, U.S. Geological Survey – Biological Resources Division
34. Western Thayer, Shoshone-Arapahoe Tribes
35. Jeff White, Newmont Mines

APPENDIX C2

Appendix 2
of the
Final Report of the
Greater Sage-grouse Range-wide Issues Forum

Forum Issues

Greater Sage-grouse Range-wide Issues Forum Strategies

*[Note: These strategies are presented to the Framework Team for further refinement and integration into the **Comprehensive Strategy**. Highlighted text reflects specific instructions or recommendations to the Framework Team to consider as they synthesize this information. All strategies contain goals and objectives. Many contain implementation actions and other elements of the strategy. Headings for these other elements of the strategy have been deleted where the participants were unable to get to this level of detail due to time constraints in the Forum process.]*

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ISSUE: HABITAT CONSERVATION AND LAND USE

SUB-ISSUE 1: Conservation and protection of habitats which are important and/or intact: "saving the best."

Goal: Conserve important and/or intact habitats and stabilize the loss of habitat across the range. [*Cross Reference with Habitat Conservation and Land Use Goals & Objectives.*

Objective 1 (short-term): In consort with LWGs, identify, prioritize and map important habitats and areas for conservation and protection across the range.

Implementation Actions:
- Develop criteria/protocol for assessing and prioritizing habitats for conservation (e.g. quality of habitat, risk factors). Consider developing protocols in the 7 sub-regions of the sagebrush biome. Include classification of habitats based on life cycle requirements (e.g. nesting, brood-rearing, wintering, etc.)
- Determine scale at which areas should be identified and prioritized: what size of area is needed to support sage grouse populations & genetic diversity.
- Map areas

Key Participants:
- USGS (sagemap)(lead)
- BLM,
- LWGs,
- State Wildlife Agencies,
- State repositories for automated data,
- NGOs: The Nature Conservancy, Nature Serve

Objective 2 (mid-term): Protect quality sage-grouse habitat from wildfire, invasive species, pinyon/juniper succession, improper livestock grazing practices, urban encroachment, roads & transmission lines, tall structures, and energy development.

Implementation Actions:
- Ensure that federal land management agency land use plans and any fire protection plans address sage-grouse needs in sage-grouse habitats.
- Implement projects that aid in the protection of quality sage-grouse habitats.
- Complete range-wide programmatic approval/authorization for federal land management agency use of pre-emergent herbicides (e.g., Oust, Plateau) to help retard cheatgrass germination.
- Continue implementation efforts regarding the Strategic Plan for the Coordinated Intermountain Restoration Project.
- Create incentives for landowners and land users to implement conservation and protection measures
- Provide financial and technical assistance to private landowners where feasible to help protect key sage-grouse habitats.
- Work with Native American Tribes whenever possible to help protect key sage-grouse habitats by providing consultation and technical assistance.

- Increase federal funding for wildfire suppression in sage-steppe ecosystems.
- Ensure that grazing strategies are conducive to healthy, sustainable, resilient sagebrush/perennial grass communities.
- Establish and enact ecologically sound range-wide, standardized guidelines for renewable and non-renewable energy exploration and development within sage-grouse/sagebrush habitats across state, provincial and jurisdictional boundaries consistent with sage grouse needs.

Measures of Success:
- Range-wide authorization of pre-emergent and other herbicides to control exotic annuals.
- Expedient response to wildfire in sagebrush habitats and incentives to get the fire out.
- Reduction in acres converted to non-habitat annually from previous rate of conversion.
- Increase in rate of restoration

Key Participants:
- BLM, USFS, USFWS, NRCS
- Native American Tribes
- State Wildlife Management Agencies

Objective 3 (long-term): Ensure that management practices and policies are geared toward maintaining or recovering sagebrush steppe habitat. This includes post-treatment management.

Implementation Actions:
- Establish a team to review federal land management policies and practices to determine whether or not they are effective at sustaining quality sagebrush habitats.
- Thorough and effective direction developed and incorporated into federal land use plans.
- Determine and convey land management practices that have not been conducive to maintaining or improving the needs of sage-grouse.
- Review and incorporate Guidelines to manage Sage-grouse and their Habitats (Connelly et. al. 2000).
- Encourage federal land management agency leadership to strive towards establishing or instituting policies and practices that improve and/or protect sagebrush steppe as agreed upon in the Memorandum of Understanding between WAFWA, USDA-FS and NRCS, and USDI – BLM, USFWS, and USGS.
- Develop and implement a research and monitoring program to assess the effectiveness of management practices geared toward conservation of important habitats.

Key Participants:
- BLM, USFS, USFWS, NRCS
- Science/Academic Community: USGS, Extension, Universities
- Native American Tribes
- State Wildlife Management Agencies

Time Frame:
- Ongoing with annual checks and updates

Objective 4: Establish monitoring program, protocols, and methods to evaluate status and trend of important habitats identified under objective 1 at the site and range-wide scales.

Implementation Actions:
- Compile and assess current monitoring activities
- Establish reference points in important habitat locations identified under objective 1 to monitor range-wide trends
- Establish common sampling strategies, and monitoring metrics and methods at the site and range-wide scales. Implement site-level monitoring that can be aggregated and synthesized at the range-wide scale. (reference quality habitat definition for condition objectives from Connelly et al)
  - Develop sampling strategy which incorporates different life cycle requirements (nesting, brood-rearing, wintering…etc.)
  - Establish reference points in selected representative habitats

Key Participants:
- NGOs: Audubon, Partners in Flight,
- Management Agencies: BLM, State, USFS
- USGS

SUB-ISSUE 2: Invasive Plant Species

Problem Statement: One of the most notable threats to the sagebrush ecosystem and greater sage-grouse habitat is invasive plants (e.g., cheatgrass, spotted knapweed, yellow starthistle, medusahead rye). Effects of invasive species on ecosystem function (e.g., altered fire regimes, nutrient loss, altered local microclimate, changes in community structure, prevention of succession) are significant at both local and regional scales, and are becoming increasingly more important on a global scale. Invasion by exotic species, particularly cheatgrass, is consistently cited as 1 of the major challenges to maintenance of healthy sagebrush communities.

Goal 1: Develop a comprehensive and range-wide list of invasive species which degrade sage-grouse habitats.

Objective 1.1: Identify and prioritize invasive species that pose the greatest risk by December 2007.

Objective 1.2: Review and recommend modification of State and Province noxious species lists to fund control measures of invasive species of concern by December 2008.

Goal 2: Identify and map the threat of invasive species within greater sage-grouse habitats.

Objective 2.1: Develop and apply range-wide models for the seven geographic subdivisions in the Sagebrush biome (e.g., spread vector analysis) to provide spatial estimates of the current and future risk of top priority invasive plant species by 2009 (short-term objective).

Objective 2.2: Develop range-wide and geographic zone maps of the current distribution of invasive plant species and compatible across different state or provincial boundaries by 2009-10 (Short-term objective).

Resources needed:
- Collate existing information and use Remote Sensing

Objective 2.3: For range-wide efforts, develop and implement site-specific detection surveys and protocols to maximize the likelihood of finding new patches of invasive plant species before they expand. By 2008 (Short-term objective).

Measures of success/monitoring responsibilities:
- Tie to land users and local interest groups in Goals 4 and 3.

Goal 3: Identify knowledge gaps and develop guidelines for control of invasive plant species within greater sage-grouse habitat.

Objective 3.1: Create methods to prioritize invasive species control on the basis of sagebrush habitat recovery potential in critical Sage-grouse range by 2008 (short-term objective).

Objective 3.2: Compile and/or identify, and implement, integrated invasive species control methods for the 7 geographic subdivisions in the Sagebrush biome by 2008 (e.g., grazing, mowing, seeding, herbicides) (short-term objective).

Objective 3.3: Compile and/or identify, and implement, beneficial management practices to minimize negative impacts of invasive species control methods in objective #2 on greater sage-grouse populations and their habitats (e.g., do not conduct any vegetation treatments during nesting and early-brood rearing periods when sage-grouse are present) by 2008.

Goal 4: Reduce the risk of new infestations of invasive species in greater sage-grouse habitat.

Objective 4.1: Compile and/or identify, and implement, guidelines for containment of existing infestations (e.g., border spraying, planting barriers of aggressive plants, grazing to minimize seed production) by 2008.

Objective 4.2: Compile and/or identify, and implement, beneficial management practices pertinent to domestic livestock and wildlife that will minimize the spread of invasive species by 2008.

Objective 4.3: Compile and/or identify, and implement, beneficial management practices pertinent to access, vehicles, and equipment that will minimize the spread of invasive species by 2008.

Objective 4.4: Develop and implement plans for areas treated for invasive species incorporating a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the re-invasion of undesirable species. Coordinate with Restoration Strategies.

Measures of success/monitoring responsibilities:

- Maintain cumulative records for invasive plants treatment and prevention programs to evaluate site specific and cumulative impacts to sage-grouse habitats.

Objective 4.5: Anticipate infestations of new invasive species and educate to target and prevent establishment, now to forever!

Goal 5: Integrate and coordinate invasive species management throughout greater sage-grouse habitat to increase effectiveness. Coordinate with Integration Strategies.

Objective 5.1: Develop partnerships among regional public and private land management entities to develop and implement identified objectives by 2008.

Objective 5.2: Solicit involvement of local weed management specialists, private landowners, wildlife biologists, and range ecologists to share knowledge and develop response plans for invasive species by 2008.

Objective 5.3: Supplement existing invasive species control programs with materials specific to the benefits of proactive management within sage grouse habitats (including weed identification, mechanisms for invasion and dissemination of invasive species, and methods of treating) by 2008.

Key actors/participants:

- State and federal agencies, local experiment stations, and local (county) weed districts

SUB ISSUE 3: LIVESTOCK GRAZING

Problem Statement: Landscapes managed for livestock grazing may fail to provide optimum habitat for sage grouse.

Goal 1: Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.

Objective 1.1: Use scientific data and historic information to establish baseline information (e.g. Ecological Site Descriptions) when evaluating soil quality and ecological processes in sage grouse habitats.

Measures of success/monitoring responsibilities:

- Completion and availability of baseline information

Key actors/participants:

- NRCS, BLM, FS, research community, State agencies, LWGs

Objective 1.2: Use WAFWA habitat guidelines where achievable considering Ecological Site Descriptions and rangeland health standards to implement flexible and appropriate grazing management systems (season of use, grazing duration, kind of livestock, and stocking intensity).

Measures of success/monitoring responsibilities:

- Federal Agencies, States, landowners and LWGs adopt and implement rangeland assessment processes that use WAFWA guidelines where appropriate; implementation of conservation plans consistent with WAFWA guidelines, where appropriate, on private lands.

- Historical grazing systems, or experimental designs, that can demonstrate achievement of population goals, but are not consistent with WAFWA guidelines, will be monitored for continued, sustainable, Greater sage-grouse populations and distribution consistent with State plans.

Key actors/participants:

- Landowners, permittees, BLM, FS, NRCS, State agencies, LWGs

Objective 1.3: Develop and/or adopt a consistent monitoring program that address effects of grazing management systems and show trends over time. In addition to monitoring progress towards achieving the WAFWA guidelines, monitor the response of vegetation (vigor and production), and the compositional diversity of species. Use monitoring methods that are best suited to the type of grazing management being practiced at a site.

Measures of success/monitoring responsibilities:

- Monitoring programs in place and active; documentation of condition relative to WAFWA guidelines.

Key actors/participants:

- Private landowners, permittees, BLM, FS, NRCS, State agencies (land and wildlife agencies), academia (university extension), LWGs, FWS

Objective 1.4: Encourage the coordination of landscape management activities on private, federal, state and tribal lands to provide yearlong benefits to sage grouse.

Measures of success/monitoring responsibilities:
- Management of sage-grouse habitats is compatible across jurisdictions; State plans are coordinated across state lines.

Key actors/participants:
- Federal and State agencies, Tribes, private landowners, permittees, NGOs, State sage-grouse working groups, LWGs

Objective 1.5: Offer incentives when and where appropriate to achieve sage grouse habitat objectives.

Measures of success/monitoring responsibilities:
- Incentive programs established and functional

Key actors/participants:
- USDA, FWS, NGOs, State agencies, industry, BIA, State technical committees (via USDA)

Objective 1.6: Review current land management agencies' grazing programs to ensure consistency and compatibility with the Comprehensive Strategy.

Measures of success/monitoring responsibilities:
- Plans are reviewed and updated/modified, if necessary

Key actors/participants:
- BLM, FS, State agencies, WAFWA

SUB-ISSUE 4: Agriculture Lands (irrigated and non irrigated crop and haylands and CRP)

Problem Statement: Agriculture lands are usually associated with private and/or tribal ownership and therefore have unique issues when dealing with sage-grouse habitat. Sage-grouse utilize these managed lands, especially alfalfa for food and cover. Management of agricultural lands can adversely affect sage-grouse (e.g. pesticides and crop harvesting). Existing programs (e.g. CRP) may encourage conversion of habitat to cropland, contains few incentives to protect and enhance sage grouse habitat, but also can become a more significant vehicle for recreating sage grouse habitat.

Desired Condition: Agricultural lands are managed to minimize or avoid adverse impacts on sage-grouse.

Goal 1: Identify where agriculture lands are associated with sage-grouse habitat.

Objective 1.1: Identify and prioritize agriculture lands that provide the greatest habitat value for sage-grouse.

Implementation actions/timeline:
- To be initiated within 1 year of the publication of the conservation strategy. The project will be completed within 2 years.

Measures of success/monitoring responsibilities:
- GIS product, criteria for habitat value.

Key actors/participants:
- NRCS, FS, USGS, BLM, State F&G

Resources needed: $50,000

Goal 2: Implement management practices on agriculture lands that protect or minimize harm to sage-grouse

Objective 2.1 Encourage spot treatment of weeds instead of whole field/pasture chemical treatment.

Implementation actions/timeline:
- To be initiated within 1 year of the publication of the conservation strategy. (Efforts are ongoing currently and need to be expanded)

Measures of success/monitoring responsibilities:
- Percent of affected acres treated. LWGs will monitor.

Key actors/participants:
- NRCS, Extension Service, local soil and water conservation districts and LWGs.

Milestones/monitoring:
- What is practical

Resources needed:
- Farm bill incentive payments as targeted by the NRCS working with their state technical committees.

Objective 2.2 Provide information and incentives to minimize application of insecticides in hayfields.

Implementation actions/timeline:
- To be initiated within 1 year of the publication of the conservation strategy. (Efforts are ongoing currently and need to be expanded)

Measures of success/monitoring responsibilities:
- Percent of affected acres treated. LWGs will monitor.

Key actors/participants:
- NRCS, Extension Service, local soil and water conservation districts and LWGs.

Resources needed:
- Farm bill incentive payments as targeted by the NRCS working with their state technical committees.

Objective 2.3 Provide agricultural producers information and incentives on harvesting techniques that reduce bird mortality.

Implementation actions/timeline:
- To be initiated within 1 year of the publication of the conservation strategy.

Measures of success/monitoring responsibilities:
- Percent of affected acres treated. LWGs will monitor.

Key actors/participants:
- NRCS, Extension Service, local soil and water conservation districts and LWGs.

Resources needed:
- Farm bill incentive payments as targeted by the NRCS working with their state technical committees.

Objective 2.4 Identify the extent to which agricultural water management and infrastructure contributes to the threat of West Nile virus.

Implementation actions/timeline:
- To be initiated within 1 year of the publication of the conservation strategy.

Key actors/participants:
- Academia, APHIS, ARS

Goal 3: Adjust incentives to encourage the retention and restoration of sagebrush habitat.

Objective 3.1 Identify incentives that are counter-productive to the retention of sage-grouse habitat.

Implementation actions/timeline:

- To be initiated within 1 year of the publication of the conservation strategy.

Key actors/participants:

- NRCS, FSA, Extension Service, local soil and water conservation districts, NGOs and LWGs.

Objective 3.2 Modify and fund existing programs to encourage the retention of sage-grouse habitat (e.g. Grasslands Reserve Program, Landowner Incentive Program) and restoration of sage-grouse habitat (CRP).

Key actors/participants:

- NRCS, FSA, Extension Service, local soil and water conservation districts, NGOs and LWGs.

Objective 3.3 Prioritize re-enrollment of CRP lands providing habitat or adjacent to existing sage-grouse populations or other sensitive or declining species.

Key actors/participants:

- FSA, Extension Service, local soil and water conservation districts and LWGs.

SUB-ISSUE 5: Fences increase sage-grouse mortality

Problem Statement: Sage-grouse now occupy areas that have been modified by fencing. Sage-grouse mortalities have been attributed to collisions with fencing (Call and Maser 1985, Danvir 2002). Fences also provide perches for raptors and corvids, thus possibly increasing predation risks. Lastly, fencing may modify access and movements by humans and livestock, thereby possibly increasing levels of disturbance. Concomitantly, fencing provides a cost-effective mechanism to manage livestock distribution and improve range and habitat condition. More information is needed regarding measures or fencing modification that can be implemented to mitigate the potential mortality risks they constitute to sage-grouse.

Desired Condition: Fence design, siting, extent or modification will mitigate potential impacts on sage-grouse and enhance range or habitat conditions.

Goal 1: Summarize or quantify the direct and indirect effects of fences on sage-grouse

Objective 1.1: Compile and analyze all known accounts of direct and indirect impacts of fencing on sage grouse and similar species to identify high risk situations.

Implementation actions/timeline:
- To be initiated within 1 year of publication of the conservation strategy. The project would be completed within one year after initiation date.

Measures of success/monitoring responsibilities:
- Framework Team

Key actors/participants:
- University or consultant

Resources needed:
- $25,000

Goal 2: Compile all known efforts regarding fence design, siting or modifications that have been used to mitigate the potential effect of fences on sage-grouse.

Objective 2.1: Compile and analyze all known anecdotal observations, research and/or case studies regarding fence design, siting and modifications that have been implemented to mitigate the direct and indirect impacts of fencing on sage grouse and similar species.

Implementation actions/timeline:
- To be initiated within 1 year of publication of the conservation strategy. The project would be completed within one year after initiation date.

Measures of success/monitoring responsibilities:
- Framework Team

Key actors/participants:
- University or consultant

Resources needed: $25,000

Goal 3: Implement and evaluate/monitor the effectiveness of proposed fence design, siting and modifications on mitigation direct and indirect impacts on sage-grouse.

Objective 3.1 Conduct site specific evaluation of fence designs or modifications proposed to mitigate the direct and indirect impacts on sage-grouse. The site specific locations would be identified under Objective 1.1.

Implementation actions/timeline:
- To be initiated within 1 year after completion of Objectives 1 and 2.

Measures of success/monitoring responsibilities:
- Framework Team

Key actors/participants:
- University or consultant

Resources needed:
- $100,000 per location identified

Implementation actions/timeline:
- To be completed within 3 years after initiation.

Goal 4: Disseminate the results of the work conduct under Objectives 1-3.

Objective 4.1 Publish site-specific fencing best management recommendations regarding design, siting and modifications that demonstrate the greatest potential to mitigate the direct and indirect impacts on sage-grouse.

Implementation actions/timeline:
- To be initiated within 1 year after completion of Objectives 1.1, 2.1, and 3.1.

Measures of success/monitoring responsibilities:
- Framework Team

Key actors/participants:
- University or consultant

Resources needed:
- Included as part of the funding to conduct the evaluation contracts initiate under objective 3.1.

Objective 4.2 Promote and distribute site-specific fencing best management recommendations regarding design, siting and modifications that demonstrate the greatest potential to mitigate the direct and indirect impacts on sage-grouse.

Implementation actions/timeline:
- To be initiated within 1 year after completion of Objectives 1.1, 2.1, and 3.1.

Measures of success/monitoring responsibilities:
- Framework Team

SUB-ISSUE 6: Changes in surface hydrology.

Problem Statement: Human-constructed impediments to natural surface drainage present a possible, but poorly understood, threat to sagebrush ecosystems and Greater Sage- Grouse. Drainage impediments can reduce the input of water, nutrients and sediments, which help to sustain and recruit sagebrush.

Sagebrush habitats often (but not exclusively) occur in riparian areas, on fans, terraces, or in valley bottoms. The sagebrush ecosystem may be dependent on the input of water, nutrients and sediments from episodic precipitation events that promote overflow. Sagebrush systems are most productive in late spring and early summer, when precipitation and warm temperatures coincide (West 1983, cited in Connelly et al. (2004, pg. 7-18)).

The artificial diversion of water can result in a loss of either riparian or wet meadow habitats, and possibly affect the health of silver sage systems (From Discussion Paper).

Desired Condition: Properly functioning hydrologic systems that enhance sage-grouse populations or habitat conditions.

Goal 1: Determine the effects of water management on the sagebrush biome.

Objective 1.1: Assess climate records and other available data for selected locations in the sagebrush biome, for extreme precipitation events and runoff events that may have impacted sage-grouse or sagebrush.

Measures of success/monitoring responsibilities:
- Analysis of available climate information from all possible sources.

Key actors/participants:
- USGS, NOAA, Academia, Environment Canada

Resources needed:
- Facilitation, conference calls, materials, information.

Objective 2: Test the hypothesis of how changes in water management can increase the productivity of sagebrush ecosystems and enhance sage-grouse populations. This should include a detailed investigation in strategically-selected sagebrush habitats, to assess the importance of surface water flow (including nutrients and sediments) for the maintenance of sagebrush habitats.

Measures of success/monitoring responsibilities:
- Completion and distribution of research.

Key actors/participants:
- USGS, Academia, ARS, Environment Canada

SUB-ISSUE 7: Energy Corridors

Energy corridors, which may include pipelines (both above and below ground), high voltage transmission lines, associated facilities (pumping stations, compressors, etc.) and transportation systems (roads and railroads), are linear features of varying widths extending across large expanses of sagebrush habitat in some states. Section 368 of the Energy Policy Act of 2005 directs Federal agencies within 2 years to designate additional energy corridors on Federal land in 11 Western states for oil, gas and hydrogen pipelines and electricity transmission and distribution facilities.

Problem Statement: The placement of energy corridors and associated facilities within Greater sage-grouse habitat and the activities associated with these corridors may lead to negative impacts to Greater sage-grouse and sagebrush habitats.

Desired Condition: New energy corridors avoid or minimize impacts on Greater sage-grouse and sagebrush habitat. Impacts of existing corridors are mitigated.

Goal 1: Evaluate effects of existing energy corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.

Objective 1.1: Review existing research studies and monitoring data for effects of energy corridors and associated facilities on Greater sage-grouse or sagebrush habitat**.**

Implementation actions/timeline:
- Assemble review team (WAFWA Framework Team) – 1 month
- Team reviews existing studies and data – 3 months
- Team produces report summarizing key findings – 6 months

Measures of success/monitoring:
- Completion and publication of report

Key actors/participants:
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- NRCS
- DOE
- University research staff
- Utility and energy companies
- County weed boards

Milestones/monitoring:
- See timeline for milestones
- Progress monitored by WAFWA Framework Team

Resources needed:
- $100,000 to conduct review and publish report

Objective 1.2: Design and conduct additional research and monitoring studies to determine effects of existing and proposed energy corridors and associated facilities on sage-grouse and sagebrush habitat.

Implementation actions/timeline
- Identify research/monitoring team – 1 month
- Design research and monitoring studies – 12 months
- Obtain funding - 1-2 years
- Conduct research/monitoring – 2-5 years
- Report results – annually

Measures of success/monitoring
- Completion of research design
- Funding obtained
- Results reported

Key actors/participants
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- NRCS
- DOE
- University research staff
- Utility and energy companies
- County weed boards

Milestones/monitoring:
- See timeline, measures of success; monitoring by WAFWA Framework Team

Resources needed:
- $500,000/yr for design team and research

Goal 2: Based on research and monitoring data, develop consistent criteria and management guidelines to locate energy corridors and operate and maintain facilities within energy corridors that cross critical sage-grouse habitat in a manner that minimizes impacts to sage-grouse and sagebrush habitat.

Objective 2.1: Develop siting criteria and management guidelines for locating energy corridors and operating facilities within energy corridors to minimize impacts.

Implementation actions/timeline:
- Identify criteria and guidelines team – 1 month
- Team reviews existing research and monitoring data and report from Goal 1, Objective 1 – 1 month after report from Goal 1, Obj. 1
- Team develops criteria and guidelines to locate, operate and maintain energy corridors – 4 months
- Agencies, industry and stakeholders review criteria and guidelines – 1 month
- Agencies and industry incorporate criteria and guidelines into new corridor design – 6 months

Measures of success/monitoring:
- Completion of criteria and guidelines
- Incorporation of criteria and guidelines into new corridor designs

Key actors/participants:
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- DOE
- University research staff
- Utility and energy companies
- Local communities and working groups

Milestones/monitoring:
- See timeline for milestones; monitoring by WAFWA Framework Team

Resources needed:
- $30,000

Goal 3: Cooperatively develop and adopt appropriate mitigation measures and best management practices for constructing new facilities within energy corridors and conducting operation and maintenance activities associated with facilities within energy corridors that will minimize impacts to sage-grouse and sagebrush habitat.

Objective 3.1: Develop mitigation measures and best management practices for construction and operation of new facilities within energy corridors.

Implementation actions/timeline:
- Identify mitigation team – 1 month
- Team develops mitigation measures/BMPs based on existing research and monitoring, currently adopted criteria and management guidelines – 3 months
- Review by agencies, industry and stakeholders – 1 month
- Incorporate mitigation measures/BMPs into new corridor design – 6 months

Measures of success/monitoring:
- Development of mitigation measures/BMPs
- Incorporation of mitigation measures/BMPs within 6 months of development

Key actors/participants:
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- DOE
- University research staff
- Utility and energy companies
- County weed boards

Milestones/monitoring
- See timeline for milestones; monitoring by WAFWA Framework Team

Resources needed:
- $30,000

Goal 4: Cooperatively develop and implement appropriate monitoring plans to assess effects of new facilities within energy corridors on sage-grouse and sagebrush habitat and adjust mitigation measures and best management practices based on monitoring results.

Objective 4.1: Develop and implement monitoring plans to measure effects of facilities within energy corridors on sage-grouse and sagebrush habitats.

Implementation actions/timeline:
- Identify monitoring team – 1 month
- Design monitoring studies – 6 months
- Conduct monitoring – on-going
- Report results – annually

Measures of success/monitoring:
- Completion of monitoring design
- Annual reports completed

Key actors/participants
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- DOE
- University research staff
- Utility and energy companies
- County weed boards

Milestones/monitoring:
- See timeline, measures of success; monitoring by WAFWA Framework Team

Resources needed:
- $500,000/yr for monitoring

Objective 4.2: Adjust mitigation measures and BMPs based on monitoring results.

Implementation actions/timeline:
- Adjust mitigation measures and BMPs (as needed) – annually

Measures of success/monitoring
- Incorporation of new mitigation measures in operating plans.

Key actors/participants

- BLM State and Field Office staff
- USFS Region and Research Station staff
- DOE
- Utility and energy companies

Milestones/monitoring:

- See timeline, measures of success; monitoring by WAFWA Framework Team

Resources needed:

- Case-by-case

SUB-ISSUE 8: ROADS AND RAILROADS

Problem Statement: Placement, use, construction, and maintenance of roads and railroads in Greater sage-grouse habitat may lead to negative impacts to Greater sage grouse.

Desired Condition: Minimize or mitigate impacts of existing roads and railroads on Greater sage-grouse, and site new roads and railroads to avoid or minimize impacts to Greater sage-grouse.

Goal 1: Evaluate effects of existing roads, trails and railroad corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.

Objective 1.1: Review existing available published research and monitoring data for effects of roads and railroads sage-grouse, related species, or sagebrush habitat

Implementation actions/timeline
- Assemble review team (WAFWA Framework Team) – 1 month
- Team reviews existing studies and data – 3 months
- Team produces report summarizing key findings – 6 months

Measures of success/monitoring
- Completion of report

Key actors/participants:
- WAFWA Directors
- WAFWA Framework Team
- State DOTs
- County Highway and Road Depts.
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- NRCS
- DOE
- University research staff
- County weed boards
- WAFWA prairie grasslands coordinator
- Local working groups

Milestones/monitoring:
- See timeline for milestones
- Monitored by WAFWA Framework Team

Resources needed:
- 1-2 person team to review studies and develop report

Objective #2: Design and implement additional research and monitoring studies to fill information gaps related to effects of existing and potential roads or railroads on sage-grouse and sagebrush habitat.

Implementation actions/timeline
- Identify research/monitoring team – 1 month
- Design research and monitoring studies – 12 months
- Obtain funding - 1-2 years
- Conduct research/monitoring – 2-5 years
- Report results – annually

Measures of success/monitoring
- Completion of research design
- Funding obtained
- Results reported

Key actors/participants
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- State Dots
- County Highway Depts.
- U.S. Dept. of Transportation
- USFS Region and Research Station staff
- USGS research staff
- NRCS
- DOE
- University research staff
- County weed boards
- Local working groups
- Interstate Prairie Dog Coordinator

Milestones/monitoring:
- See timeline, measures of success; monitoring by WAFWA Framework Team

Resources needed:
- 3-4 person design team
- $30,000

Goal 2: Develop consistent criteria and management guidelines to locate, construct, maintain, or close roads and railroads, to minimize impacts to sage-grouse and sagebrush habitat.

Objective 2.1: Cooperatively develop management guidelines or best management practices for locating, constructing, maintaining, or closing roads, trails, and rail systems.

Implementation actions/timeline
- Identify criteria and guidelines team – 1 month
- Team reviews existing research and monitoring data and report from Goal 1, Objective 1 – 1 month after report from Goal 1, Obj. 1
- Team develops criteria and guidelines to locate, construct, maintain, or close roads and railroads – 4 months
- Agencies, industry and stakeholders review criteria and guidelines – 1 month
- Agencies incorporate criteria and guidelines into new road design – 6 months

Measures of success/monitoring
- Completion of criteria and guidelines
- Incorporation of criteria and guidelines into new road and railroad designs

Key actors/participants
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- DOE
- State DOTs
- County Highway and Road Depts.
- University research staff
- Local communities and working groups
- WAFWA prairie grasslands coordinator

Milestones/monitoring:
- See timeline for milestones; monitoring by WAFWA Framework Team

Resources needed:
- $30,000

Goal 3: Implement appropriate mitigation measures or best management practices for constructing and maintaining roads and railroads within sagebrush habitat that will minimize impacts to sage-grouse and sagebrush habitat.

Objective 3.1: Implement mitigation measures or best management practices for construction and maintenance of new roads and railroads.

Implementation actions/timeline:
- Identify mitigation team – 1 month
- Team develops mitigation measures/BMPs based on existing research and monitoring, currently adopted criteria and management guidelines – 3 months

- Review by agencies, industry and stakeholders – 1 month
- Incorporate mitigation measures/BMPs into new corridor design – 6 months

Measures of success/monitoring:
- Development of mitigation measures/BMPs
- Incorporation of mitigation measures/BMPs within 6 months of development

Key actors/participants
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- DOE
- University research staff
- County weed boards
- State DOTs
- County Highway and Road Depts.
- WAFWA prairie grasslands coordinator

Milestones/monitoring:
- See timeline for milestones; monitoring by WAFWA Framework Team

Resources needed:
- $50,000

Goal 4: Cooperatively develop monitoring plans to assess effects of roads and railroads and to measure effectiveness of BMPs and mitigation measures in minimizing effects of roads on sage-grouse and sagebrush habitat.

Objective 4.1: Develop monitoring plans to measure effectiveness of BMPs and mitigation measures in minimizing effects of roads and railroads on sage-grouse and sagebrush habitats.

Implementation actions/timeline
- Identify monitoring team – 1 month
- Design monitoring studies – 6 months
- Conduct monitoring – on-going
- Report results - annually

Measures of success/monitoring
- Completion of monitoring design
- Annual reports completed

Key actors/participants
- WAFWA Directors
- WAFWA Framework Team
- BLM State and Field Office staff
- USFS Region and Research Station staff
- USGS research staff
- DOE
- University research staff
- County weed boards
- State DOTs
- County Highway and Road Depts.
- WAFWA prairie grasslands coordinator

Milestones/monitoring:
- See timeline, measures of success; monitoring by WAFWA Framework Team

Resources needed:
- $100,000

Objective 4.2: Adjust mitigation measures and BMPs based on monitoring results.

Implementation actions/timeline:
- Adjust mitigation measures and BMPs (as needed) – annually

Measures of success/monitoring:
- Incorporation of new mitigation measures in operating plans.

Key actors/participants
- BLM State and Field Office staff
- USFS Region and Research Station staff
- DOE

Milestones/monitoring:

- See timeline, measures of success; monitoring by WAFWA Framework Team

SUB-ISSUE 9: TALL STRUCTURES

Tall structures – including power lines, communication towers, wind turbines, and other installations.

Problem Statement: Tall structures and associated activities in Greater sage-grouse habitat may lead to negative impacts on Greater sage-grouse.

Desired Condition: Existing and new tall structures have no or minimal impacts on Greater sage-grouse.

Goal 1: Compile and evaluate existing published research on effects to Greater sage-grouse due to direct impacts of existing tall structures.

Objective 1.1: Evaluate adequacy of existing research information to assess or predict potential direct impacts of tall structures.

Implementation actions/timeline:
- Compile existing research studies/reports – 06/07
- Formation of peer group evaluation team – 06/07
- Evaluation of research and report findings – 09/07

Measures of success/monitoring:
- Complete evaluation and report
- Publish report and widely communicate findings

Key actors/participants:
- Scientific research team (industry, university, and agency)

Milestones/monitoring:
- Evaluation report by 09/07

Resources needed:
- $30,000 for data search, review and reporting

Goal 2: Develop research protocols for conducting new studies to assess direct impacts of tall structures.

Objective 2.1: Develop peer reviewed and scientific protocols to assess impacts of tall structures and potential mitigation methods.

Implementation actions/timeline:
- Formation of peer group evaluation team – 10/07
- Development of research and mitigation assessment protocol methods – 2/08

Measures of success/monitoring:
- Development of research and mitigation assessment protocol methods

Key actors/participants:
- Scientific research team

Milestones/monitoring:
- Protocol methods by 2/08

Resources needed:
- $30,000 for development of protocols

Goal 3: Develop scientific and consistent siting and Operation & Maintenance (O&M) criteria for "tall structures" in Greater sage-grouse habitat that will minimize negative impacts on Greater sage-grouse.

Objective 3.1: Compile existing siting and O&M criteria or conditions in federal, state and local working group plans pertaining to tall structures.

Implementation actions/timeline:
- Compile and summarize existing siting and O&M criteria – 10/07

Measures of success/monitoring:
- Completion of data compilation

Key actors/participants:
- Research team

Milestones/monitoring:
- Completion of data search by 10/07

Resources needed:
- $30,000 for data compilation

Objective 3.2: Develop consistent siting guidelines for tall structures.

Implementation actions/timeline:
- Formation of technical group evaluation team – 10/07
- Development of siting guidelines and assessment methods – 2/08
- Development of research and mitigation assessment protocol methods

Measures of success/monitoring:
- Acceptance and implementation of guidelines

Key actors/participants:
- Industry
- USFWS, BLM, USFS
- Local working groups
- Researchers

Milestones/monitoring:
- Siting guidelines by 10/08
- $30,000 for development of siting guidelines

Goal 4: Develop best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with tall structures.

Objective 4.1: Cooperatively develop best management practices and appropriate mitigation measures.

Implementation actions/timeline:
- Formation of technical team – 10/07
- Development of BMPs and mitigation recommendations – 2/08

Measures of success/monitoring:
- Development of industry accepted BMP and mitigation methods

Key actors/participants:
- Industry
- USFWS, BLM, USFS
- Local working groups

Milestones/monitoring:
- BMP recommendations by 10/08

Resources needed:
- $30,000 for development of BMP/mitigation recommendations

SUB-ISSUE 10: Urban/Exurban Development

Problem Statement: Human populations have grown and expanded greatly over the past century, particularly in the western portion of the sagebrush biome. The footprint of exurban development (low-density development occurring beyond the limits of incorporated towns and cities) is now 5 to 10 times larger than the urban footprint. Although exurban development may continue to provide some sagebrush habitat in contrast to total urban conversion, the effects of fencing, power lines, road fragmentation, and disturbance from human dwellings and activities associated with exurban development render much of it inhospitable to sage-grouse and other wildlife dependent on sagebrush habitats.

Desired Condition: Impacts of urban and exurban development on Greater sage-grouse and their habitats are avoided or minimized.

Goal 1: Avoid or minimize incursion of urban and exurban development into greater sage-grouse habitats.

Objective 1.1: Identify sage-grouse habitats most at risk to urban and exurban development.

Implementation actions/timeline:
- Determine size of problem -- estimate current and anticipated future rate of loss of sage-grouse habitat to urban and exurban development -- 4/07
- Determine areas most at risk -- identify sage-grouse habitats likely to experience greatest growth in urban and exurban development -- 8/07
- Within at-risk areas, examine how communities are planning to accommodate growth in their county comprehensive plans or similar documents -- 8/07
- Complete analysis and report to agencies and public -- 12/07

Measures of success/monitoring:
- Completion of analysis and report
- Analysis is used to achieve Objective #2

Key actors/participants:
- Agency investigators or outside vendor
- Counties
- LWGs
- State fish and wildlife and land use agencies
- University/other experts in geography and demography

Milestones/monitoring:
- Evaluation report by 2/08

Resources needed:
- Funding for analysis and reporting

Objective 1.2: Promote efforts to maintain ecologically sustainable private lands and economically viable ranches in sage-grouse habitats.

Implementation actions/timeline:
- Within sage-grouse habitats at risk of urban/exurban development, identify tools available to maintain habitats on private lands, such as zoning, conservation easements, transferable development credits -- 6/08
- Make information on tools readily accessible to local jurisdictions, LWGs, stakeholders, and communities -- 12/08
- Encourage coordinated zoning among local communities and coordinated actions by land trusts -- 12/08
- Encourage clustered and other high density development to minimize loss of sage-grouse habitat.
- Build dialogue between ranchers and environmental organizations -- 12/08
- Conduct survey on cost of community services and make readily accessible to local jurisdictions to help them understand the cost differential between exurban development and ranching -- 6/08
- Identify funding sources and incentives to maintain sage grouse habitats on private lands

Measures of success/monitoring:
- Completion of implementation actions
- Economically viable and ecologically sustainable ranchlands in sage-grouse habitats are maintained

Key actors/participants:
- Agency or contract staff to conduct implementation actions
- Ranchers
- Environmental and conservation organizations
- LWGs
- Local officials
- State/provincial wildlife and land use agencies
- Land trusts

Milestones/monitoring:
- Biennial monitoring of ranchland acreage and urban/exurban development trends in at-risk sage-grouse habitats

Resources needed:
- Funding and/or staff for implementation actions

Objective 1.3: Develop and implement governmental land management agency land tenure policies to acquire, maintain, or enhance greater sage-grouse habitats.

Implementation actions/timeline:
- Identify lands with sage-grouse habitats at risk of disposal by governmental agencies.
- Review existing land tenure policies

- Develop criteria for land tenure adjustments for sage-grouse habitat.
- Modify policies/plans to incorporate criteria.
- Identify sources to fund land tenure adjustments

Measures of success/monitoring:
- Policies modified and criteria incorporated into plans
- Acres conserved

Key actors/participants:
- Agency personnel
- Counties
- LWGs
- Elected officials

Milestones/monitoring:
- Annual report of acres conserved

Resources needed:
- Funding for land tenure adjustments

SUB-ISSUE 11: Dispersed Recreation (Effects on Greater sage-grouse and their habitats)

Definition: Dispersed Recreation-Any recreational activity that displaces or disturbs greater sage-grouse or negatively affects their habitats. This includes but is not limited to use of ATV's, ORVs, bicycles, hiking (with or without pets), shed antler searches, skiing (and other related snow activities), camping (outside of established camp grounds), etc.

Problem Statement: Greater sage-grouse and habitat used by the species can be negatively impacted by dispersed recreational activities.

Goal 1: Manage dispersed recreational activities to avoid, reduce, and where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.

Objective 1.1: Review what is known about impacts of dispersed recreation on greater sage-grouse.

Implementation actions/timeline:
- Identify scope of review, methods, etc. by 1 October 2006.
- Secure funding and political support for review by 1 December
- 2006.
- Complete review and report to agencies and public (allow for
- public review) by 31 December 2007.

Measures of success/monitoring responsibilities:
- Completion of review and report
- Report is used by agencies to resolve issue.

Key actors/participants:
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors
- USFS Regional Offices/Directors
- NRCS
- SCDs
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring:
- See timelines for milestones
- Monitored by WAFWA Framework Team

Resources needed:
- 1-3 investigators
  $300,000.00

Objective 1.2: Review what is known about effects of dispersed recreational activities on greater sage-grouse habitat.

Implementation actions/timeline:
- Identify scope of review, methods, etc. by 1 October 2006.
- Secure funding and political support for review by 1 December 2006.
- Complete review and report to agencies and public (allow for public review) by 31 December 2007.

Measures of success/monitoring responsibilities:
- Completion of review and report
- Report is used by agencies to resolve issue.

Key actors/participants:
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors
- USFS Regional Offices/Directors
- NRCS
- Scads
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring:
- See timelines for milestones
- Monitored by WAFWA Framework Team

Resources needed:
- 1-3 investigators
- $300,000.00

Objective 1.3: Develop management practices to avoid, reduce, or eliminate disturbance to or displacement of greater sage-grouse and effects to greater sage-grouse habitat from dispersed recreational activities.

Implementation actions/timeline:
- Secure funding for developing management practices by 1 February 2008.
- Develop management practices by 1 July 2008.
- Present management practices to agencies and public (allow for public review) by 1 July 2008.

Measures of success/monitoring responsibilities:
- Completion of preparation of management practices.
- Management practices are used by agencies to resolve issue.

Key actors/participants:
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors
- USFS Regional Offices/Directors
- NRCS

- Scads
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring:
- See timelines for milestones
- Monitored by WAFWA Framework Team

Resources needed:
- 1-3 investigators
- $300,000.00

Objective1. 4: Implement management practices to avoid, reduce, or eliminate negative impacts of recreational activities on greater sage-grouse and their habitat.

Implementation actions/timeline:
- Implement management practices by 1 October 2008.

Measures of success/monitoring responsibilities:
- Amount of habitat protected by management practices
- WAFWA Framework Team and Agencies

Key actors/participants:
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors
- USFS Regional Offices/Directors
- NRCS
- Scads
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring:
- Reports of disturbance or displacement of greater sage-grouse decrease by 75% starting 1 October 2008.
- Documented impacts to greater sage-grouse habitat due to dispersed recreational activities decreases by 75%.
- Monitored by WAFWA Framework Team.

Resources needed:
- Agency compliance.
- $300,000.00 per year for preparation and implementation of management plans.

SUB ISSUE 1: Non-renewable resources

Problem Statement: Potential impacts to Greater Sage-grouse and sagebrush habitats from the recovery of 'non-renewable' resources (oil, gas, coal-bed methane, natural gas, geothermal, metallic and non-metallic minerals, *etc*.) include direct habitat loss, habitat fragmentation from vegetation removal, roads, powerlines, and pipeline corridors, noise, air quality, changes in water availability and quality, and increased human presence.

Surface mining of mineral resources (coal, uranium, copper, bentonite, gypsum, oil shale, phosphate, limestone, aggregates, *etc*) results in direct habitat loss for sage-grouse if the mining occurs in occupied sagebrush habitats.

1. *Non-Renewable Energy Activities*
    a. *Oil/Gas/CBM – resource typically recovered through 'solution or fluid' recovery (wells) (in situ mining)*
    b. *Surface Coal/Oil Shale/Tar Sands – resource typically recovered through surface mining*

2. *Metallic/Non-metallic Minerals – resource typically recovered through surface mining*

The basis for this distinction, and in a practical sense, 1b and 2 are very similar, was both generally regulatory structure and 'disturbance' or facilities. Surface mining activities are generally localized and have 'support facilities' (roads, powerlines) feeding them while the hydrocarbon recovery activities tend to have more 'weblike' or link and node facilities (wells, pumps, pipelines, compressors) over much larger areas

Goal 1: Enhanced Greater Sage-grouse habitats and populations, with assurance of no 'net loss'[1] of habitat or grouse populations, at an appropriate spatial and temporal scale, while providing for non-renewable resource development and utilization.

Objective 1.1: Develop no 'net loss' criteria and methods to accurately assess current habitat/population status, potential impacts and mitigation needs (e.g. habitat equivalency, mitigation ratios, mitigation banking), and mechanisms for implementation. *The Framework Team needs to apply across all land uses.*

Implementation actions/timeline:

- WAFWA contracts independent experts to develop criteria to define no 'net loss' (modeled roughly after Section 404 CWA) by DATE.
    - Develop a uniform methodology to evaluate potential impacts and mitigation needs based on established criteria by DATE.
    - Criteria and methodology are incorporated into rangewide policy/strategy by DATE.
    - Federal, state, provincial, tribal entities develop policy and associated guidance and the framework (banking/trading system) to enable to implement by DATE.
- Incorporate habitat/population status assessment methodologies when developed by science forum (see Science objective)

[1] No 'net loss' as envisioned here, does not preclude, indeed embraces, other conservation practices and actions (e.g. CCAs, etc.). It includes the ability to develop and implement other instruments.

Considerations for Implementation:
- Mitigation actions for specific resource recovery projects should be selected from Local Working Group and State Plan projects lists (or at least first screening against such lists)
- Develop aspects of alternative habitat creation (e.g. surrogate leks, etc)
- Ensure reclamation plans and release criteria for reclamation financial assurances include sage-grouse habitat aspects; habitat enhancement practices
- Water availability, water impoundment, water quality (effect on plants, soils, and animals), hydrologic regimes, etc.

Measures of success/monitoring responsibilities:
- Favorable trend in AREA of available habitat and ABUNDANCE of Greater Sage-grouse
- Monitoring systems (as developed elsewhere)

Key participants:
- WAFWA
- Land Grant Universities/Cooperative Extension
- Minerals and Energy Fuels Industry and Organizations
- Natural Resource Consultants (Wildlife, Land Reclamation, Engineering, *etc)*
- Natural Resources Conservation Service
- US Fish and Wildlife Service
- Bureau of Land Management (and Resource Advisory Councils)
- US Forest Service
- US Geological Survey
- State Wildlife Agencies
- Tribes and Tribal Entities
- Local Working Groups
- Certain Conservation Organizations
- (Center for Doing Really Great Things) – Framework Team needs to use consistent terminology for this concept

Milestones/monitoring:
- Monitoring systems (as developed elsewhere)

Objective 1.2: Synthesize existing and develop new technologies and practices that off-set, reduce and/or minimize disturbance associated with resource recovery activities. Disseminate technologies and practices through a central repository.

Implementation actions/timeline:
- Establish and staff (Center for Doing Really Great Things) – Jun06
- Center includes or supports 'repository'
- Center includes quality control/quality assurance system
- Conduct literature and practices review – Dec06
- Identify research and information needs – Jan07
- Develop and implement research programs - Ongoing
- Prepare 'technology transfer' system – Apr07

- Prepare 'best practices manual(s),' standards and guidelines, and related products – Apr07
- Implement technology transfer program – May07
- Evaluate products and update/revise as needed - Ongoing

Measures of success/monitoring responsibilities:
- Favorable trend in AREA of available habitat and ABUNDANCE of Greater Sage-grouse

Key participants:
- WAFWA
- Land Grant Universities/Cooperative Extension
- Minerals and Energy Fuels Industry and Organizations
- Equipment Manufacturers
- Natural Resource Consultants (Wildlife, Land Reclamation, Engineering, *etc)*
- Natural Resources Conservation Service
- US Fish and Wildlife Service
- Bureau of Land Management
- US Forest Service
- US Geological Survey
- State Wildlife Agencies
- Tribes and Tribal Entities
- Local Working Groups
- Certain Conservation Organizations
- Center for Doing Really Great Things

Resources needed:
- Center for Doing Really Great Things
- Appropriate budget
- Appropriate staff and associated resources

Objective 1.3: Develop and implement voluntary incentive programs for mitigation.[2]

Implementation actions/timeline:
- Develop mechanism for evaluation, selection, and establishment of 'core areas' or 'seed sources' (to serve as re-colonization sources) adjacent to or within project areas
- Develop framework and guidance for project 'develop planning'
- Periodic coordination meetings (AMONGST WHOM?) specific to activities/projects (Public and Private Lands)

Measures of success/monitoring responsibilities:
- Favorable trend in AREA of available habitat and ABUNDANCE of Greater Sage-grouse

[2] This is a transitional instrument until the no 'net loss' system is in place and functional.

Key participants:
- WAFWA
- Federal, State, and Local Governments
- Minerals and Energy Fuels Industry and Organizations
- Equipment Manufacturers
- Natural Resource Consultants (Wildlife, Land Reclamation, Engineering, *etc)*
- Natural Resources Conservation Service
- US Fish and Wildlife Service
- Bureau of Land Management
- US Forest Service
- US Geological Survey
- State Wildlife Agencies
- Tribes and Tribal Entities
- Local Working Groups
- Certain Conservation Organizations
- Center for Doing Really Great Things

Milestones/monitoring:
- Monitoring systems (as developed elsewhere)

ISSUE: HABITAT RESTORATION

Problem Statement

Schroeder et. al. (2004) determined that the pre-settlement distribution of Greater sage-grouse encompassed 1.2 million square kilometers in western North America. The current occupied range of the Greater sage-grouse covers 668,412 square kilometers. This represents approximately 56% of the historically occupied range of the species. The loss of 44% of Greater sage-grouse range and the fragmentation/habitat degradation of remaining range poses great challenges for the perpetuation of the species.

Critical elements of the effort to ensure continued existence of Greater sage-grouse are the *conservation of important habitat and technical capability to reliably re-establish degraded habitat.* This capability includes not only ecologically sound treatment techniques and management practices, but also the production and availability of genetically appropriate plant materials.

Assumptions

The "Habitat Restoration Sub-team" is assuming that we are only to develop strategies, not to implement them. This strategy specifically focuses on the vegetation and soil treatment aspects of re-establishment of degraded, historic Greater sage-grouse range. Proposed resolution of this issue is comprised of several elements including identification of areas suitable and available for rehabilitation, stabilization of the loss of habitat, actual habitat restoration, identification of plant material supply needs (commercial production, genetics, etc.), planting and establishment technology needs, and monitoring and management practices.

A temporal context was established for achievement of the Goals and Objectives: short-term (1-5 years for achievement), mid-term (6-20 years), and long-term (more than 21 years for achievement).

Many of the objectives and recommendations include development of protocols, criteria, and assessment tools. Because of the variability of the ecological attributes across the entire range, many of these recommendations would be best developed and addressed in the 7 subregions of the sagebrush biome to be reflecting this variability.

Because there is substantial work in progress related to this topic, a key first implementation step should include considering and building upon those ongoing efforts. For example, The Great Basing Restoration Initiative (BLM); The Coordinated Intermountain Restoration Project (USGS); assessment and monitoring protocols being applied by BLM, state agencies, and other partners.

We have taken the liberty of identifying a lead point of contact, where it seemed logical or appropriate.

Definitions:

Quality sagebrush habitat that meets the needs of sage-grouse has been described by Connelly et al (2000) in the Guidelines to manage greater sage-grouse and their habitats as:

Season	Vegetative Cover		Vegetation Height		Area containing suitable habitat
	Sagebrush	Grasses /Forbs	Sagebrush	Grasses /Forbs	
Breeding	15-25%	>15%	12-32 inches	>7 inches	>80%
Brood-rearing	10-25%	>15%	12-32 inches	Variable	>40%
Winter (above snow)	10-30%	Variable	10-14 inches	Variable	>80%

All restoration efforts should consider cumulative impacts of planned treatments and unplanned wildfires, as well as the typical time interval needed for suitable habitats to become re-established (>25 years in some habitat types).

Restoration: Ecological restoration is the process of assisting the recovery of an ecosystem that has been degraded, damaged, or destroyed. An ecosystem is recovered or restored when it contains sufficient biotic and abiotic resources to continue its development without further assistance or subsidy (per SER).

SUB-ISSUE: Conifer Encroachment

Problem Statement: The increase in the distribution and density of conifer forests and woodlands (e.g., ponderosa pine, Douglas fir, pinyon pine, and juniper) has been identified as a significant threat to the sagebrush ecosystem. These forests and woodlands have expanded greatly when compared to their distribution >150 yrs ago as a result of ecological changes associated with a decrease in fire frequencies, increased fire suppression, changes in the climatic regime, historical patterns of livestock grazing, and increase in atmospheric CO_2. Although there is uncertainty in the results, modeling the effects of climate change in the Great Basin indicates continued expansion of pinyon-juniper woodlands due to projected increased precipitation. Recent work also indicates that an increasing conifer overstory is associated with an increase in the occurrence of invasive species prior to fire occurrence. Collectively, these changes are defined as encroachment of woodlands and recognized as a significant management concern related to sage grouse in some areas.

Desired Condition: Encroachment of conifer forests and woodlands into existing sagebrush cover types is managed to maintain habitat for greater sage-grouse while sustaining populations of other species of conservation concern.

Challenges to developing a successful strategy (policy, logistics): Reducing the threat posed by conifers to sagebrush is complicated by decreasing fire frequencies, increasing fire suppression, and changes in the climatic regime. Management of conifer encroachment is likely to be effective with an aggressive program of prescribed burning and mechanical treatment. However, use of fire may increase the threat of invasion by cheatgrass and there is often limited public acceptance of prescribed fire. Mechanical control of conifers may be needed to mitigate the threat of sagebrush loss but it is expensive to implement and there is limited public acceptance of some techniques (e.g., chaining). Control of these woody species through harvesting for biofuel for generation of electricity may be effective but the process is currently not economically viable.

Goal 1: (Short term) Identify and map the current extent and future threat of encroachment of conifer species within greater sage-grouse habitats.

Objective 1.1: Develop accurate maps of current distribution and composition of conifer species in proximity to greater sage-grouse habitats by 2009.

Implementation actions/timeline:
- Integrate data resources from the LANDFIRE comprehensive mapping effort currently underway and supported by the USDA Forest Service Fire Lab, USGS and The Nature Conservancy.
- Validate maps with field data
- Develop and incorporate information relating to stand age, canopy cover, snag density, soil site potential, stand density, overstory species.
- Develop definition of old-growth pinyon-juniper and other conifer species
- Identify sites within the range of greater sage-grouse that support old-growth pinyon-juniper, and other conifer species, that provide essential habitat for woodland-associated species of conservation concern.

Measures of success/monitoring responsibilities:
- Development of map by 2009
- Distribution of map and associate metadata (e.g., web and print versions)

Key actors/participants:
- USDA Forest Service
- USDI BLM
- USGS
- National Park Service
- The Nature Conservancy
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- State and Provincial Departments of Land
- State Natural Heritage Programs
- Cooperative Extension

Milestones/monitoring:
- Revision of map to include management actions, wildfire, prescribed burns, insect infestations, rust and disease occurrences, and frost kill by 2012

Resources needed:
- Cost estimate ($50,000)

Objective 1.2: (Short term) Develop, apply, and evaluate models to provide spatial estimates of risk of encroachment of conifer species by 2010.

Implementation actions/timeline:
- Determine the effectiveness of the Suring et. al. (2005) model to estimate the risk of pinyon-juniper displacement of sagebrush and modify, as necessary by 2008.

- Identify existing land cover maps that portray the distribution of conifer species in sagebrush habitats throughout the range of greater sage-grouse by 2007.
- Apply the revised Suring et al. (2005) model throughout the range of greater sage-grouse by 2008.
- Evaluate the effects of drought and insects on conifer species in sagebrush habitats throughout the range of greater sage-grouse.

Measures of success/monitoring responsibilities:
- Maps of estimated risk of encroachment in use by 2008

Key actors/participants:
- USDI BLM
- USDA Forest Service
- USGS
- Cooperative Extension
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- State and Provincial Departments of Land

Milestones/monitoring:
- Revise models periodically based on information collected from ongoing or recently completed management projects and/or research

Resources needed:
- Based on mapping, determine projected treatment needs, timelines, resources needed and implementation costs

Goal 2: In order to support defensible and well-informed resource management decisions to benefit sage grouse, synthesize information on the habitat relationships of wildlife associated with pinyon-juniper and other conifers (all phases) which have invaded sagebrush habitats.

Objective 2.1: (Short term) Initiate a comprehensive synthesis of habitat relationships for plant and animal species of concern (e.g., ferruginous hawk, gray vireo, juniper titmouse, pinyon jay) to define high-quality habitat and identify species needs associated with conifer encroachment by 2008.

Implementation actions/timeline:
- Review best available data and information on habitat needs of aforementioned species of concern
- Refer to map product from Goal #1, Objective #1 to determine the most likely areas in which the species of concern would inhabit and designate as potential suitable habitat
- Amend map to include this information
- Review site records or PIF inventories for those areas
- Conduct physical survey and inventory if little historic record is available

Measures of success/monitoring responsibilities:
- Completion of summary document within two years of initiation

Key actors/participants:
- Forest Service
- Bureau of Land Management
- USGS Biological Resources Discipline
- Universities

Milestones/monitoring:
- Completion of a map of conifer encroachment in sage-grouse habitats with areas identified as potentially suitable for species of concern
- Physical survey and inventory completed to ground truth model
- Wide distribution of information

Resources needed:
- Approximately $75,000 for the two year project

Objective 2.2: (Short term) Based on information gaps identified under objective 1, initiate research and/or monitoring to fill these gaps about species of concern by 2010.

Key actors/participants:
- Forest Service
- Bureau of Land Management
- USGS Biological Resources Discipline
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- Universities
- Partners In Flight
- Audubon

Objective 2.3: (Short term) Incorporate the results of these studies into plans (e.g. LWGs, LUPs, statewide plans, NEPA analyses) to manage conifer encroachment into greater sage-grouse habitat.

Implementation actions/timeline:
- Ensure that information is disseminated to LWGs, state resource agencies, and federal land management agencies
- Application of findings to subsequent projects' NEPA analyses

Measures of success/monitoring responsibilities:
- Incorporation of findings into LUPs and plan amendments

Key actors/participants:
- USDI BLM
- USDA Forest Service
- USGS
- State and Provincial Wildlife Management Agencies
- Local Working Groups

Objective 2.4: (Short term): Initiate research and/or monitoring to understand the effects of management actions on the species of concern and their habitats by 2010

Implementation actions/timeline:
- Carefully identify species of concern by ecoregion and assess quantifiable and qualifiable habitat attributes

Key actors/participants:
- Forest Service
- Bureau of Land Management
- USGS Biological Resources Discipline
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- Universities
- Natural Heritage Programs
- Partners In Flight
- Audubon

Resources needed:
- Approximately $150,000 to complete four year study

Goal 3: Develop and implement control measures for encroaching conifer species within greater sage-grouse habitat.

Objective #3.1: (Short term) Identify by 2010 sites of conifer encroachment that still have an understory of sagebrush and native perennial species and treat (this objective may need some work since we said in our goal statement that we would "develop **and implement** control measures"; assign a high priority for treatment since they have higher likelihood of successful rehabilitation than areas where the sagebrush understory has been depleted.

Implementation actions/timeline:
- Implementation of mechanical treatments
- Implement hand thinning using chainsaws in areas where slopes limit mechanical operation and in cultural or wildlife sensitive habitats
- Implementation of prescribed burns in high elevation, mountain sagebrush sites

Measures of success/monitoring responsibilities:
- Response of vegetation to control measures

Key actors/participants:
- USDI BLM
- USDA Forest Service
- USFWS
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- LWGs

Milestones/monitoring:
- 150,000 – 200,000 acres of greater sage-grouse habitat are crossing the woodland encroachment threshold annually; this should be reduced to 0.

Resources needed:
- $100,000,000 to effectively treat 200,000 acres of woodland encroached sagebrush habitats at $500/acre

Objective 3.2: (Short-term) Identify by 2010 former sagebrush sites with a conifer overstory that have a depleted sagebrush and native perennial herbaceous understory; develop specific restoration plans that maximize removal of encroaching species and recovery of sagebrush and associated understory species.

Implementation actions/timeline:
- Implement treatments in a study plot design using mechanical, hand, or prescribed burning in appropriate sites
- Consider seeding random plots after project is completed with appropriate number of control plots
- Rest treated area from livestock grazing for an appropriate period of time

Measures of success/monitoring responsibilities:

- Development of effective treatment methods to deal with woodland invaded sagebrush sites in this condition

Key actors/participants:

- USDA Forest Service
- USDI BLM
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies

Objective 3.3: (Mid term) Initiate research to identify effective integrated treatment methods (e.g., fire, mechanical treatment, herbicides) and apply those methods where appropriate by 2015.

Implementation actions/timeline:

- Measures of success/monitoring responsibilities
- Key actors/participants
- Milestones/monitoring
- Resources needed

Objective 4.4: (Short term) Based on an evaluation of current practices and guidance, refine and implement guidelines for reducing negative impacts of conifer control activities on greater sage-grouse populations and their habitats by 2007.

Implementation actions/timeline:

- Do not conduct any vegetation treatments during lekking, nesting and early-brood rearing periods when sage-grouse are present
- Implement treatment plans for control of conifer species that ensure control of cheatgrass and other invasive weed species in greater sage-grouse habitats.
- Ensure adequate measures are included in restoration plans to replace the cheatgrass understory with perennial species using approved reseeding strategies.
- Discourage the use of prescribed fire in the elevational "gray" area between Wyoming big sagebrush (*wyomingensis*) and mountain big sagebrush (*vaseyana*).

Goal 4: Develop and implement a long-term monitoring program designed to evaluate the effectiveness of methods to control conifer encroachment into greater sage-grouse habitat.

Objective 4.1: (Long term) Develop common protocols and standardized procedures by 2008 for recording treatments and results of monitoring efforts.

Implementation actions/timeline:

- Inventory current ongoing protocols, procedures and treatment methodologies
- Develop additional protocols as necessary
- Evaluate monitoring protocols currently in use for conifer removal
- Publish reports describing effective practices

Measures of success/monitoring responsibilities:
- Key actors/participants
- Milestones/monitoring
- Resources needed

Objective 4.2: (Short term) Develop a rangewide common database by 2007 where managers and researchers can record completed and ongoing pinyon, juniper and other coniferous species removal projects.

Implementation actions/timeline:
- Inventory current databases
- Assess whether or not this task will be appropriate for the Project Locator Database
- Develop a database within SAGEMAP if not applicable to Project Locator Database
- Market this tool to agencies, local working groups, and interested publics
- Develop a synopsis/summary of results that may be retrieved and viewed via a user-friendly process

Measures of success/monitoring responsibilities:
- Development of database

Key actors/participants:
- USGS
- USDI BLM
- USDA Forest Service
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- Local Working Groups

Milestones/monitoring:
- Track and evaluate the number of times the database is accessed

Goal 5: Integrate and coordinate conifer control efforts within greater sage-grouse habitat to increase effectiveness.

Objective 5.1: (Short term) Develop partnerships among regional public and private land management entities by 2008 to develop and implement identified objectives.

Implementation actions/timeline:
- Implement or amend existing MOU or MOA among agencies and other interested organizations to address the management of conifer species in sagebrush habitats.
- Hold a workshop that includes professionals from various federal and state agencies (especially fuels management personnel), conservation organizations, counties, as well as interested landowners dealing with encroachment issues to encourage coordinated efforts.
- Solicit involvement of local land management specialists, private landowners, wildlife biologists, and range ecologists to share knowledge and responsibilities on conifer encroachment issues.

Measures of success/monitoring responsibilities:
- Successful completion of multiple projects across jurisdictional boundaries
- Cost sharing to fund projects

Key actors/participants:
- USDI BLM
- USDA Forest Service
- National Park Service
- USFWS
- State and Provincial Wildlife Management Agencies
- State and Provincial Forestry Agencies
- State and Provincial Departments of Land
- State Natural Heritage Programs
- The Nature Conservancy
- Sierra Club
- National Audubon Society
- Intermountain West Joint Venture
- Cooperative Extension

Objective 5.2: (Short term) Develop and conduct integrated training on the management of conifer encroachment by 2008 (including mechanisms for encroachment, ecological conditions that facilitate encroachment, and methods of treating encroachments).

Implementation actions/timeline:
- Develop agenda
- Identification of experts needed to successfully implement workshop
- Identification of location and venue to hold workshop

Measures of success/monitoring responsibilities
- Participation by agency specialists

Key actors/participants:
- State and federal agencies
- Local experiment stations
- Local (county) weed districts

Milestones/monitoring:
- Implement at least one workshop every two years

Goal 6: Increase the efficiency/efficacy of conducting conifer removal in greater sage-grouse habitats.

Objective 6.1 (Mid term): Develop incentives by 2015 for private contractors to remove encroaching conifers to accomplish sage grouse habitat improvement objectives across all land ownerships

Implementation actions/timeline:
- Explore/create markets for resulting products such as chips for composting/landscaping or electric power co-generation

Key actors/participants:
- State and federal agencies
- Local experiment stations
- Local (county) weed districts
- Industry

Objective 6.2: (Mid term): Expand and promote incentives for conifer removal on private lands for improving sage grouse habitat

Implementation actions;
- Utilize and increase the scope and funding of existing Farm Bill authorities and budgets toward this objective

Objective 6.3: Increase availability of equipment (such as masticators, grinders, chippers) within agencies and to operators by 2009 (see subissue strategy related to planting expertise for specifics).

Objective 6.4: (Short, Mid, and Long term): Promote programmatic integration of wildland fire & fuels management planning and implementation with conifer treatment activities at local, regional, and rangewide scales

Implementation actions:
- Develop and implement interagency policies to require integration
- Designate liaison positions to assure communication & coordination between fire organization and resources goals
- Conduct coordinated plans which address fire& fuels management activities integrated with sage-grouse habitat restoration goals

Objective 6.5: (Short term): Improve the ability by 2008 of federal agencies to meet their mandates for environmental and archaeological reviews of sites proposed for conifer removal in a timely manner.

Implementation actions/timeline:
- Pursue activities such as block cultural inventories and programmatic NEPA analyses to streamline decisions and actions
- Pursue actions to facilitate streamlined and programmatic Section 7 consultations

Goal 7: Streamline procurement and contracting procedures to facilitate timely and effective interagency conifer treatments and other restoration activities

Objective 7.1: Evaluate and modify existing procedures to streamline procurement and contracting and to facilitate seamless interagency programs

Objective 7.2: Increase procurement and contracting staffing

Objective 7.3: Increase trained field staff to serve as contract administrators, inspectors, and contracting officer representatives (COR)

SUB-ISSUE 2: Range-wide habitat restoration assessment & planning

GOAL 1: Establish a realistic extent (acres and/or percentage of historic) of range that can be restored to support the needs of sage-grouse by December 2006.

Objective 1.1 (short-term): Standardize a protocol for characterizing the restoration potential of particular habitats that have been degraded.

Implementation Actions:
- Review Existing Frameworks to Assist in Making Sensitive Species Habitat Assessments (see BLM-Administered Public Lands in Idaho, Sather-Blair et. al. 2000)(see Owyhee Uplands Pilot Project; Utah Restoration Initiative)
- Determine vegetation classification map that will be used as a base map
- Develop assessment rules and determine the tools that are available:
  - determine the appropriate scale for assessing restoration potential
  - determine if restoration can be accomplished via management changes OR if active intervention is necessary
- Locate and develop a pilot program for rapid assessment of restoration potential with some level of ground-trusting integrated into design. Program should include areas which are representative of the variability of ecological sites across the range.
- Based on pilot program outcomes, develop and apply rapid assessment methods across the range.

Measures of Success:
- Agreement on vegetation classification map
- Completion of pilot project

Key Participants:
- Bureau of Land Management
- USFS
- USGS
- NRCS

Objective 1.2 (short-term): Determine area of historic range (acres) that is "unlikely" to be restored without substantial mechanical involvement or cost by 12/2006. Do this in consort with LWGs.

Implementation Actions:
- Develop criteria to determine how an area is considered "unlikely" to be restored and what is cost prohibitive.
- Review work of Wisdom et. al. to evaluate work that has already been completed (Wisdom, M.J., L.H. Suring, M.M. Rowland, R.J. Tausch, R.F. Miller, L. Schuek, C. Wolff Meinke, S.T. Knick, B.C. Wales. 2003. A prototype regional assessment of habitats for species of conservation concern in the Great Basin Ecoregion and state of Nevada. Version 1.1, September 2003. Unpublished report. USDA Forest Service, Pacific Northwest Research Station. La Grande, OR).
- Review Sagemap and Sagestitch for related work.

- Conduct spatial analysis of habitats that have been lost to the following various factors and are unlikely to be restored:

Urban/Suburban Development	Highways/paved surfaces
Agriculture	Transmission Lines/Pipelines
Infrastructure	Mining (active, reclaimed)
Water Impoundment	Cheatgrass/Annual Invasive
Wildfire	Dominated Sites

- Define scope and scale of map.
- Develop a map of those areas in which restoration is not feasible.

Measures of Success:
- Completion of Map and associated documents (including, but not limited to, a synopsis of area lost by causative factor)
- Provide map as an online resource.

Key Participants:
- USGS, BLM, USFS, NRCS
- State Wildlife Agencies & agencies with automated resources data
- LWGs

Time Frame:
- Initiate Draft Map and metadata by 6/2006
- Complete Draft Map and associated documentation by 10/2006
- Apply feedback and revise map by 12/2007 (map is dynamic and a work in progress)

Resources Needed:
- Conservation Assessment
- Sagemap
- Wisdom et. al.
- BLM Mining Inventory Maps

Objective 1.3 (short-term): Determine the number of acres or percentage of range that is likely to be restored with adjustments in management, limited mechanical involvement, and/or reasonable cost.

Implementation Actions:
- Develop criteria to determine how an area is considered “likely” to be restored and what reasonable costs are (per acre or other basis).
    - Evaluate if current management practices are conducive to maintenance or restoration of desired habitat conditions;
    - Determine if restoration can be accomplished via management changes OR if active intervention is necessary
- Review Framework to Assist in Making Sensitive Species Habitat Assessments for BLM-Administered Public Lands in Idaho (Sather-Blair et. al. 2000).
- Conduct spatial analysis of habitats that have been lost to the following various factors and are likely to be restored:

Wildfire	Prescribed Fire
Agriculture	Mining
Pinyon/Juniper Expansion	

- Define scope and scale of map.
- Develop a map of those areas in which restoration is feasible
- Compare map with results of VegSpec (CIRP)

Measures of Success:
- Completion of Map and associated documents (including, but not limited to, a synopsis of area lost by causative factor)

Key Participants:
- USGS, BLM, USFS, NRCS
- State Wildlife Agencies

Time Frame:
- Initiate Draft Map and metadata by 6/2006
- Complete Draft Map and associated documentation by 10/2006
- Apply feedback and revise map by 12/2007 (map is dynamic and a work in progress)

Resources Needed:
- Completion of VegSpec – a computer program that is a restoration expert system (CIRP)

GOAL 2: Ensure that restoration techniques are ecologically sound and attainable.

Objective 2.1 (short-term): Determine desired future condition: What attributes are we seeking

Implementation Actions:
- Clarify and define desired future habitat conditions based on 7 subregions and life cycle requirements of sage grouse.
- Using best available science & technology, develop and disseminate best practices about ecologically sound methods. These may need to be defined based on a more regional or state-level basis because there is ecological variability across the range.
- Develop and implement monitoring and evaluation to determine if practices are meeting desired condition objectives

Key Participants:
- Management agencies: state & federal & local
- Scientific community: USGS, Academic institutions

Objective 2.2 (short-term): Establish a user guide to restoring sagebrush habitats based on information currently available (is this CIRP?).

Implementation Actions:
- Select a group of experts to write the document
- Consult the Guidelines to manage sage-grouse populations and their habitat (Connelly et. al. 2004) for recommendations regarding sage-grouse habitat restoration.

Measures of Success:
- Identification and progress towards transitioning degraded sites into quality sagebrush habitats.

Key Participants:
- Federal Land Management Agencies
- State Wildlife Agencies
- Provincial Wildlife Agencies
- Consulting Firms

Time Frame:
- Complete draft document by 12/2007
- Complete final document by 6/2008

Objective 2.3 (long-term): Support technical assistance and workshops that demonstrate restoration efforts that worked and did not work.

Implementation Actions:
- Develop a cadre of dedicated restoration specialists to conduct trainings and on-site technical assistance on restoration methods. This cadre should be focused and organized based on 7 subregions.
- Conduct at least one workshop every two years to discuss and portray results of sagebrush habitat restoration efforts throughout Greater Sage-grouse range
- Develop and distribute on-line tools and training modules

Measures of Success:
- Were workshops held or not?
- Keep a roster of attendees
- Development of proceedings document following workshops

Key Participants:
- Management agencies
- University extension
- NGOs
- Academic institutions

Objective 2.4 (mid-term): Establish a research and monitoring program to evaluate the effectiveness of treatments and management adjustments in meeting restoration goals; include clearinghouse for distributing knowledge from monitoring

Implementation Actions:
- Compile and assess current monitoring activities
- Design and implement controlled experiments/treatments to test the effectiveness of those treatment methods in accomplishing restoration goals for different habitats
- Establish common sampling, methods, protocols, metrics, (reference table Connelly et al) for monitoring effectiveness of restoration treatments and management adjustments at local, regional, and range-wide scales.
- Sampling of different areas reflecting life cycle requirements (nesting, brood-rearing, wintering…etc.)
- Compile and communicate results of research and monitoring to all stakeholders

Key Participants:
- NGOs: Audubon, Partners in Flight,
- Management Agencies: BLM, State, USFS
- USGS
- University Extension
- LWGs

GOAL 3: Restore number of acres or percentage of range from Goal #1 above by the year 2030 (or 2040?).

Objective 3.1 (short-term): Determine a prioritized list of sites from the exercise in Goal #1 to restore.

Implementation Actions:
- Establish a criteria to determine areas that could once again provide key sag-grouse habitats
- Review map of habitat that is "likely" to be restored and apply criteria
- Develop prioritized list by 7 subregions.

Key Participants:
- Framework Team
- Management agencies
- LWGs
- USGS, other science partners

Objective 3.2 (short term): In consort with LWGs, develop restoration work plan(s) which establishes actions to implement restoration in priority areas. Include, as appropriate, NEPA compliance.

Implementation Actions:
- Establish and complete template for work plans, including desired future condition objectives, treatment methods, seed mix and quantity, equipment and resources needed, post-treatment management.
- Aggregate at the 7 subregions and range-wide levels the seed and equipment needs to identify capacity shortcomings.
- Develop multi-year budgets to implement restoration actions.

Key Participants:
- Management Agencies & Private landowners
- LWGs

Objective 3.3 (long-term): Restore degraded sites on public, private and tribal lands where feasible

Implementation Actions:
- Over the next 40 years, implement pinyon and juniper removal or thinning projects in strategic locations to protect sage-grouse habitats and improve habitat conditions.
- Conduct treatments in sagebrush habitats with canopy cover values outside the range necessary to sustain sage-grouse
- Improve understory conditions in sagebrush habitats via treatments to enhance native perennial grasses and forb growth
- Identify private lands with key sage-grouse habitats
- Utilize existing and/or future compensation and incentive programs to restore or protect sage-grouse habitats.
- Monitor results of restoration efforts
- Make private lands assistance programs more user friendly (simplify proposal process).
- Endeavor to coordinate and target restoration efforts across state, provincial and jurisdictional boundaries.
- Develop and apply post-treatment management guidelines that support restoration goals and objectives.

Measures of Success:
- Post-treatment management results in progress toward identified restoration goals/objectives and desired habitat condition.

Key Participants:
NRCS, Farm Bureau
State Wildlife Agencies
University Extension Agents

Objective 3.4 (long-term): Optimize post-fire restoration efforts so that goals/objectives include restoring sagebrush/sage-grouse habitat needs.

Implementation Actions:
- Identify and prioritize habitat conditions for rehabilitation by 2008 (e.g., initially focus on sites needing rehabilitation that are adjacent to functioning habitat) see Objective 3.1.
- Determine the potential natural vegetation associated with sites to be rehabilitated to ensure that long-term wildfire rehabilitation objectives are appropriate.
- Establish long-term objectives for seeding and replanting burned areas by 2008 that are compatible with the habitat needs of greater sage-grouse.
- Re-vegetate burned sites in greater sage-grouse habitat within one year unless natural recovery of the native plant community is expected. Give areas disturbed by heavy equipment priority for rehabilitation.
- Pursue opportunities for forage reserves to accommodate livestock operators during implementation of rehabilitation and restoration activities
- Complete programmatic EA for the use of pre-emergent herbicides (e.g., Oust and Plateau) to help retard cheatgrass germination.
- Continue to monitor restoration efforts for success and convey those results into widely distributed reports
- Garner funding support for sage-grouse/sagebrush related restoration projects from a range-wide standpoint.

Measures of Success:
- Authorization for use of pre-emergent herbicides to control invasive annual exotic grass species on federal lands.
- Improvement in funding availability.
- Secured and banked off-site mitigation funds

Key actors/participants:
- BLM, USFS, USFWS
- NRCS
- Native American Tribes
- University Cooperative Extension

Objective 3.5 (Short-term): Establish post-rehabilitation treatment management guidelines for other resources uses by 2008 that will ensure successful regeneration of habitat for greater sage-grouse (e.g., provide for a minimum of two growing seasons of rest from grazing by domestic livestock unless there are specific restoration objectives using livestock).

Objective 3.6 (Short-term): Evaluate current agency policies for fire rehabilitation and modify as needed in support of restoration actions (e.g. invasives/weed control, diverse seed mix)

GOAL 4: Develop and Implement Coordinated and Targeted (enforcement and restoration) restoration efforts across jurisdictional or state boundaries [*Cross Reference with Work Group #3: Integration and coordination across range and jurisdictions, Sub-Issue 4 (Coordinated restoration on broad scale)*]

Objective 4.1: Based on work plan described above, coordinate plans across state and regional boundaries.

Implementation Actions
Measures of Success
Key Actors/Participants
Time Frame

GOAL 5: Develop and implement a long-term monitoring program designed to evaluate the response of habitat to wildfire, prescribed burns, and mechanical fuel reduction treatments.

Objective 5.1: Develop common protocols and standardized procedures by 2008 for recording treatments and results of monitoring efforts.

- Implementation actions/timeline
- Measures of success/monitoring responsibilities
- Key actors/participants
- Milestones/monitoring
- Resources needed

Objective 5.2: Develop a common database by 2007 where managers and researchers can record completed and ongoing fire and fuel management and restoration projects.

- Implementation actions/timeline
  - Develop a database within SAGEMAP
  - Develop and maintain cumulative records for all vegetation treatments to determine and evaluate site specific and cumulative impacts to greater sage-grouse habitats and identify best management practices for successful vegetation treatments.
- Measures of success/monitoring responsibilities
- Key actors/participants
- Milestones/monitoring
- Resources needed

Objective 5.3: Develop common protocols and standardized procedures by 2008 to conduct post-fire reviews of management plans and actions to revise operating procedures, when necessary.

- Implementation actions/timeline
- Measures of success/monitoring responsibilities
- Key actors/participants
- Milestones/monitoring
- Resources needed

SUB-ISSUE 3: Native Seed Availability

Problem Statement: Site-adapted species are not available in the quantities needed to meet desired restoration program goals. We are lacking the technology and capacity to produce/store/plant items in quantity and at the times needed.

Goal 1: Develop a regional assemblage of species that are site adapted and available in quantities needed to implement restoration priority projects/actions. Increase the availability of seed and restoration methods/expertise to restore plant COMMUNITIES, not just individual plant species

Objective 1 – Research: Establish regionally-based research programs to develop procedures to grow and produce the desired seed species (crosswalk with science group).

Implementation Actions:
- Assess current abilities to propagate and produce the species identified above.
- Set priorities for developing propagation procedures.
- Identify existing partners and programs to “re-direct” existing resources & programs
- Develop proposal/strategy defining what needs to be done to develop research program: build upon CIRP, GBRI, and Report to Congress (2002) by BLM & USFS.
- Generate funding to support the research program.

Key Participants:
- NRCS Plant Materials Centers
- USDA Research Centers
- BLM & USFS Native Plant funding programs
- Commercial seed producers (state seed associations)
- Private restoration companies/specialists
- Energy & minerals companies (have an interest in developing capabilities)
- USGS
- Universities

Resources Needed:
- Funding for research and support infrastructure (nursery facilities, controlled conditions, etc.)

Objective 2 – Define specific species and quantities needed: determine and develop individual species that will be required and the amount of seed to restore sagebrush habitats identified as having the potential for restoration and the amounts of seed needed on an annual basis (under the previous habitat restoration goal).(not just native species, includes site-adapted non-native species)

Implementation Actions:
- Quantify amount of seed needed, where, & when
- Develop common principles and practices for use of non-native species: acknowledge risks and benefits of using non-native species; place emphasis on accomplishing community restoration goals, and applying use of non-

native species toward those goals. Monitor and evaluate the effects of the use of non-native.

- Delineate "regions" (sub-units of the greater sage grouse range) for implementing restoration actions based on common ecological attributes such as soils, plant communities, climatic variables, types of disturbances (e.g. fire). This will facilitate more focused, locally-based, species-specific strategies. Identify species needed to accomplish restoration goals.
- Based on 3&4 set priorities for propagation and production based on a set of criteria, including: a) the amount of seed needed; b) potential for propagation and production; c) importance to the habitat and sage grouse, etc.
- Determine and communicate projected needs/demand for seed with the goal of providing a reliable market for commercial producers.

Key Participants:

- Agencies: BLM, USFS, State Agencies
- Extension Service
- USGS/NRCS/Scientific Community: delineate regions
- NRCS
- Nature Conservancy
- Native Plant Societies
- Universities
- Professional Societies: SRM, Wildlife Society, SER
- Private restoration companies & industry

Objective 3 – Developing and Facilitating Commercially Available Seed: Develop programs to assure commercial production and availability of individual species (see Idaho seed strategy; SEAM) (surface environment and mining strategy) in the quantities needed to implement restoration projects

Implementation Actions:

- Establish coordinating/oversight committee of agencies and seed producers to oversee and coordinate and communicate seed production needs and mechanisms to meet those needs.
- Review and broaden the Utah Restoration Initiative model for identifying, planning, scheduling, and planning restoration projects and seed needs.
- Develop and provide to agencies the species recommended for specific sites by communities, location, and climatic conditions. Provide lists of recommended species to agencies by site condition.
- Schedule restoration projects to identify required species and allow time to produce these species.
- Encourage seed producers to begin production of priority species
- Identify and manage wildland sites to produce specific species in the wildland context
- Provide lists and seed quantities to seed associations and seed producers to encourage commercial seed production
- Establish cooperative procurement among agencies for seed procurement: develop and implement a model similar to the Utah Restoration Initiative for coordinating and communicating seed needs to producers
- Develop contracts for producing desired site-adapted species
- Collect site-adapted seeds and provide to state seed associations for production

Key Participants:
- Federal, state, and private land owners/managers
- State seed growers and state seed associations
- University extension

Objective 4 – Warehousing and Distribution: Develop regional seed warehousing or means to supply seed to cooperating users.

Implementation Actions:
- Use oversight/coordinating committee to identify, prioritize, and coordinate seed production and distribution
- Based on previously-identified steps, determine projected demand for seed on a statewide and regional basis.
- Determine where the most effective locations would be for seed warehousing and distribution
- Communicate and coordinate through oversight group and cooperative partnerships with commercial seed producers to establish warehouses and distribution centers

Key Participants:

Same as above

SUB-ISSUE 4: Inadequate Planting Expertise & Capacity to Accomplish Range-wide Restoration Goals

Problem Statement:
While there is some planting expertise available, knowledge and capacity are inadequate to meet rangewide restoration goals in the following ways:

1) knowledge about methods in the full range of habitat types and conditions, including a) enhancement of degraded habitats where the sagebrush component still exists but understory and desired composition are lacking; b) habitats where sagebrush and other desired components are entirely lost (converted beyond the threshold of recovery without active intervention).
2) not enough people with knowledge & expertise to plan and implement treatments at the scale necessary to accomplish restoration goals at the rangewide scale (as determined under the rangewide restoration Goal 3, Objectives 3.1 and 3.2)
3) lack of sufficient quantity of specialized seeding equipment (e.g. drills with depth bands, interseedeers, etc.)
4) technology and information transfer capacity and infrastructure are inadequate to facilitate rangewide information sharing and timely feedback on successes and failures (see Science & Data Management Sub-Issues 1 &2)

Desired Condition:
Robust knowledge and resources (people & equipment) are available at the local, regional, and rangewide scales to plan and implement proactive and effective restoration in a seamless manner across the landscape

Goal 1: Plan and conduct research to increase knowledge about restoration methods and their effects in the full range of habitat types and degrees of disturbance.

> **Objective 1.1:** Produce and maintain synthesis of research and information about restoration methods and effects
>
> **Objective 1.2:** Implement monitoring, research, and development program to test, refine, and apply improved planting techniques
>
> **Objective 1.3:** Design restoration projects to incorporate research questions

Goal 2: Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish rangewide restoration goals & priorities.

> **Objective 2.1:** Inventory & assess current human resources knowledge & capability (who knows what & where are they located) & identify gaps and priority needs
>
> **Objective 2.2:** Develop dedicated cadres of restoration specialists at a regional level (consider 7 subregions) to provide on-the-ground technical assistance for planning, implementation, and monitoring.
>
> **Objective 2.3:** Provide training to field-level resource agency personnel & partners on current restoration ecology, methods & monitoring techniques

Objective 2.4: Develop university & vocational programs to train professional restoration specialists as well as on-the-ground practitioners

Objective 2.5: Promote private sector capability to provide contract services

Goal 3: Obtain and manage specialized equipment to meet restoration goals in strategic locations

Objective 3.1: Inventory current specialized equipment and compare with projected needs (consider 7 subregions)
Objective 3.2: Acquire equipment to address shortages &/or promote private sector inventory & availability

Objective 3.3: In coordination with the establishment of regional seed warehousing, co-locate equipment in selected strategic locations based on projected restoration project needs
Objective 3.4: Implement monitoring, research, and development program to test, refine, and apply improved & durable equipment

Goal 4: Refine and develop mechanism(s) to facilitate rangewide information sharing in a timely and user-friendly manner.

Objective 4.1: Produce tools which make best available knowledge accessible and responsive to needs throughout the range (e.g. website, newsletter, symposia, workshops, on-line training, blog, training sessions)

Objective 4.2: Establish a central information clearinghouse for people seeking current knowledge about sage grouse habitat restoration from soup to nuts

Objective4. 3: Utilize regional restoration cadres for technical assistance & technology transfer

Sub-Issue 5: Fire

PROBLEM STATEMENT: Throughout its range, sagebrush occurs on a dynamic landscape shaped by variation in soils, topography, climate, and fire frequency. These dynamics resulted in the evolution of numerous sagebrush taxa that have strikingly different responses to fire. For example, Wyoming big sagebrush communities had typical historical fire return intervals of 80 – 150 yrs, while mountain big sagebrush communities may experience return intervals as short as 15 –20 yrs. Natural fire return intervals in basin big sagebrush are intermittent between mountain big sagebrush and Wyoming big sagebrush. Consequently, natural fire regimes in the sagebrush ecosystem are highly variable, ranging in frequency from 15—150 years, with a specific frequency for each community. Vegetation structure and composition in the sagebrush ecosystem have undergone major changes since European settlement. These changes are due, in part, to changes in frequency, size, and severity of wildfires resulting from changes in the climatic regime, historical patterns of livestock grazing, and subsequent invasion by exotic plant species.

Historically, fires in the sagebrush ecosystem typically produced a mosaic of burned and unburned areas as a result of the distribution of soils, topography, moisture conditions, and fuels. Sagebrush plants generally reseeded in burned sites from adjacent unburned sites because patch size of burned areas was small, allowing for adequate dispersal of sagebrush seeds from unburned plants. Under current, altered fire regimes, natural re-establishment of sagebrush after burning (especially basin big sagebrush and Wyoming big sagebrush) is unlikely. As a result, fire management (i.e., prescribed fire and wildfire suppression) must be carefully planned and implemented. Active management (e.g., seeding, protection from ungulate grazing) is often required to facilitate reestablishment of sagebrush after wildfires.

Goal 1: All local, state, and federal agencies and private entities approach management of wildland fire and fuels management in greater sage-grouse habitat in a coordinated fashion.

Objective 1.1: Develop and implement integrated policy and plans for the protection and rehabilitation of greater sage-grouse habitat by 2008.

Implementation actions/timeline:
- Develop a process by 2008 with policy support and decision criteria to set priorities for protection of habitat for greater sage-grouse vs. non-significant structures and other developments (e.g., recognize the tradeoffs associated with rehabilitating critical greater sage-grouse habitat or rebuilding structures).
- Update agency plans, such as land use plans and fire management plans to place high priority on protection and restoration of sage grouse habitat

Measures of success/monitoring responsibilities:
- Compilation of policy by 2007

Milestones/monitoring
- Is the integrated policy working/where are there problems

Objective 1.2: Broaden partnerships among regional public and private land management entities by 2008 to develop and implement fire management strategies which benefit sage grouse.

Implementation actions/timeline
- Implement or modify MOU or MOA among agencies and other interested organizations to address the management of fire in sagebrush habitats.
- Hold a workshop that includes professionals from various federal and state agencies (especially fuels management personnel), conservation organizations, counties, rural fire departments as well as interested landowners dealing with fire management issues to encourage coordinated efforts.
- Solicit involvement of local land management specialists, private landowners, wildlife biologists, fire ecologists, and range ecologists to share knowledge and responsibilities on fire management issues.

Key actors/participants
- USDI BLM
- USDA Forest Service
- National Park Service
- USFWS
- State & Provincial Wildlife Agencies
- State Forestry & Lands Agencies
- State Natural Heritage Programs
- Local fire protection districts & rural fire departments
- The Nature Conservancy
- Sierra Club
- National Audubon Society
- Intermountain West Joint Venture
- Cooperative Extension

Goal 2: Place top priority on containing and suppressing wildfires in important greater sage-grouse habitats

Objective 2.1: Develop criteria for determining where and how to contain and suppress wildfire

Implementation actions
- Complete R-value (Sather-Blair 2000) map for Great Basin
- Determine where uncharacteristic wildfires result in adverse impacts (e.g. invasives species, reduced fire return intervals)
- Determine where further loss of sage grouse habitat is unacceptable
- Establish priority habitat restoration sites

Objective 2.2: Develop and apply area-specific fire suppression plans for greater sage-grouse habitats (including location of fire camps, staging areas, and helibases).

Implementation actions/timeline:
- Plans developed for ecoregions throughout the range of greater sage-grouse

Milestones/monitoring:
- Review and revise fire suppression plans annually to incorporate new information on sage-grouse habitat distribution and occurrence

Objective 2.3: Ensure a coordinated county, fire district, and federal response to wildfires in these areas.

Key actors/participants:
- NIFC

Objective 2.4: Provide agencies with adequate resources and equipment to control wildfires (e.g., tankers, aerial support).

Implementation actions/timeline:
- Assess current equipment inventories
- Develop a needs list by BLM District of USFS Ranger District by 2008
- Develop a ten year feasibility profile to obtain necessary equipment

Measures of success/monitoring responsibilities
- Completion of inventory by December 31, 2007
- Completion of needs list by June 30, 2008

Key actors/participants
- USDI BLM
- USDA Forest Service
- State and Provincial Forestry Agencies
- Contractors

Resources needed
- Dedicated personnel

Goal 4: Manage habitat mosaics and fuels in greater sage-grouse habitat to improve habitat and reduce the possibility of damaging wildfires.

Objective 4.1: Describe desired habitat conditions for greater sage-grouse by 2007 to provide a template for management actions. *Please see Habitat Conservation and Restoration Sub-issue 1 Objectives 1 & 2.*

Objective 4.2: Develop criteria for managing fuels in greater sage-grouse habitat by 2007.

Objective 4.3: Promote programmatic integration of sage grouse habitat protection and improvement into fuels management planning and implementation at local, regional, and rangewide scales

Implementation actions:
- Develop and implement interagency policies to require integration
- Designate liaison positions to assure communication & coordination between fire organization and resources goals
- Conduct coordinated plans which address fire& fuels management activities integrated with sage-grouse habitat restoration goals

Objective 4.4: Use prescribed burns, chemicals, and mechanical treatments at an appropriate scale to improve sage grouse habitat and to reduce the potential for catastrophic wildfires in and adjacent to greater sage-grouse habitat by 2010.

Implementation actions/timeline:
- Establish plans for the size of treatment based on existing conditions (e.g., sagebrush species present, topography, previous fire history, type and distribution of seasonal habitat), cumulative areas of sagebrush modification, and potential of the proposed site.
- Maintain pockets of unburned *Artemisia* within fire perimeters to provide natural seed sources.
- Ensure that the risk of cheatgrass or other invasive weeds is minimal and that there is a low risk of reducing critical features of sage-grouse habitat as a result of prescribed burns.
- Support an enact the preferred alternative in the BLM's programmatic EIS for herbicide use for vegetation treatments
- Conduct prescribed burns in greater sage-grouse habitat above 6,500 ft elevation, as prescribed

Objective 4.5: Manage wildfire as a tool to improve sage grouse habitats

Implementation actions/timeline
- Develop criteria and guidelines for determining where and how to manage and utilize wildfire to improve sage grouse habitats
- Incorporate and apply criteria and guidelines through relevant plans such as fire & fuels management plans, land use plans, LWG plans, etc.

Objective 4.6: Strategically place and maintain green strips and/or fire breaks within or adjacent to greater sage-grouse habitat to slow or stop the spread of wildfires by 2010.

Implementation actions/timeline
- Identify key habitats in need of protection (R-value classification)
- Determine a course of action
- Coordinate with fuels management personnel within federal agencies

Goal 5: Develop and implement a long-term monitoring program designed to evaluate the response of habitat to wildfire, prescribed burns, and mechanical fuel reduction treatments.

Objective 5.1: Develop common protocols and standardized procedures by 2008 for recording vegetative treatments and results of monitoring efforts.

Implementation actions/timeline
- Determine standard reporting template
- Distribute template to resource agencies for comment
- Finalize template
- Redistribute

Objective 5.2: Develop a common database by 2007 where managers and researchers can record completed and ongoing fire and fuel management and restoration projects.

Implementation actions/timeline:
- Develop a database within SAGEMAP
- Develop and maintain cumulative records for all vegetation treatments to determine and evaluate site specific and cumulative impacts to greater sage-grouse habitats and identify best management practices for successful vegetation treatments.

Objective 5.3: Develop common protocols and standardized procedures by 2008 to conduct post-fire reviews of management plans and actions to revise operating procedures, when necessary.

ISSUE: SCIENCE, DATA MANAGEMENT, AND INFORMATION

SUB-ISSUE 1: Standardized vegetation and other data layer base map and access system

Problem Statement: Lack of a clearinghouse for information related to sage grouse and sagebrush ecosystems

Goal 1: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.

Objective 1.1: Develop a map-based locator on the SAGEMAP website for current and past research and monitoring projects in sagebrush and salt-desert shrub ecosystems.

Objective 1.2: Develop an information-dissemination framework to enable coordinated exchange of sound scientific principles between partners in conservation planning efforts and increase the effectiveness of conservation strategies.

Objective 1.3: Produce data layers appropriate for use in preparing ecoregional assessments. It also will identify primary land uses and changes, potential impacts to sagebrush habitats and associated wildlife, and species of concern that use sagebrush during some part of their life-cycle. Includes the development and maintenance of an updated map of vegetation.

Objective 4: Develop a natural resource information portal for the sage grouse and sage ecosystems. Our goal is to provide easy access to useful information for land managers, researchers, educators, and the general public.

Objective 5: Share data and information on sagebrush habitat and sage-grouse disease. West Nile Virus (WNV) poses a significant threat to sage grouse populations and possibly other wildlife species in sagebrush ecosystems.

Implementation Actions:
- Focus on SAGEMAP as the clearinghouse for a distributed information system
- Develop partnerships among all key stakeholders (public and private) to share their information via the clearinghouse
- Develop real-time information on West Nile Virus through the Wildlife Disease Information Node (WDIN) (http://wildlifedisease.nbii.gov).

Measures of Success:
- SAGEMAP partners and amount of data continues to increase in quantity and usefulness

Key Actors/Participants:

- State and Federal Natural resource agencies, tribes, universities, NGO's, local governments, working groups, industry

Time Frame:

- Build on existing partnerships already in place for SAGEMAP. Continual development with the objective of having a fully functional system by 2009.

Resources Needed:

- Funding
- Dedicated staff

SUB-ISSUE 2: Definition of success for sage-grouse conservation

Problem Statement: Lack of a definition and metrics for success or failure of conservation actions for sage grouse

Goal 1: Develop a definition and metrics for success or failure of conservation actions for sage grouse including population estimates

Objective 1.1: Produce a synthesis of information on the methods, results, effectiveness, and short-term impacts of sage-grouse habitat improvement projects and other management activities within the sagebrush ecosystem,

Objective 1.2: Develop range-wide standards for sustainable sage-grouse populations with sustainable harvest

Objective 1.3: Determine priorities for which areas to focus conservation actions to maintain the functioning of sagebrush ecosystems.

Objective 1.4: Develop an annual region-wide score-card

Implementation Actions:
- WAFWA brings together a team representing partners to identify key metrics using the conservation assessment as the baseline.
- Commission a synthesis of information on the methods, results, effectiveness, and short-term impacts of sage-grouse habitat improvement projects and other management activities within the sagebrush ecosystem,

Measures of Success:
- Metrics that display changes in abundance and distribution are developed and validated
- Activities have clear measures of progress towards desired outcomes
- Score-card helps point to areas or populations needing improvement

Key Actors/Participants:
- University researchers, USGS, North American Grouse Partnership, state wildlife agencies, federal agencies, tribes, local working groups

Time Frame:
- Within 12 months of the completion of the comprehensive strategy the indicators are identified and a draft score-card developed.
- Score-card evaluation done annually thereafter.

Resources Needed:
- Funding
- Dedicated staff

SUB-ISSUE 3: Evaluating social and economic effects of human activities on sage grouse and habitat persistence

Problem Statement: There is a lack of understanding of social and economic effects (both positive and negative) of human activities on sage grouse and habitat persistence

Goal 1: Understanding the role of social and economic factors that influence human actions and decisions on the potential persistence of sage grouse and its habitat

Objective 1.1: Ascertain cost/benefit analysis of status quo, additional conversions and restoration for rangeland uses as well as rural and urban rangelands towns and cities and counties

Objective 1.2: Determine social benefits of status quo, additional conversions and restoration for rangeland uses as well as rural and urban rangelands towns and cities and counties

Implementation Actions:
- Incorporation of key data sets within the data clearinghouse (e.g. value of recreational activities, human demographic trends, employment patterns, trade-offs between economic activities).
- Development of social models for resolving wildlife-human conflicts in a multiple stakeholder environment.
- Attitude surveys to determine the limits of social acceptability of conservation measures and economic trade-offs.

Measures of Success:
- Happy grouse and happy people living in harmony
- Access of key data sets through SAGEMAP.
- Incorporation of social models and attitude surveys in the management decision-making process.

Key Actors/Participants:
- WAFWA, Federal and state agencies, tribes, and universities, NGO's

Time Frame:
- Within 12 months of the completion of the comprehensive strategy the social science team is identified and given their charge
- Surveys continue through the life of the strategy

SUB-ISSUE 4: Ability to predict population outcomes/habitat as a result of vegetation change

Problem Statement: Lack of analytical tools to model effects of habitat treatments (succession, disturbance, bird response)

Goal 1: Development of a tool kit for managers to model habitat to understand and predict sage grouse responses to management actions

Objective 1.1: Develop predictive models for risk assessment and use areas for wildlife species dependent on sagebrush ecosystems

Objective 1.2: Model the cumulative effect of human activities on wildland systems in the western US including the zones of influence of infrastructure features on sage grouse behavior and habitat use.

Objective 1.3: Determine multi-scale changes in land cover composition and configuration in sagebrush ecosystems

Objective 1.4: Validate all models to document their effectiveness in predicting outcomes.

Implementation Actions:
- Assess and adapt current models
- Build models as needed and collect and/or simulate data

Measures of Success:
- Predictive tools are developed, tested, and used by managers

Key Actors/Participants:
- WAFWA, tribes, Federal and state agencies, and universities, NGO's

Time Frame:
- Inventory begins of existing models immediately following the completion of the comprehensive strategy
- Within 12 months of the completion of the comprehensive strategy the modeling team is identified and given their charge

SUB-ISSUE 5: Range-wide research and monitoring collaboration and coordination

Problem Statement: Lack of coordination for funding, research, monitoring and management

Goal 1: The development of an institutional framework to create (above) collaborative effort for funding, research, monitoring and management.

Objective 1.1: Provide a framework to encourage data consistency, quality and compatibility

Objective 1.2: Develop a coordinated program of site-specific research and monitoring projects integrated within the context of the landscape

Objective 1.3: Develop a coordinated effort for securing funds for research within the sagebrush ecosystem.

Objective 1.4: Annual inventory of research and data information needs.

Implementation Actions:
- Follow Federal Geographic Data Council (FGDC) standards
- WAFWA and Federal Agencies form science council
- Research needs are prioritized and assigned and/or offered
- Promote peer review of study plans and products

Measures of Success:
- Science council formed
- Agreement among council members to support the council's priorities
- Funds acquired
- More shared projects between states, federal agencies, and local working groups
- Greater consistency in data analysis, collection and interpretation
- Site-specific studies are integrated across the landscape

Key Actors/Participants:
- WAFWA, Federal agencies, universities, NGO's, Industry, tribes

Time Frame:
- Within 12 months of the completion of the comprehensive strategy the science council is identified and given their charge

ISSUE: REGULATORY MECHANISMS

(including policies but excluding guidelines)

Definitions

Policy: Governing principle, plan, or course of action. Policies may or not be based on laws, ordinances, or regulations.

Regulation: A rule, ordinance, or law including Acts by which conduct or action is regulated.

Regulatory Mechanisms: Any system for doing something that includes rules, ordinances, or laws, including Acts. (Regulatory mechanisms may include but are not limited to local, State, Federal, or Provincial laws and regulations, as well as Ramps, Amps, District and Forest Plans, SCD Plans, State/Provincial Plans, etc.).

SUB-ISSUE 1: There is inconsistent and inadequate application of existing regulations and policies.

Problem Statement: Greater Sage-grouse may be negatively impacted by inconsistent and inadequate application of regulations within and among agencies. For example, the manner in which regulations were applied in Idaho's Abridge RMP negatively affected Greater Sage-grouse abundance and distribution.

Goal 1: Uniformly apply existing regulations, regulatory mechanisms, and policies within and among agencies.

Objective 1.1: Complete a comprehensive range-wide analysis within and among agencies to identify inconsistencies and the reasons they occur among federal, provincial, tribal, state, and local governmental entities/agencies (by 31 December 2007).

Implementation actions/timeline:

- Identify scope of analysis, methods, etc. by 1 October 2006.
- Secure funding and political support for analysis by 1 December 2006.
- Select investigator/vendor (either within agencies or external) by 15 January 2007.
- Complete analysis and report to agencies and public (allow for public review) by 31 December 2007.

Measures of success/monitoring responsibilities
- Completion of analysis and report
- Analysis is used by agencies to resolve inconsistencies

Key actors/participants:
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors
- FS Regional Offices/Directors
- NRCS
- Scads
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring:
- See timelines for milestones
- Monitored by WAFWA Framework Team

Resources needed
- 1-3 investigators
- $300,000.00

Objective 1.2: Agencies implement corrective action plans in response to analysis and resolve inconsistencies (by 1 October 2008).

Implementation actions/timeline:
- Federal, provincial, tribal, state, and local governmental entities/agencies meet with investigators to discuss report findings by 1 February 2008.
- Federal, provincial, tribal, state and local governmental entities/agencies respond publicly to analysis/report to identify measures they will take to help resolve inconsistencies in policies by 1 October 2008.
- WAFWA and Federal agencies amend MOU to commit to work together to resolve policy inconsistencies 31 January 2009.

Measures of success/monitoring responsibilities:
- Corrective actions are implemented by agencies to resolve inconsistencies.
- MOU is amended.

Key actors/participants
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors

- FS Regional Offices/Directors
- NRCS
- SCDs
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring

- See timelines for milestones
- Monitored by WAFWA Framework Team
- Agencies develop and implement monitoring plan

Resources needed

- Depend on extent of measures needed to resolve inconsistencies, $300,000.00

SUB-ISSUE 2: Adequacy of regulations

Problem Statement: Emerging science suggests some regulations are antiquated resulting in negative impacts on Greater Sage-grouse and their habitat. Incentive based solutions are limited due to regulatory restrictions.

GOAL 1: Provide a regulatory framework that maintains and enhances Greater Sage-grouse habitat and populations.

Objective 1.1: Evaluate the adequacy of existing regulations (by 31 December 2007).

Implementation actions/timeline:
- Entities/agencies initiate analysis of existing regulations through GAO or other independent group by 15 January 2007.
- Complete analysis and report to agencies and public (allow for public review) by 31 December 2007.

Measures of success/monitoring responsibilities:
- GAO or other independent analysis completed
- Entities/agencies propose necessary changes needed to ensure adequate consideration for Greater Sage-grouse
- Implementation of changes

Key actors/participants:
- GAO
- WAFWA Directors/WGA
- WAFWA Framework Team
- BLM State Offices/Directors
- FS Regional Offices/Directors
- NRCS
- SCDs
- Tribes
- Local Governments
- LWGs
- Agency investigators or outside vendor

Milestones/monitoring:
- Monitor regulation implementation adequacy

Resources needed:
- 1-3 investigators
- $300,000.00

Objective 1.2: Propose recommendations for regulatory change (by 1 July 2008).

Implementation actions/timeline:
- Blue Ribbon panel of stakeholders and scientists makes recommendations (by 31 December 2007) based on study on consistency (Objective #1), GAO evaluation of implementation (by 31 December 2007) (Objective #2), and other information

Measures of success/monitoring responsibilities:
- Blue Ribbon panel makes recommendations to BLM, FS, states, provinces, tribes, local governmental entities/agencies, Congress, and public

Key actors/participants:
- WAFWA/Framework Team
- BLM State Offices/Directors
- FS Regional Offices/Directors
- NRCS
- SCDs
- Tribes
- Local Governments
- LWGs

Resources needed:
- Funding to support Blue Ribbon panel travel/per diem and reporting ($300,000.00)

Objective 1.3: Agency implementation by (1 January 2010).

ISSUE: INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS

SUB-ISSUE 1: Current approaches

Problem Statement: Current approaches do not facilitate coordinated planning and implementation and evaluation of plans that integrate the issues and address cumulative effects.

Goal 1: Long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.

Objective 1.1 (short term): Facilitate coordinated, integrated conservation planning across the range.

Implementations actions/Timeline:
- Gather examples of successful coordination and integration of conservation issues among conservation planning efforts. What are the barriers and lessons learned in achieving successful coordination and integration?
- Compile information profile suitable for local and state working groups.
- Share information with local and state working groups
- Develop a mechanism to facilitate planning coordination among working groups and develop and sustain planning capacity at the local level.

Key actors/participants:
- Solicit participation from working group #3 or others in the Forum.
- Framework Team
- Fire Learning Network
- NGO's
- Other agencies

Resources needed:
- Staff

Goal 2: To insure cumulative effects are addressed (biological and socio-economic) across the range

Objective 2.1: To Identify mechanisms to assess and address cumulative effects (biological and socio-economic) across the range

Implementations actions/Timeline:
- Gather examples of successful cumulative effects assessments at large scales. What are the barriers and lessons learned in achieving successful assessments?
- Gather examples of successfully addressing cumulative effects at large scales. What are the barriers and lessons learned?
- Compile information profile suitable for local and state working groups.

- Share information with local and state working groups
- Develop a mechanism to facilitate coordination among working groups and land management agencies

Key actors/participants:
- Solicit participation from working group #3 or others in the Forum.
- Framework Team
- Fire Learning Network
- NGO's
- Other agencies

Resources needed:
- Staff or student

SUB-ISSUE 2: Integration and coordination across range and jurisdictions. There are currently insufficient opportunities to share scientific and management information and learning among local working groups and other sage-grouse stakeholders. This condition could impede implementation of actions that benefit sage-grouse.

Problem Statement: No standardized infrastructure has been developed to facilitate exchange of scientific and management information and learning among local working groups.

Goal 1: Conduct a needs assessment of local working groups that identifies barriers and current level and efficacy of information sharing and learning that has occurred between LWGs, and others involved in sage-grouse conservation efforts.

Objective 1.1 : (Short--Term) Complete survey of LWGs to determine:

1. which LWGs have shared information with other LWGs, and other sage-grouse organizations;
2. the nature of the information shared (organizational/process in nature or data/on-the-ground related),
3. the process by which LWGs obtained and shared information and its efficacy,
4. what is needed to enhance information sharing and learning among LWGs, and between LWG and other sage-grouse organizations; and
5. what do LWG need to be successful?

Implementation actions/timeline:

- Identify lead individual or body to implement Objective within 6 months of strategy completion;
- Develop Survey Questionnaire within 9 months of strategy completion;
- Conduct outreach to LWGs on need for a survey as step to ensure efficacy and LWG ownership of and feedback on process (w/in 12 mos.)
- Distribute Questionnaire to LWGs (w/in 12 mos.)
- Create report of questionnaire findings (w/in 18 mos.)
- Implement information sharing/ education mechanisms;
- Identify actions to address needs

Measures of success/monitoring responsibilities:

- Secure funding for survey
- Support of effort by LWGs
- Percentage of LWGs respond to questionnaire
- Implementation mechanisms and actions are in place;
- Key actors/participants
- LWG chairs and members
- State Game and Fish Agency Sage-Grouse Lead Biologist(s)
- WGA
- WAFWA Framework Team
- Surveyor developer/conductor(s) (University?)
- Milestones/monitoring
- Percentage of LWGs that respond to survey questionnaire;
- Timeline met

- Resources needed
- Funding for lead entity to oversee effort
- Funding for conduct and completion of survey
- Funding for dissemination of findings to LWGs
- Funding for implementation of mechanisms and actions identified;

Objective 1.2: Enhance existing and/ or develop new mechanisms by which information from LWGs and others, could be stored, shared and utilized for shared learning among sage-grouse organizations

Implementation actions/timeline:
- WAFWA Framework team identifies the expertise needed (e.g., University extension, non-Framework Team agencies (e.g., USGS))
- WAFWA Framework team generates an inventory of available and potential mechanisms to facilitate information sharing among LWGS (e.g., Sagemap web site, sage-brush center for excellence, NRCS Sage-grouse Restoration Project at USU, Great Basin Learning Network).
- Develop or enhance mechanisms for shared learning;
- Measures of success/monitoring responsibilities
- Framework Team agrees to engage this in the timeframe noted.

Key actors/participants:
- WAFWA Framework Team
- USGS
- Other entities with pertinent expertise

Milestones/monitoring:
- Timeline is met

Resources needed:
- Funding for those involved

SUB-ISSUE 3: Integration and coordination across range and jurisdictions/Inconsistency in policy and coordination across jurisdictional boundaries.

Problem Statement: Lack of coordination of agency policies, programs and regulations at national, regional, state and local levels to address issues has adversely affected sage-grouse conservation at multiple levels.

Goal 1: Coordinated policies that enhance sage-grouse conservation efforts at multiple levels.

Objective 1.1: Complete an analysis of land management policies and land management plan direction to identify inconsistencies among federal, state, local, provincial, and tribal policies that create barriers that may inhibit sage-grouse conservation.

Implementation actions/timeline:
- Prepare proposal to identify scope of analysis, methods, etc.--7/07
- Secure support for analysis -- 10/07
- Select investigator/vendor (either within agencies or external) --12/07
- Complete analysis and report to agencies and public -- 7/08

Measures of success/monitoring responsibilities:
- Completion of analysis and report
- Analysis is used by agencies and LWGs to resolve inconsistencies

Key actors/participants:
- WAFWA/Framework Team
- BLM State Offices/Directors
- FS Regional Offices/Directors
- State/Provincial Wildlife Directors
- Tribes
- LWGs
- NRCS
- USFWS
- Soil and Water Conservation Districts
- Agency investigators or outside vendor

Milestones/monitoring:
- See timelines for milestones
- Monitored by state working group (see Objective 3)

Resources needed:
- 1-3 investigators
- $100,000

Objective 1.2: Agencies and LWGs act to resolve inconsistencies that may inhibit sage-grouse conservation.

Implementation actions/timeline:
- Federal, tribal, and state agencies meet with investigators to discuss report findings -- 7/08

- Federal, tribal, and state agencies respond publicly to analysis/report to identify measures they will take to help resolve inconsistencies in policies-- 12/08
- WAFWA and Federal agencies amend MOU to commit to work together to resolve policy inconsistencies -- 12/08
- Establish a representative management level (State Director, Regional Forester, and State Wildlife Director) coordination team to meet annually to agree on policy changes identified by the report.

Measures of success/monitoring responsibilities:
- Analysis is used by agencies and LWGs to resolve inconsistencies
- MOU is amended

Key actors/participants:
- WAFWA/Framework Team
- BLM State Offices/Directors
- FS Regional Offices/Directors
- State/Provincial Wildlife Directors
- LWGs
- NRCS
- USFWS
- Soil and Water Conservation Districts
- Agency investigators or outside vendor

Milestones/monitoring:
- Monitored by the State Working Groups

Resources needed:
- Depend on extent of measures needed to resolve inconsistencies

Goal 2: Federal, state, and LWG practices will meet PECE guidelines.

Objective 2.1: Federal, state, and LWG demonstrate how elements of the Policy for Evaluation of Conservation Efforts (PECE) of the U.S. Fish and Wildlife Service are being implemented.

Implementation actions/timeline:
- Federal and state agencies and LWGs agree to publish annual reports on efforts that meet objectives of certainty of implementation and effectiveness from PECE. - 4/07
- Amend MOU to make joint commitment -- 7/07

Measures of success/monitoring responsibilities:
- Annual reports of efforts that meet objectives of PECE are published annually
- MOU is amended

Key actors/participants:
- WAFWA/Framework Team
- BLM State Offices/Directors
- FS Regional Offices/Directors

- State/Provincial Wildlife Directors
- LWGs
- FWS

Milestones/monitoring:
- State Sage-Grouse Working Team

Resources needed:
- FTEs for reporting
- Funding for reporting

APPENDIX C3

Appendix 3
of the
Final Report of the
Greater Sage-grouse Range-wide Issues Forum

Forum Goals and Objectives

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Conservation and protection of habitats which are important and/or intact: "saving the best."**	**Goal 1:** Conserve important and/or intact habitats and stabilize the loss of habitat across the range. [*Cross Reference with Habitat Conservation and Land Use Goals & Objectives.]*	
Habitat Conservation and Land Use	**Conservation and protection of habitats which are important and/or intact: "saving the best."**	**Goal 1:** Conserve important and/or intact habitats and stabilize the loss of habitat across the range. [*Cross Reference with Habitat Conservation and Land Use Goals & Objectives.]*	**Objective 1.2 (**mid-term): Protect quality sage-grouse habitat from wildfire, invasive species, pinyon/juniper succession, improper livestock grazing practices, urban encroachment, roads & transmission lines, tall structures, and energy development.
Habitat Conservation and Land Use	**Conservation and protection of habitats which are important and/or intact: "saving the best."**	**Goal 1:** Conserve important and/or intact habitats and stabilize the loss of habitat across the range. [*Cross Reference with Habitat Conservation and Land Use Goals & Objectives.]*	**Objective 1.3** (long-term): Ensure that management practices and policies are geared toward maintaining or recovering sagebrush steppe habitat. This includes post-treatment management.
Habitat Conservation and Land Use	**Conservation and protection of habitats which are important and/or intact: "saving the best."**	**Goal 1:** Conserve important and/or intact habitats and stabilize the loss of habitat across the range. [*Cross Reference with Habitat Conservation and Land Use Goals & Objectives.]*	**Objective 1.4:** Establish monitoring program, protocols, and methods to evaluate status and trend of important habitats identified under objective 1 at the site and range-wide scales.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 1:** Develop a comprehensive and range-wide list of invasive species which degrade sage-grouse habitats.	**Objective 1.1:** Identify and prioritize invasive species that pose the greatest risk by December 2007.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 1:** Develop a comprehensive and range-wide list of invasive species which degrade sage-grouse habitats.	**Objective 1.2:** Review and recommend modification of State and Province noxious species lists to fund control measures of invasive species of concern by December 2008.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 2:** Identify and map the threat of invasive species within greater sage-grouse habitats.	**Objective 2.1:** Develop and apply range-wide models for the seven geographic subdivisions in the Sagebrush biome (e.g., spread vector analysis) to provide spatial estimates of the current and future risk of top priority invasive plant species by 2009 (short-term objective).
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 2:** Identify and map the threat of invasive species within greater sage-grouse habitats.	**Objective 2.2:** Develop range-wide and geographic zone maps of the current distribution of invasive plant species and compatible across different state or provincial boundaries by 2009-10 (Short-term objective).
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 2:** Identify and map the threat of invasive species within greater sage-grouse habitats.	**Objective 2.3:** For range-wide efforts, develop and implement site-specific detection surveys and protocols to maximize the likelihood of finding new patches of invasive plant species before they expand. By 2008 (Short-term objective).
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 3:** Identify knowledge gaps and develop guidelines for control of invasive plant species within greater sage-grouse habitat.	**Objective 3.1:** Create methods to prioritize invasive species control on the basis of sagebrush habitat recovery potential in critical Sage-grouse range by 2008. (Short-term objective).

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 3:** Identify knowledge gaps and develop guidelines for control of invasive plant species within greater sage-grouse habitat.	**Objective 3.2:** Compile and/or identify, and implement, integrated invasive species control methods for the 7 geographic subdivisions in the Sagebrush biome by 2008 (e.g., grazing, mowing, seeding, herbicides) (short-term objective).
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 3:** Identify knowledge gaps and develop guidelines for control of invasive plant species within greater sage-grouse habitat.	**Objective 3.3:** Compile and/or identify, and implement, beneficial management practices to minimize negative impacts of invasive species control methods in objective #2 on greater sage-grouse populations and their habitats (e.g., do not conduct any vegetation treatments during nesting and early-brood rearing periods when sage-grouse are present) by 2008.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 4:** Reduce the risk of new infestations of invasive species in greater sage-grouse habitat.	**Objective 4.1:** Compile and/or identify, and implement, guidelines for containment of existing infestations (e.g., border spraying, planting barriers of aggressive plants, grazing to minimize seed production) by 2008.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 4:** Reduce the risk of new infestations of invasive species in greater sage-grouse habitat.	**Objective 4.2**: Compile and/or identify, and implement, beneficial management practices pertinent to domestic livestock and wildlife that will minimize the spread of invasive species by 2008.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 4:** Reduce the risk of new infestations of invasive species in greater sage-grouse habitat.	**Objective 4.3:** Compile and/or identify, and implement, beneficial management practices pertinent to access, vehicles, and equipment that will minimize the spread of invasive species by 2008.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 4:** Reduce the risk of new infestations of invasive species in greater sage-grouse habitat.	**Objective 4.4:** Develop and implement plans for areas treated for invasive species incorporating a seed mixture appropriate for the soils, climate, and landform of the area to ensure recovery of the ecological processes and habitat features of the potential natural vegetation, and to prevent the re-invasion of undesirable species. COORDINATE WITH RESTORATION SUBCOMMITTEE.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 4:** Reduce the risk of new infestations of invasive species in greater sage-grouse habitat.	**Objective 4.5:** Anticipate infestations of new invasive species and educate to target and prevent establishment, now to forever!
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 5:** Integrate and coordinate invasive species management throughout greater sage-grouse habitat to increase effectiveness. COORDINATE WITH INTEGRATION SUBCOMMITTEE.	**Objective 5.1:** Develop partnerships among regional public and private land management entities to develop and implement identified objectives by 2008

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 5:** Integrate and coordinate invasive species management throughout greater sage-grouse habitat to increase effectiveness. COORDINATE WITH INTEGRATION SUBCOMMITTEE.	**Objective 5.2:** Solicit involvement of local weed management specialists, private landowners, wildlife biologists, and range ecologists to share knowledge and develop response plans for invasive species by 2008.
Habitat Conservation and Land Use	**Invasive Plant Species**	**Goal 5:** Integrate and coordinate invasive species management throughout greater sage-grouse habitat to increase effectiveness. COORDINATE WITH INTEGRATION SUBCOMMITTEE.	**Objective 5.3:** Supplement existing invasive species control programs with materials specific to the benefits of proactive management within sage grouse habitats (including weed identification, mechanisms for invasion and dissemination of invasive species, and methods of treating) by 2008.
Habitat Conservation and Land Use	**Livestock Grazing**	**Goal 1:** Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.	**Objective 1.1:** Use scientific data and historic information to establish baseline information (e.g. Ecological Site Descriptions) when evaluating soil quality and ecological processes in sage grouse habitats.
Habitat Conservation and Land Use	**Livestock Grazing**	**Goal 1:** Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.	**Objective 1.2:** Use WAFWA habitat guidelines where achievable considering Ecological Site Descriptions and rangeland health standards to implement flexible and appropriate grazing management systems (season of use, grazing duration, kind of livestock, and stocking intensity).

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Livestock Grazing**	**Goal 1:** Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.	**Objective 1.3:** Develop and/or adopt a consistent monitoring program that address effects of grazing management systems and show trends over time. In addition to monitoring progress towards achieving the WAFWA guidelines, monitor the response of vegetation (vigor and production), and the compositional diversity of species. Use monitoring methods that are best suited to the type of grazing management being practiced at a site.
Habitat Conservation and Land Use	**Livestock Grazing**	**Goal 1:** Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.	**Objective 1.4:** Encourage the coordination of landscape management activities on private, federal, state and tribal lands to provide yearlong benefits to sage grouse.
Habitat Conservation and Land Use	**Livestock Grazing**	**Goal 1:** Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.	**Objective 1.5:** Offer incentives when and where appropriate to achieve sage grouse habitat objectives.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Livestock Grazing**	**Goal 1:** Manage grazing to maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community that addresses the long-term needs of sage grouse and other sagebrush associated species.	**Objective 1.6:** Review current land management agencies' grazing programs to ensure consistency and compatibility with the Comprehensive Strategy.
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 1:** Identify where agriculture lands are associated with sage-grouse habitat.	**Objective 1.1:** Identify and prioritize agriculture lands that provide the greatest habitat value for sage-grouse.
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 2:** Implement management practices on agriculture lands that protect or minimize harm to sage-grouse.	**Objective 2.1** Encourage spot treatment of weeds instead of whole field/pasture chemical treatment.
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 2:** Implement management practices on agriculture lands that protect or minimize harm to sage-grouse.	**Objective 2.2** Provide information and incentives to minimize application of insecticides in hayfields.
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 2:** Implement management practices on agriculture lands that protect or minimize harm to sage-grouse.	**Objective 2.3** Provide agricultural producers information and incentives on harvesting techniques that reduce bird mortality.
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 2:** Implement management practices on agriculture lands that protect or minimize harm to sage-grouse.	**Objective 2.4** Identify the extent to which agricultural water management and infrastructure contributes to the threat of West Nile virus.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 3:** Adjust incentives to encourage the retention and restoration of sagebrush habitat.	**Objective 3.1** Identify incentives that are counter productive to the retention of sage-grouse habitat.
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 3:** Adjust incentives to encourage the retention and restoration of sagebrush habitat.	**Objective 3.2** Modify and fund existing programs to encourage the retention of sage-grouse habitat (e.g. Grasslands Reserve Program, Landowner Incentive Program) and restoration of sage-grouse habitat (CRP).
Habitat Conservation and Land Use	**Agricultural Lands**	**Goal 3:** Adjust incentives to encourage the retention and restoration of sagebrush habitat.	**Objective 3.3** Prioritize re-enrollment of CRP lands providing habitat or adjacent to existing sage-grouse populations or other sensitive or declining species.
Habitat Conservation and Land Use	**Fences**	**Goal 1:** Summarize or quantify the direct and indirect effects of fences on sage-grouse	**Objective 1.1:** Compile and analyze all known accounts of direct and indirect impacts of fencing on sage grouse and similar species to identify high risk situations.
Habitat Conservation and Land Use	**Fences**	**Goal 2:** Compile all known efforts regarding fence design, siting or modifications that have been used to mitigate the potential effect of fences on sage-grouse.	**Objective 2.1:** Compile and analyze all known anecdotal observations, research and/or case studies regarding fence design, siting and modifications that have been implemented to mitigate the direct and indirect impacts of fencing on sage grouse and similar species.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Fences**	**Goal 3:** Implement and evaluate/monitor the effectiveness of proposed fence design, siting and modifications on mitigation direct and indirect impacts on sage-grouse.	**Objective 3.1** Conduct site specific evaluation of fence designs or modifications proposed to mitigate the direct and indirect impacts on sage-grouse. The site specific locations would be identified under Objective 1.1.
Habitat Conservation and Land Use	**Fences**	**Goal 4.** Disseminate the results of the work conduct under Objectives 1-3.	**Objective 4.1** Publish site-specific fencing best management recommendations regarding design, siting and modifications that demonstrate the greatest potential to mitigate the direct and indirect impacts on sage-grouse.
Habitat Conservation and Land Use	**Fences**	**Goal 4.** Disseminate the results of the work conduct under Objectives 1-3.	**Objective 4.2** Promote and distribute site-specific fencing best management recommendations regarding design, siting and modifications that demonstrate the greatest potential to mitigate the direct and indirect impacts on sage-grouse.
Habitat Conservation and Land Use	**Surface Hydrology**	**Goal 1:** Determine the effects of water management on the sagebrush biome.	**Objective 1.1:** Assess climate records and other available data for selected locations in the sagebrush biome, for extreme precipitation events and runoff events that may have impacted sage-grouse or sagebrush.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Surface Hydrology**	**Goal 1:** Determine the effects of water management on the sagebrush biome.	**Objective 1.2:** Test the hypothesis of how changes in water management can increase the productivity of sagebrush ecosystems and enhance sage-grouse populations. This should include a detailed investigation in strategically-selected sagebrush habitats, to assess the importance of surface water flow (including nutrients and sediments) for the maintenance of sagebrush habitats.
Habitat Conservation and Land Use	**Infrastructure: Energy Corridors**	**Goal 1:** Evaluate effects of existing energy corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.	**Objective 1.1:** Review existing research studies and monitoring data for effects of energy corridors and associated facilities on Greater sage-grouse or sagebrush habitat.
Habitat Conservation and Land Use	**Infrastructure: Energy Corridors**	**Goal 1:** Evaluate effects of existing energy corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.	**Objective 1.2:** Design and conduct additional research and monitoring studies to determine effects of existing and proposed energy corridors and associated facilities on sage-grouse and sagebrush habitat.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Infrastructure: Energy Corridors**	**Goal 2:** Based on research and monitoring data, develop consistent criteria and management guidelines to locate energy corridors and operate and maintain facilities within energy corridors that cross critical sage-grouse habitat in a manner that minimizes impacts to sage-grouse and sagebrush habitat.	**Objective 2.1:** Develop siting criteria and management guidelines for locating energy corridors and operating facilities within energy corridors to minimize impacts.
Habitat Conservation and Land Use	**Infrastructure: Energy Corridors**	**Goal 3:** Cooperatively develop and adopt appropriate mitigation measures and best management practices for constructing new facilities within energy corridors and conducting operation and maintenance activities associated with facilities within energy corridors that will minimize impacts to sage-grouse and sagebrush habitat.	**Objective 3.1:** Develop mitigation measures and best management practices for construction and operation of new facilities within energy corridors.
Habitat Conservation and Land Use	**Infrastructure: Energy Corridors**	**Goal 4:** Cooperatively develop and implement appropriate monitoring plans to assess effects of new facilities within energy corridors on sage-grouse and sagebrush habitat and adjust mitigation measures and best management practices based on monitoring results.	**Objective 4.1:** Develop and implement monitoring plans to measure effects of facilities within energy corridors on sage-grouse and sagebrush habitats.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Infrastructure: Energy Corridors**	**Goal 4:** Cooperatively develop and implement appropriate monitoring plans to assess effects of new facilities within energy corridors on sage-grouse and sagebrush habitat and adjust mitigation measures and best management practices based on monitoring results.	**Objective 4.2:** Adjust mitigation measures and BMPs based on monitoring results.
Habitat Conservation and Land Use	**Infrastructure: Fences**	**Goal 1:** Design, site, or modify fences to avoid, reduce, and where possible, eliminate injuries to and mortality of greater sage-grouse.	**Objective 1.1:** Estimate risk of collisions of greater sage-grouse with fences by fence type (2, 3, 4, 5-strand, sheep-tight, electric, wood or metal posts, etc.).
Habitat Conservation and Land Use	**Infrastructure: Fences**	**Goal 1:** Design, site, or modify fences to avoid, reduce, and where possible, eliminate injuries to and mortality of greater sage-grouse.	**Objective 1.2:** Estimate risk of collisions associated with fence placement where greater sage-grouse may intersect fences (winter, breeding, brooding, etc.).
Habitat Conservation and Land Use	**Infrastructure: Fences**	**Goal 1:** Design, site, or modify fences to avoid, reduce, and where possible, eliminate injuries to and mortality of greater sage-grouse.	**Objective 1.3:** Develop and implement fence design and placement standards to reduce or eliminate injuries and mortalities to greater sage-grouse.
Habitat Conservation and Land Use	**Infrastructure: Fences**	**Goal 1:** Design, site, or modify fences to avoid, reduce, and where possible, eliminate injuries to and mortality of greater sage-grouse.	**Objective 1.4:** Inventory and replace or relocate fences (over time) that are poorly designed or placed so that injuries and mortalities of greater sage-grouse are reduced or eliminated.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Infrastructure: Roads & Railroads**	**Goal 1:** Evaluate effects of existing roads, trails and railroad corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.	**Objective 1.1:** Review existing available published research and monitoring data for effects of roads and railroads sage-grouse, related species, or sagebrush habitat
Habitat Conservation and Land Use	**Infrastructure: Roads & Railroads**	**Goal 1:** Evaluate effects of existing roads, trails and railroad corridors and associated facilities on sage-grouse and sagebrush habitat. Potential effects may include habitat fragmentation, providing conduits for spread of invasive species, noise disturbance, etc.	**Objective 1.2:** Design and implement additional research and monitoring studies to fill information gaps related to effects of existing and potential roads or railroads on sage-grouse and sagebrush habitat.
Habitat Conservation and Land Use	**Infrastructure: Roads & Railroads**	**Goal 2:** Develop consistent criteria and management guidelines to locate, construct, maintain, or close roads and railroads, to minimize impacts to sage-grouse and sagebrush habitat.	**Objective 2.1**: Cooperatively develop management guidelines or best management practices for locating, constructing, maintaining, or closing roads, trails, and rail systems.
Habitat Conservation and Land Use	**Infrastructure: Roads & Railroads**	**Goal 3:** Implement appropriate mitigation measures or best management practices for constructing and maintaining roads and railroads within sagebrush habitat that will minimize impacts to sage-grouse and sagebrush habitat.	**Objective 3.1**: Implement mitigation measures or best management practices for construction and maintenance of new roads and railroads.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Infrastructure: Roads & Railroads**	**Goal 4:** Cooperatively develop monitoring plans to assess effects of roads and railroads and to measure effectiveness of BMPs and mitigation measures in minimizing effects of roads on sage-grouse and sagebrush habitat.	**Objective 4.1:** Develop monitoring plans to measure effectiveness of BMPs and mitigation measures in minimizing effects of roads and railroads on sage-grouse and sagebrush habitats.
Habitat Conservation and Land Use	**Infrastructure: Roads & Railroads**	**Goal 4:** Cooperatively develop monitoring plans to assess effects of roads and railroads and to measure effectiveness of BMPs and mitigation measures in minimizing effects of roads on sage-grouse and sagebrush habitat.	**Objective 4.2:** Adjust mitigation measures and BMPs based on monitoring results.
Habitat Conservation and Land Use	**Infrastructure: Tall Structures**	**Goal 1:** Compile and evaluate existing published research on effects to Greater sage-grouse due to direct impacts of existing tall structures.	**Objective 1.1:** Evaluate adequacy of existing research information to assess or predict potential direct impacts of tall structures.
Habitat Conservation and Land Use	**Infrastructure: Tall Structures**	**Goal 2:** Develop research protocols for conducting new studies to assess direct impacts of tall structures.	**Objective 2.1:** Develop peer reviewed and scientific protocols to assess impacts of tall structures and potential mitigation methods.
Habitat Conservation and Land Use	**Infrastructure: Tall Structures**	**Goal 3:** Develop scientific and consistent siting and Operation & Maintenance (O&M) criteria for "tall structures" in Greater sage-grouse habitat that will minimize negative impacts on Greater sage-grouse.	**Objective 3.1:** Compile existing siting and O&M criteria or conditions in federal, state and local working group plans pertaining to tall structures.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Infrastructure: Tall Structures**	**Goal 3:** Develop scientific and consistent siting and Operation & Maintenance (O&M) criteria for "tall structures" in Greater sage-grouse habitat that will minimize negative impacts on Greater sage-grouse.	**Objective 3.2:** Develop consistent siting guidelines for tall structures.
Habitat Conservation and Land Use	**Infrastructure: Tall Structures**	**Goal 4:** Develop best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with tall structures.	**Objective 4.1:** Cooperatively develop best management practices and appropriate mitigation measures.
Habitat Conservation and Land Use	**Infrastructure: Urban/Exurban Development**	**Goal 1:** Avoid or minimize incursion of urban and exurban development into greater sage-grouse habitats.	**Objective 1.1:** Identify sage-grouse habitats most at risk to urban and exurban development.
Habitat Conservation and Land Use	**Infrastructure: Urban/Exurban Development**	**Goal 1:** Avoid or minimize incursion of urban and exurban development into greater sage-grouse habitats.	**Objective 1.2:** Promote efforts to maintain ecologically sustainable private lands and economically viable ranches in sage-grouse habitats.
Habitat Conservation and Land Use	**Infrastructure: Urban/Exurban Development**	**Goal 1:** Avoid or minimize incursion of urban and exurban development into greater sage-grouse habitats.	**Objective 1.3:** Develop and implement governmental land management agency land tenure policies to acquire, maintain, or enhance greater sage-grouse habitats.
Habitat Conservation and Land Use	**Dispersed Recreation**	**Goal 1:** Manage dispersed recreational activities to avoid, reduce, and where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.	**Objective 1.1:** Review what is known about impacts of dispersed recreation on greater sage-grouse.

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Dispersed Recreation**	**Goal 1:** Manage dispersed recreational activities to avoid, reduce, and where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.	**Objective 1.2:** Review what is known about effects of dispersed recreational activities on greater sage-grouse habitat.
Habitat Conservation and Land Use	**Dispersed Recreation**	**Goal 1:** Manage dispersed recreational activities to avoid, reduce, and where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.	**Objective 1.3:** Develop management practices to avoid, reduce, or eliminate disturbance to or displacement of greater sage-grouse and effects to greater sage-grouse habitat from dispersed recreational activities.
Habitat Conservation and Land Use	**Dispersed Recreation**	**Goal 1:** Manage dispersed recreational activities to avoid, reduce, and where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.	**Objective 1.4:** Implement management practices to avoid, reduce, or eliminate negative impacts of recreational activities on greater sage-grouse and their habitat.
Habitat Conservation and Land Use	**Non-Renewable Energy**	**Goal 1**: Enhanced Greater Sage-grouse habitats and populations, with assurance of no 'net loss' of habitat or grouse populations, at an appropriate spatial and temporal scale, while providing for non-renewable resource development and utilization.	**Objective 1.1:** Develop no 'net loss' criteria and methods to accurately assess current habitat/population status, potential impacts and mitigation needs (e.g. habitat equivalency, mitigation ratios, mitigation banking), and mechanisms for implementation. *The Framework Team needs to apply across all land uses.*

Issue	Subissue	Goal	Objective
Habitat Conservation and Land Use	**Non-Renewable Energy**	**Goal 1**: Enhanced Greater Sage-grouse habitats and populations, with assurance of no 'net loss' of habitat or grouse populations, at an appropriate spatial and temporal scale, while providing for non-renewable resource development and utilization.	**Objective 1.2:** Synthesize existing and develop new technologies and practices that off-set, reduce and/or minimize disturbance associated with resource recovery activities. Disseminate technologies and practices through a central repository.
Habitat Conservation and Land Use	**Non-Renewable Energy**	**Goal 1**: Enhanced Greater Sage-grouse habitats and populations, with assurance of no 'net loss' of habitat or grouse populations, at an appropriate spatial and temporal scale, while providing for non-renewable resource development and utilization.	**Objective 1.3:** Develop and implement voluntary incentive programs for mitigation
Habitat Restoration	**Conifer Encroachment**	**Goal 1:** Identify and map the threat of encroachment of conifer species within greater sage-grouse habitats.	**Objective 1.1:** Develop, apply, and evaluate models to provide spatial estimates of risk of encroachment of conifer species by 2010.
Habitat Restoration	**Conifer Encroachment**	**Goal 1:** (Short term) Identify and map the current extent and future threat of encroachment of conifer species within greater sage-grouse habitats.	**Objective 1.2:** (Short term) Develop, apply, and evaluate models to provide spatial estimates of risk of encroachment of conifer species by 2010.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Conifer Encroachment**	**Goal 2:** In order to support defensible and well-informed resource management decisions to benefit sage grouse, synthesize information on the habitat relationships of wildlife associated with pinyon-juniper and other conifers (all phases) which have invaded sagebrush habitats.	**Objective 2.1:** (Short term) Initiate a comprehensive synthesis of habitat relationships for plant and animal species of concern (e.g., ferruginous hawk, gray vireo, juniper titmouse, pinyon jay) to define high-quality habitat and identify species needs associated with conifer encroachment by 2008.
Habitat Restoration	**Conifer Encroachment**	**Goal 2:** In order to support defensible and well-informed resource management decisions to benefit sage grouse, synthesize information on the habitat relationships of wildlife associated with pinyon-juniper and other conifers (all phases) which have invaded sagebrush habitats.	**Objective 2.2:** (Short term) Based on information gaps identified under objective 1, initiate research and/or monitoring to fill these gaps about species of concern by 2010.
Habitat Restoration	**Conifer Encroachment**	**Goal 2:** In order to support defensible and well-informed resource management decisions to benefit sage grouse, synthesize information on the habitat relationships of wildlife associated with pinyon-juniper and other conifers (all phases) which have invaded sagebrush habitats.	**Objective 2.3:** (Short term) Incorporate the results of these studies into plans (e.g. LWGs, LUPs, statewide plans, NEPA analyses) to manage conifer encroachment into greater sage-grouse habitat.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Conifer Encroachment**	**Goal 2:** In order to support defensible and well-informed resource management decisions to benefit sage grouse, synthesize information on the habitat relationships of wildlife associated with pinyon-juniper and other conifers (all phases) which have invaded sagebrush habitats.	**Objective 2.4:** (Short term): Initiate research and/or monitoring to understand the effects of management actions on the species of concern and their habitats by 2010
Habitat Restoration	**Conifer Encroachment**	**Goal 3:** Develop and implement control measures for encroaching conifer species within greater sage-grouse habitat.	**Objective 3.1:** (Short term) Identify by 2010 sites of conifer encroachment that still have an understory of sagebrush and native perennial species and treat (this objective may need some work since we said in our goal statement that we would "develop **and implement** control measures"; assign a high priority for treatment since they have higher likelihood of successful rehabilitation than areas where the sagebrush understory has been depleted.
Habitat Restoration	**Conifer Encroachment**	**Goal 3:** Develop and implement control measures for encroaching conifer species within greater sage-grouse habitat.	**Objective 3.2:** (Short-term) Identify by 2010 former sagebrush sites with a conifer overstory that have a depleted sagebrush and native perennial herbaceous understory; develop specific restoration plans that maximize removal of encroaching species and recovery of sagebrush and associated understory species.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Conifer Encroachment**	**Goal 3:** Develop and implement control measures for encroaching conifer species within greater sage-grouse habitat.	**Objective 3.3:** (Mid term) Initiate research to identify effective integrated treatment methods (e.g., fire, mechanical treatment, herbicides) and apply those methods where appropriate by 2015.
Habitat Restoration	**Conifer Encroachment**	**Goal 3:** Develop and implement control measures for encroaching conifer species within greater sage-grouse habitat.	**Objective 3.4:** (Short term) Based on an evaluation of current practices and guidance, refine and implement guidelines for reducing negative impacts of conifer control activities on greater sage-grouse populations and their habitats by 2007.
Habitat Restoration	**Conifer Encroachment**	**Goal 4:** Develop and implement a long term monitoring program designed to evaluate the effectiveness of methods to control conifer encroachment into greater sage-grouse habitat.	**Objective 4.1:** (Long term) Develop common protocols and standardized procedures by 2008 for recording treatments and results of monitoring efforts.
Habitat Restoration	**Conifer Encroachment**	**Goal 4:** Develop and implement a long term monitoring program designed to evaluate the effectiveness of methods to control conifer encroachment into greater sage-grouse habitat.	**Objective 4.2:** (Short term) Develop a rangewide common database by 2007 where managers and researchers can record completed and ongoing pinyon, juniper and other coniferous species removal projects.
Habitat Restoration	**Conifer Encroachment**	**Goal 5:** Integrate and coordinate conifer control efforts within greater sage-grouse habitat to increase effectiveness.	**Objective 5.1:** (Short term) Develop partnerships among regional public and private land management entities by 2008 to develop and implement identified objectives.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Conifer Encroachment**	**Goal 5:** Integrate and coordinate conifer control efforts within greater sage-grouse habitat to increase effectiveness.	**Objective 5.2:** (Short term) Develop and conduct integrated training on the management of conifer encroachment by 2008 (including mechanisms for encroachment, ecological conditions that facilitate encroachment, and methods of treating encroachments).
Habitat Restoration	**Conifer Encroachment**	**Goal 6:** Increase the efficiency/efficacy of conducting conifer removal in greater sage-grouse habitats.	**Objective 6.1** (Mid term): Develop incentives by 2015 for private contractors to remove encroaching conifers to accomplish sage grouse habitat improvement objectives across all land ownerships.
Habitat Restoration	**Conifer Encroachment**	**Goal 6:** Increase the efficiency/efficacy of conducting conifer removal in greater sage-grouse habitats.	**Objective 6.2** (Mid term): Expand and promote incentives for conifer removal on private lands for improving sage grouse habitat
Habitat Restoration	**Conifer Encroachment**	**Goal 6:** Increase the efficiency/efficacy of conducting conifer removal in greater sage-grouse habitats.	**Objective 6.3:** Increase availability of equipment (such as masticators, grinders, chippers) within agencies and to operators by 2009 (see subissue strategy related to planting expertise for specifics).
Habitat Restoration	**Conifer Encroachment**	**Goal 6:** Increase the efficiency/efficacy of conducting conifer removal in greater sage-grouse habitats.	**Objective 6.4** (Short, Mid, and Long term): Promote programmatic integration of wildland fire & fuels management planning and implementation with conifer treatment activities at local, regional, and rangewide scales.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Conifer Encroachment**	**Goal 6:** Increase the efficiency/efficacy of conducting conifer removal in greater sage-grouse habitats.	**Objective 6.5** (Short term): Improve the ability by 2008 of federal agencies to meet their mandates for environmental and archaeological reviews of sites proposed for conifer removal in a timely manner.
Habitat Restoration	**Conifer Encroachment**	**Goal 7:** Streamline procurement and contracting procedures to facilitate timely and effective interagency conifer treatments and other restoration activities.	**Objective 7.1:** Evaluate and modify existing procedures to streamline procurement and contracting and to facilitate seamless interagency programs.
Habitat Restoration	**Conifer Encroachment**	**Goal 7:** Streamline procurement and contracting procedures to facilitate timely and effective interagency conifer treatments and other restoration activities.	**Objective 7.2**: Increase procurement and contracting staffing
Habitat Restoration	**Conifer Encroachment**	**Goal 7:** Streamline procurement and contracting procedures to facilitate timely and effective interagency conifer treatments and other restoration activities.	**Objective 7.3**: Increase trained field staff to serve as contract administrators, inspectors, and contracting officer representatives (COR)
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 1:** Establish a realistic extent (acres and/or percentage of historic) of range that can be restored to support the needs of sage-grouse by December 2006.	**Objective 1.1** (short-term): Standardize a protocol for characterizing the restoration potential of particular habitats that have been degraded.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 1:** Establish a realistic extent (acres and/or percentage of historic) of range that can be restored to support the needs of sage-grouse by December 2006.	**Objective 1.2 (short-term):** Determine area of historic range (acres) that is "unlikely" to be restored without substantial mechanical involvement or cost by 12/2006. Do this in consort with LWGs.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 1:** Establish a realistic extent (acres and/or percentage of historic) of range that can be restored to support the needs of sage-grouse by December 2006.	**Objective 1.3** (short-term): Determine the number of acres or percentage of range that is likely to be restored with adjustments in management, limited mechanical involvement, and/or reasonable cost.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 2:** Ensure that restoration techniques are ecologically sound and attainable.	**Objective 2.1** (short-term): Determine desired future condition: What attributes are we seeking.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 2:** Ensure that restoration techniques are ecologically sound and attainable.	**Objective 2.2** (short-term): Establish a user guide to restoring sagebrush habitats based on information currently available (is this CIRP?).
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 2:** Ensure that restoration techniques are ecologically sound and attainable.	**Objective 2.3** (long-term): Support technical assistance and workshops that demonstrate restoration efforts that worked and did not work.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 2:** Ensure that restoration techniques are ecologically sound and attainable.	**Objective 2.4** (mid-term): Establish a research and monitoring program to evaluate the effectiveness of treatments and management adjustments in meeting restoration goals; include clearinghouse for distributing knowledge from monitoring.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 3:** Restore number of acres or percentage of range from Goal #1 above by the year 2030 (or 2040?).	**Objective 3.1** (short-term): Determine a prioritized list of sites from the exercise in Goal #1 to restore.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 3:** Restore number of acres or percentage of range from Goal #1 above by the year 2030 (or 2040?).	**Objective 3.2** (short term): In consort with LWGs, develop restoration work plan(s) which establishes actions to implement restoration in priority areas. Include, as appropriate, NEPA compliance.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 3:** Restore number of acres or percentage of range from Goal #1 above by the year 2030 (or 2040?).	**Objective 3.3** (long-term): Restore degraded sites on public, private and tribal lands where feasible
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 3:** Restore number of acres or percentage of range from Goal #1 above by the year 2030 (or 2040?).	**Objective 3.4** (long-term): Optimize post-fire restoration efforts so that goals/objectives include restoring sagebrush/sage-grouse habitat needs.
Habitat Restoration	**Range-wide habitat restoration assessment & planning**	**GOAL 4:** Develop and Implement Coordinated and Targeted (enforcement and restoration) restoration efforts across jurisdictional or state boundaries [*Cross Reference with Work Group #3: Integration and coordination across range and jurisdictions, Sub-Issue 4 (Coordinated restoration on broad scale)*]	**Objective 4.1:** Based on work plan described above, coordinate plans across state and regional boundaries.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Native seed availability**	**Goal 1:** Develop a regional assemblage of species that are site adapted and available in quantities needed to implement restoration priority projects/actions. Increase the availability of seed and restoration methods/expertise to restore plant COMMUNITIES, not just individual plant species.	**Objective 1.1 – Research:** Establish regionally-based research programs to develop procedures to grow and produce the desired seed species (crosswalk with science group).
Habitat Restoration	**Native seed availability**	**Goal 1:** Develop a regional assemblage of species that are site adapted and available in quantities needed to implement restoration priority projects/actions. Increase the availability of seed and restoration methods/expertise to restore plant COMMUNITIES, not just individual plant species.	**Objective 1.2 – Define specific species and quantities needed**: determine and develop individual species that will be required and the amount of seed to restore sagebrush habitats identified as having the potential for restoration and the amounts of seed needed on an annual basis (under the previous habitat restoration goal - not just native species, includes site-adapted non-native species).
Habitat Restoration	**Native seed availability**	**Goal 1:** Develop a regional assemblage of species that are site adapted and available in quantities needed to implement restoration priority projects/actions. Increase the availability of seed and restoration methods/expertise to restore plant COMMUNITIES, not just individual plant species.	**Objective 1.3 – Developing and Facilitating Commercially Available Seed:** Develop programs to assure commercial production and availability of individual species (see Idaho seed strategy; SEAM) (surface environment and mining strategy) in the quantities needed to implement restoration projects.

Issue	Subissue	Goal	Objective
Habitat Restoration	**Native seed availability**	**Goal 1:** Develop a regional assemblage of species that are site adapted and available in quantities needed to implement restoration priority projects/actions. Increase the availability of seed and restoration methods/expertise to restore plant COMMUNITIES, not just individual plant species.	**Objective 1.4 – Warehousing and Distribution:** Develop regional seed warehousing or means to supply seed to cooperating users.
Habitat Restoration	**Planting expertise**	**Goal 1:** Plan and conduct research to increase knowledge about restoration methods and their effects in the full range of habitat types and degrees of disturbance.	**Objective 1.1:** Produce and maintain synthesis of research and information about restoration methods and effects
Habitat Restoration	**Planting expertise**	**Goal 1:** Plan and conduct research to increase knowledge about restoration methods and their effects in the full range of habitat types and degrees of disturbance.	**Objective 1.2:** Implement monitoring, research, and development program to test, refine, and apply improved planting techniques.
Habitat Restoration	**Planting expertise**	**Goal 1:** Plan and conduct research to increase knowledge about restoration methods and their effects in the full range of habitat types and degrees of disturbance.	**Objective 1.3:** Design restoration projects to incorporate research questions
Habitat Restoration	**Planting expertise**	**GOAL 2:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish rangewide restoration goals & priorities.	**Objective 2.1:** Inventory & assess current human resources knowledge & capability (who knows what & where are they located) & identify gaps and priority needs

Issue	Subissue	Goal	Objective
Habitat Restoration	**Planting expertise**	**GOAL 2:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish rangewide restoration goals & priorities.	**Objective 2.2:** Develop dedicated cadres of restoration specialists at a regional level (consider 7 subregions) to provide on-the-ground technical assistance for planning, implementation, and monitoring.
Habitat Restoration	**Planting expertise**	**GOAL 2:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish rangewide restoration goals & priorities.	**Objective 2.3:** Provide training to field-level resource agency personnel & partners on current restoration ecology, methods & monitoring techniques.
Habitat Restoration	**Planting expertise**	**GOAL 2:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish range wide restoration goals & priorities.	**Objective 2.4:** Develop university & vocational programs to train professional restoration specialists as well as on-the-ground practitioners.
Habitat Restoration	**Planting expertise**	**GOAL 2:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish rangewide restoration goals & priorities.	**Objective 2.5:** Promote private sector capability to provide contract services.
Habitat Restoration	**Planting expertise**	**GOAL 3:** Obtain and manage specialized equipment to meet restoration goals in strategic locations	**Objective 3.1:** Inventory current specialized equipment and compare with projected needs (consider 7 subregions)

Issue	Subissue	Goal	Objective
Habitat Restoration	**Planting expertise**	**GOAL 3:** Obtain and manage specialized equipment to meet restoration goals in strategic locations	**Objective 3.2:** Acquire equipment to address shortages &/or promote private sector inventory & availability.
Habitat Restoration	**Planting expertise**	**GOAL 3:** Obtain and manage specialized equipment to meet restoration goals in strategic locations	**Objective 3.3:** In coordination with the establishment of regional seed warehousing, co-locate equipment in selected strategic locations based on projected restoration project needs.
Habitat Restoration	**Planting expertise**	**GOAL 3:** Obtain and manage specialized equipment to meet restoration goals in strategic locations	**Objective 3.4:** Implement monitoring, research, and development program to test, refine, and apply improved & durable equipment.
Habitat Restoration	**Planting expertise**	**GOAL 4:** Refine and develop mechanism(s) to facilitate rangewide information sharing in a timely and user friendly manner.	**Objective 4.1:** Produce tools which make best available knowledge accessible and responsive to needs throughout the range (e.g. website, newsletter, symposia, workshops, on-line training, blog, training sessions).
Habitat Restoration	**Planting expertise**	**GOAL 4:** Refine and develop mechanism(s) to facilitate rangewide information sharing in a timely and user friendly manner.	**Objective 4.2:** Establish a central information clearinghouse for people seeking current knowledge about sage grouse habitat restoration from soup to nuts.
Habitat Restoration	**Planting expertise**	**GOAL 4:** Refine and develop mechanism(s) to facilitate rangewide information sharing in a timely and user friendly manner.	**Objective 4.3:** Utilize regional restoration cadres for technical assistance & technology transfer.

Issue	Subissue	Goal	Objective
Science, Data, Info	**Standardized vegetation and other data layer base map and access system**	**Goal 1**: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.	**Objective 1.1:** Develop a map-based locator on the SAGEMAP website for current and past research and monitoring projects in sagebrush and salt-desert shrub ecosystems.
Science, Data, Info	**Standardized vegetation and other data layer base map and access system**	**Goal 1**: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.	**Objective 1.2:** Develop an information-dissemination framework to enable coordinated exchange of sound scientific principles between partners in conservation planning efforts and increase the effectiveness of conservation strategies.
Science, Data, Info	**Standardized vegetation and other data layer base map and access system**	**Goal 1**: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.	**Objective 1.3:** Produce data layers appropriate for use in preparing ecoregional assessments. It also will identify primary land uses and changes, potential impacts to sagebrush habitats and associated wildlife, and species of concern that use sagebrush during some part of their life-cycle. Includes the development and maintenance of an updated map of vegetation.

Issue	Subissue	Goal	Objective
Science, Data, Info	**Standardized vegetation and other data layer base map and access system**	**Goal 1**: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.	**Objective 1.4:** Develop a natural resource information portal for the sage grouse and sage ecosystems. Our goal is to provide easy access to useful information for land managers, researchers, educators, and the general public.
Science, Data, Info	**Standardized vegetation and other data layer base map and access system**	**Goal**: Develop a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems. Data layers will include vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.	**Objective 1.5:** Share data and information on sagebrush habitat and sage-grouse disease. West Nile Virus (WNV) poses a significant threat to sage grouse populations and possibly other wildlife species in sagebrush ecosystems.
Science, Data, Info	**Definition of success for sage-grouse conservation.**	**Goal 1:** Develop a definition and metrics for success or failure of conservation actions for sage grouse including population estimates	**Objective 1.1:** Produce a synthesis of information on the methods, results, effectiveness, and short-term impacts of sage-grouse habitat improvement projects and other management activities within the sagebrush ecosystem.
Science, Data, Info	**Definition of success for sage-grouse conservation.**	**Goal 1:** Develop a definition and metrics for success or failure of conservation actions for sage grouse including population estimates	**Objective 1.2:** Develop range-wide standards for sustainable sage-grouse populations with sustainable harvest

Issue	Subissue	Goal	Objective
Science, Data, Info	Definition of success for sage-grouse conservation.	**Goal 1:** Develop a definition and metrics for success or failure of conservation actions for sage grouse including population estimates	**Objective 1.3:** Determine priorities for which areas to focus conservation actions to maintain the functioning of sagebrush ecosystems.
Science, Data, Info	Definition of success for sage-grouse conservation.	**Goal 1:** Develop a definition and metrics for success or failure of conservation actions for sage grouse including population estimates	**Objective 1.4:** Develop an annual region-wide score-card
Science, Data, Info	Evaluating social and economic effects of human activities on sage grouse and habitat persistence.	**Goal 1:** Understanding the role of social and economic factors that influence human actions and decisions on the potential persistence of sage grouse and its habitat	**Objective 1.1:** Ascertain cost/benefit analysis of status quo, additional conversions and restoration for rangeland uses as well as rural and urban rangelands towns and cities and counties
Science, Data, Info	Evaluating social and economic effects of human activities on sage grouse and habitat persistence.	**Goal 1:** Understanding the role of social and economic factors that influence human actions and decisions on the potential persistence of sage grouse and its habitat	**Objective 1.2**: Determine social benefits of status quo, additional conversions and restoration for rangeland uses as well as rural and urban rangelands towns and cities and counties
Science, Data, Info	Ability to predict population outcomes/habitat as a result of vegetation change	**Goal 1:** Development of a tool kit for managers to model habitat to understand and predict sage grouse responses to management actions.	**Objective 1.1**: Develop predictive models for risk assessment and use areas for wildlife species dependent on sagebrush ecosystems
Science, Data, Info	Ability to predict population outcomes/habitat as a result of vegetation change	**Goal 1:** Development of a tool kit for managers to model habitat to understand and predict sage grouse responses to management actions.	**Objective 1.2:** Model the cumulative effect of human activities on wildland systems in the western US including the zones of influence of infrastructure features on sage grouse behavior and habitat use.

Issue	Subissue	Goal	Objective
Science, Data, Info	**Ability to predict population outcomes/habitat as a result of vegetation change**	**Goal 1:** Development of a tool kit for managers to model habitat to understand and predict sage grouse responses to management actions.	**Objective 1.3:** Determine multi-scale changes in land cover composition and configuration in sagebrush ecosystems
Science, Data, Info	**Ability to predict population outcomes/habitat as a result of vegetation change**	**Goal 1:** Development of a tool kit for managers to model habitat to understand and predict sage grouse responses to management actions.	**Objective 1.4:** Validate all models to document their effectiveness in predicting outcomes.
Science, Data, Info	**Range-wide research and monitoring collaboration and coordination**	**Goal 1:** The development of an institutional framework to create (above) collaborative effort for funding, research, monitoring and management.	**Objective 1.1:** Provide a framework to encourage data consistency, quality and compatibility
Science, Data, Info	**Range-wide research and monitoring collaboration and coordination**	**Goal 1:** The development of an institutional framework to create (above) collaborative effort for funding, research, monitoring and management.	**Objective 1.2**: Develop a coordinated program of site-specific research and monitoring projects integrated within the context of the landscape
Science, Data, Info	**Range-wide research and monitoring collaboration and coordination**	**Goal 1:** The development of an institutional framework to create (above) collaborative effort for funding, research, monitoring and management.	**Objective 1.3:** Develop a coordinated effort for securing funds for research within the sagebrush ecosystem.
Science, Data, Info	**Range-wide research and monitoring collaboration and coordination**	**Goal 1:** The development of an institutional framework to create (above) collaborative effort for funding, research, monitoring and management.	**Objective 4:** Annual inventory of research and data information needs.

Issue	Subissue	Goal	Objective
Regulatory Mechanisms	**Inconsistent and inadequate application of existing regulations and policies.**	**Goal 1:** Uniformly apply existing regulations, regulatory mechanisms, and policies within and among agencies.	**Objective 1.1**: Complete a comprehensive range-wide analysis within and among agencies to identify inconsistencies and the reasons they occur among federal, provincial, tribal, state, and local governmental entities/agencies (by 31 December 2007).
Regulatory Mechanisms	**Inconsistent and inadequate application of existing regulations and policies.**	**Goal 1:** Uniformly apply existing regulations, regulatory mechanisms, and policies within and among agencies.	**Objective 1.2**: Agencies implement corrective action plans in response to analysis and resolve inconsistencies (by 1 October 2008).
Regulatory Mechanisms	**Adequacy of regulations**	**Goal 1:** Provide a regulatory framework that maintains and enhances Greater Sage-grouse habitat and populations.	**Objective 1.1**: Evaluate the adequacy of existing regulations (by 31 December 2007).
Regulatory Mechanisms	**Adequacy of regulations**	**Goal 1:** Provide a regulatory framework that maintains and enhances Greater Sage-grouse habitat and populations.	**Objective 1.2**: Propose recommendations for regulatory change (by 1 July 2008).
Regulatory Mechanisms	**Adequacy of regulations**	**Goal 1:** Provide a regulatory framework that maintains and enhances Greater Sage-grouse habitat and populations.	**Objective 1.3:** Agency implementation by (1 January 2010).
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Current approaches**	**Goal 1:** Long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.	**Objective 1.1** (short term): Facilitate coordinated, integrated conservation planning across the range.

Issue	Subissue	Goal	Objective
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Current approaches**	**Goal 2:** To insure cumulative effects are addressed (biological and socio-economic) across the range	**Objective 2.1:** To Identify mechanisms to assess and address cumulative effects (biological and socio-economic) across the range.
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Sharing scientific and management information and learning among local working groups and other sage-grouse stakeholders.**	**Goal 1:** Identify barriers and current level and efficacy of information sharing and learning that has occurred between LWGs, and others involved in sage-grouse conservation efforts.	Objective 1.1: Conduct a needs assessment of local working groups
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Sharing scientific and management information and learning among local working groups and other sage-grouse stakeholders.**	**Goal 1:** Identify barriers and current level and efficacy of information sharing and learning that has occurred between LWGs, and others involved in sage-grouse conservation efforts.	**Objective 1.2:** Enhance existing and/ or develop new mechanisms by which information from LWGs and others, could be stored, shared and utilized for shared learning among sage-grouse organizations.
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Inconsistency in policy and coordination across jurisdictional boundaries.**	**Goal 1:** Coordinated policies that enhance sage-grouse conservation efforts at multiple levels.	**Objective 1.1**: Complete an analysis of land management policies and land management plan direction to identify inconsistencies among federal, state, local, provincial, and tribal policies that create barriers that may inhibit sage-grouse conservation.
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Inconsistency in policy and coordination across jurisdictional boundaries.**	**Goal 1:** Coordinated policies that enhance sage-grouse conservation efforts at multiple levels.	**Objective 1.2**: Agencies and LWGs act to resolve inconsistencies that may inhibit sage-grouse conservation.

Issue	Subissue	Goal	Objective
INTEGRATION AND COORDINATION ACROSS RANGE AND JURISDICTIONS	**Inconsistency in policy and coordination across jurisdictional boundaries.**	**Goal 2:** Federal, state, and LWG practices will meet PECE guidelines.	**Objective 2.1**: Federal, state, and LWG demonstrate how elements of the Policy for Evaluation of Conservation Efforts (PECE) of the U.S. Fish and Wildlife Service are being implemented.

APPENDIX C3A

Facilitating Objectives
For Forum Goals and Objectives

APPENDIX C3A

Facilitating Objectives/Facilitating Conservation Strategies

The objectives below are tiered to, and complement, the goals and objectives developed during the Range-wide Conservation Issues Forum. They were developed to address issues that, due to time constraints or other reasons, were unable to be addressed by the Forum.

Issue	Sub-issue	Goal	Facilitating Objective
Integration and Coordination Across Range and Jurisdictions	Inconsistency in policy and coordination across jurisdictional boundaries	1. Coordinated policies that enhance sage-grouse conservation efforts at multiple levels	1.3. Complete an analysis of land management policies and land management plan direction within agencies and organizations to identify coordination and policy inconsistencies that may inhibit sage-grouse conservation, and take remedial action. Although this could be construed as a variation Objective 1.1, the intent here is to look not only across agencies/other entities for inconsistencies, but also within them.
Integration and Coordination Across Range and Jurisdictions	Current approaches	1. Long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.	1.2 Develop formal guidelines for translocations of prairie grouse species that address translocation standards, prioritization of translocation projects, and source population identification.
Integration and Coordination Across Range and Jurisdictions	Current approaches	1. Long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.	1.3 Integrate sage-grouse conservation efforts with broader multi-species conservation programs wherever practicable.

Issue	Sub-issue	Goal	Facilitating Objective
Integration and Coordination Across Range and Jurisdictions	Current approaches	1. Long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.	1.4 Identify by, agency and other organizations, the long-term workforce (FTE) necessary to fully implement, or support implementation of, conservation plans.
Integration and Coordination Across Range and Jurisdictions	Current Approaches	2. To insure cumulative effects are addressed (biological and socio-economic) across the range	2.2 Establish the seven Sage-grouse Management Zones described in Chapter 1 as strategic management units for assessing and addressing cumulative effects across the range.
Habitat Conservation and Land Use	Non-Renewable Resources	1. Enhanced Greater Sage-grouse habitats and populations, with assurance of no "net loss" of habitat or grouse populations, at an appropriate spatial and temporal scale, while providing for non-renewable resource development and utilization.	1.4: In conjunction with developing "no net loss" and mitigation needs criteria, ensure that sage-grouse population or sub-population source habitats and key seasonal habitats critical to their persistence are identified through actions carried out under Objective 1.1 of Forum Report Habitat Conservation and Land Use Goal 1, "In concert with LWGs, identify, prioritize and map important habitats and areas for conservation and protection across the range."

APPENDIX C4

Appendix 4
of the
Final Report of the
Greater Sage-grouse Range-wide Issues Forum

Synthesized Rated Goals

A note about the rating: *Any single goal could receive 2-6 points per person per region (west/east). The combined ratings from the Integration Team ranged from 12-36 points for any single goal by region. The combined total for west and east could range from 24-72 from the 6-member Integration Team. It is important to note that the purpose of the rating was simply to identify those goals that most Forum participants felt an immediate need to address. The rating was not intended to create an absolute ranking of the goals.*

Synthesized Rated Goals
(from Forum Strategies)

Subissue	Goal	Total West	Total East	Total Combined
	[Note: High priority/critical goals were identified as those that were rated 30 or above for either the west or east regions, or had at least a 30 in one column and at least a 28 in the other for range-wide priorities/critical goals. The one exception to this was the Integration goal "Create a mechanism for sharing information among LWGs and all levels of those involved in sage-grouse conservation"....This was included as a high priority/critical goal in light of the interest expressed throughout the Forum for coordination with and among LWGs]			
Common to All				
Monitoring	**Goal:** Design and implement monitoring that addresses the effects of human activities and natural events on sage grouse and sagebrush habitat, shows trends over time, and provides the foundation for adaptive management.			
Communication	**Goal:** Maintain and distribute guidelines, techniques, best management practices, and other critical data and information for sage-grouse and sagebrush conservation through an accessible central repository.			
Habitat Conservation and Land Use				
Conservation and protection of habitats	**Goal:** Locate important and/or intact sage-grouse habitats ("save the best")	36	36	72
Invasive Plant Species	**Goal 1:** Maintain a range-wide list of invasive species posing the greatest risk to sage-grouse habitats.	24	18	42
Invasive Plant Species	**Goal 2:** Identify known locations, and areas of future risk, for the top priority invasive plant species.	30	17	47
Invasive Plant Species	**Goal 3:** Develop and implement guidelines for coordinated prevention and control of invasive plant species throughout sage-grouse habitat.	28	20	48
Livestock Grazing	**Goal 1**: Provide for livestock grazing with the assurance of 'no net loss' of sagebrush habitat or sage-grouse populations at an appropriate spatial and temporal scales.	23	19	42
Livestock Grazing	**Goal 2:** Develop and implement grazing systems and management practices that maintain the soil quality and ecological processes necessary for a properly functioning sagebrush community to address the long-term needs of sage grouse and other sagebrush associated species.	30	28	58
Agricultural Lands	**Goal 1:** Identify locations of prioritized agriculture lands that provide the greatest habitat value for sage-grouse.	22	22	44
Agricultural Lands	**Goal 2:** Develop and implement management practices for agriculture lands to protect or minimize harm to sage-grouse.	20	17	37
Agricultural Lands	**Goal 3:** Encourage the retention and restoration of sagebrush habitat.	25	25	50
Fences	**Goal 1:** Develop and implement guidelines for designing and siting new fences to avoid, reduce and, where possible, eliminate injuries to and mortality of greater sage-grouse.	23	22	45
Fences	**Goal 2:** Modify existing fences to be consistent with new guidelines to avoid, reduce and, where possible, eliminate injuries to and mortality of greater sage-grouse.	16	14	30
Surface Hydrology	**Goal:** Develop and implement guidelines to manage surface water to increase the productivity of sagebrush ecosystems and enhance sage-grouse populations.	17	18	35
Infrastructure: Energy Corridors	**Goal 1:** Develop and utilize consistent criteria and management guidelines to locate/site, energy corridors, and operate and maintain new and existing facilities within energy corridors in a manner that minimizes impacts to sage-grouse and sagebrush habitat.	23	34	57

Subissue	Goal			
Infrastructure: Energy Corridors	**Goal 2:** Develop and implement best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with energy corridors.	24	32	56
Infrastructure: Roads & Railroads	**Goal 1:** Develop and utilize consistent criteria and management guidelines to locate/site new roads and railroads, and construct, maintain, or close roads and railroads to minimize impacts to sage-grouse and sagebrush habitat.	25	29	54
Infrastructure: Roads & Railroads	Goal 2: Develop and implement best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with roads and railroads.	22	25	47
Infrastructure: Tall Structures	**Goal 1:** Develop and utilize consistent siting and operation & maintenance (O&M) criteria for “tall structures” in sage-grouse habitat that will minimize negative impacts sage-grouse.	26	27	53
Infrastructure: Tall Structures	**Goal 2:** Develop and implement best management practices (BMPs) and appropriate mitigation measures that can be implemented for siting and O&M activities associated with tall structures.	26	27	53
Infrastructure: Urban/Exurban Development	**Goal 1:** Avoid or minimize incursion of urban and exurban development into greater sage-grouse habitats.	27	27	54
Infrastructure: Urban/Exurban Development	**Goal 2:** Maintain private lands with ecologically sustainable sage-grouse habitat, and economically viable ranches in sage-grouse habitats.	23	23	46
Infrastructure: Urban/Exurban Development	**Goal 3:** Develop and implement land management agency land tenure policies to acquire, maintain, or enhance greater sage-grouse habitats.	29	29	58
Dispersed Recreation	**Goal:** Manage dispersed recreational activities to avoid, reduce and, where possible, eliminate displacement of greater sage-grouse or negative impacts to sage-grouse habitat.	30	27	57
Non-Renewable Energy	**Goal 1**: Provide for non-renewable resource development and utilization with the assurance of 'no net loss' of sagebrush habitat or sage-grouse populations at an appropriate spatial and temporal scales.	25	36	61
Non-Renewable Energy	**Goal 2:** Develop and implement technologies and practices that off-set, reduce and/or minimize disturbance to sage-grouse and their habitat associated with non-renewable resource recovery activities.	24	33	57
Habitat Restoration				0
Conifer Encroachment	**Goal 1:** Identify the locations of areas of current extent and future threat of conifer encroachment within prioritized sage-grouse habitat.	29	16	45
Conifer Encroachment	**Goal 2:** Develop and implement coordinated control measures for encroaching conifer species within prioritized sage-grouse habitat.	26	14	40
Conifer Encroachment	**Goal 3:** Increase the efficiency/efficacy of conducting conifer removal activities in prioritized sage-grouse habitats.	24	13	37
Range-wide habitat restoration assessment & planning	**Goal 1**: Implement management practices and policies, including post-treatment management, that stabilizes or recovers sagebrush steppe habitat.	28	21	49
Range-wide habitat restoration assessment & planning	**Goal 2:** Identify and restore a realistic extent (acres and/or percentage of historic) of range to support the needs of sage-grouse.	22	22	44
Range-wide habitat restoration assessment & planning	**Goal 3:** Ensure that restoration techniques are ecologically sound and practicable.	23	21	44
Native seed availability	**Goal:** Develop a regional assemblage of species that are site adapted and available in quantities needed to implement plant COMMUNITY restoration priority projects/actions.	21	19	40
Planting expertise	**Goal 1:** Develop the human resources with knowledge and expertise to plan, implement, and monitor treatments to accomplish rangewide restoration goals & priorities.	20	20	40
Planting expertise	**Goal 2:** Obtain and manage specialized equipment in strategic locations to meet restoration goals.	18	13	31
Fire	**Goal 1:** Approach management of wildland fire and fuels management in greater sage-grouse habitat in an integrated and coordinated fashion with local, state, and federal agencies and private entities.	29	26	55
Fire	**Goal 2:** Containing and suppressing wildfires in important greater sage-grouse habitats receives top priority.	33	25	58
Fire	**Goal 3:** Manage habitat mosaics and fuels in greater sage-grouse habitat to improve habitat and reduce the possibility of damaging wildfires.	23	22	45

Subissue	Goal			
	Science, Data and Information Management			
Standardized vegetation and other data layer base map and access system	**Goal 1**: Develop and implement a database of information for use in the research and management of issues concerning wildlife species and habitats in the sagebrush ecosystems: vegetation, land cover, land-use, infrastructure, habitat change, wildlife habitat, sage-grouse information, surface geology, and hydrology data.	32	31	63
Standardized vegetation and other data layer base map and access system	Goal 2: Institutionalize and expand long term existing natural resource information portals (e.g. SAGEMAP) for the sage-grouse and sagebrush ecosystems to provide easy and dependable access to useful information.	30	30	60
Standardized vegetation and other data layer base map and access system	Goal 3: Share data and information on emerging issues that pose a significant threat to sage grouse populations and sagebrush ecosystems (e.g. West Nile Virus).	23	23	46
Definition of success for sage-grouse conservation.	**Goal 1:** Establish and apply a definition and metrics for success or failure of conservation actions for sage grouse including population estimates	26	25	51
Definition of success for sage-grouse conservation.	Goal 2: Develop and implement range-wide standards for maintaining or increasing sage-grouse disribution and abundance while allowing for sustainable harvest.	21	20	41
Definition of success for sage-grouse conservation.	**Goal 3:** Identify locations of priority areas on which to focus conservation actions to maintain the function of sagebrush ecosystems.	31	32	63
Evaluating social and economic effects of human activities on sage grouse and habitat persistence.	**Goal:** Understand the role of social and economic factors that influence human actions and decisions on the potential persistence of sage grouse and its habitat.	17	17	34
Ability to predict population outcomes/habitat as a result of vegetation change	**Goal 1:** Create and utilize a tool kit for managers to model habitat to understand and predict sage grouse responses to management actions at different scales.	24	25	49
Ability to predict population outcomes/habitat as a result of vegetation change	**Goal 2:** Create and utilize a tool kit to assess and model the cumulative effect of sage-grouse and wildlands systems in the Western U.S. and Canada.	25	26	51
Range-wide research and monitoring collaboration and coordination	**Goal 1:** Create and implement an institutional framework that supports collaborative efforts for funding, research, monitoring and management.	28	28	56
Range-wide research and monitoring collaboration and coordination	**Goal 2**: Develop and implement a coordinated program of research and monitoring projects integrated within the context of the landscape.	30	29	59
	Regulatory Mechanisms			
Inconsistent and inadequate application of existing regulations and policies.	**Goal:** Uniformly apply existing regulations, regulatory mechanisms, and policies within and among agencies.	27	26	53
Adequacy of regulations	**Goal:** Develop and implement a regulatory framework that maintains and enhances Greater Sage-grouse habitat and populations.	28	28	56
	Integration and Coordination Across Range and Jurisdictions			
Current Approaches	**Goal:** Create long-term shared leadership and commitment resulting in implementation and evaluation of plans that integrate conservation issues throughout the range.	30	29	59
Sharing scientific and management information	**Goal 1:** Share scientific information, lessons learned and effective management practices effectively and efficiently among LWGs and at all levels of those involved in sage-grouse conservation.	26	27	53
Sharing scientific and management information	**Goal 2:** Create a mechanism for sharing information among LWGs and all levels of those involved in sage-grouse conservation to enable measurement of cumulative effects on sage-grouse habitats.	29	29	58
Inconsistency in policy and coordination across jurisdictional boundaries.	**Goal 1**: Resolve inconsistencies among federal, state, local, provincial, and tribal policies that may inhibit sage-grouse conservation.	27	26	53

Subissue	Goal			
Inconsistency in policy and coordination across jurisdictional boundaries.	**Goal 2:** Ensure that federal, state, and LWG practices meet PECE guidelines.	27	27	54

APPENDIX D

FINDING
U.S. Fish and Wildlife Service

Endangered and Threatened Wildlife and Plants; 12-Month Finding for Petitions To List the Greater Sage-Grouse as Threatened or Endangered

Federal Register

Wednesday,
January 12, 2005

Part III

Department of the Interior

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; 12-Month Finding for Petitions To List the Greater Sage-Grouse as Threatened or Endangered; Proposed Rule

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

Endangered and Threatened Wildlife and Plants; 12-Month Finding for Petitions To List the Greater Sage-Grouse as Threatened or Endangered

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of a 12-month petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service (Service), announce a 12-month finding for three petitions to list the greater sage-grouse (*Centrocercus urophasianus*) as threatened or endangered under the Endangered Species Act of 1973, as amended. After reviewing the best available scientific and commercial information, we find that listing is not warranted. We ask the public to submit to us any new information that becomes available concerning the status of or threats to the species. This information will help us monitor and encourage the conservation of this species.

DATES: The finding announced in this document was made on January 6, 2005. Although further listing action will not result from this finding, we request that you submit new information concerning the status of or threats to this species whenever it becomes available.

ADDRESSES: Comments and materials received, as well as supporting documentation used in the preparation of this 12-month finding, will be available for inspection, by appointment, during normal business hours at the Wyoming Ecological Services Field Office, U.S. Fish and Wildlife Service, 4000 Airport Parkway, Cheyenne, Wyoming 82001. Submit new information, materials, comments, or questions concerning this species to the Service at the above address.

FOR FURTHER INFORMATION CONTACT: The Wyoming Field Office (see **ADDRESSES** section above), by telephone at (307) 772–2374, by facsimile at (307) 772–2358, or by electronic mail at *fw6_sagegrouse@fws.gov.*

SUPPLEMENTARY INFORMATION:

Background

Section 4(b)(3)(B) of the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 *et seq.*), requires that, for any petition to revise the Lists of Threatened and Endangered Wildlife and Plants that contains substantial scientific or commercial information that the action may be warranted, we make a finding within 12 months of the date of the receipt of the petition on whether the petitioned action is: (a) Not warranted, (b) warranted, or (c) warranted but precluded by other pending proposals. Such 12-month findings are to be published promptly in the **Federal Register**.

On July 2, 2002, we received a petition from Craig C. Dremann requesting that we list the greater sage-grouse (*Centrocercus urophasianus*) as endangered across its entire range. We received a second petition from the Institute for Wildlife Protection on March 24, 2003 (Webb 2002) requesting that the greater sage-grouse be listed rangewide. On December 29, 2003, we received a third petition from the American Lands Alliance and 20 additional conservation organizations (American Lands Alliance *et al.*) to list the greater sage-grouse as threatened or endangered rangewide. On April 21, 2004, we announced our 90-day petition finding in the **Federal Register** (69 FR 21484) that these petitions taken collectively, as well as information in our files, presented substantial information indicating that the petitioned actions may be warranted. In accordance with section 4(b)(3)(A) of the Act, we have now completed a status review of the best available scientific and commercial information on the species, and have reached a determination regarding the petitioned action.

This status review of the greater sage-grouse does not address our prior finding with regard to the Columbia Basin distinct population segment (DPS). On May 7, 2001, we published a 12-month finding on a petition to list the Washington population of the western subspecies of the greater sage-grouse as a distinct population segment (DPS) (66 FR 22984). Our finding included a summary of the historic distribution of what we then considered to be the western subspecies of the greater sage-grouse (see ‘‘Species Information’’ below regarding taxonomy). In our finding we determined that the population segment that remains in central Washington met the requirements of our policy for recognition as a distinct population segment (61 FR 4722) and that listing the DPS was warranted but precluded by other higher priority listing actions. Because the population in central Washington occurs entirely within the historic distribution of sage-grouse within the Columbia Basin ecosystem, we referred to it as the Columbia Basin DPS (66 FR 22984; May 7, 2001). In subsequent candidate notices of review (CNORs), including the most recent one published in the **Federal Register** on May 4, 2004 (69 FR 24875), we found that a listing proposal for this DPS was still warranted but precluded by higher priorities. Since that time new information has become available through this status review of the greater sage-grouse. We will use the best scientific and commercial information available (including, but not limited to information that became available during this rangewide status review) to reevaluate whether the Columbia Basin population still qualifies as a DPS under our DPS policy, and if it does, whether the DPS still warrants a listing proposal. Once that evaluation is completed, we will publish an updated finding for the Columbia Basin population in the **Federal Register** either in the next CNOR or in a separate notice.

Responses to Comments Received

We received 889 responses to our request for additional information in our 90-day finding for the greater sage-grouse (69 FR 21484). Those responses which contained new, updated, or additional information were thoroughly considered in this 12-month finding. We received a large number of identical or similar comments. We consolidated the comments into several categories, and provide responses as follows.

Comment 1: It is premature for the Service to consider listing the sage-grouse until the impact of local and State conservation efforts are realized.

Response 1: The Service is required under section 4 of the Act to determine whether or not listing is warranted within 12 months of receiving a petition to list a species. By publishing a positive 90-day finding in April, 2004 (69 FR 21484), we were required by the Act to immediately proceed with the completion of a 12-month finding. We have examined ongoing and future conservation efforts in our status review. This included using our Policy for Evaluation of Conservation Efforts When Making Listing Decisions (‘‘PECE’’) (68 FR 15100; March 28, 2003) to evaluate conservation efforts by State and local governments and other entities that have been planned but have not been implemented, or have been implemented but have not yet demonstrated effectiveness, to determine which such efforts met the standard in PECE for contributing to our finding. Our analysis of the best available scientific data revealed that the greater sage-grouse is not a threatened species, and in making this finding it was not necessary to rely on the contributions of any of the local, State, or other planned conservation efforts that met the standard in PECE. A summary of our process with regard to PECE is provided in the section ''Status Review Process,'' below.

Comment 2: Listing the sage-grouse could have a negative impact on the conservation efforts being implemented by States for this species.

Response 2: We appreciate the fact that prior to acceptance of the listing petitions, States within the range of the greater sage-grouse are fully engaged in developing and implementing conservation efforts for this species, and we encourage them to continue these efforts. Conservation actions which have already been implemented have been considered in this decision. However, our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of population status and threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision.

Comment 3: The facts do not support the need for listing this species.

Response 3: The Service has considered all factors potentially affecting the greater sage-grouse in our decision and agree that the listing is not warranted. We have made our decision based on the best available scientific and commercial data, as required by the Act.

Comment 4: In most western states, sage-grouse populations have been fairly steady and in some cases, increasing over the past decade.

Response 4: The Service has considered population trends in all States and Provinces, and across the entire range of the species in our status review, including localized increases.

Comment 5: Locally managed efforts are best suited to preserve and protect the greater sage-grouse.

Response 5: We acknowledge that local conservation efforts for this species are important to long-term conservation, particularly given the widespread distribution and the variety of habitats and threats. However, most of these efforts have not yet been implemented, or have not been demonstrated to be effective. Conservation actions that have already been implemented and for which effectiveness is known have been considered in this decision. Our determination of whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision. There is no one best strategy for sage-grouse conservation and we encourage the continuation of all conservation efforts to conserve the greater sage-grouse. The Service continues to support the development of a Conservation Strategy for the Greater Sage-grouse by Western Association of Fish and Wildlife Agencies (WAFWA), and supports voluntary conservation as the most effective method to protect species and their habitats.

Comment 6: The recovery process under the Endangered Species Act has a very low success rate.

Response 6: Our decision regarding the greater sage-grouse is a listing, not a recovery decision. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not its potential for recovery under the Act. Therefore, this comment may not be considered in this finding.

Comment 7: If the greater sage-grouse is listed there will be a reduction of freedom and private property rights and public land use, and therefore a negative impact on the country. Listing the grouse will also result in economic damage to many entities.

Response 7: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential social or economic implications of listing. Therefore, this comment may not be considered in this finding.

Comment 8: There will be a loss of management options for the greater sage-grouse if this species is listed.

Response 8: We are not aware of any management options that are beneficial to the greater sage-grouse that would need to be eliminated if this species is listed under the Act-an action we believe to be not warranted at this time.

Comment 9: Listing the greater sage-grouse will divide and polarize local communities.

Response 9: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential socio-political implications of listing. Therefore, this comment may not be considered in this finding.

Comment 10: Listing the greater sage-grouse will increase the workload for the U.S. Fish and Wildlife Service.

Response 10: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential increase in workload for the Service. Therefore, this comment may not be considered in this finding.

Comment 11: Listing the greater sage-grouse will result in Federal budget limitations for other Federal agencies and projects.

Response 11: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential implications for the Federal budget of listing. Therefore, this comment may not be considered in this finding.

Comment 12: Conservation planning efforts and current Federal agency actions are sufficient to conserve the greater sage-grouse.

Response 12: We acknowledge that many Federal agencies are implementing conservation measures for the greater sage-grouse, and that several conservation efforts for this species are underway. Current federal conservation efforts have been reviewed and considered in our analysis. We evaluated planned conservation efforts under PECE (see Response 1); most of the planned conservation efforts for the greater sage-grouse have not yet been implemented. However, because our analysis of the best available scientific and commercial data revealed that the greater sage-grouse is not warranted for listing under the ESA, it was not necessary to evaluate whether the planned conservation efforts that met PECE reduced the threats to the species.

Comment 13: The petition was subjected to an independent analysis and serious problems were found with the science.

Response 13: Our 90-day finding was based on the determination that the three petitions submitted met the "substantial information" threshold as defined under section 4(b)(3)(A) of the Act. At the time of the 90-day finding, we did acknowledge that two of the three petitions contained some misstatements (69 FR 21484). However, the petitions were only one information source of many we used in our review for the 90-day finding. For the current 12-month finding, we conducted an exhaustive review of the scientific literature, and included State, industry, and Federal agency data. This finding does not rely on the petitions, but rather the best scientific and commercial data available, as required by the Act.

Comment 14: The Western Governor's Association report provides additional information which should be considered.

Response 14: The Western Governor's Association report was considered in this finding.

Comment 15: Many private sector groups are taking steps to protect sage-grouse habitat.

Response 15: We acknowledge that local conservation efforts for this species are important to long-term conservation and strongly support the continuation of these efforts. Most of the planned conservation efforts for the greater sage-grouse have not yet been implemented. As explained above, in making this finding it was not necessary to rely on the contributions of any of the local, State, or other planned conservation efforts that met the standard in PECE (*see* Response 1).

Comment 16: Scientific reports detailing the sage-grouse's decline consistently declare more work is necessary to adequately assess the status of sage-grouse populations.

Response 16: We agree that additional information on populations would be useful. However, as required by the Act, the Service must use the best scientific and commercial information available when making a 12-month finding. The law does not provide a mechanism for the Service to improve the available information.

Comment 17: Hunting is allowed in most states and provides a benefit to hunters and state wildlife programs without a negative impact on sage-grouse populations.

Response 17: At this time, it is unclear what area-specific impacts sage-grouse hunting has on sage-grouse populations. Most States are currently managing their populations in conformance with the WAFWA guidelines, which contain the most up-to-date guidelines for sage-grouse management. Our review indicated that regulated hunting of sage-grouse does not pose a threat that would lead to the likely endangerment of the species in the foreseeable future.

Comment 18: Now that there is a coordinated effort to further protect the species, there is no reason to suspect that this progress will not continue.

Response 18: We acknowledge that many Federal, State, and local working groups are implementing protective measures for the greater sage-grouse, and that several conservation efforts for this species are underway, have been planned, or are in the process of being planned. Most of the planned conservation efforts for the greater sage-grouse have not yet been implemented. As explained above, in making this finding it was not necessary to rely on the contributions of any of the local, State, or other planned conservation efforts that met the standard in PECE (*see* Response 1). We strongly encourage continued efforts to preserve and protect the greater sage-grouse and its habitat.

Comment 19: The Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats provides additional information which should be considered.

Response 19: The Conservation Assessment of Greater Sage-grouse and Sagebrush Habitats report was considered in this finding.

Comment 20: The worst possible outcome is to list the sage-grouse.

Response 20: Our determination of whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision. We strongly encourage all efforts to conserve the greater sage-grouse and its habitat.

Comment 21: Predators are causing the decline of sage-grouse.

Response 21: We have considered the effects of predators and predator control in our sage-grouse analysis.

Comment 22: We need to consider the effects of hunting on sage-grouse.

Response 22: We have considered the effects of hunting in our sage-grouse analysis.

Comment 23: Sage-grouse are doing well in some areas and therefore, they should not be listed in those areas. Also, the Service should consider the need to list sage-grouse on a state-by-state basis.

Response 23: The petitions requested that we determine if the species needed to be listed across its entire range. Therefore, we have to consider the sage-grouse population range-wide. Additionally, our Policy Regarding the Recognition of Distinct Vertebrate Populations (61 FR 4722) requires that in order to consider separate populations within a species for listing under the Act, such populations must (1) be discrete in relation to the remainder of the species to which it belongs, and (2) have biological and ecological significance for the taxon. We have received no information that suggests any population of the greater sage-grouse is isolated from conspecific populations, with the exception of the Columbia Basin population in central Washington. As described above, we previously determined that a proposal to list the Columbia Basin distinct population segment is warranted but precluded by other higher priority listing actions (66 FR 22984), and in the near future we will reevaluate that determination to consider new information, including (but not limited to) information available as a result of this status review and finding on petitions to list the greater sage-grouse.

Comment 24: Drought and other weather conditions have had a major effect on sage-grouse populations.

Response 24: We acknowledge that drought and other weather conditions are a natural occurrence in the west and we have considered the effects of drought in our sage-grouse analysis.

Comment 25: It was interesting to see flocks of dozens of grouse near fences, since conventional wisdom sees fences as perches for raptors and hence areas of avoidance for raptor-wary grouse.

Response 25: We acknowledge that raptors do use fences as perch sites. Sage-grouse tend to avoid perch sites like fences but threats of raptors do not totally exclude sage-grouse use of habitat near fences.

Comment 26: The size of sage-grouse populations can be affected by habitat condition.

Response 26: We acknowledge that habitat conditions can affect local sage-grouse numbers. We have considered this information in the finding.

Comment 27: Disease is a natural event that may be negatively affecting sage-grouse.

Response 27: We have considered the effects of disease on greater sage-grouse in this finding. As identified in the Act, it is one of the threat factors we are required to consider in our status review.

Comment 28: Listing the greater sage-grouse will remove the flexibility of local planning efforts.

Response 28: We recognize that listing may affect local planning efforts, due to its effect on voluntary conservation efforts. However, we may not consider those effects under this status review.

Comment 29: Maintaining and improving habitat is the answer to increasing sage-grouse numbers.

Response 29: We concur that maintaining habitat is important for the long-term conservation of the greater sage-grouse. We strongly encourage efforts to conserve sage-grouse and sagebrush habitat.

Comment 30: Greater sage-grouse numbers and distribution have significantly declined since 1900.

Response 30: The information pertaining to the status and distribution of the greater sage-grouse has been reviewed and incorporated in our analysis. Sage-grouse abundance has been scientifically documented as declining since the 1950s, but the rate of decline has decreased since the 1980s and in some places has stabilized, or even increased.

Comment 31: Destructive land use practices and management on public and private lands are negatively affecting the greater sage-grouse.

Response 31: We have considered the effects of various uses of private and public lands on the status of the greater sage-grouse in this finding.

Comment 32: Negative impacts to the greater sage-grouse continue irrespective of efforts by State and local working groups.

Response 32: Most State and local working group conservation efforts for the greater sage-grouse have not yet been implemented, and the certainty of implementation and effectiveness of such efforts is unclear. However, we have considered all conservation efforts which have been implemented and shown to be effective. As explained above, in making this finding it was not necessary to rely on the contributions of any of the local, state, or other planned conservation efforts that met the standard in PECE (*see* Response 1).

Comment 33: Listing the sage-grouse would affect much-needed land management reform.

Response 33: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential land management implications of listing. Therefore, this comment may not be considered in this finding.

Comment 34: The ESA requires that listing decisions be based solely on the best science and biological information about the species and its habitats.

Response 34: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act.

Comment 35: Meaningful regulatory mechanisms are non-existent and existing management is inadequate to conserve the bird.

Response 35: We have considered existing regulatory mechanisms and management activities in this finding.

Comment 36: Only listing the greater sage-grouse under the Endangered Species Act will save the birds and its habitat.

Response 36: Our determination of whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision. We strongly encourage all efforts to conserve the greater sage-grouse and its habitat.

Comment 37: Listing the greater sage-grouse would benefit a variety of other sagebrush obligates and sagebrush-dependent species.

Response 37: This finding is for the greater sage-grouse only. Therefore, we cannot consider the potential impact of listing the greater sage-grouse on the status of other sagebrush-dependent species in our decision.

Comment 38: The WAFWA Conservation Assessment is disturbing in that its findings show a wide discrepancy in how States monitor greater sage-grouse.

Response 38: The WAFWA Conservation Assessment represents one component of the best available scientific and commercial data that we used in our analysis, as required by the Act. The fact that the States vary somewhat in how they conduct monitoring of this species was considered in this finding.

Comment 39: The loss of small populations of sage-grouse increases the species' risk of extinction when the species occurs primarily in spread out, island-like patches of habitat.

Response 39: We have considered the effects of small population sizes and isolated populations in our finding.

Comment 40: Current regulatory frameworks are sufficient to protect the greater sage-grouse.

Response 40: We have considered existing regulatory mechanisms and management activities in this finding and determined that existing regulatory protections in combination with the existing threats do not warrant listing the greater sage-grouse range-wide.

Comment 41: Grazing is good for sage-grouse. Improvements to grazing practices have been positive for sage-grouse.

Response 41: We have considered all aspects of grazing impacts on the greater sage-grouse in our finding.

Comment 42: Listing the greater sage-grouse will curtail energy development.

Response 42: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential land management implications of listing. We did evaluate the threat of energy development to greater sage-grouse in this finding.

Comment 43: ESA is prohibitively expensive to implement.

Response 43: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential cost of listing. Therefore, this comment may not be considered in this finding.

Comment 44: There is adequate funding available for future conservation efforts for the greater sage-grouse.

Response 44: We evaluated the certainty of funding for future conservation efforts as part of our evaluation of efforts that were subject to PECE. We encourage the continued implementation of conservation efforts for the greater sage-grouse.

Comment 45: We have additional information for your analysis.

Response 45: All relevant additional, new, or updated information received in comments submitted was thoroughly considered in this 12-month finding.

Comment 46: We have information regarding proposed actions for your analysis.

Response 46: We have examined proposed actions, consistent with PECE (68 FR 15100) in our status review. Our analysis of the best available scientific and commercial data revealed that listing the greater sage-grouse as threatened or endangered is not warranted, and in making this finding it was not necessary to rely on the contribution of any of the local, State, or other planned conservation efforts that met the standard in PECE (*see* Response 1).

Comment 47: The Service's 90-day finding did not consider all available information.

Response 47: For a 90-day finding, we are required to review the information in the petition(s), our files, and any information provided by States and Tribes. Based upon this information, the Service determines whether there is substantial information indicating that further review is necessary. We are required to consider the best available scientific and commercial data in our 12-month status review. This finding represents our conclusions based on that information.

Comment 48: Falconers take very few sage-grouse. They are a preferred species for only one extremely specialized form of falconry.

Response 48: We have considered this information in our analysis.

Comment 49: If the Service determines that listing the sage-grouse is appropriate, they will have to designate critical habitat.

Response 49: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision. We designate critical habitat for listed species as required by the Act.

Comment 50: The Service must consider the status of the sage-grouse across the entirety of its range.

Response 50: We have considered the status of the greater sage-grouse across the entirety of its range, as petitioned.

Comment 51: We do not believe that the designation of the Washington population of sage-grouse as a Distinct Population Segment (DPS) is appropriate.

Response 51: This status review of the greater sage-grouse does not address our prior finding with regard to the Columbia Basin distinct population segment (DPS). New information which has become available through this status review of the greater sage-grouse will be considered when we re-evaluate the status of the Columbia Basin population, either through an updated finding or in the next Candidate Notice of Review.

Comment 52: Managing agencies lack Best Management Practices due to the lack of support, manpower, and funding.

Response 52: We acknowledge that the extent of support, manpower, and funding may influence some aspects of the implementation of Best Management Practices (BMPs) for sage-grouse. As currently described, most BMPs are very broadly stated mitigation measures that involve incorporating project design features when various resource management activities are planned, in order to reduce or avoid impacts to species.

Comment 53: Industry has implemented many mitigation and protection measures for sage-grouse.

Response 53: We acknowledge that industries are implementing some mitigation and protective measures for sage-grouse. We evaluated all such information that was available to us. We strongly encourage the continuation of all efforts to conserve the greater sage-grouse and its habitat.

Comment 54: Listing the sage-grouse could have profound impacts on a number of military facilities.

Response 54: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, not the potential impact of listing on military facilities. Therefore, this comment may not be considered in this finding.

Comment 55: Loss of habitat to cheatgrass and juniper invasion are major threats to sage-grouse habitat. The technologies and know-how exist to eliminate or reduce the cheatgrass and juniper invasion trends.

Response 55: We acknowledge that cheatgrass and juniper invasions are threats to sage-grouse habitats. Currently, technologies have been developed or are being developed to treat problems of cheatgrass and juniper invasions. Our review found mixed results in the current technologies' ability to treat cheatgrass and juniper problems.

Comment 56: Historic declines and habitat loss are not relevant to the current listing decision.

Response 56: Our decision regarding the greater sage-grouse is based on the best available scientific and commercial data, as required by the Act. Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision, including information on historic declines and habitat loss to the extent that they contribute to current threats.

Comment 57: There is no peer-reviewed science to support a listing.

Response 57: We have reviewed scientific, peer-reviewed literature in our analysis, as well as commercial and unpublished data. The cumulative review of this information was used to determine if the greater sage-grouse warrants listing under the Endangered Species Act.

Comment 58: Most sage-grouse habitat loss due to agriculture (*i.e.*, conversion to cropland, seeding to crested wheatgrass, etc.) has been eliminated or greatly reduced. Large-scale conversions to agriculture are decreasing.

Response 58: We acknowledge that there have been changes in the rate of loss of sage-grouse habitat due to various agricultural conversions. We have considered this information in our analysis.

Comment 59: The Service must consider all listing factors when making a determination.

Response 59: Our determination regarding whether or not this species warrants listing under the Act must be based on our assessment of the threats to the species, the species' population status, and the status and trend of the species' habitat as they are known at the time of the decision. We consider the effects of all threats on the status of the species when we make our determination.

Comment 60: Present habitat provides the necessary elements to sustain a highly viable sage-grouse population.

Response 60: We have considered existing habitat conditions for the greater sage-grouse throughout its range in this finding.

Comment 61: There is insufficient funding available to adequately fund existing and proposed conservation plans for the greater sage-grouse.

Response 61: We have examined ongoing and future conservation efforts in our status review. We have examined proposed actions, consistent with PECE (68 FR 15100), in our status review, and this included consideration of funding, consistent with one of the criteria in PECE. (*See also* Response 1, above).

Comment 62: Wildfire is a threat to sage-grouse habitat and can result in habitat elimination across the species' range.

Response 62: We have considered the effects of wildfire on sage-grouse habitat in this finding.

Information Quality Act

In addition to the comments received, two Information Quality Act challenges were submitted. The challenge received from the Partnership for the West was addressed through a response directly to that organization. The second challenge from the Owyhee County Commissioners (Idaho) primarily stated that we failed to conduct an exhaustive search of all scientific literature, and other information in the completion of our 90-day finding. Section 4(b)(3)(A) of the Act only requires that the petitions present ''substantial scientific or commercial information indicating that the petitioned action may be warranted.'' The Act does not require an exhaustive search of all available information at that time. Other concerns identified in the Owyhee County Commissioner's challenge are addressed in our comment responses above, and an overall summary regarding the steps we have taken to ensure conformance with our Information Quality Guidelines is provided below.

The Service's Information Quality Guidelines define quality as an encompassing term that includes utility, objectivity, and integrity. Utility refers to the usefulness of the information to its intended users, including the public. Objectivity includes disseminating information in an accurate, clear, complete, and unbiased manner and ensuring accurate, reliable, and unbiased information. If data and analytic results have been subjected to formal, independent, external peer review, we generally will presume that the information is of acceptable objectivity. Integrity refers to the security of information—protection of the information from unauthorized access or revision, to ensure that the information is not compromised through corruption or falsification.

The Service conducted a thorough pre-dissemination review of the data it is relying on to make this 12-month finding. In particular, the Service used the information in the WAWFA Conservation Assessment, which is a peer-reviewed science document. The WAWFA assessment was based on data provided by the states, provinces, land management agencies, as well as data in published, peer-reviewed manuscripts and other verified sources available to the authors of the assessment. The draft final assessment was reviewed by State agency wildlife biologists to ensure that data submitted by each State were presented accurately and completely. The assessment also was peer reviewed by an independent group of scientists selected by the Ecological Society of America. These reviewers were experts from academia, government, and non-governmental organizations, and included researchers as well as wildlife managers.

The WAWFA Conservation Assessment assembles in one place almost all of the available pertinent data that addresses the current biological and ecological condition of the sage-grouse and its habitat. This compilation of material allows the public to see a large body of information all in one document, making the information more useful than the many separate sources of information would be. Since the document has been subject to an independent, external peer review, the Service believes it is of acceptable objectivity. For these reasons the Service believes this information meets our Information Quality Guidelines.

Status Review Process

Section 4(b)(1)(A) of the Act requires us to consider the best scientific and commercial data available as well as efforts being made by States or other entities to protect a species when making a listing decision. To meet this standard we systematically collected information on the greater sage-grouse, its habitats, and environmental factors affecting the species, from a wide array of sources. The scientific literature on greater sage-grouse and sagebrush habitats is extensive. In addition we received a substantial amount of unpublished information from other Federal agencies, States, private industry and individuals. We also solicited information on all Federal, State, or local conservation efforts currently in operation or planned for either the greater sage-grouse or its habitats.

The current distribution of greater sage-grouse and sagebrush habitat encompasses parts of 11 states in the western United States and 2 Canadian provinces (Figure 1). This large geographical scale combined with major ecological differences in sagebrush habitat and myriad of activities occurring across this large area required that the Service employ a structured analysis approach. Given the very large body of information available to us for our decision, structuring our analysis ensured we could explicitly assess the relative risk of changes occurring across the range of the sage-grouse, and integrate those individual assessments, be they regional or rangewide in nature, into an estimate of the probability that sage-grouse would go extinct at defined timeframes in the future. Using such extinction risk analysis to frame listing decisions under the Act has been recommended (National Research Council 1995), and was adopted by the Service as an important component of a structured analysis of the status review of the greater sage-grouse.

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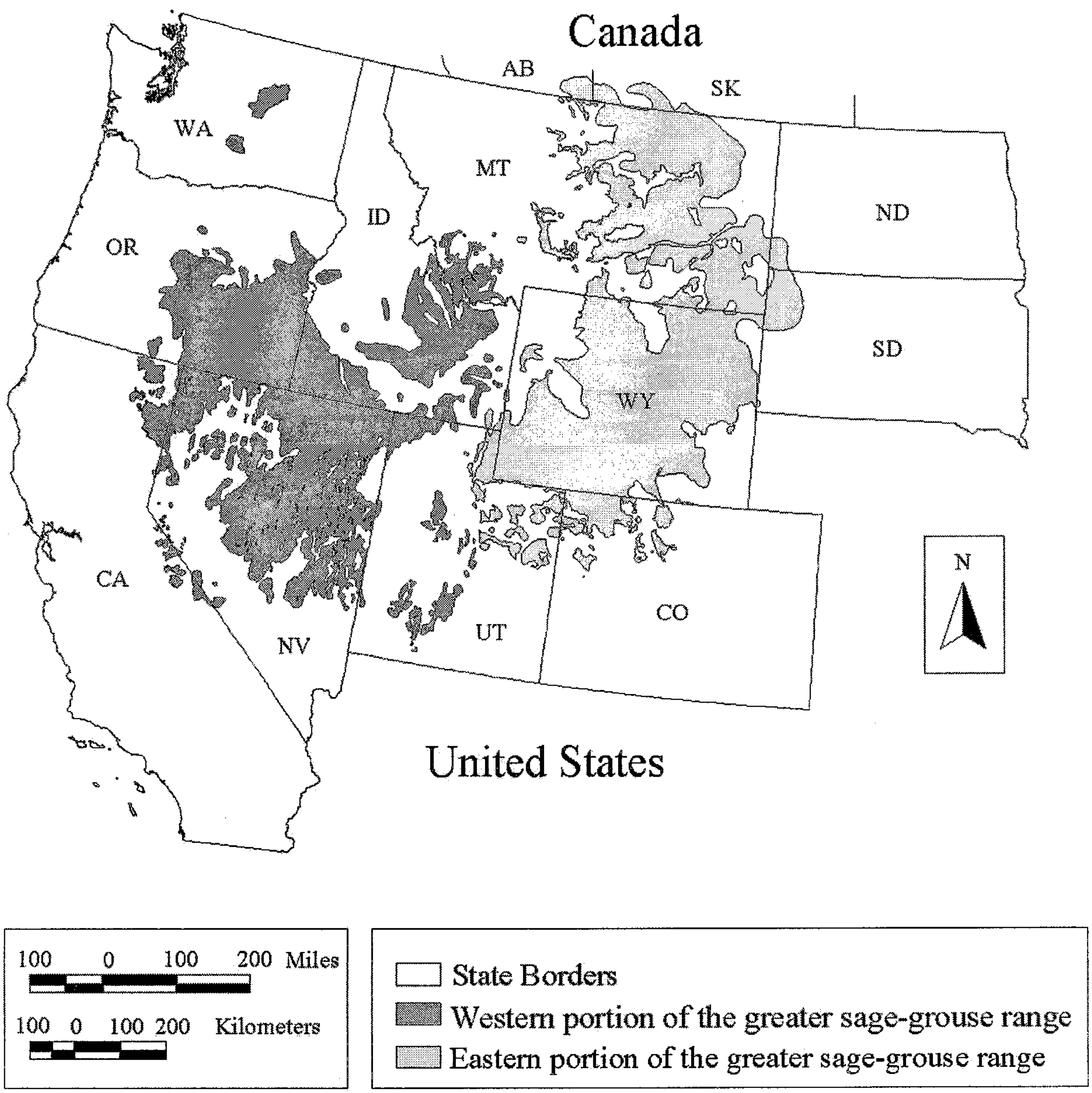
Figure 1. Current distribution of greater sage-grouse in North America (AB = Alberta, CA = California, CO = Colorado, ID = Idaho, MT = Montana, ND = North Dakota, NV = Nevada, OR = Oregon, SD = South Dakota, SK = Saskatchewan, UT = Utah, WA = Washington, WY = Wyoming)



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As part of the structuring of this status review, the Service compiled from the best scientific and commercial data available a summary of the changes or impacts occurring to the sagebrush ecosystem that could potentially affect the sage-grouse directly or indirectly. This summary, or synthesis of biological information, was one of many sources of information provided to a panel of seven experts, who, through a two-day facilitated process discussed threats to the species and each generated an estimate of extinction risk for the greater sage-grouse at different timeframes in the future. This information and all other available information were then considered by Service biologists and managers to frame a listing recommendation, and ultimately the decision reported in this finding.

Expert panels are not a required component of structured analysis but are used to help inform decision makers when there is uncertainty (National Research Council 1995). Typically, this uncertainty is due to a lack of information. While the scientific information on greater sage-grouse and their habitats is extensive, substantial gaps and uncertainty remain in the scientific community's knowledge of all the factors that may affect sage-grouse populations across such a wide geographical range encompassing major ecological differences in sagebrush habitats. Further, scientific knowledge of how the species may respond to those factors over time is incomplete. For these reasons, we requested input from scientific experts outside the Service to help us make a reasonable projection of the species' potential extinction risk. The panel consisted of experts in sage-grouse biology and ecology, sagebrush community ecology, and range ecology and management.

The organization of this finding reflects this basic approach. We first describe in more detail the structured process; present a summary of the threats to the species organized according to the 5 listing factors in the Act; then we present results from the facilitated expert panel process, including estimates of extinction risk; and finally present how a team of Service biologists and managers interpreted the extinction risk analysis, the threat ranking of the expert panelists, and other available information in the context of a listing decision under the Act. In order to ensure that the process we used to reach our finding is transparent, discussion of the biological significance of each threat listed under the 5 listing factors, and the geographical scale at which they affect sage-grouse is based on results of the expert panel and decision support team process. A thorough description of this process and its results is presented later in the finding along with the decision support team's evaluation of the threats in the context of a listing decision under the Act. However, we felt it was important to include a brief discussion of the spatial and biological significance of each threat as they are presented by listing factor.

Following compilation of the best available scientific and commercial information, which is summarized in other sections of this finding and available in full in our administrative record, we conducted three phases of information synthesis and evaluation. First, the information on individual planned conservation efforts was evaluated under PECE to determine which efforts met the following standard in PECE: ''To consider that a formalized conservation effort(s) contributes to forming a basis for not listing a species or listing a species as threatened rather than endangered, we must find that the conservation effort is sufficiently certain to be implemented and effective so as to have contributed to the elimination or adequate reduction of one or more threats to the species identified through the section 4(a)(1) analysis'' (*see* 68 FR 15115). Second, we completed a structured analysis of greater sage-grouse extinction risk including the evaluation of all factors that may be contributing to the species' population trends and the likelihood of the species' extinction at various timeframes into the future. Finally, we evaluated whether the available information on status, trends, ongoing conservation efforts, and potential extinction risk indicate that the greater sage-grouse should be listed as a threatened or endangered species. We further structured these three phases by differentiating two distinct stages of the status review: (1) A risk analysis phase which consisted of compiling biological information, conducting the PECE analysis, and assessing the risk of extinction of greater sage-grouse, and (2) a risk management phase where a decision support team of senior Service biologists and managers evaluated whether or not the potential threats identified as part of our section 4(a)(1) analysis, and summarized in this finding, are significant enough to qualify the greater sage-grouse as a threatened or endangered species under the Act.

For the PECE analysis, we received and reviewed 27 plans, or conservation strategies, outlining more than 300 individual efforts. Most of the plans were from States, but we also received information from the Department of Energy (DOE), Bureau of Land Management (BLM), U.S. Forest Service (USFS), Department of Defense (DOD), Natural Resources Conservation Service (NRCS), Western Governor's Association (WGA), and the North American Grouse Partnership (NAGP).

Each effort within each plan was evaluated under PECE, which provides a framework and criteria for evaluating conservation efforts that have not yet been implemented or have not yet demonstrated whether they are effective at the time of a listing decision. Recognizing that the certainty of implementation and effectiveness of various efforts within a conservation plan, strategy, or agreement may vary, PECE requires that we evaluate each effort individually, and the policy provides criteria to direct our analysis. PECE specifies that ''Those conservation efforts that are not sufficiently certain to be implemented and effective cannot contribute to a determination that listing is unnecessary or a determination to list as threatened rather than endangered'' (*see* 68 FR 15115). As described above, when determining whether or not a species warrants listing, with regard to conservation efforts that are subject to PECE we may only consider those efforts that we are sufficiently certain to be implemented and effective so as to have contributed to the elimination or reduction of one or more threats to the species. Using the criteria provided in PECE, we determined that 20 of the individual efforts we evaluated met the standard for being sufficiently certain to be implemented and effective in reducing threats. Hence, we included those 20 efforts in the information used for the extinction risk evaluation.

The expert panelists participated together in a series of facilitated exercises and discussions addressing first the species' inherent biological vulnerability and resilience, then the potential, relative influence of extrinsic or environmental factors on populations, and finally the experts' projections of extinction risk at different geographical scales both with and without the 20 planned conservation efforts from the PECE analysis. The Service would only consider the effect of the conservation efforts that met PECE in our decision if our review of the best available scientific and commercial data revealed that listing the greater sage-grouse under the Act was warranted. The experts participated only in the assessment of biological and environmental factors and related extinction risk without any consideration or discussion of the petition or regulatory classification of the species. Structuring of the assessment facilitated thorough and careful deliberation by the experts and observing Service biologists and managers on the decision support team, including clarification of what information was critical to forming the experts' views of, where knowledge gaps and areas of uncertainty exist, and confidence experts felt in the biological judgments they expressed. Structuring also facilitated independent contributions from the experts.

In the final status review stage, following the compilation of biological information, PECE analysis of conservation efforts, and the facilitated extinction risk assessment by the expert panel, Service biologists and managers met and conducted a separate facilitated process to assess whether or not the threats to the greater sage-grouse described in this finding were significant enough at this time to meet the definition of a threatened or endangered species under the Act. Specific results from both the facilitated risk analysis stage of the status review and the facilitated risk management stage of the status review are presented later in the finding to clarify how the Service reached its decision. The Service's finding considered all of the available information on record.

Species Information

The sage-grouse is the largest North American grouse species. Adult males range in length from 66 to 76 centimeters (cm) (26 to 30 inches (in)) and weigh between 2 and 3 kilograms (kg) (4 and 7 pounds (lb)). Adult females range in length from 48 to 58 cm (19 to 23 in) and weigh between 1 and 2 kg (2 and 4 lb). Males and females have dark grayish-brown body plumage with many small gray and white speckles, fleshy yellow combs over the eyes, long pointed tails, and dark green toes. Males also have blackish chin and throat feathers, conspicuous phylloplumes (specialized erectile feathers) at the back of the head and neck, and white feathers forming a ruff around the neck and upper belly. During breeding displays, males exhibit olive-green apteria (fleshy bare patches of skin) on their breasts (Schroeder *et al.* 1999).

In 2000, the species was separated into 2 distinct species, the greater sage-grouse (*C. urophasianus*) and the Gunnison sage-grouse (*C. minimus*) based on genetic, morphological and behavioral differences (Young *et al.* 2000). This finding only addresses the greater sage-grouse.

Although the American Ornithological Union (AOU) recognizes two subspecies of the greater sage-grouse, the eastern (*C. u. urophasianus*) and western (*C. u. phaios*), based on research by Aldrich (1946), recent genetic analyses do not support this delineation (Benedict *et al.* 2003; Oyler-McCance *et al.* in press). There are no known delimiting differences in habitat use, natural history, or behavior between the two subspecies. Therefore, the Service no longer acknowledges the subspecies designation (68 FR 6500; February 7, 2003; 69 FR 933; January 7, 2004).

Sage-grouse depend on a variety of shrub-steppe habitats throughout their life cycle, and are considered obligate users of several species of sagebrush (*e.g.,* Wyoming big sagebrush (*Artemisia tridentata wyomingensis*), mountain big sagebrush (*A. t. vaseyana*), and basin big sagebrush (*A. t. tridentata*) (Patterson 1952; Braun *et al.* 1976; Connelly *et al.* 2000a; Connelly *et al.* 2004)). Sage-grouse also use other sagebrush species such as low sagebrush (*A. arbuscula*), black sagebrush (*A. nova*), fringed sagebrush (*A. frigida*) and silver sagebrush (A. cana) (Schroeder *et al.* 1999; Connelly *et al.* 2004). Thus, sage-grouse distribution is strongly correlated with the distribution of sagebrush habitats (Schroeder *et al.* 2004). While sage-grouse are dependent on large, interconnected expanses of sagebrush (Patterson 1952; Connelly *et al.* 2004), information is not available regarding minimum sagebrush patch sizes required to support populations of sage-grouse. Sage-grouse exhibit strong site fidelity (loyalty to a particular area) for breeding and nesting areas (Connelly *et al.* 2004).

During the spring breeding season, male sage-grouse gather together to perform courtship displays on display areas called leks. Areas of bare soil, short-grass steppe, windswept ridges, exposed knolls, or other relatively open sites may serve as leks (Patterson 1952; Connelly *et al.* 2004 and references therein). Leks are often surrounded by denser shrub-steppe cover, which is used for escape, thermal and feeding cover. Leks can be formed opportunistically at any appropriate site within or adjacent to nesting habitat (Connelly *et al.* 2000a), and therefore lek habitat availability is not considered to be a limiting factor for sage-grouse (Schroeder 1997). Leks range in size from less than 0.04 hectare (ha) (0.1 acre (ac)) to over 36 ha (90 ac) (Connelly *et al.* 2004) and can host from several to hundreds of males (Johnsgard 2002). Males defend individual territories within leks and perform elaborate displays with their specialized plumage and vocalizations to attract females for mating. A relatively small number of dominant males accounts for the majority of breeding on each lek (Schroeder *et al.* 1999).

Sage-grouse typically select nest sites under sagebrush cover, although other shrub or bunchgrass species are sometimes used (Klebenow 1969; Connelly *et al.* 2000a; Connelly *et al.* 2004). The sagebrush understory of productive nesting areas contains native grasses and forbs, with horizontal and vertical structural diversity that provides an insect prey base, herbaceous forage for pre-laying and nesting hens, and cover for the hen while she is incubating (Gregg 1991; Schroeder *et al.* 1999; Connelly *et al.* 2000a; Connelly *et al.* 2004). Shrub canopy and grass cover provide concealment for sage-grouse nests and young, and are critical for reproductive success (Barnett and Crawford 1994; Gregg *et al.* 1994; DeLong *et al.*1995; Connelly *et al.* 2004). Vegetation characteristics of nest sites, as reported in the scientific literature have been summarized by Connelly *et al.* (2000a). Females have been documented to travel more than 20 km (12.5 mi) to their nest site after mating (Connelly *et al.* 2000a), but distances between a nest site and the lek on which breeding occurred is variable (Connelly *et al.* 2004). While earlier studies indicated that most hens nest within 3.2 km (2 mi) of a lek, more recent research indicates that many hens actually move much further from leks to nest based on nesting habitat quality (Connelly *et al.* 2004). Research by Bradbury *et al.* (1989) and Wakkinen *et al.* (1992) demonstrated that nest sites are selected independent of lek locations.

Sage-grouse clutch size ranges from 6 to 13 eggs (Schroeder *et al.* 2000). Nest success (one or more eggs hatching from a nest), as reported in the scientific literature, ranges from 15 to 86 percent of initiated nests (Schroeder *et al.* 1999), and is typically lower than other prairie grouse species (Connelly *et al.* 2000a) and therefore indicative of a lower intrinsic (potential) population growth rate than in most game bird species (Schroeder *et al.* 1999). Renesting rates following nest loss range from 5 to 41 percent (Schroeder 1997).

Hens rear their broods in the vicinity of the nest site for the first 2 to 3 weeks following hatching (Connelly *et al.* 2004). Forbs and insects are essential nutritional components for chicks (Klebenow and Gray 1968; Johnson and Boyce 1991; Connelly *et al.* 2004). Therefore, early brood-rearing habitat must provide adequate cover adjacent to areas rich in forbs and insects to assure chick survival during this period (Connelly *et al.* 2004).

Sage-grouse move from sagebrush uplands to more mesic areas during the late brood-rearing period (3 weeks post-hatch) in response to summer desiccation of herbaceous vegetation (Connelly *et al.* 2000a). Summer use areas can include sagebrush habitats as well as riparian areas, wet meadows and alfalfa fields (Schroeder *et al.* 1999). These areas provide an abundance of forbs and insects for both hens and chicks (Schroeder *et al.* 1999; Connelly *et al.* 2000a). Sage-grouse will use free water although they do not require it since they obtain their water needs from the food they eat. However, natural water bodies and reservoirs can provide mesic areas for succulent forb and insect production, thereby attracting sage-grouse hens with broods (Connelly *et al.* 2004). Broodless hens and cocks will also use more mesic areas in close proximity to sagebrush cover during the late summer (Connelly *et al.* 2004).

As vegetation continues to desiccate through the late summer and fall, sage-grouse shift their diet entirely to sagebrush (Schroeder *et al.* 1999). Sage-grouse depend entirely on sagebrush throughout the winter for both food and cover. Sagebrush stand selection is influenced by snow depth (Patterson 1952; Connelly 1982 as cited in Connelly *et al.* 2000a), and, in some areas, topography (Beck 1977; Crawford *et al.* 2004).

Many populations of sage-grouse migrate between seasonal ranges in response to habitat distribution (Connelly *et al.* 2004). Migration can occur between winter and breeding/summer areas, between breeding, summer and winter areas, or not at all. Migration distances of up to 161 kilometers (km) (100 mi) have been recorded (Patterson 1952); however, average individual movements are generally less than 34 km (21 mi) (Schroeder *et al.* 1999). Migration distances for female sage-grouse generally are less than for males (Connelly *et al.* 2004). Almost no information is available regarding the distribution and characteristics of migration corridors for sage-grouse (Connelly *et al.* 2004). Sage-grouse dispersal (permanent moves to other areas) is poorly understood (Connelly *et al.* 2004) and appears to be sporadic (Dunn and Braun 1986).

Sage-grouse typically live between 1 and 4 years, but individuals up to 10 years of age have been recorded in the wild (Schroeder *et al.* 1999). Juvenile survival (from hatch to first breeding season) is affected by food availability, habitat quality, harvest, and weather. Documented juvenile survival rates have ranged between 7 and 60 percent in a review of many field studies (Crawford *et al.* 2004). The average annual survival rate for male sage-grouse (all ages combined) documented in various studies ranged from 38 to 60 percent (Schroeder *et al.* 1999), and for females 55 to 75 percent (Schroeder 1997; Schroeder *et al.* 1999). Survival rates are high compared with other prairie grouse species (Schroeder *et al.* 1999). Higher female survival rates account for a female-biased sex ratio in adult birds (Schroeder 1997; Johnsgard 2002). Although seasonal patterns of mortality have not been thoroughly examined, over-winter mortality is low (Connelly *et al.* 2004).

Range and Distribution

Prior to settlement of the western North America by European immigrants in the 19th century, greater sage-grouse lived in 13 States and 3 Canadian provinces—Washington, Oregon, California, Nevada, Idaho, Montana, Wyoming, Colorado, Utah, South Dakota, North Dakota, Nebraska, Arizona, British Columbia, Alberta, and Saskatchewan (Schroeder *et al.* 1999; Young *et al.* 2000; Schroeder *et al.* 2004). Sagebrush habitats that potentially supported sage-grouse occurred over approximately 1,200,483 km2 (463,509 mi2) before 1800 (Schroeder *et al.* 2004). Currently, sage-grouse occur in 11 States and 2 Canadian provinces, ranging from extreme southeastern Alberta and southwestern Saskatchewan, south to western Colorado, and west to eastern California, Oregon, and Washington. Sage-grouse have been extirpated from Nebraska, British Columbia, and possibly Arizona (Schroeder *et al.* 1999; Young *et al.* 2000; Schroeder *et al.* 2004). Current distribution of the greater sage-grouse is estimated at 668,412 km2 (258,075 mi2) or 56 percent of the potential pre-settlement distribution (Schroeder *et al.* 2004; Connelly *et al.* 2004). The vast majority of the current distribution of the greater sage-grouse is within the United States.

Estimates of current total sage-grouse abundance vary, but are all much lower than the historical estimates of a million or more birds. Braun (1998) estimated that the 1998 rangewide spring population numbered about 142,000 sage-grouse, derived from numbers of males counted on leks. The Service estimated the rangewide abundance of sage-grouse in 2000 was at least 100,000 (taken from Braun (1998)) and up to 500,000 birds (based on harvest data from Idaho, Montana, Oregon and Wyoming, with the assumption that 10 percent of the population is typically harvested) (65 FR 51578). Survey intensity has increased markedly in recent years and, in 2003, more than 50,000 males were counted on leks (Connelly *et al.* 2004). Therefore, Connelly *et al.* (2004) concluded that rangewide population numbers in 2003 were likely much greater than the 142,000 estimated in 1998 but was unable to generate a rangewide population estimate. Sampling methods used across the range of the sage-grouse differ, resulting in too much variation to reliably estimate sage-grouse numbers (Connelly *et al.* 2004). Since neither pre-settlement nor current numbers of sage-grouse are known with complete precision, the actual rate and extent of decline cannot be exactly estimated.

Periods of historical decline in sage-grouse abundance occurred from the late 1800s to the early-1900s (Hornaday 1916; Crawford 1982; Drut 1994; Washington Department of Fish and Wildlife 1995; Braun 1998; Schroeder *et al.* 1999). Other declines in sage-grouse populations apparently occurred in the 1920s and 1930s, and then again in the 1960s and 1970s (Connelly and Braun 1997; Braun 1998). State wildlife agencies were sufficiently concerned with the decline in the 1920s and 1930s that many closed their hunting seasons and others significantly reduced bag limits and season lengths (Braun 1998) as a precautionary measure.

Following review of published literature and anecdotal reports, Connelly *et al.* (2004) concluded that the abundance and distribution of sage-grouse have declined from pre-settlement numbers to present abundance. Most of the historic population changes were the result of local extirpations, which has been inferred from a 44 percent reduction in sage-grouse distribution described by Schroeder *et al.* 2004 (Connelly *et al.* 2004). In an analysis of lek counts, Connelly *et al.* (2004) found substantial declines from 1965 through 2003. Average declines were 2 percent of the population per year from 1965 to 2003. The decline was more dramatic from 1965 through 1985, with an average annual change of 3.5 percent. Sage-grouse population numbers in the late 1960s and early 1970s were likely two to three times greater than current numbers (Connelly *et al.* 2004). However, the rate of decline rangewide slowed from 1986 to 2003 to 0.37 percent annually, and some populations increased (Connelly *et al.* 2004).

According to Connelly *et al.* (2004), of 41 populations delineated rangewide on geographical, not political boundaries, 5 have been extirpated and 14 are at high risk of extirpation due to small numbers (only one active lek). Twelve additional populations also have small numbers (7 to 18 known active leks), and 9 of those are declining at a statistically significant rate. However, the remaining 10 populations contained the majority (92 percent) of the known active leks and were distributed across the current range. Five of these populations were so large and expansive that they were divided into 24 subpopulations to facilitate the analysis for a rangewide assessment (Connelly *et al.* 2004).

Habitat

Sagebrush is the most widespread vegetation in the intermountain lowlands in the western United States (West and Young 2000). Scientists recognize many species and subspecies of sagebrush (Connelly *et al.* 2004), each with unique habitat requirements and responses to perturbations (West and Young 2000). Sagebrush species and subspecies occurrence in an area is dictated by local soil type, soil moisture, and climatic conditions (West 1983; West and Young 2000), and the degree of dominance by sagebrush varies with local site conditions and disturbance history. Plant associations, typically defined by perennial grasses, further define distinctive sagebrush communities (Miller and Eddleman 2000; Connelly *et al.* 2004), and are influenced by topography, elevation, precipitation and soil type.

All species of sagebrush produce large ephemeral leaves in the spring, which persist until soil moisture stress develops in the summer. Most species also produce smaller, over-wintering leaves in the late spring that last through summer and winter. Sagebrush have fibrous, tap root systems, which allow the plants to draw surface soil moisture, but also access water deep within the soil profile when surface water is limiting (West and Young 2000). Most sagebrush flower in the fall. However, during years of drought or other moisture stress, flowering may not occur. Although seed viability and germination are high, seed dispersal is limited. Additionally, for unknown reasons, sagebrush seeds do not persist in seed banks beyond the year of their production (West and Young 2000).

Sagebrush are long-lived, with plants of some species surviving up to 150 years (West 1983). They produce allelopathic chemicals that reduce seed germination, seedling growth and root respiration of competing plant species and inhibit the activity of soil microbes and nitrogen fixation. Sagebrush has resistance to environmental extremes, with the exception of fire and occasionally defoliating insects (*e.g.*, the webworm (*Aroga* spp.; West 1983)). Most species of sagebrush are killed by fire (Miller and Eddleman 2000; West 1983; West and Young 2000). Natural sagebrush re-colonization in burned areas depends on the presence of adjacent live plants for a seed source or on the seed bank, if present (Miller and Eddleman 2000).

Sagebrush is typically divided into two groups, big sagebrush and low sagebrush, based on their affinities for different soil types (West and Young 2000). Big sagebrush species and subspecies are limited to coarse-textured and/or well-drained sediments, whereas low sagebrush subspecies typically occur where erosion has exposed clay or calcified soil horizons (West 1983; West and Young 2000). Reflecting these soil differences, big sagebrush will die if surfaces are saturated long enough to create anaerobic conditions for 2 to 3 days (West and Young 2000). Some of the low sagebrush are more tolerant of occasionally supersaturated soils, and many low sage sites are partially flooded during spring snowmelt. None of the sagebrush taxa tolerate soils with high salinity (West and Young 2000). Both groups of sagebrush are used by sage-grouse.

The response of sagebrush and sagebrush ecosystems to natural and human-influenced disturbances varies based on the species of sagebrush and its understory component, as well as abiotic factors such as soil types and precipitation. For example, mountain big sagebrush can generally recover more quickly and robustly following disturbance than Wyoming big sagebrush (Miller and Eddleman 2000), likely due to its occurrence on moist, well drained soils, versus the very dry soils typical of Wyoming big sagebrush communities. Soil associations have also resulted in disproportionate levels of habitat conversion across different sagebrush communities. For example, basin big sage is found at lower elevations, in soils that retain moisture two to four weeks longer than in well drained, but dry and higher elevation soils typical of Wyoming big sagebrush locations. Therefore, sagebrush communities dominated by basin big sagebrush have been converted to agriculture more extensively than have communities on poorer soil sites (Winward 2004).

The effects of disturbance to sagebrush are not constant across the range of the sage-grouse. Connelly *et al.* (2004) presented sage-grouse population data by the described delineations of sagebrush ecosystems and communities (Miller and Eddleman 2000, from Kuchler's 1985 map; and West 1983). Unfortunately, information on impacts to the habitats has not been collected in a compatible manner, making analyses of these impacts specifically within each distinct ecosystem and community impossible. Therefore, while we acknowledge habitat differences across the greater sage-grouse range, we were unable to conduct our review at that level.

Discussion of Listing Factors

Section 4 of the Act (16 U.S.C. 1531) and implementing regulations at 50 CFR part 424 set forth procedures for adding species to the Federal endangered and threatened species list. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act. These factors and their application to the greater sage-grouse are as follows:

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range

Habitat Conversion

Sagebrush is estimated to have covered roughly 120 million ha (296 million ac; Schroeder *et al.* 2004) in western North America, but millions of those hectares have been cultivated for the production of potatoes, wheat, and other crops (Schroeder *et al.* 1999, 2000). Western rangelands were converted to agricultural lands on a large scale beginning with the series of Homestead Acts in the 1800s (Braun 1998, Hays *et al.* 1998), especially where suitable deep soil terrain and water were available (Rogers 1964). Connelly *et al.* (2004) estimated that 24.9 million ha (61.5 million ac) within their assessment area for sage-grouse is now comprised of agricultural lands (note, not all of the species' total range is sagebrush habitat, and the assessment area is larger than the sage-grouse current distribution). Influences resulting from agricultural activities adjoining sagebrush habitats extend into those habitats, and include increased predation and reduced nest success due to predators associated with agriculture (Connelly *et al.* 2004). Adding a 6.9 km (4.3 mi) buffer around agricultural areas (for the potential foraging distance of domestic cats and red foxes (*Vulpes vulpes*)), Connelly *et al.* (2004) estimated 115.2 million ha (284.7 million ac) (56 percent) within their assessment area for the greater sage-grouse is influenced by agriculture.

In some States, the loss of sagebrush shrub-steppe habitats through conversion to agricultural crops has been dramatic. This impact has been especially apparent in the Columbia Basin of the Northwest and the Snake River Plain of Idaho (Schroeder *et al.* 2004). Hironaka *et al.* (1983) estimated that 99 percent of basin big sagebrush (*A. t. tridentata*) habitat in the Snake River Plain has been converted to cropland. Prior to European immigrant settlement in the 19th century, Washington had an estimated 42 million ha (103.8 million ac) of shrub-steppe (Connelly *et al.* 2004). Dobler (1994) estimated that approximately 60 percent of the original shrub-steppe habitat in Washington has been converted to primarily agricultural uses. In eastern Washington, land conversion to dryland farming occurred mostly between 1900 and the 1940s (Hays *et al.* 1998) and then in the 1950s and 1960s large-scale irrigation projects (made possible through the construction of dams) reduced sage-grouse habitat even further (Hofmann 1991 in Hays *et al.* 1998). Deep soils supporting shrub-steppe communities in Washington continue to be converted to agricultural uses (Vander Haegen *et al.* 2000), resulting in habitat loss. In north central Oregon, approximately 2.6 million ha (6.4 million ac) of habitat were converted for agricultural purposes, essentially eliminating sage-grouse from this area (Willis *et al.* 1993). More broadly, across the Interior Columbia Basin of southern Idaho, northern Utah, northern Nevada, eastern Oregon and Washington, approximately 6 million ha (14.8 million ac) of shrub-steppe habitat has been converted to agricultural crops (Altman and Holmes 2000).

Development of irrigation projects to support agricultural production, in some cases conjointly with hydroelectric dam construction, has resulted in additional sage-grouse habitat loss (Braun 1998). The reservoirs formed by these projects impacted native shrub-steppe habitat adjacent to the rivers in addition to supporting the irrigation and direct conversion of shrub-steppe lands to agriculture. The projects precipitated conversion of large expanses of upland shrub-steppe habitat in the Columbia Basin for irrigated agriculture (August 24, 2000; 65 FR 51578). The creation of these reservoirs also inundated hundreds of kilometers of riparian habitats used by sage-grouse broods (Braun 1998). However, other small and isolated reclamation projects (4,000 to 8,000 ha [10,000 to 20,000 ac]) were responsible for three-fold localized increases in sage-grouse populations (Patterson 1952) by providing water in a semi-arid environment which provided additional insect and forb food resources (*e.g.*, Eden Reclamation Project in Wyoming). Shrub-steppe habitat continues to be converted for both dryland and irrigated crop production, albeit at much-reduced levels (65 FR 51578; Braun 1998).

Although conversion of shrub-steppe habitat to agricultural crops impacts sage-grouse through the loss of sagebrush on a broad scale, some studies report the use of agricultural crops (*e.g.*, alfalfa) by sage-grouse. When alfalfa fields and other croplands are adjacent to extant sagebrush habitat, sage-grouse have been observed feeding in these fields, especially during brood-rearing (Patterson 1952, Rogers 1964, Wallestad 1971, Connelly *et al.* 1988, Fischer *et al.* 1997). Connelly *et al.* (1988) reported seasonal movements of sage-grouse to agricultural crops as sagebrush habitats desiccated during the summer.

Sagebrush removal to increase herbaceous forage and grasses for domestic and wild ungulates is a common practice in sagebrush ecosystems (Connelly *et al.* 2004). By the 1970s, over 2 million ha (5 million ac) of sagebrush had been mechanically treated, sprayed with herbicide, or burned (Crawford *et al.* 2004). Braun (1998) concluded that since European settlement of western North America, all sagebrush habitats used by greater sage-grouse have been treated in some way to reduce shrub cover. The use of chemicals to control sagebrush was initiated in the 1940s and intensified in the 1960s and early 1970s (Braun 1987).

The extent to which mechanical and chemical removal or control of sagebrush currently occurs is not known, particularly with regard to private lands. However, the BLM has stated that with rare exceptions, they no longer are involved in actions that convert sagebrush to other habitat types, and that mechanical or chemical treatments in sagebrush habitat on BLM lands currently focus on improving the diversity of the native plant community, reducing conifer encroachment, or reducing the risk of a large wildfire (BLM 2004a).

Greater sage-grouse response to herbicide treatments depends on the extent to which forbs and sagebrush are killed. Chemical control of sagebrush has resulted in declines of sage-grouse breeding populations through the loss of live sagebrush cover (Connelly *et al.* 2000a). Herbicide treatment also can result in sage-grouse emigration from affected areas (Connelly *et al.* 2000a), and has been documented to have a negative effect on nesting, brood carrying capacity (Klebenow 1970), and winter shrub cover essential for food and thermal cover (Pyrah 1972 and Higby 1969 as cited in Connelly *et al.* 2000a). Conversely, small treatments interspersed with non-treated sagebrush habitats did not affect sage-grouse use, presumably due to minimal effects on food or cover (Braun 1998). Also application of herbicides in early spring to reduce sagebrush cover may enhance some brood-rearing habitats by increasing the coverage of herbaceous plant foods (Autenrieth 1981).

Mechanical treatments are designed to either remove the aboveground portion of the sagebrush plant (mowing, roller chopping, and rotobeating), or to uproot the plant from the soil (grubbing, bulldozing, anchor chaining, cabling, railing, raking, and plowing; Connelly *et al.* 2004). These treatments were begun in the 1930s and continued at relatively low levels to the late 1990s (Braun 1998). Mechanical treatments, if carefully designed and executed, can be beneficial to sage-grouse by improving herbaceous cover, forb production, and resprouting of sagebrush (Braun 1998). However, adverse effects also have been documented (Connelly *et al.* 2000a). For example, in Montana, the number of breeding males declined by 73 percent after 16 percent of the 202 km^2 (78 mi^2) study area was plowed (Swenson *et al.* 1987). Mechanical treatments in blocks greater than 100 ha (247 ac), or of any size seeded with exotic grasses, degrade sage-grouse habitat by altering the structure and composition of the vegetative community (Braun 1998).

While many square miles of sagebrush habitat has been lost during the past 150 years to conversion of sagebrush habitat to agriculture, this conversion occurs at such relatively low levels today, that we do not consider it a threat to the greater sage-grouse on a rangewide basis.

Habitat Fragmentation

This section considers the various natural and anthropogenic forces that influence sage-grouse habitat and can result in habitat fragmentation. Habitat fragmentation is the separation or splitting apart of previously contiguous, functional habitat components of a species. Fragmentation can result from direct habitat losses that leave the remaining habitat in non-contiguous patches, or from alteration of habitat areas that render the altered patches unusable to a species (*i.e.*, functional habitat loss). Functional habitat losses include disturbances that change a habitat's successional state or remove one or more habitat functions, physical barriers that preclude use of otherwise suitable areas, and activities that prevent animals from using suitable habitats patches due to behavioral avoidance.

Sagebrush communities exhibit a high degree of variation in their resistance and resilience to change, beyond natural variation. Resistance (the ability to withstand disturbing forces without changing) and resilience (the ability to recover once altered) generally increase with increasing moisture and decreasing temperatures, and can also be linked to soil characteristics (Connelly *et al.* 2004). However, most extant sagebrush habitat has been altered since European immigrant settlement of the West (Baker *et al.* 1976; Braun 1998; Knick *et al.* 2003; Connelly *et al.* 2004), and sagebrush habitat continues to be fragmented and lost (Knick *et al.* 2003) through the factors described below. The cumulative effects of habitat fragmentation have not been quantified over the range of sagebrush and most fragmentation cannot be attributed to specific land uses (Knick *et al.* 2003).

Fragmentation of sagebrush habitats has been cited as a primary cause of the decline of sage-grouse populations since the species requires large expanses of contiguous sagebrush (Patterson 1952; Connelly and Braun 1997; Braun 1998; Johnson and Braun 1999; Connelly *et al.* 2000a; Miller and Eddleman 2000; Schroeder and Baydack 2001; Johnsgard 2002; Aldridge and Brigham 2003; Beck *et al.* 2003; Pedersen *et al.* 2003; Connelly *et al.* 2004; Schroeder *et al.* 2004). However, there is a lack of data to assess how fragmentation influences specific greater sage-grouse life history parameters such as productivity, density, and home range. While sage-grouse are dependent on interconnected expanses of sagebrush (Patterson 1952; Connelly *et al.* 2004), data are not available regarding minimum sagebrush patch sizes to support populations of sage-grouse. Estimating the impact of habitat fragmentation on sage-grouse is complicated by time lags in response to habitat changes, particularly since these long-lived birds will continue to return to altered breeding areas (leks, nesting areas, and early brood-rearing areas) due to strong site fidelity despite nesting or productivity failures (Wiens and Rotenberry 1985).

Powerlines

Power grids were first constructed in the United States in the late 1800s. The public demand for electricity has grown as human population and industrial activities have expanded (Manville 2002), resulting in more than 804,500 km (500,000 mi) of transmission lines (lines carrying ≥ 115,000 volts/115kV) by 2002 within the United States (Manville 2002). A similar estimate is not available for distribution lines (lines carrying ≤ 69,000 volts/69kV), and we are not aware of data for Canada. Within their analysis area (*i.e.*, the pre-European settlement distribution of greater sage-grouse, including Canada, plus a 50-km (31.3-mi) buffer (buffer is to allow for external factors that may have contributed to current trends in populations or habitats)), Connelly *et al.* (2004) state there is a minimum of 15,296 km^2 (5,904 mi^2) of land (less than 1 percent of their assessment area) in transmission powerline corridors, but could provide no estimate of the density of distribution lines in their assessment area.

Powerlines can directly affect greater sage-grouse by posing a collision and electrocution hazard (Braun 1998; Connelly *et al.* 2000a), and can have indirect effects by increasing predation (Connelly *et al.* 2004), fragmenting habitat (Braun 1998), and facilitating the invasion of exotic annual plants (Knick *et al.* 2003; Connelly *et al.* 2004). In 1939, Borell reported the deaths of 3 adult sage-grouse as a result of colliding with a telegraph line in Utah (Borell 1939). Both Braun (1998) and Connelly *et al.* (2000a) report that sage-grouse collisions with powerlines occur, although no specific instances were presented. Other than an unpublished observation reported by Aldridge and Brigham (2003), we were unable to find documentations of other collisions and/or electrocutions of sage-grouse resulting from powerlines.

In areas where the vegetation is low and the terrain relatively flat, power poles provide an attractive hunting and roosting perch, as well as nesting stratum for many species of raptors (Steenhof *et al.* 1993; Connelly *et al.* 2000a; Manville 2002; Vander Haegen *et al.* 2002). Power poles increase a raptor's range of vision, allow for greater speed during attacks on prey, and serve as territorial markers (Steenhof *et al.* 1993; Manville 2002). Raptors may actively seek out power poles where natural perches are limited. For example, within one year of construction of a 596-km (372.5-mi) transmission line in southern Idaho and Oregon, raptors and common ravens (*Corvus corax*) began nesting on the supporting poles (Steenhof *et al.* 1993). Within 10 years of construction, 133 pairs of raptors and ravens were nesting along this stretch (Steenhof *et al.* 1993). The increased abundance of raptors and corvids within occupied sage-grouse habitats can result in increased predation. Ellis (1985) reported that golden eagle predation on sage-grouse on leks increased from 26 to 73 percent of the total predation after completion of a transmission line within 200 m (220 yd) of an active sage-grouse lek in northeastern Utah. The lek was eventually abandoned, and Ellis (1985) concluded that the presence of the powerline resulted in changes in sage-grouse dispersal patterns and fragmentation of the habitat. Leks within 0.4 km (0.25 mi) of new powerlines constructed for coalbed methane development in the Powder River Basin of Wyoming had significantly lower growth rates, as measured by recruitment of new males onto the lek, compared to leks further from these lines, which was presumed to be the result of increased raptor predation (Braun *et al.* 2002). Within their analysis area, Connelly *et al.* (2004) estimated that the area potentially influenced by additional perches for corvids and raptors provided by powerlines, assuming a 5 to 6.9-km (3.1 to 4.3-mi) radius buffer around the perches based on the average foraging distance of these predators, was 672,644 to 837,390 km^2 (259,641 to 323,317 mi^2), or 32 to 40 percent of their assessment area. The actual impact on the area would depend on corvid and raptor densities within the area. The presence of a powerline may fragment sage-grouse habitats even if raptors are not present. Braun (1998; unpublished data) found that use of otherwise suitable habitat by sage-grouse near powerlines increased as distance from the powerline increased for up to 600 m (660 yd) and based on that unpublished data reported that the presence of powerlines may limit sage-grouse use within 1 km (0.6 mi) in otherwise suitable habitat.

Linear corridors through sagebrush habitats can facilitate the spread of invasive species, such as cheatgrass (*Bromus tectorum*) (Gelbard and Belnap 2003; Knick *et al.* 2003; Connelly *et al.* 2004). However, we were unable to find any information regarding the amount of invasive species incursion as a result of powerline construction.

Powerlines are common to nearly every type of anthropogenic habitat use, except perhaps some forms of agricultural development (*e.g.*, livestock grazing) and fire. Although we were unable to find an estimate of all future proposed powerlines within currently occupied sage-grouse habitats, we anticipate that powerlines will increase, particularly given the increasing development of energy resources and urban areas. For example, up to 8,579 km (5,311 mi) of new powerlines are predicted for the development of the Powder River Basin coal-bed methane field in northeastern Wyoming (BLM 2003a) in addition to the approximately 9,656 km (6,000 mi) already constructed in that area. Although raptors associated with powerlines may negatively impact individual greater sage-grouse and habitats, we could find no information regarding the effect of this impact on a rangewide basis.

Communication Towers

Within sage-grouse habitats, 9,510 new communication towers have been constructed within recent years (Connelly *et al.* 2004). While millions of birds are killed annually in the United States through collisions with communication towers and their associated structures (guy wires, lights, etc.; Manville 2002), most documented mortalities are of migratory songbirds. We were unable to determine if any sage-grouse mortalities occur as a result of collision with communication towers or their supporting structures, as most towers are not monitored and those that are lie outside the range of the species (Shire *et al.* 2000; Kerlinger 2000). However, communication towers also provide perches for corvids and raptors (Steenhof *et al.* 1993; Connelly *et al.* 2004). We could find no information regarding the potential impacts of communication towers to the greater sage-grouse on a rangewide basis.

Fences

Fences are used to delineate property boundaries and for livestock management (Braun 1998; Connelly *et al.* 2000a). The effects of fencing on sage-grouse include direct mortality through collisions, creation of predator (raptor) perch sites, the potential creation of a predator corridor along fences (particularly if a road is maintained next to the fence), incursion of exotic species along the fencing corridor, and habitat fragmentation (Call and Maser 1985; Braun 1998; Connelly *et al.* 2000a; Beck *et al.* 2003; Knick *et al.* 2003; Connelly *et al.* 2004).

Sage-grouse frequently fly low and fast across sagebrush flats and new fences can create a collision hazard (Call and Maser 1985). Thirty-six carcasses of sage-grouse were found near Randolph, Utah, along a 3.2 km (2 mi) fence within three months of its construction (Call and Maser 1985). Twenty-one incidents of mortality through fence collisions near Pinedale, Wyoming, were reported in 2003 to the BLM (Connelly *et al.* 2004). Fence collisions continue to be identified as a source of mortality (Braun 1998; Connelly *et al.* 2000a; Oyler-McCance *et al.* 2001; Connelly *et al.* 2004), although effects on populations are not understood. Fence posts also create perching places for raptors and corvids, which may increase their ability to prey on sage-grouse (Braun 1998; Connelly *et al.* 2000b; Oyler-McCance *et al.* 2001; Connelly *et al.* 2004). We anticipate that the effect on sage-grouse populations through the creation of new raptor perches and predator corridors into sagebrush habitats are similar to that of powerlines discussed previously (Braun 1998; Connelly *et al.* 2004). Fences and their associated roads also facilitate the spread of invasive plant species that replace sagebrush plants upon which sage-grouse depend (Braun 1998; Connelly *et al.* 2000a; Gelbard and Belnap 2003; Connelly *et al.* 2004). Greater sage-grouse avoidance of habitat adjacent to fences, presumably to minimize the risk of predation, effectively results in habitat fragmentation even if the actual habitat is not removed (Braun 1998). More than 1,000 km (625 mi) of fences were constructed annually in sagebrush habitats from 1996 through 2002, mostly in Montana, Nevada, Oregon and Wyoming (Connelly *et al.* 2004). Over 51,000 km (31,690 mi) of fences were constructed on BLM lands supporting sage-grouse populations between 1962 and 1997 (Connelly *et al.* 2000a). However, some of the new 1–3 wire fencing being erected across the range may pose less of a collision risk to sage grouse than woven fences.

Roads and Railroads

Impacts from roads may include direct habitat loss, direct mortality, create barriers to migration corridors or seasonal habitats, facilitation of predators and spread of invasive vegetative species, and other indirect influences such as noise (Forman and Alexander 1998). Interstates and major paved roads cover approximately 14,272 km^2 (22,835 mi^2), less then 1 percent of their assessment area (Connelly *et al.* 2004). Secondary paved road densities within this area range to greater than 2 km/km^2 (3.24 mi/mi^2). Sage-grouse mortality resulting from collisions with vehicles does occur (Patterson 1952), but mortalities are typically not monitored or recorded. Therefore, we are unable to determine the importance of this factor on sage-grouse populations. Data regarding how roads affect seasonal habitat availability for individual sage-grouse populations by creating barriers and the ability of sage-grouse to reach these areas were not available. Road development within Gunnison sage-grouse habitats precluded movement of local populations between the resultant patches, presumably to minimize their exposure to predation (Oyler-McCance *et al.* 2001).

Roads can provide corridors for predators to move into previously unoccupied areas. For some mammalian species, dispersal along roads has greatly increased their distribution (Forman and Alexander 1998; Forman 2000). Corvids also use linear features such as primary and secondary roads as travel routes, expanding their movements into previously unused regions (Connelly *et al.* 2000b; Aldridge and Brigham 2003; Connelly *et al.* 2004). In an analysis of anthropogenic impacts, Connelly *et al.* (2004) reported that at least 58 percent of their analysis area has a high or medium presence of corvids, known sage-grouse nest and chick predators (Schroeder and Baydack 2001). We have no information on the extent to which corvids prey on sage-grouse chicks and eggs. Additionally, highway rest areas provide a source of food and perches for corvids and raptors, and facilitate their movements into surrounding areas (Connelly *et al.* 2004). It has not been documented that sage-grouse populations are affected by predators using roads as corridors into sagebrush habitats.

The presence of roads also increases human access and their resulting disturbance effects in remote areas (Forman and Alexander 1998; Forman 2000; Connelly *et al.* 2004). Increases in legal and illegal hunting activities resulting from the use of roads built into sagebrush habitats have been documented (Patterson 1952; Connelly *et al.* 2004). However, the actual current effect of these increased activities on sage-grouse populations has not been determined. Roads may also facilitate access for habitat treatments (Connelly *et al.* 2004), resulting in subsequent direct habitat losses. New roads are being constructed to support development activities within the greater sage-grouse extant range. For example, in the Powder River Basin of Wyoming, up to 28,572 km (17,754 mi) of roads to support coalbed methane development are proposed (BLM 2003a).

The expansion of road networks has been documented to contribute to exotic plant invasions via introduced roadfill, vehicle transport, and road maintenance activities (Forman and Alexander 1998; Forman 2000; Gelbard and Belnap 2003; Knick *et al.* 2003; Connelly *et al.* 2004). Invasive species are not limited to roadsides (or verges), but have also encroached into the surrounding habitats (Forman and Alexander 1998; Forman 2000; Gelbard and Belnap 2003). In their study of roads on the Colorado Plateau of southern Utah, Gelbard and Belnap (2003) found that improving unpaved four-wheel drive roads to paved roads resulted in increased cover of exotic plant species within the interior of adjacent vegetative communities. This effect was associated with road construction and maintenance activities and vehicle traffic, and not with differences in site characteristics. The incursion of exotic plants into native sagebrush systems can negatively affect greater sage-grouse through habitat losses and conversions (see further discussion below).

Additional indirect effects of roads may result from birds' behavioral avoidance of road areas because of noise, visual disturbance, pollutants, and predators moving along a road. The absence of screening vegetation in arid and semiarid regions further exacerbates the problem (Suter 1978). Male sage-grouse depend on acoustical signals to attract females to leks (Gibson and Bradbury 1985; Gratson 1993). If noise interferes with mating displays, and thereby female attendance, younger males will not be drawn to the lek and eventually leks will become inactive (Amstrup and Phillips 1977; Braun 1986). Dust from roads and exposed roadsides can damage vegetation through interference with photosynthetic activities; the actual amount of potential damage depends on winds, wind direction, the type of surrounding vegetation and topography (Forman and Alexander 1998). Chemicals used for road maintenance, particularly in areas with snowy or icy precipitation, can affect the composition of roadside vegetation (Forman and Alexander 1998). We were unable to find any data relating these potential effects to impacts on sage-grouse population parameters.

In a study on the Pinedale Anticline in Wyoming, sage-grouse hens that bred on leks within 3 km (1.9 mi) of roads associated with oil and gas development traveled twice as far to nest as did hens bred on leks greater than 3 km (1.9 mi) from roads. Nest initiation rates for hens bred on leks ''close'' to roads were also lower (50 vs 65 percent) affecting population recruitment (33 vs. 44 percent) (Lyon 2000; Lyon and Anderson 2003). Lyon and Anderson (2003) suggested that roads may be the primary impact of oil and gas development to sage-grouse, due to their persistence and continued use even after drilling and production have ceased. Braun *et al.* (2002) suggested that daily vehicular traffic along road networks for oil wells can impact sage-grouse breeding activities based on lek abandonment patterns. In a study of 804 leks within 100 km (62.5 mi) of Interstate 80 in southern Wyoming and northeastern Utah, Connelly *et al.* (2004) found that there were no leks within 2 km (1.25 mi) of the interstate and only 9 leks were found between 2 and 4 km (1.25 and 2.5 mi) along this same highway. The number of active leks increased with increasing distance from the interstate. Lek persistence and activity relative to distance from the interstate were also measured. The distance of a lek from the interstate was a significant predictor of lek activity, with leks further from the interstate more likely to be active. An analysis of long-term changes in populations between 1970 and 2003 showed that leks closest to the interstate declined at a greater rate than those further away (Connelly *et al.* 2004). What is not clear from these studies is what specific factor relative to roads (*e.g.*, noise, changes in vegetation, etc.) sage-grouse are responding to, and Connelly *et al.* (2004) caution that they have not included other potential sources of indirect disturbance (*e.g.*, powerlines) in their analyses.

Railroads presumably have the same potential impacts to sage-grouse as do roads since they create linear corridors within sagebrush habitats. Railways were primarily responsible for the initial spread of cheatgrass in the intermountain region (Connelly *et al.* 2004). Cheatgrass, an exotic species that is unsuitable as sage-grouse habitat, readily invaded the disturbed soils adjacent to railroads, being distributed by trains and the cattle they transported. Fires created by trains facilitated the spread of cheatgrass into adjacent areas. Railroads cover 137 km^2 (53 mi^2) of the sage-grouse in Connelly *et al.*'s (2004) assessment area, but are estimated to influence an area of 183,915 km^2 (71,000 mi^2), assuming a 3 km (1.9 mi) zone of influence (9 percent of their assessment area). Avian collisions with trains occur, although no estimates of mortality rates are documented in the literature (Erickson *et al.* 2001).

The effects of infrastructure, particularly as related to energy development and urbanization, were identified by some members of the expert panel as an important factor contributing to the extinction risk for greater sage-grouse, particularly in the eastern part of the species range (Montana, Wyoming and Colorado). Across the entire range of the greater sage-grouse, infrastructure ranked second as an extinction risk factor by the expert panel.

Grazing

Bison, antelope and other ungulates grazed lands occupied by sage-grouse prior to European immigrant settlement of the western United States in the mid to late 1800s. With settlement, from 1870 to the early 1900s, the numbers of cattle, sheep, and horses rapidly increased, peaking at the turn of the century (Oliphant 1968, Young *et al.* 1976) with an estimated 26 million cattle and 20 million sheep in the West (Wilkenson 1992). Livestock grazing is the most widespread type of land use across the sagebrush biome (Connelly *et al.* 2004); almost all sagebrush areas are managed for livestock grazing (Knick *et al.* 2003). Cattle and sheep animal unit months (AUMs; the amount of forage required to feed one cow with calf, one horse, five sheep, or five goats for one month) on all Federal land have declined since the early 1900s (Laycock *et al.* 1996). By the 1940s AUMs on all Federal lands were estimated to be 14.6 million, increasing to 16.5 million in the 1950s, and gradually declining to 10.2 million by the 1990s (Miller and Eddleman 2000). As of 2003, active AUMs for BLM lands in States where sage-grouse occur totaled about 10.1 million (BLM 2003b). Most of the 78.3 million acres of BLM-administered land within the current range of the greater sage-grouse are open to livestock grazing (BLM 2004a). Knick *et al.* (2003) state that excessive grazing by domestic livestock during the late 1800s and early 1900s, along with severe drought, significantly impacted sagebrush ecosystems. Long-term effects from this overgrazing, including changes in plant communities and soils persist today.

Few studies have directly addressed the effect of livestock grazing on sage-grouse (Beck and Mitchell 2000, Wamboldt *et al.* 2002, Crawford *et al.* 2004), and there is little direct experimental evidence linking grazing practices to sage-grouse population levels (Braun 1987, Connelly and Braun 1997). Native herbivores, such as pronghorn antelope (*Antilocarpo americana*), were present in the sagebrush steppe region prior to European settlement of western States (Miller *et al.* 1994), and sage-grouse co-evolved with these animals. However, many areas of sagebrush-steppe did not support herds of large ungulates, as large native herbivores disappeared 12,000 years before present (Knick *et al.* 2003). Therefore, native vegetation communities within the sagebrush ecosystem developed in the absence of significant grazing presence (Knick *et al.* 2003).

It has been demonstrated that the reduction of grass heights due to livestock grazing of sage-grouse nesting and brood-rearing areas negatively affects nesting success by reducing cover necessary for predator avoidance (Gregg *et al.* 1994; Delong *et al.* 1995; Connelly *et al.* 2000a). In addition, livestock consumption of forbs may reduce food availability for sage-grouse.

This is particularly important for pre-laying hens, as forbs provide essential calcium, phosphorus, and protein. A hen's nutritional condition affects nest initiation rate, clutch size, and subsequent reproductive success (Connelly *et al.* 2000a). This information indicates that grazing by livestock could reduce the suitability of breeding and brood-rearing habitat, subsequently negatively affecting sage-grouse populations (Braun 1987, Dobkin 1995, Beck and Mitchell 2000). Exclosure studies have demonstrated that domestic livestock grazing also reduces water infiltration rates and cover of herbaceous plants and litter, as well as compacting soils and increasing soil erosion (Braun 1998). This results in a change in the proportion of shrub, grass, and forb components in the affected area, and an increased invasion of exotic plant species that do not provide suitable habitat for sage-grouse (Miller and Eddleman 2000). Hulet (1983, as cited in Connelly *et al.* 2000a) found that heavy grazing could lead to increases in ground squirrels that depredate sage-grouse nests. Thus, important factors of livestock operations related to impacts on sage-grouse include stocking levels, season of use, and utilization levels.

Other consequences of grazing include several related to livestock trampling. Outright nest destruction by livestock trampling does occur and the presence of livestock can cause sage-grouse to abandon their nests (Rasmussen and Griner 1938, Patterson 1952, Call and Maser 1985, Crawford *et al.* 2004). Call and Maser (1985) indicate that forced movements of cattle and sheep could have significant effects on nesting hens and young broods caught in the path of these drives. Livestock may also trample sagebrush seedlings thereby removing a source of future sage-grouse food and cover (Connelly *et al.* 2000a), and trampling of soil by livestock can reduce or eliminate biological soil crusts making these areas susceptible to cheatgrass invasion (Mack 1981 as cited in Miller and Eddleman 2000; Young and Allen 1997; Forman and Alexander 1998).

Livestock grazing may also compete directly with sage-grouse for rangeland resources. Cattle are grazers, feeding mostly on grasses, but they will make seasonal use of forbs and browse species like sagebrush (Vallentine 2001). Domestic sheep are intermediate feeders making high use of forbs, but also use a large volume of grass and browse species like sagebrush (Vallentine 2001). Pedersen *et al.* (2003) documented sheep consumption of rangeland forbs in areas where sage-grouse occur. The effects of direct competition between livestock and sage-grouse depend on condition of the habitat and grazing practices, and thus vary across the range of the species. For example, Aldridge and Brigham (2003) suggest that poor livestock management in mesic sites, which are considered limited habitats for sage-grouse in Alberta, results in a reduction of forbs and grasses available to sage-grouse chicks, thereby affecting chick survival.

Some effects of livestock grazing may have positive consequences for sage-grouse. Evans (1986) found that sage-grouse used grazed meadows significantly more during late summer than ungrazed meadows because grazing had stimulated the regrowth of forbs. Klebenow (1981) noted that sage-grouse sought out and used openings in meadows created by cattle grazing in northern Nevada. Finally both sheep and goats have been used to control invasive weeds (Mosely 1996 as cited in Connelly *et al.* 2004; Olson and Wallander 2001; Merritt *et al.* 2001) and woody plant encroachment (Riggs and Urness 1989) in sage-grouse habitat.

Although there are few studies which directly examine the effects of livestock grazing on greater sage-grouse, and no studies on a rangewide scale, the expert panel ranked grazing as a potential extinction risk factor. This ranking incorporates not only the direct effects of grazing, but all associated activities, such as vegetation management, fencing, overuse of riparian habitats by domestic livestock, etc. The expert panel also noted that the recovery of greater sage-grouse populations from the 1930s to the 1950s occurred during a period of a reduction in livestock grazing as well as a change in weather resulting in wetter conditions. However, the panel also noted that proper grazing management may be a beneficial tool for enhancing greater sage-grouse habitats where maintenance and enhancement of these habitats is identified as an objective, although this has not been rigorously tested.

Free-roaming horses and burros have been a component of sagebrush and other arid communities since they were brought to North America at the end of the 16th century (Wagner 1983; Beever 2003). About 31,000 wild horses occur in 10 western States, with herd sizes being largest in States with the most extensive sagebrush cover (Nevada, Wyoming, and Oregon; Connelly *et al.* 2004). Burros occur in five western States, with about 5,000 of these present (Connelly *et al.* 2004). Due to physiological differences, a horse consumes 20 to 65 percent more forage than would a cow of equivalent body mass (Wagner 1983; Menard *et al.* 2002). We are unaware of any studies that directly address the impact of wild horses or burros on sagebrush and sage-grouse. However some authors have suggested that wild horses could negatively impact important meadow and spring brood-rearing habitats used by sage-grouse (Crawford *et al.* 2004; Connelly *et al.* 2004). Other impacts from wild horse grazing may be similar to the impacts resulting from domestic livestock in sagebrush habitats, but these have not been documented.

Sagebrush removal to increase herbaceous forage and grasses for domestic and wild ungulates is a common practice in sagebrush ecosystems (Connelly *et al.* 2004). Removal from chemical and mechanical means has been discussed previously. The elimination of sagebrush is usually followed with rangeland seedings to improve forage for livestock grazing operations (Knick *et al.* 2003; Connelly *et al.* 2004). Large expanses of sagebrush have been removed and reseeded with non-native grasses, such as crested wheatgrass (*Agropyron cristatum*), to increase forage production on public lands (Shane *et al.* 1983, cited in Knick *et al.* 2003; Connelly *et al.* 2004). These treatments had the effect of reducing or eliminating many native grasses and forbs present prior to the seedings. Sage-grouse are affected indirectly through the loss of native forbs that serve as food and the loss of native grasses that provide concealment or hiding cover within the understories of the former sagebrush stands (Connelly *et al.* 2004). BLM reports that they no longer implement actions that result in removing large expanses of sagebrush and reseeding with non-native grasses (BLM 2004a).

Water developments for the benefit of livestock on public lands are common (Connelly *et al.* 2004). Development of springs and other water sources to support livestock in upland shrub-steppe habitats can artificially concentrate domestic and wild ungulates in important sage-grouse habitats, thereby exacerbating grazing impacts in those areas through vegetation trampling, etc. (Braun 1998). Diverting the water sources has the secondary effect of changing the habitat present at the water source before diversion. This could result in the loss of either riparian or wet meadow habitat important to sage-grouse as sources of forbs or insects.

Mining

Development of mines within the distribution of the sage-grouse began before 1900 (Robbins and Ward 1994, cited in Braun 1998). Surface mining for any mineral resource (coal, uranium, copper, bentonite, gypsum, oil shale, phosphate, limestone, gravel, etc.) will result in direct habitat loss for sage-grouse if the mining occurs in occupied sagebrush habitats. Direct loss of sage-grouse habitat can also occur if the overburden and/or topsoil resulting from mining activities are stored in sagebrush habitats. The actual effect of this loss depends on the quality, amount, and type of habitat disturbed, the scale of the disturbance, and if non-breeding habitat is affected, the availability of adjacent habitats (Proctor *et al.* 1983; Remington and Braun 1991). Sage-grouse habitat losses from all sources of mining have occurred in Utah (Beck *et al.* 2003), Colorado (Braun 1986), and Wyoming (Hayden-Wing Associates 1983), but the actual amount of habitat loss has not been tabulated. Sagebrush habitat has also been lost to mining in other states within the range of sage-grouse although reliable estimates of the amount of loss are not available.

Mined land reclamation is required by either the Federal or State governments in the greater sage-grouse states and Canada (Smyth and Dearden 1998). Due to the relatively recent nature of federal coal and Canadian regulation (27 and 41 years, respectively; Smyth and Dearden 1998) there is limited long-term monitoring data. The laws generally allow for a change in post-mining land use from pre-mining conditions, and restoration of pre-mining sagebrush habitat may not occur if the surface owner determines an alternative habitat type is preferable. However, Federal coal reclamation requires restoration of diversity and density standards if the private landowner agrees. Early efforts to restore sage-grouse habitats on mined lands focused on creating artificial leks, which was largely unsuccessful (Tate *et al.* 1979; Proctor *et al.* 1983). Most efforts now rely on seasonal restrictions for lek destruction and restoration of sagebrush habitats (Proctor *et al.* 1983; Parrish and Anderson 1994). Regulation of non-coal mining in the United States is at the discretion of the individual States, and may or may not include wildlife habitat restoration as a criterion (Pat Deibert, U.S. Fish and Wildlife Service, pers. comm. 2004).

New vegetation types including exotic species may become established on mined areas (Moore and Mills 1977), altering their suitability for sage-grouse. Temporary habitat loss can stem from intentional planting to minimize erosion or for nurse crops (those crops planted to create suitable microhabitat conditions for the desired vegetative species). The length of this temporary conversion depends on the life of the mine, the success of reclamation, and whether or not reclamation is concurrent with mining disturbance. If reclamation plans call for the permanent conversion of the mined area to a different habitat type (*e.g.*, agriculture) the habitat loss becomes permanent. Invasive exotic plants may also establish on the disturbed surfaces. Removal of the overburden and target mineral may result in changes in topography, subsequently resulting in changes in microclimates and microhabitats (Moore and Mills 1977). Significant topographical changes can affect the ability to successfully restore the mined area to pre-existing vegetative conditions (Moore and Mills 1977). Additional habitat losses can occur if supporting infrastructure, such as roads, railroads, utility corridors, etc., become permanent landscape features after mining and reclamation are completed (Moore and Mills 1977).

In Wyoming and Montana an estimated 38,833 ha (96,000 ac) of disturbed Federal and non-Federal surface are associated with existing coal mining operations (Kermit Witherbee, Bureau of Land Management, pers. comm. 2004). Over the next ten years, it has been estimated that approximately 20,243 ha (50,000 ac) will be disturbed for coal mining activities. This is less than 1 percent of the Connelly *et al.* (2004) assessment area. Of that, 14,170 ha (35,000 ac) should be reclaimed within the same time-period, resulting in a net annual disturbance of 607 ha (1,500 ac). The actual impact to sage-grouse may be longer, as it takes 15 to 30 years for sagebrush regeneration to usable conditions (Connelly and Braun 1997). There will likely be additional losses of sagebrush habitat in other states as a result of mining activities (all types) although we are unable to quantify this.

Mining infrastructure, such as roads, railroads, powerlines, etc., may impact sage-grouse, although those effects are not expected to be different than previously described. Presumably, direct habitat loss will not be as large from subsurface mining. However, the amount of supporting infrastructure and indirect effects may be similar as for surface mines (Thomas and Leistritz 1981). Other indirect effects from mining can include reduced air quality from gaseous emissions and fugitive dust, degradation of surface water quality and quantity, changes in vegetation, topography, land-use practices, and disturbance from noise, ground shock and human presence, and mortality from collision with mining equipment (Moore and Mills 1977; Brown and Clayton 2004). Gaseous emissions, created from the operation of heavy equipment, trains, etc., are usually quickly dissipated in the windy, open areas typical of sagebrush. Fugitive dust could affect local vegetative and insect resources through coating important respiratory surfaces. In extreme cases, plant photosynthesis may be restricted (Moore and Mills 1977). This may result in reduced food and cover resources for sage-grouse. Fugitive dust may also affect sage-grouse through direct irritation of mucus membranes and/or exposure to toxic minerals that are otherwise trapped in the soils (Moore and Mills 1977). Most large surface mines are required to control fugitive dust, so these impacts are probably limited.

Water quality can generally be reduced through increased sediment loads, leaching of toxic compounds or elements from exposed ore, waste rock and overburden, introduction of excess nutrients from blasting and fertilizers, or introduction of pathogens from septic systems and waste disposal associated with mining activity (Moore and Mills 1977). Contamination of water supplies through toxic elements can result in either direct mortality to wildlife, or long-term chronic health problems. Pathogens can also have a similar detrimental effect on wildlife. Water supplies may decline either through direct removal of wetlands from mining activity or reduction from use for fugitive dust suppression. Remaining wetlands may subsequently receive increased use from other wildlife or domestic livestock, resulting in habitat degradation. In Nevada, extensive de-watering of ground water results from open pit gold mining (Kevin Kritz, U.S. Fish and Wildlife Service, pers. comm. 2004). The actual impact of these effects on sage-grouse is unknown. Since sage-grouse do not require free water (Schroeder *et al.* 1999), we anticipate that impacts to water quality from mining activities have minimal population-level effects. The possible exception is degradation of riparian areas, which could result in brood habitat loss.

If blasting is necessary for removal of overburden or the target mineral, ground shock may occur. The full effects of ground shock on wildlife are unknown, but given its temporary duration and localized impact area, impacts are considered minimal (Moore and Mills 1977). One possible exception is the repeated use of explosives during lekking or nesting, which could potentially result in nest and/or lek abandonment (Moore and Mills 1977).

We are unaware of any research on the impact of these factors to sage-grouse. Noise from mining activities may limit sage-grouse use of surrounding suitable habitat. In a study of sharp-tailed grouse (*Pedioecetes phasianellus*) leks in northeastern Wyoming, data suggested that noise from an adjacent coal mine adversely affected leks by masking vocalizations, which resulted in reduced female attendance and yearling recruitment (Amstrup and Phillips 1977). In that study, the authors found that mining noise was continuous across days and seasons, and did not dissipate as it traveled across the adjacent landscape. The effects on sage-grouse of noise from mining are unknown, but sage-grouse also depend on acoustical signals to attract females to leks (Gibson and Bradbury 1985; Gratson 1993). If noise does interfere with mating displays, and thereby female attendance, younger males will not attend the lek, and eventually leks will become inactive (Amstrup and Phillips 1977; Braun 1986).

Mining can also impact sage-grouse through the increased presence of human activity, either through avoidance of suitable habitat adjacent to mines or through collisions with vehicles associated with mining operations (Moore and Mills 1977; Brown and Clayton 2004). An increased human population in an area, as a result of mine extraction activities, may result in increased hunting pressure, both legal and poaching (Moore and Mills 1977). Although these effects have not been quantified on sage-grouse populations, the State of Wyoming requires coal operators to educate their employees about wildlife regulations when they are hired. Sage-grouse may also be at increased risk for collision with vehicles simply due to the increased traffic associated with mining activities and transport (Moore and Mills 1977; Brown and Clayton 2004). However, we were unable to find any information regarding increased mortality of sage-grouse near mines as a result of this effect.

We were only able to locate a few studies that specifically examined the effects of coal mining on greater sage-grouse (Tate *et al.* 1979; Hayden-Wing Associates 1983; Braun 1986; Remington and Braun 1991; Brown and Clayton 2004). In a study in North Park, Colorado, overall population numbers of sage-grouse were not reduced, but there was a reduction in the number of males attending leks within 2 km (0.8 miles) of three coal mines, as well as a failure to recruit yearling males to these existing leks (Braun 1986; Remington and Braun 1991). New leks formed further from the mining disturbance (Remington and Braun 1991). Additionally, some leks adjacent to mine areas that had been abandoned at the onset of mining were re-established when mining activities ceased, suggesting disturbance rather than loss of habitat was the limiting factor. There was no decline in hen survival in a population of sage-grouse near large surface coal mines in northeastern Wyoming and nest success was apparently unaffected by the adjacent mining activity (Brown and Clayton 2004). However, the authors concluded that this population could only be sustained by aggressive land management to maintain suitable habitat, as the existing habitat will become fragmented by continued mining.

Braun (1998) concluded that surface coal mining and all associated activities have negative short-term impacts on sage-grouse numbers and habitats near the mines. Sage-grouse will reestablish on mined areas once mining has ceased, but there is no evidence that population levels will reach their previous size. Additionally, the time span for population re-establishment may be 20 to 30 years (Braun 1998). Hayden-Wing Associates (1983) concluded that the loss of one or two leks in a regional area from coal mining was likely not limiting to local populations in their study on the Caballo Rojo Mine in northeastern Wyoming. However, if several leks are affected, local population numbers may decline (Hayden-Wing Associates 1983).

Hard rock mining impacts greater sage-grouse at the local level. The expert panel identified hard rock mining as a threat of relatively low importance compared to other threats. The effect of hard rock mining, when considered independently of other threats to the species, is likely of relatively low importance to the status of the species range-wide.

Non-Renewable and Renewable Energy Development

Non-renewable energy development (petroleum products, coal) has been occurring in sage-grouse habitats since the late 1800s (Connelly *et al.* 2004). Interest in development of oil and gas has been sporadic and typically focused in limited geographical areas (Braun *et al.* 2002). The re-authorization of the Energy Policy and Conservation Act in 2000 dictated re-inventory of Federal oil and gas reserves, which identified extensive reserves in the Greater Green River Basin of Colorado, Utah, and Wyoming, the San Juan Basin of New Mexico and Colorado, and the Montana Thrust Belt and the Powder River Basin of Wyoming and Montana (Connelly *et al.* 2004). All of these basins are located in primarily sagebrush-dominated landscapes (Knick *et al.* 2003; Connelly *et al.* 2004).

The development of oil and gas resources requires surveys for economically recoverable reserves, construction of well pads and access roads, subsequent drilling and extraction, and transport of oil and gas, typically through pipelines. Ancillary facilities can include compressor stations, pumping stations and electrical facilities (Connelly *et al.* 2004). Surveys for recoverable resources occur primarily through seismic activities, using vibroesis buggies (thumpers) or shothole explosives. Well pads vary in size from 0.10 ha (0.25 ac) for coalbed natural gas wells in areas of level topography to greater than 7 ha (17.3 ac) for deep gas wells (Connelly *et al.* (2004). Pads for compressor stations require 5 to 7 ha (12.4 to 17.3 ac; Connelly *et al.* 2004). Well densities and spacing are typically designed to maximize recovery of the resource and are administered by State and Provincial oil and gas agencies and the BLM (on Native American lands) (Connelly *et al.* 2004). Based on their review of project EIS's, Connelly *et al.* (2004) concluded that the economic life of a coalbed methane well averages 12 to 18 years and 20 to 100 years for deep oil and gas wells.

Connelly *et al.* (2004) reviewed oil and gas development environmental impacts statements to determine that approximately 4,000 oil and gas wells have been approved in the Green River Basin of Wyoming, Colorado and Utah, with approval of an additional 9,700 wells pending. In the Powder River Basin of Wyoming and Montana, 15,811 wells have been approved, and an additional 65,635 are being considered (Connelly *et al.* 2004). In the Uinta/Piceance Basin of Utah, 3,500 wells have been drilled and another 2,600 are pending (Connelly *et al.* 2004). Approximately 3,000 more permits will be issued annually for Montana, Colorado, Utah and Wyoming (Connelly *et al.* 2004). Nine million hectares (22.2 million ac) in Montana, Wyoming, Colorado, Utah and New Mexico are available for oil and gas leasing, and approval for 29,000 new oil and gas leases is anticipated by 2005 (BLM 2003c). The BLM has not quantified the portion of these lands that provide sage-grouse habitat. In September, 2004, the Utah BLM office sold 279 oil and gas leases, incorporating approximately 195,000 ha (481,000 ac) on both BLM and Forest Service surfaces (BLM 2004c). Based on a review of National

Environmental Policy Act (NEPA) documents, there are 27,231 existing oil and gas wells in sagebrush habitats, and another 78,938 to 79,647 are proposed.

Potential impacts to sage-grouse and sagebrush habitats from the development of oil and gas resources include direct habitat loss, habitat fragmentation from vegetation removal, roads, powerlines and pipeline corridors, noise, gaseous emissions, changes in water availability and quality, and increased human presence (Suter 1978; Aldridge 1998; Braun 1998; Aldridge and Brigham 2003; Knick *et al.* 2003; Lyon and Anderson 2003; Connelly *et al.* 2004). We found no information regarding the effects of gaseous emissions produced by oil and gas development. Presumably, as with surface mining, these emissions are quickly dispersed in the windy, open conditions of sagebrush habitats (Moore and Mills 1977), minimizing the potential effects on sage-grouse.

Direct habitat losses result from construction of well pads, roads, pipelines, powerlines, and potentially through the crushing of vegetation during seismic surveys. For example, coal-bed methane development in the Powder River Basin of Wyoming is expected to result in the loss of an additional 21,711 ha (53,626 ac) of sagebrush habitat by 2011 (BLM 2003a). This is less than 1 percent of the Connelly *et al.* (2004) assessment area. Current sage-grouse habitat loss in the Basin from coal-bed methane is estimated at 2,024 ha (5,000 ac) (Braun *et al.* 2002).

Connelly *et al.* (2004) estimated that habitat loss from all existing natural gas pipelines in the conservation assessment area was a minimum of 4,740 km^2 (1,852 mi^2, 1.17 million ac, 474,000 ha; less than 1 percent of their assessment area). Proposed pipelines to support future oil and gas developments are not included in this figure. Although reclamation of short-term disturbances is often concurrent with project development, habitats would not be restored to pre-disturbance conditions for an extended period (BLM 2003a). The amount of direct habitat loss within an area will ultimately be determined by well densities and the associated loss from ancillary facilities. Most Federal land management agencies impose stipulations to preclude exploration in suitable habitat during the nesting season.

Reclamation of areas disturbed by oil and gas development can be concurrent with field development. As disturbed areas are reclaimed, sage-grouse may repopulate the area. However, there is no evidence that populations will attain their previous size, and re-population may take 20 to 30 years, as habitat conditions are not immediately restored (Braun 1998). For most developments, return to pre-disturbance population levels is not expected due to a net loss and fragmentation of habitat (Braun *et al.* 2002). After 20 years, sage-grouse have not recovered to pre-development numbers in Alberta, even though well pads in these areas have been reclaimed (Braun *et al.* 2002). In some reclaimed areas, sage-grouse have not returned (Aldridge and Brigham 2003).

Habitat fragmentation impacts to sage-grouse resulting from vegetation removal, roads, powerlines and pipeline corridors are similar to those described previously. Fragmentation resulting from oil and gas development and the associated introduced infrastructure may have more effects on greater sage-grouse than the associated direct habitat losses, which may not be extensive. For example, of the total 904,109 ha (2,234,103 ac) project area in the Powder River Basin, an estimated 23,735 ha (58,625 ac) of habitat will be directly disturbed by well construction (BLM 2003a). However, up to 8,579 km (5,311 mi) of powerlines, 28,572 km (17,754 mi) of roads, and 33,548 km (20,846 mi) of pipelines are also proposed for this project. The presence of these ancillary facilities may preclude sage-grouse from using suitable adjacent habitats (see previous discussion). As previously discussed, roads associated with oil and gas development were suggested to be the primary impact to greater sage-grouse due to their persistence and continued use even after drilling and production has ceased (Lyon and Anderson 2003).

Noise can drive away wildlife, cause physiological stress and interfere with auditory cues and intraspecific communication, as discussed previously. Aldridge and Brigham (2003) reported that, in the absence of stipulations to minimize the effects, mechanical activities at well sites may disrupt sage-grouse breeding and nesting activities. Hens bred on leks within 3 km (1.9 miles) of oil and gas development in the upper Green River Basin of Wyoming selected nest sites with higher total shrub canopy cover and average live sagebrush height than hens nesting away from disturbance (Lyon 2000). The author hypothesized that exposure to road noise associated with oil and gas drilling may have been one cause for the difference in habitat selection. However, noise could not be separated from the potential effects of increased predation resulting from the presence of a new road. Above-ground noise is typically not regulated to mitigate effects to sage-grouse or other wildlife (Connelly *et al.* 2004). Ground shock from seismic activities may affect sage-grouse if it occurs during the lekking or nesting seasons (Moore and Mills 1977). We are unaware of any research on the impact of ground shock to sage-grouse.

Water quality and quantity may be affected in oil and gas development areas. The impacts are similar relative to the contamination of water supplies by toxic elements and pathogens (see previous discussion), with the addition of potential oil contamination in settling and/or condensate ponds. In many large field developments, water produced during the gas dehydration process is stored in tanks, removing this potential threat. Where oil contamination of open water pits has occurred, no sage-grouse mortalities are known (Pedro Ramirez, U.S. Fish and Wildlife Service, pers. comm. 2004). Water may also be depleted from natural sources for drilling or dust suppression purposes. Remaining wetlands may subsequently receive increased use from other wildlife or domestic livestock, resulting in habitat degradation. Since, sage-grouse do not require free water (Schroeder *et al.* 1999) we anticipate that impacts to water quality from mining activities have minimal effects on them. The possible exceptions are a reduction in habitat quality (*e.g.*, trampling of vegetation, changes in water filtration rates), habitat degradation (*e.g.*, poor vegetation growth), which could result in brood habitat loss. However, we have no data to suggest this is a limiting factor to sage-grouse.

Water produced by coal-bed methane drilling may benefit sage-grouse through expansion of existing wetland and riparian areas, and creation of new areas (BLM 2003a). These habitats could provide additional brood rearing and summering habitats for sage-grouse. However, based on the recent discovery of West Nile virus in the Powder River Basin, and the resulting mortalities of sage-grouse (Naugle *et al.* 2004), there is concern that produced water could be a negative impact if it creates suitable breeding reservoirs for the mosquito vector of this disease. There is currently no evidence supporting a link between West Nile virus and coal-bed methane development (Naugle *et al.* 2004). Produced water could also result in direct habitat loss through prolonged flooding of sagebrush areas, or if the discharged water is of poor quality because of high salt or other mineral content, either of which could result in the loss of sagebrush and/or grasses and forbs necessary for foraging broods

(BLM 2003a). We do not have quantitative information on the extent of habitat influenced by produced water, nor the net effects on sage-grouse populations.

Increased human presence resulting from oil and gas development can also impact sage-grouse either through avoidance of suitable habitat, disruption of breeding activities, or increased hunting and poaching pressure (Aldridge and Brigham 2003; Braun *et al.* 2002; BLM 2003a). Sage-grouse may also be at increased risk for collision with vehicles simply due to the increased traffic associated with oil and gas activities (BLM 2003a).

Only a few studies have examined the effects of oil and gas development on sage-grouse. While each of these studies reported sage-grouse population declines, specific causes for the negative impacts were not determined. In Alberta, Canada, the development of well pads and associated roads in the mid-1980s resulted in the abandonment of three lek complexes within 200 m (220 yd) of these features (Braun *et al.* 2002). Those leks have not been active since that time. A fourth lek complex has gone from three to one lek with fewer numbers of sage-grouse on it (Braun *et al.* 2002). The well pads have since been reclaimed, but sage-grouse numbers have not recovered (we do not have information on post-reclamation vegetation). Subsequent to the development of the Manyberries Oil Field in high quality sage-grouse habitat in Alberta, male sage-grouse counts fell to the lowest known level (Braun *et al.* 2002). Two additional leks were directly disturbed, and neither of these leks has been active within the past 10 years (Braun *et al.* 2002). The development of oil reserves in Jackson County, Colorado, was concurrent with decline of sage-grouse numbers in the oil field area (Braun 1998). Sage-grouse populations still occur in at least one long-term oil field development in Colorado where leks are not within line-of-sight of an active well or powerline (Braun *et al.* 2002). Although the number of active leks has declined in this field, sage-grouse have been consistently documented there since 1973.

Of particular relevance to estimating oil and gas development impacts is the fidelity of sage-grouse hens to nesting and summer brood rearing areas demonstrated by Lyon and Anderson (2003). Hens that have successfully nested will return to the same areas to nest every year. If these habitats are affected by oil and gas development, there is a strong potential that previously successful hens will return but not initiate nests (Lyon 2000). Depending on the number of hens affected, local populations could decline.

Over 200 known leks occur within the coal-bed methane development area in Powder River Basin of northeastern Wyoming. Those leks have been affected by direct habitat losses, higher human activity, and powerlines (Braun *et al.* 2002). Since initiation of field development, 28 percent of known sage-grouse habitat within the project area has been affected. On 30 leks within 0.4 km (0.25 mi) of a well, significantly fewer males have been recorded when compared with other, undisturbed leks. The rate of recruitment to the male breeding population on these leks is also lower when compared with increases on less disturbed leks (Braun *et al.* 2002; BLM 2003a). Powerlines have been constructed within 0.4 km (0.25 mi) of 40 leks within the project area. These leks also have lower recruitment rates, possibly due to increased raptor predation. Lower numbers of grouse have also been counted on leks within 1.6 km (1 mi) of compressor stations (Braun *et al.* 2002). In the Final EIS for this project, the BLM stated that local sage-grouse extirpations may occur as a result of the synergistic effects of all aspects of coal-bed methane development in this area (BLM 2003a).

In the Jonah natural gas field in southwestern Wyoming, 10 of 24 leks in or near the project area are no longer active, although data collection has not been consistent on 4 of those leks (BLM 2004d). Two leks were destroyed by the placement of well pads on the leks, and re-establishment of those leks at that location is not anticipated (BLM 2004d). Based on nest initiation and habitat fidelity results, Lyon and Anderson (2003) concluded that impacts occur greater than 0.4 km (0.25 mi) from well pads, thus current no-surface-occupancy buffers around active sage-grouse based on that distance may not be adequate to avoid adverse effects. However, to our knowledge no information exists concerning whether leks are subsequently re-established.

Protective wildlife stipulations are typically placed on individual oil and gas leases at the time of sale, including seasonal and temporal restrictions around important sage-grouse habitats (Connelly *et al.* 2004). The protection afforded by these stipulations depends on the specific prescriptions, and whether or not important sage-grouse habitats are identified in the area proposed for development. Additional stipulations may be placed on oil and gas development, as identified in BLM land use plans, and through the NEPA process. Most lease stipulations have exception, waiver, and/or modification criteria that are included in BLM land use plans. Waivers, which are a permanent exemption, and modifications, which are changes to the terms of a stipulation, are described by BLM as being rare, and they also may require public notice (BLM 2004a). Exceptions are a one-time exemption to a lease stipulation. An example cited by BLM is a timing stipulation designed to avoid activity in wintering habitat, which could be the subject of an exception in a mild winter if a company requests an early entry to drill and BLM or the local wildlife agency make an on-the-ground survey and find sage-grouse are not using the winter habitat or have left the area earlier than normal (BLM 2004a).

On June 22, 2004, BLM issued an Instruction Memorandum (IM) establishing policy that BLM field offices consider Best Management Practices (BMPs) for oil and gas and other fluid mineral operations as part of NEPA documents. The purpose of the BMPs is to mitigate anticipated effects to surface and subsurface resources, and to encourage operators to consider BMPs during the application process for permits to drill (BLM 2004e). BLM expects that wells drilled using BMPs will have fewer impacted acres of sagebrush habitat than has been estimated in EISs (*e.g.*, for the Powder River EIS) and consequently there will be less habitat loss and fragmentation (BLM 2004a). The effect of the IM and the BMPs is difficult to predict. Although the IM makes it BLM policy to consider the BMPs, their adoption is voluntary, not mandatory. The Service is available to provide BLM with technical assistance as they implement BMPs.

The Forest Service can place additional seasonal or temporal stipulations to protect sage-grouse on oil and gas developments on lands they manage (Forest Service in litt. 2004). Development of oil and gas resources on private lands does not always require mitigation (Braun 1998; Connelly *et al.* 2004), and most States do not place wildlife stipulations on development occurring on their lands. In Canada, no current legislation commits energy development to adhere to recommendations by Alberta Fish and Wildlife to reduce impacts of drilling in important sage-grouse habitats (Braun *et al.* 2002).

Renewable energy resources, such as windpower and geothermal energy, require many of the same features for construction and operation as do non-renewable energy resources. Therefore, we anticipate that potential impacts from direct habitat losses, habitat fragmentation through roads and powerlines, noise, and increased human presence (Connelly *et al.* 2004) will generally be the same as already discussed for nonrenewable energy development. Windpower may have additional mortalities resulting from sage-grouse flying into turbine rotors or meteorological towers (Erickson *et al.* 2001). One sage-grouse was found dead within 45 m (148 ft) of a turbine on the Foote Creek Rim wind facility in south-central Wyoming, presumably from flying into a turbine (Young *et al.* 2003). During 3 years of monitoring operation, this is the only known sage-grouse mortality at this facility. Sage-grouse hens with broods have been observed using Foote Creek Rim, under the turbines, during surveys for other species (David Young, WEST, Inc., pers. comm. 2004). Mortalities at other facilities within sagebrush habitats are unknown and may not be monitored. However, most developed windpower facilities are not located within sagebrush habitats, and the average above-ground height of windpower facilities is 107 m (350 ft; Erickson *et al.* 2001), above the normal height of short-distance sage-grouse flights (Johnson *et al.* 2000).

Fifteen thousand wind turbines were projected to be operational in the United States by the end of 2001, not including the wind turbines located in California (Erickson *et al.* 2001). On September 10, 2004, the BLM released a draft programmatic EIS regarding the modification of land use plans in western States (including all States within the extant sage-grouse range) for the increased development of wind resources (BLM 2004f). Locations and potential impacts to sage-grouse were not discussed in specific detail.

Development of hydropower energy may impact sage-grouse through direct habitat losses, and increases in human traffic and activity if a resulting reservoir provides recreational resources. During construction, there may also be additional impacts of fugitive dust, gaseous emissions, road construction, increased traffic, and increased poaching activities. We do not anticipate that the potential for impacts from these activities to sage-grouse are different from those discussed previously for infrastructure issues. During the mid-1900s, a number of hydroelectric dams were developed on the Columbia and Snake Rivers in Washington and Oregon. More than 400 dams were constructed on the Columbia River system alone. The irrigation projects formed by these reservoirs precipitated conversion of large expanses of upland shrub-steppe habitat in the Columbia Basin for irrigated agriculture adjacent to the rivers as discussed previously in the Agriculture section (65 FR 51578). The creation of these reservoirs also directly inundated hundreds of kilometers of riparian habitats used by sage-grouse broods (Braun 1998). We were unable to find any information regarding the amount of sage-grouse habitat affected by hydropower projects in other areas of the species range beyond the Columbia Basin. We do not anticipate that future dam construction will result in large losses of sagebrush habitats. Although dam removal has been proposed for some areas, upland restoration goals, and the potential benefit to sage-grouse, are unknown.

The development of geothermal energy requires intensive human activity during field development (Suter 1978). Toxic gases may be released, and the type and effect of these gases depends on the geological formation in which drilling occurs. The amount of water necessary for drilling and condenser cooling may be high (Suter 1978). Therefore, water depletions may be a concern if such depletions result in the loss of limiting brood-rearing habitats (*see* discussion above). Geothermal activity on public lands is primarily in California, with over 23 producing leases. Nevada, and Utah also have producing leases (BLM 2004g). Impacts to sage-grouse were not identified.

We were unable to find any information regarding the commercial development of solar energy. We anticipate the effects from this resource will be those associated with direct habitat loss, fragmentation, roads, powerlines, increased human presence, and disturbance during facility construction, where solar energy development occurs.

Energy development was identified by the expert panel as the most significant extinction risk to the greater sage-grouse in the eastern portion of its range (Colorado, Wyoming and Montana). Their primary concern was the rapidity of development and the persistent demand for petroleum products. On a rangewide scale, however, energy development alone (not including the infrastructure associated with it—see Roads and Railroads above) ranked as the sixth most important extinction risk factor. To better understand the actual mechanism by which energy development affects greater sage-grouse, the panel suggested excluding some areas from extraction activities so that comparative analyses could be conducted.

Fire

The effects of fire on sagebrush habitats vary according to the species of sagebrush present, other plant species present (*e.g.,* the understory) and the frequency, size and intensity of fires. Widely variable estimates of mean fire intervals have been described in the literature: 35 to 100 years (Brown 2000), greater than 50 years for big sagebrush communities (McArthur 1994), 12 to 15 years for mountain big sagebrush (Miller and Rose 1999), 20 to 100 years (Peters and Bunting 1994), 10 to 110 years depending on sagebrush species and specific geographic area (Kilpatrick 2000), and 13 to 25 years (Frost 1998 cited in Connelly *et al.* 2004).

In general, fire tends to extensively reduce the sagebrush component within the burned areas. Big sagebrush (*A. tridentata* spp.), the most widespread species of sagebrush (McArthur 1994), is killed by fire. It does not re-sprout after burning (Agee 1994, Braun 1998, Wrobleski and Kauffman 2003), and can take as many as 30 to 50 years to recolonize an area (Agee 1994, Telfer 2000, Wambolt *et al.* 2001). This suggests that these sagebrush subspecies evolved in an environment where wildfire was infrequent (interval of 30 to 50 years) and patchy in distribution (Braun 1998). However, as noted by the expert panel, fire has been an important component in sagebrush systems.

A characteristic of natural fire in sagebrush stands is the incomplete burning that leaves areas of unburned sagebrush (sometimes referred to as islands of habitat) (Huff and Smith 2000). Huff and Smith (2000) noted that these unburned islands appear to be important to the future recolonization of the sagebrush community by providing sources of sagebrush seed. Prior to settlement by European immigrants, fire patterns in sagebrush communities were patchy, particularly in Wyoming big sagebrush, due to the discontinuous and limited fuels and unburned islands that remained after a fire (Miller and Eddleman 2000).

Connelly *et al.* (2004) summarized fire statistics from records obtained for the sagebrush biome (both wild and prescribed fires). The total area burned and the number of fires increased across the sagebrush ecoregions from 1960 to 2003. In the Southern Great Basin and Wyoming basins, average fire size increased. In the 40.5 million ha (100 million ac) sagebrush-steppe ecoregion (essentially the northern distribution of sagebrush), or drier sagebrush areas fire regimes have shifted to more frequent fire episodes (Brown 2000). Fire was identified as the primary factor resulting in sage-grouse habitat conversion in Oregon (1.4 million ac; Oregon Department of Fish and Wildlife in litt. 2004).

In parts of the Great Basin (Nevada, Oregon and Utah) a decline in fire occurrence since the late 1800s has been reported in several studies, which coincides with fire suppression and reduction of fuels by introducing livestock (Touchan *et al.* 1995, Miller and Rose 1999, Kilpatrick 2000, Connelly *et al.* 2004). Long fire intervals and fire suppression can result in increased dominance of woody conifer species, such as western juniper (*Juniperus occidentalis*) (Wrobleski and Kauffman 2003), resulting in a near total loss of shrubs and sage-grouse habitat in localized areas (Miller and Eddleman 2000). Alternatively, invasion of exotic annuals, such as cheatgrass and medusahead (*Taeniatherum asperum*), has resulted in increases in the frequency and number of fires within the range of the greater sage-grouse (Young and Evans 1973, Brown 2000, Wrobleski and Kauffman 2003, Connelly *et al.* 2004). Following fire, sagebrush will not re-establish on its own for long time intervals, while non-native grasses quickly recover from fire and increase, effectively preventing sagebrush return. Management to restore an area to sagebrush after cheatgrass becomes established is difficult and usually ineffective (Paysen *et al.* 2000). As a result of this direct relationship between wildfire and the spread of invasive plants, large areas of habitat in the western distribution of the greater sage-grouse have already been converted to cheatgrass (Connelly *et al.* 2000c). The loss of habitat due to establishment of and dominance by non-native annual grasses results in the loss of sage-grouse populations (Connelly *et al.* 2000c).

Wildfires have removed extensive areas of sagebrush habitat in recent years. For example, 30 to 40 percent of the sage-grouse habitat in southern Idaho was destroyed in a 5-year period (1997–2001) due to range fires (Signe Sather-Blair, U.S. Bureau of Land Management, quoted in Healy 2001). The largest contiguous patch of sagebrush habitat in southern Idaho occupied approximately 283,000 ha (700,000 ac), (Michael Pellant, U.S. Bureau of Land Management, quoted in Healy 2001). Of that total area, about 202,000 ha (500,000 ac) burned in the years 1999 to 2001; half of the acres that burned for the first 3 to 5 years post fire, but accompanying forbs and surviving grasses increased biomass production. In another study, productivity of perennial herbs had increased by the second year post-burn to an average 2.2 times higher on burned verses control areas (Cook *et al.* 1994). In a 1998 prescribed burn on the Hart Mountain National Antelope Refuge, Crawford (1999) observed little change in species composition between unburned and burned areas. In the same general area, fall burning had no apparent effect on most primary foods although some Cichorieae species did increase (Pyle 1992). Fischer *et al.* (1996) also noted that vegetative cover of important forbs in the diets of sage-grouse was similar in unburned and burned habitat. In a review of 13 sites that had burned during a span of 2 to 32 years, Wambolt *et al.* (2001) reported that perennial grasses and forbs did not benefit from prescribed burning.

A variety of techniques have been attempted at re-establishing sagebrush post-fire, with mixed success (Cadwell *et al.* 1996, Quinney *et al.* 1996, Livingston 1998). Restoration of the sagebrush biome following a fire has been complicated not only by the invasion of exotic annual plant species, but the difficulty associated with establishing sagebrush seedlings (Boltz 1994). Wirth and Pyke (2003) reported that forb response post-fire is dependant on the forb community pre-burn. Habitat rehabilitation following fires has become a major activity in recent years, increasing from 281 km^2 (109 mi^2) in 1997 to 16,135 km^2 (6,230 mi^2) in 2002 with most treatments in Oregon, Idaho, and Nevada (Connelly *et al.* 2004), but we have no data on the extent of actual sagebrush restoration.

A clear positive response of greater sage-grouse to fire has not been demonstrated (Braun 1998). Call and Maser (1985) noted that fires could cause adverse conditions where cover is limited. Studies of prescribed fire in mountain big sagebrush at Hart Mountain National Antelope Refuge demonstrate short-term benefits in certain forbs, but the reduction in sagebrush cover potentially rendered habitat less suitable for nesting and brood rearing (Rowland and Wisdom 2002). Similarly, Nelle *et al.* (2000) reported that the removal of sage-grouse nesting and brood-rearing habitat by fire resulted in no increase in invertebrate abundance in the first year post-fire and hence, no benefit for sage-grouse chick foraging. This loss of nesting habitat created a long-term negative impact which would require 20 years of sagebrush re-growth before sufficient canopy cover was available for nesting birds (Nelle *et al.* 2000). Byrne (2002) reported the general avoidance of available burned habitats by nesting, brood-rearing, and broodless females. Connelly *et al.* (2000c) and Fischer *et al.* (1996) found that prescribed burning did not improve brood rearing habitat in Wyoming big sagebrush, as forbs did not increase and insect populations declined as a result of the treatment. Hence fire in this sagebrush type may negatively affect brood rearing habitat rather than improve it (Connelly and Braun 1997). However, Klebenow (1970), Gates (1983, as cited in Connelly *et al.* 2000c), Sime (1991 as cited in Connelly *et al.* 2000a), and Pyle and Crawford (1996) all indicated that fire could improve brood-rearing habitat. Slater (2003) reported that sage-grouse using burned areas were rarely found more than 60 m (200 feet) from the edge of the burn. In southeastern Idaho, Connelly *et al.* (2000c) concluded that, even though age-grouse populations were in decline across the study area, population declines were more severe in the post-fire years. Fischer *et al.* (1997) concluded that habitat fragmentation, as a result of fire, may influence distribution or migratory patterns in sage-grouse. Hulet (1983, as cited in Connelly *et al.* 2000a) documented the loss of leks as a result of fire.

The expert panel ranked wildfire as the second most important extinction risk factor for the greater sage-grouse in western portions of its range (the Great Basin—Utah, Idaho, Nevada, eastern Oregon), primarily due to the subsequent establishment of invasive species such as cheatgrass (see following discussion). Since invasive species has not become the problem in the eastern part of the greater sage-grouse range, the expert panel did not rank wildfire as high in that area. Across the species range, wildfire was identified as the third most important extinction risk factor by the expert panel.

Invasive Species/Noxious Weeds

Invasive species have been defined as those that are not native to an ecosystem and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health (Executive Order 13112, 1999). A wide variety of plants are considered invasive within the range of sagebrush ecosystems that the greater sage-grouse occupies (Wamboldt *et al.* 2002, Crawford *et al.* 2004, Connelly *et al.* 2004). Invasive species often cause declines in native plant populations by reducing light, water, and nutrients, and they grow so quickly that they outcompete other species (Wooten *et al.* 1996). The rate of spread for noxious weeds is approximately 931 ha (2,300 ac) per day on BLM lands and 1862 ha

(4,600 ac) per day on all public lands in the West (Knick *et al.* 2003). The area infested with exotic (non-native) invasive plants increased from 1.1 million ha (2.7 million ac) in 1985 to 3.2 million ha (7.9 million ac) in 1994 on BLM lands (Knick *et al.* 2003). The replacement of sagebrush vegetation communities with exotic species such as Russian thistle (*Salsola* spp.), halogeton (*Halogeton glomeratus*) and medusahead, has resulted in sage-grouse habitat loss (Miller and Eddleman 2000).

Young *et al.* (1972) found that plant communities of the Great Basin are highly susceptible to invasion by alien plants since native annuals are not adapted to occupy conditions created by intensive livestock grazing. Exotic plants can reduce and eliminate populations of plants that sage-grouse use for food and cover. As previously discussed, frequent fires with short intervals within sagebrush habitats favor invasion of cheatgrass, which is unsuitable as sage-grouse habitat (Schroeder *et al.* 1999). Cheatgrass then shortens the fire interval (from approximately 30 years down to 5 years), perpetuating its own persistence and spread, and exacerbating the effects of fire in remaining sage-grouse habitats (Connelly *et al.* 2004). Rehabilitation of an area to sagebrush after cheatgrass becomes established is extremely difficult (Connelly *et al.* 2004).

Large areas of habitat in the western distribution of the greater sage-grouse have already been converted to cheatgrass (Connelly *et al.* 2000a). Exotic plant communities are now dominant on more than 40 million ha in the Intermountain West (Mack 1981, as cited in Miller and Eddleman 2000). This invasive species also occurs in lower abundance throughout the entire range of the sage-grouse. Connelly *et al.* (2004) estimated the risk of cheatgrass invasion into sagebrush and other natural vegetation areas in the western part of the range of greater sage-grouse (Southern and Northern Great Basin, part of the Columbia Basin, and most of the Snake River Plain), where cheatgrass currently is concentrated. Based on elevation, landform, and south-facing slope parameters, Connelly *et al.* (2004) projected that 80 percent of this land area is susceptible to displacement by cheatgrass and that in 65 percent of this area cheatgrass is either already present or will be within 30 years. Wyoming-basin big sagebrush and salt desert scrub, which occupy over 40 percent of the Great Basin, are the cover types most susceptible to cheatgrass displacement (Connelly *et al.* 2004).

We could not find any studies that document or attempted to document a direct relationship between cheatgrass expansion and sage-grouse population declines. Yet the available evidence is clear that cheatgrass has invaded extensive areas in western parts of greater sage-grouse range, supplanting sagebrush plants upon which sage-grouse depend. Although there is a lack of evidence documenting that cheatgrass invasion causes sage-grouse declines, Connelly *et al.* (2000a) indicated that some sage-grouse populations have been affected and some will decline due to projected, continuing spread of cheatgrass domination in the absence of effective management.

Invasive species was ranked as the primary extinction risk factor for the greater sage-grouse by the expert panel. This concern was based on the ability of invasive species to outcompete sagebrush, the inability to effectively control invasives once they become established, and the ease with which invasive species are spread through other factors on the landscape, such as wildfire and infrastructure construction. Additionally, one member of the panel indicated that once invasive species become established, the ecology of the system can be changed, resulting in increased opportunities for other invasive species to establish, and subsequently, permanent habitat loss. Although cheatgrass has been identified as the primary invasive species resulting in sagebrush habitat conversion, the expert panel also cautioned that many other invasive species (*i.e.*, Japanese brome and various species of mustards and knapweeds) may be a greater threat in the future. The expert panel advised that based on current knowledge, prevention is the only effective tool to preclude large-scale habitat loss from invasive species in the future. However, they did not believe that the current rate of invasive species spread was sufficient to result in the complete loss of sagebrush, and therefore the extinction of sage grouse within the reasonably foreseeable future.

Pinyon-juniper

There has been an unprecedented expansion of pinyon-juniper woodlands, a native habitat type dominated by pinyon pine (*Pinus edulis*) and various juniper species (*Juniperus* spp.), with an estimated 10-fold increase in the Intermountain West since European immigrant settlement (Miller and Tausch 2001). The expansion of pinyon-juniper forests has resulted in the loss of many bunchgrass and sagebrush-bunchgrass communities that formerly dominated the Intermountain West (Miller and Tausch 2001). The major factor cited for the increase in the pinyon-juniper forest type is a decrease in fire return intervals (Miller and Tausch 2001). Other factors facilitating the increase include historical livestock grazing patterns, which reduced the buildup of fine fuels that more readily carry fire, and possibly increases in global carbon dioxide concentrations and climate change (Miller and Rose 1999, Miller and Tausch 2001).

Connelly *et al.* (2004) estimated the risk of pinyon-juniper displacement of sagebrush for a large portion of the Great Basin, based on site elevation, proximity to extant pinyon-juniper, precipitation, and topography. Using these parameters, Connelly *et al.* (2004) projected the risk that sagebrush habitats would be displaced by pinyon-juniper within the next 30 years. They found that about 60 percent of sagebrush in the Great Basin was at low risk of being displaced by pinyon-juniper, 6 percent of sagebrush is at moderate risk, and 35 percent of sagebrush habitats are at high risk of displacement (Connelly *et al.* 2004). Connelly *et al.* (2004) also found that mountain big sagebrush appears to be the sagebrush type most at risk for pinyon-juniper displacement. When juniper increases in mountain big sagebrush communities, shrub cover declines and the season of available succulent forbs is shortened due to soil moisture depletion (Crawford *et al.* 2004). Connelly *et al.* (2004) caution that additional field research is needed to support their estimates.

Pinyon-juniper expansion into sagebrush habitats, with subsequent replacement of sagebrush shrub communities by woodland has been documented (Miller *et al.* 1999, Miller and Tausch 2001, Crawford *et al.* 2004, Connelly *et al.* 2004). It is likely that further losses of sagebrush habitat due to pinyon-juniper expansion will occur within the western part of greater sage-grouse range, especially the southern Great Basin. We could find no documentation, however, that pinyon-juniper expansion is a factor affecting sage-grouse habitat persistence in the eastern portion of the range (Wyoming Basin, Colorado Plateau, and silver sagebrush areas (Connelly *et al.* 2004)). Although we could not locate any studies that documented the effect of pinyon-juniper expansion on greater sage-grouse, Commons *et al.* (1999) found that the number of male Gunnison sage-grouse on leks in southwest Colorado doubled after pinyon-juniper removal and mechanical treatment of mountain sagebrush and deciduous brush. Hence we can infer that some sage-grouse populations have been affected and some will decline due to projected increases in the pinyon-juniper type, at least within parts of the Great Basin. The expert panel considered pinyon-juniper as an extinction risk for the greater sage-grouse in the western portion of its range, but only ranked it as a moderate risk across the entire species' range.

Urbanization

Low densities of indigenous peoples have been present for more than 12,000 years in the historical range of sage-grouse. By 1900, Connelly *et al.* (2004) reported that less than 1 person/km^2 resided in 51 percent of the 325 counties within their assessment area, and densities greater than 10 persons/km occurred in 4 percent of the counties. By 2000, counties with less than 1 person/km^2 occurred in 31 percent of the 325 counties and densities greater than 10 persons/km^2 occurred in 22 percent of the counties (Connelly *et al.* 2004). Today, the dominant urban areas are located in the Bear River Valley of Utah, the portion of Bonneville Basin southeast of the Great Salt Lake, the Snake River Valley of southern Idaho, and in the Columbia River Valley of Washington (Rand McNally Road Atlas 2003, Connelly *et al.* 2004).

Urban development has eliminated some sage-grouse habitat (Braun 1998). Interrelated effects from urban/suburban development include construction of associated infrastructure (roads, powerlines, and pipelines) and predation threats from the introduction of domestic pets and increases in predators subsidized by human activities (*e.g.,* landfills). More recent urban expansion into rural subdivisions is also resulting in direct habitat loss and conversion, as well as alteration of remaining sage-grouse habitats around these areas due to the presence of humans and pets (Braun 1998; Connelly *et al.* 2000a). In some Colorado counties, up to 50 percent of sage-grouse habitat is under rural subdivision development, and it is estimated that 3 to 5 percent of all sage-grouse historical habitat in Colorado has already been converted into urban areas (Braun 1998). We are unaware of similar estimates for other States within the range of the greater sage-grouse, and therefore cannot determine the effects of this factor on a rangewide basis.

Municipal solid waste landfills (landfills) have been shown to contribute to increases in common raven populations (Knight *et al.* 1993, Restani *et al.* 2001, Webb *et al.* 2004). Ravens are known to prey on sage-grouse and have been considered a restraint on sage-grouse population growth in some locations (Batterson and Morse 1948, Autenrieth 1981, Altstatt 1995). Landfills are found in every State and a number of these are located within or adjacent to sage-grouse habitat. However, no studies could be found that linked landfill presence, common raven populations, and sage-grouse population levels. Urbanization was considered as a moderate extinction risk for the greater sage-grouse by the expert panel, primarily as a result of habitat loss and fragmentation from increasing resource needs to support expanding human populations.

Summary of Factor A

Loss of sagebrush and greater sage-grouse habitat has been occurring since arrival of European settlers in the 1800s, as evidenced by the change in the sage-grouse's distribution and loss of local populations (Schroeder *et al.* 2004). Habitat loss and fragmentation continues today as a result of the many factors described in the preceding paragraphs. When the expert panel was asked to identify and rank extinction risk factors for the greater sage-grouse, the threats ranked highest in importance were, in order: invasive species, infrastructure as related to energy development and urbanization, wildfire, agriculture, grazing, energy development, urbanization, strip/coal mining, weather, and pinyon-juniper expansion. However, the majority of the expert panel did not believe that these threats were occurring at such a rate to cause the extinction of the greater sage-grouse within the next 60 to 100 years. Other threats (*e.g.,* disease and predation, hard-rock mining, hunting, contaminants) were considered by the expert panel to be of lesser importance to the sage-grouse. Several experts identified concerns with the synergistic effects of threat factors (*e.g.,* infrastructure increases and invasive species expansion). The expert panelists also discussed that the range of the greater sage-grouse would likely contract and fragment due to habitat modifications and losses.

Based on the information gathered through the scientific literature, industry, public comments and State and Federal agencies, as well as the opinions of the expert panel, Service biologists determined that the principal habitat-related threats are not proceeding at a rate that will threaten the continued existence of the species within the foreseeable future. In addition, the wide distribution of the species, presence of large "core" populations, recent population trends in some areas throughout the species range (indicating that populations are stable and/or increasing), and large blocks of sagebrush habitat are all factors that contributed to the determination that the greater sage-grouse is not in danger of extinction within the foreseeable future. Thus, based on the best available scientific and commercial data, we have concluded that present or threatened destruction, modification, or curtailment of the sage-grouse's habitat or range is not a factor that threatens or endangers the species over all or a significant portion of its range. In reaching this conclusion, we did identify that continued efforts to conserve sagebrush ecosystems and address habitat threats are important to long-term persistence of the greater sage-grouse.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

Presently, there is no commercial trade in greater sage-grouse, and under State and Federal laws the sale of sage-grouse meat, feathers and body parts is illegal. Historically, the greater sage-grouse was heavily exploited by commercial and sport hunting in the late 1800s and early 1900s (Patterson 1952; Autenrieth 1981). Hornaday (1916) and others alerted the public to the risk of extinction to the species as a result of this overharvest. In response, many States closed sage-grouse hunting seasons by the 1930s (Patterson 1952, Autenrieth 1981). The impacts of hunting on greater sage-grouse during those historical decades may have been exacerbated by impacts from human expansion into sagebrush-steppe habitats (Girard 1937). With the increase of sage-grouse populations by the 1950s, limited hunting seasons were again allowed in most portions of the species range (Patterson 1952, Autenrieth 1981).

Hunting

Greater sage-grouse are currently legally sport-hunted in 10 of 11 States where they occur (Connelly *et al.* 2004), and hunting is regulated by State wildlife agencies. The hunting season for sage-grouse in Washington was closed in 1988 (Stinson *et al.* 2004). In Canada sage-grouse hunting is not allowed (Connelly *et al.* 2004). Most State agencies base their hunting regulations on local population information and peer-reviewed scientific literature regarding the impacts of hunting on greater sage-grouse (Bohne in litt., Wyoming Game and Fish Department, 2003). Hunting seasons are reviewed annually, and

States change harvest management based on harvest and population data (Bohne in litt, Wyoming Game and Fish Department, 2003). For example, Wyoming delayed their season to allow for more equitable distribution of hunting mortality across all age and sex classes, thereby reducing female mortality as compared to previous seasons (Bohne in litt., Wyoming Game and Fish Department, 2003).

Relatively few studies have addressed the effect of recreational hunting on sage-grouse populations. These studies suggest that hunting may be compensatory (*i.e.,* mortality that replaces deaths that would have happened otherwise due to other causes such as predation, or mortality that is compensated by increased productivity; Crawford 1982), have no measurable effect on spring sage-grouse densities (Braun and Beck 1996), or may be additive (*i.e.,* mortality that adds more deaths per year to the total otherwise attributable to other causes, and is not compensated by increased productivity; Zunino 1989, Connelly *et al.* 2000a). Johnson and Braun (1999) concluded that harvest mortality may be additive for the species if brood hens and young birds sustain the highest hunting mortality within a population. No studies have demonstrated that regulated hunting is a primary cause of widespread reduced numbers of greater sage-grouse (Connelly *et al.* 2004).

Hunting seasons that are managed so as to evenly distribute mortality across all age and sex classes are less likely to negatively affect subsequent breeding populations (Braun 1998). Connelly *et al.* (2000a) state that most greater sage-grouse populations can sustain hunting if the seasons are carefully regulated to keep total mortality within sustainable levels—but do not evaluate the extent to which such careful regulation has been successfully implemented. A maximum sustainable harvest rate has not been determined for greater sage-grouse populations (Connelly *et al.* 2004). All States with hunting seasons have changed limits and season dates to more evenly distribute hunting mortality across the entire population structure by harvesting birds after females have left their broods (Bohne in litt., Wyoming Game and Fish Department, 2003). Total annual gun harvest of sage-grouse across the 10 western States that have seasons was approximately 24,000 birds in 2003 (Connelly *et al.* 2004). We could not locate any data to assess how those changes correlate with population trends.

All 10 States that allow gun hunting of sage-grouse also allow falconers to hunt sage-grouse, although no falconers are currently hunting sage-grouse in South and North Dakota (John Wrede, South Dakota Game, Fish and Parks, pers. comm. 2004; Gerald Kobriger, North Dakota Game and Fish Dept., pers. comm. 2004). Montana (Rick Northrup, Montana Dept. Fish, Wildl. Parks, pers. comm. 2004), Oregon (Dave Budeau, Oregon Dept. Fish and Wildlife, pers. comm. 2004), and Idaho (Tom Hemker, Idaho Dept. Fish and Game, pers. comm. 2004) indicated that they do not have data on the level of harvest through falconry, but believe such harvest is low due to the few numbers of falconers and their dispersed activities. Wyoming reported a take of 63 sage-grouse by falconers. We are not aware of any studies that demonstrate that falconry take of greater sage-grouse influences population trends.

We surveyed the State fish and wildlife agencies within the range of greater sage-grouse to determine what information they had on illegal harvest (poaching) of the species. Two states, South Dakota and North Dakota indicated that they had no known incidents of poaching (John Wrede, South Dakota Game, Fish and Parks, pers. comm. 2004; Gerald Kobriger, North Dakota Game and Fish Dept., pers. comm. 2004). None of the remaining States had any quantitative data on the level of poaching in their States. Based on these results, illegal harvest of greater sage-grouse poaching appears to occur at low levels. We are not aware of any studies or other data that demonstrate that poaching has contributed to sage-grouse population declines.

Religious, Scientific, and Recreational Use

Some Native American tribes harvest sage-grouse as part of their religious or ceremonial practices. In Wyoming, Native American hunting occurs on the Wind River Indian Reservation, with about 20 males per year taken off of leks in the spring (Tom Christiansen, Wyoming Game and Fish Dept., pers comm. 2004), and a harvest of 30 males in the fall (U.S. Fish and Wildlife Service, in litt. 2004). No harvest by Native Americans for religious or ceremonial purposes occurs in South Dakota, North Dakota, Colorado, Washington, or Oregon (John Wrede, South Dakota Game, Fish and Parks affiliation pers. comm. 2004; Gerald Kobriger North Dakota Game and Fish Dept., pers. comm. 2004; Anthony Apa, Colorado Div. Wildl., pers. comm. 2004; Michael Schroeder, Washington Dept. Fish and Wildlife, pers. comm. 2004; and Dave Budeau, Oregon Dept. Wildl., pers. comm. 2004).

Greater sage-grouse are the subject of many scientific research studies and some of these field studies include the capture and handling of the species. Of the 11 western States where sage-grouse occur, all except South Dakota and North Dakota (John Wrede, South Dakota Game, Fish and Parks, pers. comm. 2004; Gerald Kobriger, North Dakota Game and Fish Dept., pers. comm. 2004) reported some type of field studies on sage-grouse between 1999 to 2004 that included the capture, handling, and subsequent banding, or banding and radio-tagging of sage-grouse. For these 9 States, 2,491 birds were captured and processed over six years, of which 68 birds (about 2.7 percent of handled birds) died due to capture, handling, or radio-tagging processes. We are not aware of any studies that document that this level of taking has affected any sage-grouse population trends.

Greater sage-grouse have been translocated in several States and the Province of British Columbia (Reese and Connelly 1997). Reese and Connelly (1997) documented the translocation of over 7,200 birds between 1933 and 1990, and additional translocation efforts have taken place since 1990. Only 5 percent of the translocation efforts documented by Reese and Connelly (1997) were considered to be successful in producing sustained, resident populations at the translocation sites. In 2004 the State of Nevada supplied the State of Washington with greater sage-grouse to increase the genetic diversity of geographically isolated populations. No information is available at this time regarding the success or effectiveness of this translocation. Given the low numbers of birds that have been used for translocation spread over many decades it is unlikely that the removals from source populations have contributed to greater sage-grouse declines, while the limited success of translocations has also likely had nominal impact on rangewide population trends.

Greater sage-grouse are also subject to a variety of non-consumptive uses such as bird watching or tour groups visiting leks, general wildlife viewing, and photography. Daily human disturbances on sage-grouse leks could cause a reduction in mating, and some reduction in total production (Call and Maser 1985). Only a few leks in each state receive regular viewing use visitation by humans during the strutting season, and most States report no known impacts from this use (John Wrede, South Dakota Game, Fish and

Parks, pers. comm. 2004; Rick Northrup, Montana Dept. Fish, Wildl. Parks, pers. comm. 2004; Tom Christiansen, Wyoming Game and Fish Dept., pers. comm. 2004; Tom Hemker, Idaho Dept. Fish and Game, pers. comm. 2004). Only Colorado had data regarding the effects of non-consumptive use, which suggested that controlled lek visitation has not impacted sage-grouse (Anthony Apa, Colorado Div. Wildl., pers. comm. 2004). State agencies in Oregon, Nevada, and North Dakota report that there is potential for impacts at individual leks that are the most heavily used for viewing (Dave Budeau, Oregon Dept. Wildl., pers. comm. 2004; Shawn Espinosa, Nevada Divison of Wildl., pers. comm., 2004; Gerald Kobriger North Dakota Game and Fish Dept., pers. comm. 2004). The BLM has reported movement of a sage-grouse lek, and decreasing male numbers on the same lek apparently in response to lek viewing at that location (Jan Hanf, BLM, pers. comm. 2004). We were not able to locate any studies documenting how lek viewing, or other forms of non-consumptive recreational uses, of sage-grouse are related to sage-grouse population trends and we have no indication that they are contributing to declining trends.

Summary of Factor B

The expert panel did not identify hunting as a primary threat factor for the greater sage-grouse. In their discussion of extrinsic threat factors, the expert panel identified that hunting occurs within a limited timeframe and at a time of the year when productivity is unlikely to be affected significantly. In addition, they noted that hunting is a regulated management technique that can be quickly adjusted to changing conditions. No data were collected suggesting that poaching, non-consumptive use, or scientific use limit greater sage-grouse populations rangewide. Based on the best scientific and commercial data available, including input from the expert panel, we have concluded that overutilization for commercial, recreational, scientific, or educational purposes is not a factor that endangers or threatens the sage-grouse throughout all or a significant portion of its range.

C. Disease or Predation

Disease

There have been few systematic surveys for parasites or infectious diseases of the greater sage-grouse, and therefore, their role in population declines is unknown for this species (Connelly *et al.* 2004). Some early studies have suggested that sage-grouse populations are adversely affected by parasitic infections (Batterson and Morse 1948). Parasites have also been implicated in sage-grouse mate selection, with potentially subsequent effects on the genetic diversity of this species (Boyce 1990; Deibert 1995), but Connelly *et al.* (2004) note that while these relationships may be important to the long-term ecology of greater sage-grouse, they have not been shown to be significant to the immediate status of populations. Connelly *et al.* (2004) have suggested that diseases and parasites may limit isolated sage-grouse populations. The potential effects of emerging diseases require additional study.

Sage-grouse are hosts to many parasites (Connelly *et al.* 2004; Thorne *et al.* 1982). Only the protozoan, *Eimeria* spp., which causes coccidiosis (Connelly *et al.* 2004), has proven to be fatal, but mortality is not 100 percent, and young birds that survive an initial infection typically do not succumb to subsequent infections (Thorne *et al.* 1982). Infections tend to be localized to specific geographic areas. Most cases of coccidiosis in greater sage-grouse have been found where large numbers of birds congregated, resulting in soil and water contamination by fecal material (Connelly *et al.* 2004). While the role of this parasite in population changes is unknown, Petersen (2004) hypothesized that coccidiosis could be limiting for local populations, as this parasite causes decreased growth and significant mortality in young birds, thereby potentially limiting recruitment. However, no cases of sage-grouse mortality resulting from coccidiosis have been documented since the early 1960s (Connelly *et al.* 2004).

Other parasites which have been documented in the greater sage-grouse include, *Sarcosystis* ssp (another form of coccidea), blood parasites (including avian malaria, *Leucocytozoon* spp., *Haemoproteus* spp., and *Trypanosoma avium*), *Tritrichomonas simoni,* tapeworms, gizzard worms (*Habronema* spp. and *Acuaria* spp.), cecal worms, and filarid nematodes (Thorne *et al.* 1982; Connelly *et al.* 2004; Petersen 2004). None of these parasites have been known to cause mortality in the greater sage-grouse. Sub-lethal effects of these parasitic infection on sage-grouse have never been studied.

Greater sage-grouse host many external parasites, including lice, ticks, and dipterans (midges, flies, mosquitoes, and keds) (Connelly *et al.* 2004). Most ectoparasites do not produce disease, but can serve as disease vectors or cause mechanical injury and irritation (Thorne *et al.* 1982). Many biologists contend that ectoparasites can be detrimental to their hosts, particularly when the bird is stressed by inadequate habitat or nutritional conditions (Petersen 2004). Some studies have suggested that lice infestations can affect sage-grouse mate selection (Boyce 1990; Spurrier *et al.* 1991; Deibert 1995), but population impacts are not known (Connelly *et al.* 2004).

Greater sage-grouse are also subject to a variety of bacterial, fungal, and viral pathogens. The bacteria *Salmonella* spp., has caused mortality in the greater sage-grouse; the bacteria apparently contracted through of exposure to contaminated water supplies around livestock stock tanks (Connelly *et al.* 2004). Other bacteria found in sage-grouse include *Escherichia coli,* botulism (*Clostridium* spp.), avian tuberculosis (*Mycobacterium avium*), and avian cholera (*Pasteurella multocida*). These bacteria have never been identified as a cause of mortality in greater sage-grouse and the risk of exposure and hence, population effects, is low (Connelly *et al.* 2004). One case of aspergillosis, a fungal disease, has been documented in sage-grouse, but there is no evidence to suggest this fungus plays a role in limiting greater sage-grouse populations (Connelly *et al.* 2004; Petersen 2004).

Viral diseases could cause serious diseases in grouse species and potentially influence population dynamics (Petersen 2004). However, prior to 2003 only avian infectious bronchitis (caused by a coronavirus) had been identified in the greater sage-grouse. No clinical signs of the disease were observed.

West Nile virus (WNv; *Flavivirus*) was introduced into the northeastern United States in 1999 and has subsequently spread across North America (Marra *et al.* 2004). This virus was first diagnosed in greater sage-grouse in 2003, and has been shown to affect sage-grouse survival rates. Data from four studies in the eastern half of the sage-grouse range (Alberta, Montana, Wyoming) showed survival in these populations declined 25 percent in July and August as a result of the WNv infection (Naugle *et al.* 2004). Populations of grouse that were not affected by WNv showed no similar decline. Additionally, individual sage-grouse in exposed populations were 3.4 times more likely to die during July and August, the ‘‘peak’’ of WNv occurrence, than birds in non-exposed populations (Connelly *et al.* 2004; Naugle *et al.* 2004). Subsequent declines in both male and female lek attendance in infected areas in 2004 compared with years before WNv was detected in this area suggest outbreaks could contribute to local population extirpation (Walker *et al.* 2004). Lek surveys in 2004, however, indicated that regional sage-grouse populations did not decline, suggesting that the initial effects of WNv were localized (Oedokoven, unpublished data, 2004). Five sage-grouse deaths resulting from WNv have been identified in 2004, four from the Powder River Basin area of northeastern Wyoming and southeastern Montana (Dave Naugle, U. Montana, pers. comm. 2004), and one from the northwestern Colorado, near the town of Yampa (Anthony Apa, Colorado Division of Wildlife, pers. comm. 2004). An additional three sage-grouse deaths in California from WNv were reported in 2004 (Scott Gardner, Ca. Dept. Fish Game, pers. comm. 2004). In 2004, WNv was detected in a variety of species in western Colorado, Utah, Idaho, Nevada, California and Oregon (U.S. Geological Service, National Wildlife Health Laboratory, 2004). Outside of the Powder River Basin of Wyoming and Montana, California and western Colorado, we are unaware of comprehensive efforts to track sage-grouse mortalities. Therefore, the actual distribution and extent of WNv in sage-grouse in 2004 is unknown.

Greater than 300 serum samples taken from live-captured wild grouse in known WNv infected areas were negative for WNv antibodies, indicating that these animals had not been exposed to the virus (Todd Cornish, U. Wyoming, pers. comm. 2004). The lack of birds with antibodies suggests that sage-grouse do not survive a WNv infection because if any were surviving, at least some of the birds sampled from the exposed areas should be survivors with antibodies (Connelly *et al.* 2004; Oedekoven 2004). All 25 wild sage-grouse brought into a controlled research laboratory and inoculated with various doses of WNv, including doses thought to be less than the amount that would be delivered by a typical mosquito bite, perished within 8 days of infection (Todd Cornish, U. of Wyoming, unpublished data, 2004). In addition, direct exposure of non-infected sage-grouse to infected sage-grouse under laboratory conditions also resulted in 40 percent mortality of 6 individuals, in the absence of the mosquito vector for WNv (*Culex tarsalis*) (Todd Cornish, U. of Wyoming, unpublished data, 2004). These experimental results, combined with field data, suggest that a widespread WNv infection could negatively impact greater sage-grouse.

Late-summer habitat requirements of sage-grouse potentially increase their exposure to WNv. Sage-grouse hens and broods congregate in mesic habitats in the mid- to late summer, thereby placing them in the same potential habitats as the WNv mosquito vector when the mosquitoes are likely to be active. Surface water sources that have been created for agricultural, livestock, and oil and gas activities may increase the contact between sage-grouse and the mosquito vector (Naugle *et al.* 2004; Connelly *et al.* 2004; Walker *et al.* 2004). Losses from WNv come at a time of year when survival is otherwise typically high for adult females (Schroeder *et al.* 1999; Connelly *et al.* 2000a; Aldridge and Brigham 2003), thus potentially making these WNv deaths additive to other mortality sources and reducing average annual survival.

Predation

Predation is the most commonly identified cause of direct mortality for sage-grouse (Schroeder *et al.* 1999, Connelly *et al.* 2000b). Greater sage-grouse have many predators, which vary in relative importance depending on the sex and age of the bird and the time of year. Predators of adult greater sage-grouse include coyotes (*Canis latrans*), bobcats (*Lynx rufus*), weasels (*Mustela* spp.), golden eagles (*Aquila chrysaetos*), red-tailed hawks (*Buteo jamaicensis*), Swainson's hawks (*B. swainsoni*), and ferruginous hawks (*B. regalis*) (Hartzler 1974, Schroeder *et al.* 1999, Rowland and Wisdom 2002, Schroeder and Baydack 2001). In the Strawberry Valley of Utah, Bambrough *et al.* (2000) noted that low survival of greater sage-grouse may have been due to an unusually high density of red foxes.

Adult male greater sage-grouse are most susceptible to predation during the mating season as they are very conspicuous while performing their mating display. And, because leks are attended daily, predators may be attracted to these areas during the breeding season (Braun in litt. 1995). However, given the greater sage-grouse's breeding system, where only a few males are selected by all the females for mating, loss of some adult males on the lek is not likely to have significant population effects (Braun in litt. 1995).

Adult female greater sage-grouse are most susceptible to predators while on the nest or during brood-rearing when they are with young chicks (Schroeder and Baydack 2001). Autenrieth (1981), referencing annual predator losses, concluded that predation of eggs was the most important population constraint in Idaho at that time.

Juvenile grouse are susceptible to predation from badgers, red foxes, coyotes, weasels, American kestrels (*Falco sparverius*), merlins (*F. columbarius*), northern harriers (*Circus cyaneus*), and other hawks (Braun in litt. 1995; Schroeder *et al.* 1999). Gregg *et al.* (2003a, 2003b) found that chick predation mortality ranged from 27 percent to 51 percent in 2002 and 10 percent to 43 percent in 2003 on three study sites in Oregon. The juvenile mortality rate, during the first few weeks after hatching, was estimated to be 63 percent (Wallestad 1975 in Schroeder and Baydack 2001). While chicks are very vulnerable to predation during this period, other causes of mortality, such as weather, are included in this estimate.

Nesting success is positively correlated with the presence of big sagebrush and relatively thick grass and forb cover (Schroeder and Baydack 2001). Losses of nesting adult hens and nests appear to be related to the amount of herbaceous cover surrounding the nest (Braun in litt. 1995; Braun 1998; Coggins 1998, Connelly *et al.* 2000b; Schroeder and Baydack 2001). DeLong *et al.* (1995) found a lower probability of nest predation at nest sites with tall grass and medium shrub cover in Oregon. Removal or reduction of this cover, by any method, can reduce nest success and adult hen survival. Similarly, habitat alteration that reduces cover for young chicks can increase the rate of predation on this age class (Schroeder and Baydack 2001). Losses of breeding hens and young chicks can influence overall greater sage-grouse population numbers, as these two groups contribute most significantly to population productivity.

Agricultural development, landscape fragmentation, and human populations have the potential to increase predation pressure by forcing birds to nest in marginal habitats, by increasing travel time through habitats where they are vulnerable to predation, and by increasing the diversity and density of predators (Ritchie *et al.* 1994, Schroeder and Baydack 2001, Connelly *et al.* 2004; Summers *et al.* 2004). Increasing populations of predators that historically were relatively rare in the sagebrush landscape, and are very effective nest predators, such as red fox and corvids (Sovada *et al.* 1995), have the potential to increase rates of predation on sage-grouse. Connelly *et al.* (2000a) noted that ranches, farms, and housing developments have resulted in the introduction of nonnative predators including domestic dogs (*Canis domesticus*) and cats (*Felis domesticus*) into greater sage-grouse habitats. Where greater sage-grouse habitat has been altered in localized areas, the influx of predators can limit populations (Gregg *et al.* 1994; Braun in litt. 1995; Braun 1998; DeLong *et al.* 1995; Schroeder and Baydack 2001). Habitat fragmentation and the resultant predation increase may be a limiting factor for the Gunnison sage-grouse (Oyler-McCance *et al.* 2001).

Research conducted to determine nest success and greater sage-grouse survival has concluded that predation typically does not limit greater sage-grouse numbers (Connelly and Braun 1997, Connelly *et al.* 2000a, Connelly *et al.* 2000b, Wambolt *et al.* 2002). The conclusion that predation is not generally a limiting factor is supported by evidence showing that predator removal does not have long-lasting effects on sage-grouse population size or stability over large regions (Cote and Sutherland 1997, Schroeder *et al.* 1999, Wambolt *et al.* 2002). For example, Slater (2003) demonstrated that coyote control failed to produce an effect on greater sage-grouse nesting success in southwestern Wyoming. In their review of literature regarding predation, Connelly *et al.* (2004) noted that only two of nine studies examining survival and nest success indicated that predation had limited a sage-grouse population by decreasing nest success. However, both studies indicated low nest success due to predation was ultimately related to poor nesting habitat. Connelly *et al.* (2004) further noted that the idea that predation is not a widespread factor depressing sage-grouse populations is supported by studies of nest success rates (which indicate nest predation is not a widespread problem), by the relatively high survival of adult birds, and by the lack of an effect on nesting success as a result of coyote control in Wyoming.

Summary of Factor C

The expert panel did not identify disease or predation as primary extinction risk factors for the greater sage-grouse. The experts expressed concerns about the potential effects of future WNv outbreaks, but were unable to draw any definitive conclusions about extinction risk to sage-grouse posed by this disease because insufficient information is available to do so. Connelly *et al.* (2004) noted that prior to the recent emergence of WNv there was little evidence to suggest that pathogens or parasites were major threats to the greater sage-grouse.

Although we have relatively poor understanding of the actual effects of disease or parasites on sage-grouse populations, since systematic surveys have never been conducted, we continue to be concerned about the potential effects of WNv on greater sage-grouse. We will closely monitor future infections and observed population effects to the greater sage-grouse. Predation has also not been identified as a limiting factor to sage-grouse populations, except in areas of habitat degradation and loss. Thus, based on the best scientific and commercial data available, we have concluded that disease and predation are not factors that endanger or threaten the sage-grouse throughout all or a significant portion of its range at this time.

D. The Inadequacy of Existing Regulatory Mechanisms

Local Laws and Regulations

Approximately 27 percent of the sagebrush land in the United States is privately owned (Connelly *et al.* 2004). We are not aware of any county or city ordinances that provide protection specifically for the greater sage-grouse or their habitats on private land, although we recognize that such ordinances could be proposed as rural governments and local sage-grouse working groups investigate strategies to protect sage-grouse on private lands. We recognize that county or city ordinances that address agricultural lands, transportation, and zoning for various types of land uses have the potential to influence sage-grouse (*e.g.*, zoning that protects open space can retain suitable sage-grouse habitat, and zoning that allows a housing development and associated roads can result in destruction and/or fragmentation of habitat occupied by sage-grouse during some part of their life cycle). However, we have no detailed information regarding the nature or extent of zoning efforts within the species range and its direct or indirect effects on populations and habitats.

State Laws and Regulations

In the United States, greater sage-grouse are managed by State wildlife agencies on all lands within the State as resident native game birds (Connelly *et al.* 2004), except in Washington, where the bird was listed as a State-threatened species in 1998 and they are managed as a State-listed threatened species (Stinson *et al.* 2004). The classification as a resident game bird (with the exception of Washington) allows the direct human taking of the bird during hunting seasons authorized and conducted under State laws and regulations. Currently, harvest of greater sage-grouse is authorized by 10 of the 11 western States where they occur (Connelly *et al.* 2004). Sage-grouse hunting is prohibited is Washington, where the season has been closed since 1988 (Stinson *et al.* 2004).

Each State agency bases its hunting regulations on local population information and peer-reviewed scientific literature regarding the impacts of hunting on the greater sage-grouse (Bohne in litt., Wyoming Game and Fish Department 2003). Hunting seasons are reviewed annually by each State, and they implement adaptive management based on harvest and population data (U.S. Fish and Wildlife Service 2004; 69 FR 21484; Montana Sage Grouse Work Group (MSGWG) 2004).

State agencies directly manage 5 percent of the total landscape dominated by sagebrush in the United States and various State laws and regulations identify the need to conserve wildlife habitat (Connelly *et al.* 2004). As an example, in Colorado, ‘‘wildlife and their environment’’ are to be protected, preserved, enhanced and managed (Colorado Revised Statutes, Title 33, Article 1–101 *in* Connelly *et al.* 2004). Laws and regulations in Oregon, South Dakota, and California have similar provisions, and allow for acquisition of funding to acquire and conserve wildlife habitat (Connelly *et al.* 2004). Some States also have the legal authority to make land purchases and/or to enter into easements with landowners regarding wildlife habitats. For example, Montana Fish Wildlife and Parks (MTFWP) has authority to acquire easements or purchase land directly to protect wildlife habitat (MSGWG 2004). The Washington Department of Fish and Wildlife (WADFW) has designated sage-grouse habitat as a ‘‘priority habitat’’ which identifies this habitat as a priority for conservation and management, and provides species and habitat information to interested parties for land use planning purposes (Stinson *et al.* 2004). However, the recommendations provided under this program are guidelines, not regulations; thus, their use is not required.

Alternatively, some States have laws that directly address the management of certain State lands and require that it be based on maximizing financial returns. For example, under a provision of the State Constitution (Article IX-Section 8), the Idaho Department of Lands (IDL) is directed to manage approximately 2.4 million acres of state endowment lands ‘‘in such a manner as to secure the maximum long-term financial return to the beneficiary institution to which granted.’’ The IDL can take measures that protect or enhance wildlife habitat subject to their fundamental requirement to secure maximum long-term financial returns (Idaho Dept. Fish and Game in litt. 2004). The Montana Department of Natural Resources and Conservation (MTDNRC) is responsible for managing approximately 5.1 million surface acres and 6.3 million acres of subsurface trust land distributed across the State (MSGWG 2004). Under State law, proceeds from the sale and management of this trust land are used to support and maintain public schools and various State institutions. The obligation for management and administration of these trust lands is to obtain the greatest benefit for the school trusts, and the monetary return must be weighed against the long-term productivity of the land to ensure continued future returns to the trusts (MSGWG 2004). State lands which are managed to enhance economic returns for the benefit of education trust funds may or may not include benefits for wildlife habitat. The Service does not have complete information pertaining to all State laws and regulations that directly or indirectly relate to greater sage-grouse habitat on these lands.

All States within the extant range of the greater sage-grouse have, or are developing, conservation plans for the species and its habitats. These efforts are in addition to current research and monitoring efforts for the greater sage-grouse conducted by State agencies. The conservation plans are focused on addressing local sage-grouse or sagebrush habitat concerns through a variety of mechanisms (*i.e.*, changes in regulations, habitat improvement projects, etc.). These plans are in various stages of development, and many have not yet begun implementation of actual habitat conservation practices. As previously stated, 20 of approximately 300 individual efforts contained within the 27 plans we received met the standard in PECE (*see* 68 FR 15115) for having sufficient certainty of implementation and effectiveness (*see* the ''Status Review Process'' section, above, for further details regarding PECE). Of these 20 efforts, 15 involved state wildlife agencies (the other 5 involved the BLM or Forest Service). The members of the expert panel were provided with information regarding these 20 projects, and were given the opportunity to re-evaluate their projections of extinction risk to the greater sage-grouse on a rangewide basis considering these. Only one panelist determined that these cumulative efforts would reduce the risk of extinction to the species. All the panelists agreed that local conservation efforts are necessary to the long-term conservation of the species, but the existing plans were too early in development and implementation to influence their opinion at this time.

United States Federal Laws and Regulations

The greater sage-grouse is not covered or managed under the provisions of the Migratory Bird Treaty Act (16 U.S.C. 703–712). Federal agencies in the United States are responsible for managing 66 percent of the sagebrush landscape (Connelly *et al.* 2004). The Federal agencies with the most sagebrush are the Bureau of Land Management (BLM), an agency of the Department of the Interior, and the U. S. Forest Service (USFS), an agency of the Department of Agriculture. The U.S. Department of Defense, U.S. Department of Energy, and several agencies in the Department of the Interior also have responsibility for lands and/or decisions that involve habitat of the greater sage-grouse.

The BLM estimates that about 46 percent of greater sage-grouse habitat is on BLM-administered land, with approximately 78.3 million acres of BLM-administered lands falling within the range currently occupied by the greater sage-grouse (BLM 2004a). The Federal Land Policy and Management Act of 1976 (FLPMA) (43 U.S.C. 1701 *et seq.*) is the primary federal law governing most land uses on BLM-administered lands. Section 102(a)(8) of FLPMA specifically recognizes wildlife and fish resources as being among the uses for which these lands are to be managed: ''The Congress declares 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 and domestic animals. * * *'' Regulations pursuant to FLPMA and the Mineral Leasing Act (30 U.S.C. 181 *et seq.*) that address wildlife habitat protection on BLM-administered land include 43 CFR 3162.3–1 and 43 CFR 3162.5–1; 43 CFR 4120 *et seq.*; 43 CFR 4180 *et seq.*

BLM policy and guidance for species of concern occurring on BLM managed land is addressed under BLM Manual 6840—Special Status Species Management (BLM 2001). In 1998 the greater sage-grouse was State-listed as a threatened species in Washington (Stinson *et al.* 2004), and therefore BLM decisions and actions involving greater sage-grouse habitat on BLM-administered lands in Washington have been subject to the policy guidance in BLM Manual 6840 since then. The BLM has designated the greater sage-grouse a sensitive species across all 11 States in the sage-grouse range. BLM's policy regarding sensitive species is that ''The protection provided by the policy for candidate species shall be used as the minimum level of protection for BLM sensitive species'' (BLM 2001). The BLM policy regarding candidate species includes: implementation of management plans for conserving the species and its habitats; ensuring actions authorized, funded, or carried out by the BLM do not contribute to the need for the species to become listed; ensuring the species are considered in land use plans; developing and/or participating in management plans and species and habitat assessments; and monitoring the species for evaluating of management objectives (BLM 2001).

Land use plans are the basis for all actions and authorizations involving BLM-administered lands and resources: they establish allowable resource uses, resource condition goals and objectives to be attained; program constraints and general management practices needed to attain the goals and objectives; general implementation sequences; and intervals and standards for monitoring and evaluating the plan to determine its effectiveness and the need for amendment or revision (43 CFR 1601.0–5(k)). According to a draft Report provided to the Service by BLM, there are 98 land use plans that involve sage-grouse habitat (BLM 2004a). Based on information provided by BLM field offices, 13 of the 98 plans do not contain any direction that specifically pertains to the greater sage-grouse or its habitat (BLM 2004a). The other 85 plans contain standards and/or prescriptions that ''contribute positively to on-the-ground sage-grouse habitat conservation'' and/or ''contribute positively to on-the-ground sagebrush conservation.'' Examples include fencing areas with value to sage-grouse, and applying distance stipulations around leks (BLM 2004a). However, the BLM does not provide or describe the criteria or process used to determine that the standards and/or prescriptions listed in this report contribute positively to sage-grouse habitat or sagebrush conservation (BLM 2004a).

Land use plans provide a framework and programmatic guidance for implementation (activity) plans, which are site-specific plans written to implement decisions made in a land use plan. Examples include allotment management plans (AMPs) that address livestock grazing, oil and gas field development, travel management, and wildlife habitat management. Implementation/activity plan decisions normally require additional planning and NEPA analysis. With regard to special status species, BLM Manual

6840.22A states: ''Implementation-level planning should consider all site-specific methods and procedures which are needed to bring the species and their habitats to the condition under which the provisions of the ESA are not necessary, current listings under special status species categories are no longer necessary, and future listings under special status species categories would not be necessary.''

On November 16, 2004, BLM Instruction Memorandum (IM) No. 2005–024 transmitted information to all BLM field and Washington Office officials regarding the development of a National BLM Sage-grouse Habitat Conservation Strategy for BLM-administered lands. This strategy is described as the framework to address the conservation of sage-grouse and risk to sagebrush habitats on lands and activities administered by the BLM. It commits the BLM to work with States and local interests on this issue. The IM instructed BLM State Directors to develop a process and schedule to update deficient land use plans to adequately address sage-grouse and sagebrush conservation needs no later than April 1, 2005. Implementation plans are also covered by this IM.

BLM has the regulatory authority for oil and gas leasing, as provided at 43 CFR 3100 *et seq.*, and they are authorized to require stipulations as a condition of issuing a lease. Program-specific guidance for fluid minerals (which include oil and gas) in the BLM planning handbook specifies that land use plan decisions will identify restrictions on areas subject to leasing, including closures, as well as lease stipulations (BLM 2000). This handbook further also specifies that all stipulations must have waiver, exception, or modification criteria documented in the plan, and notes that the least restrictive constraint to meet the resource protection objective should be used (BLM 2000). BLM states that some ''older'' oil and gas leases do not have stipulations that address sage-grouse (BLM 2004a), but we do not have information on how many of these leases are in this category. BLM has the regulatory authority to condition the application for drill use authorizations, conducted under a lease, that does not contain sage-grouse conservation stipulations (BLM 2004a). Also, some oil and gas leases have a 200-meter (0.12-mile) stipulation, which allows movement of the drilling area by that distance (BLM 2004a). BLM states that many of their field offices work with the operators to move a proposed drilling site farther or justify such a move through the site-specific NEPA process (BLM 2004a).

In developing stipulations for oil and gas the BLM considers the best available scientific information, including, but not limited to, the sage-grouse population and habitat management guidelines developed by the Western States Sage and Columbian Sharp-tailed Grouse Technical Committee under the direction of the Western Association of Fish and Wildlife Agencies, as published by Connelly *et al.* (2000a) (BLM 2004a). BLM states that a site-specific evaluation decision is required to implement conservation measures given the complexity and variability of the habitat and other variables (BLM 2004a).

The oil and gas leasing regulations authorize BLM to modify or waive lease terms and stipulations if the authorized officer determines that the factors leading to inclusion of the term or stipulation have changed sufficiently to no longer justify protection, or if proposed operations would not cause unacceptable impacts (43 CFR 3101.1–4). The Service does not have information on the type or number, or the basis for, exceptions, modifications, or waivers of stipulations pertaining to the greater sage-grouse and/or their habitat that have been granted by BLM.

The Energy Policy and Conservation Act (EPCA) of 2000 included provisions requiring the Secretary of the Interior to conduct a scientific inventory of all onshore Federal lands to identify oil and gas resources underlying these lands and the nature and extent of any restrictions or impediments to the development of such resources (U.S.C. Title 42, Chapter 77, section 6217(a)). On May 18, 2001, the President signed Executive Order 13212—Actions to Expedite Energy-Related Projects (E.O. 13212) (66 FR 28357, May 22, 2001), which states that it is the Administration's policy that the executive departments and agencies shall take appropriate actions, to the extent consistent with applicable law, to expedite projects that will increase the production, transmission, or conservation of energy. The Executive Order specifies that this includes expediting review of permits or taking other actions as necessary to accelerate the completion of projects, while maintaining safety, public health, and environmental protections. The BLM has responded to these declarations with the issuance of several IM to their staff that may influence sage-grouse conservation during these actions, including providing guidance for land use planning relative to oil and gas operations and focusing efforts for resource recovery in seven areas, six of which are within occupied greater sage-grouse habitats ((IM 2003–137, April 3, 2003; IM No. 2003–233, July 28, 2003).

As discussed previously, BLM land use plans and implementation plans may include BMPs, which are defined as ''a suite of techniques that guide, or may be applied to, management actions to aid in achieving desired outcomes. IM 2004–194 (June 22, 2004) addresses the integration of Best Management Practices (BMPs) into Application for Permit to Drill (APD) approvals and associated rights-of-way. This IM states that BLM Field Offices ''shall incorporate appropriate BMPs into proposed APDs and associated on and off-lease rights-of-way approvals after appropriate NEPA evaluation. The wildlife management criteria are broadly stated. For example, one BMP is: ''To minimize habitat loss and fragmentation, re-establish as much habitat as possible by maximizing the area reclaimed during well production operations. In many cases, this ''interim'' reclamation can cover nearly the entire site. It is OK to set up well workover operations or park on the restored vegetation. Just repair the damage when you are done.'' Another example is: ''Consider drilling multiple wells from a single well pad to reduce the footprint of oil and gas activity on wildlife habitat.'' The Service has no information regarding the results of BLM monitoring and evaluation of the effectiveness of these or similar BMPs that may have been adopted previously in BLM planning documents or as part of other, more site-specific planning decisions.

BLM regulatory authority for grazing management is provided at 43 CFR part 4100 (Regulations on Grazing Administration Exclusive of Alaska). Livestock grazing permits and leases contain terms and conditions determined by BLM to be appropriate to achieve management and resource condition objectives on the public lands and other lands administered by the BLM, and to ensure that habitats are, or are making significant progress toward being, restored or maintained for BLM special status species (43 CFR 4180.1(d)). Grazing practices and activities subject to standards and guidelines include the development of grazing related portions of implementation/activity plans, establishment of terms and conditions of permits, leases and other grazing authorizations, and range improvement activities such as vegetation manipulation, fence construction, and development of water.

The State or regional standards for grazing administration must address habitat for endangered, threatened, proposed, candidate, or special status species, and habitat quality for native plant and animal populations and communities (43 CFR 4180.2(d)(4) and (5). The guidelines must address restoring, maintaining or enhancing habitats of BLM special status species to promote their conservation, and maintaining or promoting the physical and biological conditions to sustain native populations and communities (43 CFR 4180.2(e)(9) and (10). BLM is required to take appropriate action not later than the start of the next grazing year upon determining that existing grazing practices or levels of grazing use are significant factors in failing to achieve the standards and conform with the guidelines (43 CFR 4180.2(c)). BLM agreed to work with their Resource Advisory Councils to expand the rangeland health standards required under 43 CFR part 4180 so that there are public land health standards relevant to all ecosystems, not just rangelands, and that they apply to all BLM actions, not just livestock grazing (BLM Manual 4180.06.A). All States within the range of greater sage-grouse have a resource advisory council, except Wyoming.

The BLM states that 89 percent of lands are meeting standards, or are not meeting standards but appropriate actions have been implemented to ensure significant progress towards the standards (BLM 2004a). The remaining 11 percent are not meeting standards due to either livestock grazing or other causes. We have no information on how these rangeland health categories affect sage-grouse habitats.

On December 8, 2003, BLM issued a proposed rule (68 FR 68452) that would modify the current grazing management regulation in two ways: (1) It provides that assessment and monitoring standards are needed to support a determination that livestock grazing significantly contributes to not meeting a standard or conforming with a guideline; and (2) It requires BLM to analyze, formulate and propose appropriate action within 24 months of the determination (rather than ''before the start of the next grazing year''). This proposed rule has not been finalized.

The Forest Service (USFS) has management authority for 8 percent of the sagebrush habitat in the United States (Connelly *et al.* 2004). Management of Federal activities on National Forest System lands is guided principally by the National Forest Management Act (NFMA) (16 U.S.C. 1600–1614, August 17, 1974, as amended 1976, 1978, 1980, 1981, 1983, 1985, 1988 and 1990). NFMA specifies that all National Forests must have a land and resource management plan (LRMP) (16 U.S.C. 1600) to guide and set standards for all natural resource management activities on each National Forest or National Grassland. NFMA requires the USFS to incorporate standards and guidelines into LRMPs (16 U.S.C. 1600). This has historically been done through a NEPA process, including provisions to manage plant and animal communities for diversity, based on the suitability and capability of the specific land area in order to meet overall multiple-use objectives. The Forest Service planning process is similar to BLM's.

The 1982 NFMA implementing regulation for land and resource management planning (1982 rule, 36 CFR part 219), under which all existing forest plans were prepared, requires the Forest Service to manage habitat to maintain viable populations of existing native vertebrate species on National Forest System lands (1982 rule, 36 CFR 219.19). Management indicator species were used to estimate the effects of each alternative on fish and wildlife populations, and were selected because their population changes are believed to reflect the effects of management activities (1982 rule, 36 CFR 219.19(a)). The regulation requires that during the planning process, each alternative considered needed to establish objectives for the maintenance and improvement of habitat for management indicator species, to the degree consistent with overall multiple use objectives of the alternative (1982 rule, 36 CFR 219.19(a)). Fourteen National Forests identified greater sage-grouse as a Management Indicator Species, including Beaverhead National Forest, Little Missouri National Grassland, Thunder Basin National Grassland, Buffalo Gap National Grassland, White River National Forest, Ashley National Forest, Boise National Forest, Caribou National Forest, Curlew National Grassland, Humboldt National Forest, Toiyabe National Forest, Sawtooth National Forest, Inyo National Forest, and Modoc National Forest.

Revisions to the planning regulations adopted on November 9, 2000 (65 FR 67514) did not retain the management indicator species requirement, but rather stated: ''Plan decisions affecting species diversity must provide for ecological conditions that the responsible official determines provide a high likelihood that those conditions are capable of supporting over time the viability of native and desired non-native species well distributed throughout their ranges within the plan area * * *'' (65 FR 67514). Further revisions have been proposed (67 FR 72770; December 6, 2002) but a final rule has not been promulgated. Until such time a rule is completed, officials responsible for planning decisions may use the management indicator provisions.

As part of our status review process, the members of the expert panel and the Service's decision support team of senior Service biologists and managers were provided with information regarding NFMA and related regulations, including the 1982 and 2000 planning regulations and the recent interpretive rule, along with information explaining that the Forest Service had proposed, but not promulgated, changes to the 2000 regulation. Since the meeting by the expert panel and the Service's decision support team, the Forest Service has promulgated a final planning rule at 36 CFR 219 and eliminated the 2000 planning rule. The new Forest Service planning regulation became effective when it was published in the **Federal Register** on January 5, 2005 (70 FR 1023).

As described by the Forest Service, plans developed under the new regulation will be more strategic and less prescriptive in nature than those developed under the 1982 planning rule (which has guided the development of all forest plans to date). For instance, plans previously might have included standards for a buffer for activities near the nest sites of birds sensitive to disturbance during nesting, whereas under the new rule a desired condition description and guidelines will be provided, rather than a set of prescriptive standards that would apply to projects. Planning and decisions for projects and activities will address site-specific conditions and identify appropriate conservation measures to take for each project or activity.

Under the new rule, the purpose of forest plans is to establish goals and to set forth guidance to follow in pursuit of those goals. The rule calls for five components of plans: desired conditions, objectives, guidelines, suitability of areas, and special areas (36 CFR 219.7(a)(2)). The rule states that these components are intended to provide general guidance and goals or other information to be considered in subsequent project and activity decisions, and that none of these components are commitments or final decisions approving projects and activities (36 CFR 219.7(a)(2)). Approval of a plan, plan amendment, or plan revision comprised of these five components may be categorically excluded from NEPA documentation (36 219.4(b)). In a separate **Federal Register** publication issued in conjunction with the new planning rule, the Forest Service announced a proposed revision to one of its handbooks (FSH 1909.15, Chapter 30) to include final decisions on proposals to develop, amend, or revise land management plans as one of the categories of actions that will not result in significant impacts on the human environment and which are therefore exempt from requirements to prepare further NEPA documentation (70 FR 1062; January 5, 2005).

The new rule requires that an environmental management system (EMS) be established for each unit of the National Forest System and the EMS may be established independently of the planning process (36 CFR 219.5). Plan development, amendment, or revision must be completed in accordance with direction at 36 CFR 219.14 and with the EMS. The EMS must conform to the standard developed by the International Organization for Standardization (ISO), specifically ISO 14001: Environmental Management Systems—Specification With Guidance for Use (36 CFR 219.5)(b)).

The new rule requires maintenance of three types of evaluation reports: (1) Comprehensive evaluation of current social, economic, and ecological conditions and trends that contribute to sustainability (to be updated at least every five years); (2) evaluation for a plan amendment, which must analyze issues relevant to the purposes of the amendment; and (3) annual evaluation of monitoring information (36 CFR 191.6). The rule specifies that the plan must describe the monitoring program for the plan area, and describes general categories of items to be provided for in the monitoring program (*e.g.* determining the effects of various resource management activities on the productivity of the land) (36 CFR 219.6(b)). The new rule also includes a provision that the responsible official must take into account the best available science (36 CFR 219.11) in the planning process; the official also will consider public input, competing use demands, budget projects and other factors as appropriate.

The new planning regulation does not include provisions regarding habitat for species viability. Rather, with regard to ecological sustainability, plans are to provide a framework to contribute to sustaining native ecological systems by providing ecological conditions to support diversity of native plants and animal species in the plan area (36 CFR 219.10 (b)). Ecosystem diversity is described as being the primary means by which a plan contributes to sustaining ecological systems (36 CFR 219.10 (b)), and the Forest Service states that this focus is expected to conserve most species. If the Responsible Official determines that provisions in plan components, beyond those addressing ecosystem diversity, are needed ''to provide appropriate ecological conditions for specific threatened and endangered species, species-of-concern, and species-of-interest, then the plan must include additional provisions for these species, consistent with the limits of agency authorities, the capability of the plan area, and overall multiple use objectives'' (36 CFR 219.10(b)(2)). The rule defines species-of-concern as ''Species for which the Responsible Official determines that management actions may be necessary to prevent listing under the Endangered Species Act'' and defines species-interest as ''Species for which the Responsible Official determines that management actions may be necessary or desirable to achieve ecological or other multiple use objectives'' (36 CFR 219.16).

The new rule does not include Management Indicator Species. It specifies that for national forest system units with plans developed, amended, or revised using the 1982 planning regulations, compliance with any obligations relating to management indicator species may be achieved by considered data and analysis relating to habitat (as compared to the 1982 regulation that required population trend data) unless the plan specifically requires population monitoring or population surveys for the species, and also specifies that site-specific monitoring or survey of a proposed project or activity area (pertaining to such species) is not required in relation to such species (36 CFR 219.14(f)).

For each unit of the National Forest System, the transition period for the new rule is three years or at the unit's establishment of an EMS, whichever comes first (36 CFR 219.14). A document approving a plan developed, revised, or amended using the new regulation must include a description of the effects of the plan on existing, permits, contracts, or other instruments implementing approved projects and activities (36 219.8(a)). If not expressly excepted, approved projects and activities must be consistent with the applicable plan components, subject to provisions in 36 219.8(e) that provide options for addressing a use, project or activity that is not consistent with the applicable plan.

The supplementary information provided with the new rule states that the Forest Service is developing planning directives (*i.e.*, manuals and handbooks) regarding the use of this new rule, and that proposed changes in the directives will be available for public comment as soon as possible after adoption of the final rule.

The greater sage-grouse is designated as a USFS sensitive species in Regions 1 (Northern Region—northern ID, MT, ND, and northern SD), 2 (Rocky Mountain Region—CO, WY), 4 (Intermountain Region—southern ID, southwestern WY, UT, NV, eastern CA), 5 (Pacific Southwest Region—CA), and 6 (Pacific Northwest Region—OR, WA) (USDA Forest Service, in litt. 2004). These regions encompass the entire range of the species in the United States (USDA Forest Service, in litt. 2004).

Many forests within the range of sage-grouse provide important seasonal habitats for the species, particularly the Thunder Basin National Grassland and the Humboldt-Toiyabe National Forest (USDA Forest Service, in litt. 2004). While the 1982 planning regulation, including its provision for population viability, was used in the development of the existing Forest Plans, no information has been provided to the Service regarding specific implementation of the above regulations and policies for the greater sage-grouse. Also, we have no information regarding the results of sage-grouse population monitoring for those National Forests that identified it as a management indicator species, and thus were subject to the requirement in the 1982 rule to monitor population trends and determine relationships to habitat changes.

Of the 34 National Forests within greater sage-grouse range, approximately half do not specifically address sage-grouse in their Forest Plans (USDA Forest Service, in litt. 2004). Reasons for this include lack of species occurrence, incidental use of the National Forest System lands by sage-grouse, or the Forest Plan pre-dated concern for sage-grouse conservation (pre-2000; USDA Forest Service, in litt. 2004). Direction for the conservation of sage-grouse and their habitats (at least indirectly) was provided in 15 plans relative to minerals management, 18 plans for fire and fuels management, 24 for livestock grazing actions, 10 for realty actions, 15 for recreation activities, 8 for recreation, and 20 for vegetation management (USDA Forest Service, in litt. 2004). The effectiveness of these efforts for sage-grouse and their habitats was not reported to us by the USFS (USDA Forest Service, in litt. 2004).

The USFS incorporates conservation measures for sage-grouse protection at the project level through site-specific

NEPA analyses, using the Western Association of Fish and Wildlife Agencies Sage-grouse management guidelines (Connelly *et al.* 2000a) as a reference (USDA Forest Service, in litt. 2004). According to USFS, if a specific project location does not meet these guidelines, management use standards are developed and incorporated into the design of the project to achieve these conditions (USDA Forest Service, in litt. 2004). Temporal and seasonal restrictions can also be implemented to protect sage-grouse resources.

Other Federal agencies in the U.S. Department of Defense, U.S. Department of Energy, and the U.S. Department of Interior (including the Bureau of Indian Affairs, Fish and Wildlife Service, and National Park Service) are responsible for managing less than 5 percent of sagebrush lands within the United States (Connelly *et al.* 2004). The National Park Service Organic Act (39 Stat. 535; 16 U.S.C. 1, 2, 3 and 4) states that the NPS will administer areas under their jurisdiction ''* * * by such means and measures as conform to the fundamental purpose of said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historical objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.''

The National Wildlife Refuge System Administration Act (16 U.S.C. 668dd–668ee) provides guidelines and directives for administration and management of all areas in the National Wildlife Refuge system. This includes wildlife refuges, areas for the protection and conservation of fish and wildlife that are threatened with extinction, wildlife ranges, game ranges, wildlife management areas, or waterfowl production areas. Relatively few units within the Refuge system have habitat for the greater sage-grouse. Refuges are managed for species conservation, consistent with direction in the National Wildlife Refuge System Administration Act, as amended, and related Service polices and guidance.

The Department of the Army has developed Integrated Natural Resources Management Plans for their facilities within sage-grouse habitats. These plans ''reflect the mutual agreement of the facility, the Fish and Wildlife Service and the appropriate State fish and wildlife agency on the conservation, protection and management of fish and wildlife resources'' (Department of the Army, in litt. 2004). Six Army facilities have confirmed sage-grouse presence, and integrated plans have been developed for all. While some agencies have developed site-specific plans for conserving sage-grouse habitats on their lands (*i.e.*, Yakima Training Center, Seedskadee National Wildlife Refuge), we do not have monitoring data regarding the effectiveness of these management actions.

In 1992, we entered into a voluntary Conservation Agreement with the Army and the WADFW for sage-grouse occurring at the Yakima Training Center (66 FR 22984) in Washington. The Conservation Agreement expired April 30, 2000 (66 FR 22984). Efforts to update and implement a revised Conservation Agreement for sage-grouse throughout Washington are ongoing (66 FR 22984). In our 2003 Candidate Notice of Review we concluded that the Army is implementing conservation measures and considerably less-than-planned training activities in Yakima and Kittitas Counties, the location of the sage-grouse that are part of the Columbia Basin DPS of the greater sage-grouse (69 FR 24875).

The Natural Resources Conservation Service (NRCS) of the U.S. Department of Agriculture assists farmers, ranchers, and other private landowners in reducing threats to sage-grouse habitat by providing technical assistance and financial resources to support management and habitat restoration efforts; helping farmers and ranchers maintain and improve habitat as part of larger management efforts; and developing technical information to assist NRCS field staff with sage-grouse considerations when working with private landowners. The United States Congress recently appropriated $5 million for NRCS to use in 2005 to fund sage-grouse conservation efforts on public and private lands across the range of the greater sage-grouse (PL 108–447). One example of these conservation efforts is found in Douglas County, Washington, the site of the northern subpopulation of the Columbia Basin DPS. Large areas of privately-owned lands are currently withdrawn from crop production and planted to native and non-native cover under the NRCS' Conservation Reserve Program (CRP) (69 FR 24875).

Executive Order 13112 on Invasive Species (64 FR 6183) was signed on February 3, 1999. It seeks to prevent the introduction of invasive species and provide for their control and minimize their impacts through better coordination of federal agency efforts under a National Invasive Species Management Plan to be developed by an interagency Invasive Species Council. The Order directs all federal agencies to address invasive species concerns as well as refrain from actions likely to increase invasive species problems (E.O. 13112).

Executive Order 13112 requires the National Invasive Species Council (Council) to produce a National Management Plan (NMP) for Invasive Species every two years (E.O. 13112). In January 2001, the Council released the first NMP, which serves as a blueprint for all federal action on invasive species. It provides goals and objectives for invasive species management, research needs, and measures to minimize the risk of species introductions. Although individual States have regulations regarding invasive species, we were unable to determine if these regulations will affect sage-grouse habitats.

Canadian Federal and Provincial Laws and Regulations

Greater sage-grouse are cooperatively managed by Provincial and Federal governments in Canada. The species is afforded Federal legal protection under schedule 1 of the Species at Risk Act (SARA; Canada Gazette, Part III, Chapter 29, Vol. 25, No. 3, 2002). Passed in 2002, the Species at Risk Act is similar to the Endangered Species Act and allows for habitat regulations to protect sage-grouse (Aldridge and Brigham 2003). The purpose of the SARA is to prevent the extinction or extirpation of any indigenous Canadian wildlife species, subspecies or distinct population segment. SARA also provides for the recovery of endangered or threatened wildlife and encourages the management of other species to prevent them from becoming species at risk (Connelly *et al.* 2004).

Greater sage-grouse are classified as resident wildlife by the Provinces (Connelly *et al.* 2004). The species is listed as endangered at the Provincial level in Alberta and Saskatchewan, and neither Province allows harvest (Aldridge and Brigham 2003; Connelly *et al.* 2004). Alberta manages greater sage-grouse under the statutory authority of Chapter W–10 of its Wildlife Act (Revised Statutes of Alberta (RSA) 2000). Individual birds are protected in Alberta, but their habitat is not. The Provincial laws also provide for the development of recovery strategies and plans (Connelly *et al.* 2004). Alberta has developed voluntary guidelines to protect leks (Aldridge and Brigham 2003). Provincial laws in Saskatchewan prevent sage-grouse habitat from being sold or from having native vegetation cultivated (Aldridge and Brigham 2003). The Saskatchewan Wildlife Act provides protection for sage-grouse nests and lek sites by providing spatial and temporal restrictions. No developments are permitted within 500 m (550 yards) of leks and no construction is allowed within 1,000 m (1,100 yards) of leks between March 15 and May 15 (Aldridge and Brigham 2003).

Summary of Factor D

Various regulatory mechanisms that guide the protection and conservation of the greater sage-grouse are in place. The members of the expert panel and the Service's decision support team were provided with more detailed information than we have summarized above regarding regulatory mechanisms pertaining to the greater sage-grouse. Based on the best scientific and commercial data available we have concluded that existing regulatory mechanisms do not endanger or threaten the greater sage-grouse throughout all or a significant portion of its range. Based on the current status of the greater sage-grouse and the fact that the lands administered by the Forest Service comprise a relatively small percentage of sagebrush habitat (approximately 8 percent) in the United States, the new Forest Planning regulation does not result in a change in our conclusion regarding the adequacy of existing regulatory mechanisms.

E. Other Natural or Manmade Factors Affecting Its Continued Existence

Pesticides

Few studies have examined the effects of pesticides to sage-grouse, but at least one has documented direct mortality of greater sage-grouse as a result of ingestion of alfalfa sprayed with organophosphorus insecticides (Blus *et al.* 1989, Blus and Connelly 1998). In this case, a field of alfalfa was sprayed with dimethoate when approximately 200 sage-grouse were present; 63 of these sage-grouse were later found dead, presumably as a result of pesticide exposure (Blus *et al.* 1989, Blus and Connelly 1998). A comparison of applied levels of herbicides with toxicity studies of grouse, chickens, and other gamebirds (Carr 1968, as cited in Call and Maser 1985) concluded that herbicides applied at recommended rates should not result in sage-grouse poisonings.

Game birds that ingested sub-lethal levels of pesticides have been observed exhibiting abnormal behavior that may lead to a greater risk of predation (Dahlen and Haugen 1954, McEwen and Brown 1966, Blus *et al.* 1989). McEwen and Brown (1966) reported that wild sharp-tailed grouse poisoned by malathion and dieldrin exhibited depression, dullness, slowed reactions, irregular flight, and uncoordinated walking. Although no research has explicitly studied the indirect levels of mortality from sub-lethal doses of pesticides (*e.g.*, predation of impaired birds), it has been assumed to be the reason for mortality among some study birds (McEwen and Brown 1966, Blus *et al.* 1989, Connelly and Blus 1991). Both Post (1951) and Blus *et al* (1989) located depredated sage-grouse carcasses in areas that had been treated with insecticides. Exposure to these insecticides may have predisposed sage-grouse to predation. Sage-grouse mortalities were also documented in a study where they were exposed to strychnine bait type used to control small mammals (Ward *et al.* 1942 as cited in Schroeder *et al.* 1999).

A reduction in insect population levels resulting from insecticide application can potentially affect nesting sage-grouse females and chicks (Willis *et al.* 1993, Schroeder *et al.* 1999), although we could find no information on this specific issue for the greater sage-grouse. Eng (1952) noted that after a pesticide was sprayed to reduce grasshoppers, bird population levels decreased by 50 to 100 percent depending upon which chemical was used. He further stated that it appeared that nestling development was adversely affected due to the reduction in grasshoppers. Potts (1986 in Connelly and Blus 1991) determined that reduced food supply resulting from the use of pesticides ultimately resulted in high starvation rates of partridge chicks. In a similar study on partridges, Rands (1985) found that pesticide application adversely affected brood size and chick survival by reducing chick food supplies.

Three approved insecticides, carbarayl, diflubenzuron, and malathion, are applied across the extant range of sage-grouse as part of implementation of the Rangeland Grasshopper and Mormon Cricket Suppression Control Program, under the direction of the Animal and Plant Health Inspection Service (APHIS) (APHIS 2004). Carbaryl is applied as bait, while the others are sprayed. Application rates are in compliance with U.S. Environmental Protection Agency regulations. APHIS has general guidelines for buffer zones around sensitive species habitats. These pesticides are applied wherever grasshopper and Mormon cricket control are requested by private landowners (APHIS 2004). We were unable to find any information regarding the effects these pesticide applications may have on sage-grouse.

Herbicide applications can kill sagebrush and forbs important as food sources for sage-grouse (Carr 1968 as cited in Call and Maser 1985). The greatest impact resulting from a reduction of either forbs or insect populations is for nesting females and chicks due to the loss of potential protein sources that are critical for successful egg production and chick nutrition (Schroeder *et al.* 1999; Johnson and Boyce 1991).

In summary, pesticides can result in direct mortality of individuals, and can also reduce the availability of food sources, which in turn could contribute to mortality of sage-grouse. Despite these potential effects we could find no information to indicate that the use of pesticides, at current levels, negatively affects greater sage-grouse populations (*see also* Schroeder *et al.* 1999), and many of the pesticides that have been shown to have an effect have been banned in the U.S. for more than 20 years.

Contaminants

Across the range of the greater sage-grouse exposure to various types of environmental contaminants either occur, or may potentially occur, as a result of a variety of human activities, including agricultural and rangeland management practices, mining, energy development and pipeline operations, nuclear energy production and research, and transportation of materials along highways and railroads. Many of these potential exposures and their effects have been discussed above. In addition, numerous gas and oil pipelines occur across the range of the species. Exposure to oil or gas from spills or leaks could impact sage-grouse and cause mortalities or morbidity. Similarly, given the extensive network of highways and railroad lines that occur throughout the range of the greater sage-grouse there is some potential for exposure to contaminants resulting from hazardous materials spills or leaks along these transportation corridors. However these types of spills occur infrequently in only small portions of sage-grouse range and we could not locate any documented occurrences of impacts to sage-grouse from them.

There are no nuclear power plants within the area of current distribution of the greater sage-grouse and there is only one that occurs in range formerly occupied by the species (Nuclear Energy Institute Web page *http://www.nei.org* 2004). Sage-grouse do occur on the U.S. Department of Energy's Idaho National Engineering Laboratory in eastern Idaho (Connelly and Markham 1983). Exposure of sage-grouse to radionuclides (radioactive atoms) has been documented at this site (Connelly and Markham 1983). Although researchers noted the presence of varying levels of radionuclides in greater sage-grouse at this site they did not report any harmful effects to the population (Connelly and Markham 1983).

Indirect effects of contaminants on greater sage-grouse include loss of habitat components, such as food or cover. The indirect effects of contaminants from agriculture, mining operations, energy development and distribution, or hazardous waste spills along roads and railroad lines, can result in the killing of plants or insects that provide food for sage-grouse. Although the expert panel identified contaminants in the list of extinction risk factors for sage-grouse, it received the lowest ranking of relative importance.

Recreational Activities

Studies have determined that non-consumptive recreational activities can degrade wildlife resources, water, and the land by distributing refuse, disturbing and displacing wildlife, increasing animal mortality, and simplifying plant communities (Boyle and Samson 1985). Sage-grouse response to disturbance may be influenced by the type of activity, recreationist behavior, predictability of activity, frequency and magnitude, activity timing, and activity location (Knight and Cole 1995). Examples of recreational activities in sage-grouse habitats include hiking, camping, pets, and off-highway vehicle (OHV) use. Although we have not located any published literature concerning recreational effects on sage-grouse, they could disturb sage-grouse on leks and in nesting areas. Baydack and Hein (1987) reported displacement of male sharp-tailed grouse at leks from human presence resulting in loss of reproductive opportunity during the disturbance period. Female sharp-tailed grouse were observed at undisturbed leks while absent from disturbed leks during the same time period (Baydack and Hein 1987). Disturbance of incubating female sage-grouse could cause displacement from nests, increased predator risk, or loss of nests. Disruption of sage-grouse during vulnerable periods at leks, or during nesting or early brood rearing, however, could affect reproduction or survival (Baydack and Hein 1987). However, we were unable to find any published information regarding effects to sage-grouse as a result of these factors. The presence of pets in proximity to sage-grouse can result in sage-grouse mortality or disturbance, and increases in garbage from human recreators can attract sage-grouse predators and help maintain their numbers at increased levels.

Indirect effects to sage-grouse from recreational activities include impacts to vegetation and soils, and facilitating the spread of invasive species. Payne *et al.* (1983) studied OHV impacts to rangelands in Montana, and found long-term (2 years) reductions in sagebrush shrub canopy cover as the result of repeated trips in the area. Increased sediment production and decreased soil infiltration rates were observed after disturbance by motorcycles and four-wheel drive trucks on two desert soils in southern Nevada (Eckert *et al.* 1979). However, we could find no information that quantified impacts to the sagebrush community or to sage-grouse populations.

We are unaware of scientific reports documenting direct mortality of greater sage-grouse through collision with off-road vehicles. Similarly, we did not locate any scientific information documenting instances where snow compaction as a result of snowmobile use precluded greater sage-grouse use, or affected their survival in wintering areas. Off-road vehicle or snowmobile use in winter areas may increase stress on birds and displace sage-grouse to less optimal habitats. However, there is no empirical evidence available documenting these effects on sage-grouse, nor could we find any scientific data supporting the possibility that stress from vehicles during winter is limiting greater sage-grouse populations.

The expert panel identified human activities within greater sage-grouse habitats as an extinction risk factor. However, this factor ranked relatively low.

Drought/Climate Change

Drought is a common occurrence throughout the range of the greater sage-grouse (Braun 1998). Drought reduces vegetation cover (Milton *et al.* 1994; Connelly *et al.* 2004), potentially resulting in increased soil erosion and subsequent reduced soil depths, decreased water infiltration, and reduced water storage capacity. Drought can also exacerbate other natural events, such as defoliation of sagebrush by insects. Approximately 2,544 km^2 (982 mi^2) of sagebrush shrublands died in Utah in 2003 as a result of drought and infestations with the *Aroga* (webworm) moth (Connelly *et al.* 2004). Sage-grouse are affected by drought through the potential loss of vegetative habitat components and reduced insect production (Connelly and Braun 1997). These habitat component losses can result in declining sage-grouse populations due to increased nest predation and early brood mortality associated with decreased nest cover and food availability (Braun 1998; Schroeder *et al.* 1999).

Sage-grouse populations declined during the 1930s period of drought (Patterson 1952; Willis *et al.* 1993; Braun 1998). Drought conditions in the late 1980s and early 1990s also coincided with a period when sage-grouse populations were at historically low levels (Connelly and Braun 1997). Although drought has been a consistent and natural part of the sagebrush-steppe ecosystem, drought impacts on the greater sage-grouse can be exacerbated when combined with other habitat impacts that reduce cover and food (Braun 1998). Many studies discuss the effects of decreased insect and forb production to sage-grouse, but we could find no research specifically addressing drought effects on sage-grouse populations.

Short-term climatic cycles over timescales of decades can affect plant community dynamics, potentially resulting in a shift in successional stage (Connelly *et al.* 2004). Long-term changes in climate and atmospheric conditions over timescales of centuries will shift competitive advantage among individual plant species (Connelly *et al.* 2004). Environmental changes resulting from climate change could facilitate invasion and establishment of invasive species or exacerbate the fire regime, thereby possibly accelerating the loss of sagebrush habitats (Connelly *et al.* 2004). Increases in the expansion of pinyon and juniper woodlands in the Great Basin may have resulted from a combination of poor habitat management and climate change (Connelly *et al.* 2004). The potential conversion of habitats as a result of climate change could have long-term effects on sage-grouse populations (Connelly *et al.* 2004). We have no evidence however, that past climate change has directly affected sage-grouse populations.

One expert panelist identified climate change as the primary extinction risk factor for the greater sage-grouse. While the other panelists did not score this factor as highly, most acknowledged that long-term ongoing climate change will result in changes within the sagebrush ecosystem that may be negative for the greater sage-grouse.

Life History Traits Affecting Population Viability

Sage-grouse have comparatively low reproductive rates and high annual survival (Schroeder *et al.* 1999; Connelly *et al.* 2000a), resulting in slower potential or intrinsic population growth rates than typical of other game birds. Therefore, recovery of populations after a decline from any reason may require years. Also, as a consequence of their site fidelity to breeding and brood-rearing habitats, measurable population effects may lag behind, negative habitat impacts that may occur (Wiens and Rotenberry 1985). While these natural history characteristics would not limit sage-grouse populations across large geographic scales under historical conditions of extensive habitat, they may contribute to local population declines when humans alter habitats or mortality rates.

Sage-grouse have one of the most polygamous mating systems observed among birds (Deibert 1995). Asymmetrical mate selection (where only a few of the available members of one sex are selected as mates) should result in reduced effective population sizes (Deibert 1995), meaning the actual amount of genetic material contributed to the next generation is smaller than predicted by the number of individuals present in the population. With only 10 to 15 percent of sage-grouse males breeding each year (Aldridge and Brigham 2003), the genetic diversity of sage-grouse would be predicted to be low. However, in a recent survey of 16 greater sage-grouse populations, only the Columbia Basin population in Washington showed low genetic diversity, likely as a result of long-term population declines, habitat fragmentation, and population isolation (Benedict *et al.* 2003; Oyler-McCance *et al.*, In press). The level of genetic diversity in the remaining range of sage-grouse has generated a great deal of interest in the field of behavioral ecology, specifically sexual selection (Boyce 1990; Deibert 1995). There is some evidence of off-lek copulations in sage-grouse (copulations that occur off the lek by subordinate males), as well as multiple paternity within one clutch (Connelly *et al.* 2004). Dispersal may also contribute to genetic diversity, but little is known about dispersal in sage-grouse (Connelly *et al.* 2004). However, the lek breeding system suggests that population sizes in sage-grouse must be greater than non-lekking birds to maintain long-term genetic diversity.

Aldridge and Brigham (2003) estimated that up to 5,000 individual sage-grouse may be necessary to maintain an effective population size of 500 birds. Their estimate was based on individual male breeding success, variation in reproductive success of males that do breed, and the death rate of juvenile birds. We were unable to find any other published estimates of minimal population sizes necessary to maintain genetic diversity and long-term population sustainability in sage-grouse.

Summary of Factor E

In our 90-day petition finding, we identified several other natural or manmade factors (*i.e.* endocrine disruption, competition with other bird species, and direct mortality from fires and snowmobiles) that might potentially pose a threat to the greater sage-grouse. However, for this analysis, we could find no supporting information to indicate that any of these are endangering or threatening sage-grouse populations.

One expert panelist identified climate change, and resultant habitat changes from invasive species establishment, as the most significant threat factor for the sagebrush ecosystem. However, the imminent threats to this ecosystem were not thought to be sufficient to endanger or threaten the greater sage-grouse within the defined foreseeable future. Thus, based on the best scientific and commercial data available, including input from the expert panel, we have concluded that other natural and manmade factors do not endanger or threaten the sage-grouse throughout all or a significant portion of its range.

Petition Finding

We have carefully assessed the best scientific and commercial information available regarding the past, present, and future threats faced by this species. We reviewed the three petitions, information available in our files, other published and unpublished information, and comments submitted to us during the public comment period following our 90-day petition finding, and we consulted with recognized experts and other resource agencies. On the basis of the best scientific and commercial information available, we find that the petitioned action to list the greater sage-grouse is not warranted at this time. Although sagebrush habitat continues to be lost and degraded in parts of the greater sage-grouse's range (albeit at a lower rate than historically observed), from what we know of the current range and distribution of the sage-grouse, its numbers are well represented. As a result, we find that the species is not in danger of extinction, nor is it likely to become endangered in the foreseeable future. We are encouraged that sage-grouse and sagebrush conservation efforts will moderate the rate and extent of habitat loss for the species in the future. We strongly encourage the continuation of these efforts.

As described earlier in this document (*see* Status Review Process), the status review was conducted in two stages: (1) A risk analysis stage which consisted of compiling biological information, conducting the PECE analysis of conservation efforts, and conducting a facilitated extinction risk assessment by a panel of experts, and (2) a risk management stage where senior Service biologists and managers evaluated whether or not the greater sage-grouse qualifies as threatened or endangered under the Act.

Prior to estimating the risk of extinction in the risk analysis stage, the expert panel agreed on the 19 most important threats to sage-grouse across its range. To better understand the impact of these threats to the survival of the species, each expert assigned a relative rank to each threat within each of three different geographical distinctions. These included the eastern and western portion of the range of the greater sage-grouse and the whole range of the species (Figure 1). Dividing the range of the species into an eastern and western region for the purposes of the expert panel exercises was intentional to help Service biologists and managers and the expert panelists understand the importance of the various threats to the species at different geographical scales. The relative rankings of the identified threats reflect that some threats are regional in nature while others express themselves across the whole range of the species. Threats that ranked low on a regional and rangewide basis were considered to operate at the local or site-specific level where they occurred.

In reaching these rankings the expert panelists reviewed an initial list of threats that was generated from the synthesis of biological information the Service had prepared, and through a discussion among the panelists held in front of the Service's decision support team, added to that list and modified it before agreeing to a list of the most important threats. Ranking of the relative importance of those threats occurred in two stages. First, each panelist was asked to anonymously rank the 19 threats from most to least significant. After an initial scoring by the experts occurred, the ranks were presented to the expert panel by a facilitator in front of the decision support team and the experts discussed why they ranked as they did. After this discussion the experts rescored the threats. The threats that moved to the top of the list are, in order, invasive species, infrastructure as related to energy development and urbanization, wildfire, agriculture, grazing, energy development, urbanization, strip/coal mining, weather, and pinyon-juniper expansion.

The threat ranking component of the structured process was important for three reasons: (1) It provided an informed, science based, ranking of the threats to the species, (2) the discussions that occurred in formulating the threat list and the discussions among the experts after their initial scoring played a critical role in helping the Service's decision support team understand the magnitude of a threat and the geographical scale at which a threat operated, and (3) it provided via the threat ranking and the discussion among experts, the foundation for the expert panel to conduct an extinction risk analysis.

The highest ranking threats exert their influence primarily through habitat loss. Thus, our structured analysis process revealed that at this time habitat loss appears to be the most important threat to the greater sage-grouse, a conclusion consistent with the available biological information and our 90-day finding.

It is clear there are various threats to the sagebrush steppe ecosystems upon which the greater sage-grouse depends. However, we are aware of no quantitative projections of extinction risk for the greater sage-grouse in the face of these rangewide, regional and local threats. This information gap is important because the Act's definitions of threatened and endangered are closely tied to risk of extinction. We therefore elicited quantitative estimates of time to extinction from the expert panelists. Besides their own expertise, the panelists prepared for estimating future risk by reading a wide variety of background materials, and they participated in two days of discussions of relevant sage-grouse life history attributes, threats (summarized above), the land ownerships and allocations, the regulatory setting and management challenges currently existing across the landscape, the size and distribution of the major sage-grouse population centers, and state by state indices of population status. After these deliberations, the expert panelists were asked to quantitatively express their beliefs about when the greater sage-grouse might go extinct.

Panelists expressed their beliefs about most likely time to extinction on score sheets where the future was broken down into the following time intervals: 1–20, 21–40, 41–60, 61–80, 81–100, 101–200 and more than 200 years. Panelists expressed biological uncertainty about the most likely time to extinction by spreading 100 points over the various time intervals. The experts were not uniform in their estimates of the most likely time to extinction although five of the seven panelists believed that the sage-grouse would not face extinction for at least 100 years. One panelist, for example, believed the most likely time to extinction is in the time period 61 to 80 years from present, one believed the most likely time is 81 to 100 years from present, 2 panelists believed the most likely time to extinction is in the period 101 to 200 years from present, 1 panelist split points equally between the 101 to 200 year and 200+ year categories, and 2 panelists believed the most likely time to extinction was in the 200+ year category. Most of the panelists, for example spread points over several time intervals, from a period less than 100 years in the future to the greater than 200 years category, expressing individual uncertainty about the most likely time to extinction. On one count the experts performed very uniformly; no points were allocated by any panelist for the two time intervals within 40 years of present.

In their deliberations about the most likely time to extinction, the experts engaged in wide-ranging discussions of future risk which included West Nile virus, management advances in addressing threats, the expectation that there will still be some vast areas of sagebrush habitat at least 100 years in the future, looking into the past to help predict the future, the difficulty of controlling invasive annual plants, the major native perennial grass communities and their resiliency in the eastern versus the western part of the range, the role and geographic extent of infrastructure development, role of population subdivision for population vulnerability, plant community oscillations, climate oscillations, limited role of predators, and the elusiveness of cause-effect relationships for sage-grouse population trends, especially the increases seen in the most recent sampling (1993 to 2003).

After the extinction risk estimate exercise was completed the experts were asked to describe data gaps that, if resolved, could reduce uncertainty in their scores or even change their estimates. This question generated a wide-ranging discussion of uncertainty and data gaps. In some cases research programs were proposed. Areas of uncertainty discussed by the experts included: systematic relationships among various grouse species; underlying mechanisms by which sage-grouse populations respond to habitat changes; how to scale grouse habitat preference up to the level at which federal land is managed; lack of studies across the range limits inferences; effects of invasive plants; application of grazing techniques to favor sagebrush habitat; underutilization of the case study approach for sage-grouse management; future gas and oil development impacts; future advances in horticulture and fire suppression; the role of crested wheatgrass in sagebrush management; and the effectiveness of CRP program. No attempt was made to rank the effects of these and other areas of uncertainty on the estimates of future risk.

This list of data gaps and uncertainties helps explain some of the biological uncertainty that limits our understanding of future risk to the greater sage-grouse. The Service, however, must make its decision about whether this species qualifies as threatened or endangered under the Act based on the best available scientific and commercial data, even if there is uncertainty. To help increase the chances of making an optimal decision about whether or not to list, the decision support team of senior Service biologists and managers (described above—*see* Status Review Process) participated in a structured analysis that included a discussion of the Act's statutory requirements, in particular the Act's definitions of threatened and endangered, and a review of the information from the risk analysis and all other compiled biological information. Finally they participated in an exercise where they compared the information about risk to sage-grouse, including explicit measures of uncertainty, against the statutory requirements of the Act. In this exercise, much like the extinction risk exercise described above, the decision support team was asked to express their beliefs about the optimal status category for the greater sage-grouse. The Act defines endangered and threatened as:

Endangered species means any species in danger of extinction throughout all or a significant portion of its range.

Threatened species means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range.

The basic question facing the decision support team was whether the factors influencing the greater sage-grouse and its habitat place it in danger of extinction or whether they are likely to cause it to become endangered in the foreseeable future. Estimates of extinction risk help address this question; however, neither general classification thresholds nor standardized criteria for establishing species-specific thresholds have yet been adopted for Service use.

The Service decision support team discussed the extinction risk threshold concept generally, and discussed previous Service applications. With regard to the foreseeable future, team members agreed by consensus that given all of the uncertainties, a reasonable timeframe for ''foreseeable future'' for the threatened definition is approximately 30 to 100 years (about 10 greater sage-grouse generations to 2 sagebrush habitat regeneration cycles). The decision support team reflected on the ''significant portion of the range'' term, and discussed previous applications by the Service. The team reviewed the findings of the risk analysis phase and found that while different threats are asserting themselves at different rates in different parts of the range, it is difficult to find major variation in risk over significant portions of the range. Discussions by the expert panel in the risk analysis phase indicated that if the species continues to decline, the most likely scenario would include some combination of losses around the edges of some portions of the range, some localized losses and fragmentation of larger core areas, but these projected losses are geographically unknown at this time and difficult to predict. Thus, in the absence of major geographical variation in projected extinction risk, or any measure of the spatial extent or location of projected future losses, it was decided by consensus that there was not a significant portion of the range in which threats to sage-grouse are greater than range-wide threats.

To help further inform the Service's finding, the decision support team's final exercise assessed their beliefs about what the appropriate petition finding should be: not-warranted, threatened, or endangered. The team had read the compiled background materials, observed the two-day risk assessment discussions of the expert panelists, which included explicit measures of uncertainty, and participated in general and specific discussions about the application of the Act's definitions of the threatened and endangered categories.

None of the decision support team assigned any of their 100 points to the endangered category; however, all decision support team members placed some of their points in the threatened category. The average number of points assigned to the not-warranted and threatened categories were, respectively, 74 (range 50–85) and 26 (range 15–50). The fact that all decision support team members placed some of their points in the threatened category reflects a degree of biological uncertainty associated with making scientific decisions. Nevertheless, the ''not warranted'' finding was based on the best scientific and commercial information available at the time of their recommendation.

The best available scientific and commercial information, as summarized within this finding and in the Conservation Assessment of Greater Sage-Grouse and Sagebrush Habitats prepared by WAFWA, clearly reflect that there are a myriad of changes occurring within the sagebrush ecosystem that can impact sage-grouse. Our structured analysis process not only confirmed that many of these changes are indeed threats to the sage-grouse but it clarified the relative importance of these threats at different geographical scales which is an important factor when making a listing determination of such a widely dispersed species. The results reflect the opinion of the expert panelists that some threats are clearly important across the range of the sage-grouse while others are important on a regional scale.

In determining that the greater sage-grouse does not warrant protection under the Act, the Service biologists and managers who participated in the structured analysis process acknowledged that there are real threats to the sage-grouse and its habitat. However, in formulating their recommendation, these biologists and managers noted that there is uncertainty in how these threats will impact the grouse in the future and that there were reasons to be encouraged by current assessments of grouse population status, trends and distribution.

The higher ranking threats, while rangewide and regional in scale, are to a large degree prospective in nature (*e.g.*, invasive species, infrastructure, wildfire, oil and gas development and conifer invasion). Neither the Service nor the expert panelists could predict how these threats will develop over time or interact with each other or with different less important threats to accelerate habitat loss or other impacts to the grouse. This uncertainty was explicitly noted by several of the Service biologists and managers as part of the reason for a not-warranted recommendation. The Act requires the Service to make a decision based on what is known at the time of listing. However, most Service biologists and managers on the decision support team also noted the future health of both the sagebrush system and the sage-grouse would depend on how the threats are expressed and how managers responded to them in the next 5 to 20 years. This uncertainty about the future impact of the threats to sage-grouse may also be reflected in why some experts projected sage-grouse extinction risk at 60 years while others felt that beyond 200 years was more realistic.

It is clear that the number of greater sage-grouse rangewide has declined from historically high levels, with well documented declines between 1960 and 1985. However, the most recent data reflect that overall declines have slowed, stabilized or populations have increased. These data and the fact that 92% of the known active leks occur in 10 core populations across 8 western states, and that 5 of these populations ''were so large and expansive that they were subdivided into 24 subpopulations to facilitate analysis'' (Connelly *et al.* 2004: page 13–4), was cited by managers on the decision support team as part of the reason for their not warranted recommendation.

Although the decision support team referenced the prospective nature of the higher ranking threats in reaching their recommendation, they also acknowledged and considered the fact that these threats were currently occurring at some level across the range of the sage-grouse or in smaller regions within the range. However, because of the relatively long projected risk of extinction, in many cases greater than 200 years, which was minimally 100 years beyond the foreseeable future the Service considered in this case, combined with considering the variety of sources of information generated for and during the risk analysis phase, including the expert panel deliberations and the Conservation Assessment from WAFWA, the decision support team found that the levels of these existing threats, although very real, when considered against the status, trends and distribution of the current population, were not sufficient to result in the greater sage-grouse becoming an endangered species in the next 40 to 100 years.

Other factors cited by the managers as most important for their beliefs about the appropriate listing category included, the large size of the current range, the slow pace with which some of the threat factors are exerting themselves, synergistic effects between threats, large blocks of existing sagebrush habitat, expected range contractions, relative stability of core population areas, expected increases in infrastructure development in areas that currently have little or none, expected population losses to increase the impact of stochastic events, resiliency of sagebrush habitats to some threats, recent sage-grouse population trends as stable or increasing, and some evidence of positive changes on the sagebrush landscape.

Factors contributing most to uncertainty among the decision support team members included the prospective nature of some of the threats, uncertainty about how pending threats will be managed, and uncertainty about how and if leks can persist in the presence of disturbances.

Since the publication of our 90-day finding we have compiled additional materials and information on the greater sage grouse. We believe we have a fairly complete compilation of the existing relevant information and much of it is summarized above. We also convened a panel of experts and conducted a structured analysis of risk. A decision support team of Service biologists and managers read selected background materials and observed the deliberations of the expert panel. To further inform the Service's final petition response, the decision support team participated in a structured analysis of the optimal listing category where they assessed whether the greater sage grouse qualifies as threatened or endangered. After considering the compiled information, the risk assessment, the applicable conservation actions, and the assessment of the decision support team, we find that the petitioned actions are not warranted at this time.

We will continue to monitor the status of the greater sage-grouse and sagebrush ecosystems, and to accept additional information and comments from all governmental agencies, the scientific community, industry, or any other interested party concerning this finding.

References

A complete list of references used in the preparation of this finding is available upon request from the Wyoming Field Office (see **ADDRESSES** section).

Author

The primary author of this document is Wyoming Field Office, U.S. Fish and Wildlife Service, Cheyenne, Wyoming (see **ADDRESSES** section).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Dated: January 6, 2005.

Steve Williams,

Director, U.S. Fish and Wildlife Service.

[FR Doc. 05–583 Filed 1–10–05; 8:45 am]

BILLING CODE 4310–55–C

APPENDIX E

WESTERN SHRUB AND GRASSLAND SCIENCE INFORMATION AND MANAGEMENT CONSORTIUM

Proposal

APPENDIX E

Proposal for a Cooperative Agreement
To Establish a Western Shrub and Grassland
Science Information and Management Consortium

June 2005

Executive Summary

The sagebrush biome and associated wildlife species in the western United States and Canada are currently the focus of intensive management efforts. Numerous groups have been established at all levels of government to address conservation and restoration issues. In some cases, these groups have mandates that appear to overlap – a circumstance that may result in redundant efforts and inefficient allocation of resources. There is a clear need for improved communication, coordination, and consultation among these various stakeholders.

This proposal is to establish a cooperative agreement among the participants involved in the expanded Memorandum of Understanding (MOU) to implement a Western Shrub and Grassland Science Information and Management Consortium (WSGSIMC or Consortium). The purpose of the MOU is to provide for cooperation among the participating State and Federal management and science agencies in the development and implementation of conservation programs for the sagebrush biome and associated wildlife in the western United States.

The Consortium is designed to empower Local Working Groups with current information, validated science, and conservation tools in order to aid in the conservation and management of the sagebrush biome and associated wildlife. The proposed Consortium would consist of a National Service Team, Regional Coordinators, State Coordinators, and Local Working Groups to develop a network of science repositories, experts, lessons learned, training opportunities, and stable funding sources. The primary function of the Consortium is to help Local Working Groups in the design and development of projects, training, implementation activities, research, monitoring and adaptive management.

The proposed implementation of the Consortium is a four-phased approach. Phase I establishes the National Service Team. In Phase II, the major components of the Consortium will be implemented through a pilot project to be conducted in two eco-regions. The goal of this pilot project will be to establish functionality of the Consortium at a small scale to meet Local Working Group needs. Phase III will build on the success of the pilot project and expand the efforts of the Consortium to all western United States and Canadian Provinces within the sagebrush biome. The National Service Team will be expanded in Phase IV to further assist Local Working Groups, State Coordinators, and Regional Coordinators across the sagebrush biome. The conclusion of this phase will result in a fully functional Consortium that meets all identified customer needs.

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I. Introduction

The sagebrush biome and associated wildlife species in the western United States and Canada are currently the focus of intensive management efforts. The Greater sage-grouse (*Centrocercus urophasianus urophasianus*), Gunnison sage-grouse (*Centrocercus minimus*), Columbian sharp-tailed grouse (*Tympanuchus phasianellus columbianus*) and pygmy rabbits (*Brachylagus idahoensis*) are all species that have been petitioned for protection under the provisions of the Endangered Species Act or are Candidate Species. The individual States of the Western Association of Fish and Wildlife Agencies (WAFWA), United States Department of Interior - Bureau of Land Management (BLM), United States Department of Agriculture - Forest Service (FS), and United States Department of Interior - Fish and Wildlife Service (FWS) have invested large sums of money and resources in the development of conservation efforts for these species. These efforts have been undertaken by more than 70 Local Working Groups throughout 11 Western States that are composed of local resource professionals, industry, tribes, conservation representatives, and citizens. These groups of conservationists use a variety of input to formulate their recommended management actions.

II. Purpose and Need

This document proposes to establish a cooperative agreement to implement a Western Shrub and Grassland Science Information and Management Consortium (WSGSIMC or Consortium). This proposal is intended to be consistent with the terms and conditions of the MOU signed in 2000 and to meet the needs expressed by the Local Working Groups and representatives of the Framework Team. The signatories of the 2000 MOU include the Western Association of Fish and Wildlife Agencies, United States Department of Agriculture - Forest Service, United States Department of Interior - Bureau of Land Management, and the United States Department of Interior - Fish and Wildlife Service. A proposed revision of the MOU would add the United States Department of the Interior - Geological Survey (USGS), and United States Department of Agriculture - Natural Resource Conservation Service (NRCS) (hereafter known as the Parties).

A. Needs Identified in the Memorandum of Understanding

The purpose of the 2000 MOU was to provide for cooperation among the participating State and Federal management and science agencies in the development and implementation of conservation programs for the sagebrush biome and associated wildlife in the western United States. In the MOU, the Parties agreed that cooperative efforts among the Parties, consistent with the applicable statutory requirements, are necessary to conserve and manage the Nation's sagebrush ecosystems for the benefit of sage-grouse and all other sagebrush-dependent species.

The original MOU and proposed revisions have identified the following objectives:

Applicable MOU Objectives:

- Identify the effects of major land uses on sage-grouse and other sagebrush obligate species, and determine the primary causes for declines in abundance and distribution of sage-grouse and other sagebrush-dependent species.
- Develop monitoring and evaluation strategies, as agreed by the signing organizations, to further understanding of sage grouse and sagebrush systems and to evaluate the success or management actions and conservation strategies.

- Develop a range-wide conservation framework to provide for cooperation and integration in the development of conservation plans to address conservation needs across geographic scales, as appropriate.
- Develop partnerships among agencies, organizations, Tribes, communities, individuals, and private landowners to cooperatively accomplish the preceding objective.
- Ensure that all products resulting from this MOU reflect the best available science and have received independent, scientific peer review.

The MOU calls for convening Local Working Groups to develop State or local conservation plans. The Parties agree to collect, analyze, and distribute sage-grouse population and habitat data to the [Local] working groups for conservation planning. The Parties further agree to work together to identify research needs and strategies; conduct joint assessments, monitoring and research; and to provide technical and management information to end users in support of the development, implementation, and evaluation of State and local sage-grouse conservation plans.

B. Needs Identified by Local Working Groups

At the *National Conference for Sage-grouse Local Working Groups* held on February 11th and 12th, 2005 in Reno, Nevada, the primary conference objective was to empower Local Working Groups with current information, validated science, and conservation tools. The following narrative is excerpted from the Conference Final Report - (www.westgov.org/wga/initiatives/grouse/FinalReport.pdf):

1. Support for Local Working Groups: The Local Working Groups expressed a need to be empowered to be able to take action and are still looking for support, commitment, and buy-in by State and Federal agencies. They would like to see a teamwork approach by the agencies in which scientists serve as advisors to the Local Working Groups. Finally, the Local Working Groups need process support for facilitation, recording, and other process management functions which creates an ongoing need for base funding.

2. Funding Issues: The need for adequate funding was a general theme of most discussions. The Local Working Group members would like to see long-term funding commitments that include the flexibility needed for implementation and associated monitoring of their actions.

3. Habitat Protection: The Local Working Groups would like more information on the effects on sage-grouse of land uses such as grazing and recreation and all types of development including urban sprawl, energy, and others. They would like to see Local Working Groups become more involved in long-range planning at the County and State level.

4. Science Issues: There is a consensus among the Local Working Group members that science is a key to their transitioning from planning to implementation. There is a need for data collection protocol for range-wide issues. Some general topics that Local Working Groups need more information about include the effects of West Nile Virus and other diseases, the importance of forbs and insects in the sage-grouse life cycle, population dynamics, issues related to survival of the birds during the first 2 years when success is low, the effects of hunting and predation, the effects of grazing management, and best management practices for Juniper (*Juniperus* spp.) control and removal. They also expressed a need for an easily accessible repository for research and conservation results. This repository would contain examples of practices and projects that have successfully influenced sage-grouse populations (e.g., the Deseret Land and Livestock Ranch project).

5. Implementation: A repeated request heard from the Local Working Groups was that they would like "success" defined. They would like to know when a Local Working Group has been successful or a project is determined to be a success. They requested assistance from the agencies to develop a system to prioritize projects. This system would prioritize implementation of Local Working Group planned, regional, and range-wide projects to maximize positive effects on sage-grouse populations. The regional and range-wide coordination will be especially critical during implementation and monitoring. The Local Working Group members believe that creative approaches were needed to get things done and that waiting for <u>all</u> the science answers was not acceptable. To support requests for funding, project implementation should be connected to and monitored for consequential sage-grouse increases. This use of adaptive administration techniques will help the Consortium decide which projects to continue to fund based on demonstrable sage-grouse population increases. Further breakdown of political boundaries and more cooperative projects across those lines need to occur for the conservation effort to be successful.

Local Working Groups recommend that:

1) The States conduct an annual (or biennial) State or, preferably, regional workshop or conference for their Local Working Groups to meet, communicate, and network so that the States can provide current information, validated science, and new conservation tools.
2) One of the partners host a range-wide conference at least every 3 years to ensure cooperation and information exchange across political boundaries. An alternative would be for an active Local Working Group or Region to host the conference but the partners' staff would complete the details and tasks of putting on the conference.
3) **WAFWA facilitates the development of a clearinghouse for research and monitoring data and information, identification and funding of priority projects, the documentation and evaluation of best management practices, and project implementation stories that Local Working Groups can easily access (emphasis added).**
4) The Western Governors Association works closely with the Governors' offices to assist them in being advocates for the Local Working Groups. The proposed Sagebrush Conservation Council should provide a direct link to the Governors for the Local Working Group members and other agencies.
5) **A group be established to work with the State and Federal agencies on how best to provide funding to implement the Local Working Group planned projects based on local and range-wide priorities (emphasis added).**
6) All the agencies and non-government groups establish and maintain the sage-grouse conservation effort as a priority.

C. Needs Identified by Representatives of the Framework Team and Other Agencies

The following assistance categories were identified by representatives of the WAFWA Framework Team and representatives of the Parties to the MOU at a meeting held in December 2004. The identified categories reflect a range of general requirements that have been communicated by Local Working Groups since the initiation of the MOU in 2000.

1. Training and Instruction:

One of the primary services requested by Local Working Groups is training and instruction in all aspects of sagebrush biome conservation and management. The Working Groups have requested assistance in implementing workshops, classroom and web-based instruction, technical publications, and informal consultation services. The Groups request that instruction and guidance be furnished by recognized experts who will have access to the most reliable and credible information available.

2. Information Management:

The Working Groups have indicated that there is a need for a network to facilitate interaction among stakeholders that will serve as a conduit for the expedited flow of credible and reliable information. Information management activities should include collecting, organizing, archiving, synthesizing, and disseminating of all forms of information needed to support effective decision-making and adaptive management.

Information collected should be maintained in a clearinghouse that will adhere to a minimum set of quality standards as defined by the Data Quality Act and will be made available to stakeholders on a near-real time basis. The clearinghouse should serve as a repository for a wide range of information including lessons learned, research, legal opinions and a registry of scientific and technical expertise.

The Working Groups also requested an organization to broker data analysis services for the purpose of developing a sagebrush biome-related knowledge base and documenting, publishing, and disseminating results. Ultimately, the information contained within the database may be published in the form of technical documents and the lessons learned repository would contribute to a frequently asked questions (FAQ) capability on the internet.

3. Access to Expertise:

Another service requested by Local Working Groups is ready access to pertinent expertise. The groups have indicated a need for a process to identify and maintain a registry of individuals or organizations having a depth of experience or knowledge that can be brought to bear on all manner of management issues. The Framework Team has also identified a requirement to reduce the current demand on existing expertise to a manageable level. An important category of expertise relates to the cultural history and unique conservation perspective of Native Americans.

4. Funding and Administrative Support:

The stakeholders have identified a need to document sources of short- and long-term funding and support for western sagebrush biome conservation and management. These resources will be used to acquire and maintain facilities and equipment for research and demonstration projects. Funding may also be used for logistical support including acquiring hardware, software, and information systems. Agencies, non-government organizations, and Congress should be solicited to contribute funding to support new or existing projects.

5. Strategic Planning:

The groups also recognize the need for strategic planning to facilitate networking and the formation of partnerships, including access to decision-makers. Strategic planning is also needed to identify research needs and stakeholder capabilities. The identified needs and capabilities must be managed in such a way as to efficiently conduct the research and demonstrate management practices on priority sites.

III. Objectives

At the present time, stakeholders associated with the sagebrush biome are estimated to be spending tens of millions of dollars per year on conservation and restoration efforts. Numerous groups have been established at all levels of government to address conservation and restoration issues. In some cases, these groups have mandates that appear to overlap – a circumstance that may result in redundant efforts and inefficient allocation of resources. There is a clear need for improved communication, coordination, and consultation among these various stakeholders. The Western Shrub and Grassland Science Information and Management Consortium is proposed to meet this need.

The Consortium is designed to empower Local Working Groups with current information, validated science, and conservation tools to aid in the conservation and management of the sagebrush biome and associated wildlife. The proposed Consortium would consist of a National Service Team, Regional Coordinators, State Coordinators, and Local Working Groups to develop a network of science repositories, experts, lessons learned, training opportunities, and stable funding sources. The primary function of the Consortium is to help Local Working Groups with the design and development of projects, training, implementation activities, research, monitoring, and the application of adaptive management techniques.

The mission of the proposed Consortium is to provide credible and reliable scientific information and technical assistance that will facilitate the conservation and management of the sagebrush biome by individuals, organizations, industry, and government. Established under the auspices of WAFWA, the Consortium's principal role will be to coordinate the wide range of wildlife habitat conservation and restoration activities now occurring across the West. Once it becomes fully operational, the Consortium is expected to significantly improve the efficiency and effectiveness of sagebrush biome conservation efforts. By maximizing the effect of these efforts, the Consortium can help to restore and maintain the health of the sagebrush biome ecosystem and the viability of the species that depend upon it.

The Consortium will meet Local Working Group needs by providing a framework in which, as necessary and appropriate, Local Working Group needs are analyzed, validated, and coordinated on State and regional levels. The Consortium will address the differing needs of Local Working Groups to help them work more effectively together. Local Working Groups will have ready access to a wide range of expertise including wildlife; sagebrush habitat; human dimensions; information technology; range management and ecology; geology, mining, petroleum; and soil science. The Consortium will assist Local Working Groups in obtaining a stable, equitable stream of funding to implement and monitor Local Working Group projects, and will assist Local Working Groups in the development of conservation plans that reflect their contribution to range-wide conservation efforts. Training will be coordinated on local, State, and regional levels to provide Local Working Groups with the best available science and the knowledge to accomplish established goals.

The Consortium will collaborate with existing and proposed entities to accomplish goals. For example, the Western Governors' Association's Sagebrush Conservation Council (SCC) was established by the Western Governors' Association on June 13, 2005 (see http://www.westgov.org/wga/initiatives/grouse/Sagebrush-Council-Agreement.pdf). The purpose of the SCC is to 1) ensure continued progress of the efforts at the federal, State, and local level to conserve sagebrush habitats and the sage grouse across its range and 2) provide support for other conservation initiatives within the sagebrush ecosystem. The SCC may be able to work with the Consortium to secure funding and coordinate efforts among parties associated with sagebrush management.

A. Organizational Model

The Consortium would be patterned after the interagency Riparian Coordination Network (RCN) that has been functioning successfully for several years. The RCN was formed as part of a strategy adopted by the BLM, the USFS, and subsequently, the NRCS, as a principal partner, in 1996 and amended in 2002 (RCN 2002).

The foundation of the RCN model is the recognition of 1) agreed upon qualitative and standardized "proper functioning condition" assessment parameters, and 2) the need to manage at the landscape scale. When standardized physical functionality parameters are identified, people learn to understand and speak about the situation using common terms, definitions, and concepts. This common language enables diverse stakeholders and subject matter experts to consistently interpret the effectiveness of management activities and identify critical ecosystem sustainability requirements as a team. The results of physical functionality assessments can be used to design focused monitoring strategies and to select credible stewardship activities. The results enable informed investment choices, individual and organizational accountability, and timely prioritization and commitment of resources.

B. Consortium Capabilities

There are many entities engaged in sagebrush conservation efforts including Federal, State, local, and international agencies; Tribes; private industry; non-governmental organizations; universities; and, private landowners. One of the first steps in establishing the Consortium will be to conduct a structured inventory of capabilities to effectively map identified Local Working Group needs to known capabilities. As capabilities are identified, the Consortium will coordinate with Local Working Groups to recommend solutions to meet those needs.

A clear knowledge of capabilities will help the Consortium identify gaps between the Local Working Group needs and available resources. This knowledge may be used to direct research to satisfy unmet needs and to restructure existing capabilities to more effectively satisfy expressed needs.

The Consortium will seek to maximize the use of existing resources to avoid duplication of efforts, achieve economies of scale, and best utilize the resources available within the Consortium. Specific examples of existing resources include the USGS National Biological Information Infrastructure (NBII); data portals such as the Sagebrush and Grassland Ecosystem Map Assessment Project (SAGEMAP); Cooperative Ecosystem Studies Units (CESUs), USGS

Cooperative Research Units, and other existing databases, partnerships, and networks. Other examples include state-of-the-art training facilities maintained by Federal agencies such as the USFWS, the BLM, and NPS.

It is proposed that inventories of existing or proposed stakeholder capabilities be conducted in parallel with a user needs analysis described in the following section. It is currently envisioned that the capabilities inventories and the user needs analysis will be completed at about the same time which will allow the development of a matrix to match identified user needs with corresponding capabilities to meet those needs.

IV. Actions

A. Prepare a User Needs Analysis

1. Scope

The initial action recommended to be undertaken (prior to the establishment of a National Service Team - Phase I) involves the preparation of a comprehensive, accurate, and statistically valid assessment of stakeholder needs (also known as a user needs analysis). Although a great deal of anecdotal user need information is available from a variety of sources, it is critical to the success of the Consortium that an accurate assessment of user needs be performed. This assessment is particularly important in establishing the Consortium's organizational objectives, matching stakeholder capabilities with priority requirements, and creating a baseline for future adaptive administration strategies. Approval and funding will be requested at the WAFWA Summer 2005 meeting to initiate a user needs analysis of the Local Working Groups.

The specific objectives of the user needs assessment are to:

1. Gather additional information to accurately quantify stakeholder needs
2. Establish a baseline for assessing customer satisfaction and organizational effectiveness
3. Identify stakeholder priorities
4. Provide information to providers on how to focus their efforts and modify their current capabilities
5. Determine if all of the existing Local Working Group priority needs have been captured
6. Develop a matrix that will be used to compare stakeholder needs with provider capabilities

A survey instrument is proposed that will be administered to all local working group members (and possibly other major stakeholders). The instrument is proposed to be developed with the assistance of the USGS and will be administered under the auspices of WAFWA.

If the proposal is approved at the July 2005 WAFWA meeting, work will begin on developing, administering, and evaluating the user needs assessment. The first step in the survey process will involve the assessment of existing documentation. Next, a limited number of focus group sessions will be conducted with managers and a selected sampling of Local Working Group members. The purpose of the focus groups is to narrow the potential range of questions to a manageable number (18-22) that would take no more than 20–30 minutes to answer.

The survey could be administered as early as February 2006 with a final analysis being completed in April or May 2006. Currently, an internet-enabled instrument is being considered that would be made available to all Local Working Group members and other major stakeholders. It is anticipated that the survey would be made available to a total of between 1,400 and 2,000 respondents.

2. Schedule:

Milestone Date	Milestone Description
July 2005	Discuss survey proposal at the WAFWA meeting in Alberta and request approval to proceed
August 2005	Begin survey design and initiate OMB approval process
September 2005	Perform focus group interviews
January 2006	Discuss survey implementation progress at the WAFWA Winter meeting
February 2006	Distribute survey instrument
May 2006	Complete user needs analysis
July 2006	Present results to WAFWA summer meeting

B. Phase I: Implement a National Service Team

1. Scope:

The first phase of this proposal involves establishing two organizational components. The first component is an Executive Oversight Board (EOB) composed of the signatories to the MOU. The EOB would be chartered under the auspices of the MOU and would be responsible for executive oversight of the Consortium and managing agency commitment. A detailed description of the Board functions is contained in Section V, Roles and Responsibilities.

The second component to be established is a National Service Team (NST). The primary function of this team is to provide science and management information that assists and enables conservation efforts as envisioned by the EOB and guided by the Framework Team (FT). Administrative support will be provided through the services of a Team Leader and Program Coordinator. Technical subject matter expertise (Phase 1: Wildlife; Plants and Habitat; Human Dimensions; Information Management with additional expertise in later phases) will be leveraged across agencies and regions to address the needs of the conservation effort. The responsibilities of NST include developing strategies relating to training, information delivery, research, and funding. The NST will annually report to the FT progress to achieve conservation goals and emerging needs.

An alternative proposal is to reduce the initial cost of this phase by consolidating the National Service Team functions within the construct of the WAFWA Framework Team. This alternative would support 2-3 full-time positions (reduces budget by ~$300K in Phase I) and would encourage the formation of Working Groups within the context of the Framework Team to address major topical issues as they emerge. A fully functional NST could be established at a later time as a separate empowered entity if necessary.

2. Schedule:

Milestone Date	Milestone Description
January 2006	Discuss proposal at the WAFWA Winter Meeting
January 2006	Approve concept and begin implementation of Phase I
July 2006	Achieve initial operating capability
September 2006	Complete formal evaluation of Phase I
September 2006	Present Phase I results to the Framework Team

3. Budget:

In Phase I, the National Service Team is proposed to be constituted as a "virtual" team without a physical office location. Each of the team members would continue to be housed by their respective organizations with space and utility costs being covered by their agency. In the future, as the roles and responsibilities of the team change, the need for physical office space can be reexamined.

It is also anticipated that, at the start of Phase I, the subject matter expertise (SME) will be provided by the Parties to the MOU and other stakeholders. There will probably be at least four individual SMEs providing support to the team although, in reality' there will probably be many individuals contributing on a part time basis. It is proposed that funding for the SMEs will be provided by the agencies that currently employ them and that support for the NST will represent an ancillary duty of their position.

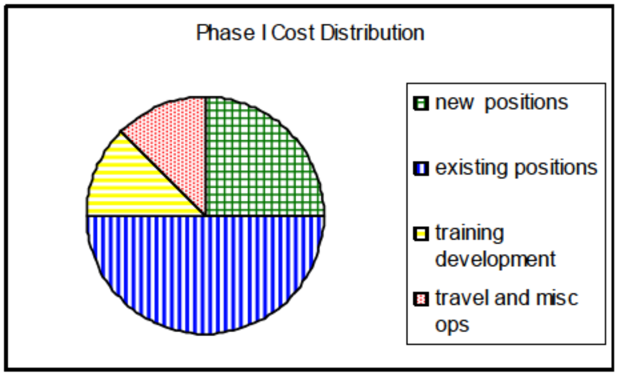
Funding for the team leadership and program administration positions would initially be provided by the agencies that employ them. Future funding of positions could be provided through the Consortium budget's base funding. It is anticipated that the principal sources of base funding will be contributions from the Parties to the MOU, from industry, and from non-government organizations and the public at large. In many cases, these will be in-kind contributions in the form of labor or other services provided in lieu of actual dollars.

Budget Element	Estimated Cost (Annual)
Labor Costs (Calendar Year 2006)	
Subject Matter Expertise (equivalent to 4 FTE)	~ $400,000 (existing positions) (salary and benefits)
Program Administration	~ $100,000 (new position) (salary and benefits)
Team Leadership	~ $100,000 (new position) (salary and benefits)
Subtotal	~ $600,000
Operations Costs (Phase I only)	
Travel / Supplies / Equipment	~ $100,000
Training Strategy Development	~ $100,000
Subtotal	~ $200,000
Grand Total: Phase I	~ $800,000

- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Labor costs reflect the total costs for calendar year (CY) 2006 and will be adjusted downward if Phase II is not implemented.

- Operations costs shown in the preceding table are approximate and reflect only activities associated with implementing Phase I.
- Operations costs would be assessed against contributions provided by the MOU signatories and other sources (e.g., SCC, industry).
- The development of a training strategy will probably involve the issuance of contracts.

Figure 1. Distribution of Phase I Costs.



Budget Element	Estimated Cost
new positions	~ $200,000
existing positions	~ $400,000
training development	~ $100,000
travel and miscellaneous operations	~ $100,000
Total: Phase I	**~ $800,000**

C. Phase II: Perform a Pilot Demonstration Project

1. Scope:

In Phase II, all of the organizational components of the Consortium will be implemented in two ecoregions. The goal of this pilot project is to establish a scaled-down initial operating capability and to ensure that the proposed organization meets Local Working Group needs.

a. Project Implementation

The pilot project will take place in four States spanning two ecoregions. Colorado and Wyoming will compose the Wyoming Basin Region, and Nevada and Idaho will represent the Great Basin Region. These four States have been selected because of the diversity of issues affecting the sagebrush biome within each State and across the regions. For example, the development of oil and gas development has a major effect on wildlife habitat within the Wyoming Basin, and the spread of cheatgrass *(Bromus tectorum L.)* is a major threat to wildlife habitat within the Great Basin.

The budget for the National Service Team will include $50,000 per State to be allocated toward planning, implementation, and monitoring of conservation actions and the employment of adaptive management principles.

Multiple States were selected in each ecoregion to explore coordination issues between States. Regional Coordinators will help State and Local Working Groups communicate across State boundaries and collaborate with each other to address common problems. The Regional Coordinators will elevate State and local needs to the National Service Team. The Regional

Coordinators will also facilitate training. For the pilot, two Regional Coordinator positions will be staffed by people already in place within agencies that are signatories to the MOU.

The State Coordinators will be responsible for assisting Local Working Groups with implementing conservation plans, providing training (or elevating training needs to Regional Coordinators), and collaborating between Local Working Groups, as necessary. The State Coordinator positions will be staffed by people already in place within agencies that are signatories to the MOU.

Six Local Working Groups from the four States will be selected to participate in the Consortium. The level of Group functionality and conservation plan development will range from fully functional groups with completed conservation plans to semi-functional Groups with undeveloped plans. The Local Working Groups within each ecoregion will be located near State lines in order to encourage partnership across State borders. The Local Working Groups will be provided funding to build conservation plans and implement projects described within those plans.

The Framework Team should use the results of this pilot to establish a review and evaluation process for the selection of projects to be addressed by the Local Working Groups and the evaluation of project results. It is important that local projects be well documented; reflect the best available science; and be evaluated to yield best management practices.

b. Measurement of Results

Each project will include an evaluation of results. Guidelines for project evaluation will be developed by the National Service Team (or Framework Team) and will be incorporated and implemented by Local Working Group projects. A post-assessment survey will be distributed to all Local Working Groups to gauge the success of the pilot project. The six Local Working Groups involved in the pilot project will also be interviewed to record their views and perceptions. Results of the six Local Working Groups involved in the pilot will be compared to those of the other working groups to evaluate achievements of the pilot project Working Groups and to promote the synthesis of results across the range.

Local Working Group progress will be continuously monitored by the National Service Team during the pilot. The Local Working Groups will evaluate their resources, monitor their projects, and modify strategies accordingly. The functionality of the State Coordinators, Regional Coordinators, and National Service Team will be examined both during the pilot project and after its completion. Survey results and recommendations from all parties involved will be used to subsequently tailor the Consortium to effectively meet Local Working Group needs.

2. Schedule:

Milestone Date	Milestone Description
September 2006	Begin implementation of Phase II
April 2007	Complete Phase II Pilot Project
May 2007	Evaluate Phase II
July 2007	Present results of Phase II at the WAFWA Summer Meeting

3. Budget:

National Service Team	
Labor Costs (Calendar Year 2007)	
Subject Matter Expertise (equivalent to 4 FTE)	~ $400,000 (existing positions) (salary and benefits)
Program Administration	~ $100,000 (salary and benefits)
Team Leadership	~ $100,000 (salary and benefits)
Subtotal	~ $600,000
Operations Costs (Phase II only)	
Training / Workshops	~ $50,000
Research Projects / Consultant Contracts (4 States @ $50K per State)	~ $200,000
Subtotal	~ $250,000
Grand Total: Phase II	~ $850,000

- Funding for National Service Team positions reflects the approximate total costs associated with calendar year (CY) 2007 and will be adjusted downward if Phase III is not implemented.
- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Operations costs shown in the preceding table reflect only activities associated with implementing Phase II.
- Research Project funding will be distributed by Regional and State Coordinators to Local Working Groups to facilitate on-the-ground activities.

Regional Coordinators	
Labor Costs (Calendar Year 2007)	
2 Coordinators (each FTE @ $100K per year)	~ $200,000
Subtotal	~ $200,000
Operations Costs (Phase II only)	
Travel / Supplies / Equipment ($10K per Coordinator)	~ $20,000
Subtotal	~ $20,000
Grand Total: Phase II	~ $220,000

- Labor costs reflect the total cost for 4 months of CY 2006 and all of CY 2007 and will be adjusted downward if Phase III is not implemented.
- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Operations costs shown in the preceding table reflect only activities associated with implementing Phase II.

State Coordinators	
Labor Cost (Calendar Year 2007)	
Subject Matter Expertise (equivalent to 0.5 FTE for each participating state)	~ $200,000
Subtotal	~ $200,000

Operations Costs (Phase II only)	
Travel / Supplies / Equipment ($10K per Coordinator)	~ $40,000
Subtotal	~ $40,000
Grand Total: Phase II	~ $240,000

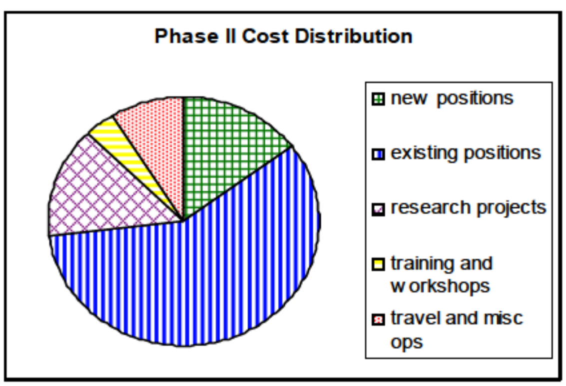
- Labor costs reflect the total cost for 4 months of CY 2006 and all of CY 2007 and will be adjusted downward if Phase III is not implemented.
- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Labor costs for state coordinators could be covered by current employer.
- Operations costs shown in the preceding table reflect only activities associated with implementing Phase II.

Local Working Groups	
Operations Costs (Phase II only)	
Travel / Operations ($10K per group)	~ $60,000
Subtotal	~ $60,000
Grand Total: Phase II	~ $60,000

Table of Summary Costs for All Organizational Levels for Phase II.

National Service Team	~ $850,000
Regional Coordinators	~ $220,000
State Coordinators	~ $240,000
Local Working Groups	~ $60,000
Grand Total: Phase II	~ $1.37 Million

Figure 2. Distribution of Phase II Costs.



Budget Element	Estimated Cost
new positions	~ $200,000
existing positions	~ $800,000
research projects	~ $200,000
training and workshops	~ $50,000
travel and miscellaneous operations	~ $120,000
Total: Phase II	**~$1,370,000**

D. Phase III: Expansion of Capabilities

1. Scope:

The third phase of the proposal will build on the success of the pilot project and expand the efforts of the Consortium to all western United States and Canadian Provinces within the sagebrush biome. Survey results and recommendations from all parties involved in the pilot project will be used in an adaptive management framework to tailor the Consortium to effectively meet Local Working Group needs. This phase will involve support for a total of 7 Regional Coordinators, 11 State, and 2 Provincial Coordinator positions.

a. Project Implementation:

Regional Coordinators will aid State and Local Working Groups in communicating across State boundaries and collaborating to address common problems. Regional Coordinators will identify resources pertinent to the ecoregion and aid State Coordinators and Local Working Groups in obtaining information, training, and additional funding. Five additional Regional Coordinator positions will be established in Phase III.

State Coordinators will be responsible for assisting Local Working Groups with the implementation of conservation plans, providing training (or elevating training needs to Regional Coordinators and the National Service Team), and coordinating Local Working Groups on a State basis. They will aid in technology transfer to distribute information to Local Working Groups. The State Coordinators will attend Local Working Group meetings and assist with project designs. They will also be responsible for obtaining additional funding to support the Local Working Groups. State Coordinators will report progress to State political entities, as requested. The four State Coordinator positions that were created in Phase II will be maintained, and seven additional State and two Provincial coordinators will be established in Phase III.

b. Measurement of Results:

Local Working Group progress will be continuously monitored. The functionality of the State Coordinators, Regional Coordinators, and National Service Team will be assessed through administrative accountability. Progress will be documented to show how money is spent. Local working groups will identify the amount of funding received through the Consortium and other sources and how the money was used. Adaptive administration of both the Consortium efforts and on-the-ground projects will be used to continually aid Local Working Groups.

2. Schedule:

Milestone Date	Milestone Description
August 2007	Implement Phase III
April 2008	Complete Phase III
May 2008	Evaluate Phase III
July 2008	Present Phase III results at the WAFWA Summer Meeting

3. Budget:

National Service Team	
Labor Costs (Calendar Year 2008)	
Subject Matter Expertise (equivalent to 4 FTE)	~ $400,000 (salary and benefits)
Program Administration	~ $100,000 (salary and benefits)
Team Leadership	~ $100,000 (salary and benefits)
Subtotal	~ $600,000
Operations Costs (Phase III only)	
Travel / Operations / Equipment	~ $100,000
Training / Workshops	~ $100,000
Research Projects / Consultant Contracts (13 States/Provinces @ $100K each)	$~ 1,300,000
Subtotal	~ $1,500,000
Grand Total Proposed Budget for the National Service Team	~ $2.10 Million

- Labor costs reflect the total cost for Calendar Year (CY) 2008 and will be adjusted downward if Phase IV is not implemented.
- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Operations costs shown in the preceding table reflect only activities associated with implementing Phase III.

Regional Coordinators	
Labor Costs (Calendar Year 2008)	
7 Coordinators (FTE @ $100K per year)	~ $700,000 (salary and benefits)
Subtotal	~ $700,000
Operations Costs (Phase III only)	
Travel / Operations / Equipment ($20K per Coordinator)	~ $140,000
Subtotal	~ $140,000
Grand Total Proposed Budget for the Regional Coordinators	~ $840,000

- Labor costs reflect the total cost for CY 2008 and will be adjusted downward if Phase IV is not implemented.
- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Operations costs shown in the preceding table reflect only activities associated with implementing Phase III.

State Coordinators	
Labor Costs (Calendar Year 2008)	
13 Coordinators (0.5 FTE @ $100K per year)	~ $650,000

Subtotal	~ $650,000
Operations Costs (Phase III only)	
Travel / Operations ($10K per coordinator)	~ $130,000
Subtotal	~ $130,000
Grand Total: Phase III	~ $780,000

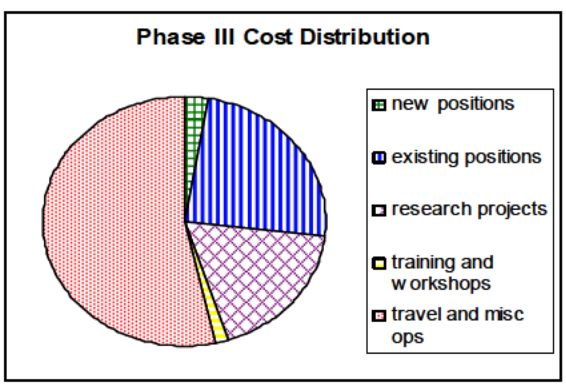
- Labor costs reflect the total cost for CY 2008 and will be adjusted downward if Phase IV is not implemented.
- Labor costs estimates are approximate and represent a fully burdened rate that includes both salaries and benefits.
- Operations costs shown in the preceding table reflect only activities associated with implementing Phase III.

Local Working Groups	
Operations Costs (Phase III)	Annual Estimated Cost
Travel / Operations ($50K per group)	~ $3,500,000
Subtotal	~ $3,500,000
Grand Total: Phase III	~ $3.5 Million

Table of Summary Costs for All Organizational Levels

National Service Team	~ $2.10 Million
Regional Coordinators	~ $840,000
State Coordinators	~ $780,000
Local Working Groups	~ $3.50 Million
Grand Total	~ $7.22 Million

Figure 3. Distribution of Phase III Costs



Budget Element	Estimated Cost
new positions	$200,000
existing positions	$1,750,000
research projects	$1,300,000
training and workshops	$100,000
travel and misc ops	$3,870,000
Total: Phase III	**$7,220,000**

E. Phase IV: Operation and Maintenance

1. Scope:

The National Service Team will be expanded in Phase IV to further assist Local Working Groups, State Coordinators, and Regional Coordinators across the sagebrush biome. The conclusion of this phase will result in a fully functional Consortium that meets all identified customer needs.

a. Project Implementation

The National Service Team will actively work to overcome administrative barriers, identify management issues, and leverage efforts to conserve the sagebrush biome. The National Service Team will provide information and training to support Local Working Groups. The National Service Team will provide outreach and communication to demonstrate Consortium successes and actions.

Additional subject matter experts may be hired in response to Local Working Group needs. It is estimated that the additional subject matter experts may include the following adjunct positions: range ecologist; geologist, mining engineer or petroleum engineer; soil scientist; range management scientist for cattle; and a range management scientist for sheep. One additional administrative assistant will also be added to the National Service Team.

b. Measurement of Results

The functionality of the expansion of the National Service Team will be assessed through administrative accountability. Progress will be documented to demonstrate the number of Local Working Groups supported by the additional National Service Team staff.

2. Schedule:

Milestone Date	Milestone Description
August 2008	Implementation of Phase IV
Ongoing	Monitoring of Consortium efforts and adaptive management
Semi-annual	Report progress to WAFWA Executive Oversight Board

3. Budget:

National Service Team	
Labor Costs (Annual)	
Subject Matter Expertise (equivalent to 4 FTE)	~ $400,000 (salary and benefits)
2 Administrative Assistants (FTE @ $50K per year)	~ $100,000 (salary and benefits)
Program Administration (FTE @ $100K per year)	~ $100,000 (salary and benefits)
5 Adjunct Subject Matter Experts (0.5 FTE @ $100K per year)	~ $250,000 (salary and benefits)

Team Leadership (FTE @ 100K per year)	~ $100,000 (salary and benefits)
Subtotal	~ $950,000
Operations Costs (Annual)	
Travel / Operations / Equipment	~ $100,000
Training / Workshops	~ $500,000
Research Projects / Consultant Contracts (15 States / Provinces @ $500K each)	~ $7,500,000
Subtotal	~ $8,100,000
Total: Phase IV	~ $9.05 Million

Regional Coordinators	
Labor Costs (Annual)	
7 Coordinators (FTE @ $100K per year)	~ $700,000 (salary and benefits)
Subtotal	~ $700,000
Operations Costs (Annual)	
Travel / Operations / Equipment	~ $350,000
Subtotal	~ $350,000
Total: Phase IV	~ $1.05 Million

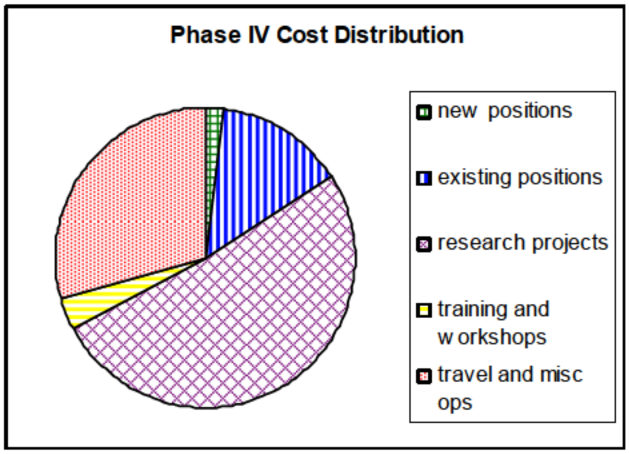
State Coordinators	
Labor Costs (Annual)	
13 Subject Matter Experts (0.5 FTE @ $100K per year)	$650,000
Subtotal	$650,000
Operations Costs (Annual)	
Travel / Operations	$350,000
Subtotal	$350,000
Total: Phase IV	$1.0 Million

Local Working Groups	
Operations Costs (Annual)	
Travel / Operations ($50K per group)	~ $3,500,000
Subtotal	~ $3,500,000
Total: Phase IV	~ $3.5 Million

Table of Summary Costs for All Organizational Levels

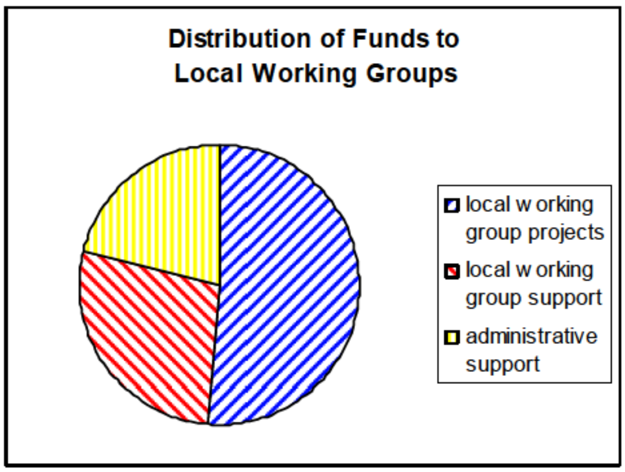
National Service Team	~ $9.05 Million
Regional Coordinators	~ $1.05 Million
State Coordinators	~ $1.00 Million
Local Working Groups	~ $3.50 Million
Grand Total	~ $14.60 Million

Figure 4. Distribution of Phase IV Costs.



Budget Element	Estimated Cost
new positions	~ $300,000
existing positions	~ $2,000,000
research projects	~ $7,500,000
training and workshops	~ $500,000
travel and miscellaneous operations	~ $4,300,000
Total: Phase IV	**~$14,600,000**

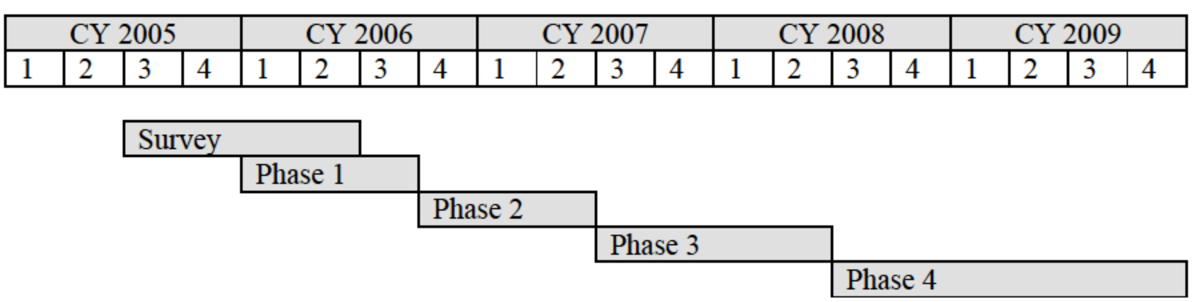
Figure 5. Distribution of Phase IV Funds



Budget Element	Estimated Cost
local working group projects	~$7,500,000
local working group support	~$4,000,000
administrative support	~$3,100,000
Total: Phase IV	**~$14,600,000**

Figure 6 graphically portrays the relationship of all the phases proposed for Consortium implementation. The final phase, Phase 4, is open-ended and will not be completed until all of the issues associated with the sagebrush biome are resolved.

Figure 6. Schedule of all phases.



V. Roles and Responsibilities

A. Executive Oversight Board

An Executive Oversight Board (EOB) is proposed that will be composed of representatives of all of the MOU signatories. The Board members will function as coequal partners and will have the ultimate decision-making authority for all activities covered under the MOU and cooperative agreement. The EOB is projected to meet periodically (at least quarterly or more often if deemed necessary) to address evolving issues, assess status, implement the budget strategy, develop policy, and provide input from their respective agencies. The primary organizational contact for the EOB will be the Framework Team, which will serve in a staff capacity to the EOB.

B. Sage-Grouse Conservation Planning Framework Team

The extant MOU provided direction to the Parties to establish a Sage Grouse Conservation Planning Framework Team (PFT) consisting of 5 biologists from the WAFWA and 1 biologist each from the Bureau of Land Management, the U.S. Fish and Wildlife Service, and the U.S. Forest Service. Initially, the PFT was charged with developing a range-wide Greater Sage-Grouse Conservation Strategy and assisting with its implementation. The Strategy will address monitoring of implementation and long-term success of conservation actions and the use of adaptive management principles.

To complete this task, the Parties agreed to collect and analyze sage-grouse population and habitat data; develop and implement local, State, and agency plans; prepare training materials; and provide assistance to States, agencies, and working groups in support of conservation planning, implementation, and monitoring of conservation actions. The PFT were also directed to establish guidelines and protocols for monitoring activities and data and for implementing adaptive management.

The PFT will provide operational oversight to the Consortium staff and will interact with the EOB. The role of the PFT is to brief the EOB on progress and performance and to present organizational and funding issues to the EOB for decisions. With the assistance of the National Service Team, the PFT will also monitor the status of implementation of conservation plans and will identify emerging issues.

C. National Service Team

The National Service Team (NST) is charged with addressing issues at the national and international levels. Operationally, the NST will concentrate on issues that are typically beyond the scope of Local Working Groups, State Coordinators, or Regional Coordinators. The NST will report directly to the PFT and will provide a forum for Regional Coordinators, State Coordinators, and Local Working Groups to elevate their concerns.

The NST staff is proposed to operate as a virtual center that would support shared positions funded by respective agencies. Consultation provided by the NST would take place primarily by telephone, e-mail, or other electronic methods of communication.

Recommended Staff Positions:

Core Staff:
- Team Lead
- Program Administrator
- Staff Experts
  - Wildlife Expert
  - Plants and Habitat Expert
  - Human Dimensions Specialist
  - Information Management Specialist

Adjunct Staff:
- Range Management/Ecology Expert
- Geology/Mining/Petroleum Expert
- Soils Expert
- Range Management (Cattle) Expert
- Range Management (Sheep) Expert

D. Regional Coordinators

The Consortium has identified the following seven regions within the sagebrush biome: 1) Southern Great Basin, 2) Northern Great Basin, 3) Columbia Basin, 4) Wyoming Basin, 5) Colorado Plateau, 6) Silver Sage, and 7) Snake River Plain. Each of these regions will have a Coordinator to direct regional efforts. The Coordinators will report to the NST on a periodic basis. Efforts of State Coordinators will be analyzed in a broader context to ensure that actions are coordinated on a regional basis. Regional Coordinators will organize training and workshops on a regional basis and will work with State Coordinators to obtain funding to support regional-level activities. This partnership is intended to avoid duplication of effort and to allocate resources more efficiently.

E. State Coordinators

The following thirteen States constitute the Consortium's area of responsibility within the sagebrush biome: Wyoming, Colorado, New Mexico, Arizona, Nevada, California, Oregon, Washington, Idaho, North Dakota, South Dakota, Utah, and Montana. All but two of these states (i.e., Arizona and New Mexico) currently have sage-grouse within their borders. In addition, the Canadian Provinces of Alberta and Saskatchewan share parts of the sagebrush biome. Partnerships with these two Provinces will need to be formally established as the Consortium expands to incorporate the entire sagebrush biome.

The State Coordinators will have several key functions including interfacing with Local Working Groups to make sure efforts are coordinated at the State level. They will provide input to regional teams and will elevate State and local information and needs to a regional level as necessary. They will also coordinate with their respective gubernatorial and Congressional staffs. State Coordinators will attend Local Working Group meetings and provide information to Local Working Groups. They will assist Local Working Groups with project design and implementation. State Coordinators may also facilitate training exercises. They will also work with Local Working Groups to identify needed research, design and implement projects, institute effective monitoring strategies, and apply adaptive management principles.

F. Local Working Groups

State fish and wildlife agencies have agreed to convene Local Working Groups to identify and plan management actions and policies that can be pursued across the local landscape for the benefit of sage-grouse and sagebrush habitat (1999 MOU). The Local Working Groups consist of volunteers who serve on the group convened for their geographic area. Local working groups were formed by identifying and contacting entities having a large number of diverse interests including elected officials, State and Federal agencies, Tribes, landowners, the energy industry, individual farmers and ranchers, and conservation and agricultural organizations. There are no qualifications necessary for serving on a Local Working Group beyond an interest in the conservation of sage-grouse.

Meetings of Local Working Group meetings are structured to 1) provide information about sage-grouse and sagebrush habitat to the participants, raising the collective level of understanding; 2) allow for the collection of observations and knowledge from landowners and other participants; and 3) encourage discussion of the specific strategies in the plan and how to implement them.

About 70 Local Working Groups presently exist or are being organized. These Working Groups represent the foundation of the Consortium organization and encompass most of the on-the-ground conservation and management activities. Local Working Groups will present management issues and problems to State Coordinators. They will also provide training to other Local Working Groups and to other levels of the organization. These groups are anticipated to be the primary consumers of the information, expertise, training, and funding provided by the Consortium.

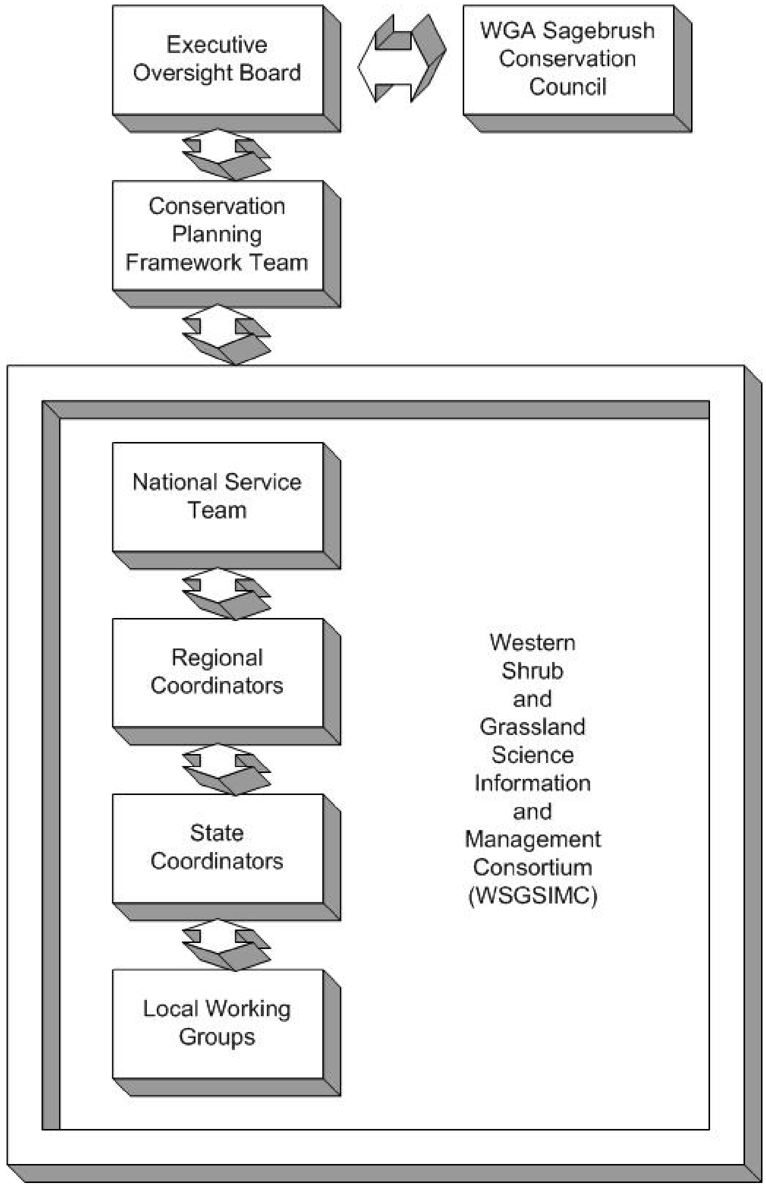
G. Western Governors Association - Sagebrush Conservation Council

The Sagebrush Conservation Council (SCC) has been chartered by the Western Governors Association (WGA) to assist Local Working Groups in completing their sage-grouse conservation plans and developing a conservation plan for sagebrush habitat that covers much of the West. Assistance will be provided when Local Working Groups need coordination across political boundaries and the involvement of decision-makers. The SCC also provides assistance in activating groups and bringing together concerned individuals, organizations, and agencies.

The SCC will be co-chaired by the Lead Governors or their designees, and will be composed of members appointed by the governors with greater sage-grouse habitat in their States. The SCC may include representatives of Local Working Groups, State wildlife agencies, principal Federal agencies, non-governmental organizations, industry representatives and others as deemed necessary by the Governors to provide for broad participation by the stakeholders in the sagebrush habitat ecosystem. The WGA will seek public and private funding to support the activities of the SCC, WGA management of the SCC, and meetings of the sage-grouse Local Working Groups.

Although none of the WSGSIMC organizational units will report directly to the Sagebrush Conservation Council, it is anticipated that there will be a high level of coordination between the SCC, the Executive Oversight Committee, and the Planning Framework Team. The primary role of the Council is expected to be coordination of funding, political assistance, and outreach efforts at the State and regional levels. The relationships among the WSGSIMC organizational components and the WGA Sagebrush Conservation Council are shown in Figure 7.

Figure 7. Relationships of the WSGSIMC Organizational Components and WGA Conservation Council



Appendix
List of Participants

Appendix . List of Participants

The following individuals attended the June 8-9, 2005 rescoping meeting in Denver, Colorado:

Participant	Organization	E-mail Address	Telephone Number
Tony Apa	CDOW/WAFWA	tony.apa@state.co.us	(970) 255-6156
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Cal McCluskey	BLM (WO-230)	cal_mccluskey@blm.gov	(208) 373-4042
Sarah McCall	BLM (ST-131)	sarah_mccall@blm.gov	(303) 236-0154
Travis Haby	BLM (ST-131)	travis_haby@blm.gov	(303) 236-0537
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The following December 2004 meeting attendees were not able to attend the June 2005 meeting:

Participant	Organization	E-mail Address	Telephone Number
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