

# Greater Sage-Grouse Conservation Plan for Nevada and Eastern California

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First Edition – June 30, 2004



*Prepared for:*  
*Nevada Governor Kenny C. Guinn*  
*Sage-Grouse Conservation Team*

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## EXECUTIVE SUMMARY

The First Edition of the Greater Sage-Grouse Conservation Plan for Nevada and California represents the culmination of almost four years worth of what can only be described as a massive planning effort. Volunteers expended over 9,000 hours and 110,000 miles on Greater sage-grouse conservation planning and monitoring. The following conservation plan is a work in progress compiled from Local Area Sage-Grouse Conservation Plans, input from the Nevada Governor's Sage-Grouse Conservation Team, and data compiled by the Nevada Department of Wildlife and the California Department of Fish and Game.

The process began in August of 2000 with an appointed task force representing industry, Native American Tribal Governments, conservation organizations, land managing agencies, legislators and biological professionals. This group was charged with creating a strategy that would lay the framework for Local Area Conservation Planning groups to follow when creating sage-grouse conservation plans for their respective areas. These local plans form the building blocks of this statewide conservation plan. The Nevada Sage-Grouse Conservation Strategy was completed in October of 2001 and marked the beginning of the Local Area Conservation Planning phase of the Greater Sage-Grouse Conservation Plan, which was the foundation of Nevada and California's plan of action.

The Plan includes an introduction that provides a background, purpose, participants, and approach to sage-grouse conservation planning as well as chapters with in-depth information regarding the assessment of sage-grouse populations in Nevada and Eastern California and the risk factors facing them, strategies and actions to reduce or eliminate those risk factors, implementation of and commitment to employ those strategies and actions, and monitoring the effectiveness of those strategies as well as ascertaining the health of sage-grouse populations.

Because of the decline in Greater sage-grouse populations and habitat loss range-wide, most western states have engaged in a conservation planning process for sage-grouse. Eight petitions have been filed to list the Greater sage-grouse as a threatened or endangered species to date. Regardless of the outcome of the listing process, the purpose of this plan is to fulfill the following vision:

*Safeguard our natural heritage through conservation of sage-grouse by means of cooperation and collaboration ensuring that, to the greatest extent feasible, sage-grouse populations and their habitat are maintained, enhanced, or restored on public lands, and that such activities are promoted on private lands through development and implementation of conservation actions that will balance ecologically diverse, sustainable, and contiguous sagebrush habitats, sage-grouse populations, and local economic considerations.*

State and Federal resource management agencies as well as conservation organizations are committed to make this vision a reality through the implementation of proposed projects as prioritized according to this plan. Priorities for sage-grouse conservation actions on a statewide scale are based on maintaining the largest and most sustainable bird populations and associated habitats with secondary emphasis on enhancing degraded seasonal habitats that have the greatest potential for recovery.

Assessment of the greater sage-grouse population within the plan area from data collected by the Nevada Department of Wildlife, California Department of Fish and Game, Field Offices of the Bureau of Land Management, U.S. Fish and Wildlife Service, and volunteers reveal a

minimum population estimate of between 68,000 and 88,000 sage-grouse in Nevada and Eastern California. The average number of males counted on leks in Nevada has fluctuated from a low of 7.8 males/lek in 1976 to a high of 39.3 males/lek just four years later in 1980. Last years' lek counts generated an average of 12.9 males/lek. Sage-grouse within both states have been found to exhibit migratory and non-migratory movements.

The factors affecting sage-grouse and sage-grouse habitat were assessed at either the Population Management Unit or Local Area Conservation Planning unit depending on the respective area and include the following:

- Habitat Quantity
- Habitat Quality/Nutrition
- Wildfire
- Habitat Fragmentation
- Livestock Grazing
- Wild and Free Roaming Horses
- Predation
- Changing Land Uses
- Hunting/Poaching
- Disturbance
- Disease
- Pesticides
- Cycles
- Climate/Weather

Of these risk factors, habitat quantity, habitat quality, and wildfire have affected Nevada and California sage-grouse populations the most. Habitat quantity has been reduced because of pinyon-juniper encroachment and changes in the plant community from sagebrush to annual grasses due to catastrophic wildfire. Habitat quality has been reduced due to invasion of exotic annuals and other invasive weed species, improper grazing management systems, and wild horse over-utilization. Other risk factors contribute to sage-grouse declines as well, but in many cases, appear to be more localized. In addition, some of these other risk factors such as natural cycles and climate/weather are uncontrollable.

Actions to improve habitat quantity include such things as mechanical pinyon/juniper removal in known sage-grouse seasonal habitats, protecting quality habitats from wildfire using green-strips at the interface of previously burned areas and unburned areas, and re-seeding crested wheatgrass seedings with native grasses and forbs to improve early and late brood rearing habitat. These landscape level habitat alterations will be conducted on a pilot project basis to determine effectiveness with regards to habitat and sage-grouse population objectives. Habitat quality conservation actions include vegetative management to establish sagebrush in perennial grasslands, managing riparian areas for proper functioning condition, altering livestock grazing systems through the allotment evaluation process, and vegetation management to combat cheatgrass establishment and/or domination of the understory. Wildfire conservation actions mainly include pre-suppression treatments to help reduce the intensity and size of wildfires. These projects will be coordinated and implemented in conjunction with local land use plans and/or fire management plans.

Implementation of the proposed actions, public education, monitoring and research facets of the plan will be incorporated into agency annual budgets and work plans where possible. The plan explains agency roles and the genesis of the Governor's Team into the Sage-Grouse Conservation Team. Commitment to the plan by various federal and state agencies including the Bureau of Land Management, USDA Forest Service, Natural Resource Conservation Service, U.S. Fish and Wildlife Service, U.S. Geological Survey, Nevada Department of Wildlife, and the California Department of Fish and Game as well as commitment from the Local Area Conservation groups to continue their efforts, complete unfinished plans, and implement actions is set forth in Chapter 4. This chapter also details specific projects that have been completed or are well into the planning process by each local area.



The monitoring section of this plan (Chapter 5) describes the three levels of monitoring necessary to ensure success of the plan. The three levels include 1) monitoring of agency activities, 2) monitoring conservation actions and management, and 3) monitoring of sage-grouse populations and their health. Specific methods for conducting population monitoring are described including lek count methodologies, wing collection and analysis to determine production, brood survey methodology, harvest monitoring and management, and disease monitoring. Habitat monitoring, adaptive management, and research needs and descriptions of ongoing research projects are also presented in this section.

The 2004 First Edition of the Sage-Grouse Conservation Plan for Nevada and Eastern California represents the state-of-the-States' knowledge of sage-grouse populations and risks to sage-grouse populations as they are understood to date. It will take years of coordinated monitoring to determine if the actions, once implemented as recommended in this plan, are effective at improving sage-grouse habitat and subsequently creating more robust/self sustaining populations. The collaboration of governmental agencies and private industries that can affect sage-grouse viability in Nevada and California is essential to achieve the long-term sustainability of sage-grouse in conjunction with the other users of the sagebrush-steppe ecosystem.

## **ACKNOWLEDGEMENTS**

*The Nevada Department of Wildlife wishes to thank all those who participated in and supported the work of the Governor's Sage-Grouse Conservation Team and the Local Area Conservation Planning groups. This Conservation Planning effort is unsurpassed by any other of its kind between Nevada and California.*

*The facilitation provided by the University of Nevada Cooperative Extension and participation of the various agencies, interest groups, and individuals was truly a marvel. The following First Edition of the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California represents four years of hard work that required dedication, collaboration, and in some cases, compromise that has set up a framework for future planning and implementation that will benefit sage-grouse in the long-term.*

*This plan represents the compilation of over nine thousand volunteer hours as well as the countless time and energy of a vast array of representatives of many interests across Nevada. Over the almost four years worth of planning efforts, participants have come and gone and many have persevered through the sometimes difficult, laborious and controversial entire process. To attempt to identify all parties who had a hand in its making would beg to leave someone out.*

## CHAPTER 1. INTRODUCTION

### 1.1 Background

Greater sage-grouse (*Centrocercus urophasianus*) currently range from southeastern Alberta and southern Saskatchewan; western North and South Dakota; Colorado, Utah, Nevada, eastern California, eastern Oregon and Washington (Schroeder 2004) (see **Figure 1**). The core sage-grouse populations have contracted to include land in Colorado, Idaho, Montana, Nevada, Oregon, and Wyoming with remnant populations in other states, closely paralleling the distribution of the big sagebrush ecosystem. Within the core area of their range, populations have dramatically declined (Braun 1998, Wisdom et al. 1998). Sage-grouse have been extirpated in British Columbia, Nebraska, New Mexico, Arizona, and Oklahoma (Braun 1991, 1993). Braun (1993) considered populations remaining in Alberta, North Dakota, Saskatchewan, South Dakota, California, Colorado, Utah and Washington to be "greatly reduced" or "marginal".

Sage-grouse is a species of aesthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people. Greater sage-grouse are found throughout Nevada (except in Clark County) and in eastern California.

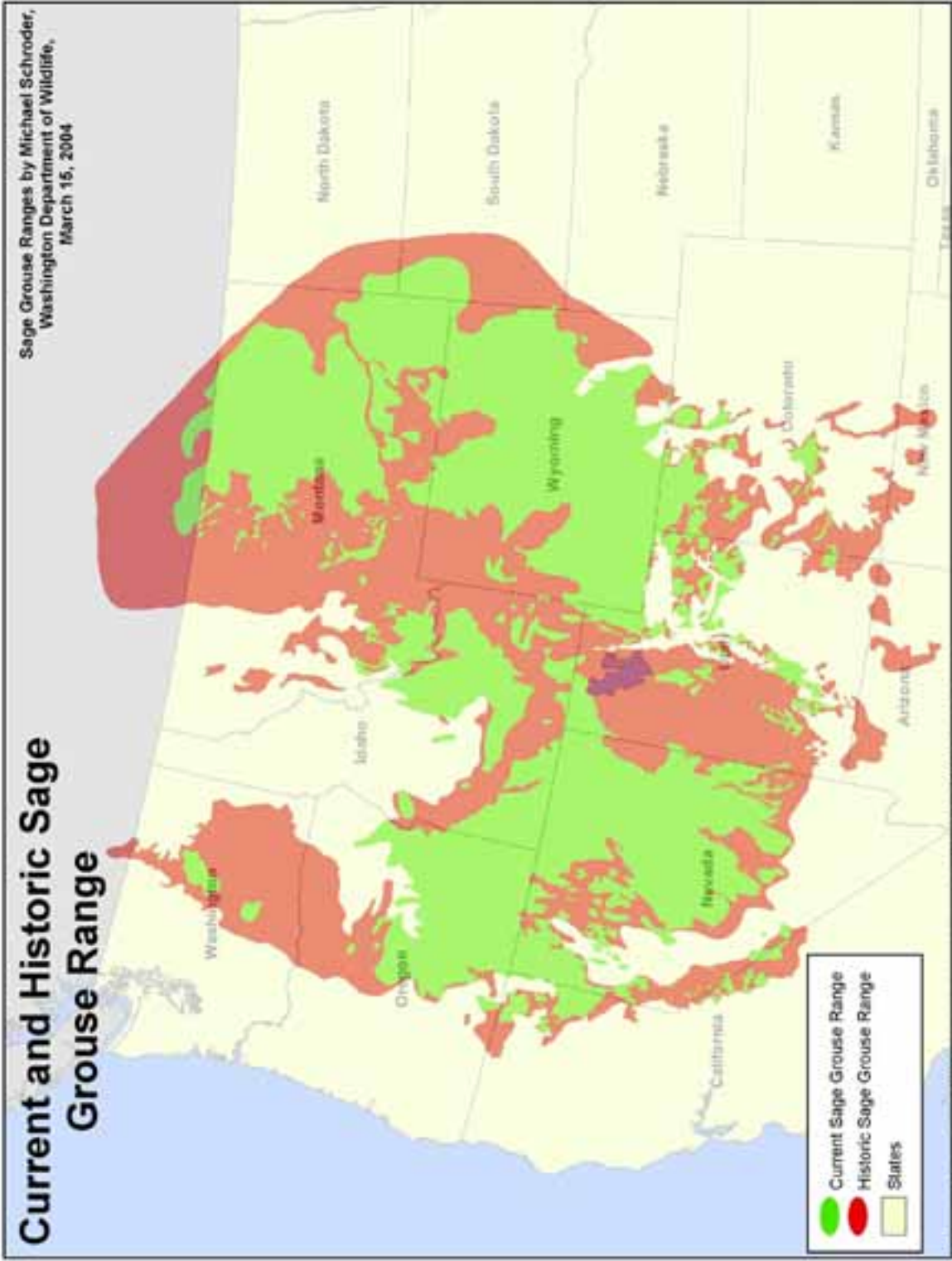
Concern has been expressed throughout the western United States, including Nevada that sage-grouse populations and habitat quality/quantity have been declining. The concern over this trend has been elevated in the form of eight petitions to list the sage-grouse as a threatened or endangered species filed with the U.S. Fish and Wildlife Service (USFWS) between 1999 and 2004 (see **Appendix A**). The latest petition was submitted in December 2003 for listing the species over its entire range. The 90-day finding on the merit of the "range-wide" petitions was issued on April 15, 2004 and the finding by the USFWS was that the petitions and additional information available in the USFWS files present substantial information indicating that listing the greater sage-grouse may be warranted. A species status review has been initiated as a result of this finding.

The listing of the greater sage-grouse as a threatened or endangered species would have a significant impact on Nevada. Land development, land uses, water use, and recreational activities would be affected. While sage-grouse still thrive over much of their range in Nevada, with relatively large populations of birds in Elko, northern Humboldt, northern Washoe, Eureka, and White Pine Counties, the following conservation plan defines proactive actions that will be implemented to address localized problems before the species truly reaches a threshold of vulnerability from which recovery might be difficult.

### 1.2 Purpose of the Nevada-California Plan

Regardless of the outcome of the listing process, the purpose of the *Sage-Grouse Conservation Plan for Nevada and Eastern California (Nevada-California Plan)* is to fulfill the following vision:

*Safeguard our natural heritage through conservation of sage-grouse by means of cooperation and collaboration ensuring that, to the greatest extent feasible, sage-grouse populations and their habitat are maintained, enhanced, or restored on public lands, and that such activities are promoted on private lands through development and implementation of conservation actions that will balance ecologically diverse, sustainable, and contiguous sagebrush habitats, sage-grouse populations, and local economic considerations.*



Whether or not the current status of sage-grouse across its range warrants a listing, the states of Nevada and California and the participating parties involved with developing and implementing this plan are committed to sage-grouse conservation and perpetuation of this species and its habitat. The State of Nevada also intends to cooperate with other neighboring states when their sage-grouse conservation plans are completed.

### **1.3 Participating Parties**

Innovative partnerships have been developed among public and private sectors to conserve sage-grouse and their habitat before they become critically endangered. Federal lands provide more than half the existing habitat for sage-grouse while private lands provide some critical seasonal ranges particularly important in the arid areas of Nevada-California. Careful management of these lands can help maintain and improve sage-grouse populations and habitat. Federal and State agencies have the expertise to assist non-Federal land managers and private property owners in sage-grouse conservation and protection efforts. The State and Federal agencies that have entered into this partnership are listed below. Existing state and federal regulatory mechanisms are adequate for implementation of the Nevada-California Plan. Regulatory and administrative authorities for the involved agencies are described in **Appendix B**.

- Nevada Department of Wildlife (NDOW)
- California Department of Fish and Game (CDFG)
- Nevada and California State Offices, Bureau of Land Management (BLM)
- Humboldt-Toiyabe National Forest, U.S. Forest Service (USFS)
- U. S. Fish and Wildlife Service (USFWS)
- Natural Resources Conservation Service (NRCS)
- Nevada Department of Agriculture (NDOA)
- Nevada Department of Conservation and Natural Resources (NDCNR)
- Nevada Board of Wildlife Commissioners
- Nevada Natural Heritage Program (NNHP)
- Nevada Division of State Lands (NDSL)
- Nevada Indian Commission

The Nevada Governor's Office and the Nevada State Legislature also participated in this process. In addition to the governmental agencies, the collaborative effort at the Governor's Team level also includes the following cooperators:

- Great Basin Bird Observatory
- Lahontan Audubon Society
- National Association of Conservation Districts
- Nevada Association of Counties
- Nevada Farm Bureau
- Nevada Mining Association
- Nevada Wildlife Federation
- Northeastern Nevada Stewardship Group
- Nevada Cattlemen's Association
- Nevada Sheep Commission
- Coalition for Nevada's Wildlife
- Sierra Pacific Resources
- Sierra Club
- University of Nevada Reno
- Non-affiliated advocates

## 1.4 Approach

The Nevada sage-grouse conservation effort was initiated by Nevada Governor Kenny Guinn, who appointed a Sage-Grouse Conservation Team (Governor's Team), representing industry, Native Americans, conservation organizations, land management agencies, legislators and biological professionals. Working through consensus, the efforts of the Governor's Team were codified in the *Nevada Sage-Grouse Conservation Strategy* (Strategy).

The Strategy was expanded to include Eastern California and identified six Local Area Planning Groups (Local Groups), charged with designing workable solutions to specific on-the-ground challenges in their respective areas. The Northeastern Nevada Stewardship Group (NNSG) was formed in 1998 as a non-profit group formed under Internal Revenue Service section 501 (c) (3) to address conservation issues within Elko County, and this group was selected for Elko County. In 2003 the number of Local Groups was expanded to seven when the East Central Local Planning Group was further subdivided into two groups representing White Pine and Lincoln Counties to take advantage of the Coordinated Resource Management (CRM) processes that were already in place. (see **Figure 2 depicting locations of Local Planning Groups**).

The local planning process provided local stakeholders with a unique opportunity to create conservation plans that aim to protect and enhance sage-grouse habitats and aspire to develop a better understanding of greater sage-grouse population ecology and habitat relationships. Development of local sage-grouse conservation plans through local collaborative planning processes provided a critical opportunity to coordinate current land and bird management activities through a single integrated process, using adaptive management techniques. Through collaboration, the Local Groups have the opportunity to develop and implement an effective sage-grouse conservation program that will balance sagebrush habitat, sage-grouse populations, and economic considerations.

### 1.4.1 Local Area Planning Group Planning Process

The Strategy preliminarily formed Local Area Conservation Planning (LACP) groups and provided guidance for each LACP group to establish some uniformity in the level of planning; however, the solutions for specific local issues were the responsibility of the LACP group. The Strategy also identified Population Management Units (PMU) and provided an extensive list of suggested conservation strategies to guide the local planning teams in their approaches to on-the-ground conservation solutions. Planning tools were made available in the appendices of the Strategy to lead the way to successful attainment of the statewide goals through local consensus planning, implementation, and monitoring.

LACP groups were subdivided based on county boundaries. Most groups, except for Elko, White Pine, and Lincoln, are a conglomeration of counties. The North Central group consists of Humboldt, Pershing, and Churchill Counties, the South Central group consists of Nye, Lander, and Eureka Counties, the Washoe-Lassen-Modoc group consists of Washoe County in Nevada and Lassen and Modoc Counties in California, and the Bi-State group consists of Lyon, Douglas, Mineral, Esmeralda, Carson City, and Storey Counties in Nevada and Inyo and Mono Counties in California. Local teams are made up of representatives of local government (county planners), wildlife agency representatives (Nevada Department of Wildlife and California Fish and Game), land management agencies (BLM and U.S. Forest Service), NGO representatives, agribusiness representatives (landowners, grazing permittees, irrigation districts, etc.), mining industry representatives, sportsmen and tribal representatives.

# Local Area Conservation Planning Units

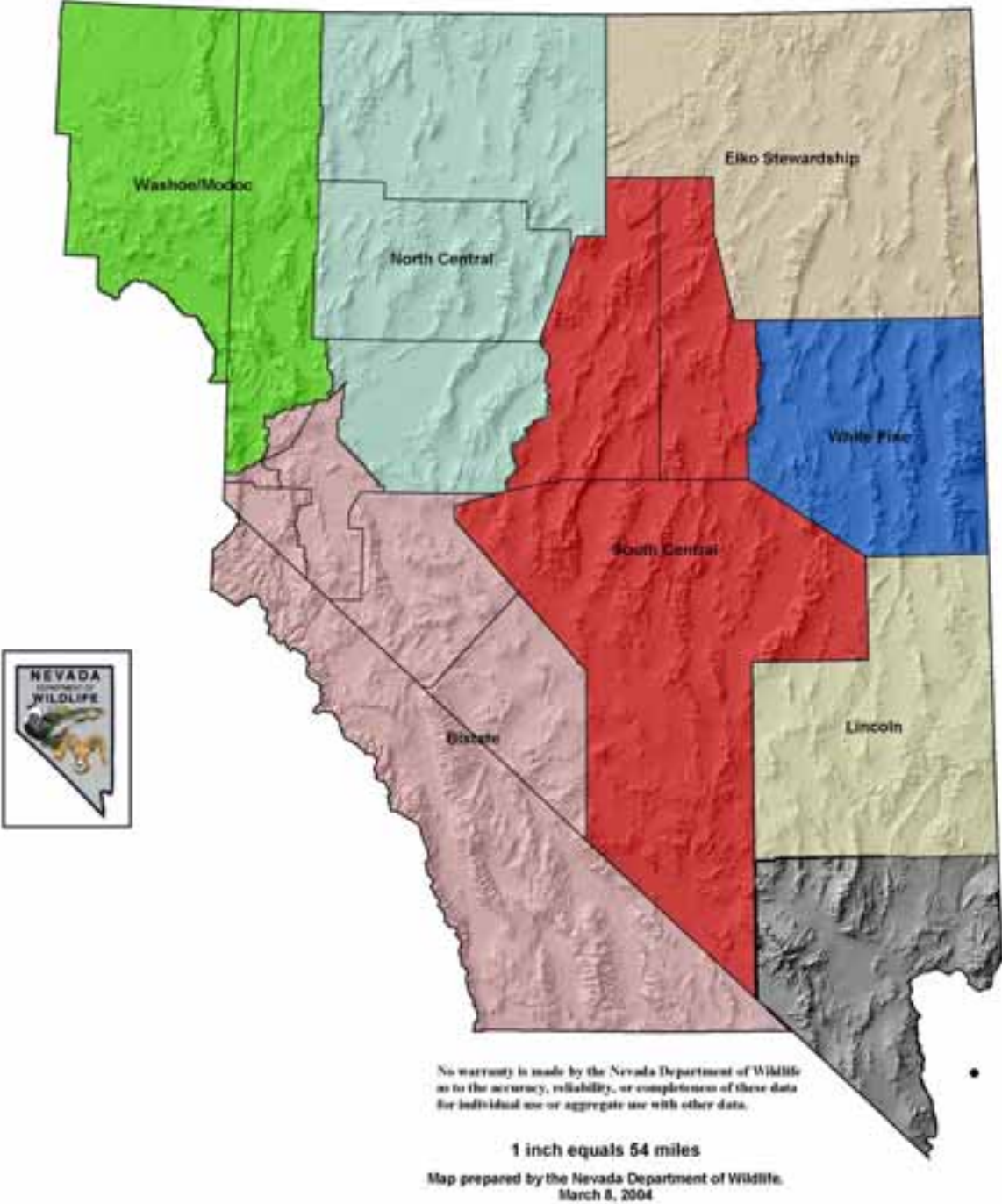


Figure 2. Location of the seven local area planning groups in the Nevada-California Plan Area

The Strategy included a preliminary identification of sage-grouse population management units (PMUs) throughout the plan area. The initial process for designating PMUs in Nevada is described in **Appendix C**. The PMUs were used as the basic management unit for risk assessment and mitigation planning. The refinement of the PMU boundaries was one of the first tasks for the Local Groups, and the results of that task are shown in **Figure 3**. PMU boundaries may be modified as research better defines populations and will be incorporated into future versions of the plan. The PMUs that lie within the boundaries of the LACP are, in most cases, the responsibility of that particular LACP. There are several instances where PMU boundaries cross LACP boundaries. Usually, whichever LACP designation that the majority of the PMU lies in is the responsibility of that particular LACP. Still, in other cases, PMUs are shared between two LACP groups (i.e. Cave PMU in White Pine and Lincoln Counties). The PMU was really the fine-scale planning unit for the LACP groups. Separate PMU plans were developed by many groups to address specific risks that were germane to that particular PMU.

Development of local plans included several opportunities for feedback from the Governor's Team to the LACP groups. The Internal Review Team was formed as a subcommittee of the Governor's Team to provide oversight and review throughout the plan development phase. LACP groups submitted their individual local plans to the Internal Review Team early in the Draft Plan phase. The Internal Review Team determined if the LACP groups had fulfilled the tasks identified in the Strategy; had provided a level of detail sufficient for the identification of risks to sage-grouse and their habitat; and had provided effective measures to address the risks identified. For some LACP groups, this process included several iterations of review. The Governor's Team also provided assistance to the LACP groups by attending LACP group meetings, providing technical expertise and presentations regarding sage-grouse and their habitats, developing guidelines on predation, interpretation of Western Association of Fish and Wildlife Agency guidelines, and responding to LACP group requests for information.

Each of the seven local area plans were submitted to the Governor's Team for compilation into a Draft *Sage-Grouse Conservation Plan for Nevada and Eastern California* (Draft Plan). The Draft Plan was then submitted to an External Science Peer Review Team (**Appendix K**) to evaluate the scientific basis of the various management actions with respect to the identified risks. This External Science Peer Review Team was formed based on nominations (individuals known to be subject matter experts on sage-grouse and their habitats) from the Governor's Team. The nominees were contacted by either telephone or e-mail and those that were willing to review the Draft Plan were placed on the External Science Peer Review Team. This group consisted of wildlife and wildland conservation professors, wildlife biologists from other states, and range resource professors. The External Science Peer Review Team was asked only to review and comment on the Draft Plan; however, they were also given LACP plans as reference material and could provide comments if time allowed. Their comments were passed on to the appropriate LACP groups and used by the Governor's Team to modify the Draft Plan and produce the *First Edition of the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California* (Nevada-California Plan).

#### **1.4.2 Current Status of the Nevada-California Greater Sage-Grouse Conservation Plan**

Each LACP group has produced local plans for sage-grouse conservation and local strategies for either addressing the risks for the various PMUs or for obtaining additional information necessary to develop specific management actions. The progress made toward these efforts as of the May 25, 2004 deadline is presented in this document. The commitment of the local groups to complete the plans-in-progress is described in Section 4.5.



# Sage Grouse Population Management Units (PMUs)

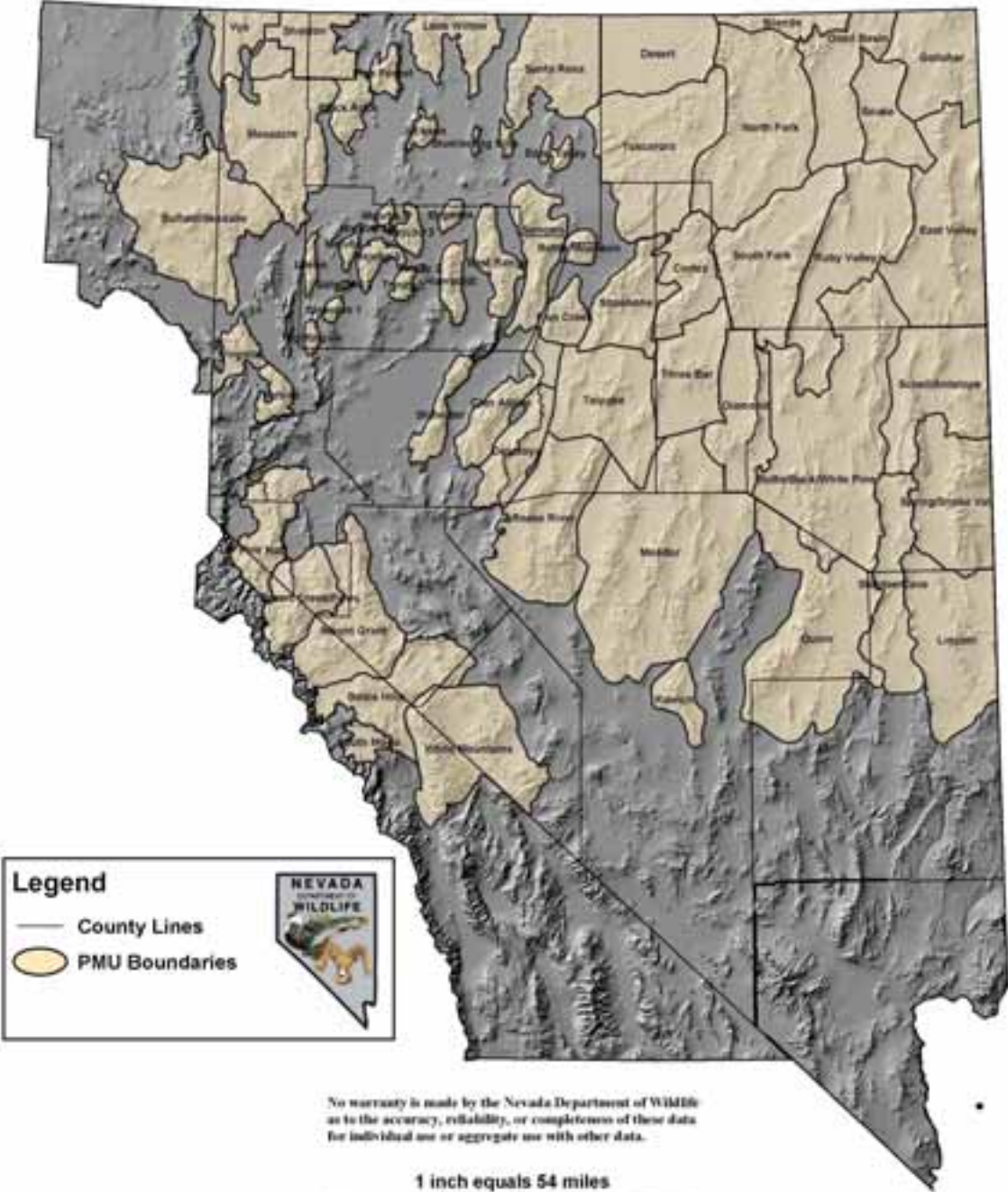


Figure 3. Population Management Unit locations and boundaries in the Nevada-California Plan Area

The Northeastern Nevada Stewardship Group (NNSG), responsible for the Elko County local planning area, chose to use watersheds as the management unit to be consistent with their previous and ongoing resource management initiative. The NNSG effort varied somewhat from the Strategy by developing a sagebrush ecosystem conservation strategy, with emphasis on sage-grouse. The NNSG strategy fulfilled the objectives of the *Nevada Sage-Grouse Conservation Strategy (Strategy)* tasks regarding identification of risks to sage-grouse within each PMU. However their emphasis on watershed planning requires a more detailed assessment of each watershed management unit. The watershed assessments are scheduled for initiation during the 2004 field season with approximately three watershed assessments to be completed each year. The NNSG *Elko County Sagebrush Ecosystem Conservation Strategy* (NNSG 2004) outlined a variety of actions that are currently underway that will help conserve sage-grouse and sage-grouse habitats. Therefore, the NNSG effort is in conformance with the *Strategy* and all of the local sage-grouse conservation efforts will be implemented under the auspices of this statewide document.

### **1.4.3 Nevada-California Plan Update Process**

The Local Group conservation plans, as well as the *Sage-Grouse Conservation Plan for Nevada and Eastern California* are “living documents” that will be updated every two years as the planning efforts at the local level and plan implementation at the state and local levels continue.

## **1.5 Conservation Goals and Priorities**

The Strategy identified the following two goals that form the premise for state and local conservation strategies:

- 1) *Throughout sage-grouse range in Nevada, have locally functional, well-informed groups empowered to actively contribute to sage-grouse conservation while balancing habitat, bird, and economic considerations.*
- 2) *Create healthy, self-sustaining sage-grouse populations well distributed throughout the species historic range by maintaining and restoring ecologically diverse, sustainable, and contiguous sagebrush ecosystems and by implementing scientifically-sound management practices.*

The efforts and products of the Local Groups indicate substantial progress in achieving the first goal. Two following general priorities have been identified to facilitate accomplishment of the second goal:

- 1) *Avoid causing or allowing irreparable damage to habitat or populations, and*
- 2) *Manage to improve habitats and promote stronger populations, keeping the best habitats and populations viable and resilient. Conserve sagebrush ecosystems that continue to function and remain capable of providing high quality habitat into perpetuity, to maintain a sufficient quantity of these habitats in a high quality condition at all times and maintain sage-grouse populations in a viable status.*

These principles will be used to guide funding decisions, either at the federal and state level or at the local planning group level, but are not intended to exclude funding or planning for other projects that meet local needs, or other multi-species or ecosystem goals.

### **1.5.1 Immediate and Highest Priorities**

Highest priority efforts for sage-grouse conservation should be focused on those habitats currently intact and highly productive. The following guidelines are of utmost importance when considering where limited funds and effort should be expended: 1) Identification, at a broad scale, of ecosystem units (hundreds or thousands of acres) which constitute Nevada and California strongholds for large populations of sage-grouse, which are in relatively good ecological health, but which are “at risk” by threat of wildfire and/or imminent invasion of cheatgrass or other exotic species from adjacent areas, and 2) Prescribe management actions to protect these areas in the next two years. Implementation actions need to address timeframes and process to be used in compiling a list of priority areas and proposed treatments to be completed “immediately”.

Management actions that sustain the health of rangelands and the quality of sagebrush habitat are the highest and immediate priorities. Such activities include proper management of livestock grazing, setting and maintaining appropriate management levels for wild horses, management of off-highway vehicles, licensed hunting, proper placement of a variety of Right of Ways including transmission lines, conservation education, acquiring conservation easements on critical private or tribal lands, etc. Monitoring of these actions is important to determine their effectiveness and adapt management strategies if necessary.

Reseeding following wildfire may also be considered an immediate priority under certain conditions. At higher elevations (6500-8000 feet) where there was a good mix of native species before a fire, minimal re-seeding will be necessary. Lower elevation sites where cheatgrass is much more competitive, or at higher elevation sites with dense stands of pinyon/juniper with little understory previous to fire are examples of areas where re-seeding will be critical to preserve future options and eventual recovery to native species.

### **1.5.2 High Priorities**

These projects and actions should comprise most of the effort for the conservation of sage-grouse, and should, for the most part, be funded through routine land or population management activities. However, extra funding will also be needed for special projects.

High priority management actions would include projects such as restoring meadow habitats at risk of becoming drained by head cutting, down cutting, or over-utilization. The availability of meadows for late brood habitat is limited throughout much of the arid and semi-arid rangelands that comprise Nevada-California plan area. Maintaining meadows in proper functioning condition (PFC) is critical to sage-grouse conservation and many times more cost effective than repairing damage after it has occurred.

Wildfire pre-suppression treatments and fire control in limited seasonal sagebrush habitats and existing high quality habitats that support healthy sage-grouse populations are high priority conservation actions. This includes protecting important seasonal habitats from catastrophic wildfires through fuels and fire management. In addition, large contiguous blocks of habitat that are at risk of being lost in a single fire due to fuel loading will also be protected by appropriate fuels management projects. Nevada has already lost significant sagebrush habitat to wildfire, especially within the last five years. Some of the sagebrush in burned areas is recovering naturally; other areas have been re-seeded to reestablish sagebrush habitat. In the interim period, while burn recovery takes place, additional loss of sagebrush habitat would impact

habitat availability for sage-grouse in certain areas. Responsible actions include placement of green-strips at the interface of highly flammable vegetation (e.g., cheatgrass in previously burned areas) and sagebrush habitats.

### **1.5.3 Medium Priorities**

This category is similar to high priority, but of larger scale, or involves a greater degree of intervention, requiring larger funding and longer timeframes for completion. These projects should be completed within the next five years.

Weed control in areas of habitat that are at risk of conversion to invasive noxious weeds can be considered a medium priority unless the invasion is taking place within important sage-grouse habitat such as a brood rearing meadow. It is critical that treatment of this condition occurs when weed populations are still small and manageable, before they spread and become too expensive to treat or put the landscape at too great a risk. Also, treating weeds in small areas before they spread prevents the need to treat large areas in ways that could diminish other important plants like palatable forbs.

Population or conservation actions that help keep a population from risk may also be considered a medium priority. Population maintenance actions could include closure of a hunt, hunting season or bag limit changes, and planned predator control. Actions such as these may be considered important and urgent after a specific event such as disease has occurred.

Vegetation management in areas of habitat that are at risk of permanent conversion to a vegetative seral stage unsuitable to sage-grouse is considered a medium priority. Such areas include habitat where pinyon-juniper has encroached, but adequate perennial understory and shrubs still exist and sagebrush habitats where stress on the perennial herbaceous plants is causing a downward trend. If left untreated, habitat will be lost. Furthermore, treatment options diminish and expense increases without treatment. Eventually treatment of these areas becomes expensive and risky.

### **1.5.4 Low Priorities**

Low priorities should be comprised of those areas where maintaining viability is no longer a feasible long-term goal. For example, some areas have been lost as habitat because plant communities have crossed a threshold and will not be maintained as sagebrush communities or become sagebrush communities again without very expensive and risky large-scale restoration.

In some cases, populations that exist around the urban interface of major cities will be considered low priority populations depending on the level of planned development. However, there may be instances such as that within the South Mono Population Management Unit where community and tourist development would potentially impact a significant and potentially distinct population of sage-grouse. In this scenario, a high priority status may be warranted for this population.

## CHAPTER 2. CONSERVATION ASSESSMENT

### 2.1 Species Taxonomy

The greater sage-grouse is one of 11 species in the order Galliformes, family Phasianidae, subfamily Tetraonidae (grouse) found in North America (AOU Checklist of North American Game Birds, 7<sup>th</sup> edition). In recent years, sage-grouse have been split into two species; the greater sage-grouse, which is the only species of sage-grouse that exists in Nevada and California, and the Gunnison sage-grouse (*Centrocercus minimus*) in southwest Colorado and southeastern Utah. References to sage-grouse heretofore in this document pertain to the greater sage grouse.

Recent genetic testing indicates that sage-grouse from Mono County, California and Lyon County, Nevada are genetically unique (Benedict et al. 2003, Oyler-McCance et al. 2001). The samples used in the analysis were taken from birds in the core population areas of the Bi-State PMU. The level of uniqueness of the sampled birds suggests that they have been isolated from other greater sage-grouse populations for tens of thousands of years, but the extent of isolation is not clear from the available data. Further genetic testing and monitoring of bird movements, particularly in peripheral areas not yet sampled, is needed to better understand uniqueness of the Bi-State population. The ramifications of this information are that sage-grouse in the Bi-State area should be conserved as a potentially unique population. The Bi-State plan was, and will continue to be, developed as a “stand-alone” effort (Appendix L).

### 2.2 Seasonal Activities and Habitats

Sage-grouse are considered a sagebrush ecosystem obligate species (Braun et al. 1977). Obligate species are those species that are restricted to certain habitats or to limited conditions during one or more seasons of the year to fulfill their life requirements. Sage-grouse are only found where species of sagebrush exist. Sagebrush species provide nesting, brood, and fall/winter cover as well as forage throughout the year.

Each year, male sage-grouse congregate in late winter through spring on leks to display their breeding plumage and to attract hens for mating. As defined by Connelly et al. (2003), a lek is a traditional display area where two or more male sage-grouse have attended in two or more of the previous five years. The area is normally located in a very open site in or adjacent to sagebrush-dominated habitats. Generally, lek sites are traditional, with the same lek sites used year after year (Scott 1942, Batterson and Morse 1948, Wiley 1978, Autenrieth 1981). Taller sagebrush on the outskirts of the leks is necessary as a food source, escape cover, nesting cover for females, and loafing cover during the day (Patterson 1952, Gill 1965, Klebenow 1985). **Figure 4** shows the distribution of known leks throughout California and Nevada. In Nevada, preliminary Geographic Information System (GIS) analysis regarding descriptive lek location parameters conducted by the Elko District of the Bureau of Land Management with respect to actual known leks within Elko County (Lister, personal comm. 2004) has shown that leks generally occur on slopes with a south to east facing aspect and slopes less than 15 percent in sagebrush habitats. This information is useful for conducting lek discovery flights and is further explained in section 5.4.1. In California, it is assumed that a high percentage (>90%) of lek locations are known at this time.

Nesting habitat is primarily characterized by big sagebrush communities that have 15 to 38 percent canopy cover and a grass and forb understory (Connelly et al. 1991, Gregg et al. 1994,

## Sage Grouse Leks and Local Area Conservation Planning Groups

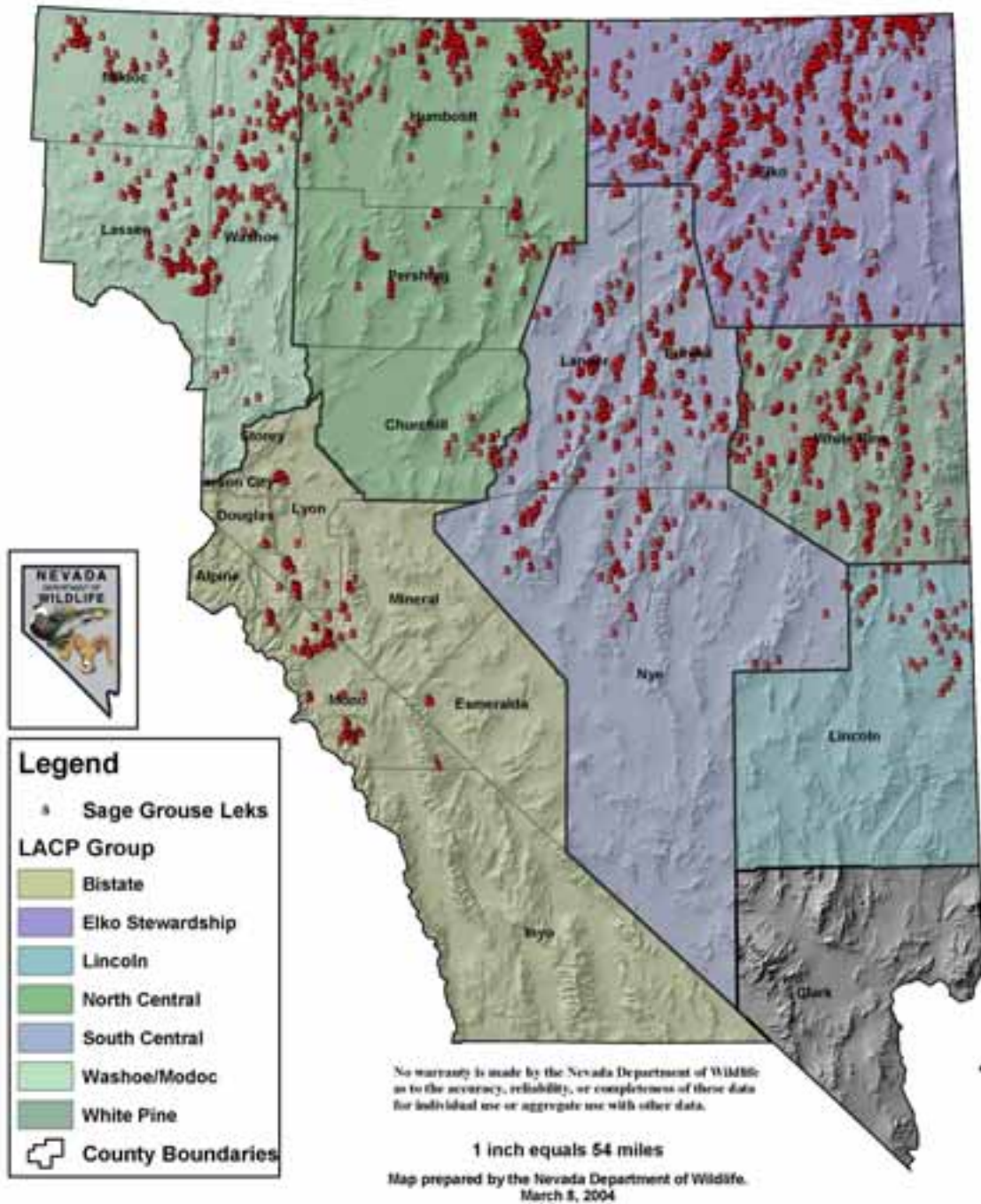


Figure 4. Known lek sites in the Nevada-California Plan Area

Sveum et al. 1998a). Recent research on the Sheldon National Wildlife Refuge found 41 percent of nests and 37 percent of successful nests in mountain big sagebrush (Davis 2003). Residual cover of grasses is also important for nesting cover (Klebenow 1969, Connelly et al. 1991, Gregg 1991, Gregg et al. 1994, Sveum et al. 1998a, Connelly et al. 2000).

Results from studies conducted in Montana and Colorado (Wallestad and Pyrah 1974, Braun et al. 1977) indicate that most nesting occurs within two miles (3 km) of leks. Approximately 2,200 leks are documented in the NDOW Master Lek Database. This total is comprised of active, inactive, unknown, and historic leks. Definitions of these classifications can be found in section 5.4.4. Approximately 1,000 leks are considered to be active at this time. One study in northwestern Nevada within the Washoe-Modoc Planning Area conducted between 1998 and 2000 found the average distance between lek sites and nest locations to be approximately three miles (Davis 2003). Seven females nested an average of 0.3 miles from the preceding years nest location. Consecutive year data indicated possible nest site fidelity by female sage-grouse in Nevada (Davis 2003).

Nesting and early brood rearing in Nevada generally occur from April through June. Habitats used by pre-laying hens are also part of the general breeding habitat. These areas provide forbs that are high in calcium, phosphorus, and protein, all of which are necessary for egg production. There is limited information on nesting and brood rearing habitats in Nevada because site-specific data is scarce.

Early brood-rearing generally occurs close to nest sites; however, movements of individual broods may be highly variable (Connelly 1982, Gates 1985). When considered on a range-wide basis, optimum brood-rearing habitat consists of sagebrush stands that are 16 to 32 inches tall with a canopy cover of 10 percent to 25 percent and an herbaceous understory of 15 percent grass canopy and 10 percent forb canopy (this is consistent with nesting habitat). Ideally, this type of habitat will be found on at least 40 percent of the area that is considered brood-rearing habitat (Connelly et al. 2000). Hens with broods will use sagebrush habitats that have less canopy cover (about 14 percent) than that provided in optimum nesting habitat (Martin 1970, Wallestad 1971), but need at least 15 percent cover of grasses and forbs (Sveum et al. 1998b). The habitats used during the first few weeks after hatching need to provide cover to conceal the chicks, but more importantly, to provide the nutritional requirements during period of rapid development. Brood-rearing habitats that have a wide variety of plant species tend to provide a corresponding variety of insects that are important chick foods.

When chicks are about six weeks of age, sage-grouse hens will usually move the chicks from the early brood habitat/nest area to summer habitat, where the majority of brood rearing occurs. This movement occurs about two weeks after males and females without broods have moved to summer range (Connelly et al. 1988). Summer habitat consists of sagebrush mixed with areas of wet meadows, riparian, or irrigated agricultural fields (Connelly et al. 2000). In general, a sagebrush ecosystem with a good understory of grasses and forbs, and associated wet meadow areas, are essential for optimum habitat. As upland habitats begin to desiccate, sage-grouse broods move to more mesic areas including wet meadows and riparian areas, where succulent grasses and insects are still available (Savage 1968, Schlatterer and Pyrah 1970, Oakleaf 1971, Neel 1980, Autenrieth 1981, Klebenow 1985). These areas mainly occur in the upper elevations of mountain ranges within Nevada and are especially important to small populations of sage-grouse residing in the Battle Mountain, Fish Creek, Desatoya, and Clan Alpine mountain ranges in Nevada. Sage-grouse will also utilize agricultural areas during the late summer and early fall; whether wet meadow or alfalfa pivot. Examples of this use can be

found throughout Nevada, but some important agricultural benefits have been identified in the Nine-Mile Flat area of the Bi-State LACP and the Porter Canyon area within the North Central LACP.

Fall habitat consists of mosaics of low-growing sagebrush (*Artemisia arbuscula*, *A. nova*) and Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*). As with the other seasons of the year, a mosaic of sagebrush vegetation (different species, different cover values, different height classes, etc.) provides the necessary food and cover requirements during the fall period.

Information on winter habitats in Nevada and California are based on limited data. In general, winter movements are related to severity of winter weather, topography, and vegetative cover (Beck 1977). Sagebrush canopy at sage-grouse winter use sites can be highly variable (Patterson 1952, Eng and Schladweiler 1972, Wallestad et al. 1975, Beck 1977, Robertson 1991). However, sage-grouse habitats must provide adequate amounts of sagebrush because their winter diet consists almost exclusively of sagebrush. It is crucial that sagebrush be exposed at least 10 to 12 inches above snow level as this provides both food and cover for wintering sage-grouse (Barrington and Back 1984, Hupp and Braun 1989). During periods of heavy snowfall accumulation that essentially blanket an area, sage-grouse may move to canyon bottoms or lower elevation sagebrush flats or benches associated with mountain ranges within Nevada to access available sagebrush. During the winter, it is not uncommon to find sage-grouse on wind-swept ridges and slopes with south facing exposures.

From the preceding discussion it is evident that although sage-grouse are sagebrush obligates, they use a variety of habitats. Sagebrush habitats vary from low growing to taller sagebrush species, and from plant communities with sparse sagebrush cover to those with relatively high shrub cover. The amount of herbaceous cover also varies between seasonal habitats. There are also important seasonal habitats that do not have a sagebrush component (e.g., riparian meadows), but generally have sagebrush nearby. Sage-grouse have also been observed in or near aspen stands and other areas with trees or very tall shrubs; however, these habitats are not used with any consistency.

The spatial arrangement of the habitats is also important. Leks generally have taller sagebrush cover nearby, and leks and nesting habitat generally need to be in close proximity (although instances of leks being separated from nesting habitat by long distances have been documented). Early brood habitat and nesting habitat should also be in close proximity to one another. Meadows need nearby sagebrush cover to provide the escape cover and loafing cover during summer. The variety of height and cover classes of sagebrush used for winter should also be intermixed.

Therefore, sage-grouse habitat, when considered over the period of a year, consists of a variety of habitats or habitat conditions over a large area. A mosaic of these habitat types or conditions must be available on the landscape to provide all of the sage-grouse seasonal cover and nutritional needs. Adequate grass and forb cover is an important component to nesting and early brood rearing habitats for both forage and concealment from predators. In Oregon, grass cover was greater at successful nests than at unsuccessful nests (Gregg 1991). Other studies conducted in southeastern Oregon (Gregg et al. 1994) have also shown that grass height greater than 18 cm occurring in stands of sagebrush 40-80 cm tall resulted in lesser nest predation rates than in stands with lesser grass heights. The mere presence of sagebrush alone, especially uniform stands over vast acreages should not be considered quality sage-grouse habitat. These stands may provide some seasonal habitat, but cannot provide all the



habitat needs throughout the year. The needs of this species must be provided on a landscape scale level.

## 2.3 Diet

As indicated above, sage-grouse are sagebrush obligates and one reason is their dependence on sagebrush as their exclusive diet during winter. However, over the course of the year, a variety of foods provide the nutritional needs of this species.

The nutrients obtained from forbs are an important part of the diet for pre-laying and nesting hens (Barnett and Crawford 1944). Poor condition hens need to leave their nest more frequently to forage, thus increasing the risk of predation. Body condition of the hens is important for egg shell development.

Chick diets include forbs and invertebrates (Patterson 1952, Klebenow and Gray 1968, Johnson and Boyce 1990, Drut et al. 1994b). Insects are an important component of early brood-rearing habitat (Drut et al. 1994b, Fischer et al. 1996a). Insects, primarily beetles and some ants, comprised over 50 percent of total diet the first week after hatching (Klebenow 1969). Forbs increase in the diet after the first week and remain the major food item for chicks and juveniles throughout the summer.

The proportion of insects and plant material in the chick diet are indirectly proportional to each other. Insects make up the greatest proportion of the young chick diet and the percentage of insects declines as the percentage of plant material increases. Plant use parallels the phenology of a given species (Klebenow and Gray 1968). As plants desiccate, sage-grouse cease to feed on them.

Summer food habits of adult grouse are similar to juvenile food habits, with some differences in proportion of foods eaten. Plant material comprises a larger proportion of the adult diet in early and mid-summer and insects make up less of the adult diet during these periods. However, the actual food items (i.e., species of plant or insect) taken by adults overlap considerably with juveniles (Rasmussen and Griner, 1938, Wallestad et al. 1975).

The use of sagebrush increases in late summer and continues to be the major food item until spring (Girard 1937, Rasmussen and Griner 1938, Patterson 1952, Leach and Hensley 1954, Leach and Browning 1958, Leach and Hensley 1954, Leach and Browning 1958, Klebenow and Gray 1968, Peterson 1970, Wallestad et al. 1975). Several species of sagebrush are used by sage-grouse including Wyoming big sagebrush, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), low sagebrush (*A. arbuscula longiloba*), black sagebrush (*A. arbuscula nova*), fringed sagebrush (*A. frigida*), and silver sagebrush (*A. cana*).

## 2.4 Sage-Grouse Distribution and Status in Nevada and Eastern California

### 2.4.1 Distribution and Movement

Greater sage-grouse are distributed throughout the northern two-thirds of Nevada characterized by sagebrush steppe and sagebrush scrub plant communities. Various sagebrush habitat types occupy approximately 31,000,000 acres (44 percent of the land area in Nevada) providing seasonal habitat or potential habitat for sage-grouse as shown in **Figure 5**. In general, sagebrush sites are dispersed across alluvial fans in the transition zone between salt desert

## Sagebrush Types in Nevada

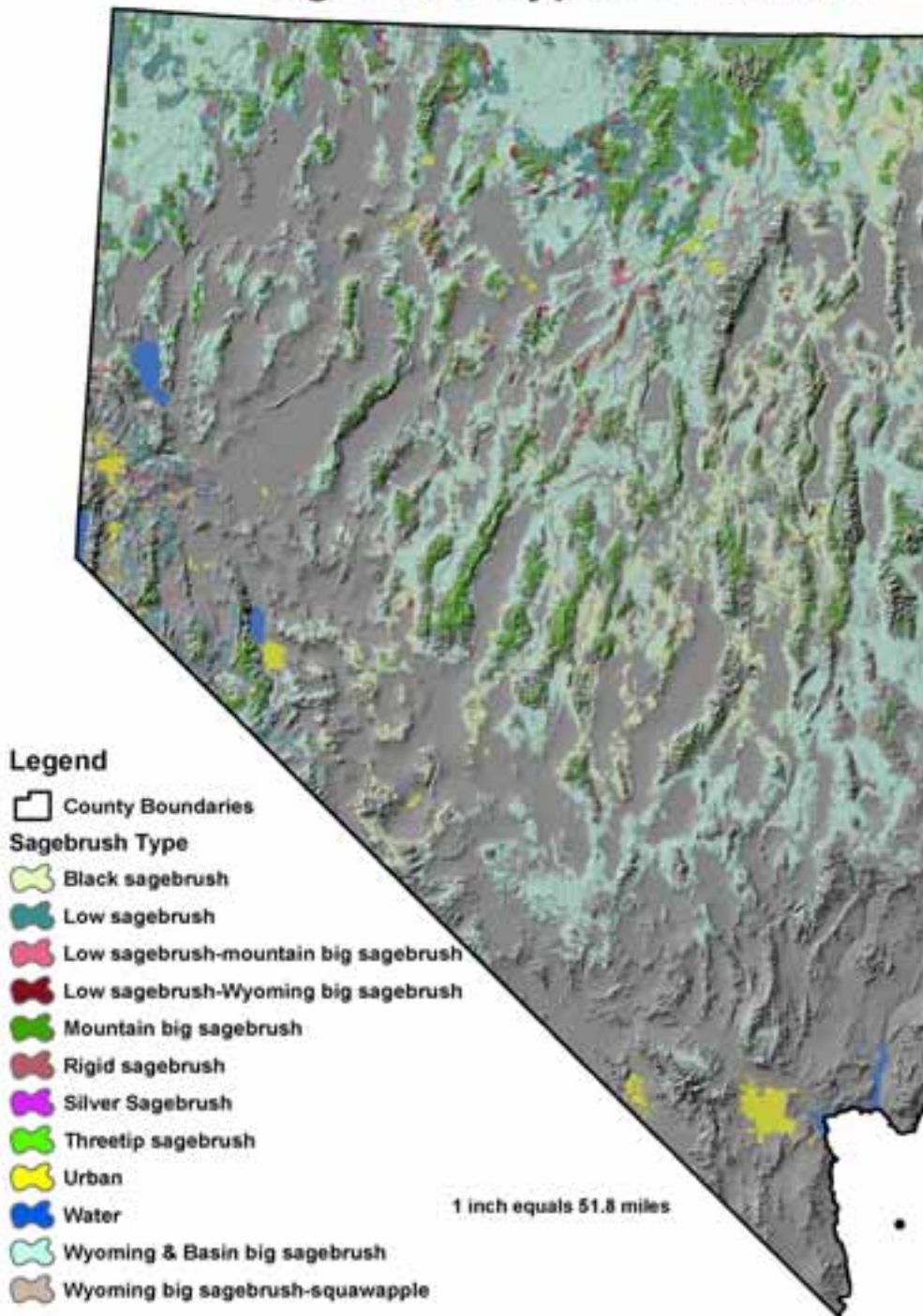


Figure 5. Distribution of sagebrush habitat in Nevada

scrub and alkaline playas in the lower elevation valley floors, and forested or woodland areas at higher elevations. However, it is not uncommon for sagebrush to occupy mountain summits as well. The distribution of sage-grouse in Nevada and California is closely tied to the sagebrush ecosystem.

The most common riparian habitats associated with sagebrush communities include wet meadows, primarily at mid to upper elevations; perennial streams that are frequently lined with willow, aspen, Woods rose and other hydrophytic shrubs; and intermittent (or sometimes perennial) stream channels that are characterized with adjacent stringer meadows. Stringer meadows are generally narrow (but vary in width), are vegetated with grasses, forbs, sedges and rushes and are confined to the seasonally shallow groundwater table. Wet meadows and stringer meadows are particularly important summer habitat for sage-grouse.

Similar sagebrush and riparian habitats characterize portions of eastern California that support two primary sage-grouse populations. The northern population is located primarily in Lassen County and extends into Modoc County. The southern population is located primarily in Mono County and extends into northern Inyo and western Alpine Counties. Sage-grouse from these two population areas move between Nevada and California. The distribution of sage-grouse PMUs in the Nevada-California Plan area are shown in **Figure 3**.

Sage-grouse movements and seasonal habitat information for the Nevada PMUs have been generally described based upon long-term observations by NDOW field biologists, historical information, and some recent telemetry data. NDOW biologists, federal agency biologists, and tribal representatives compiled county records dating back to 1901, anecdotal reports, and over 6,000 sage-grouse sight records dating back to 1947 into a GIS database. Maps were produced at 1:100,000 scale delineating winter range (**Figure 6**), summer range (**Figure 7**), and early brood rearing habitat (**Figure 8**)<sup>1</sup>.

More recent information on sage-grouse movements in Nevada and California has been obtained from radio-telemetry studies. A total of 262 sage-grouse from seventeen study areas were fitted with radio telemetry equipment and were monitored on a monthly basis between March 1998 and May 2000 (for most projects). Seasonal ranges were identified and used to interpret the migratory or non-migratory status of the populations using the general definitions given below as described by Connelly et al. (2001). The results are provided in **Table 2-1**.

- Non-migratory - grouse do not make long-distance movements between or among seasonal ranges (greater than 6 miles one way).
- One-stage migratory – grouse move between two distinct seasonal ranges.
- Two-stage migratory – grouse move among three distinct seasonal ranges.

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<sup>1</sup> Data compiled in the GIS analyses included

- NDOW Form 1 – sage-grouse strutting ground counts;
- NDOW Form 2 – sage-grouse strutting ground summary;
- NDOW Form 4 – summer production survey summary;
- NDOW Form 5 – seasons and harvest data;
- NDOW Form 14 – sage-grouse brood detail sheets;
- NDOW Form 17 – annual sage-grouse production summary; and
- NDOW Form 240 – wildlife sight records, and wintering ground records.

## Sage Grouse Winter Habitat

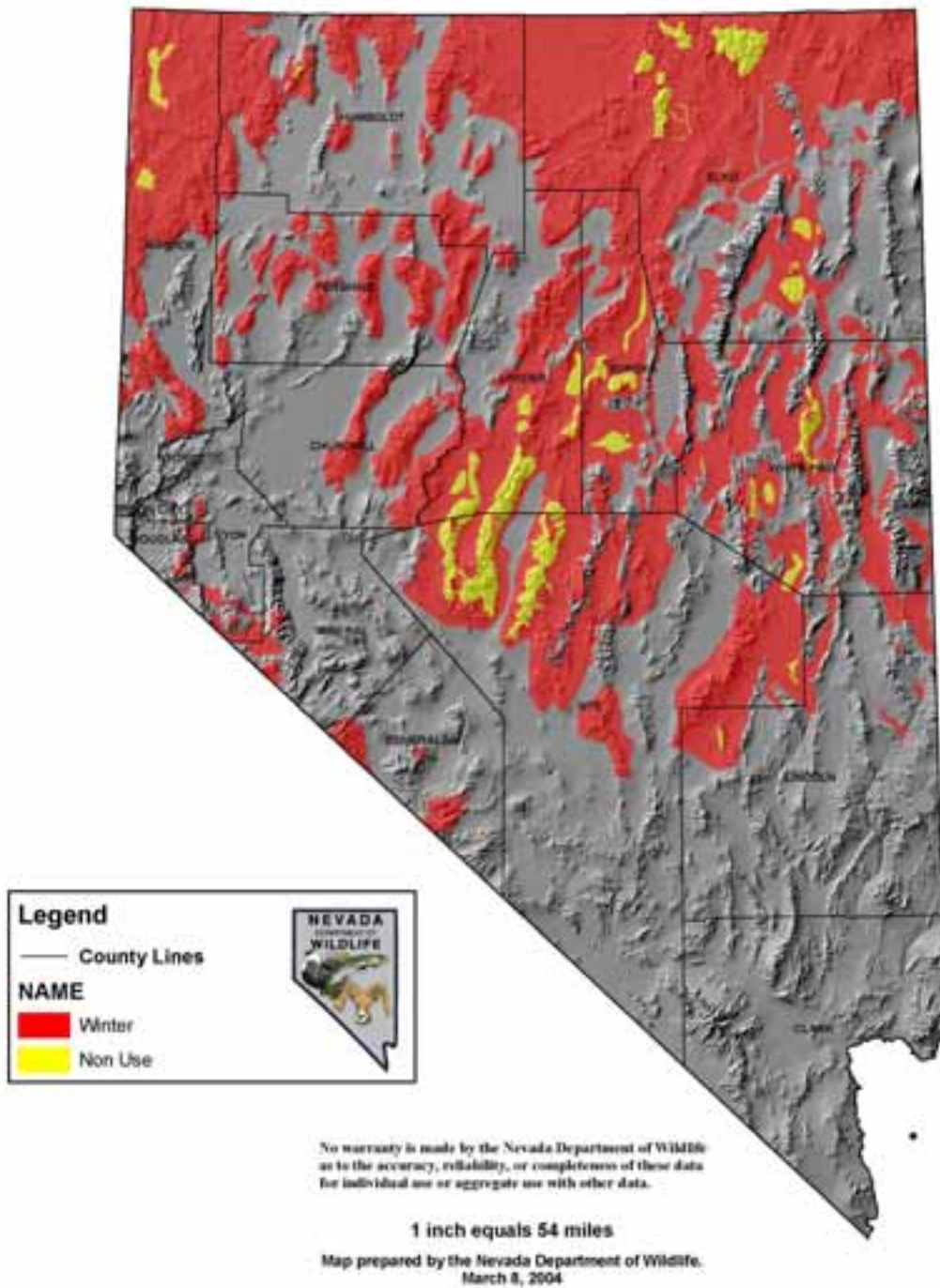


Figure 6. Distribution of sage grouse winter habitat in Nevada



## Sage Grouse Nesting Habitat

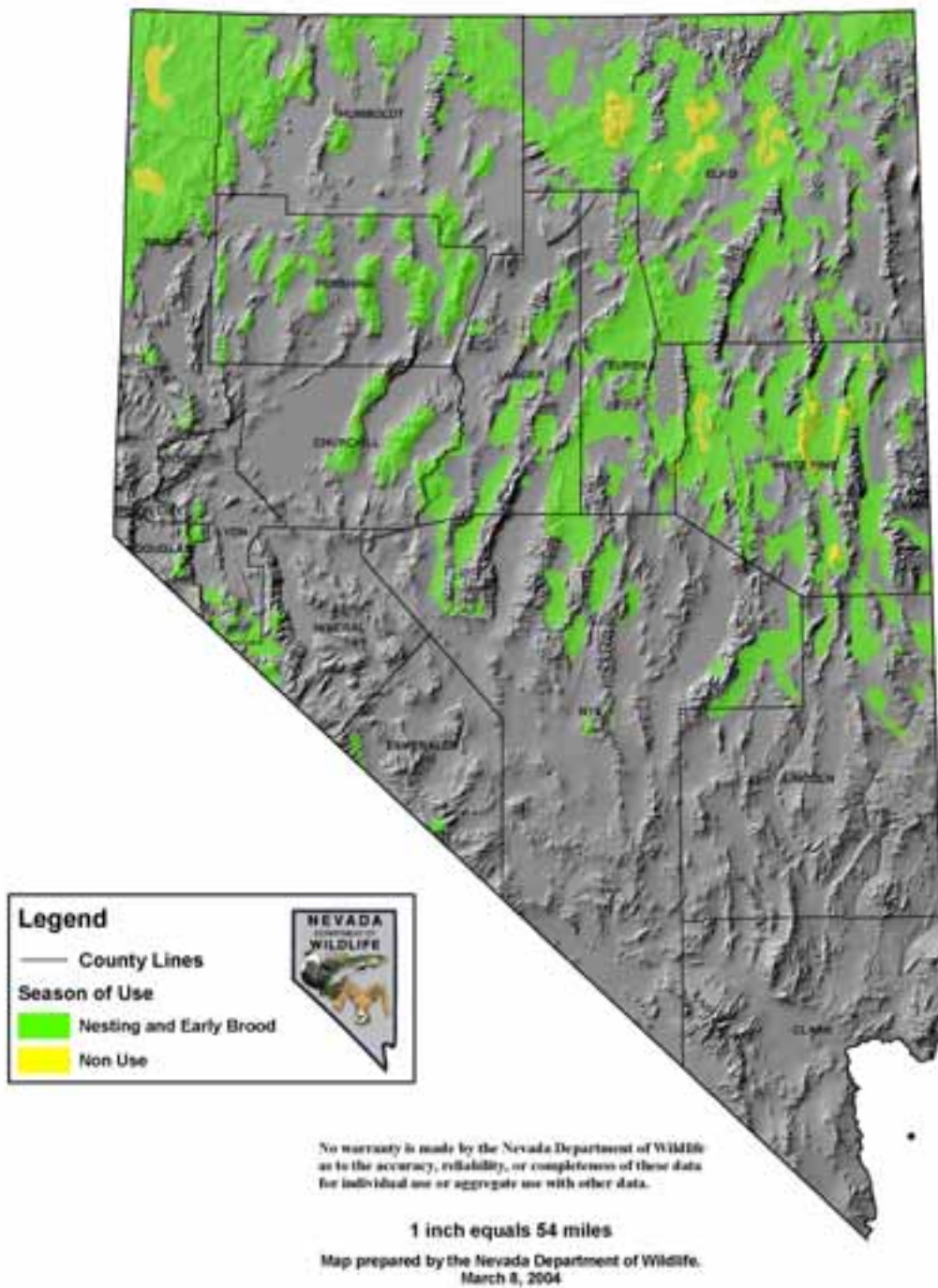


Figure 8. Distribution of sage grouse nesting habitat in Nevada

**Table 2-1. Preliminary Migratory Patterns of Sage-Grouse from Seventeen Different Areas Throughout Nevada and Eastern California. (? – Indicates insufficient information to determine migratory status)**

| Study Site           | County             | Non-migratory | Migratory 1-Stage | Migratory 2-Stage |
|----------------------|--------------------|---------------|-------------------|-------------------|
| Cave Valley          | Lincoln/White Pine | ?             | ?                 | ?                 |
| Charleston           | Elko               |               | X                 |                   |
| Desert Creek         | Lyon               | X             |                   |                   |
| Double Mountain      | Elko               |               |                   |                   |
| Green Mountain       | Elko               |               | X                 |                   |
| Indian Valley        | Nye                |               |                   | X                 |
| Little Spring Valley | Lincoln            |               | X                 |                   |
| Mount Grant          | Lyon               | ?             | ?                 | ?                 |
| Towhee Camp          | Elko               |               | X                 |                   |
| Ruby Valley          | Elko               |               |                   | X                 |
| Sheldon NWR          | Humboldt           |               |                   | X                 |
| Sweetwater           | Lyon               |               | X                 |                   |
| Buffalo/Skedaddle    | Lassen (CA)/Washoe | X             | X                 | X                 |
| Tuscarora            | Elko               |               | X                 |                   |
| Bodie Hills (CA)     | Alpine             |               | X                 |                   |
| Parker (CA)          | Mono               | X             |                   |                   |
| Long Valley (CA)     | Mono               | X             |                   |                   |

Telemetry studies in the Ruby Mountains of Elko County (Northern Nevada Stewardship Plan Area – Ruby Valley PMU) and the Toiyabe Range (Indian Valley study site) of Nye County (South Central Local Plan Area – Reese River PMU) found that sage-grouse moved relatively long distances between breeding habitat and summer habitat. These mountain ranges receive heavy snowfalls during late fall and winter that essentially render the upper elevations unusable to sage-grouse. During the late summer and early fall, the upper elevations provide wet meadows and riparian areas for sage-grouse to forage and access water.

In contrast, sage-grouse home ranges were found to be relatively small and confined to mountaintops within the Battle Mountain and Fish Creek PMUs of the South Central Planning Area. Sage-grouse movement monitoring also showed similar results for the Virginia and Pah-Rah PMUs of the Washoe-Modoc Planning Area.

Seventy-nine sage-grouse were marked in the Buffalo/Skedaddle portions of Lassen County (California) and Washoe County (Nevada) and monitored with radio telemetry from 1998-2000. Birds captured on the same lek exhibited varied movement patterns, including residency and both types of migrations. These multiple migration types included interstate seasonal movements of up to 70 kilometers.

In 2003, the U.S. Geological Survey and California Department of Fish and Game began a study to determine, in part, seasonal movements and habitat use of sage-grouse throughout Mono County. Movement patterns differed between study areas in 2003. Only birds from Bodie Hills (n=6) exhibited migratory behavior (**Table 2-1**). Migratory behavior was observed between integrated spring/summer areas and winter activity centers in the Bodie Hills. Both Long Valley

(n=9) and Parker (n=5) birds moved long distances (greater than 3.2 miles) between successive tracking efforts, but activity centers remained within 6.4 miles between seasons. Short movements characterized the Jackass/Wheeler/Burcham Flats area (n=10) during all seasons. The winter of 2003-2004 was relatively mild, possibly precluding the need for migratory behavior in some of these populations. The study is ongoing and additional movement data will be collected in 2004-2005, which will be available in the next edition of the Nevada-California Plan.

## 2.4.2 Status

The largest populations of sage-grouse in the Nevada portion of the plan area inhabit most of Elko County and portions of Washoe, White Pine, Humboldt, and Nye Counties in Nevada. Similarly, the highest concentrations of sage-grouse leks also occur in these areas (see **Figure 4**). Specifically, the Gollaher, North Fork, O'Neil, and Tuscarora PMUs of Elko County, the Buffalo/Skedaddle, Massacre, and Sheldon PMUs of northern Washoe County, the Butte/Buck/White Pine PMUs of White Pine County, the Santa Rosa PMU in northern Humboldt County, and the Reese River and Monitor PMUs of Nye County contain relatively high densities of sage-grouse.

In California, the highest concentrations of sage-grouse inhabit the Bodie Hills and South Mono PMUs within the Bi-State planning area and the Buffalo/Skedaddle PMU within the Washoe-Lassen-Modoc planning area.

**Figure 9** depicts these "core" population areas; however, it should be noted that not all of the PMUs have population estimates established for them, mostly because of the lack of data. It should also be noted that the Lone Willow PMU in northern Humboldt County is probably misrepresented in Figure 9 because the population estimates used for this map have been extrapolated solely from lek count data. The Lone Willow PMU has had little lek monitoring from the ground because of access issues in the springtime. Most of the monitoring is conducted aerially and only once per year; however, mark-recapture studies in the Lone Willow PMU (described later within this section) have revealed that this area supports a high population of sage-grouse.

The PMU population estimates that are available at this time are provided in **Table 2-2**, which will be updated in future editions or amendments to the Nevada-California Plan. These estimates are crude, but do provide a minimum population estimate based on the number of male sage-grouse observed during a given breeding season. The assumptions and procedures used to calculate the population estimates are included in **Appendix D**.



## Sage Grouse Population Estimates by PMU's

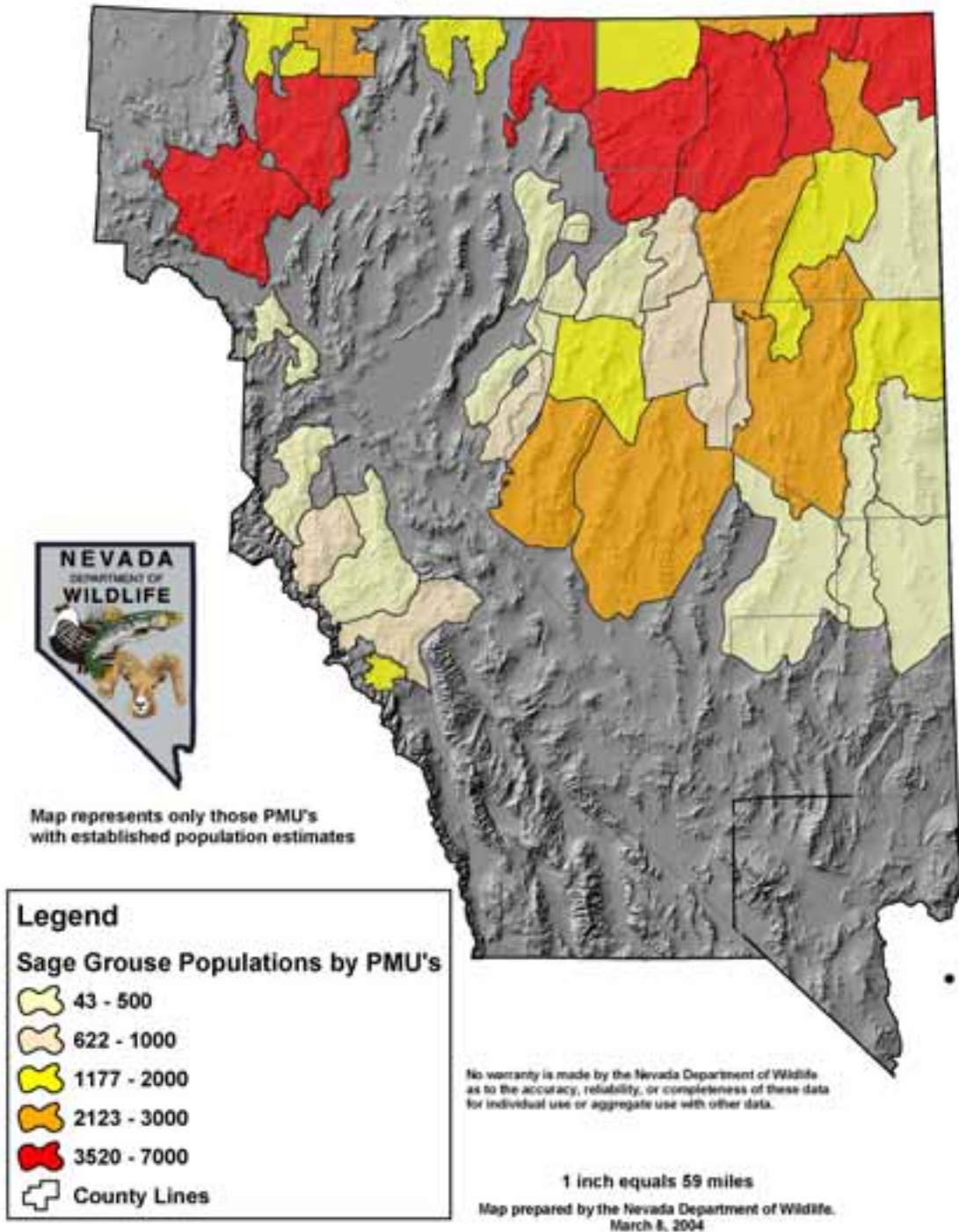


Figure 9. Sage grouse populations estimates by PMU

**Table 2-2. Population Estimates and Number of Known and Active Leaks for Population Management Units (PMU) within Nevada and Eastern California.**

| <b>PMU Name</b>   | <b>Total Known Leaks<sup>1</sup></b> | <b>Active Leaks</b>                      | <b>Low-end Estimate</b> | <b>High-end Estimate</b> |
|---|--------------------------------------|--|-------------------------|--------------------------|
| <b><i>Bi-State Local Planning Area</i></b>                        |                                      |  |                         |                          |
| Pine Nut  | 16                                   | 8  | 292                     | 389                      |
| Desert Creek/Fales  | 26                                   | 11                                       | 699                     | 899                      |
| Mount Grant   | 14                                   | 3  | 230                     | 306                      |
| Bodie Hills   | 8                                    | 7  | 622                     | 700                      |
| South Mono  | 20                                   | 8  | 1177                    | 1324                     |
| White Mountains   | 5                                    | Insufficient data to estimate population |                         |                          |
| <b>Subtotal</b>   | <b>89</b>                            | <b>37</b>                                | <b>3020</b>             | <b>3618</b>              |
| <b><i>Northeastern Nevada Stewardship Group (Elko County)</i></b> |                                      |  |                         |                          |
| Desert  | 25                                   | 19                                       | 1330                    | 1596                     |
| East Valley   | 14                                   | 8  | 382                     | 459                      |
| Gollaher  | 104                                  | 53                                       | 4501                    | 5402                     |
| North Fork  | 202                                  | 126                                      | 6653                    | 8870                     |
| O'Neil Basin  | 167                                  | 67                                       | 5025                    | 6700                     |
| Ruby Valley   | 86                                   | 45                                       | 1946                    | 2335                     |
| Snake   | 53                                   | 39                                       | 2123                    | 2548                     |
| South Fork  | 46                                   | 41                                       | 2979                    | 3575                     |
| Tuscarora   | 105                                  | 64                                       | 3520                    | 4693                     |
| Islands   | 40                                   | 40                                       | 2680                    | 3573                     |
| <b>Subtotal</b>   | <b>842</b>                           | <b>502</b>                               | <b>31139</b>            | <b>39751</b>             |
| <b><i>White Pine Local Planning Area</i></b>                      |                                      |  |                         |                          |
| Butte/Buck/White Pine   | 133                                  | 56                                       | 2688                    | 3136                     |
| Schell/Antelope   | 33                                   | 22                                       | 1550                    | 1809                     |
| Spring/Snake Valley   | 21                                   | 11                                       | 372                     | 434                      |
| Steptoe/Cave (north) <sup>2</sup>                                 | 34                                   | 11                                       | 424                     | 495                      |
| <b>Subtotal</b>   | <b>221</b>                           | <b>100</b>                               | <b>5034</b>             | <b>5874</b>              |
| <b><i>Lincoln County Local Planning Area</i></b>                  |                                      |  |                         |                          |
| Lincoln   | 31                                   | 9  | 480                     | 576                      |
| Steptoe/Cave (south) <sup>2</sup>                                 | 34                                   | 6  | 272                     | 326                      |
| Quinn   | 6                                    | Insufficient data to estimate population |                         |                          |
| <b>Subtotal</b>   | <b>71</b>                            | <b>15</b>                                | <b>752</b>              | <b>902</b>               |
| <b><i>North Central Local Planning Area</i></b>                   |                                      |  |                         |                          |
| Santa Rosa  | 160                                  | 58                                       | 3596                    | 4795                     |
| Lone Willow <sup>3</sup>  | 127                                  | 39                                       | 1833                    | 2444                     |
| Pine Forest   | 6                                    | 2  | Insufficient data       |                          |
| Black Rock  | 18                                   | 8  | Insufficient data       |                          |
| Jackson   | 6                                    | 1  | Insufficient data       |                          |
| Slumbering Hills  | 2                                    | 0  | Insufficient data       |                          |
| Eden Valley   | -                                    | -  | Insufficient data       |                          |
| Sonoma  | 13                                   | 8  | 486                     | 688                      |
| East Range  | 3                                    | 1  | Insufficient data       |                          |
| Eugenes   | 7                                    | 4  | Insufficient data       |                          |

| PMU Name   | Total Known Leks <sup>1</sup> | Active Leks | Low-end Estimate  | High-end Estimate |
|--|-------------------------------|-------------|-------------------|-------------------|
| <b>North Central Local Planning Area (continued)</b> |                               |             |                   |                   |
| Majuba (1, 2, 3, 4, 5)                               | 8                             | 0           | Insufficient data |                   |
| Limbo  | -                             | -           | Insufficient data |                   |
| Sahwave (1, 2)                                       | -                             | -           | Insufficient data |                   |
| Nightingale  | -                             | -           | Insufficient data |                   |
| Trinity (1, 2)                                       | -                             | -           | Insufficient data |                   |
| Stillwater   | 7                             | 0           | Insufficient data |                   |
| Clan Alpine  | 3                             | 1           | 67                | 80                |
| Desatoya   | 12                            | 10          | 735               | 980               |
| Humboldt   | 3                             | 0           | Insufficient data |                   |
| <b>Subtotal</b>                                      | <b>375</b>                    | <b>132</b>  | <b>6717</b>       | <b>8987</b>       |
| <b>South Central Local Planning Area</b>             |                               |             |                   |                   |
| Battle Mountain                                      | 6                             | 3           | 48                | 60                |
| Fish Creek   | 6                             | 2           | 43                | 53                |
| Shoshone   | 22                            | 15          | 480               | 600               |
| Cortez   | 23                            | 11          | 644               | 858               |
| Three Bar  | 40                            | 10          | 860               | 1147              |
| Diamond  | 28                            | 11          | 638               | 851               |
| Toiyabe  | 64                            | 17          | 1802              | 2403              |
| Reese River  | 34                            | 21          | 2226              | 2968              |
| Monitor  | 73                            | 27          | 2827              | 4240              |
| Kawich   | -                             | -           | Insufficient data |                   |
| <b>Subtotal</b>                                      | <b>296</b>                    | <b>117</b>  | <b>9568</b>       | <b>13180</b>      |
| <b>Washoe-Lassen-Modoc Local Planning Area</b>       |                               |             |                   |                   |
| Buffalo/Skedaddle                                    | 150                           | 33          | 3667              | 4125              |
| Massacre   | 68                            | 24          | 3636              | 4848              |
| Vya  | 27                            | 13          | 1885              | 2513              |
| Sheldon  | 35                            | 18          | 2896              | 3475              |
| Virginia/Pah-Rah                                     | 5                             | 2           | 258               | 331               |
| <b>Subtotal</b>                                      | <b>285</b>                    | <b>90</b>   | <b>12342</b>      | <b>15292</b>      |
| <b>Totals</b>  | <b>2179</b>                   | <b>993</b>  | <b>68,572</b>     | <b>87,604</b>     |

<sup>1</sup> The number of total known leks includes active, inactive, unknown, and historic leks. For lek definitions, please see section 5.4.1.

<sup>2</sup> This PMU extends between the two counties and subsequently the Local Planning Area and is displayed twice; however, the estimates are split as accurately as possible and the combined total is used in the overall total population estimates.

<sup>3</sup> This population estimate was based solely on lek count data conducted aerially and only once during the breeding season. For a more reliable population estimate please see the North Central Local Plan Area portion of this section.

Based on these PMU population estimates, the current estimate of sage-grouse within Nevada and eastern California is between 68,000 and 88,000 birds. This estimate does not include the birds within 17 PMUs for which population estimates are not yet available; however, the low-end estimate is consistent with the population estimate of 68,453 generated independently by the Partners in Flight Breeding Bird Survey and documented in the North American Landbird Conservation Plan (Rich et al. 2004).

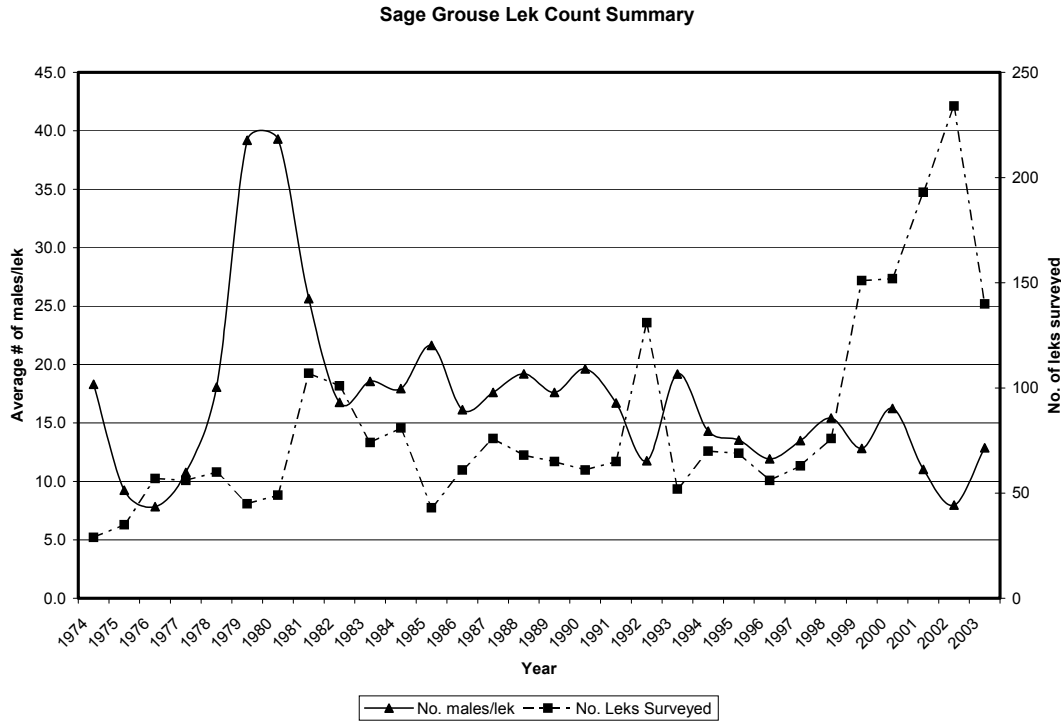
### **Population Trends Observed From Lek Counts in Nevada**

Sage-grouse leks in Nevada have been surveyed since the early 1950's; however, more complete data sets are available from 1974 through the present. Sage-grouse population trends based on historical lek count data suggest that populations were slightly low during 1975 and 1976 then showed a strong upward spike that peaked in 1980 with an average of 39.3 males observed per lek as illustrated in **Table 2-3** and **Figure 10**. The trend in the average number of males per lek was stable until 1994, when a downward trend was observed that has continued to the present time. Much of this downward trend is probably associated with significant habitat losses from wildfires that occurred in the northern part of the state that burned key sage-grouse habitats in Elko, Lander and Humboldt Counties (see **Figure 11**). Population declines in the Lincoln and White Pine County Planning Areas as well as the Bi-State Planning Area have been attributed to loss of habitat due to pinyon-juniper encroachment.

All lek locations are not currently known in Nevada and all known lek locations are not surveyed annually. Several leks known as "trend" leks are surveyed annually according to the protocol in **Appendix G**. Between 1999 and 2003, NDOW biologists and volunteers from the NDOW PrOWL program (Preserving Our Wildlife Legacy) counted an average of 174 leks each year. Between 1980 and 1984, NDOW counted approximately 82 leks each year. The recent increased effort to locate and monitor new leks, both aerially and from the ground, has revealed several new lek locations throughout the state. In many cases, these new leks are smaller or can be considered "satellite" leks of much larger leks. Doubling the number of leks counted, most of which are smaller in size and occupancy, tends to lower the average proportion of males per lek.

**Table 2-3. Summary of Sage-Grouse Lek Surveys in Nevada, 1974-2003.**

| <b>Year</b> | <b>Number of<br/>Leks<br/>Surveyed</b> | <b>Number of<br/>Males<br/>Observed</b> | <b>Number of<br/>Males/Lek</b> |
|-------------|--|---|--------------------------------|
| 1974        | 29                                     | 531                                     | 18.3                           |
| 1975        | 35                                     | 324                                     | 9.3                            |
| 1976        | 57                                     | 447                                     | 7.8                            |
| 1977        | 56                                     | 603                                     | 10.8                           |
| 1978        | 60                                     | 1084                                    | 18.1                           |
| 1979        | 45                                     | 1763                                    | 39.2                           |
| 1980        | 49                                     | 1926                                    | 39.3                           |
| 1981        | 107                                    | 2743                                    | 25.6                           |
| 1982        | 101                                    | 1694                                    | 16.8                           |
| 1983        | 74                                     | 1374                                    | 18.6                           |
| 1984        | 81                                     | 1454                                    | 18.0                           |
| 1985        | 43                                     | 930                                     | 21.6                           |
| 1986        | 61                                     | 984                                     | 16.1                           |
| 1987        | 76                                     | 1339                                    | 17.6                           |
| 1988        | 68                                     | 1306                                    | 19.2                           |
| 1989        | 65                                     | 1145                                    | 17.6                           |
| 1990        | 61                                     | 1197                                    | 19.6                           |
| 1991        | 65                                     | 1087                                    | 16.7                           |
| 1992        | 131                                    | 1541                                    | 11.8                           |
| 1993        | 52                                     | 998                                     | 19.2                           |
| 1994        | 70                                     | 1002                                    | 14.3                           |
| 1995        | 69                                     | 934                                     | 13.5                           |
| 1996        | 56                                     | 668                                     | 11.9                           |
| 1997        | 63                                     | 850                                     | 13.5                           |
| 1998        | 76                                     | 1172                                    | 15.4                           |
| 1999        | 151                                    | 1936                                    | 12.8                           |
| 2000        | 152                                    | 2470                                    | 16.3                           |
| 2001        | 193                                    | 2130                                    | 11.0                           |
| 2002        | 234                                    | 1867                                    | 8.0                            |
| 2003        | 140                                    | 1804                                    | 12.9                           |



**Figure 10. Average number of males/lek in relation to the number of leks surveyed from 1974 through 2003, Nevada.**

**Bi-State Local Plan Area (Nevada)**

The Nevada portion of the Desert Creek/Fales PMU supports the largest sage-grouse population on the Nevada side of the Bi-State Planning Area. The population estimate for the entire PMU is approximately 700-900 sage-grouse. The Desert Creek leks have been monitored on a consistent basis since the early 1980's (excluding 1996, 1997, and 1998 for unknown reasons). In 1984, 19 males were observed on the Desert Creek trend lek as compared to 49 males observed in 2003. In contrast, Sweetwater #2 has decreased over the same time period from a high count of 60 males in 1984 and 1985 to 15 males observed in 2003.

The Pine Nut PMU supports a small population of sage-grouse at the present time. Anecdotal evidence suggests that populations within the Pine Nut Range were greater and were once distributed across a wider area. Lek survey data are limited and inconclusive. Leks in the northern portion of the range were not discovered until 1993.

The limited amount of data available for the Mount Grant PMU also indicates a relatively small sage-grouse population. Lek monitoring on Mount Grant began in 1969 and continued annually until 1977. The peak number of males observed was 65 in 1972. No surveys were conducted between 1978 and 1988. Between 1991 and 2000 the average number of males per lek decreased to 12. During the most recent survey in 2002, and average of 24 males per lek were observed. Population trends based on the lek data for the Mount Grant PMU are inconclusive.

## Nevada Fire History Map

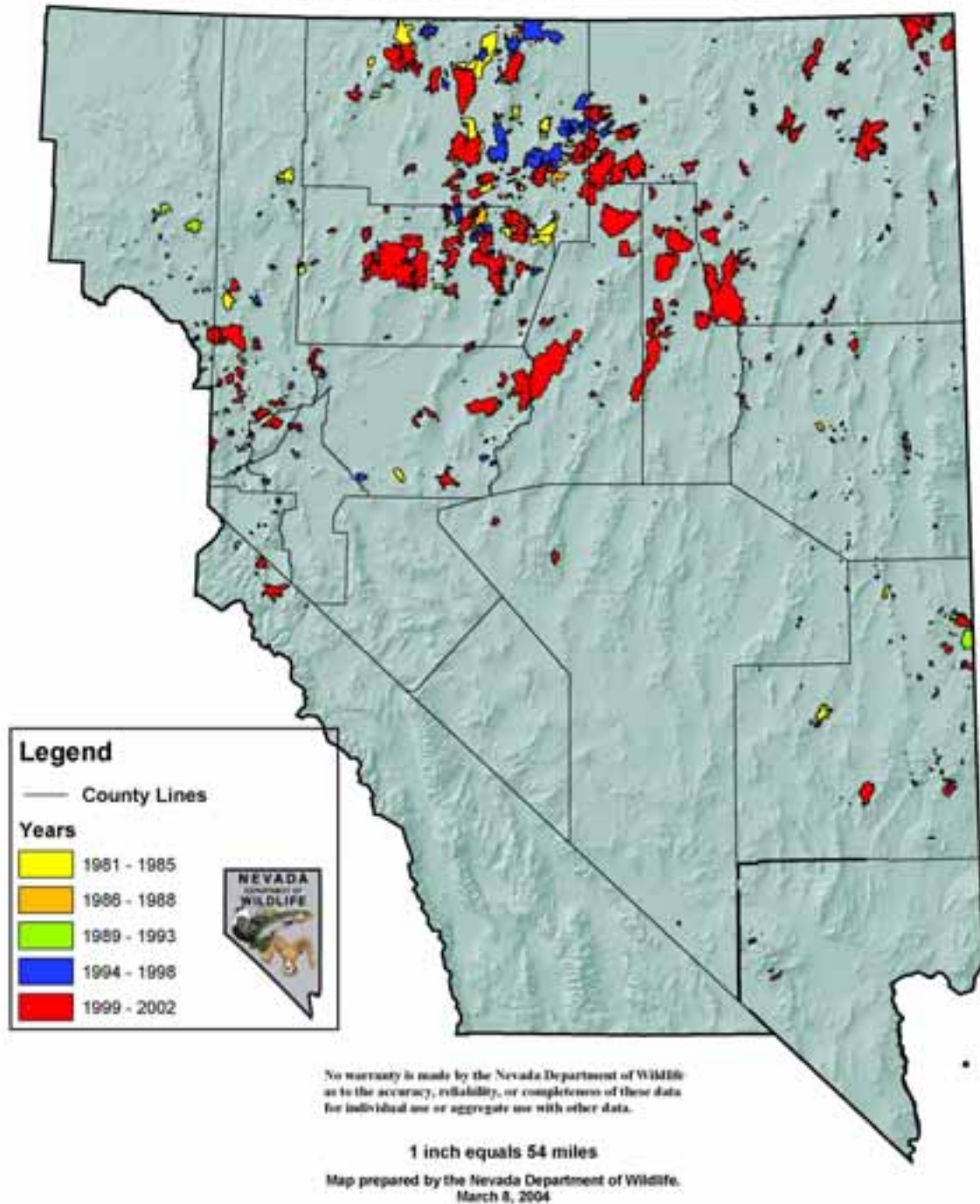


Figure 11. Wildfire history in Nevada 1981 - 2002

Relatively little is known about the White Mountain PMU and it is assumed to support a small sage-grouse population. Harvest records from past decades suggest that there may have been a sizeable population within this area. Only five leks have been documented within the White Mountain PMU at this time.

#### **Washoe-Modoc Local Plan Area (Nevada)**

Sage-grouse in the Massacre PMU occur over a large geographic area with little or no occurrence of habitat fragmentation. The Bureau of Land Management manages over 80 percent of the land in this PMU, and no large-scale changes in land management practices are anticipated for the Massacre area. The population is estimated at 3,600 to 4,800 birds based on 10 years of lek counts that show relatively stable bird numbers.

The Sheldon PMU, more commonly known as the Charles Sheldon National Wildlife Refuge, is managed by the U.S. Fish and Wildlife Service and contains some important sage-grouse habitat. Consistent sage-grouse monitoring was developed in the mid 1990s when NDOW began helicopter lek counts. The population is estimated at 2,900 to 3,500 birds. Average number of males per lek has increased since 1996, but several leks counted from the ground in the early 1990s are no longer active. Productivity, measured as chicks per hen, shows high annual variation, but has decreased slightly since 1995.

Sage-grouse in the Virginia and Pah-Rah PMUs occur in small isolated pockets of suitable habitat. NDOW biologists and other individuals knowledgeable of this area estimate that sage-grouse currently utilize approximately 54,000 acres or 14 percent of the 402,748 acres in this PMU. Approximately 57 percent of the PMU is managed by the Bureau of Land Management; 35 percent is in private ownership, and 8 percent belongs to the Pyramid Lake Paiute Tribe. Urbanization particularly in the Pah Rah Range is the biggest threat to existing sage-grouse habitat. Of the estimated 53,760 acres of habitat currently suitable for sage-grouse in the Pah Rah and Virginia Mountain Ranges, 27,520 acres or 51 percent are under private ownership. A qualitative population viability analysis of risk factors was conducted by Nevada Department of Wildlife biologists using parameters outlined in **Appendix I** (from Nevada Sage-Grouse Conservation Strategy) that showed a high probability of extirpation of this population within the next 20 years.

Sage-grouse in the Vya PMU occur over a large geographic area with little or no occurrence of habitat fragmentation. Over 80 percent of the land in this PMU is managed by the Bureau of Land Management. No large-scale changes in land management practices are anticipated for this PMU. The population is estimated at 1,900 to 2,500 sage-grouse. A qualitative population viability analysis was also conducted for this population by Nevada Department of Wildlife biologists using parameters outlined in **Appendix I**. The analysis of these factors in the Vya PMU indicates a low probability of extirpation within the next 20 years.

#### **North Central Local Plan Area**

The Lone Willow PMU in north-central Humboldt County historically and presently supports a large sage-grouse population. Prior to 2001, NDOW estimated that the population of sage-grouse in this area was approximately 3,000 birds based on lek counts and hunter harvest information. It was also estimated that approximately 200 hunters visited the area annually and harvested between 350 and 400 birds. In 2000, NDOW collected 438 wings from hunter-harvested birds, reflecting a harvest rate of approximately 15 percent of the estimated population. The most recent population estimates from lek count data are 1,900 to 2,400 birds.



The harvest rate and the questionable accuracy of the population estimates caused some concern that hunter harvest may have an impact on this particular sage-grouse population. In turn, NDOW initiated an intensive mark-recapture study that began in 2001 and will be concluded in 2004. The following preliminary results have been recorded:

- 817 sage-grouse have been captured and marked with either a leg band or telemetry collar and leg band during the summer months
- The nine-day fall hunting season was used as the random recapture sample.
- The Lincoln Index calculation estimated 11,070 sage-grouse in the Lone Willow PMU in 2003, which is substantially greater than the original population estimate size of 3,000 birds in 2000.

Sage-grouse population estimates for the Desatoya PMU range from 735 to 980 birds. Harvest and production data from the 1950's thru the 1970's is limited; however, the number of birds classified during surveys and the number of birds harvested during various open hunting seasons would indicate higher population numbers than what is estimated to be present today.

In the Desatoya PMU, more information has been collected in recent years regarding important lek sites and the distribution of sage-grouse within this PMU. Currently, there are 10 active leks in the Desatoya PMU. Two new leks were discovered in the spring of 2003. Nine of the 19 total known leks that have been identified in the Desatoya PMU were located during the intensive 1992 aerial survey. The remaining ten leks have been discovered over the last few years during ground and aerial surveys. The continuous identification of new leks in recent years strongly suggests that additional leks exist.

The Clan Alpine Population Management Unit has a small population of sage-grouse estimated at less than 100 birds based upon lek count data (**Table 2-2**). The population is believed to have decreased significantly over the past three decades, but have experienced stable trends over the last three-year period. Obtaining population data on small sage-grouse populations is very difficult. The amount of population data collected to date for this population is limited. The only active lek that has been identified in recent years was discovered in the spring of 2002. A high count of 14 sage-grouse (10 males and 4 females) was observed on the lek. The two leks that were active in the early to mid 1990's were last surveyed in 2002. No sage-grouse were observed during the one-day aerial survey. Two historical leks from the 1960's were also surveyed to check for grouse activity, but no birds were observed. Continued monitoring of these leks is encouraged to determine if they are still active.

Population estimates for the East Range PMU are based on professional judgment due to insufficient field based census data. During the last decade, only three small leks have been identified, during helicopter surveys. The Spaulding Complex Fire (2001) burned a majority of the habitat surrounding all three of the known leks. Islands of sagebrush habitat remain within the burned areas and may provide sufficient cover and forage for a small population. In 1992, when the strutting grounds were discovered, a total of 16 birds were observed with a high count of twelve birds on a single lek. A deer hunter reported an observation of 30 sage-grouse one mile north of Granite Mountain in October of 2001 following the fire. This represents the highest number of birds recorded in the PMU.

### **Northeastern Nevada Stewardship Group**

Decreases in the number of males counted on trend leks in Elko County were documented for 9 of the last 13 years. Lek monitoring efforts were coordinated between Elko NDOW and Elko Bureau of Land Management Field Office personnel. Monitoring by NDOW personnel focused mainly on ground counts. The Bureau of Land Management biologists conducted an extensive survey for lek activity in burned areas from the previous three summers and areas that had not been checked in several years. NDOW personnel checked trend leks between two and six times each during April and early May. For Elko County as a whole, there were 59 active leks, 128 unknown status and 64 new leks documented by survey in 2003. NDOW personnel monitored 14 trend leks counting 426 males, yielding an average of 30 males/lek. This shows a 13% increase in numbers from 2002. On 38 other active leks, 785 male sage-grouse were observed for an average of 21 males/lek. There are a total of 502 leks classified as active in Elko County. Obviously, many of these leks were not visited in 2002. The number of active leks classified in Elko County is due in large part to the fact that the status applied to a lek during its most recent visitation will not change because a lek is not surveyed during a subsequent year; in other words, if a lek was considered active two years ago, but has not been surveyed since, the lek will still be considered active until a visit confirming status is conducted.

### **White Pine Local Plan Area**

In White Pine County, survey data from 22 trend leks shows a decrease in male attendance of 8 percent in from 2002 to 2003. The number of males attending leks in the White Pine planning area can be considered erratic with declines dating back to 1995 followed by a period of stability in 1997-1998 and increased in 1999 and 2000 and declines again in 2001 and 2002. Eight trend grounds that have been monitored since 1982 have shown a 64 percent decrease in male attendance as of 2003.

The most recent population estimates for White Pine County showed 100 active leks with a total sage-grouse population estimate of 5,800 to 6,800 birds. The Bureau of Land Management Ely District monitored 91 leks in 2003 and found 44 to be active with more than 400 male sage-grouse observed. In 2002, 138 leks were monitored including many leks that had not been checked in many years. A total of 45 active leks were recorded with a total of 545 male sage-grouse. In 2001, 108 leks were monitored; 56 were active with a total of 642 males. In 2000, 104 leks were monitored and 62 leks were active; 830 males were observed.

### **Lincoln Local Plan Area**

Survey data from 12 leks counted in both 2002 and 2003 in Lincoln County reflect a five percent increase in overall attendance (males and females) over the short-term, but an 8 percent decrease in attendance by males during the same time period. Long-term data are still being analyzed for many leks in Lincoln County. Short-term data indicate that breeding populations of sage-grouse in Lincoln County are relatively stable at low numbers at the present time and range between 750 and 900 birds.

### **South Central Local Plan Area**

Trend lek survey data gathered in 2003 from 13 leks in the Reese River and Monitor PMUs of Nye County reflect a 7 percent decrease in overall attendance over the short-term, and a 9 percent decrease in attendance by males during the same time period. Long-term trends are inconclusive. Trend grounds, designated in 2001, are being counted annually. Trend leks in central Nevada have shown a 33 percent decrease in male attendance since 2001. Some of this

observed decrease may be due to differences in snow accumulations at higher elevations over the past three winters. The winter of 2001 experienced heavier snow accumulations and sage-grouse may have been forced to lower elevations to carry out breeding activities. In contrast, the winters of 2002 and 2003 offered more favorable conditions, enabling sage-grouse to utilize open areas at those higher elevations.

In Lander County, twelve leks were visited in the Shoshone, Fish Creek, Battle Mountain, and Toiyabe PMUs in 2003 and 169 males were observed. Five of these leks are counted annually for trend analysis. The data showed a 30 percent increase in male attendance from numbers recorded in 2002 that followed a 6 percent increase from 2001.

In the Diamond, Three Bar, and Cortez PMUs of Eureka County ten leks were surveyed in 2003 with 200 males observed for an average of 20 males per lek. This represented a slight increase from 2002 when 189 males were observed on these same ten grounds for an average of 19 males per lek. The twenty-year (1983-2002) cumulative average for comparable grounds was 28 males per lek.

NDOW and UNR graduate students surveyed ten active leks in the Diamond PMU in 2003. NDOW biologists determined that there were 19 active leks in Eureka County in 2003 based on visitation and the assumption that leks not visited, but were active the year prior, were still active. Lek counts revealed 310 males in attendance for an average of 16 males per lek. Two new lek locations or "satellite" grounds used by sage-grouse from adjacent older leks were observed during the 2003 surveys. In 2002, 24 active leks were monitored with 290 males observed for a ratio of 12 males per lek.

### **Population Trends Observed from Lek Counts in California**

In California, leks have been surveyed for the past 50 years. Earlier efforts were often anecdotal or not standardized. Monitoring efforts increased significantly in 1987 with multiple counts of each lek each year to determine peak male attendance. Currently, a high percentage of active leks are assumed to be known in California, with attempts to gather three to five counts on each annually. Because of inconsistencies in survey efforts, population trends are estimated on a subset of leks that have been surveyed consistently over the years (trend leks) as described below.

The recently released Conservation Assessment for Greater Sage-Grouse and Sagebrush Habitats (Connelly et al. 2004) indicates that sage-grouse populations in California have been stable to increasing during the assessment period of 1965-2003. Available lek count data was used by the authors to reach this conclusion, which is probably accurate for the core populations in California during the assessment period. However, longer-term losses of sage-grouse from peripheral areas such as western Modoc County, where few sage-grouse currently exist, were anecdotally documented as far back as 1923 (Leach and Hensley 1954).

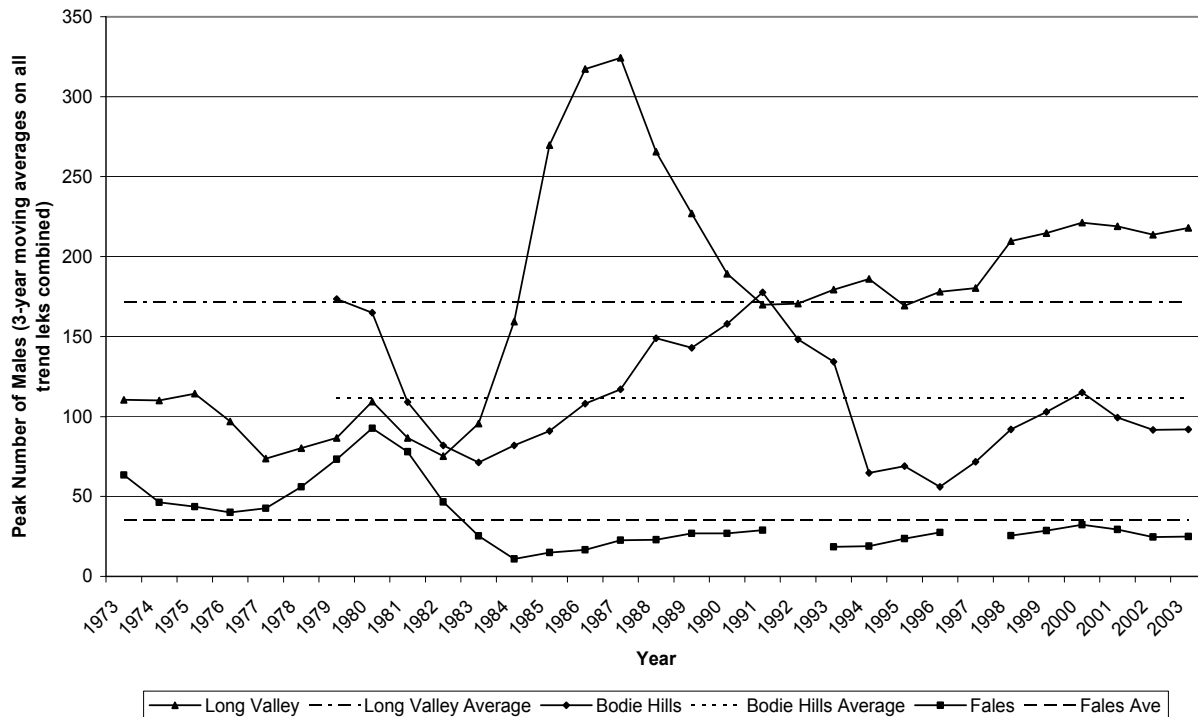
Concerns about harvest of sage-grouse dates back as far as 1901 in California, with numerous closures and season adjustments in the past 100 years. Currently, limited hunting seasons are allowed by limited permits in four zones with the largest and most stable populations, including Bodie and Long Valley in the Bi-State Area and Central and East Lassen in the Buffalo/Skedaddle Area. Lek counts are used to develop permit allocations, accounting for <5% of the spring population estimate, well below harvest levels suggested in the Western Association of Fish and Wildlife Agency Guidelines (Connelly et al. 2000).

**Bi-State Local Plan Area (California)**

Long-term lek data is available to address population trends in three sub-populations, including: Fales (Fales/Desert Creek PMU), the Bodie Hills (Bodie PMU), and Long Valley (South Mono PMU). Hunting is allowed under a conservative permit system in Long Valley and Bodie, but closed in Fales. See **Appendix L** for more detailed analyses of population trends in the Bi-State plan area.

**Figure 12.**

**Total Number of Male Greater Sage-grouse on Trend Leaks for Long Valley (n=6), the Bodie Hills (n=4), and Fales (n=4) Subpopulations in the Bi-State Area (Mono County, CA), 1973-2003**



The trend in the Fales sage-grouse populations (Bi-State Local Plan Area) is marked by two distinct periods. From 1957-1981, the three-year moving average for the number of males counted fluctuated between 75 and 311 percent of the long-term average. In some years, lek surveys were not conducted or abnormally low sample sizes were obtained due to low sampling effort (e.g., one-time counts), which may account for the wide fluctuation in three-year average lek counts. For the most part, however, average lek counts remained well above or just slightly below the long-term average through the early 1980's. The Fales sage-grouse population attained its highest level from 1959-1964.

Beginning in 1982, the Fales population began a steep, downward trend that was apparently linked to the cessation of breeding activity on one lek. Three-year moving averages from 1982-1991 dropped from 88 percent of the long-term average in 1982 to as low as 20-30 percent of the long term average from 1984-1986. From 1993-2003, the three-year moving average ranged from 26 to 56 percent of the long-term average. The most recent three-year average

(2000-2002) indicates that the Fales sage-grouse population is maintaining a low, but stable trend at around 50 percent of the long term average.

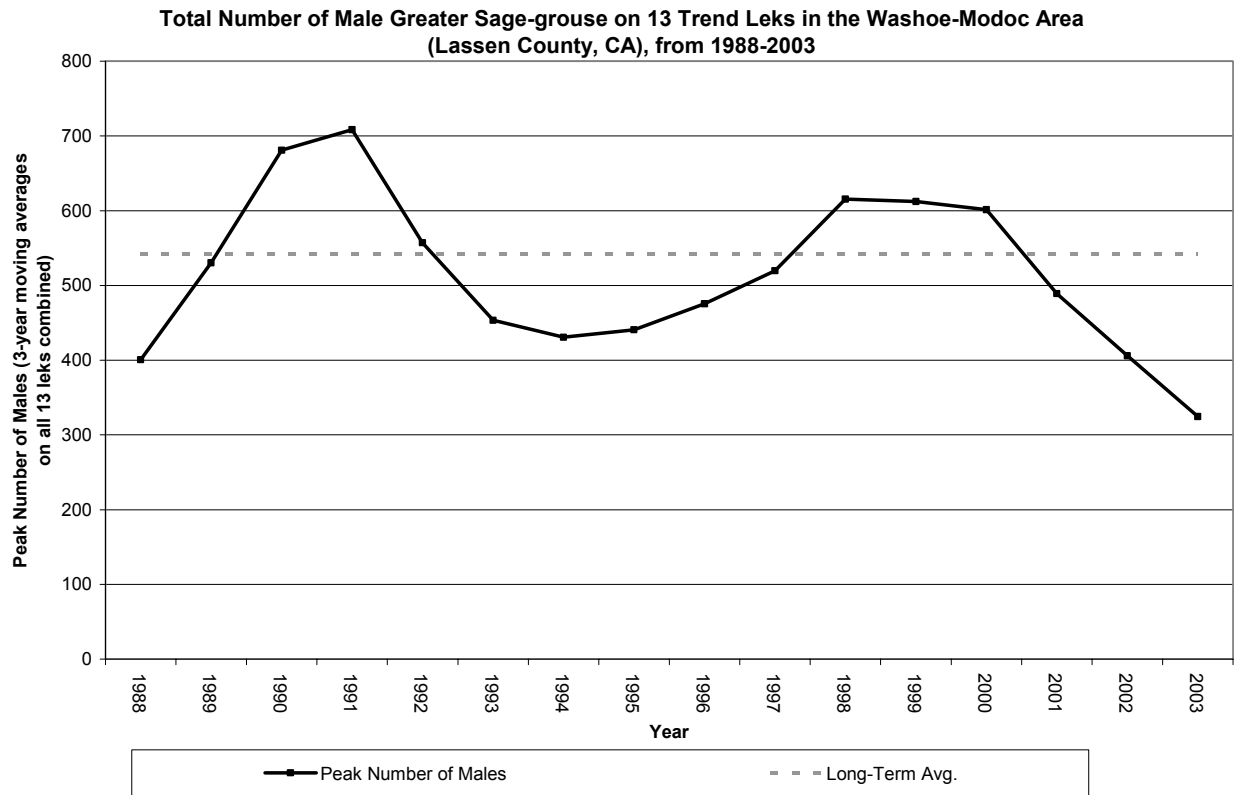
In the Bodie Hills PMU, the three-year moving averages for the number of males counted between 1959 and 1980 were near, or well above, the long-term average. This era was highlighted by the period from 1959-1965 when the breeding population was at its highest level, indicated by three-year moving averages that ranged from 124 to 191 percent of the long-term average. This trend was reversed from 1981-1986 when three-year moving averages ranged from 47 to 88 percent of the long-term average. From 1988-1992, the trend in breeding population increased, with three-year moving averages ranging from 126 to 155 percent of the long-term average. This upward trend was again reversed from 1993-2002, when three-year moving averages ranged from 50 to 69 percent of the long-term average. The trend has been relatively stable over the last three years (2000-2003) at between 58 and 63 percent of the long-term average.

The long-term trend in breeding population for Long Valley in the South Mono PMU (Bi-State Local Planning Area) was evaluated from 1973 to the present for the six core leks. This trend was marked by several distinct changes in spring population. From 1973 to 1983, three-year averages for the number of males counted on core leks ranged from 43 percent to 67 percent of the long-term average. Since 1984, the population has remained above the long-term average, marked by a high in 1987 close to 200 percent of the long-term average. By the early 1990's, the population had dropped back to the long-term average and since 1995 there has been a steady upward trend. Long-term trend information is not available for the Mono Basin portion of the South Mono PMU. Leks in the Granite Mountain and Adobe Valley areas have been monitored since 1984 and numbers have ranged from 5 to 19 strutting males. Leks have been monitored at Parker Meadow since first discovered in 2002.

#### **Washoe-Modoc Local Plan Area (California)**

Sage-grouse population estimates in the Buffalo/Skedaddle PMU have ranged between 1,500 and 4,500 sage-grouse, depending on the year. These estimates are calculated from the peak number of males on California leks using methods in the published literature (see **Appendix G**). The number of active leks in the California portion of the PMU was 21 in 2003. In 1992 there were 17 active leks in the Nevada portion of the PMU. Five of these were active in 1998. Populations fluctuate depending largely on habitat quality and precipitation. For example, the highest recent breeding population was in 1990 but the population almost doubled between 1996 and 1999 based on California lek data. However, overall population trend since 1987 has not changed substantially.

**Figure 13.**



**Population Trends Observed from Harvest Data**

Fall recruitment of sage-grouse is determined from the examination of wings taken from birds harvested by hunters in open hunt units or counties. The annual upland game bird season brochure asks that hunters provide one wing from each sage-grouse harvested to NDOW either by dropping the wing off at any of the regional offices throughout the state or depositing them into wing barrels placed along access routes to hunt areas. In California, wings are also requested from all hunters as part in their permit package. The effort to collect wings has increased greatly over the past decade. Each year, wings are analyzed after the hunting season to determine age, sex, number of successful nesting hens and number of chicks per hen. The wings are analyzed using established keys and information from various studies including Crunden (1963) and Braun (no date). **Table 2-4** shows results of the wing-bee since 1997 in Nevada. **Table 2-5** shows results of wing collections in Lassen County, California since 1998. Information from wing collections from the Bi-State population is not presented because of small sample sizes resulting from permit reductions in recent years.

**Table 2-4. Annual estimates of the number of juveniles per hen from wing data 1997-2003 in Nevada.**

| Year | Total Sample | Chicks/Hen |
|------|--------------|------------|
| 2003 | 2,523        | 2.12       |
| 2002 | 3,867        | 1.53       |
| 2001 | 2,019        | 1.49       |
| 2000 | 1,885        | 1.61       |
| 1999 | 1,739        | 2.15       |
| 1998 | 1,073        | 2.04       |
| 1997 | 1,463        | 1.62       |

**Table 2-5 Sage-Grouse production data for Lassen Management Zones, California from 1998 to 2003**

| Year | No. Wings | % Young | Chicks/hen | Chicks M:F |
|------|-----------|---------|------------|------------|
| 2003 | 83        | 64      | 2.52       | 25:28      |
| 2002 | 73        | 47      | 1.21       | 17:17      |
| 2001 | 105       | 46      | 1.07       | 18:30      |
| 2000 | 110       | 7       | 0.13       | 6:2        |
| 1999 | 223       | 50      | 1.59       | 11:52      |
| 1998 | 201       | 44      | 1.19       | 14:51      |

Based on seven years of wing data it appears that fall recruitment of sage-grouse has varied from a low of 1.49 in 2001 to a high of 2.15 juveniles per hen in Nevada in 1999. In California, chicks per hen were at a low of 0.13 in 2000 and a high of 2.52 in 2003. Long-term ratios of 1.40 to 2.96 juveniles per hen have been reported among western states; however, since 1985 these ratios have ranged from 1.21 to 2.19 (Connelly and Braun 1997). For sage-grouse populations to remain stable or increase, a ratio greater than or equal to 2.25 juveniles per hen in the fall is necessary (Connelly and Braun 1997 and Edelman et al. 1998).

Since 2000, precipitation for much of Nevada has been below normal. The effect of these conditions on forb and grass growth during early spring may have negatively affected nest success and recruitment. In 2003, an abnormally wet April was most likely responsible for the recovery of the recruitment rate to a level that can sustain the sage-grouse population at a stable level in the short term.

### Summary

In summary, Nevada and eastern California have considerable amounts of intact sage-grouse habitat that harbor some relatively large populations of sage-grouse that are well-distributed throughout the sagebrush biome. Approximately 68 percent of the 40 PMUs for which population estimates have been made have greater than 500 birds (based on the low-end estimate). With the implementation of the Local Group PMU plans, both the number of acres of habitat and the number of birds can be anticipated to increase over the long term. The awareness that sage-grouse numbers and available habitat quantity and quality have been in decline is the first step to reversing the trend. Through the identification of the factors affecting sage-grouse and sage-grouse habitats, the decreasing trend in acreage and quality of habitat and numbers of birds can be reversed.

## 2.5 Factors Affecting Sage-Grouse and Sage-Grouse Habitats

The following issues were identified in the Strategy as potential factors contributing to the decline in sage-grouse throughout the West, and particularly in Nevada:

- Habitat Quantity
- Habitat Quality/Nutrition
- Wildfire
- Habitat Fragmentation
- Livestock Grazing
- Wild and Free Roaming Horses
- Predation
- Changing Land Uses
- Hunting/Poaching
- Disturbance
- Disease
- Pesticides
- Cycles
- Climate/Weather

Each Local Group conducted an assessment of the factors that were known or suspected to be affecting sage-grouse and sage-grouse habitats in each PMU. The Local Groups were not confined to this list, but most of the factors they identified could be included under one of these categories. A description of each factor is provided below, and the conservation strategies or actions to address identified risks by PMU are provided at the end of each section.

### 2.5.1 Habitat Quantity

Changes in habitat quantity result from alteration of sagebrush habitats to other vegetation types. These changes are short-term, or temporary, if the change is reversible and results in sagebrush reestablishment over time. Permanent changes that prevent sagebrush reestablishment are discussed below under Changing Land Uses.

Wildfires, pinyon-juniper encroachment, crested wheatgrass seedings, sagebrush control projects, mining activities, and to a lesser extent, historic livestock grazing practices, have resulted in the conversion of sagebrush rangelands to other plant communities in Nevada. The acreage converted has included sage-grouse winter, breeding, nesting, brood habitat, and summer habitat.

**Wildfire** - 1999 was recorded as the worst fire season in Nevada history with more than 1.5 million acres burned. Approximately 750,000 additional acres burned in 2000 and 2001. The majority of the burned area was sagebrush habitat; some of the areas burned were from repeated fires that resulted in converting sagebrush-dominated rangelands to cheatgrass (R-4 Habitat Condition). These areas include substantial portions of Humboldt and Pershing Counties within the North Central Planning Group, portions of western Elko County (Northeastern Nevada Stewardship Group), and portions Lander and Eureka County of the South Central Planning Group (see **Figure 11**). The areas burned included some key sage-grouse habitat, particularly in Humboldt and Elko Counties. Burned areas that have not recovered to sagebrush dominance have been removed from potential habitat acreage.

**Pinyon-Juniper Encroachment** - The conversion of suitable sagebrush habitats to woodland non-habitat has been documented throughout much of northern Nevada. The expansion of woodlands following the mining era in the mid to late 1800's has been exacerbated over the last several decades with aggressive wildfire suppression efforts. The result of expanding woodlands diminishes the amount of suitable sagebrush habitat available for sage-grouse. The impacts can become permanent and irreversible without appropriate management. If pinyon-juniper encroachment is not managed in these areas, a permanent change of the site potential



can occur that would alter plant successional pathways and preclude the natural recovery of the sagebrush ecosystem. If sagebrush and its associated herbaceous understory are replaced, recovery of sagebrush sites to desirable sage-grouse habitat will require significant human intervention and expense.

**Seedings** - Although some seedings have been used by sage-grouse for breeding (leks), the overall effect has been considered to be detrimental to sage-grouse (Braun 1998). Some seedings in Nevada where sagebrush has reestablished have been noted as being used by sage-grouse for winter use (Back et al. 1984) and nesting. Similar results have been observed on treated areas where sagebrush was removed to allow native grasses to increase in abundance. Where sagebrush has been allowed to reestablish on these treated lands, sage-grouse habitats have likely been reestablished. Where follow-up treatments have been conducted and sagebrush has not been allowed to reestablish, these areas remain in non-habitat status.

## 2.5.2 Habitat Quality/Nutrition

The quality of the habitat contributes to the effectiveness of many of the other risk factors and is itself affected by many of the risk factors evaluated. Disease, predation, hunting, and disturbance are less likely to effect populations when habitat quality is high and both the birds and the populations are resilient. Population impacts from unfavorable weather conditions are also somewhat ameliorated by having high quality habitats. Livestock grazing can have negative or positive effects on sage-grouse habitat quality depending on the timing and intensity of grazing, and which habitat element is being considered (Crawford et al. 2004). Managing for quality habitats, while maintaining and restoring habitat quantity, are probably the two most important factors for long-term sustainability of sage-grouse populations.

Habitat quality also pertains to the integrity of the plant communities. Invasive weeds, annual grasses, and exotic species (desired or undesired) all detract from habitat quality. For each invasive weed, annual grass, or exotic species there is one less forb, native grass, or sagebrush seedling that can be supported within the community. These species also increase the risk of conversion from a shrub-herb community to an annual grassland-noxious weed community following catastrophic events (see habitat quantity, above).

Habitat quality was also addressed by conducting a habitat condition assessment. The purpose of the assessment was to determine five broad categories of habitat condition and mapping the location of habitats of each condition class within each PMU. The habitat condition assessment procedure (Sather-Blair 2000) is included in **Appendix E**. Each LACP group refined these definitions to fit local conditions. For information pertaining to a specific PMU, the definition provided by the local plan should be referenced.

The five habitat conditions, or restoration values, (R-0, R-1, R-2, R-3, and R-4) are generally described as follows:

**R-0** - Habitat areas with desired species composition that has sufficient, but not excessive, sagebrush canopy and sufficient grasses and forbs in the understory to provide adequate cover and forage to meet the seasonal needs of sage-grouse.

**R-1** - Habitat areas that currently lack sufficient sagebrush and are currently dominated by perennial grasses and forbs, yet have the potential to produce sagebrush plant communities with good understory composition of desired grasses and forbs.

**R-2** - Existing sagebrush habitat areas with insufficient desired grasses and forbs in the understory to meet seasonal needs of sage-grouse.

**R-3** - Sagebrush habitat areas where pinyon-juniper encroachment has affected the potential to produce sagebrush plant communities that provide adequate cover and forage to meet the seasonal needs of sage-grouse.

**R-4** - Habitat areas that have the potential to produce sagebrush plant communities, but are currently dominated by annual grasses, annual forbs, or bare ground.

Some of the Local Groups refined these categories or added additional categories to meet their local situations. These refinements can be located in the individual Local Plans. The acreage of each habitat condition rating by PMU is provided in **Table 2-6**.

### **2.5.3 Wildfire**

The trend toward increased size, intensity, and frequency of wildfires in recent years has focused attention on fire ecology. The climatic, paleobotanic, and historic evidence indicates that fire was a factor in the sagebrush ecosystem long before European man's arrival (Miller and Wigand 1994, Miller and Rose 1999, Miller and Eddleman 2000). The landscape that existed in the early 1800s was a result of the interaction of geomorphic conditions, climatic factors, anthropogenic factors, and fire history.

Each ecological site responds to varying fire intensities differently from other range sites. For a mountain big sagebrush community, historic fire intervals are estimated to be on the order of 25 years (Winward 2000, Gruell et al. 1994, Miller and Rose 1999). Following a fire in this community, mountain big sagebrush often establishes within the first few years. Within ten to 15 years, a brush community is well established and the site has sufficient fuel loading to burn again under "normal" conditions.

The fire interval for Wyoming big sagebrush communities is somewhat longer, perhaps 50 to 100 years (Wright and Bailey 1982), or as short as 40 years (Winward 2000). The differences are probably due to the differences in productivity of the various range sites that support Wyoming big sagebrush. Wyoming big sagebrush is found at lower elevations than mountain big sagebrush and on more xeric sites. Wyoming big sagebrush seedling establishment is also dependent on two consecutive years of normal or above normal winter precipitation; therefore, establishment of this species after a fire is weather dependent. Sagebrush seed does not establish far from the mother plant, which also limits the rate at which Wyoming big sagebrush re-colonize burned areas.

Low sagebrush does not burn often. Estimates of pre-settlement fire intervals for the low sagebrush community range from 100 to 200 years (Young and Evans 1981, Miller and Rose 1999). This may be less a function of fuel loading, which may reach optimum condition for burning in less than 100 years, and more a function of ignition frequency under the extreme conditions (extremely low relative humidity with high winds) necessary to burn this vegetation

type. The conditions under which low sagebrush communities burn are the conditions under which catastrophic fires occur, and every plant community burns.

Table 2-6. Estimated Areas (acres) of Habitat Condition by Population Management Unit (PMU) within the Plan Area.\*

| <i>PMU</i>                                      | <i>R-0</i>       | <i>R-1</i>       | <i>R-2</i>       | <i>R-3</i>       | <i>R-4</i>       | <i>Non-Habitat</i> | <i>Total</i>      |
|---|------------------|------------------|------------------|------------------|------------------|--------------------|-------------------|
| <b><i>NNSG Local Planning Area</i></b>          |                  |                  |                  |                  |                  |                    |                   |
| Desert  | 568,272          | 17,860           | 438,631          | 0                | 7,856            | 75,963             | 1,108,582         |
| Island  | 192,912          | 410              | 0                | 0                | 0                | 66,064             | 259,386           |
| North Fork                                      | 1,261,252        | 92,011           | 189,240          | 2,485            | 19,119           | 167,124            | 1,731,231         |
| Tuscarora                                       | 588,029          | 284,186          | 284,108          | 0                | 126,560          | 102,229            | 1,385,112         |
| South Fork                                      | 364,428          | 272,808          | 187,934          | 57,022           | 37,573           | 450,171            | 1,369,936         |
| O'Neil Basin                                    | 630,096          | 144,535          | 130,189          | 4,033            | 2,926            | 102,342            | 1,014,121         |
| Snake   | 245,647          | 103,340          | 119,904          | 11,078           | 14,524           | 43,627             | 538,120           |
| Gollaher  | 366,148          | 204,442          | 162,402          | 139,454          | 0                | 39,771             | 912,217           |
| Ruby Valley                                     | 253,339          | 41,233           | 318,979          | 62,080           | 4,332            | 435,077            | 1,115,040         |
| East Valley                                     | 334,982          | 8,789            | 186,311          | 78,339           | 38,683           | 143,543            | 790,647           |
| <b>Subtotal</b>                                 | <b>4,805,105</b> | <b>1,169,614</b> | <b>2,017,698</b> | <b>354,491</b>   | <b>251,573</b>   | <b>1,625,911</b>   | <b>10,224,392</b> |
| <b><i>White Pine Local Planning Area</i></b>    |                  |                  |                  |                  |                  |                    |                   |
| Butte/Buck/White Pine                           | 919,544          | 34,596           | 708,146          | 208,031          | No value         | No value           | 2,814,640         |
| Schell/Antelope                                 | 107,607          | 15,201           | 525,763          | 60,850           | No value         | No value           | 1,207,858         |
| Spring/Snake Valley                             | 146,389          | 13,256           | 328,567          | 66,096           | No value         | No value           | 1,134,174         |
| Steptoe/Cave (north)                            | 221,876          | 40,944           | 189,423          | 71,563           | No value         | No value           | 835,284           |
| <b>Subtotal</b>                                 | <b>1,395,416</b> | <b>103,497</b>   | <b>1,751,899</b> | <b>406,540</b>   | <b>No value</b>  | <b>No value</b>    | <b>5,991,956</b>  |
| <b><i>North Central Local Planning Area</i></b> |                  |                  |                  |                  |                  |                    |                   |
| Santa Rosa                                      | 362,368          | 67,627           | 375,055          | 0                | 113,522          | 20,221             | 938,793           |
| Lone Willow                                     | 195,201          | 127              | 128,640          | 0                | 152,565          | 0                  | 476,533           |
| <b>Subtotal</b>                                 | <b>557,569</b>   | <b>67,754</b>    | <b>503,695</b>   | <b>0</b>         | <b>266,087</b>   | <b>20,221</b>      | <b>1,415,326</b>  |
| <b><i>Washoe-Modoc Local Planning Area</i></b>  |                  |                  |                  |                  |                  |                    |                   |
| Buffalo/Skedaddle                               | 124,120          | 323,966          | 66,275           | 101,477          | 859,668          |                    | 1,475,506         |
| Massacre  | 602,438          | 100,648          | 408,187          | 23,987           | 0                |                    | 1,135,260         |
| Vya   | 191,925          | 22,515           | 126,562          | 107,239          | 6,900            |                    | 455,141           |
| Sheldon   | 317,480          | 68,039           | 85,008           | 5,740            | 0                |                    | 476,267           |
| Virginia  | 63,395           | 87,085           | 50,522           | 26,595           | 34,241           |                    | 261,838           |
| Pah-Rah   | 58,969           | < 500            | 22,358           | 22,217           | 56,991           |                    | 161,035           |
| <b>Subtotal</b>                                 | <b>1,358,327</b> | <b>602,753</b>   | <b>758,912</b>   | <b>287,255</b>   | <b>957,800</b>   |                    | <b>3,965,047</b>  |
| <b>Totals</b>                                   | <b>8,116,417</b> | <b>1,943,618</b> | <b>5,032,204</b> | <b>1,048,286</b> | <b>1,475,460</b> | <b>1,646,132</b>   | <b>21,596,721</b> |

R0=Habitat intact R1=Perennial grass lacking sage cover R2=Sagebrush lacking herbaceous R3=Pinyon Juniper dominated R4=Cheatgrass

\*The Bi-State, South Central, and Lincoln County LACP groups have not yet completed their R-value evaluations.

Records of large wildfires between 1900 and 1960 are inconsistent and incomplete. However, in the 1960s, several large fires occurred in northern Nevada. As these fires burned, cheatgrass began its domination over much of the burned area. Over the last 40 years, areas that had historic fire intervals of 40 to 100 years prior to settlement and only small fires between 1850 and 1960, burned on average once every decade. The spread of cheatgrass from these areas to other sagebrush communities increased the flammability of these communities, resulting in cheatgrass dominance as fires started in these altered plant communities. By 1999, the open stands of sagebrush of the 1950s had become dense stands of sagebrush, many with a cheatgrass understory. The extreme conditions in July and August of 1999, combined with thousands of lightning strikes, caused wildfires that burned over 1.7 million acres in the Great Basin. Similar situations occurred in 2000 and 2001, but involved less acreage in Nevada. Not all of the acres burned converted to cheatgrass and not all of the acreage required emergency rehabilitation; however, the acreage that was sagebrush is not likely to support sagebrush for the next 10 to 15 years or longer. The wildfire history for 1981-2003 is shown in **Figure 11**.

The major wildland fires that have occurred over the last four decades have been the result of changing conditions on the landscape (e.g., changes due to livestock grazing, cheatgrass expansion, sagebrush domination, cumulative effects of historical fire suppression efforts, etc.) and changing climatic conditions. Consequently, the fire interval has decreased on large acreages of rangelands to a decade or less. This decreased interval (or increased fire frequency) is not favorable for shrub establishment. Continuation of this pattern will result in a change from sagebrush dominated rangelands to grass dominated rangelands; either perennial grasses, annual grasses, or a combination of both. Invasion of secondary exotic weeds is also of concern. Species of knapweed (*Cetraurea* spp.), rush skeleton weed (*Chondrilla juncea* L.), and bur buttercup (*Ranunculus testiculatus* Crantx), to name a few, are rapidly invading cheatgrass and native plant communities in the Intermountain West (Crawford et al. 2004). Species such as these also increase the fire return interval.

The pinyon-juniper woodland has undergone similar changes in fire ecology. Miller and Tausch (2001) estimated that juniper and pinyon woodlands have increased ten-fold during the past 130 years in the Intermountain West. Much of this acreage involves lands that formerly supported sagebrush and sage-grouse habitats. The reader is directed to literature by Miller and Rose (1995, 1999), Miller and Wigand (1994), Miller et al. (2001), Gruell et al. (1994), and Neilson (1987) for discussions of fire history, fire ecology, and post-settlement changes in the pinyon-juniper woodlands.

Fire suppression over the last 150 years has also contributed to the current conditions. Suppression of wildfires to protect life and property has interrupted the fire cycle, allowing fuels to accumulate. Grazing that removed the understory or fine fuels that carried the fire between shrubs, also was responsible for changing the fire frequency (fire interval) and fire intensity. The low to moderate intensity fires that would normally have burned and maintained a mosaic of vegetation conditions on the landscape could not occur without the fine fuels. The combination of suppression and modification of the fire frequency and interval allowed the shrub component or the pinyon-juniper component of the plant community to increase in density and cover, creating vast acreages of woody fuels. The density of shrubs and/or trees over vast acreages has crossed a threshold that allows these plant communities to burn without the fine fuels. The result has been larger fires with greater fire effects.

The changes in plant communities resulting from fire suppression and livestock grazing also created changes in the habitat quality for sage-grouse. The mosaic of vegetation conditions on

the landscape that provided the seasonal habitats began to shift to a shrub-dominated landscape with less variety. The open stands of sagebrush with abundant forbs and insects needed by hens prior to egg-laying and needed by chicks immediately after hatching, as well as the stands of sagebrush with moderate canopy cover and abundant grasses used for nesting, were gradually replaced by dense stands of sagebrush with an understory lacking in forbs and grasses. Although these stands provided winter habitat, the “production” habitats (i.e., those habitats that are associated with breeding and brood rearing) became less abundant. This change in habitat quality continues to the present and may be a significant factor in the lack of recruitment to the local populations of sage-grouse.

#### **2.5.4 Habitat Fragmentation**

Habitat fragmentation consists of breaking up large areas of habitat into smaller, isolated areas of habitat. Species need to move through “non-habitat” to use the resulting patchwork of suitable habitats. The “non-habitats” can be physical/psychological barriers (e.g., roads or fences), blocks of unsuitable habitat (e.g., crested wheatgrass seeding or annual grassland), or other zones that a species avoids due to predation risks (e.g., adjacent to transmission lines). Natural vegetation type transitions (e.g., salt desert shrub to sagebrush scrub) are not considered fragmented habitat.

The effects of fragmentation vary by species due to the home range, daily range, and territorial requirements of different species. A species that spends an entire lifetime on only a few acres may not be effected by the construction of a road or implementation of a crested wheatgrass seeding within a quarter mile of its home range, whereas a species that requires a large home range or seasonal habitat area may be affected by breaking a large block of habitat into smaller patches.

Pinyon-juniper encroachment and wildfire are other risk factors that can contribute to habitat fragmentation and are addressed in 2.5.1 and 2.5.3 respectively. Railroads, interstate and state highways, and large transmission lines across the state also contribute to habitat fragmentation. These factors were commonly assessed at the PMU level.

#### **2.5.5 Livestock Grazing**

Perhaps one of the most controversial habitat influences is livestock grazing. Beck and Mitchell (2000) reviewed the limited information regarding livestock grazing impacts on sage-grouse habitat and found that livestock grazing practices or range improvements that remove sagebrush from a site have adverse effects on sage-grouse, at least for the short-term. Long-term studies of these practices were not presented. Grazing levels that created poor conditions on rangelands or meadows also had adverse impacts on sage-grouse. Livestock grazing resulted in some nest desertion and egg destruction. Potential population impacts were only related to practices that impacted nest success and early chick survival.

Conversely, light to moderate grazing of meadows created conditions favorable for sage-grouse by reducing dense grass growth and stimulating forb growth and nutritional content. Rest-rotation grazing systems promoted forb production, and practices that reduce sagebrush cover were associated with increased herbaceous cover (Beck and Mitchell 2000). Although the studies of these issues are limited in number, the general conclusion is that livestock grazing practices and range improvements that maintain healthy rangeland and riparian conditions are compatible with sage-grouse management, and those practices that degrade rangeland and riparian conditions create adverse impacts to sage-grouse.

Over the last 150 years, the combination of plant-animal interactions (herbivory) and plant-plant interactions (competition) has resulted in changes in the plant communities on western landscapes. The prevalence of grazing in the West has resulted in many people reaching the conclusion that all of the plant community changes have been the result of livestock grazing. As the above discussion demonstrated, herbivory can impact vegetation, but the degree of impact is dependent on the intensity of herbivory (i.e., how much of each plant and what proportion of the total number of plants are consumed), the period of time that the herbivory takes place (i.e., early, late, or after the growing season), the duration of the herbivory (i.e., how long during the growing season the herbivory occurs), repeated herbivory at the same time of the year every year, and other stresses on plant physiology (i.e., competition between shrubs and herbaceous vegetation).

The Bureau of Land Management and the United States Forest Service administer grazing allotments within Nevada and California, some of which include sage-grouse habitat. Grazing permit renewal processes and allotment evaluation procedures include mechanisms for adjusting grazing to address seasonal sage-grouse concerns. Grazing allotments under managed grazing systems are intended to improve rangeland health with regard to the regional Resource Advisory Council Standards and Guidelines. Other BLM programs that may potentially play a role in sage-grouse conservation and livestock management include the Healthy Forest Initiative/Hazardous Fuels Reduction program, Weeds Program, and the Rangeland Improvement Program.

The effect of livestock grazing was assessed at the PMU level to enable site specific analyses of potential impacts to sage-grouse resulting from distributional overlap and seasonal forage species overlap and the potential for structural alterations to the habitat.

### **2.5.6 Wild and Free Roaming Horses**

Since passage of the 1971 Free Roaming Wild Horse and Burro Act, the Bureau of Land Management has worked to establish Appropriate Management Levels for wild horse herds in Nevada. Currently, many herd management areas exceed the appropriate management level over much of their range in Nevada. Although specific studies quantifying direct effects of wild horse utilization to sage-grouse habitat are lacking, it is generally conceded that horse utilization, especially when horse numbers are above the Appropriate Management Level, can degrade sage-grouse habitats.

The Bureau of Land Management has initiated management actions designed to reduce wild horse herds on public lands to manageable levels and bring them into balance with the carrying capacity of the land. Although wild and free roaming horses are present across the state, their effect on sage-grouse and sage-grouse habitats was assessed at the PMU level.

### **2.5.7 Changing Land Uses**

Change in land use refers to a change from wildlife habitat to another land use that represents a long-term or permanent change. This includes changes associated with construction of reservoirs, recreational developments, urban sprawl, mining, wind energy development or other developments. The impacts are similar to those discussed under Habitat Quantity, but because of the permanent or long-term nature of these changes, the habitat values are generally not recoverable.

Human population growth and the trend for rural lifestyles have resulted in urban development within previous sage-grouse habitats. These types of land use changes are anticipated to increase as the population of Nevada increases, and as demands for certain types of recreation increase. In Nevada the opportunity for urban development is somewhat limited by the current land status. Most of Nevada is public land administered by federal agencies. The bulk of the private land is associated with the checkerboard land status along the Union Pacific railroad corridor that traverses Nevada east to west, irrigable lands and water sources, and a few large blocks of private land created through various land exchanges. The private lands within the checkerboard corridor have been recently made available for purchase and rural developments and ranchettes have increased in these areas, or are likely to occur.

Wind energy development also has potential to impact sage-grouse and/or sage-grouse habitats. Areas within Nevada are currently being monitored for suitability as wind energy sites. These developments include the turbine to harness the energy, as well as the access to the sites, and transmission lines from the site to substations or other existing power grids. Therefore, this type of land use change has a variety of potential impacts to sage-grouse.

Due to the rural nature of Nevada, land use changes occur primarily around urban centers. Therefore, this factor was assessed at the PMU level.

### **2.5.8 Predation**

Predation is the most important proximate cause of sage-grouse mortality (Braun 1975, Bergerud 1988a, Autenrieth 1986, Schroeder et al. 1999); almost every sage-grouse will eventually be eaten. Sage-grouse are known to be included in the diet of a variety of species. Sage-grouse eggs, new-born chicks, and juvenile birds have a greater number of predators and are more vulnerable to predators than are adult birds. The differential adult sex ratio also indicates that males have higher mortality than females (Schroeder et al. 1999).

Survival between hatching and the end of summer varies from approximately 40 percent (June 1963) to 60 percent (Wallestad 1975). Although a greater number of predators are known to prey on chicks, several factors lower the mortality rate at this life stage. After about six weeks of age, the chicks are able to take advantage of cover, detect predators, and escape by flying. As the birds increase in size and their ability to escape improves, a predator is more likely to take an individual juvenile sage-grouse, whereas a single predator is more likely to take an entire clutch of eggs or brood of newly hatched chicks that cannot yet escape by flight.

Sage-grouse are most vulnerable during the first few weeks after hatching. Insects and forbs are critical during this period and climatic conditions greatly influence the availability of these food items. In addition to lack of forage, heavy rainfall along with unseasonably cold temperatures during hatching may decrease production (Wallestad 1975). Stress due to lack of quality food items or from weather conditions also make the chick more vulnerable to predators. On the other hand mortality rates for adult sage-grouse are generally considered to be relatively low when compared to other upland game birds (Connelly et al. 1993, Zablán 1993).

Predation occurs throughout the year and what may seem like an obvious limiting factor on the population may only be part of a bigger issue. For example, beginning in the spring of 2000 NDOW contracted with US Department of Agriculture Aphis - Wildlife Services to conduct predator control within the Grassy-Stevens Camp area with emphasis on ravens. The Grassy-Stevens Camp area is approximately 50 miles north of the town of Gerlach, Nevada and is within the Washoe-Modoc Local Plan Area. Monitoring the effects of predator control on sage-



grouse populations was conducted through analysis of wings collected during the general hunting season and from an application of a special sage-grouse hunt conducted within the Grassy Stevens Camp area (limited to 75 hunters). Wings were analyzed to determine age, sex, nest success of females, and days since hatch of chicks.

After three years of conducting this project within the Grassy-Stevens Camp area, sage-grouse production rates remained low and population levels showed a downward trend. Analysis of sage-grouse wings collected from harvest indicated that raven control increased sage-grouse nest success, but continued low recruitment suggested that other problems exist within this area. An alternative hypothesis to test is that poor habitat quality makes nests and chicks more vulnerable to predators.

Predation of adult sage-grouse occurs, but overall survival of adult birds ranges from 55 to 67 percent for females and from 38 to 60 percent for males (Zablan 1993, Connelly et al. 1994, June 1963). Although there are several predators of adult sage-grouse, the relative impact of these predators on the population is less because the encounters may be less frequent during portions of the year and predators are less effective when preying on adults (Bean 1941, Beck 1977).

### **2.5.9 Hunting/Poaching**

The axiom that upland species, being density regulated, are virtually unaffected by hunting pressure has a long history in the field of wildlife management (Errington 1945, Mardsen and Baskett 1958). Studies of hunting impacts on sage-grouse in Colorado showed that harvest was a function of the total birds available in the fall (Braun and Beck 1985). Hunters generally harvested between 7 and 11 percent of the birds available in the fall, regardless of season length and bag/possession limits. The study concluded that hunting had no measurable impact on spring densities of sage-grouse. Wallestad (1975) also concluded that hunting had little influence on sage-grouse populations in Montana. Information from Idaho (Gray 1967, Autenrieth 1981), Oregon (Willis et al. 1993), and Wyoming (Patterson 1952) indicate that harvest rates range from less than 3 percent to approximately 25 percent.

Connelly et al. (2000) analyzed band returns and radio-location/return data for Idaho sage-grouse over a 23-year period. Harvest rates for females were greater than for males. Forty-six percent of the adult female mortality occurred in September and October compared to only 28 percent of the adult male mortality, with 95 percent of the combined September-October mortality due to hunting. The differential mortality rates during this time period were attributed to females with chicks and juveniles remaining on meadows and riparian areas, while males and unsuccessful females were more dispersed in the upland vegetation. The relatively high rate of female mortality at this time of the year suggests that hunting may be additive to winter mortality, decreasing the size of the spring breeding population.

Concern exists that local, isolated populations may be vulnerable to concentrated hunting pressure and some studies suggest that this is possible (Autenrieth 1981, Zunino 1987, Connelly et al. 2003). These populations may require special attention if they are to remain viable.

Poaching is the illegal take of a game species. Because this activity often takes place during seasons of the year when the birds are vulnerable because of some process in their life history (e.g., winter, spring, or summer), the potential exists for long-term poaching to cause a population decline. The lack of survey data to determine the level of poaching and its effects

makes it difficult to estimate the level of impact that poaching may have in Nevada and eastern California.

### **2.5.10 Disturbance**

Disturbance refers to direct interference with sage-grouse, rather than a habitat disturbance, and can include various types of disruption. Increased traffic on a road that formerly had little traffic and is located near a lek is an example of a disturbance that may cause the birds to abandon a lek. Similarly, a new housing development near seasonal habitats may result in sage-grouse abandoning that habitat as people or their pets disrupt seasonal activities. The impact of military flyovers has been raised as a concern, but studies have not been conducted to determine if impacts actually occur. Recreational viewing of sage-grouse at leks or on wintering grounds is also a concern if the number of visits becomes high or the actions of those viewing the birds are not appropriate. Very little work has been done to document these types of impacts or the extent to which they affect populations. However, disturbance is an issue that should be included in planning documents.

### **2.5.11 Disease**

The documented effects of West Nile virus on greater sage-grouse populations in northeast Wyoming, eastern Montana, and southeast Alberta in the summer of 2003 (D.E. Naugle et al. unpublished report) has heightened concern and warranted greater monitoring efforts in all states and provinces harboring greater sage-grouse populations. Greater sage-grouse however, are susceptible to many different types of infectious diseases that can be categorized as bacterial, fungal, and viral. Historically, diseases have been infrequently blamed for localized effects on sage-grouse populations (i.e. Lincoln and White Pine Counties in Nevada), but at the present time, West Nile virus seems to be the leading cause of documented sage-grouse mortality via disease.

Sage-grouse are known to harbor a variety of diseases and parasitic organisms. Schroeder et al. (1999) provides a comprehensive listing of the parasites and disease agents. The mere presence of a disease organism or a parasite does not necessarily indicate a population level effect. Herman (1963) pointed out that a "healthy" wild animal carrying only a single pathogenic agent is a rare occurrence. Therefore, some background level of disease or parasites exists, but under most conditions these agents may be of little significance. However, under certain environmental circumstances, such as drought, one or more disease agents or parasites may increase to a level that impacts the local population (Herman 1963). The casual factors are likely to be different for different outbreaks and different localities.

Although disease outbreaks in sage-grouse have been documented (Grover 1944, Batterson and Morse 1948, Honess and Winter 1956, Thorne 1969, Wallestad 1975), the conditions under which the outbreaks have occurred have not always been well documented. For coccidiosis, outbreaks appear related to drought, drying water holes, and/or contaminated water. As with most diseases, transmission is favored when sage-grouse have a high probability of contact with other infected sage-grouse, or when they are forced to use limited habitats. The concentration of birds at limited water sources may result in fecal contamination of the water and surrounding soils (Thorne 1969). A reversal of the conditions or seasonal dispersal of sage-grouse can alleviate the problem (Wallestad 1975).

Long-term residents of Lincoln, White Pine, Eureka, and Elko Counties recount reports of a disease outbreak in the 1960s that is referred to as "blue wing". The nature of this disease is

unknown, but the result was prevalent enough to leave a lasting impression on those that observed the carcasses.

Bacterial diseases such as salmonellosis, tularemia, colibacillosis, and botulism can infect sage-grouse; however, there have been very few documented cases (Connelly et. al 2004) and/or the potential for exposure is so low rangewide that these diseases are not considered a significant threat. Aspergillosis, a fungal disease, has been documented in a sage-grouse population only once (Honest and Winter 1956) and is also not considered a significant threat to greater sage-grouse ecology. Viral infections include avian pox, avian infectious bronchitis (AIB), and avian influenza; however, none of these diseases has caused as great an alarm for the health and well being of sage-grouse populations as the recent emergence of West Nile virus.

West Nile virus has been recently introduced to the United States and has been documented as the proximal cause of death in many avian species, including sage-grouse. No sage-grouse mortality has been attributed to this virus in Nevada, and due to the arid conditions, the risk may be lower in Nevada than in some other states. This is due to the fact that the virus is carried and spread by mosquitoes. Until there are reported cases in Nevada and eastern California, the impact of this virus on sage-grouse populations is unknown. (See section 5.4.7 regarding monitoring for this disease).

#### **2.5.12 Pesticides**

Organophosphate insecticides applied to croplands have the potential to cause mortality among sage-grouse, especially juvenile birds (Blus et al. 1989). This is a potential problem where sage-grouse use croplands for summer brood habitat. Dry baits for cricket control have not been demonstrated to have impacts on sage-grouse. The overall use of pesticides is not generally an important risk in Nevada, although within local PMUs there may be considerable opportunity for exposure to insecticides (i.e., in hay production or other crop production areas). Herbicides are not known to have direct impacts (i.e., cause mortality) to sage-grouse, but the subsequent changes in plant communities and the associated insect abundance could have indirect effects to sage-grouse.

#### **2.5.13 Cycles**

Rich (1985) analyzed 32 years of sage-grouse lek counts in southern Idaho and determined that population peaks occurred about every ten years. Although Rich (1985) found some climatic factors that correlated with the population changes, cause and effect relationships were not evident. Braun (1998) reviewed population data throughout the area of sage-grouse distribution and concluded that sage-grouse populations do not fluctuate on a regular or cyclic basis.

In Nevada, the population data has indicated declining populations since the 1950s, with some rebound in the 1970s. If cycles are occurring in Nevada, they are being masked by the downward trend in the state population.

#### **2.5.14 Climate/Weather**

Other than extended periods (i.e., hundreds of years) of drought, or periods like the Little Ice Age, where climatic changes drive plant community changes, climate is not a major factor in short-term population fluctuations. However, weather, which is a short-term expression of climatic factors, is likely to have influence on annual populations.

Weather can influence the availability and quality of sage-grouse food and sage-grouse energetics. Newly hatched chicks have limited reserves in the yolk sac and must acquire a high energy/high nutritional diet during the first few days after hatching. This diet is comprised primarily of insects, and insect availability is highly dependent on weather. Cold, wet weather causes many insects to seek shelter and become inactive, reducing their availability to sage-grouse chicks. Chicks that are stressed are more vulnerable to predators and to direct effects of weather. If chicks survive the first few days, warm, dry weather can reduce forb production on upland sites, forcing the birds to use riparian areas before they have developed sufficient mobility and flight capability to escape predators. During cold, dry winters, sage-grouse may not find suitable snow for snow roosting, reducing their ability to build up energy reserves for spring breeding. All of these factors can limit recruitment to the population in any given year. Because these types of weather events generally occur over a broad area, population effects can be realized.

In contrast, warm, wet springs that promote forb production and insect abundance, or wet summers that extend the growing season on the upland sites, and winters with abundant snow should all contribute to higher sage-grouse population recruitment. Therefore, weather is an important factor in sage-grouse population changes, but not a factor that can be managed.

## CHAPTER 3. CONSERVATION STRATEGIES

### 3.1 Statewide Strategies

The framework to be used in Nevada and Eastern California to conserve sage-grouse and sage-grouse habitat is multi-faceted and consists of various strategies developed by the Local Groups that address four general conservation categories:

- **Population and habitat management** measures that focus on maintaining existing healthy populations and habitat conditions;
- **Habitat enhancement and rehabilitation** actions where on-the-ground projects have been identified and developed to mitigate verified risks;
- **Education and outreach** to promote long-term conservation through widespread stewardship and proper land use ethics; and
- **Regulations and policies** to facilitate implementation of management actions.

Risk Assessments completed by each of the Local Groups address the factors discussed in Section 2.5 and are included in **Volume II of the Appendices of the Nevada-California Plan**. When identified risks were field verified and actions could be recommended to mitigate specific conditions, Local Groups developed specific action plans to initiate local projects that will enhance site specific areas and meet specific conservation objectives. A general summary of conservation actions proposed by the Local Groups to address habitat quantity risks is discussed below.

Specific conservation action plans developed by the Local Groups address specific goals and objectives and provisions for implementation and monitoring. Conservation actions proposed for individual PMUs are summarized but not limited to those in **Appendix F (Note that the actions in Appendix F are not listed in priority order)**.

Population management actions are generally those that regulate harvest. Not all sage-grouse populations in Nevada and eastern California are hunted. Some are isolated or have low population sizes and have been closed to hunting as a population protection action. Other populations that are hunted are monitored to ensure that the WAFWA guidelines regarding harvest are not exceeded. The Local Groups also assessed active habitats that are currently providing seasonal habitat requirements for sage-grouse. Actions were also developed to maintain these habitats on the landscape.

Although this conservation effort has included many individuals, landowners, and permittees, the need for continued education and outreach exists. Many of the strategies discussed below include an education and outreach component, especially when addressing private land issues.

Some of the Local Groups identified regulations and policies that need to be developed or implemented to facilitate sage-grouse conservation. For example, management of wild horses to appropriate management levels is necessary in some PMUs to protect or maintain sage-grouse habitats.

### 3.2 Habitat Quantity Conservation Actions

Four major habitat quantity issues were identified through the Local Group process:

- Conversion of sagebrush habitats to pinyon-juniper woodlands;
- Conversion of sagebrush to lands dominated by cheatgrass or other annual species;
- Conversion of sagebrush habitats to introduced perennial grasslands; and
- Development of sagebrush habitats or other seasonal habitats for housing or agriculture.

The Bi-State, White Pine, and Lincoln Local Group strategies to increase habitat quantity include treatment of pinyon-juniper in areas where the woodland has encroached on rangeland and replaced the sagebrush plant community. Potential treatment areas include removal of pinyon-juniper in areas adjacent to meadows that would otherwise provide late brood rearing habitat; removal of pinyon-juniper to establish corridors between spring breeding/nesting habitat and summer brood rearing habitat, and removal of pinyon-juniper to increase the overall acreage of sagebrush habitat (especially in the vicinity of lek sites as described in the Lincoln County LACP).

Restoration of areas dominated by cheatgrass have been proposed by the North Central Local Group, particularly in Humboldt County, to reestablish the sagebrush-perennial grass-forb community. This is another conservation strategy to increase the amount of available habitat, and at the same time, reduce the threat of wildfire to adjacent unburned habitats. Reassessment of fire rehabilitation projects has been proposed in Elko County to determine if overseeding with sagebrush or other means of establishing sagebrush in these perennial grasslands, in a mosaic pattern, will be effective in increasing the quantity of sage-grouse habitats. Since Elko County supports relatively high sage-grouse populations, projects such as these will be of high priority.

White Pine and Lincoln Counties contain several crested wheatgrass seedings and both the White Pine and Lincoln LACP Groups have suggested seeding these monotypic sites with forbs to increase forage diversity and insect abundance, thereby increasing and enhancing nesting and early brood habitat. Creating a mosaic of sagebrush and forbs in crested wheatgrass seedings that currently lack these components can also increase habitat quantity. A pilot project is being proposed in the South Steptoe Valley Watershed to mechanically disturb an existing crested wheatgrass seeding and follow it up with seeding native grasses and forbs. The trial would provide a comparison of the effects of various mechanical disturbances within a crested wheatgrass seeding.

Creating a mosaic of age class/structure within large, contiguous stands of sagebrush to increase the quantity of other seasonal habitats (pre-nesting, nesting, and early brood habitat) will also be implemented on a pilot project basis. Additional watershed improvements are also anticipated to result in a long-term increase in the quantity of riparian meadow habitat.

Conservation easements, landowner incentives, and education regarding sage-grouse and their habitats will be used to maintain existing habitat on private lands. Conservation easements, such as those being pursued by the Washoe-Lassen-Modoc LACP group with funding from the Landowner Incentive Program Tier II, will provide long-term protection from conversion of habitats to other incompatible uses. Landowner incentives, such as assisting with habitat management plans and cost-share programs for on-the-ground habitat projects, will be used to

assist landowners to create, maintain, or improve habitat for sage-grouse on the private lands. The information and education component of this strategy is critical to provide the private landowner with the importance of managing private lands for sage-grouse, and will provide the rationale for private landowners to enter into conservation easements and habitat management projects.

Habitat conversion projects will be implemented prudently building upon knowledge gained through initial pilot projects such as the demonstration plots constructed in Elko County. The acreage of planned actions by Local Groups through the year 2007 to address the habitat quantity issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.3 Habitat Quality Conservation Actions**

Improvement of habitat quality requires an assessment of the habitat to determine which seasonal habitats exist in an area and in what quantities, what deficiencies in habitat quality exist within each seasonal habitat, and what management strategies can be implemented to improve the habitat quality. Only a few of the PMUs have been assessed at the level required to identify habitat improvement projects at this time, but most Local Groups have identified habitat quality as an issue to be addressed. The assessment of habitats will be an ongoing process, but some areas have been assessed and projects have been identified.

Improvement in habitat quality will be achieved through actions designed to increase forb and insect abundance, create a variety of age class and structure conditions in sagebrush sites, improve riparian condition, and maintain the sagebrush ecosystem through periodic disturbance. Specific actions include (in no priority order):

- Rehabilitating sagebrush sites that have been encroached by pinyon-juniper;
- Noxious weed control to maintain native vegetation;
- Improvement of riparian and upland habitats through grazing management; thinning of sagebrush in large continuous stands where the understory vegetation is sufficient to be released;
- Installation of guzzlers in areas with little natural water;
- Vegetation management to establish sagebrush in perennial grasslands (native or exotic);
- Vegetation management to combat cheatgrass establishment and/or domination of the understory;
- Rehabilitation of burned areas with native perennial grasses and forbs and with the appropriate sagebrush species or subspecies; and
- Managing riparian areas for proper functioning condition (PFC).

Seeding may be used in conjunction with the vegetation treatments where understory vegetation is insufficient or the soil seed bank is insufficient to create desired conditions through shrub management alone. Other administrative actions include managing off road vehicle use in sage-grouse seasonal habitats.

The acreage of planned actions by Local Groups through the year 2007 to address the habitat quality issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

The Lincoln Local Group is proposing to conduct mechanical treatment of sagebrush in selected sites and subsequently seed these sites with native grasses and forbs to improve understory cover and forage. Treatments are proposed within selected portions of the Cave and Lincoln PMUs which support the majority of the sage-grouse population within this Local Conservation Planning Area.

### **3.4 Wildfire Conservation Actions**

Local working group actions to mitigate the risk of wildfire include wildfire pre-suppression treatments to help reduce the intensity and size of the wildfires. The projects will be coordinated and implemented in conjunction with local land use plans and/or fire management plans, as appropriate and with the Healthy Forests Initiative announced by the White House in 2002. A key element of the Healthy Forests Initiative is to implement core components of the National Fire Plan's 10-year Comprehensive Strategy and Implementation Plan. The plan, adopted by federal agencies and western governors in the spring of 2002 in collaboration with county commissioners, state foresters, and tribal officials, calls for more active forest and rangeland management.

Strategies to be implemented include mechanical treatment (e.g., aerating, mowing, plowing, etc.), herbicide treatment, biological treatment (i.e. grazing), and prescribed fire, all of which may include or be followed by seeding, to reduce fuels and reestablish a stand of younger sagebrush mixed with herbaceous species. The type of treatment used will depend on the vegetation on site and the treatment objectives, as well as site topography. Treatments may be conducted in phases. For example, a thinning operation may be necessary to open a woodland to allow for a seeding to be conducted, followed by removal of the remaining woodland when the herbaceous plants have established. The fuels reduction goals can also accommodate the needs of sage-grouse habitat improvement where large areas of sagebrush with little age class diversity occur on the landscape. Coordination between the need to reduce fuel and the need to maintain and/or improve sage-grouse habitats are necessary. Recommendations from the Governor's Team on implementation of fuels reduction treatments are included in **Appendix J**.

Pre-suppression treatments to reduce the risk or impact of wildfire have been recommended by the LACP groups to protect existing good condition sagebrush habitats. Fuel breaks to be implemented include green-strips, especially at the interface of cheatgrass-dominated lands and intact sagebrush habitats, to prevent or reduce the potential for fires that initiate in cheatgrass to expand into the intact sagebrush. In the Lone Willow PMU (North Central Local Group), where loss of the remaining expanse of big sagebrush to wildfire was identified as the most significant risk factor to sage-grouse, green-strips up to 300 feet wide have been installed, or are scheduled for installation at Thacker Pass, Washburn, and other strategic locations to prevent the potential rapid advance of wildfire into critical habitat. These green-strips are placed in previously burned areas immediately adjacent to the unburned, remaining sagebrush habitats. It is proposed to seed these green-strips with sagebrush and create suitable sage-grouse habitat. Once these areas have been rehabilitated, another 300 foot-wide green-strip will be created and treated for sagebrush re-establishment. The general concept is to begin with a feasible project and work in concentric layers outward until a sufficient amount of habitat has been re-established, diminishing the potential of habitat fragmentation and improving habitat quality and quantity. This area supports a high population of sage-grouse and these actions are of at least high priority within the State of Nevada.



“Brown-strips” have been defined by the NNSG as fuel breaks that use the existing native herbaceous vegetation. The shrubs are removed from a strip and the native perennial herbaceous vegetation that remains is grazed to reduce the amount of standing fuel. These areas act similarly to green-strips, but the name brown-strip distinguishes between the use of exotic species in the green-strip and the use of native species (which cure out and turn brown) in the brown-strips. The brown-strips are suggested along existing allotment fence boundaries, roads, transmission and/or distribution lines, or other features on the landscape that can be used to break up large contiguous stands of sagebrush that are at risk of burning and/or converting to annual grasslands. Once in place, the brown-strips can be maintained with any of the shrub control methods used for green-strips.

Wildfire suppression strategies include annual meetings with Bureau of Land Management and U.S. Forest Service Fire Management Officers to update maps and information in fire management plans pertinent to critical habitat protection and full suppression.

Wildfire rehabilitation strategies include maintaining an annual seed collection contract with the Nevada Division of Forestry (NDF) Honor Camps to ensure the availability of a fresh and local supply of sagebrush seed to be used in fire rehabilitation seed mixes. NDF will store fresh sagebrush seed, and other desirable forb seeds when available at the State Seed Bank in Washoe Valley. The Bureau of Land Management and the U.S. Forest Service with assistance from the Natural Resources Conservation Service will develop pre-fire rehabilitation plans that designate the appropriate ecological sites that either 1) require seeding to deter cheatgrass dominance and reestablish critical sagebrush habitat or 2) will naturally succeed to sagebrush reestablishment following fire. Seed mixture recommendations and application specifications will be developed in advance in consideration of natural ecological site potential and will be available for immediate use following a wildfire in all critical habitat areas. In lower elevation Wyoming big sagebrush areas where the potential for cheatgrass dominance is imminent, seeding recommendations can include insurance species that are the most reliable choices for establishment success under arid conditions, and are commercially available, regardless of their continent of origin (e.g. crested wheatgrass). Use of exotic species under certain, pre-designated conditions is an obligatory protective measures against cheatgrass domination or invasion of noxious weeds to maintain the potential for sagebrush reestablishment in the future.

The acreage of planned actions by Local Groups through the year 2007 to address the wildfire issues is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.5 Habitat Fragmentation Conservation Actions**

The strategies to reduce habitat fragmentation fall into two categories: 1) habitat rehabilitation, and 2) habitat protection. Rehabilitation of sagebrush habitats on lands that have been converted to non-sagebrush habitat will restore the sagebrush continuity on the landscape. These strategies are outlined above in the section on habitat quantity, as the strategies are the same: restore sagebrush on sites where it formerly occurred and has been replaced by plant communities that are not part of the sagebrush ecosystem (i.e., annual grasslands, exotic perennial grasslands, pinyon-juniper on range sites, etc.).

The second strategy to reduce habitat fragmentation will be to work to prevent fragmentation from occurring, to the extent feasible. The focus on sage-grouse over the last few years has heightened the awareness of the habitat fragmentation issue. Revisiting the location of designated utility corridors, road corridors, and other factors that are likely to create habitat

fragmentation and amending land use plans to adjust the corridors to minimize habitat fragmentation is one such strategy. Using land exchanges, especially along the “checkerboard” area adjacent to the Union Pacific railroad, will allow consolidation of public land into a utility corridor to serve future transmission line needs across the state. Designating new utility corridors along existing rights-of-way and existing roads and railways will reduce the amount of additional fragmentation that will be needed to meet future human population needs. These types of actions are generally included in the land use plan updates or by land use plan amendments.

The acreage of planned actions by Local Groups through the year 2007 to address the habitat fragmentation issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.6 Livestock Grazing Conservation Actions**

Conservation actions to mitigate the effects of livestock grazing will be implemented where necessary to address proven problems. Conservation strategies involve working through the allotment evaluation process and determining if guidelines recommended by the Western Association of Fish and Wildlife Agencies are being met to develop grazing systems that provide for healthy rangeland conditions conducive to sage-grouse survival, reproduction, and recruitment needs. For example, addressing nesting habitat needs may involve identifying where sage-grouse nesting habitat is in relation to early spring use pastures. If the grazing period does not overlap with the nesting season in the designated nesting habitat, then changes in grazing management may not be necessary. Where there is overlap, the situation needs to be examined on a case-by-case basis to determine how to provide nesting cover. This may include changes in the timing and intensity of grazing, changing the order in which pastures are grazed to avoid removal of nesting cover during the nesting season, changes in pasture configuration to avoid grazing nesting habitat in early spring, modification of trail routes for sheep operations, or other solutions that evolve from the site evaluation.

Grazing management strategies for riparian areas should, at a minimum, maintain or achieve riparian proper functioning condition (PFC). Specific management actions include riparian fencing to provide control of the season, duration or degree of herbivory, providing alternate water sources away from the riparian area, changing the grazing system, or other grazing management practices that promote herbage removal within acceptable limits. In many cases on BLM-administered lands, meeting the standards for riparian vegetation as outlined in the various Resource Advisory Council (RAC) Standards and Guidelines for Ecological Health will meet the sage-grouse habitat requirements. In addition, there are specific grazing systems for riparian areas that will be considered for areas with riparian issues.

The Washoe-Lassen-Modoc Local Group has worked with the appropriate BLM Field Offices and the livestock permittees to ensure that livestock grazing permits are being issued by comprehensive environmental assessments. Standards and guidelines are being applied to permits that are in compliance with the Western Association of Fish and Wildlife Agencies Sage-Grouse Guidelines. Livestock have been excluded from the Sheldon PMU (Sheldon National Wildlife Refuge), which supports a high population of sage-grouse, in order to restore and research sage-grouse habitat.

Within the White Pine Local Conservation Planning Area, the Ely Ranger District of the U.S. Forest Service will start work on Environmental Impact Statements in 2005 to review all the range allotments on the district. Grazing allotments will be evaluated and revised Allotment

Management Plans will be developed with standards updated to provide for improved sage-grouse habitat conditions. Many of these allotments are in key sage-grouse habitat areas including the Butte/Buck/White Pine PMUs that supports a relatively large sage-grouse population.

The acreage of planned actions by Local Groups through the year 2007 to address the livestock grazing issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.7 Wild and Free Roaming Horses Conservation Actions**

Conservation actions to mitigate the effects of wild horses will be implemented where necessary to address proven problems. Controlling the duration and timing of grazing may be possible with domestic livestock, but is not feasible with wild and free roaming horses. Therefore, the Bureau of Land Management has established appropriate management levels for wild horse Herd Management Areas to accommodate the perpetuation of this resource and at the same time protect the landscape.

The primary conservation strategy for addressing impacts from wild horses is to remove wild horses in sufficient numbers to reach Appropriate Management Level on the Herd Management Areas that include active habitat and conduct regular gathers to maintain wild horses at Appropriate Management Level. Other management actions include removing wild horses from lands outside of the designated Herd Management Areas, buck and pole fences at springs or water sources to prevent destruction of these resources by wild horses, and other population management actions (e.g., birth control) to limit population growth.

The management of wild horses is under the jurisdiction of the Bureau of Land Management and all wild horse management strategies must be in conformance with the federal laws, local land use plans, and herd management plans and will generally be carried out by the Bureau of Land Management. These projects are budget dependent and prioritized on an annual basis.

The number of planned projects by Local Groups through the year 2007 to address the wild horse issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.8 Changing Land Use Conservation Actions**

Three primary strategies were identified by the Local Groups for maintaining existing sage-grouse habitats-at-risk from development or conversion to other land uses on private lands:

1. Provide habitat conservation information to the land owners so that they are aware of the importance of private lands to sage-grouse conservation;
2. Obtain conservation easements that allow the continued maintenance of habitats; and
3. Use landowner incentives to provide a means of conducting habitat management on private lands.

When actions are proposed on public lands that can change the existing land use, such as mining and energy development, compliance with existing National Environmental Policy Act requirements includes evaluation and mitigation of the potential effects to sage-grouse. The preferred priority order for mitigation alternatives is "avoid, minimize and mitigate." Mitigation

frequently involves land reclamation that can successfully reestablish resource values for sage-grouse.

The acreage of planned actions by Local Groups through the year 2007 to address the changing land uses issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.9 Predation Conservation Actions**

The primary strategies for addressing predation within the PMUs include site-specific and predator-specific predator control, assessment of predation to determine if predation is a limiting factor and, if so, is it a function of habitat condition or other proximal factor. Predator management includes actions that can make the habitat less suitable for the identified predator (e.g., removal of nest structures or perch sites such as non-functional windmills, or abandoned utility poles), or actions that provide alternative prey species, or removal of an artificial food source that allows predators to maintain an artificially high population (e.g., landfills).

The species protection action in the Pine Nut PMU addresses the predation risk by implementing short term, properly monitored predator control during the strutting-nesting-early brood period. This action is only to be implemented in conjunction with the pinyon-juniper removal project designed to reestablish big sagebrush nesting habitat that is currently lacking. The objective is to enhance or maintain juvenile recruitment into the population during the interim period when big sagebrush habitats are rehabilitated. Professional predator control biologists with USDA APHIS Wildlife Services would implement the action under the supervision of NDOW.

Predator control work in the Grassy-Stevens camp area within the Washoe-Lassen-Modoc Local Group that began in 2000 provided inconclusive, but interesting results regarding the effects of raven control on the local sage-grouse population. The objective of this project is to improve nest success and subsequently, chick recruitment into the fall population. This project was successful at improving nest success compared to adjacent, untreated areas, but did not improve chick recruitment into the fall. This suggests there are other problems involving habitat condition or a combination of factors involving habitat condition and other predators. This project will end in 2004.

The number of projects planned by Local Group through the year 2007 to address the predation issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.10 Disturbance Conservation Actions**

The disturbance issues are generally site-specific and don't lend themselves to broad strategy discussions. However, rerouting roads to avoid important seasonal habitats, such as leks or meadows, restricting certain types of land uses (e.g., motocross races, off-road vehicle events, etc.) during the breeding or nesting season, and education of the public regarding viewing leks in a manner that does not cause lek abandonment are the types of actions that address the disturbance issue.

The acreage of planned actions by Local Groups through the year 2007 to address the disturbance issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

### **3.11 Disease Related Conservation Actions**

Currently there are no actions identified by the Local Groups that directly address disease within sage-grouse populations. The improvements proposed for habitat quality are likely to improve the overall health of the populations and keep disease outbreaks at a minimum. Steps to combat the West Nile virus may be necessary in the near future. Monitoring will be used to determine if the disease will become a factor in Nevada and Eastern California. The Nevada Department of Wildlife and the California Department of Fish and Game are coordinating with the U.S. Geological Survey, Biological Resources Division and its associated National Wildlife Health Center to monitor for West Nile virus while conducting summer capture and banding projects scheduled in various PMUs throughout both the States of Nevada and California. (See section 5.4.7 for monitoring details).

### **3.12 Pesticide Related Conservation Actions**

Strategies to avoid or minimize effects from pesticides include avoiding the use of highly toxic organophosphorous and carbamate insecticides, using insecticides only when other means of pest control are not effective, restricting pesticide application to the minimal area necessary to achieve pest control objectives, and assisting private land owners by providing information related to pesticide toxicity and alternative pest control methods. NDOW will continue to coordinate Mormon cricket control practices with the BLM and Nevada Department of Agriculture to assure that no pesticide treatments occur within a one-mile radius of existing leks.

### **3.13 Cycles Conservation Actions**

The literature is inconsistent on the existence of cycles within specific sage-grouse populations and for the existence of range-wide cycles. The causes of such cycles, if they exist, are at present unknown, and therefore, are not addressed in this conservation plan.

### **3.14 Climate/Weather Conservation Actions**

As previously discussed, climate and weather may influence vegetation and chick survival, respectively, but are generally beyond human control. However, the effects of weather on chick survival can be reduced by maintaining high quality habitat conditions that favor quality egg production, abundant insects and forbs for chick nutrition, and adequate cover for protection from inclement weather. The strategies discussed above under habitat quality include strategies that will minimize the effects of weather.

### **3.15 Hunting and Poaching Conservation Actions**

Hunting and poaching conservation actions have been instituted in several areas throughout California and Nevada. In Nevada, several areas have been closed to hunting, season dates have been altered, and the general sage-grouse season has been shortened. California institutes a permit only system to control the number of hunters and has conservative bag limits. Several more conservation actions have been proposed in some Local Groups throughout the State.

Hunting seasons were closed in several Nevada counties and hunt units in 1999 where populations were thought to be less than 300 sage-grouse (as recommended by WAFWA guidelines) or where hunting pressure would negatively effect sage-grouse populations. These areas included Douglas, Esmeralda, Lyon, and Mineral Counties within the Bi-State LACP; Pershing County along with hunt units 042, 044, and 046 in Humboldt County within the North Central LACP; hunt units 021, 022, 194 and 196 within the Washoe-Lassen-Modoc LACP; and

those hunt units within the Lincoln County LACP. Season lengths were also shortened from 16 days to 9 days in 1999 in the counties and hunt units that continue to support hunting seasons. In 2001, hunt units 183 (Clan Alpine Range) and 184 (Desatoya Range) within the North Central LACP were closed to sage-grouse hunting. Sage-grouse hunting areas were further reduced in 2003 when hunt unit 151 (Battle Mountains and Fish Creek Range) within the South Central LACP was closed. **Figure 14** represents the areas that continue to be open to sage-grouse hunting in Nevada.

Hunting is allowed in some areas of California under a very conservative permit allocation system based on solid lek count data. For example, 25 1-bird permits were issued in the Long Valley area of the South Mono PMU and 10 1-bird permits were issued in the Bodie Hills PMU, both located in the Bi-State Local Planning Area, for a 2-day hunting season in 2003. Peripheral populations in the White Mountains and Fales area are closed to hunting because of small population numbers.

Future conservation actions proposed by some Local Groups include increased game warden patrols to deter poaching incidents at certain times of the year and monitoring to ensure that no more than 10% of the estimated fall population is being harvested. This year (2004) will be the final year of the harvest impact study being conducted in the Lone Willow PMU of the North Central LACP. The results from this study have consistently shown that the harvest rates over the last three years have been consistent with those recommended in the WAFWA guidelines.

The number of planned actions by Local Groups through the year 2007 to address the disturbance issue is provided in **Table 3-1** at the end of this chapter. The specific project worksheets for each PMU that have been completed to date are in **Appendix F**.

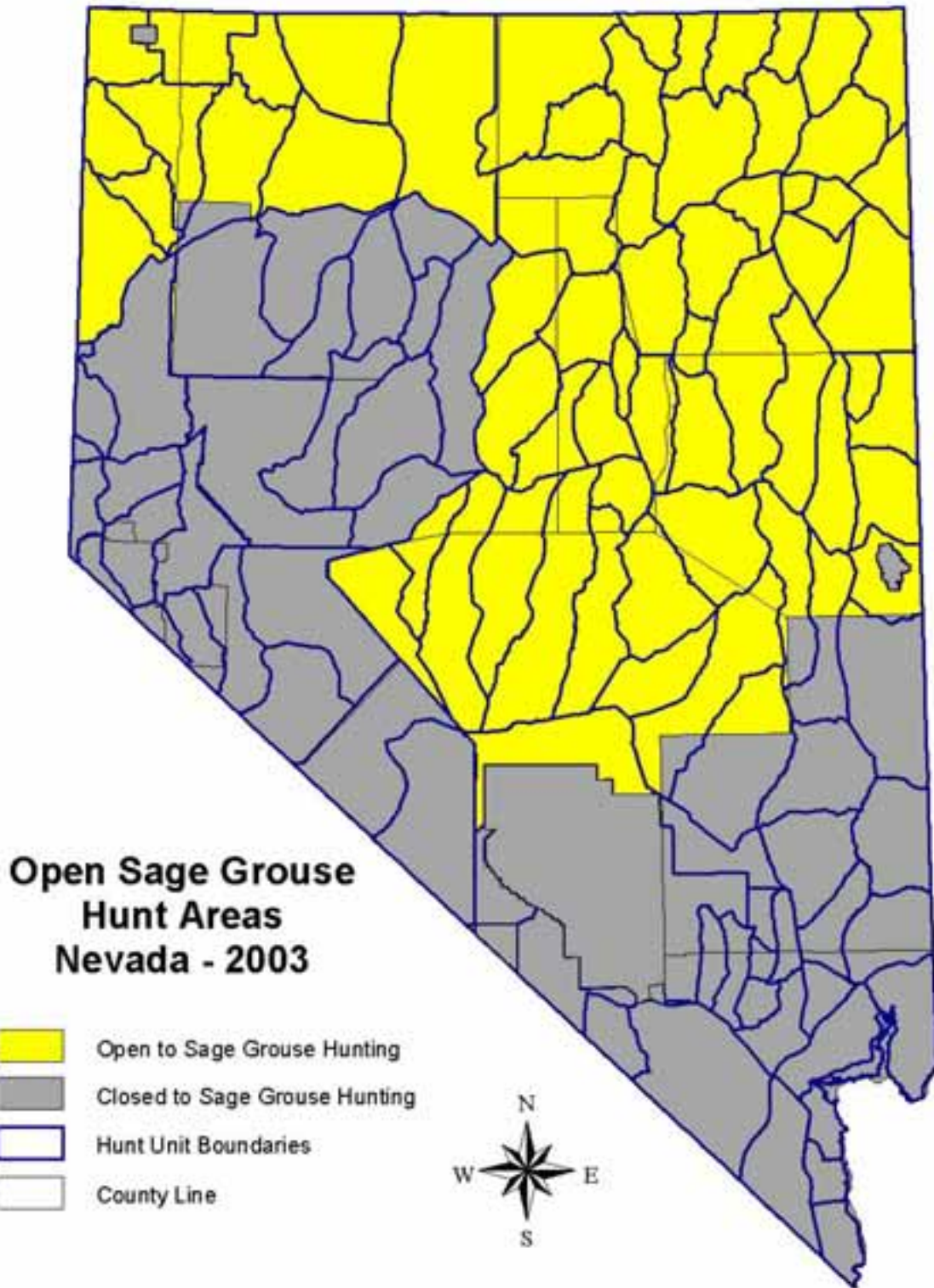


Figure 14 Open Sage-grouse Hunt Areas in Nevada

**Table 3-1. Projects by Local Groups to Address Factors Affecting Sage-Grouse in Nevada and Eastern California.**

| Treatments                                    | Local Area Planning Group Projects and Acres Proposed for Treatment |              |               |              |               |                |             |
|---|---|--------------|---------------|--------------|---------------|----------------|-------------|
|   | Bi-State  | Washoe-Modoc | North Central | Elko (NNSG)  | South Central | East Central   |             |
|   |   |              |               |              |               | White Pine Co. | Lincoln Co. |
| <b>Habitat Quantity</b>                       |   |              |               |              |               |                |             |
| P-J Removal                                   | 33,800 ac   | Planning     |               |              |               | 7,200 ac       | 4,000 ac    |
| P-J Assessment                                | 1 ea*   |              |               |              |               |                |             |
| Restoration of cheatgrass areas               |   |              | Planning      |              |               |                |             |
| Rehabilitation of crested wheatgrass seedings |   |              |               |              |               | 244 ac         |             |
| Conservation Easements                        | yes   |              |               |              |               |                |             |
| Private Land Habitat Mgt.                     | yes   |              |               |              |               |                |             |
| <b>Habitat Quality</b>                        |   |              |               |              |               |                |             |
| P-J Reduction                                 | 3,560 ac  | Planning     |               |              |               |                | 800 ac      |
| Riparian/Meadow Improvement                   | 240 ac  | Planning     | 8 ea*         |              | X             |                |             |
| Water Development                             | 2 ea*   |              |               |              |               |                | 16          |
| Sagebrush Habitat Improvement                 | Planning  | Planning     | 4,000 ac      |              |               |                | Planning    |
| Spring Improvement                            | 4 ea*   |              |               |              |               |                |             |
| Noxious Weed Control Projects                 | 1 ea*   | Planning     | 1 ea*         |              |               |                |             |
| Habitat Assessment                            |   | 2 ea         |               | 800,000 + ac |               | 1 ea*          | 3 ea*       |
| <b>Wildfire</b>                               |   |              |               |              |               |                |             |
| Pre-suppression                               |   |              | Planning      | Planning     |               |                |             |
| Green-strips                                  |   |              |               | Planning     |               | 850 ac         |             |
| <b>Habitat Fragmentation</b>                  |   |              |               |              |               |                |             |
| Protection                                    | 1 ea*   |              |               |              |               |                |             |
| <b>Livestock Grazing</b>                      |   |              |               |              |               |                |             |
| Assessment/Management                         | 2 ea*   | 3 ea*        | 1 ea*         | 3 ea*        |               | 35 ea*         |             |



**Table 3-1. Continued.**

| <b>Wild Horses</b>                 |       |       |       |       |  |  |       |
|------------------------------------|-------|-------|-------|-------|--|--|-------|
| HMA Boundary Adjustment            |       |       |       |       |  |  |       |
| Removal outside of HMA             | 2 ea* |       | 1 ea* |       |  |  | 2 ea* |
| Removal to AML                     | 1 ea* | 1 ea* |       |       |  |  |       |
| <b>Predator Control/Management</b> |       |       |       |       |  |  |       |
| Predator Control                   | 1 ea* | 1 ea* |       |       |  |  |       |
| Assessment of Predation            | 1 ea* | 1 ea* |       | 3 ea* |  |  | 1 ea* |
| <b>Disturbance</b>                 |       |       |       |       |  |  |       |
| Limit seasonal access              | 2 ea* | 1 ea* |       |       |  |  |       |
| OHV education program              | 1 ea* | 1 ea* |       |       |  |  |       |
| <b>Hunting/Poaching</b>            |       |       |       |       |  |  |       |
| Assessment of Hunting Levels       | 2 ea* | 3 ea* |       |       |  |  |       |
| Assessment of Poaching Levels      | 2 ea* | 2 ea* |       |       |  |  |       |

\* "ea" represents each individual project – acres were not necessarily applicable to these projects

## CHAPTER 4. IMPLEMENTATION AND COORDINATION

### 4.1 Implementation Approach

Implementation of the proposed actions, public education, monitoring and research facets of the Nevada-California Plan will be incorporated into agency annual budgets and work plans where possible. They will also rely on collaboration with existing initiatives that share common or complimentary objectives with sage-grouse conservation. Where possible, these projects will be planned, funded, and implemented in conjunction with:

- National Fire Plan
- Bureau of Land Management - 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
- others such as mine land reclamation plans

### 4.2 Organization and Agency Roles

Effective implementation of this Nevada-California Plan requires coordination and cooperation between the primary land management agencies, the primary wildlife management agencies, private landowners, and other interested parties. For a complete list of participating agencies and organizations, please refer back to Section 1.3. Specific roles and responsibilities for individual agencies and organizations are detailed below:

#### 4.2.1 Governor's Team and Local Area Planning Groups

Completion of the First Edition of the *Greater Sage-Grouse Conservation Plan for Nevada and Eastern California (2004)* fulfills the request from Governor Kenny Guinn to conduct risk assessments and develop sage-grouse conservation strategies at the local level. As the planning process transitions into the implementation phase, the Governor's Team will continue to provide support and continuity to the Local Area Planning Groups that are completing PMU plans in 2004, and will take on new responsibilities for assuring implementation and monitoring of the conservation actions. To facilitate this transition the name 'Governor's Team' will be changed to the "Sage-Grouse Conservation Team."

Membership on the Sage-Grouse Conservation Team will be open to any interested agency, group or individual taking an active role in sage-grouse conservation. Membership, representation, working rules, procedures, and decisions such as facilitation and chairmanship will be decided upon at the onset of the transition process that takes place in 2004. The first meeting of the Sage-Grouse Conservation Team is anticipated to occur in September 2004. Potential responsibilities of the Sage-Grouse Conservation Team may include:

- Serving as a forum for coordination and implementation of the *Sage-Grouse Conservation Plan for Nevada and Eastern California*, consisting of public education/outreach, habitat improvement, research, population monitoring, data archives, information exchange, and implementation monitoring.

- Establishing 'Working Groups' of experts in specific program areas to identify needs and develop specific techniques for monitoring, sampling designs, and data analyses/interpretation.
- Encouraging members to take appropriate action within the limits of their respective authorities, policies, and budgets.
- Compiling recommendations from Local Groups and securing funding for implementation of the action items.
- Promoting cooperative efforts with Counties, Tribal land managers, and conservation organizations through existing agreements or through establishment of new agreements.
- Evaluating plan implementation on a regular basis to determine how effectively objectives are being met.
- Organize the annual State Sage-Grouse Symposium to provide updates on implementation progress, present new science, and provide Local Groups with an opportunity to give updates on their progress.

Potential roles and responsibilities of the 'Local Area Planning Groups' are specified for each individual group as described in their statements of commitment in Sections 4.5.1 through 4.5.6. Other general responsibilities of the Local Groups may include:

- Identifying local management needs for sage-grouse and coordinating annual activity recommendations between Federal, State, Tribal and private interests within the regions.
- Determining the local needs for public education/outreach, research, conservation actions, databases and information exchange and annual monitoring. Groups may, when appropriate, work to plan, coordinate, and facilitate implementation of annual work plans and report periodically to the Sage-Grouse Conservation Team on progress at the local level.

#### **4.2.2 Bureau of Land Management**

The Nevada and California (NV/CA) Bureau of Land Management (BLM) are committed to implementing the actions identified in the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California (herein referred to as "the Nevada-California Plan"), where feasible and through collaborative action with partners, to the extent consistent with the agency mission and within the constraints of statute and regulation.

NV/CA BLM manages greater sage-grouse habitat under statutory authority of the Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*), as amended. Statute and regulation identify the Bureau of Land Management Headquarters Office as the agency responsible for the establishment of broad policy for the management and protection of Wildlife and Sensitive Species Habitat at the National level. Delegation of Authority identifies the Nevada State Director and California State Director as the persons responsible for implementation of National Policy and establishment and implementation of regional policies for the management and protection of wildlife and sensitive species habitat within their states' jurisdiction. Significant laws and regulations regarding sage-grouse are:

- Endangered Species Act of 1973 (16 U.S.C. 1531 *et seq.*), as amended

- Sikes Act, Title II (16 U.S.C. 670g *et seq.*), as amended
- The Federal Land Policy and Management Act of 1976 (43 U.S.C. 1701 *et seq.*), as amended.

NV/CA BLM will continue to monitor greater sage-grouse habitat and populations with the California Department of Fish and Game and Nevada Department of Wildlife on an annual basis utilizing methods described in this Nevada-California Plan. Monitoring efforts will be coordinated with the appropriate federal and state agencies and tribal governments to ensure consistent techniques are utilized. NV/CA BLM will continue to provide support and be actively involved with on-going research projects. NV/CA BLM will also pursue research opportunities and seek funding sources to accomplish research that is identified in local plans. NV/CA BLM will utilize the resources available to further the purposes of conducting research projects such as the Great Basin Cooperative Ecosystem Study Unit (CESU). Other research projects that may be proposed in the future may be considered even though they may not have been identified in local plans.

NV/CA BLM will perform land use plan consistency reviews of the goals, objectives and actions contained in the Nevada-California Plan and determine if current BLM land use plans require updating through amendment or revision in order to achieve the goals and objectives identified in the Nevada-California Plan. NV/CA BLM will ensure that any actions implemented on public lands will be in conformance with existing land use plans, comply with the National Environmental Policy Act (NEPA), the Endangered Species Act (ESA), other applicable statutes and regulations, and ensure appropriate Native American consultation is conducted.

NV/CA BLM will observe the principles of the Secretary's "Four C's" (Consultation, Conservation through Consultation, Communication, and Cooperation) and partner with appropriate federal and state agencies, tribal governments, and private landholders to implement habitat improvement projects identified in the local plans where applicable. NV/CA BLM will also work to ensure management practices implemented both from these projects or as the result of other federal actions, are beneficial to greater sage-grouse populations, to the extent allowed by statute and regulation and consistent with BLM approved land use plans.

NV/CA BLM will seek funding opportunities that become available through the federal budget process, Cooperative Conservation Initiative (CCI) and Challenge Cost Share (CCS) programs, and through federal and state grant programs, including but not limited to the Fish and Wildlife Fund, and seek additional funding opportunities with the National Fish and Wildlife Foundation to implement actions set forth in the Nevada-California Plan and that pertain to the NV/CA BLM administered lands or interest in lands.

NV/CA BLM will compile results of its monitoring and details regarding habitat improvement projects and/or conservation easements in an annual report. These reports are public information and are available upon request.

NV/CA BLM will continue to provide local field office membership to Local Area Planning Groups and continue working in the local collaborative planning process. Local Area Planning Group proposals and recommendations regarding issues that pertain to BLM management of public lands will be considered through existing authorities, land use, and activity level planning processes as appropriate.

Contact persons for the BLM are:

Mr. Bob Abbey, Nevada State Director  
Mr. Mike Pool, California State Director

### **4.2.3 Forest Service**

The Forest Service will continue to participate and coordinate with both local and statewide organizations. In regards to implementation of projects identified as priority emphasis items in this Nevada-California Plan and specific projects identified in Local Area Plans, the Forest Service will comply with the appropriate regulatory requirements before any on-the-ground activities will occur. These requirements include the National Forest Management Act, National Environmental Policy Act (NEPA), Endangered Species Act, and the National Historic Preservation Act. Funding for any specific project(s) will be allocated on a Forest priority basis, which is based upon National, Regional, and Forest emphasis items. It is anticipated that implementation of actions that provide for the conservation of the greater sage-grouse and associated habitat will be a high priority.

### **4.2.4 Natural Resource Conservation Service**

The Natural Resource Conservation Service (NRCS) mission statement is “To provide leadership in a partnership effort to help people conserve, maintain, and improve our natural resources and environment.” In achieving that mission, NRCS is committed to participate in implementation of the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California where feasible and pertinent to the agency.

The NRCS is a non-regulatory federal agency that provides technical assistance to landowners who are interested in implementing conservation practices on their land as well as developing and delivering technical assistance and information on conservation practices to individuals, communities, Tribal governments, governmental agencies and private-sector organizations at all levels. Conservation Districts, which are local units of government organized by locally elected citizens under state law, are the heart of the NRCS conservation delivery system. NRCS conducts natural resources surveys and helps land users develop conservation plans for their land. NRCS is also able to provide financial assistance in some cases through Farm Bill programs such as the Environmental Quality Incentives Program (EQIP), and the Wildlife Habitat Incentives Program (WHIP) as well as others.

NRCS has been involved with the sage-grouse planning efforts from the beginning at both the state and local levels. In 2004, NRCS identified greater sage-grouse habitat as a priority in the EQIP and WHIP programs. NRCS will utilize the Nevada-California Plan as a guide for targeting priority areas. Where feasible, NRCS will partner with other federal agencies and private groups to achieve the projects listed in this Nevada-California Plan.

### **4.2.5 U.S. Fish and Wildlife Service**

The mission of the U.S. Fish and Wildlife Service (Service) is working with others to conserve, protect and enhance, fish, wildlife, and plants and their habitats for the continuing benefit of the American people. As part of this broad role, the Service is committed to being an active partner in sage-grouse conservation efforts in both California and Nevada. The Nevada Fish and Wildlife Office (NFWO) has played, and will continue to play, an active role in sage-grouse conservation planning work in both states and at both the state-wide and local area planning group levels. In addition to this work, the NFWO will also assist with the implementation of sage-

grouse conservation plans for California and Nevada, consistent with the authorities of the Service. The Service has several conservation funding programs that could provide funding to implement on-the-ground conservation actions that will benefit sage-grouse habitat and populations. Service conservation funding could also potentially fund research studies on sage-grouse, or genetic analysis work. The NFWO will continue to fulfill Service legal obligations under the Endangered Species Act with regard to listing petitions. Finally, the NFWO will keep other partners in sage-grouse conservation efforts, and the general public, informed about Service actions.

The mission of the Service's National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans. As part of this broad mission, National Wildlife Refuges in Nevada and California that have sage-grouse and/or sage-grouse habitat, are committed to proactively managing this species and its habitat. The broad goal of these efforts on National Wildlife Refuge lands is to maintain, enhance, or restore sage-grouse populations and habitat. Within the limits of available budget and authorities, Refuge personnel will implement habitat management projects to benefit sage-grouse. These Refuges will also cooperatively manage the harvest of sage-grouse with both states, utilizing principles of adaptive harvest management. Refuges will also conduct necessary research on sage-grouse populations, subject to available funding and authorities, or they may assist other partners in this work. Refuge personnel will continue to participate in sage-grouse conservation planning efforts subject to budget limitations.

#### **4.2.6 U.S. Geological Survey**

The United States Geological Survey (USGS) serves as the federal source for science about the Earth, its natural and living resources, natural hazards, and the environment. Because it has no regulatory or management mandate, USGS provides impartial science that serves the needs of our changing world. The USGS seeks to provide the understanding and scientific information needed to recognize and mitigate adverse effects and to sustain the health of the Nation's environment. USGS scientific efforts include long-term data collection, monitoring, analysis, and predictive modeling. Field investigations, direct observations of natural science processes and phenomena, and monitoring and data collection at the local scale are the scientific hallmarks of USGS.

USGS serves as the primary source of scientific research for US Department of the Interior agencies, including the Bureau of Land Management, the U.S. Fish and Wildlife Service, and the National Park Service. USGS provides these and other state, local, and private groups with scientific expertise to address a broad range of information needs. The Western Ecological Research Center of USGS is currently leading several research projects within the Bi-State Local Area Planning Group investigating the biology of greater sage-grouse in the region and continues to support the ongoing conservation efforts. USGS will continue to serve as a partner by providing sound scientific data in order to form a strong scientific foundation for these ongoing conservation efforts.

#### **4.2.7 Nevada Department of Wildlife**

The Nevada Department of Wildlife (NDOW) is committed to following through on the actions identified in the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California where feasible and pertinent to the agency and its mandates.

The Nevada Department of Wildlife manages greater sage-grouse under statutory authority of the Nevada Revised Statutes (NRS) and Nevada Administrative Code (NAC). Statute and code identify the Nevada State Board of Wildlife Commissioners as the entity responsible for the establishment of broad policy for the management and protection of the State's wildlife. NDOW is the agency charged with the execution of state law, and commission regulation and policy. Significant laws and regulations regarding sage-grouse are:

*NRS 501.110 Classification of wildlife*

*For the purposes of this title, wildlife must be classified as follows:*

*..Wild birds, which must be further classified as either game birds, protected birds or unprotected birds. Game birds must be further classified as upland game birds or migratory game birds.*

*NRS 501.181 Duties; regulations. The Commission shall:*

*Establish broad policies for:*

*The protection, propagation, restoration, transplanting, introduction and management of wildlife in this state....*

*NAC 503.040 Wild birds. Wild birds include all species classified as game, protected and unprotected birds.*

*Upland game birds, which include: .....Centrocercus urophasianus.*

NDOW will continue to monitor greater sage-grouse populations on an annual basis consistent with the methods described in this Nevada-California Plan. Monitoring efforts will be coordinated with the appropriate federal agencies, adjacent state wildlife agencies, and applicable tribal governments to ensure consistent techniques are utilized.

NDOW will compile monitoring results and other details regarding habitat improvement projects and/or conservation easements in an annual report (similar to Federal Aid Job Progress Reports submitted annually to the U.S. Fish and Wildlife Service). These reports are public information and are available upon request.

NDOW will pursue habitat improvement projects identified in the Nevada-California Plan where applicable and will coordinate with the appropriate federal and state agencies, tribal governments, and private landowners to conduct these projects or ensure management practices are beneficial to greater sage-grouse populations.

NDOW will continue to provide support and be actively involved with ongoing research projects. 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 actions and research projects that pertain to NDOW set forth in the Nevada-California Plan. Additional research projects will also be supported by NDOW even though they may not have been identified in local plans.

NDOW will continue to provide membership to Local Area Planning Groups and continue participating in the local collaborative planning process. Local area plans and recommendations regarding issues that pertain to and are regulated by NDOW will be processed in accordance with existing protocols that include notification and recommendation to County Wildlife Advisory Boards and the Nevada Wildlife Commission.

#### **4.2.8 California Department of Fish and Game**

In California, greater sage-grouse are classified as a resident game bird under Fish and Game Code (FGC) Section 3500. Fish and Game Code Section 1801 outlines the policies for the conservation of wildlife resources of the state of California, including, "... the preservation, conservation, and maintenance of wildlife resources under the jurisdiction and influence of the state", and FGC Section 1802 indicates that "the Department [of Fish and Game] has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and habitat necessary for biologically sustainable populations of those species." The Department considers greater sage-grouse a species of special concern.

The California Fish and Game Commission (Commission) "is delegated the power to regulate the taking or possession of [game] birds..." (FGC 200) and "[formulation of] general policies for the conduct of the Department..." (FGC 703(a)). Commission policy for upland game is to "conserve, restore, maintain and enhance upland game habitat and to maintain upland game populations at optimum levels on public and private lands within California. The Department's Upland Game Program shall be aggressively carried out in a manner that is consistent with Section 1801 of the Fish and Game Code and in accordance with the objectives and elements stated in each of the appropriate Upland Game Species Management Plans...The goals of these plans include the restoration, maintenance and enhancement of upland game populations at the highest levels of diversity, distribution and density commensurate with the optimum management opportunities on both public and private lands."

The California Department of Fish and Game (CDFG) is committed to carry out the actions identified in the Greater Sage-Grouse Conservation Plan for Nevada and Eastern California where feasible and pertinent to the agency and its mandates. CDFG will prepare appropriate notification and/or consultations for projects that require review under the California Environmental Quality Act.

CDFG will continue monitoring of greater sage-grouse populations using the methods described in this Nevada-California Plan. CDFG is the lead agency responsible for collecting information on the bird statewide for management. CDFG will coordinate these activities with other state, federal, and non-government agencies, and be the central repository of all pertinent data statewide. CDFG will remain up to date on the scientific literature and data collection and interpretation through membership in the WAFWA Sage-Grouse Technical Committee and provide expertise when permitting research by other entities. CDFG will seek funding in cooperation with other agencies and academic institutions to conduct research outlined in the plans and other projects deemed most necessary. CDFG will use current monitoring data to estimate population trends within designated hunting areas, formulate harvest recommendations for those areas, propose harvest regulations to the Commission as identified in the LACPs and/or deemed most appropriate by CDFG, and seek cooperative harvest management for interstate populations with NDOW.

CDFG will pursue habitat restoration and improvement projects and consult with public and private entities to ensure management practices that most benefit sage-grouse on public and



private lands as identified in the Local Plans and as other opportunities arise. CDFG will prepare land acquisition evaluations and encourage the purchase of important private lands by the Wildlife Conservation Board. CDFG will seek additional funding for easements and habitat restoration and improvement projects on public and private lands.

CDFG will seek funding for adaptive management programs identified in the Local Plans from state and federal sources including, but not limited to, Wildlife Restoration Funds, State Wildlife Grants, State Upland Game Stamp Funds, CDFG Resource Assessment Program Funds, USFWS Section 6 Cooperative Grant Funds, the Intermountain West Joint Venture, and seek conservation easements on private lands.

CDFG will continue working in the collaborative framework by remaining as active participants and providing leadership in California for Local Groups established under this plan. CDFG will prepare an annual report of its accomplishments under the Conservation Plan and update the plan annually. Actions identified in the planning process under jurisdiction of the Department will be addressed through standard procedures of CDFG and the Commission.

### **4.3 2004-2005 Work Plan**

The work planned for the 2004-2005 fiscal years includes completing the planning and assessment work for PMUs by the Local Planning Groups. Field verification of risk assessments, habitat conditions, identification of seasonal habitats, and other site-specific local work will be prioritized.

A partial list of projects that are in progress or are nearing completion of the planning process are included in Section 4.4. Work will continue on these projects during the 2004-2005 work period.

## **4.4 Conservation Actions Currently In Progress**

### **4.4.1 Bi-State Local Area Conservation Planning Group**

The California Department of Fish and Game (CDFG) received a non-traditional grant from the U.S. Fish and Wildlife Service under Section 6 of the Endangered Species Act to develop a conservation plan for greater sage-grouse in Mono County, California. Section 6 funds are used for the recovery of listed and candidate species under ESA. The grant for sage-grouse was given under a special category used to develop conservation agreements for candidate species. Although not a candidate species, genetic information collected to date has shown greater sage-grouse in Mono County, CA and Lyon County, NV to be unique. The data suggests that the Mono/Lyon population has been separated from other greater sage-grouse populations for some time. Therefore, conservation of the Mono/Lyon population is being addressed as a unique population of grouse.

The U.S. Geological Survey is currently conducting several large-scale studies of greater sage-grouse within the Bi-State Local Planning Area. These studies are in partnership with CDFG, UNR, BLM, USFS, USFWS, LADWP, and Quail Unlimited. The primary objectives of these studies include:

- Determine seasonal habitat use areas of greater sage-grouse.
- Identify critical habitats for greater sage-grouse in the Bi-State Local Planning Area.

- Determine seasonal and annual survival rates.
- Determine nest success and link to habitat characteristics.
- Identify new lek sites within the Bi-State Local Planning Area.

The fieldwork for these studies is occurring primarily within four of the population management units within the Bi-State area. These include the Desert Creek/Fales PMU, the Bodie Hills PMU, the South Mono PMU and the White Mountains PMU. Field work will continue into 2005. Results of these studies will be incorporated into the Bi-State Conservation Plan (**Appendix J**) via the adaptive management process.

#### **4.4.2 Washoe-Lassen-Modoc Local Area Conservation Planning Group**

A Landowner Incentive Program Tier II grant was applied for and received jointly by the Nevada Department of Wildlife and the California Department of Fish and Game to create conservation easements for sage-grouse habitat protection on private lands that contained strutting grounds (leks) or important seasonal habitats along the border of the two states within the Buffalo/Skedaddle PMU. The proposed conservation easements will protect those leks from disturbance in the form of development or management strategy alterations. Specific rights to be obtained should include any future water development, mineral extraction, construction or building, or any other incompatible use with providing quality sage-grouse habitat. These conservation easements will be designed to provide financial incentive to use (or not use) these lands in the same manner as they have been in the recent past. Sage-grouse that use private lands in the proposed project area use habitats seasonally in both the states of California and Nevada.

In addition, major Bureau of Land Management land use plan revisions are underway in the Buffalo Hills/Skedaddle, Massacre and Vya Population Management Units. New Resource Management Plans will set the framework for project implementation by the Bureau of Land Management.

Full fire suppression to specifically delineated sage-grouse habitats is currently the BLM policy applied to lands delineated in these conservation plans. Monitoring of sagebrush restoration of previous wildfires is ongoing to determine the proper rehabilitation prescriptions for future wildfires.

Livestock grazing permits are being issued by comprehensive environmental assessments. Standards and guidelines are being applied to permits that are in compliance with the Western Association of Fish and Wildlife Agencies Sage-Grouse Guidelines. Livestock are excluded from the Sheldon National Wildlife Refuge in order to restore and research sage-grouse habitat restoration. Wild horse gathers to achieve appropriate management levels are underway, but dependent on this year's budget.

Juniper control is being considered in land use plan revisions to allow for large-scale projects to restore sagebrush communities in Massacre and Vya Population Management Areas. Past small projects are being monitored to measure the effects of the projects.

About 2,200 acres in Lassen County were acquired in 2000 to provide sites for restoration, enhancement and protection of sage/steppe plant communities and associated wildlife species as sites for impacts of the Sierra Pacific Power Company Alturas Project (365kv power line) and the Tuscarora Gas Transmission Company Project (natural gas pipeline). Target species included

sage-grouse and pronghorn antelope. These sites are within important sage-grouse seasonal use areas and will provide significant opportunities for enhancing sagebrush habitats.

#### **4.4.3 North Central Local Area Conservation Planning Group**

Several projects that will benefit sage-grouse habitat are ongoing or in the final stages of planning within those PMUs that have had conservation plans completed to date in this local planning area. Some of the completed PMU plans with projects in the planning or implementation phase include the Santa Rosa, Lone Willow, and Desatoya PMUs.

##### **Santa Rosa Population Management Unit**

Several projects are proposed or being implemented by the Santa Rosa Ranger District of the Humboldt Toiyabe National Forest. The projects include the following:

##### Cabin Creek Riparian Pasture

- Creation of a riparian pasture to improve vegetation and riparian conditions over several thousand acres near Cabin Creek on the Martin Basin Allotment.
- Part of the Martin Basin Rangeland Project.
- Planning in 2004 with implementation in 2005.
- Project supported by livestock permittees.

##### Rebel Creek Riparian Pasture

- Creation of a Riparian Exclosure to improve vegetation and riparian conditions over several thousand acres within Rebel Creek on the Rebel Creek Allotment.
- Part of the Martin Basin Rangeland Project.
- Planning in 2004 with implementation in 2005.

##### Camas Creek Watershed Project

- Watershed treatments to improve vegetation and riparian conditions on 200 acres within the Buttermilk Allotment.
- Project to be implemented during the summer of 2004.

##### Abel Creek Watershed Project

- Watershed treatments to improve vegetation and riparian conditions on approximately 30 acres within the Paradise Allotment.
- Project nearly completed.
- Project supported by livestock permittees.

##### Quinn River Headcut Project

- Watershed treatments to improve vegetation and riparian conditions on approximately 30 acres within the Quinn River Allotment.
- Project nearly completed.
- Project supported by livestock permittees.

### Nevada First Land Acquisition

- Project was approved under Round 4 of the Southern Nevada Public Land Management Act.
- Approximately 10,500 acres of scattered private inholdings would be acquired by the Forest Service.
- Most of the inholdings provide important sage-grouse habitats.
- This proposal would maintain viable livestock allotments and prevent private land developments like recreational cabins or other developments.

### Round Corral Watershed Project

- Watershed treatments to improve vegetation and riparian conditions on approximately 30 acres within the Buttermilk Allotment.
- Project nearly completed.
- Project supported by livestock permittees.

### Pow Wow Pond Watershed Project

- Watershed treatments to improve vegetation and riparian conditions on approximately 30-50 acres within the Martin Basin Allotment.
- Planning to be completed during 2004-2005 with implementation during 2005 or 2006.

### Buttermilk Meadows Watershed Project

- Watershed treatments to improve vegetation and riparian conditions on approximately 75 acres within the Buttermilk Allotment.
- Planning to be completed during 2004-2005 with implementation during 2005.
- Project Supported by livestock permittees.

### Noxious Weed Treatments

- District-wide treatment of approximately 400-500 acres of noxious weeds annually.
- Project supported by livestock permittees and others.

### Unauthorized Livestock Project

- Ongoing Range Administration activities to address a serious and long-term problem involving illegal and unauthorized horses and cattle on the northern portion of the District.
- Problem is resulting in serious impacts to riparian and upland habitats.
- Activities may involve law enforcement activities, livestock impoundments, and ongoing monitoring.
- Project Supported by legal livestock permittees, wildlife groups, agencies and others.

### **Lone Willow Population Management Unit**

Within the Lone Willow PMU, biologists and resource managers are working to revise BLM resource management plans to identify key sage-grouse habitat locations as high priority suppression sites, and ensure local and regional suppression organizations know where these sites are located. In addition, minerals staff in the Winnemucca Field Office are working to provide the wildlife and range management specialists quarterly updates about exploration activities (including new mining claims) so that BLM and NDOW can develop pre-activity review/planning meetings with mining companies to identify potential effects to sage-grouse early in the planning process, and develop mining/exploration operational plans that minimize/prevent adverse impacts to Lone Willow's sage-grouse population.

The harvest impact study being conducted in the Montana Mountains of the Lone Willow PMU has given biologists and resource managers a better idea of the overall importance of this sage-grouse population. A number of goals have been met through the implementation of this study including attainment of a more scientifically accurate population estimate, identification of hunter harvest rates and seasonal movements of sage-grouse within the PMU. This study has been ongoing for three years and population estimates have been generated using a basic Lincoln Index formula. The 2003 population was estimated at 11,070, showing a large discrepancy with population estimates generated solely from aerial lek count data, which can be considered an underestimate of the population size. Harvest rates have been between 8.2% and 10.6% and are within the recommended guidelines established by the Western Association of Fish and Wildlife Agencies for managing greater sage-grouse.

Additional research is ongoing in the Lone Willow PMU by Oregon State University and the University of Nevada, Reno. Specific information about these research projects is included in Section 5.7.2.

### **Desatoya Population Management Unit**

Several riparian restoration/protection and meadow restoration projects are in the planning and/or implementation phase within the Desatoya PMU on both private and public lands. The Bureau of Land Management is proposing riparian enhancement projects in Smith and Topia Canyons in 2004. The projects are designed to protect and restore critical meadow and riparian habitats important for sage-grouse brood rearing. In addition, the NRCS is coordinating a private lands habitat enhancement project in Porter Canyon. The proposed treatments include pinyon/juniper removal, erosion control, and the re-seeding of areas following treatment with grass/forb mixes. Meadow and riparian fencing regarding this private lands project has been completed.

The Nevada Department of Wildlife will be conducting a sage-grouse capture effort in the Desatoya PMU in the summer of 2004. The objective is to capture and attach radio-telemetry collars to fifteen sage-grouse within this PMU to more accurately identify seasonal habitats, the migratory nature of the birds, and potentially new lek sites.

#### **4.4.4 South Central Local Area Conservation Planning Group**

Telemetry projects initiated in 2003 in the Battle Mountain and Fish Creek PMUs have resulted in valuable information being gathered relative to predation, winter range and overall movement. Follow-up work on radio marked sage-grouse has also led to the discovery of two new active leks within the Fish Creek PMU.

Field visitation of high elevation riparian meadows within the Battle Mountain PMU has resulted in a cooperative agreement between the BLM, private landowners and BLM permittees to renovate three meadows important to sage-grouse brood rearing. The renovation includes weed control, fencing and grazing plans to benefit sage-grouse. State of Nevada Question 1 Bond monies have been applied for by the South Central LACP through the Nevada Division of State Lands to complete the scope of work associated with this project.

#### **4.4.5 Lincoln County Local Area Conservation Planning Group**

The Lincoln County Local Area Conservation Planning Group does not currently have any projects being implemented, but are working to initiate pilot projects to determine the effectiveness of proposed conservation actions. These actions include projects such as mechanical removal of pinyon/juniper within 0.5 miles of existing lek sites, re-seeding after removal with appropriate grass/forb mixes, and mechanical treatment of sagebrush and subsequent seeding of grasses and forbs to diversify otherwise monotypic habitats. These projects will be closely monitored for habitat response and any effects regarding sage-grouse use or distribution within and around proposed project sites. Results from these projects will be incorporated into future projects and applied at larger scales if successful.

#### **4.4.6 White Pine Local Area Conservation Planning Group**

The following represent projects that have gone through the planning stage and are ready to be implemented in the summer of 2004. Many of these projects have been closely coordinated and formulated between the White Pine Local Planning Group and the Bureau of Land Management to specifically benefit sage-grouse habitat:

- Mechanical removal of encroaching pinyon and juniper trees from four springs/riparian areas to improve late brood habitat values on USFS lands.
- Establish field trial sites in south Steptoe Valley within existing crested wheatgrass seedings to evaluate various treatment methods for the reestablishment of native vegetation on 244 acres of BLM administered lands.
- Thinning of pinyon and juniper trees on approximately 800 acres to release the sagebrush/grass/forb understory in the Gleason Creek watershed. This watershed has value to sage-grouse in the form of nesting and brood rearing habitat.
- Conduct prescribed burning (1,300 acres) and green-stripping (17 miles) to diversify sagebrush age class/structure and reduce potential for future catastrophic wildfire in known sage-grouse habitat as well as removal of encroaching pinyon and juniper trees on BLM lands within Cave Valley.
- Construct fuel breaks in south Steptoe Valley and north White River Valley watersheds in sagebrush habitats using a variety of methods (mechanical and burning). A total of 870 acres will be treated for this project. Study plots will be developed to allow for a direct comparison of selected treatment combination. Seeding will be done post-treatment with native species only.
- Radio collar approximately 16 sage-grouse and conduct follow-up telemetry to delineate seasonal ranges, reveal nesting habits and verify PMU boundaries [NDOW/BLM cooperative effort].

#### **4.4.7 Northeastern Nevada Stewardship Group (Elko County)**

Over the last 10 years, NDOW has implemented restoration work on nearly 40,000 acres in the western portion of the county where the wildfire and cheat grass issue has impacted nearly 90%

of historic deer winter range in one mule deer management area. Almost all of this project work is within historic or existing sage-grouse habitat. The overarching goal of many of these projects is to reestablish sagebrush in areas where wildfires have effectively eliminated this essential element of mule deer and sage-grouse habitat. Costs associated with these projects have exceeded \$1,000,000. With collaborative efforts involving BLM, USFS and private landowners, NDOW has taken an active role in the rehabilitation of important sagebrush habitats following wildfires. Over the last four years, NDOW has spent over \$250,000 in Elko County in efforts to restore sagebrush to 30,000 acres impacted by fire, all of which have value to sage-grouse.

In addition, data collection efforts on Elko County sage-grouse populations have been increased to better quantify the bird's population using trend leks in the area. Additional population inventory work has been conducted on a frequent basis with the Elko BLM. A significant effort has been undertaken during the last several years to identify new sage-grouse strutting grounds using GIS models to predict lek locations. Both helicopter and ground surveys have been employed to identify new leks, using both volunteer labor and agency personnel. This continuing collaborative effort between agencies has allowed BLM/NDOW personnel to visit nearly 1,500 leks and identify nearly 300 new leks over the last four years in Elko County alone.

Elko County's sage-grouse conservation planning effort relies to a great degree upon a willing partnership with the local BLM District and U.S. Forest Service District Offices. To date, habitat and population inventories are being conducted collaboratively, and sage-grouse conservation efforts are being integrated into the federal land use planning documents as they are developed. As part of one study, the Hubbard Vineyard Allotment in Northeastern Elko County, BLM implemented holistic management practices to shift grazing activity during the critical nesting season for sage-grouse. Data from this study and others may help formulate a knowledge base for future management actions. The local U.S. Forest Service office has incorporated greater sage-grouse into the region's list of sensitive species, and has identified sage-grouse as a management indicator species. The Forest Service reseeded 3,000 acres in the Jarbidge Ranger District and 500 acres in the East Humboldt Range with bitterbrush and sagebrush to benefit sage-grouse and mule deer. Forest Service planning documents in the district include several recommendations to improve habitat conditions for several species, including sage-grouse.

Private partners, such as mines, provide additional funding for sage-grouse conservation activities in Northeastern Nevada. In addition to mitigating direct impacts associated with surface mining activities, creative solutions have often included off-site mitigation to address impacts to sage-grouse and sagebrush habitats. Newmont Gold has provided funding for habitat restoration on more than 8,000 acres of sagebrush habitat, while various other mining partners, such as Barrick, Independence, and Bootstrap have provided for rehabilitation of another 1,300 acres of habitat for sage-grouse as well as a number of other species.

#### **4.5 Local Group Commitments to Planning and Implementation**

Each Local Area Planning Group was given the opportunity for active participation in development of the Nevada-California Plan. Each Local Group has made significant accomplishments during this initial planning phase, which have culminated in this First Edition-2004 Plan. Local Planning Group Sage-Grouse Conservation Plans are included in their entirety in Volume II of the 2004 Nevada-Californian Plan and reflect their progress to date. Although a significant amount of planning has been accomplished at this stage, each Local Group recognizes that much work remains to be done. The following commitments (verbatim)

document the intentions of each Local Group to follow through at the local level with the ongoing planning and implementation work that they have begun.

#### **4.5.1 Bi-State Local Conservation Planning Area**

*The sage-grouse conservation planning team, known as the Bi-State Local Area Planning Group, will form a “Bi-State Sage-Grouse Conservation Coalition” on or before March 2005. The primary purpose of the Coalition will be to advocate continuity in sage-grouse conservation planning and project implementation in the Bi-State Planning Area. Other, more detailed purposes are summarized below.*

##### **Assessment and Evaluation**

*Prepare a report for the annual sage-grouse symposium, detailing ongoing sage-grouse conservation actions and progress in the Bi-State Planning Area.*

##### **Project Implementation**

*Facilitate implementation of sage-grouse conservation projects in the Bi-state Planning Area. Identify annual project priorities, moderate potential obstacles to project implementation, and suggest specific courses of action to ensure project completion. Assemble a Technical Support Team to provide interdisciplinary assistance at the project level. Identify funding sources and key contacts and provide recommendations and support to ensure project funding. The Coalition may identify agencies or nonprofits (e.g. conservations districts or conservation groups) capable of accepting funds to facilitate project implementation.*

##### **Adaptive Management**

*Ensure ongoing conservation planning for sage-grouse in the Bi-State Planning Area. Facilitate timely updates and additions to the conservation plan. Ensure appropriate changes are made as more information is compiled and as lessons are learned from plan implementation.*

##### **Public Involvement & Awareness**

*Facilitate continued public involvement and agency cooperation for sage-grouse conservation efforts in the Bi-State Planning Area. Maintain the current level of public participation and support. Encourage new stakeholders to be involved with the Coalition. Develop strategies to inform and attract the public.*

*Key Contacts: Bill Dunkelberger and Steve Nelson, BLM Bishop Field Office, have volunteered to arrange the first meeting of the Bi-State Coalition.*

#### **4.5.2 Washoe-Lassen-Modoc Local Conservation Planning Area**

*Participants of the Washoe-Modoc Local Group recognize the importance of providing a level of assurance that, as an adaptive document, the Governor's Statewide Sage-Grouse Conservation Plan will be implemented in consideration of the most current information and resource available. As such, the Washoe Modoc Local Group has agreed to meet on a quarterly basis beginning in August 2004. The intent of the Washoe Modoc Local Group will be to:*

- *Monitor implementation of the Statewide plan, particularly the Washoe-Modoc portion, and provide recommendations for amendments, modifications, or addendums;*
- *Monitor and pursue funding opportunities to facilitate implementation of the Washoe-Modoc portion of the statewide plan;*



- *Facilitate, where possible, the development of sage-grouse conservation plans on tribal lands located within the Washoe-Modoc planning area.*

### **4.5.3 North-Central Local Conservation Planning Area**

*The North Central Nevada Sage-Grouse Planning Group (NCNSGPG) plans to continue its efforts into the foreseeable future. Efforts during the next year or so will focus on completing risk assessments for all 19 of the PMUs in the planning area. Plans submitted to date include the Desatoya, Lone Willow, Clan Alpine, and Santa Rosa. Drafts are being prepared for the Black Rock, Stillwater, Slumbering Hills, Humboldt, and Trinity PMUs. The risk assessment is in progress for the Sonoma PMU. Work will continue on these PMUs throughout the remainder of this year. Risk assessments will be conducted on the Pine Forest, Jackson, Majuba, Eugene, Eden Valley, Sahwaves, Nightingale, and Limbo PMUs as schedules permit. These PMUs generally have small populations (current and historic) of sage-grouse; thus, they are lower priority than those where work has commenced.*

*Jose Noriega has committed the U.S. Forest Service to continued participation with the North Central Nevada Sage-Grouse Planning Group (NCNPG). Their primary emphasis is the Santa Rosa PMU: the only PMU with Forest Service administered lands in the planning unit. At this time they are developing/planning a long series of projects designed to improve sage-grouse habitat. Their role is changing from plan development to implementation.*

*Roger Bryan has committed himself and the wildlife biologists he supervises at the Winnemucca Field Office of the BLM to continued participation in plan development. There has been no representation from the Carson City Field Office at our last 3-4 meetings. I expect participation will be limited to only those issues that affect management in the Desatoya, Clan Alpine and Stillwater PMUs. They are located in the area administered by the Carson City Field Office.*

*Staff with the Nevada Department of Wildlife is committed to varying degrees. Chris Hampson has switched positions and is not a biologist in the planning unit. Despite this situation, he has committed to stay engaged until his replacement understands the issue and the process adequately enough to take over Chris's role. Ed Partee stated he is committed but the level of his participation will depend on the direction he receives from his supervisor and program managers at the state office.*

*Jeannette Dahl, who represents the Lahontan Environmental Alliance, desires to remain committed, but will be without organizational support (funding) after June 30, 2004. Churchill County is shifting her priorities, largely because the PMUs in Churchill County have had their risk assessments completed. Her degree of involvement after June 30, 2004 remains unknown.*

*Brad Schultz, with University of Nevada Cooperative Extension, will remain engaged to participate in the risk assessments and technical review of write-ups for risk assessments. He is a University Faculty member and must focus his input on the education and research components of the planning process (including project implementation, monitoring, and data analysis). Brad intends to be involved in project design, monitoring, data analyses, and reporting.*

*I have not contacted individual livestock permittees, but I expect most individuals will participate at some level when specific components of the planning process (including implementation) directly affect them. Most have not regularly attended meetings of the NCNSGPG, but many*

*have contacted me throughout the process seeking updates, and providing informal input. I expect this level of effort to continue.*

#### **4.5.4 South Central Local Conservation Planning Area**

*The South Central Sage-Grouse Planning Team discussed future plans at its April 19, 2004 meeting. It was the consensus of the group that it would continue to function as needed to complete the following tasks:*

- *Implement tasks/conservation strategies as outlined in its conservation plan as well as those devised in future sessions.*
- *Conduct habitat assessment on the Battle Mountain and Fish Creek PMUs if the Question-1 grant application is successful.*
- *Continue conservation planning etc. on the Area's PMUs not included in current version of the South Central Sage-grouse Conservation Plan.*

#### **4.5.5 Lincoln Local Conservation Planning Area**

*The Lincoln County Sage-Grouse Technical Review Team (TRT) operates under a charter from the Lincoln County Coordinated Resource Management (CRM) Steering Committee. The CRM Steering Committee meets on a regular basis and will provide oversight to ensure the implementation of the TRT's plan. If issues arise regarding implementation, the CRM Steering Committee will reconvene the TRT.*

*The TRT intends to meet at appropriate intervals to work toward implementation of the plan. Members of the TRT expect to actually participate in some of the monitoring and data gathering aspects of the plan and will be working with the appropriate land management agencies to see that projects prioritized for sage-grouse conservation are carried out.*

*Sincerely,*

*Lincoln County Sage-Grouse TRT*

#### **4.5.6 White Pine Local Conservation Planning Area**

*The White Pine Local Area Conservation Planning group is made up of several agency personnel, local interest group participants, landowners, and sportsmen. The White Pine County Coordinated Resource Management (CRM) Steering Committee oversees and participates in the LACP group. A letter of commitment is pending consensus from the CRM Steering Committee as per their process of document distribution.*

#### **4.5.7 Northeastern Nevada Stewardship Group (Elko County)**

*The Northeastern Nevada Stewardship Group, Inc. (NNSG) is a non-profit, 501 C 3 organization with a strong interest and commitment to resolving natural resource issues in Elko County. As*

*an incorporated organization, we have the process for orderly and continued leadership through annual elections to the board of directors and because our interest does not only revolve around the sage-grouse issue, we are not likely to dissolve as a group following completion of the Elko County Sagebrush Ecosystem Conservation Plan (Plan). The Plan is an ongoing effort based on the Elko County Sagebrush Ecosystem Strategy that was submitted to the Governor's Sage-Grouse Conservation Team, and will eventually consist of 19 watershed plans.*

*The NNSG effort with respect to sagebrush ecosystem conservation and its associated benefits for sage-grouse remains our first priority. However, NNSG is engaged in many activities and issues within Elko County. As with all organizations, the funding for the assessment and planning for each watershed plan is the key to our continued involvement. We currently have grant requests submitted for conducting three watershed assessments in 2004. However, the funds have not yet been granted. In the event that the grant requests are denied, NNSG will pursue other options for completing the watershed assessments.*

*The NNSG initiated the sage-grouse conservation effort in Nevada and we intend to be there for the completion of the effort.*

*Sincerely,*

*Leta M. Collord*

*President, NNSG*

#### 4.5.8 Pyramid Lake Paiute Tribe

**RESOLUTION OF THE TRIBAL COUNCIL  
OF THE PYRAMID LAKE PAIUTE TRIBE  
NIXON, NEVADA**

**RESOLUTION NO.: PL26-03**

**WHEREAS**, *the Pyramid Lake Paiute Tribe is organized pursuant to the provisions of Section 16 of the Indian Reorganization Act (25 U.S.C. subsection 476) and is a Federally recognized Indian Tribe by the United States government through the Secretary of the Interior; and*

**WHEREAS**, *the Pyramid Lake Paiute Tribal Council is the governing body of the Pyramid Lake Paiute (hereinafter referred to as “the Reservation”) with the responsibility of establishing policy and taking action to preserve and protect the health, safety and general welfare of Tribal members, as well as property and the natural resources of the Reservation; and*

**WHEREAS**, *the sage-grouse (Centrocercus urophasianus) is an avian species in which declining populations have been severely impacted by habitat degradation, declining big sage populations, human interactions, and livestock grazing; and*

**WHEREAS**, *sage-grouse utilizes the Reservation lands throughout portions of their life cycles, however, the sage-grouse areas throughout Washoe County are imperiled and must be protected from further decline; and*

**WHEREAS**, *the Environmental Department has been actively coordinating with the Nevada Department of Wildlife and the Governor’s Sage-Grouse Team to protect and conserve the existing habitat of the sage-grouse populations adjacent and/or within the Reservation boundaries; and*

**WHEREAS**, *the cooperated efforts will involve survey and monitoring activities, conservation planning, and protecting key habitat areas such as brooding and lek habitat; and*

**NOW, THEREFORE BE IT RESOLVED**, *the Pyramid Lake Paiute Tribal Council formally authorizes the PL Environmental Department to coordinate with NDOW and other conservation agencies in efforts to protect existing sage-grouse populations through the development of a Tribal Sage-Grouse Conservation Plan which will include directives for monitoring, surveying, conservation measure for habitat and species protection, and the conservation of the sagebrush landscape.*

---

*Gina Wadsworth, Tribal Secretary  
Pyramid Lake Tribal Council*

## **CHAPTER 5. MONITORING AND RESEARCH**

### **5.1 Monitoring Rationale**

It will take several years and intensive monitoring to learn if most of the conservation actions will be successful in helping sage-grouse. The Governor's team has recognized three levels of monitoring essential for the successful implementation and adaptive management approach of the Nevada-California Plan.

First, it is important that responsible agencies are accountable to each other to ensure that agencies seek and commit sufficient resources to implement activities described in the Nevada-California Plan. We envision monitoring of agency activity will best be accomplished by an interagency management team, representing the responsible agencies, which reports to the Sage-Grouse Conservation Team.

The second level of monitoring is an assessment of the effectiveness of management actions in achieving the desired environmental response: for example, measuring the effectiveness of pinyon-juniper removal in eliminating pinyon-juniper and maintaining or restoring sagebrush; or reestablishing a mosaic of sagebrush habitats with an invigorated herbaceous component for nesting and brood rearing.

The third level is monitoring sage-grouse activity and demographics. This level of monitoring includes both annual assessments and intensive (research) levels of investigation to answer questions about the effectiveness of conservation strategies in terms of measured responses of key demographic parameters (for example, nest success, chick survival, movement) associated with sites where management activities have been implemented. Cost associated with these more intensive studies will likely preclude their implementation across the entire state.

### **5.2 Monitoring Agency Activities**

Progress toward implementation of the Nevada-California Plan will be monitored to ensure that agencies, LACP groups, and other participants are given the technical and financial support necessary to fulfill the objectives of the conservation actions. An annual sage-grouse symposium will be held for agency biologists and administrators, researchers, and LACP groups to provide progress reports on actions completed in the previous year, finalize work plan priorities for the upcoming year, and disseminate new scientific information. Actions and treatment successes and failures will be shared and funding options will be reviewed to ensure accountability, achieve conservation of sage-grouse, and maintain local involvement in the conservation process.

### **5.3 Monitoring Actions and Management**

Each action plan will include specific detailed monitoring objectives and procedures that are tied to the specific hypotheses on which the action is based and the experimental design required to properly assess the action. The appropriate indicators will be identified prior to implementing the action. These indicators can include, but are not limited to the following: vegetation parameters (e.g., cover, density, fuel loading, etc.), bird population parameters (e.g., population estimates, recruitment, genetic analyses) bird habitat use (e.g., telemetry observations, bird surveys, dropping counts, track counts), or human related parameters (e.g., hunting/poaching, types of disturbances).

## 5.4 Monitoring Numbers of Sage-Grouse

The high profile and public interest in sage-grouse, combined with implementation of the Nevada-California Plan, requires a monitoring program to assess the size, trajectory and health of Nevada and California sage-grouse populations. Such monitoring must first provide estimates of the size and trajectory of sage-grouse populations at the scale of the local planning areas (best case scenario) and the state of Nevada (minimum requirement) at time scales of approximately five years.

Monitoring a population for conservation reflects tradeoffs that affect the quality of inference possible. These tradeoffs are governed by cost, manpower and logistic limitations. Essentially, these tradeoffs mean that we cannot measure everything everywhere. Consequently, while we can monitor population processes at small scales (for example leks in a Population Management Unit) it is difficult to precisely measure numbers and trends of individuals at local sites because of the small sample of leks available. It is imperative in the development of a monitoring program that adequate resources are appropriately assigned to both large-scale and small-scale measurements to achieve sufficiently precise estimates of key population parameters.

Conservation decision-making will be enhanced by continuing or expanding existing NDOW programs to collect age-ratio and banding data, which can provide insights into reproductive success and survival at large spatial scales. Additional research-level investigations will be conducted to answer specific questions regarding population responses to specific treatments with appropriate statistical inferences.

### 5.4.1 Lek Counts

**Current Status - Nevada:** NDOW conducts annual lek counts across most PMUs in Nevada. "Trend leks" are surveyed by biologists a minimum of three times during each strutting season via ground counts. The NDOW protocol for conducting lek counts from the ground is included in **Appendix G**. The protocol for counting birds on "lek routes" is used in certain locations where several leks are clustered together and are easily accessible. This approach allows shifts in lek preference to be observed if they occur. These procedures are also described in **Appendix G**. The peak counts of male and female sage-grouse are recorded each strutting season. The peak number of males attending the leks is used to estimate population numbers for each PMU, each local planning area, or for the entire state.

Aerial lek counts are conducted in remote areas that are not easily accessed by vehicle between April and May. Both NDOW and BLM conduct aerial surveys from helicopters to count the total number of birds on a lek. These aerial surveys are used at a broad scale to evaluate the proportion of active leks in a PMU on an annual basis, and to identify the locations of new leks.

NDOW has also developed an active volunteer program, *Preserving Our Wildlife Legacy Program (PrOWL)*, to train volunteers who provide additional manpower in assisting with additional lek counts. Volunteers must be qualified by attending a day-long training session that includes actual field training each year.

**Current Status - California:** Annually, the California Department of Fish and Game, BLM, other agencies, and private organizations cooperate to assess the status of sage-grouse breeding populations on leks in California. Annual efforts include surveying all known leks for

activity, searching for new leks, and obtaining peak counts of male attendance at each known lek. Because the sage-grouse population in California is relatively small, all known leks are usually sampled at least 3-4 times to obtain peak counts of males annually. However, not every historically active lek site is checked every year. In the Bi-State populations, all leks in each PMU are counted simultaneously on the same day, with multiple counts each year. Although males are not known to substantially move between leks, such methodology avoids potentially inflated counts by males attending different leks on different days. Lek counts form the basis for evaluating population trends and issuing hunting permits in areas open to hunting in California. The quality of the lek count data improved significantly in 1987, with a concerted effort to count all known leks multiple times every year. Prior to 1987, a subset of leks consistently monitored annually has been used to establish longer term trends.

**Monitoring Objectives:** The objectives for conducting lek counts are to:

- Determine the peak attendance of male and female sage-grouse;
- Consistently determine lek status across regions;
- Expand the Master Lek database where applicable and develop consistency between agencies and regions in terms of data management;
- Estimate sage-grouse population numbers; and
- Develop population trends.

NDOW recognizes the limitations associated with extrapolation and trend analysis from the lek count data. For example, trend leks can have a negative bias in their assessment of trend because leks can disappear (possibly because they moved) but new leks cannot appear because the sample is defined by the locations of leks that were present at some past point in time. Thus, trend leks could indicate a decline in an otherwise stable local population.

Consistency is of utmost importance when monitoring wildlife populations. Lack of standard definitions has led to divergence in terminology among regions. In Nevada, an area where this has been prevalent in the past is the classification of leks as either active, inactive, unknown, or historic. In order to rectify this problem, the following definitions have been formulated to standardize the classification process and help generate more accurate population estimates:

**Active** – a lek that had two or more birds present during at least one of three or more visitations in a given breeding season. For a strutting ground to attain this status it must also have had two or more birds present during at least two years in a five-year period (Connelly et al. 2003).

**Inactive** – a lek that has been surveyed three or more times during one breeding season with no birds detected during the visitations and no sign observed on the lek. If a lek is only visited once during a breeding season and was surveyed under adequate conditions and no birds were observed at the location during the current and the previous year and no sign was observed at the lek, then an inactive status can be applied to the lek.

**Unknown** – a lek that may not have had birds present during the last visitation, but could be considered viable due to the presence of sign at the lek. This designation could be especially useful when weather conditions or observer arrival at a lek could be considered unsuitable to observe strutting behavior. The presence of a single strutting male would invoke the classification of the lek as unknown. A lek that was active in the previous year, but was inadequately sampled (as stated above) in the current year with no birds observed could also be classified as unknown.

**Historic** – a lek that has not had bird activity for twenty years or more and has been checked according to protocol at least intermittently. Another means of classifying a lek as historic is to photograph a lek location (field biologist) and determine if the habitat is suitable for normal courtship displays. For example, if a lek location lies in a monotypic stand of sagebrush that is three to four feet tall, then conditions are no longer suitable for lekking activity.

**Note** - for active, inactive, and unknown status leks: because of the sheer number of documented lek locations in the State of Nevada and the limited personnel available to visit all leks each year, the status applied to a lek through its most recent visitation will be upheld in subsequent years until the lek is revisited to verify its status.

These descriptions are the most current attempt at applying a definition to the status of a lek. These definitions are subject to change to compensate for any unforeseen scenarios. All the leks in Nevada have not yet been classified according to these definitions; however, the Nevada Department of Wildlife is committed to standardizing lek status across regions and field verifying lek status over time.

### **Monitoring Needs**

Counting males on leks is a relatively easy and reliable means of gathering information on population trends, but extrapolation and analysis of trends from such data has its scientific limitations. At present, long-term population trends are assessed using trends on individual leks that have been monitored consistently over time, or trend leks. However, selection of lek sites may be dynamic over time in some areas, and they cannot be considered static locations to sample population trends. Biases associated with trend leks may be varied. For example, a trend lek may disappear because the birds have moved to another location, but a new lek could not appear because the sample is pre-defined by the past lek location, thereby concluding that the population is declining. On the other hand, many trend leks, particularly some of the largest, tend to be sites that birds have developed strong fidelity to over time. Counts associated with those leks may ignore declines occurring in peripheral areas. Inferences associated with trend leks alone with no knowledge of population dynamics in a given area may be misleading.

The University of Nevada has recommended a two-pronged approach to estimation of sage-grouse numbers in Nevada. First, a sampling protocol using aircraft is essential to estimate the number of leks statewide. Under such a design, aircraft would fly transects through potential lek habitat with the goal of counting leks irrespective of their size. Sampling would likely be stratified, meaning more effort would be placed in areas where there are more leks because such areas have a larger effect on the overall state estimate. Such surveys would not likely provide precise estimates of number of grouse at the level of local PMUs. The details for such



aerial surveys require substantial development, including visibility (detection) of leks from aircraft of different types from different altitudes. For example, grouse are more visible from helicopters than fixed-wing aircraft but because helicopters are much more expensive to fly, more transect miles can be flown using fixed-wing aircraft. Some experimental sampling will be required to determine the most efficient survey aircraft and survey design for operational surveys. It is important to recognize that it is not essential, or even important, to find every lek along transect lines as long as we know what proportion of leks are actually seen along transect lines. Similarly, it is not important to sample every square inch of sage-grouse habitat. If we know the proportion of the habitat in which leks are counted and the proportion of leks in counted areas that are seen we can estimate the total number of leks.

The second component for producing a statewide estimate will require counts of displaying males on a random sample of leks counted during the aerial survey. Such counts will be conducted from the ground, supplemented by aircraft (likely helicopter) for inaccessible leks. Trend leks cannot serve this purpose because they do not represent a random sample of leks but were selected based on their accessibility and generally large size. It will be important to continue the trend lek program after establishing a statistically designed statewide sampling program to ensure continuity of statewide monitoring.

The Nevada Department of Wildlife supports the approach that the University of Nevada, Reno is suggesting; however, because of manpower and budget constraints, it is not feasible to conduct this work at this time. This rationale will be discussed at upcoming Sage-Grouse Conservation Team meetings and a workable solution will be sought. The proposed monitoring scheme will most likely require additional funding mechanisms and may also require contract surveyors to carry out the effort.

#### **5.4.2 Wing Collection**

Population demographic data is determined from the sage-grouse harvest. NDOW requests that hunters deposit one wing from each bird harvested in wing barrels located on primary hunting access roads, check stations, or to be delivered to a NDOW Field or Regional Office. The California Department of Fish and Game collects wings from recipients of permits for four sage-grouse hunt areas (see Section 5.4.3 for further details). Wings are separated by geographic locations (county or hunt area). Wings can be used to identify sex, age, nest success, and number of chicks per hen. Wing data are only available where sage-grouse are hunted. Nonetheless, wing data provide a picture of production at larger spatial scales than would be possible to conduct intensive studies.

Age ratios from wings are subject to the potential bias of differential vulnerability of juveniles and adults to hunters. If juveniles are more vulnerable and preferable than adults, then wing data will cause an overestimate of the number of young in the population. More importantly, multiple factors affect the production of young, including the probability that females breed, clutch size, nest success, and chick survival. Wing data don't allow us to sort out at which point production is affected. It will likely be desirable to differentiate among these demographic stages in the assessment of specific management actions.

#### **Monitoring Objectives:**

Expansion of the wing collection program where appropriate will enhance our understanding of production of young in areas where grouse are hunted. NDOW is moving toward collecting and summarizing wing count data on a PMU basis. While wing data have limitations as described

above, they probably provide the only viable means for assessing the effects of management actions on production at the state or local PMU scale. Similarly, an enhanced leg banding program in areas where grouse are hunted would allow estimation of adult and juvenile survival using standard methods for analysis of band recovery data.

### **5.4.3 Harvest Monitoring**

The Nevada Department of Wildlife will continue to monitor harvest in the future through the use of the 10% Hunter Questionnaire that randomly polls license holders and through the collection of sage-grouse wings from hunter harvested birds. The harvest data provide the following information that potentially can be used to alter harvest regulations:

- 1) Sex and Age Composition of the Harvest
- 2) Distribution of Harvest and Hunter Pressure
- 3) Hunter Success
- 4) Estimate of Total Harvest by Management Unit
- 5) Estimate of Total Hunters
- 6) Estimate of Hunter Effort

California monitors harvest by providing permitted hunters in four management zones (two in Inyo/Mono counties and two in Lassen County) a questionnaire that is mailed with their permit. Hunter harvested wings are collected at check stations in Lassen County and Mono County and requested from 100% of hunters receiving pre-paid mail-in wing envelopes in all 4 hunt areas. Returned wings and completed questionnaires are received from about 70% to 90% of permitted hunters each year. Information gathered from questionnaires and wings is similar to that for Nevada.

### **5.4.4 Harvest Management**

In Nevada, harvest is typically regulated by season length and bag limit as set forth by the Nevada Board of Wildlife Commissioners, consulting recommendations made by the Nevada Department of Wildlife. The Nevada Department of Wildlife has adopted the Sage-Grouse Management Guidelines (Connelly et al. 2000) that states populations should not be hunted where  $\leq 300$  birds comprise the breeding population. Harvest is estimated by the Nevada Department of Wildlife using the 10% Hunter Questionnaire that randomly polls license holders and collecting wings from hunter-harvested birds.

Bag and Possession limits over the last several years have usually been two daily and four in possession; however there are a few special hunts (Sheldon National Wildlife Refuge and Grassy Stevens Camp) where bag and possession limits are 3 and 6 respectively; however, these hunts are limited to successful lottery draw applicants.

California manages harvest by providing permit only hunting within a two-day season in four management zones (two in Inyo/Mono counties and two in Lassen County). Annual hunting permit numbers are usually adjusted each year in each of the four zones to respond changes in peak male attendance on leks. Harvest in eastern California has been predicted to within 5 or 10% in most years. Permit numbers issued, estimated hunter harvest, and hunter success data for each hunt held in eastern California since 1987 is presented in Appendix M (Washoe/Modoc) and Appendix L (Bi-state).

### **5.4.5 Brood Surveys**

In areas that are closed to hunting, wing data are not available for monitoring population demographics such as the number of chicks per hen. For some of these areas, NDOW conducts brood counts along established routes. Brood surveys are conducted mid-summer when sage-grouse are concentrated on meadow habitats. Established brood count routes are surveyed to record average brood size and the number of chicks per hen.

#### **Monitoring Objectives:**

The populations that are monitored by brood counts are typically small, are not hunted, and possibly lower in priority for funding on a statewide scale. The State wildlife agencies recognize that there are inherent problems when using brood surveys for generating chicks per hen ratios for comparative purposes. Problems arise due to repeatability, varying climatic conditions relative to the timing of brood surveys each year, and minimal observation time. Using trained volunteers and LACP groups, NDOW hopes to increase the frequency of brood counts in certain areas lacking data. Volunteers will be coordinated by NDOW and instructed to use a standardized survey protocol. These changes will improve the reliability of the brood count data, and increase the accuracy of the population estimators providing better demographic information for populations that are not hunted.

### **5.4.6 Telemetry Monitoring**

Several radio telemetry studies are in progress in Nevada and are being coordinated through NDOW in accordance with Nevada Revised Statute 502.130. NDOW is the repository for data from each of these studies and is updated every six months on project findings. This data will be compiled and provided to the local NDOW biologist and to the LACP groups for local plan revisions and updates.

Statewide coordination of telemetry monitoring efforts will be especially important as more projects come online in the future. Several sage-grouse captures are being planned throughout Nevada and California to outfit grouse with VHF telemetry collars in response to recommendations from Local Groups to fulfill the following objectives:

- 1) Determine seasonal habitats such as breeding, nesting, brood rearing,
- 2) Determine movement patterns, and
- 3) Determine survival rates

Survival rates of sage-grouse have principally been measured by following radio-tagged birds. This approach has the advantage that marked individuals can be located with a probability of nearly 1.0. The disadvantage of radios is that the cost of the radios typically limits the size of the sample. Nevertheless, where logistics or manpower limits the number of birds that can be captured radios are the preferred method of marking for estimating survival.

Some of the areas slated for capture in 2004 include the Pine Nut Range, Montana Mountains, Desatoya Range, and Newark Valley. Much consideration must be placed into determining the personnel necessary to successfully capture birds and follow up marked birds on a monthly basis. The local area game biologist will coordinate these projects with help from the Wildlife Diversity Staff Specialist for sage-grouse.

In California, a large-scale telemetry project was conducted in Lassen County from 1998-2002, and information regarding nest site selection was reported in Popham (2000) and Popham and Gutierrez (2003). Comprehensive analyses of movements and seasonal habitat selection county-wide are currently being conducted. A large-scale telemetry project is ongoing in Mono County to better understand seasonal ranges, nest site and brood-rearing habitat selection, and demographics of populations county-wide. This data will be used to complete the Bi-State Plan conservation plan and for future adaptive management decisions.

In addition to efforts conducted by the Nevada Department of Wildlife and the California Department of Fish and Game, other telemetry work is either ongoing or planned by various other agencies and educational institutions including the BLM, University of Nevada, Reno, Oregon State University, and Yerington High School. This work must be permitted by the Nevada Department of Wildlife according to Nevada Revised Statute 502.130. As a stipulation of the permit, the permitted agency or institution must provide the Department with results from any study or work being conducted. In most instances, any permitted work is closely coordinated with the local area game biologist. Follow up information gained from flights or ground work must be reported on a Telemetry Form provided by the Nevada Department of Wildlife and the Wildlife Staff Specialist for sage-grouse must be given an update every six months, at which time maps will be created for distribution to the local area game biologist and Local Groups for information and planning use.

#### **5.4.7 Disease Monitoring**

The Nevada Department of Wildlife and the California Department of Fish and Game are coordinating with the U.S. Geological Survey, Biological Resources Division and associated National Wildlife Health Center to conduct investigations into the effects of West Nile virus (WNV) and other disease pathogens on greater sage-grouse. Objectives of the proposed study include the following:

- 1) Determine prevalence of WNV and other avian pathogens, including hermatozoa, coccidian, respiratory viruses, and bacterial pathogens in greater sage-grouse
- 2) Determine susceptibility of hatch-year greater sage-grouse to West Nile virus; and
- 3) Determine alternate hosts for West Nile virus in greater sage-grouse habitats.

This study will be closely coordinated with capture efforts that take place in the late summer or early fall for banding and/or radio telemetry studies. Addressing Objective 1) will involve, but is not limited to, collection of blood, fecal and oral samples from live birds as well as conducting necropsies on sage-grouse sacrificed for sampling and collection of tissue from hunter harvested birds. Fulfilling Objective 2) will include collection of up to 30 eggs from wild nests and hatching and raising chicks until approximately 2 months of age and experimentally infecting chicks with West Nile virus. Completion of Objective 3) involves capture, mark, and sampling of birds and small mammals whose range overlap that of greater sage-grouse populations and testing the samples for evidence of exposure to West Nile virus.

Samples may also be individually collected outside of the purview of this study by Nevada Department of Wildlife personnel and provided to the Nevada Department of Agriculture's Animal Disease Testing Lab. Likewise for California Fish and Game that may submit samples to their own Wildlife Investigation Laboratory.

Results from the study or individual analysis will be reported in annual Nevada Department of Wildlife Job Progress Reports. Sample analysis may also be reported by the Nevada

Department of Agriculture. The proposed USGS study is expected to last two years and results may be available in a published format in 2007.

Capture efforts and disease monitoring that pertain to sage-grouse populations that utilize habitats in both Nevada and California will be closely coordinated between the two state wildlife agencies. Results of any disease sampling will be shared between Nevada and California as well as the pertinent Local Area Conservation Planning Groups. Coordination with other neighboring state wildlife agencies is also very important; however, at this time, coordination has not gone beyond Nevada and California. This is mainly because of the stage of planning that other neighboring states may be in. The proposed USGS study may compensate for this, providing results on a much larger scale.

## **5.5 Monitoring Habitat Condition and Trend**

Wildlife habitat monitoring consists of repeatable measurements of habitat attributes or variables such as vegetation structure, plant species composition, presence of physical features, or other factors. Those that are required by key wildlife species or correlate with presence or abundance of key wildlife species often determine the habitat attributes or variables chosen for measurement. Monitoring should focus on specific objectives identified for a specific area or habitat and/or a specific project and be designed to determine if progress toward achievement of objectives is occurring or not and, if not, what the causative agent is.

Monitoring of wildlife habitat is a statutory responsibility of many land management agencies including the Bureau of Land Management and the U.S. Forest Service (Cooperrider et al. 1986). The Bureau of Land Management and the U.S. Forest Service will provide the leadership for habitat monitoring relative to the public lands included in this plan.

Sage-grouse habitat monitoring will focus on both site specific habitat variables such as vegetation structure and plant species composition and related landscape level attributes related to changing acreages among R value sites, (e.g. R0 acreages impacted by wildfire and converted to R4 or R3 acreages converted to R0 through pinyon/juniper control projects). The following provide examples of appropriate habitat management objectives and monitoring strategies:

### **Sagebrush Habitat Condition Classes (R-values)**

The Nevada Sage-Grouse Conservation Strategy identified the loss of sagebrush habitats in Nevada to be occurring at an average of approximately 240,000 acres per year, primarily to wildfires and pinyon-juniper encroachment. Thus, implicit in the goals and priorities established in this Nevada-California Plan is the need to address at least 250,000 acres per year, either as restoration of cheatgrass-dominated or pinyon-juniper-dominated rangelands, or as improvement of existing habitats, or as successful burned area rehabilitation projects, which in combination will result in a net increase in sage-grouse habitat in the R0 condition class over the long term.

### **Monitoring Objective:**

It will be important to monitor the distribution of acreage in the R0 through R4 habitat condition classes over the next 20 years in each PMU. A quantitative accounting of the change in acreage of R0 through R4 habitats will be used to determine if specific habitat rehabilitation projects have been successful in decreasing cheatgrass or pinyon-juniper dominated habitats, if wildfire pre-suppression treatments have been successful in protecting existing R0 habitats from

burning and converting to R1 or R4 conditions, and to determine if the net acreage of desirable sage-grouse habitat is increasing or being maintained.

A ground-verification of the acreage shown in **Table 2-6** will be conducted by the BLM, USFS and/or the Local Groups to provide the baseline condition for future comparisons. A GIS database will be created and updated annually to allow trend analysis of habitat condition class acreage. The trend of habitat condition will be analyzed and reported for 5-year intervals. This data will be used in the adaptive management process to identify successful habitat rehabilitation procedures, determine future project priorities, evaluate effectiveness on changes in management, and report progress to the Sage Grouse Conservation Team, the Local Groups, the USFWS, and the public.

### **Sagebrush Cover and Understory Composition**

Critical to effective habitat monitoring and progress reporting, as established in the U.S. Fish and Wildlife Service Policy for Evaluation of Conservation Efforts when making listing decisions, are the establishment of specific and measurable habitat objectives. Agency biologists, range ecologists and other local experts will work to identify the "desired plant community" (DPC) for sage-grouse habitat in each BLM District and USFS Ranger District. Private lands will also be assessed for DPC where there is critical habitat and a willing landowner. DPC will be based upon ecological site potential, and the seasonal habitat requirements described by Connelly et al. (2000). The DPC will be described in terms of sagebrush structure (height, density, and cover). The herbaceous component will be described in terms consistent with the ecological site descriptions (species composition based upon weight) and structure.

### **Monitoring Objective:**

Once DPC decisions are documented for specific areas, monitoring will occur on 5-year intervals to compare existing conditions to DPC. These results will be used in adaptive management process to determine the need for habitat treatment or change in management. Example objectives and monitoring strategies for both the landscape levels and habitat specific levels are provided below:

Objective for R-0 habitat: 1. Maintain present habitat conditions. 2. Design and implement project work to protect these habitats from threats such as wildfire.

Monitoring Strategy for R-0: Continue fire mapping efforts and measure changes of R0 acreages to other habitat condition ratings. Conduct vegetation structure and composition monitoring using scientifically approved methodology to determine present management is consistent with the maintenance objective. This could be implemented on a less intensive schedule, that is, sampling every 5 to 7 years unless there is a change in current management.

Objectives for R-1 habitat: 1. Increase sagebrush to 15% to 25% Canopy cover. 2. Maintain herbaceous composition and structure consistent with Western Association of Fish and Wildlife Agency (WAFWA) Guidelines to manage sage-grouse populations and their habitats (Connelly et al. 2000) adjusted for range site potential.

Monitoring Strategy for R-1: Conduct vegetation structure and composition monitoring using scientifically approved methodology to determine if management changes and/or project work are achieving objectives and if not what the causative agent is.

Objectives for R-2 habitat: 1. Increase herbaceous composition and structure consistent with WAFWA Guidelines to manage sage-grouse populations and their habitats (Connelly et al. 2000) adjusted for range site potential.

Monitoring Strategy for R-2: Conduct vegetation structure and composition monitoring using scientifically approved methodology to determine if management changes and/or project work are achieving objectives and if not, what the causative agent is.

Objectives for R-3 habitat: 1. Reduce pinyon/juniper cover to 0% on 5% of this area a year for 20 years. 2. Establish herbaceous composition and structure consistent with WAFWA Guidelines to manage sage-grouse populations and their habitats (Connelly et al. 2000) adjusted for range site potential.

Monitoring Strategy for R-3: Conduct vegetation structure and composition monitoring using scientifically approved methodology to determine if management changes and/or project work are achieving objectives and if not, what the causative agent is.

Objectives for R-4 habitat: 1. Increase sagebrush to 15% to 25% canopy cover. 2. Maintain herbaceous composition and structure consistent with WAFWA Guidelines to manage sage-grouse populations and their habitats (Connelly et al. 2000) adjusted for range site potential.

Monitoring Strategy for R-4: Conduct vegetation structure and composition monitoring using scientifically approved methodology to determine if management changes and/or project work are achieving objectives and if not what the causative agent is.

### **Riparian Habitat Monitoring**

The Proper Functioning Condition (PFC) method is used to identify the hydrologic condition, the stability, and to some degree the wildlife habitat functionality of riparian ecosystems. Meadows that are important to sage-grouse for late brood habitat will be monitored using PFC procedures as well as appropriate monitoring of specific DPC objectives to identify conditions that indicate habitat deterioration and habitat recovery. These procedures are currently widely accepted and used by the USFS, BLM, and NRCS for determining meadow condition and apparent trend. Because of the small proportional distribution of meadow habitat associated with sagebrush ecological sites in Nevada and Eastern California, and the dependence of sage-grouse on these habitats for late brood rearing in mid to late summer, the maintenance of these habitats in good condition is of paramount importance.

#### **Monitoring Objectives:**

PFC records will be kept on critical sage-grouse meadow habitats to interpret meadow condition and trend, quantify meadow recovery or degradation, and to evaluate the effectiveness of meadow rehabilitation treatments. Riparian habitat condition will be analyzed and reported for 5-year intervals. Example objectives and monitoring strategies for riparian habitats are provided below:

Objectives for riparian habitat: 1. Manage all riparian habitats to achieve Proper Functioning Condition. 2. Identify and manage specifically selected meadow habitats important to sage-grouse to attain a DPC exhibiting an open characteristic with plant community composition dominated by riparian/wetland plant species and utilization by large herbivores not exceeding moderate levels.

Monitoring strategy for riparian habitat: Riparian habitats will be monitored using PFC procedures. Conduct vegetation structure and composition monitoring, relative to DPC objectives, using scientifically approved methodology to determine if management changes and/or project work are achieving objectives and if not, what the causative agent is. Focus on encroachment of upland plant species. PFC records will be kept on critical sage-grouse meadow habitats to interpret meadow condition and trend, quantify meadow recovery or degradation, and to evaluate the effectiveness of meadow rehabilitation treatments. Riparian habitat condition will be analyzed and reported for 5-year intervals.

## **5.6 Monitoring for Adaptive Management**

Adaptive management can be considered the application of knowledge gained to the processes and modification of actions to enhance effectiveness and efficiency in meeting specific objectives. This can be applied at two levels, adapting actions to new research findings and specific monitoring of management actions and the resulting information on their effectiveness being applied to future project planning and implementation. Here we will focus on the monitoring of actions and their effectiveness as this is the area that federal and state management agencies will spend the majority of their efforts.

In the context of Nevada sage-grouse, adaptive management represents the implementation of management actions designed to meet specific objectives and are based on the best available science, and monitoring their effectiveness in order to modify future management practices when and where necessary. We note here that if adaptive management is to be most effective in improving management of sage-grouse and their habitats, the ability to learn from a treatment should influence the efficiency of future project planning and implementation and the effectiveness of these projects.

Habitat monitoring may be accompanied by population measurements to confirm habitat relationships and measure effectiveness of management actions. Measurements of population parameters should be included with habitat monitoring where feasible and affordable, but should not be considered mandatory for every management action. Caution should be taken in interpretation of population data to consider all variables in order to assure accurate determination of effects of the targeted management action. Population measurements can be considered more long-term data needs. A variety of methods exist to measure these demographic parameters that are described in Section 5.4.4.

## **5.7 Research**

Not all of the PMUs have field-verified potential risks or have had sufficient baseline assessment to develop specific projects related to the factors discussed above. Fieldwork will be conducted in these PMUs starting this 2004 field season and will continue until all PMUs have been assessed. A variety of research topics have and will continue to be identified by this process. These topics will be submitted to the Sage-Grouse Conservation Team for budget planning and distribution to the appropriate research entity.

### **5.7.1 Research Needs**

It is important and necessary to better understand habitat utilization by sage-grouse within the plan area under different resource management schemes. This directly involves considering how an area is managed according to land use plans and the details within them. Things to consider may be Wilderness and National Conservation Area designations, grazing systems, level of recreational use, wild horse and burro impacts, etc. Some studies are ongoing to



address this issue; however, other study areas will be needed for comparative purposes (see Section 5.7.2).

Developing a better understanding of survival rates, especially for juveniles under different conditions is also important to develop effective conservation actions. Determining when, where and why sage-grouse chicks fall out of the population will be important both to determine risks and recommend conservation actions. Survival rates can be estimated by the recapture of previously marked grouse or by the pattern (through time) of the recovery of banded grouse by hunters. Band recoveries, by themselves, are probably not a viable approach to survival estimation, except possibly at the scale of the entire state, because of the relatively small number of sage-grouse shot by hunters in Nevada each year. Recapture of previously marked grouse, however, offers a viable complement to application of radio tags on intensive study areas, where relatively large numbers of sage-grouse will be captured each year for some predetermined period (absolute minimum three years) because individuals marked in one year have a relatively high probability of being recaptured the next year. Because leg bands are substantially less expensive (\$1 versus \$200 per bird) than radios, a larger sample of individuals can be marked with leg bands than radios and banding should be considered as a complement to radios on intensive study areas. Very powerful study and analysis designs exist for the combined use of radios and leg bands and these should be exploited where possible. These designs have the potential to enable estimation of movement between geographic areas and partitioning mortality events among seasons of the year. Combined approaches would also enable us to estimate the bias (if any) created by attaching radios to sage-grouse. It is essential that sample sizes are adequate to provide sufficient statistical power to produce precise estimates. About 30-50 radio tags and a minimum of 100 leg banded birds per year per site are reasonable targets for individual sites.

Understanding demographic parameters within population management units is another key when identifying potential risks. Demographic parameters are usually measured at small spatial scales. Intensive studies required for such measurements are usually not feasible at large scales. It may only be possible gain precise estimates of population size and trend at the scale of the entire state, while detailed assessments of demography will only be possible at a few intensive study areas. An important approach for bridging the gap between large-scale population monitoring and detailed demographic studies is to develop local statistical relationships between key demographic parameters and environmental variables, such as vegetation characteristics or predator abundance. These statistical relationships can then be used to make inferences about likely population dynamics in areas where it is not possible to study the grouse in detail.

A better understanding of recruitment and more accurate measure of recruitment in certain areas is vital to developing management recommendations for nesting and early brood rearing habitats. Recruitment represents the outcome of four different processes: 1) the probability that a female breeds, 2) the number of eggs she lays if she breeds, 3) the proportion of eggs that hatch, and 4) the probability that chicks that hatch survive to recruit into the population. Most parts of the recruitment process have been measured by application of radio transmitters to female sage-grouse captured near leks. Radio-tagged females are then located on a regular schedule to determine if they nest, how many eggs they lay, and hatching success. By locating these females and their broods during brood-rearing, the survival rate of chicks can be estimated. Survival of young after fledging requires that the young themselves be marked either with radios or another mark. While no known methods work better than application of radios to adult females, there is potential for bias using this approach. First, females captured near leks

may be more predisposed to nesting than other females from the population. Capturing and marking females on other parts of their annual range away from leks can reduce this problem. Second, the effects of the radios themselves on females have not been assessed.

A better understanding of movement patterns and its application to management actions is also necessary. Estimating movement is substantially more difficult than estimating survival or reproductive rates because movement distances may exceed the size of individual study areas. Radio-tagged individuals clearly provide a tool for observing movement from an area. Because of the small number of individuals marked with radios, it is unlikely that radio-tagged individuals will produce precise estimates of movement rates. Marking and recapture of a substantial number of individuals from a number of leks in a region provides an alternative that may produce more precise estimates of movement among sample leks than is possible with radios. Measuring immigration is especially difficult because it requires observing individuals marked away from a site of interest. Unless marking of large numbers of grouse throughout a region is occurring immigration estimates will not typically be possible. Again, designs using a variety of methods including radio tags, and recapture and recovery of leg-banded birds provide the best potential for estimating movement probabilities.

### **5.7.2 Ongoing Research**

In addition to the annual monitoring activities conducted by NDOW, USFS, and BLM, there are several studies currently being conducted by academic institutions in Nevada and California which include, but are not limited to, the following:

#### **Oregon State University**

##### ***Sage-Grouse Reproductive Characteristics and Habitat Use in the Montana Mountains, Nevada***

Oregon State University (OSU) is conducting a chick survival and nutritional study in the Montana Mountains located in northern Humboldt County, Nevada. This area is within the Lone Willow PMU in the North Central Local Plan Area. This study is being funded by contributions from BLM, NDOW, ODFW, USFWS, and OSU. The objectives of the study are to:

- 1) Determine relationships between condition of the hen during the pre-laying period and the weight of chicks at hatching and chick survival;
- 2) Determine relationships between brood-rearing habitat components and chick survival;
- 3) Determine the factors that are important in regulating chick survival (and ultimately population conservation) by comparison of health and reproductive parameters, habitat components, and chick survival rates. Three areas with similar cover types but different management practices and levels of grouse productivity are being evaluated.

2004 is the second year of this 5-year study. To date, 42 female sage-grouse have been captured and fitted with telemetry equipment for the 2004 field season. These birds will be located by OSU twice weekly throughout the summer. Upon completion of the summer data collection, NDOW will monitor the bird locations once a month using fixed wing aircraft to determine seasonal movement of sage-grouse and identify important winter and early/late brood rearing habitat.

## **University of Nevada Reno**

### ***Comparative Nutritional Analysis (Tuscarora Mountains and Montana Mountains)***

The University of Nevada, Reno (UNR) is also conducting research work in several areas throughout Nevada. Nutritional analyses and sage-grouse health are being studied in the Montana Mountains (as described in **Section 2.4.2**) and the Tuscarora PMU within Elko County. Nutritional status of sage-grouse hens will be compared between the Montana Mountains and the Tuscarora Mountains during important physiological periods throughout the year. The objectives of this project are to:

- 1) Locate sage-grouse during four physiological periods throughout the year using radio transmitters;
- 2) Collect blood for blood constituent analyses to determine bird health; and
- 3) Correlate bird health with habitat condition parameters determined from a concurrent project.

The final report will be an assessment of predicted habitat quality on bird health that local groups and agencies can use to help develop or modify management plans.

### ***Dynamics of Sage-Grouse Populations in Response to Transmission Lines in Central Nevada***

The intention of this study is to monitor the effects of a recently installed transmission line on a sage-grouse population in Eureka County, Nevada (South Central Local Conservation Planning Area). This 179-mile transmission line, known as the Falcon to Gonder transmission line, intersects important sage-grouse habitat and is in the vicinity of several strutting grounds (leks). The goal is to initiate a 10-year study of the sage-grouse population within this area. Monitoring of the population will occur during the strutting, nesting and brood rearing periods. The study will correlate population dynamics to the distance from the transmission line.

## **Idaho State University**

### ***Effects of Corvid Removal on Sharp-tailed and Sage-Grouse Reproduction in Elko County, Nevada***

Researchers from Idaho State University are currently studying the effects of corvid removal on Sharp-tailed and greater sage-grouse in northeastern Elko County. The primary objective of the study was to increase reproductive success of a recently introduced population of Columbian sharp-tailed grouse and the existing native sage-grouse within the area. The study objectives include the following:

- 1) Identification of nest predators and their depredation sign,
- 2) Identification of compensatory predators effects at areas of corvid control,
- 3) Determination of the time of day and period of incubation in which nests are most vulnerable to predation, and
- 4) Detection of links between female time budgets and types of successful predator encounter.

This study has been ongoing since March of 2000 and is expected to be completed in 2005. Videography has been used to record nest predation incidents. A total of 13 nests were monitored using videography and approximately 4,450 incubation hours were recorded.

## **U.S. Geologic Survey and California Department of Fish and Game**

### ***Ecology of Greater Sage-Grouse in Mono County, California***

In 2003, the USGS and CDFG began a study to gather information for use in development of a conservation plan for sage-grouse in Mono County, California. Study objectives include determination of movements, survival, productivity, habitat selection, genetics, and morphology. The study is currently in its second year. Information gathered from this study will be incorporated in the next edition of this plan.

## CHAPTER 6. SUMMARY

Despite some major landscape changes that have occurred over the last century, Nevada and Eastern California continue to harbor an abundance of intact sage-grouse habitat and a relatively large number of birds that are well distributed throughout Nevada and Eastern California. The 63 identified populations within Population Management Units and the habitats on which those populations depend are not without risks and problems. The three most significant risk factors that were evaluated by Local Area Conservation Planning groups include habitat quantity, habitat quality, and wildfire. Other risk factors such as habitat fragmentation, disturbance, changing land uses and hunting/poaching also contribute to population risks and may be more prevalent in specific areas; however, limited information currently available does not indicate that these factors have nearly the widespread effect as the habitat loss/habitat quality/wildfire factors.

Loss of habitat through conversion to pinyon-juniper woodlands and conversion of sagebrush habitats to cheatgrass as a result of catastrophic fires has had negative effects on various sage-grouse populations throughout the States of Nevada and California. Habitat quality has been affected by various factors such as livestock grazing, wild horse utilization, the spread of invasive annual grasses and other exotics, and more recently, the lack of precipitation necessary to carry out good plant growth and provide water resources.

Habitat fragmentation, disturbance, changing land uses, and hunting/poaching also contribute to population risks and may be pronounced in specific areas, but the limited information currently available does not indicate that these factors have nearly the widespread effect as the habitat loss/habitat quality/wildfire factors. Some of the problems that have caused habitat loss also contribute to other risk factors such as habitat fragmentation, creating somewhat of a feedback loop. For example, wildfire generally creates habitat loss in the short term and can potentially fragment sage-grouse habitat making less habitat available to the bird, potentially exacerbating the effects of disturbance such as off-road vehicle use on limited nesting and/or brood rearing habitat.

The remaining factors such as disease, pesticides, cycles, and climate/weather, either are not within our ability to control, or are only important in site-specific instances in terms of population level impacts within the planning area. Therefore, by focusing on the habitat quantity, habitat quality, and fire ecology factors, the declining trend is likely to be reversed. Creating more habitat, increasing the quality of the existing habitat, and using disturbance to perpetuate the system are key factors to perpetuating the species in Nevada and Eastern California.

The conservation strategies and goals included in this Nevada-California Plan are consistent with the land use plans and other state and federal initiatives, and therefore, are likely to be implemented. All the funding necessary to conduct all the proposed projects is not likely to be available through agency budgets, but cost share programs, grants, and private sector support are all likely to contribute to the effort. The prioritization scheme that has been identified will help to keep the projects focused on the issues and actions that will provide the greatest results. The use of monitoring and the adaptive management program will provide the opportunity to identify what actions work, what actions do not work, and why some actions do not work. The adjustments

that can be made as a result of the adaptive management approach will also improve the management, as well as technology transfer to other collaborative groups.

The 2004 First Edition of the Nevada-California Plan represents the state-of-the-States' knowledge of sage-grouse populations and risks to sage-grouse populations as they are understood to date. However, it will take years of coordinated monitoring to determine if the actions, once implemented as recommended in this plan, are effective at improving sage-grouse conservation. The collaboration of governmental agencies and private industries that can affect sage-grouse viability in Nevada and California are committed to working together to achieve the long-term sustainability of sage-grouse in conjunction with the other users of the sagebrush ecosystem.

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