Conservation Plan for

Greater Sage-grouse in Utah

February 14, 2013

FINAL

Table of Contents

1.0 Introduction

Utah's Conservation Plan for Greater Sage-grouse (Plan) is designed to protect high-quality habitat, enhance impaired habitat and restore converted habitat to support, in Utah, a portion of the range-wide population of greater sage-grouse (*Centrocercus urophasianus*) necessary to eliminate threats to the species and negate the need for the listing of the species under the provisions of the federal Endangered Species Act (ESA). The U.S. Fish and Wildlife Service's (FWS) most recent finding on the need for a listing, issued in March, 2010, found that the listing of the greater sage-grouse was warranted on a range-wide basis, but that further action was precluded by higher ESA priorities of the Service. The FWS is now bound by a court decree to review this decision by the end of 2015.

This Plan is designed to eliminate the threats facing the sage-grouse while balancing the economic and social needs of the residents of Utah through a coordinated program which provides for:

- **incentive-based programs** for private, local government and School and Institutional Trust Lands Administration (SITLA) lands, and a
- **reasonable and cooperative regulatory programs** on other state and federally managed lands.

Implementation of the Plan requires a cooperative effort among local, state and federal agencies, working in concert with private interests.

1.1 Background

Currently, the state supports about 8% of the total range-wide population of greater sage-grouse, distributed throughout the northern, western, and central parts of Utah in a highly discontinuous habitat pattern. This habitat occupancy pattern is a result of the natural topography of Utah, and by the land use activities associated with, and necessary for, the human population.

The FWS determined the range-wide listing was warranted because of habitat fragmentation, and the lack of a regulatory structure designed to protect habitat. Various "threats" to habitat were identified and discussed in the finding. As a result of the finding, the Bureau of Land Management (BLM), the U.S. Forest Service (USFS), the State of Utah and the other western states with sage-grouse habitat, have each initiated planning and other actions designed to mitigate the identified threats and protect important sagebrush habitats, develop adequate regulatory mechanisms, and thereby eliminate the need for a listing under the ESA.

Within Utah, Governor Herbert chartered a Working Group to develop recommendations for a statewide plan for the conservation of sage-grouse, while also providing for the continued economic health of the state. The Working Group met in open, public meetings from late February to October of 2012. In addition to the recommendations of the Working Group, the Governor's Office, through the Public Lands Policy Coordination Office, received comments and advice from other interested parties, including industry, environmental organizations and county commissioners.

1.2 Conservation Principles

The overall effort to protect habitat and associated populations of sage-grouse in Utah is based upon the principles set forth in the Greater Sage-Grouse Conservation Objectives Final Report, prepared by the FWS chartered Conservation Objectives Team (COT), and dated February, 2013.

The COT report reiterates that sage-grouse are a landscape species, and long-term species conservation will require the cooperation of the western states and federal agencies to negate the need for a listing of the species. The COT report emphasized the need to protect the "best of the best" habitat given the high cost, long time-frame to completion and relative uncertainty of sagebrush restoration, and recognized that not all populations are required to contribute to a range-wide conservation of the species. The COT report also recognized that because of variation in range-wide, and local, environmental conditions, state wildlife management agencies are in the optimal position to determine the appropriate conservation goals for the species, and give advice on the necessary methods to achieve the goals.

2.0 Conservation Goal and Objectives

This Plan builds upon earlier efforts of state agencies to protect sage-grouse. In 2003, the Utah Wildlife Board adopted the first Strategic Plan for the Management of Sage Grouse in Utah. In 2009, the plan was revised. Those plans identified local population dynamics, site-specific threats, and research needs, and recommended management strategies to conserve the species. Many of the research needs were subsequently addressed, thereby contributing to the deep body of knowledge about sage-grouse in Utah (See Appendix 8).

The biological pillars of sage-grouse conservation remain;

1) protection of habitat which provides for **the year-round life-cycle needs** of the species,

2) perpetuation of conditions necessary **to ensure recruitment of a continuing population** within the aggregate state population, and

3) enhancement or improvement of sage-grouse habitat that has been impaired or altered through restoration or rehabilitation activities.

Sustaining the best-of-the-best existing sage-grouse populations and increasing populations through habitat restoration and rehabilitation are the basis of this Plan. Utah's current distribution of sage-grouse is dictated by;

1) the **discontinuous nature of habitat** which reflects the rugged and incised topography in the eastern and southern parts of the state,

2) previous **human-caused habitat modifications**,

3) **natural events** (such as wildfire), and

4) the connection of habitat with habitat occupied by birds in Nevada and Idaho, and physical and genetic connections to **larger populations** in the Wyoming Basins, Great Basin in the northern and western parts of the state, and to populations in northwest Colorado.

To prevent the need to list sage-grouse under the provisions of the ESA, the goals and objectives for the conservation of the species in Utah include:

Sage-grouse Management Goal: Protect, maintain, improve and enhance sage-grouse populations and habitats within the established Sage-grouse Management Areas.

2.0.1 Objective 1 - Population: Sustain an average male lek count of 4100 males (based on a ten-year rolling average on a minimum of 200 monitored leks) in the Sage-grouse Management Areas, and increase the population of males to an average of 5000 (based on the same ten-year rolling average on a minimum of 200 monitored leks) within the Sage-grouse Management Areas. (See Appendix 3 for baseline male lek counts.)

2.0.2 Objective 2 - Habitat: Protect 10,000 acres of sage-grouse habitat on private and School and Institutional Trust Lands Administration (SITLA) lands annually through conservation covenants, leases, easements or other legal tools, with emphasis on the best-of-the-best populations.

2.0.3 Objective 3 - Habitat: Enhance an average of 25,000 acres of sage-grouse habitat in Sage-grouse Management Areas annually.

2.0.4 Objective 4 - Habitat: Increase the total amount of sage-grouse habitat acreage within Sage-grouse Management Areas by an average of 50,000 acres per year, through management actions targeting Opportunity Areas.[1]

2.0.5 Objective 5 – Distribution: Maintain viable populations within each SGMA.

---

[1] Opportunity Areas are areas which offer the best potential for creating new habitat for greater sage-grouse. (See definition in Section 10.0 below.)

2.0.5.1 Employ the management protocol (Section 6.0 below) requiring avoidance, minimization, and mitigation to preserve habitat and bird populations. Ensure a path for birds to migrate within SGMAs on a seasonal basis, and ensure a long-term genetic connection between populations as needed.

2.0.5.2 Viability of the populations in the Ibapah and Hamlin Valley SGMAs is tied to habitat occupied by birds in Nevada. Other SGMAs connect to habitat occupied by birds in neighboring states, but the viability of the populations within the SGMAs is not dependent upon the habitat outside Utah.

2.0.5.3 This objective, more than any other, has potential to be affected by factors (stressors) beyond the management control of the state, such as catastrophic wildfire. Should the population trends within an SGMA temporarily or permanently suffer from the effects of such factors, management controls in the other SGMAs will be adjusted to achieve the other objectives listed above.

These Objectives will be tracked on a statewide basis through the Public Lands Policy Coordination Office (PLPCO), with support from the Division of Wildlife Resources (DWR), the BLM, the USFS, the FWS, and local governments. Habitat enhancement, improvement and restoration will be implemented and coordinated on a statewide basis through programs such as the Watershed Restoration Initiative (WRI), Utah Partners for Conservation and Development (UPCD), the Natural Resources Conservation Service's (NRCS) Sage-grouse Initiative (SGI), the Grazing Improvement Program (GIP), and others.

3.0. Sage-grouse Management Areas (SGMAs)

3.0.1 This Plan is anchored around efforts to conserve the species within eleven specifically identified Sage-grouse Management Areas (SGMAs). The SGMAs represent the best opportunity for high-value, focused conservation efforts for the species in Utah. This approach recognizes and accepts current use of the land, and identifies potential future uses which may cause conflict with the needs of the species. The sage-grouse populations within the SGMAs all lend themselves to increases through appropriate protective measures and habitat enhancements, so each SGMA identifies areas on the landscape that provide these additional habitat enhancement opportunities (Opportunity Areas) for greater sage-grouse. In addition, habitat in the Rich County area of Utah is connected to habitat in eastern Idaho and western Wyoming , habitat in Box Elder Tooele, Juab, and Beaver Counties is connected to the habitat supporting populations in southern Idaho and Nevada, and habitat in the Uintah and Daggett County areas is connected to habitat in Wyoming and Colorado.

> *These SGMAs encompass the highest sage-grouse breeding density areas, which together currently support greater than 90% of the Utah aggregate population of greater sage-grouse.*

3.0.2 Sage-grouse habitat outside the SGMAs is not required for long-term conservation of the species. Much of this habitat has already been disturbed by human and natural causes, and is not suitable for enhancement or improvement. Therefore, greater sage-grouse populations in these areas are not considered essential to perpetuation of the species in Utah, and no specific management actions for this habitat are recommended or required.

3.1 Scientific Information and Studies

The boundaries of each SGMA reflect the biological and geographical realities of area currently occupied by a population or populations of sage-grouse. The SGMAs are based upon the location of occupied leks, the identification of nesting and brood rearing habitat, on average, within a 3.0 mile radius of the occupied leks[2], and associated winter and other habitat.

For decades prior to the current review, the DWR has been supporting research and community-based conservation efforts to learn more about the ecology of the species. Appendix 8 contains a listing of research studies and reports on sage-grouse conducted in Utah. To facilitate this effort, the DWR established ten Local Area Working Groups (LAWGs) under the general direction of Utah State University, with the first established as far back as 1996. These LAWGs were composed of private interests and governmental entities, and were charged to assess the local nature and scope of the threats to the species, and to recommend a course of action to address those threats.

Because of this early and ongoing assessment, the State of Utah is fortunate to have a high level of knowledge about seasonal range, migration routes, and other factors known to be essential to maintenance of the species, all in the context of Utah's unique conditions. This information, along with peer-reviewed scientific studies, forms the basis for this plan.

When local or county, state agency, and federal agency planning is aggregated into a statewide plan for sage-grouse, the collective result provides a complete and credible means of addressing the factors used by the FWS to measure the success of conservation efforts. Specifically, the objectives to enhance and increase habitat, and the implementation of this Plan to eliminate threats to greater sage-grouse populations will address the need for *resiliency* of the species – the ability of birds to persist in each management area in the face of normal or catastrophic events, and provide adequate *representation* of the species across its range in Utah. This plan further protects against the need for this species to be listed as threatened or endangered by providing a level of *redundancy* - numerous resilient populations that contribute to the long-term viability of the species across its range.

---

[2] In Utah, based on statewide averages, 91% of greater sage-grouse hens nest within 3 miles of a lek, This is based upon data compiled by the DWR, Utah State University and Brigham Young University. These data include 478 sage grouse nests within SGMAs. The Strawberry SGMA is excluded from this analysis due to the transplanted nature of the population and the on-going establishment of new leks**.**

3.2 Geography of Utah

Sage-grouse occupied habitat in Utah is highly influenced by the geography of Utah, which is characterized by mountainous terrain, separated by broad valleys in the Great Basin, and by deeply incised canyons in the Colorado Plateau. Sage-grouse habitat may be found in intact blocks in the Great Basin, or in disconnected "islands" of habitat in the Colorado Plateau.

3.3 Analysis of Current Land Uses

The development of energy and mineral resources, maintenance and development of utility infrastructure needed to serve Utah's existing and future residential and commercial needs, housing developments, and the pursuit of recreational activities in Utah are a vital component of the state and local economies, and the quality of life in Utah. Additionally, a strong economy provides some of the funding necessary to implement the Management Protocol and mitigation procedures outlined in this Plan. In some areas, mineral extraction, housing developments, recreational activities, wildfire, and other factors have, or will in all likelihood in the near future, negatively impact local sage-grouse populations. These realities were considered in the preparation of this Plan as a means of allocating available funding to areas with the greatest likelihood of success for species conservation (see USFWS 2013 Conservation Objectives Report). For this reason, some sage-grouse populations are considered non-essential, and they have not been included in SGMA boundaries, and no management provisions are expected or provided for those areas.

3.4 Sage-Grouse Management Areas

The SGMAs for Utah are;

1. Bald Hills
2. Box Elder
3. Carbon
4. Hamlin Valley
5. Ibapah
6. Panguitch
7. Parker Mountain - Emery
8. Rich-Morgan-Summit
9. Sheeprock Mountains

10. Strawberry

11. Uintah

A map of each SGMA is attached to this Plan.

3.5 Maps and Mapped Habitat

3.5.1 Maps

Of necessity, identification of the eleven SGMAs requires the establishment of boundaries. These boundaries include 1) delineation of the extent of the SGMA, 2) delineation among habitat, non-habitat and opportunity lands within the SGMA, and 3) within habitat, delineation among nesting, winter and other habitat. The GIS maps which accompany this Plan contain representations of these boundaries for informational purposes, but are not meant to themselves represent, for example, a survey-grade boundary, and are not intended to be the final authority for habitat delineation issues. Parties should consult with the DWR to determine the precise delineation of habitat as part of the consultation for any particular development proposal. If in the review of any proposal or other action, differences between the maps and the on-the-ground situation become apparent, the on-the-ground boundaries shall control.

3.5.2 Annual Review of SGMA Boundaries and Other Provisions of the Plan

The SGMAs should be reviewed annually through the coordination efforts of PLPCO as set forth in Section 4.2 below. Review should include, for example, changes in the distribution of disturbance, the increases in habitat through enhancement or improvement, decreases in habitat through wildfire or other events, status of population numbers, and related items.

3.5.2.1 Adjustments to SGMA boundaries will be reviewed every five years, unless large-scale events such as wildfire, and successful annual events, such as habitat enhancement or improvement, necessitate a more frequent adjustment.

3.5.2.2 Adjustments may include expansion or constriction of the external boundaries and a redrawing of the internal boundaries among habitat, non-habitat and opportunity areas.

3.5.2.3 Before mitigated areas are considered to be habitat within an SGMA, a preponderance of the evidence must indicate that sage grouse are occupying the mitigated area. Habitat altered by fire shall not be removed from an SGMA until rehabilitation or restoration of the burned areas is determined to be unsuccessful or not feasible.

3.6 Habitat Types Included Within SGMAs

Within each SGMA, lands were classified based on current or potential sage grouse habitat:

3.6.1 Habitat – The aggregation of seasonal habitats used by sage-grouse at some point during the yearly life-cycle of the birds. Habitat includes the geographical extent of leks, nesting, brood-rearing, late-brood rearing, transitional and winter areas.

3.6.2 Non-Habitat - Non-habitat areas within SGMAs include lands that do not contribute to the annual life-cycle of sage-grouse. Effort has been made to minimize the amount of non-habitat within an SGMA, but given the topographic, physiographic and land cover features within Utah and the scale and detail of mapping, the inclusion of some non-habitat was unavoidable.

3.6.3 Opportunity Areas - Opportunity areas are those portions of a SGMA that currently do not contribute to the life cycle of sage-grouse but are areas where restoration or rehabilitation efforts can provide additional habitat when linked to existing sage-grouse populations. In Utah, the majority of these areas are lands that have been altered due to wildfire or the proliferation of invasive plant species. Examples include areas where pinon-juniper, conifers, deciduous shrubs or other plant species have encroached upon habitat, rendering it less useful or useless as habitat. Opportunity areas may be transformed into either habitat or non-habitat based upon natural events or management choices, and may be used to mitigate disturbance within habitat as appropriate.

3.6.4 Additional Mapping of Habitat, Non-habitat and Opportunity Areas

Implementation of this Plan should be accompanied by efforts to refine mapping of each of these habitats. These efforts should be coordinated among federal, state and local agencies, and private landowners who may choose to participate. On-the-ground projects conducted under this Plan may contribute to this refined mapping for the project area.

3.7 Land Ownership

The eleven SGMAs contain lands owned or managed by:

- Private or corporate citizens and local government,
- School and Institutional Trust Lands Administration,
- Division of Wildlife Resources,
- Division of State Parks and Recreation,
- Confederated Tribes of the Goshute Reservation,
- Bureau of Land Management, and
- United States Forest Service.

Each type of land requires a different approach for successful protection of sage-grouse. See Appendix 4 for the property ownership breakdown within each Sage- Grouse Management Area.

.1 Private Lands

Five SGMAs will be the focal point for state and local efforts to obtain **incentive-based negotiated** covenants, easements, leases or other legal tools necessary for sage-grouse conservation on private lands. These SGMAs contain the highest percentage of private lands, along with larger and flourishing populations of birds, and represent the center of the state's effort. The SGMAs are

- Box Elder
- Parker Mountain - Emery
- Rich-Morgan-Summit
- Strawberry
- Uintah

Private landowners should follow the protocol identified in Appendix 3 in order to participate in the conservation efforts.

3.7.2 School and Institutional Trust Lands Administration (SITLA)

Use of SITLA lands for any purpose requires compensation, including the conservation purposes of this Plan. Pursuant to state constitutional and statutory law, the beneficiaries of the various trusts do not include general governmental or public purposes. (See Utah Code 53C-1-102(2)(d).)

Similar to the effort for private lands, SITLA lands within the same five SGMAs will be the center of the state's efforts to **negotiate incentive-based** covenants, easements, or leases to achieve conservation purposes on SITLA lands.

.3 Local Government Lands

County or municipally owned lands shall be treated like private or SITLA lands, requiring the acquisition of voluntarily negotiated covenants, easements, leases, or other legal tools necessary for greater sage-grouse conservation.

.4 BLM, USFS, and State Agency Lands

The remaining six SGMAs have a larger percentage of federally managed lands, and will require cooperative management decisions among local, state and federal agencies. In line with federal land planning and decision-making processes, this portion of the Conservation Plan will feature conditions and stipulations to be employed by the BLM and USFS when considering approvals for activities on federally managed lands. Similarly, state agencies will employ the necessary management actions to fulfill the purposes of this strategic conservation plan for state lands.

.5 Department of Defense Lands and Airspace

Lands and airspace owned, managed or controlled by the Department of the Defense, or its various services or directorates are near or over SGMAs. Operations on these lands or within this airspace shall not be affected by the implementation of this Plan, unless strong and credible evidence directly linking such operations to a loss of habitat or bird populations is presented at one of the annual SGMA review meetings. Such evidence shall be reviewed by the parties to the implementation plan for possible adjustments to the SGMAs or implementation of the Plan.

.6 Tribal Lands

The Ibapah SGMA contains lands under the jurisdiction of the Confederated Tribes of the Goshute Reservation with the permission of the Goshute Tribe. Decisions concerning the implementation of this Plan on the tribal lands will be coordinated with other efforts through the efforts of PLPCO and the LAWGs, but remain under the jurisdiction of the Goshute Tribe on reservation lands. The state recognizes that greater sage-grouse exist on lands under the jurisdiction of the Ute Tribe, but has chosen not to incorporate any of those lands into this Plan absent the permission of the Ute Tribe. The state will continue to seek a cooperative relationship with the Ute Tribe on greater sage-grouse conservation efforts and recognizes that the Ute Tribe may wish to coordinate its efforts for the conservation of the greater sage-grouse with this Plan, or propose its own Conservation Plan to the FWS.

.7 Mineral Estate

The state recognizes that there are situations where the surface is owned by one entity or person, and the subsurface mineral estate is owned by another, including tribal governments. Because the surface estate is the key to conservation of habitat, the SGMAs have been mapped according to surface ownership, but the state recognizes that implementation of his Plan will have to accommodate the dominant nature of the mineral estate, and react accordingly.

4.0 Implementation of the Conservation Plan

4.1 Private and SITLA lands

The necessary covenants, easements, leases or other protective tools for habitat on private and SITLA lands will be secured through cooperative assistance and funding efforts provided by all interested parties, including:

- Utah Department of Agriculture and Food (UDAF)
- Utah Department of Natural Resources (DNR)
- U.S. Department of Agriculture - Natural Resources Conservation Service (NRCS)
- U.S. Department of Agriculture – Forest Service
- U.S. Department of Interior – Bureau of Land Management (BLM)
- U.S. Department of the Interior - Fish and Wildlife Service
- Private sources – industry and non-governmental organizations
- Other

4.2 Coordination among Local Government, State Agencies and Federal Agencies

The PLPCO will coordinate the efforts of BLM, Forest Service, Fish and Wildlife Service, state agencies, local government and others to accomplish the purposes of this Plan. The PLPCO will convene a Working Group with membership including the DNR, UDAF, SITLA, BLM, USFS, NRCS, FWS, and others as needed. The Working Group will meet as often as needed to coordinate the implementation of this Plan. The Working Group will initiate and coordinate the efforts of necessary technical teams to assure scientific and monitoring information is shared by all management agencies, and that efforts to achieve the necessary conservation goals are progressing.

.3 Local Area Working Groups (LAWG)

The existing LAWGs have functioned well over the years, and provide the proper forum for the assessment of the nature and scope of localized threats which may affect the species. The LAWGs will, under the management supervision of Utah State University, assist the coordination efforts of PLPCO, defined in Section 4.2 above, by providing information concerning the effects of local disturbance on the species. In addition, the LAWGs will 1) make recommendations for projects to improve or enhance habitat or opportunity areas, 2) make recommendations for voluntary agreements on private, SITLA or county lands to benefit the species, and 3) make recommendations for conservation of the species on state and federal land as part of the implementation of this Plan.

5.0 Threat Assessment and Management Provisions

Based on information obtained from the DWR and the ongoing LAWG process, (which is based on peer-reviewed and observational science), the following threats have been identified for greater sage-grouse and habitat in Utah as those of the greatest concern statewide. It is crucial to note that not all of these threats exist in each of the eleven SGMAs. These potential threats are presented in a non-hierarchical order. In all cases, evaluation of disturbance due to the listed threats should be addressed through the Management Protocol discussed in Part 6.0 below. The management provisions listed below to address threats to the species should be reviewed if new research demonstrates a modification is necessary. It will be necessary to allocate sufficient resources to fully address habitat loss and degradation in the next ten years.

5.1 Fire Control, Suppression and Rehabilitation

Habitat loss due to fire and replacement of (burned) native vegetation by invasive plants is the single greatest threat to greater sage-grouse in Utah. However, fires ignited by natural events and human activities are beyond the control of human planning efforts. While unscheduled fires may occur, response to fire can have a large impact on the severity of the effects, especially over time as rehabilitation or restoration continues. The Governor has established a committee to

develop a collaborative process to protect the health and welfare of Utahns and our lands by reducing the size and frequency of catastrophic fires. This committee is operating under the direction of the Commissioner of Agriculture and Food. Implementation of this Plan will coordinate needs and efforts related to sage-grouse with this committee.

Fire by natural ignition should be addressed as a serious threat, and prescribed fire should only be used at higher elevations and in a manner designed prescriptively to benefit greater sage-grouse. Immediate, proactive means to reduce or eliminate the spread of invasive species, particularly cheatgrass, after a wildfire, is a high priority. All federal, state and local governmental agencies, and other interested parties, should implement the following:

5.1.1 Create and implement a statewide fire agency agreement(s) that will eliminate jurisdictional boundaries and allow for immediate response to natural fire. These should include fire suppression actions recommended locally, including, but not limited to

a) first strike agreements that allow aggressive fire control on an all-land jurisdictional basis;

b) allocation of resources to maintain enhanced abilities of all fire agencies to combat ignitions in SGMAs;

c) allocation of resources to immediately commence restoration of habitats impacted by wildfire by all responsible agencies; and

d) removal or establishment of waiver provisions for procedural barriers that may impact the ability of responsible agencies to respond to wildfire with effective reclamation or rehabilitation, such as federal raptor stipulations, cultural assessments, and the like.

5.1.2 Amend land management provisions which restrict the use of non-native species on federal lands to allow use of fire-retardant vegetation that will buffer areas of high quality greater sage-grouse habitat from catastrophic fire.

5.1.3 Focus research efforts on effective reclamation and restoration of landscapes altered by wildfire, and provide adequate funding to do so.

5.1.4 Conduct effective research into controlling fire size and protecting remaining greater sage-grouse areas that are adjacent to high-risk cheatgrass areas.

5.1.5 Consider the use of prescriptive grazing to specifically reduce fire size and intensity on all types of landownership, where appropriate. This could be particularly effective in areas where cheatgrass is encroaching on sagebrush habitat. This will require cooperation and coordination among different land managers and owners and livestock owners. In some cases feed supplementation and water hauling may need to be utilized to obtain the desired results.

5.1.6 Use prescriptive fire with caution in sagebrush habitat. The Western Association of Fish and Wildlife Agencies has prepared information that explains the risks from using prescribed fire in xeric sagebrush habitats.[3]

5.2 Invasive Species

Habitat loss due to invasive species, such as whitetop, medusahead, knapweeds, tamarisk, cheatgrass and others are a serious threat to greater sage-grouse habitat. These species displace native communities, and alter the soil and environment in a way that makes reestablishment of native ecosystems very difficult. An aggressive response to new infestations is key to keeping invasive species from spreading. Every effort should be made to identify and treat new infestations before they become larger problems. Additionally containment of known infestations in or near sagebrush habitats should be a high priority for all land management agencies.

5.3 Predation

Predation is often tied to habitat quality, particularly in areas where an interface exists between human disturbance and the remaining habitat. While predator control may not be a long-term solution to a general range-wide decline in populations of greater sage-grouse, it has been shown to be an effective tool to gain increased survival of specific populations. Predation has been identified as a key threat in many SGMAs, primarily due to increased populations of corvids (primarily ravens) and emergence of non-native canids (red fox) that did not co-evolve with greater sage-grouse. Predation control and management should be managed by USDA-APHIS Wildlife Services (WS), UDAF, in consultation with the DWR.

5.3.1 Eliminate or minimize external food sources for corvids, particularly dumps, waste transfer facilities, and road kill.

5.3.2 Apply habitat management practices (e.g., grazing management, vegetation treatments) that decrease the effectiveness of predators.

5.3.3 Develop strategies for active short-term predator control based on biological assessments appropriate to local conditions.

5.3.4 Monitor effects of predator control to determine causal connections with greater sage-grouse survivability and modify control strategies accordingly.

5.4 Vegetation Management

Habitat loss in Utah is caused by both natural and man-made alterations to existing habitat. Protection of remaining habitat is the primary focus of conservation efforts, but many locations can be reclaimed or restored by active vegetation management actions. For example,

[3] See Appendix 5.

a) removal of encroaching conifers may create new habitat or increase the carrying capacity of habitat and thereby expand grouse populations, or

b) the distribution of water into wet meadow areas may improve seasonal brood-rearing range and enhance greater sage-grouse recruitment.

Utah has a unique partnership to and a demonstrated record of enhancing and improving habitat through restoration and reclamation on a large scale through the Utah Partners in Conservation and Development (UPCD and the Watershed Restoration Initiative - WRI.) See Appendix 9 for a listing of greater sage-grouse habitat projects completed since FY2006.

5.4.1 Aggressively remove encroaching conifers and other plant species to expand greater sage-grouse habitat where possible.

5.4.2 Aggressively remove cheatgreass and other invasive species, and rehabilitate areas to provide additional habitat for greater sage-grouse where possible.

.3 Sagebrush treatment projects within nesting and winter habitat should be limited and require pre-approval by the appropriate regulatory agency in consultation with the DWR. Sagebrush treatment projects should maintain 80% of the available habitat as sagebrush within the project area; 20% of the habitat can be managed for younger age classes of sagebrush, if appropriate. These treatments are generally recommended only to improve brood-rearing habitat, but need to be carefully considered before use in winter and other habitat.

.4 Design water developments to enhance mesic habitat for use by greater sage-grouse and maintain adequate vegetation in wet meadows. Within SGMAs, greater sage-grouse stipulations should take precedence over stipulations for other species if conflicts occur, if otherwise allowable by law.

5.4.5 Appendix 6 discusses the complexities and factors to be considered in restoring and improving sage grouse habitat.

5.5 Extractive Mineral Development

In SGMAs, limit or ameliorate impacts through the use of the Management Protocol (Section 6.0 below).

5.5.1 Recognize that surface vents associated with underground mining are essential for human safety, and must be permitted under the provisions of this Plan.

5.5.2 Engage in reclamation efforts as projects advance or are completed.

5.5.3 Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim disturbed areas, and remove those barriers in order to achieve immediate and effective reclamation, if otherwise allowable by law.

.4 Prioritize areas for habitat improvement to make best use of mitigation funds.

.6 Transmission Corridors

Most existing utility corridors (pipelines, roads, major overhead electrical transmission lines) are well-defined at the present time, and this threat is seen as minimal. With respect to major transmission lines, research completed to date has not shown immediate impacts from existing power lines on nest or brood success. As a result, management stipulations and conditions should focus on mitigating direct disturbance during construction. Should new research demonstrate indirect impacts to greater sage-grouse production, additional mitigation measures may be required (see Appendix 1 for a discussion of the current research).

.1 Apply mitigation standards based on habitat type as discussed in the Management Protocol, and best management practices accepted by industry and state and federal agencies.

.2 For electrical transmission lines, and where feasible and consistent with federally required electrical separation standards, site new linear transmission features in existing corridors, or at a minimum, in concert with existing linear features in greater sage-grouse habitat. Siting linear features accordingly shall be deemed to be mitigation for the siting of that linear feature. Mitigation for the direct effects of construction is still required.

.3 Engage in reclamation efforts as projects are completed.

5.7 Renewable Energy Development

Development of renewable energy is a high priority for the State of Utah, and should employ the same Management Protocol recommended for extractive mineral development. Preliminary results from scientific research have indicated that wind energy development near greater sage-grouse nesting and brood-rearing habitat may have a negative impact on nest success, brood success, and populations. However, research completed to date has not shown an immediate impact from transmission lines on nest or brood success, so necessary stipulations and conditions related to transmission lines associated with renewable energy projects should focus on disturbance during construction (see Appendix 1 for a discussion of the current research).

5.7.1 Engage in reclamation efforts as projects are completed.

5.7.2 Recognize that stipulations for other species (e.g. raptors) may impede the ability to effectively reclaim areas of impact and remove those barriers to achieve immediate and effective reclamation, if otherwise allowable by law.

.3 Prioritize areas for habitat improvement.

5.7.4 Apply mitigation standards based on habitat type as discussed in the Management Protocol in Section 6.0.

5.7.5 New permanent tall structures should not be located within one mile of the lek, if visible by the birds within the lek.

5.8 Recreation and OHV Use

Recreational activities, particularly motorized off-highway uses, may conflict with greater sage-grouse, most often in nesting and winter habitats where and when birds are unable to move freely. In SGMAs, limit or ameliorate impacts through the use of the Management Protocol discussed in Section 6.0 below.

.1 Restrict OHV use to identified trails and roads in nesting and winter habitat.

5.8.2 Develop an educational process to advise OHV users of the potential for conflict with greater sage-grouse.

.2 Counties should adopt and enforce travel management plans that include consideration for greater sage-grouse.

.9 Improper Livestock Grazing

Livestock grazing is a major resource use in most SGMAs, and can be an effective tool to improve habitat quality and seasonal nutrition, and thereby enhance local populations. Existing grazing operations which utilize recognized rangeland best management practices increase the necessary vegetation, and thereby increase the potential for nesting success and population recruitment.

Should concerns be raised about the effect of grazing on sage-grouse, and such effects are documented over a sufficiently long time-frame, corrective management actions should be addressed through the best management practices identified by the Department of Agriculture and Food's Grazing Improvement Program. (UDAF GIP).

More detail on grazing practices and greater sage-grouse conservation are found in Appendix 2.

.9.1 Rangeland habitat treatments to improve grazing should fully consider the impact on sage grouse seasonal habitat during planning and implementation.

.9.2 Address incompatible grazing strategies through established rangeland management practices consistent with the maintenance or enhancement of habitat.

.9.3 Allocate funds and effort to the development of grazing strategies that will enhance or improve habitat for the preservation of greater sage-grouse.

.9.4 Locate livestock fences away from leks and employ the NRCS fence standards.(See NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes.") [4]

.10 Hunting

Limited hunting of greater sage-grouse is currently (2013) allowed, by permit, in the Box Elder, Rich-Morgan-Summit, Uintah, and Parker Mountain-Emery SGMAs. These SGMAs have the largest stable populations. Hunt quotas are determined annually based on very conservative estimates, and are based on criteria found in the Utah 2009 Greater Sage-grouse Strategic Management Plan. Decreases in population in any particular year due to natural or human caused events, will lead to a reduced number of hunting permits or cancellation of the hunt for the year. Hunting fees are expended only for the benefit of species subject to the hunts, so a complete cessation of hunting of greater sage-grouse would lead to a cessation of expenditures from that funding source for the species' benefit.

.10.1 Maintain the interest of the sportsman's community by continuing a viable hunting program.

.10.2 Continue to gather scientific data from the birds harvested.

.10.3 Continue to support the bird through the use of hunter fees and expenditures.

.11 Other Threats Identified in the FWS Listing Decision

The 2010 FWS listing decision identified other threats to greater sage-grouse. These threats include: wild horses and burros, climate change, religious use, scientific and educational use,

[4] See http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb1049415.pdf

disease, drought, pesticides and contaminants. Wild horses and burros were determined to not have population level impacts if managed in accordance with existing land management standards. Climate change is undefined at this time and is addressed by preservation of habitat and habitat improvements. Religious use was not determined to be a threat for Utah sage-grouse populations. Scientific and educational use is regulated by the DWR and is not viewed as a threat in Utah. Disease has not been documented to have population level effects on Utah sage-grouse populations. West Nile virus has been documented in one Utah sage-grouse; testing and mosquito control does occur. Drought cannot be directly addressed, however by protecting large blocks of habitat sage-grouse should be able to adapt. Pesticides and contaminants were not identified as a threat for Utah sage-grouse populations. These perceived threats are adequately addressed by existing protocol or plans, and do not require additional management provisions at this time.

6.0 Management Protocol and Mitigation

Management of activities on **state and federally managed lands** within SGMAs will be based on a hierarchical protocol that provides as follows:

1) Avoidance of disturbance to habitat or birds by an activity is the preferred option;

2) Minimization of the disturbance is desired if the disturbance cannot be avoided in greater sage-grouse habitat, with mitigation for the effects of the minimization decisions; and finally

3) Mitigation of the disturbance from an activity within sage grouse habitat is required if a disturbance cannot be avoided.

This Management Protocol does not apply to private, SITLA or local government lands unless an agreement has been reached with the landowner to incorporate these provisions.

6.1 Disturbance

Disturbance, as defined in Section 10.0, is any ground disturbing activity, event or action, natural or human-caused, which will either eliminate or render greater sage-grouse habitat unusable for the life-cycle of the bird, *or* human activities and presence which causes a negative response from birds within the SGMA. Disturbance based on ground disturbing activities can be temporary or permanent, while negative response disturbances can cause negative effects year-round, seasonally, or only at certain times of day.

6.1.1 Temporary ground disturbance is defined as any ground disturbing activity which lasts less than five years. Temporary disturbances do not need to be mitigated, if the reclamation or restoration work is effective within the five year period.

6.1.2 Permanent ground disturbance is defined as any ground disturbing activity which lasts five years or more.

6.2 "Avoidance" means an overt action that eliminates disturbance to greater sage-grouse and its habitat. Examples include

a) purposefully siting activities in non-habitat or opportunity areas rather than habitat areas, or siting the project outside the SGMA, or

b) the use of seasonal noise restriction stipulations.

Avoidance requires no mitigation.

6.3 "Minimization" means actions that reduce the amount, duration, or impact of disturbance within habitat. Examples include

a) using a smaller development footprint;

b) the reduction of noise levels below identified thresholds, or

c) the reduction of traffic volume on a road.

Minimization does not preclude the need to mitigate (compensate) for the disturbance which does occur within habitat.

6.4 "Mitigation" means actions that are designed to create new habitat or ameliorate disturbances by the creation of or protection of other habitat or birds. Mitigation for a disturbance must be shown to be effective in the time-frame of the activity, not at some future date. Effective mitigation does not require that birds are immediately present using the land, only that the habitat is capable of supporting birds as part of their yearly life-cycle, however, as stated in Section 3.5.2.3 above, SGMA boundaries may not be adjusted in response to mitigation until birds are occupying the site. Mitigation should be performed in areas which have the highest likelihood of occupation by the species. The amount of mitigation, if required, should be calculated based on the effects generated within habitat inside an SGMA.

6.4.1 Mitigation Program (including Mitigation Banks)[5]

Effective mitigation in Utah will require the creation of a mitigation program, which includes banks, to allow projects to proceed, while enhancing or improving habitat elsewhere. For this reason, mitigation for a disturbance should not necessarily be tied to reclamation efforts at the actual site of the disturbance. Mitigation may occur locally, elsewhere in the same SGMA, or in another SGMA, based upon the location which offers greater potential for enhancing greater sage-grouse populations, so long as the location of the mitigation does not result in the loss of resiliency, representation or redundancy of the species in Utah. The PLPCO, with assistance from the DWR, BLM, USFS, NRCS, DNR, UDAF, and other entities, shall coordinate and

[5] Mitigation Bank is a defined term used by the Army Corps of Engineers, so the Utah effort for greater sage-grouse will be referred to as a Mitigation Program, which may include a mitigation bank.

oversee the creation and operation of a Greater Sage-grouse Mitigation Program in Utah. The operation of this Mitigation Program will seek to rehabilitate or restore lands as habitat prior to need, as well as coordinate the mitigation for development or other effects upon the habitat of the greater sage-grouse. Once operational, contributions to the Program will be welcome.

6.5 Management Protocol

Agencies should follow application of the following Management Protocol upon federally managed lands and state lands within an SGMA as follows:

6.5.1 Habitat: Areas identified as habitat on federal and state lands should be managed to avoid surface disturbance to the greatest degree possible. Consultation with the DWR must occur at the earliest opportunity when land use which may result in a disturbance is contemplated. This protocol may be applied by the private landowner, or on SITLA property, through an incentive-based agreement.

For purposes of determining the specific appropriate management response to a proposed disturbance, habitat is divided into four subcategories:

1) the lek[6] itself;
2) the nesting and brood rearing area, *e.g.*, habitat within a three (3) mile radius of the lek; [7]
3) winter habitat; and
4) other seasonal habitat.

.1 Lek

Management provisions include:

a) Avoid disturbance within the lek, if possible. Project proponents must demonstrate why avoidance is not possible.

b) If avoidance is not possible, use minimization as appropriate to the lek.

c) If minimization is not sufficient, mitigation is required. Mitigation should be calculated at a minimum of a 4:1 ratio starting with the first acre disturbed. Mitigation must produce lands capable of supporting greater sage-grouse as habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the conditions have been met.

---

[6] Occupied leks. (See Section 10.6)

[7] See footnote 2, *supra*.

Successful mitigation for effects may include:

i) Removal of trees on or adjacent to the lek
ii) Removal or marking of fences on or adjacent to the lek.
iii) Employment of the Mitigation Program, if appropriate

d) New permanent disturbance, including structures, fences, and buildings, should not be located within the lek itself.

e) No permanent disturbance within one mile of the lek, unless it is not visible to the sage-grouse using the lek.

f) Fences should not be located adjacent to leks where bird collisions would be expected to occur. If required, the construction of any fences near the lek should follow the standards identified in the NRCS fence collision risk tool (See NRCS/CEAP Conservation Insight Publication "Applying the Sage Grouse Fence Collision Risk Tool to Reduce Bird Strikes.")

g) A disturbance outside the lek should not produce noise which rises more than 10 db above the background level at the edge of the lek during breeding season.

h) Employ seasonal disturbance stipulations as follows:

i) implement time-of-day stipulations during the season when the lek is occupied. (*e.g.*, no activity from two (2) hours before **sunrise** to two (2) hours after **sunrise**)

ii) avoid activities (construction, vehicle noise, etc.) that will disturb lek attendance or breeding from February 15 - May 15. The local DWR biologist should be consulted for time and distance determinations based on site-specific conditions.

.2 Nesting and Brood-Rearing Area

Management provisions include**:**

a) Avoid disturbance within nesting and brood-rearing area, if possible. Project proponents must demonstrate why avoidance is not possible.

b) If avoidance is not possible, use minimization as appropriate in the nesting and brood-rearing area. For example, try to minimize effects by locating development in habitat of the least importance, take advantage of topographic features to screen the disturbance, or maintaining and enhancing wet meadow and riparian vegetation to provide food and shelter.

c) If minimization is not sufficient, mitigation is required. Mitigation should be calculated at a minimum of a 4:1 ratio starting with the first acre disturbed. Mitigation must produce lands capable of supporting sage-grouse as habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the conditions have been met.

Successful mitigation may include:

i) Removal of trees to no more than 5% cover (the closer to 0% the better) and maintenance of at least 10% sagebrush cover;
ii) Maintain forb cover greater than 10% and greater than 10% grass cover during nesting and brood-rearing season;
iii) Maintain or improve wet meadows, when present: and
iv) Installation of green-strips or firebreaks to protect existing nesting habitat.
v) Employment of the Mitigation Program, if appropriate.

d) Cumulative new permanent disturbance within the SGMA should not exceed 5% of the spatial extent of the nesting habitat within the SGMA.[8] Allowances must be made to include the temporal effects of any temporary disturbance, if any such effects are expected. The calculation of the spatial extent of each proposed project or land use, or the area of a natural event, such as wildfire, to be employed in this calculation, is defined as part of the definition of disturbance found in Section 10 below. The base upon which this calculation is made may be increased through successful rehabilitation or restoration of habitat, or other mitigation actions as appropriate.

e) Employ seasonal stipulations as follows:

○ Avoid activities (construction, vehicle noise, etc.) that will disturb nesting or brood-rearing from April 1 - August 15. The local DWR biologist should be consulted for time and distance determinations based on site-specific conditions.

.3 Winter Habitat

Winter habitat in Utah is mostly dominated by Wyoming Big and Black Sagebrush.

Management provisions include:

a) Avoid disturbance within winter habitat, if possible. Project proponents must demonstrate why avoidance is not possible.

[8] The 5% limitation must be implemented in concert with the provisions of Section 8.0, *infra.*

b) If avoidance is not possible, minimize as appropriate in winter habitat. Minimization provisions include, for example, the location of development in habitat of least importance or by locating development to take advantage of topographic screening.

c) If minimization is not sufficient, mitigation is required. Mitigation should be calculated at a 4:1 ratio starting with the first acre disturbed. Mitigation must produce lands capable of supporting greater sage-grouse as habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the mitigation conditions have been met.

Successful mitigation may include:

i) Removal of trees to no more than 5% cover (and the closer to 0% the better) and maintenance of minimum of 10% sage brush cover; and
ii) Installation of green-strips or firebreaks to protect existing winter habitat.
iii) Employment of the Mitigation Program, if appropriate.

d) Cumulative new permanent disturbance should not exceed 5% of the surface area of winter habitat within the SGMA.[9] Allowances must be made to include the temporal effects of any temporary disturbance, if any such effects are expected. The calculation of the spatial extent of each proposed project or land use, or the area of a natural event, such as wildfire, to be employed in this calculation, is defined as part of the definition of disturbance found in Section 10 below. The base upon which this calculation is made may be increased through successful rehabilitation or restoration of habitat, or other mitigation actions as appropriate.

e) Manage winter habitat to maintain maximum amount of sagebrush, especially tall sagebrush, which would be available to greater sage-grouse above snow during a severe winter. Tall sagebrush is capable of standing above heavier than normal snowfall. Greater sage-grouse do not require an understory component in winter habitat.

f) Employ seasonal disturbance stipulations as follows:

Avoid activities (construction, vehicle noise, etc.) that will disturb wintering sage-grouse from November 15 - March 15. The local DWR biologist should be consulted for time and distance determinations based on site-specific conditions.

g) Sagebrush treatment projects within winter habitat need pre-approval by the appropriate regulatory agency in consultation with the DWR. Sagebrush treatment

[9] The 5% limitation must be read in concert with the provisions of Section 8*, infra*.

projects within winter habitat should maintain 80% of the available habitat as tall sagebrush; 20% of the habitat can be managed for younger age classes, if appropriate.

6.5.1.4 Other Habitat

Other Habitat is habitat within SGMAs but which is not part of the lek, nesting or wintering areas. Management provisions include:

a) Avoid disturbance in other habitat if possible. Project proponents must demonstrate why avoidance is not possible.

b) If avoidance is not possible, minimize as appropriate in other habitat. Minimization provisions include, for example, the location of development in habitat of least importance or by locating development to take advantage of topographic screening.

c) If minimization is not sufficient, mitigation is required. Mitigation should be calculated at a 1:1 ratio starting with the first acre disturbed. Mitigation must produce lands capable of supporting greater sage-grouse as habitat before the proposed disturbance occurs, though birds do not need to be using the mitigated area. The proponent of the disturbance must demonstrate that the mitigation conditions have been met.

Successful mitigation includes:

i) Removal of trees to less than 5% cover and maintenance of at least 10% sage brush cover;
ii) Maintain forb cover greater than 10% and grass cover greater than 10% during nesting/brood-rearing season;
iii) Maintain or improve wet meadows, when present; and
iv) Installation of green-strips or firebreaks to protect existing habitat.
v) Employment of the Mitigation Bank, if appropriate.

d) Cumulative new permanent disturbance should not exceed 5% of the surface area of other habitat within the SGMA.[10] Allowances must be made to include the temporal effects of any temporary disturbance, if any such effects are expected. The calculation of the spatial extent of each proposed project or land use, or the area of a natural event, such as wildfire, to be employed in this calculation, is defined as part of the definition of disturbance found in Section 10 below. The base upon which this calculation is made may be increased through successful rehabilitation or restoration of habitat, or other mitigation actions as appropriate.

e) Manage the lands to avoid barriers to migration, if applicable.

[10] The 5% limitation must be read in concert with the provisions of Section 8.0*, infra.*

6.5.2 Non-habitat: No specific management provisions are proposed for non-habitat areas within SGMAs, except to consider noise and permanent structure stipulations around a lek, and to note that, birds may fly over the non-habitat as they connect to other populations or seasonal habitat areas. [11]

6.5.3 Opportunity Areas: Opportunity areas may be employed to meet improvement, restoration or rehabilitation goals, or as mitigation areas for disturbance within habitat. If this occurs, an opportunity area may become habitat and be treated as discussed under the habitat section above, especially as part of the calculation for disturbance limitations. Alternatively, opportunity areas may be employed as the site for disturbances which are diverted from habitat, or other economic proposals not involving habitat, and therefore become non-habitat. In either event, boundaries of the SGMA, or the land types within, should be adjusted accordingly.

7.0 Existing Land Uses

7.1 Every effort has been made to exclude existing land disturbance within SGMAs, however in order to focus the state's efforts to conserve greater sage-grouse populations by creation of the SGMAs, some may remain within the exterior boundaries. These existing uses may be considered either 1) concentrated within a discrete area (*e.g.*, cement plants, agricultural fields, coal mine portals and related facilities) or 2) dispersed throughout a larger area (*e.g.*, oil and gas pads and roads within a developed field, wind farms, transmission lines). All existing uses are explicitly recognized by this Plan, and shall not be affected by the implementation of this Plan. Incorporated towns which may be physically within the exterior boundaries of an SGMA are expressly removed, and are not to be considered as within the SGMAs for purposes of implementation of this Plan. Existing concentrated uses within SGMAs are to be considered non-habitat.

7.2 Planned developments that are under review by city, county, or state or federal agency project review processes, such as a Planning Commission review, or a review under the provisions of the National Environmental Policy Act (NEPA), which may be within an SGMA, should not be discontinued simply by virtue of presence of the proposed project within an SGMA, but should be reviewed, and permission to proceed resolved by the landowner, and other applicable law.

7.3 Existing Review Processes

---

[11] Corridors may or may not be included as habitat within the SGMA, depending on local conditions, topography, and other factors. Corridors are important to sage-grouse, but may not require restrictions on human activity. As a general rule, it will be adequate to avoid removal of sagebrush and to minimize development that would create a physical barrier to sage-grouse movement in these areas.

7.3.1 Proposals which have completed environmental reviews, including the Narrows Project in Sanpete County and the Sigurd to Red Butte Transmission Line, are recognized as in compliance with this (Existing Uses) provision of the Plan.

7.3.2 Proposals which are nearly completed environmental reviews, such as the Alton Lease-by-Application coal mine proposal in Kane County, the TransWest Transmission Line proposal, the Sufco Mine Green's Hollow Tract Lease-by-Application coal mine proposal and the Kinney Mine proposal in Carbon County, and which have independently considered the effects of the project on greater sage-grouse, may continue the pending evaluation without recourse to the provisions of this Plan.

8.0 Five Percent Permanent Disturbance Limitation.

8.1 The provisions of this Plan include, under certain circumstances, a general limit on new permanent disturbance of five (5) percent of habitat on state or federally managed lands within any particular SGMA. The fundamental purpose of this provision is to limit the effects of a large amount of disturbance to the existing habitat or activities of the greater sage-grouse. The cumulative calculation of permanent disturbance in any SGMA, and specific habitats within an SGMA, is the aggregate of the various project, land use, or natural event disturbances, as defined within the definition of disturbance in Section 10 below, and as modified by the effects of rehabilitation, restoration or other mitigation actions.

8.2 Many of the SGMAs extend into two or more counties. In such case, the five (5) percent limitation shall be apportioned to each county in proportion to the total amount of habitat within the larger SGMA.

8.3 Because of the highly discontinuous nature of greater sage-grouse habitat in Utah, each of the SGMAs is a composite of habitat, non-habitat and opportunity areas. In many cases, it may be difficult to discern whether an existing dispersed use is part of habitat or non-habitat, and thereby make an accurate calculation of the base for the limitation calculation difficult to determine. As part of the implementation of this Plan, such issues should be brought to the interagency review effort coordinated by the PLP C O to insure consistency in interpretation throughout the state. In addition, if it should become sufficiently apparent that an accurate determination of the base for the limitation calculation is not feasible, then the interagency coordination effort may propose and seek approval for an alternative measurement of, or technique to measure, the cumulative effects of disturbance, and this Plan may be amended to approve such alternative measurement or technique.

9.0 Effective Date

9.1 This Plan shall become effective when approved by the Governor, and shall remain in effect until June 2016, unless extended by the Governor.

9.2 By the end of June 2016, the Plan shall be reviewed, by such public process as the Governor shall direct, for effectiveness and continued need.

9.3 If there is a continued need, the Governor may extend the Plan, or approve an amended Plan. The Plan shall thereafter be reviewed for effectiveness and need every five years.

9.4 Notwithstanding the provisions of Section 9 above, if the FWS should finalize a regulation which lists the greater sage-grouse as threatened or endangered under the provisions of the Endangered Species Act, this Plan shall immediately become optional, and may be revoked and rendered ineffective by the Governor at that time.

10.0 Definitions

10.1 Brood success: The success of a brood is achieved when one or more chicks in a brood survive to 50 days of age or more.

10.2 Corridors: Areas between greater sage-grouse habitat that provide a path for birds to move between populations. Corridors are generally found as sagebrush "islands of habitat" within other landforms, and assist with the natural movement of birds.

10.3 Disturbance: Disturbance is defined as

10.3.1 Any ground disturbing activity, event or action, natural or human-caused, that will either eliminate or render greater sage-grouse habitat not useable for the life-cycle of the bird, *or*

10.3.2 Human activities and presence which causes a negative response from birds within the SGMA. Any activity or presence that disrupts common activities or behavior of sage-grouse within a habitat at either the population or local scale is included.

10.3.3 The area of permanent disturbance is the area within a spatial polygon defined by the outside limits of the actual disturbed area, *plus* the area outside of this polygon where effects of the project, based on the type of project, could be expected to cause a disturbance, as defined in Section 10.3.2 above, to greater sage-grouse.

10.3.4 Duration of a Disturbance

Disturbance as defined in Section 10.3.1 and 10.3.2 is further divided into

10.3.3.1 Permanent disturbance: Any ground disturbing activity where the effects would be expected to last five years or more; and

10.3.3.2 Temporary disturbance: Any ground disturbing activity where the effects would be expected to last less than five years.

10.4 Habitat: The aggregation of seasonal habitat used by greater sage-grouse at some point during the yearly life-cycle of the birds. Habitat includes the geographical extent of leks, nesting, brood-rearing, late-brood rearing and winter areas.

> **Seasonal habitat**: Areas of crucial importance to greater sage-grouse population survival throughout the year. Includes leks, nesting, brood-rearing, transitional, and winter habitat.

10.5 Habitat enhancement: An improvement to existing habitat that does not result in an acreage gain. For example: Removal of pinon-juniper conifer trees in young open canopy stands still used by sage grouse.

10.6 Habitat improvement: An improvement in opportunity areas that results in an acreage gain in habitat. For example: Removal of pinon-juniper conifer trees in closed canopy stands not used by greater sage-grouse.

10.7 Lek: An area where two or more strutting males attend the same location for two years or more; not necessarily consecutive years.

> **10.7.1 Active lek:** Based on a year-by-year review, a lek that has been attended by male greater sage-grouse during the annual strutting and breeding season.

> **10.7.2 Occupied lek:** A lek which has been active at least once within the last 10 years.[12]

10.8 Observational Science: Observational science (or scientifically observed) is defined to mean measurements recorded according to some pre-set scientific protocol, and is published literature which has not been peer-reviewed, (e.g., Master's Theses)

10.9 Opportunity Area: An area adjacent to habitat that can be treated by management actions. After treatment, the area becomes sagegrouse habitat.

10.10 Population: A group of greater sage-grouse utilizing habitat in a geographic area that share genetic traits and have regular genetic exchange.

> **10.10.1 Migratory population:** A greater sage-grouse population that moves 6 miles (10 km) or more between seasonal habitat locations.

---

[12] This is a standard definition adopted by all states which contain greater sage-grouse habitat.

10.10.2 Non-migratory population: A greater sage-grouse population that does not move more than 6 miles (10 km) between seasonal habitat locations.

10.11 Reclamation/ Rehabilitation: Affirmative action to return an area to a functioning habitat condition immediately after a disturbance, and is generally related to a temporary disturbance or a planned activity.

10.12 Restoration: Affirmative action to return an area to a functioning habitat condition, most often with a lapse between disturbance and action, and generally not planned when the disturbance occurred.

10.13 SITLA lands: Lands owned or managed by the Utah School and Institutional Trust Lands Administration.

10.14 State lands: State Lands are lands managed by state agencies other than the School and Institutional Trust Lands Administration.

Appendix 1

Summary of the Current Knowledge of the Effects of Tall Structures upon Sage-grouse

Tall structures can range from fences to meteorological towers, including transmission lines and wind turbines. Fences can cause direct mortality of sage-grouse, mostly collisions with the fence wires near leks (Stevens 2011). Marking fences reduces the risk of fence collisions. The impact on sage-grouse from the remaining tall structures is mostly indirect.

A literature review of the impacts tall structures may have on sage-grouse was conducted by Utah Wildlife-In-Need and Utah State University. The final report was released in September of 2010. This report was in response to some of the goals outlined in the 2006 Greater Sage-grouse Conservation Strategy. Although Dr. Jim Sedinger, University of Nevada, Reno, has been conducting research on sage-grouse and tall structures in Nevada for a number of years, he has

not published his work at this time. The report concluded there was a lack of science upon which to base tall structure BMPs and decisions. The report recommended research be conducted to gain sound science.

In the winter of 2011 a group of researchers and managers with expertise in sage-grouse met at Bear Lake, UT to establish research protocols to evaluate the impacts from Electric Transmission and Distribution lines on greater sage-grouse and their habitat. The final report was released July 6, 2011. It provides researchers with the protocols to follow while conducting research on transmission lines and sage-grouse using a Before-After Control-Impact (BACI) design. Research sites have been tentatively identified, none occur in Utah, mostly due to low sage-grouse population sizes.

In October, 2012 the Avian Power Line Interaction Committee, http://www.aplic.org/index.php held a workshop specifically discussing sage-grouse and powerlines. Utah participated. Their next steps are to develop BMPs for sage-grouse and power lines using available information.

In addition to the tall structure report and transmission line research protocols, the National Wind Coordinating Collaborative (NWCC), http://www.nationalwind.org/sagegrouse.aspx, has a group that is looking at wind energy development and sage-grouse.

The Sage-Grouse Research Collaborative (SGC), which is part of the NWCC, was formed in 2010 under the Wildlife Workgroup's Grassland and Shrub Steppe Species Subgroup to coordinate studies examining the potential impacts of wind energy development on sage-grouse across their range with the goal of informing wind development and sage-grouse management strategies. Three research projects were selected:

- "A study of the impacts of a wind energy development on Greater Sage-Grouse populations in southeastern Wyoming," led by Wyoming Wildlife Consultants LLC
- "Ecology of male Greater Sage-Grouse in relation to wind energy development in Wyoming," led by University of Missouri and Power Company of Wyoming
- "Response of Greater Sage-Grouse to wind power development," led by Idaho Department of Fish and Game (postponed due to BLM planning efforts)

Utah has been involved with and updated on these research efforts. In February 2011, the group met in Salt Lake City to discuss updates.

The first publication from the NWCC SGC was released in August 2012, a thesis by Chad LeBeau (LeBeau, C. W. 2012. Evaluation of greater sage-grouse reproductive habitat and response to wind energy development in south-central, Wyoming). This project used VHF radio telemetry to study greater sage-grouse in Wyoming from 2008-2012; 116 female sage-grouse were collared and followed for this research. The thesis covers short-term effects, however this research will continue into the future and look at long-term effects. Lag effects on sage-grouse populations due to disturbance have been show to take up to 10 years in oil and gas fields (Harju

et al 2010). Our conclusion is that LeBeau did not document any effects from transmission lines on sage-grouse nest or brood success but did document that brood success and nest success decreased closer to wind turbines.

The following is a brief summary of LeBeau's findings sorted by general, transmission line effects, turbine effects, and lek attendance effects (all statements are direct quotes from the thesis; readers are encouraged to read the full publication for proper context.)

General Comments

"Greater sage-grouse nest and brood survival decreased in habitats in close proximity to wind turbine, …"

"Greater sage-grouse were not avoiding the wind energy development two years following construction and operation of the wind energy facility. This is likely related to high site fidelity inherent in sage-grouse. In addition, more suitable habitat may exist closer to turbines at Seven Mile Hill [SMH, wind turbine area], which may also be driving selection."

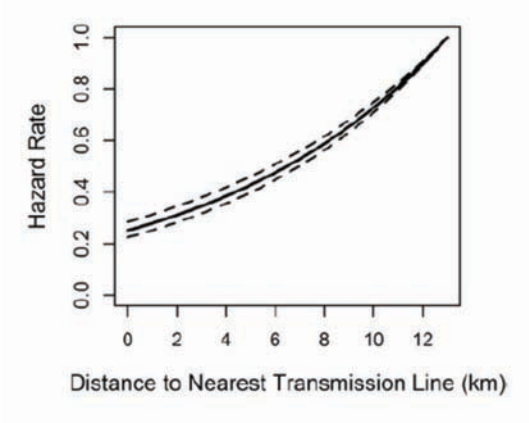
"The presence of turbines did not influence sage-grouse nest site selection or brood-rearing habitat selection. However, sage-grouse appeared to select for habitats in close proximity to wind turbines during the summer period. These results may be related to the fact that areas near turbines are comprised of high quality habitats that were used extensively by sage-grouse prior to development of the SMH wind energy facility; however without the collection of pre-development data, it is difficult to speculate the reasons for these selection patterns.... I caution the interpretations of these results because of the strong site fidelity exhibited by sage-grouse and the inherent time lags associated with population-level response to anthropogenic infrastructure as seen in oil and gas developments."

"…placing wind turbines at least 5 km from nesting and brood-rearing habitat should reduce negative influences from wind energy infrastructure on sage-grouse nest and brood survival."

Transmission Line Effects

Nests

"The risk or the odds of a nest failing increased by 11.1% [(exp(ϒ0)-1)*100] with every 1.0 km increase in the distance to nearest overhead transmission line..." [higher nest survival closer to overhead transmission lines-jr comment].

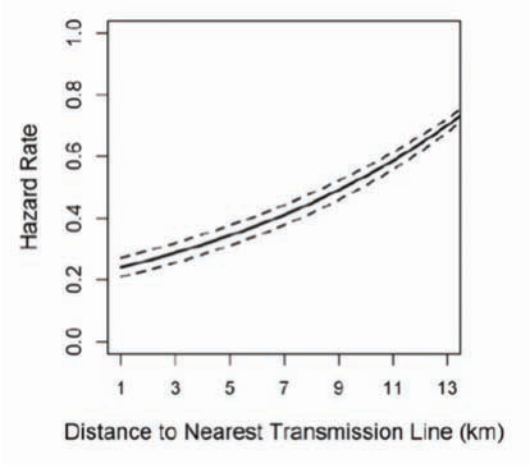


Broods

Impacts to brood survival didn't come into the top AIC models, which may show transmission lines are not as important for brood survival as other criteria evaluated (e.g. distance to turbine, terrain ruggedness, or % shrub cover).

Hen Survival

"Spatially, habitats closer to transmission lines had a higher odds of survival than habitats farther from transmission lines…"

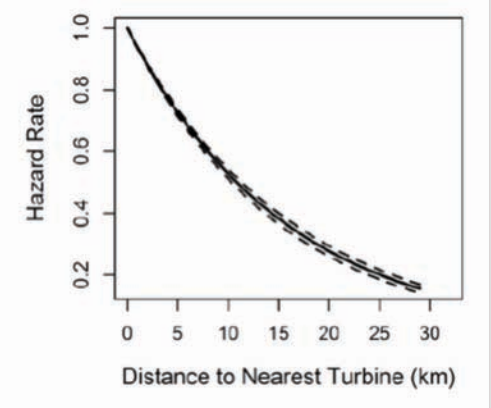


Wind Turbine Effects

Nests

"…the risk of a nest failing decreased by 6.2% as distance from turbine increased by 1 km (90% CI: 5.9–6.5%). More specifically, as distance increased from turbines, the risk of failure decreased by 17.5% (ɯ3(-θ.064)) at 3.0 km to 47.3% at 10.0 km (ɯ10(-θ.064)) from the nearest turbine."

"Spatially, habitats closer to turbines had higher odds of a nest failing than habitats farther from turbines (Fig. 3-3)."



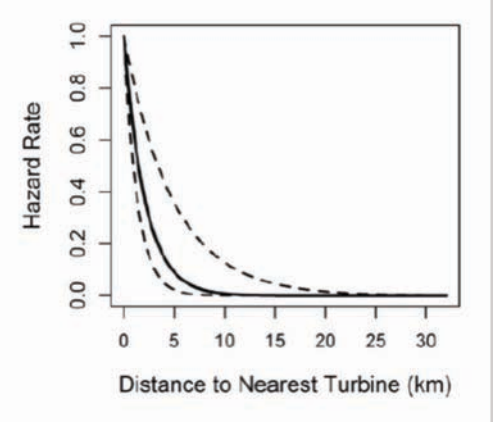
Broods

"Results of the univariate model estimating differences in survival among study areas indicated that broods located within the SMH study area [wind turbine study area] were 2.9- times more likely to fail than broods within SR [no wind turbine study area](hazard ratio = 2.9; 90% CI: 1.1–7.6)."

"…the risk of a brood failing decreased by 38.1% with every 1.0 km increase in distance from nearest turbine (hazard ratio = 0.619; 90% CI: 18.6–52.9%; Table 3-3; Fig. 3-4)."

"…the effect of a 0.50 km increase in distance to nearest turbine decreased the risk of brood failure by 21.3%. As distance increased from turbine, the relative risk of failure decreased from 76.2% at 3 km to 97.8% at 8 km from the nearest turbine (Fig. 3-4)."

"Spatially, habitats closer to turbines had higher odds of a brood failing than habitats farther from turbines."



Hen Survival

"The univariate model estimating differences in female survival among study areas indicated that study area (SMH vs. SR) did not influence female survival (hazard ratio = 0.84; 90% CI: -0.73–0.36)."

"Overall female survival was not influenced by proximity to turbines or any other landscape habitat feature used in the analysis; however, female survival was highest around transmission lines throughout the study area."

<u>Lek Attendance Effects</u>

"Peak male lek attendance within both study areas experienced significant declines from 1 year pre development to 4 years post development; however, this decline was not attributed to the presence of the wind energy facility."

"Leks located within wind energy development experienced a significant decline in male lek attendance from pre development to 4 years post development. However, leks located outside of the wind energy development experienced similar significant declines."

"The significant decline in male lek attendance from 1 year pre development to 4 years post development cannot solely be attributed to the presence of the wind energy facility. Impacts from the wind energy facility may not be initially realized due to the time lags associated with sage-grouse breeding populations. More than 4 years of post development monitoring and multiple sites may be necessary to adequately assess greater sage-grouse breeding response to wind energy development."

"…the results from other studies where leks have been impacted by oil and gas development indicate there is a time lag and effects may not be realized until 2–10 years following development. There is only one grouse/wind energy published study I am aware of that assessed male grouse lek attendance relative to wind energy development. Black grouse (*Tetrao tetrix*) in Austria, were not impacted by the wind energy facility the immediate year following construction, but did show considerable declines 4 years after construction suggesting there may

be a similar time lag to wind development as oil and gas development in grouse (Zeiler and Grünschachner-Berger 2009)."

Appendix 2

Grazing Practices and Greater Sage-grouse Conservation

Introduction

This is a synthesis of contemporary knowledge regarding the relationship between grazing by domestic livestock (cattle and sheep) and greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse) in occupied sagebrush (*Artemisia* spp.) habitats in Utah. It is intended to provide general perspective and guidance regarding the management of Utah rangelands to benefit sage-grouse. Although, the published literature contains extensive descriptions of sage-grouse biology and habitat requirements, it is largely void of grazing best management practices (BMPs) based on replicated experimental research, which can be universally applied to benefit sage-grouse. Hence, some of the options provide some historical perspective and also constitute salient hypotheses, which may require further experimentation.

Background

Sage-grouse are a sagebrush obligate species; as such their survival is tied to having access to sagebrush plant communities. The general reduction and fragmentation of sagebrush habitats throughout western North America is cited as a primary factor in the decline of sage-grouse populations (Aldridge 2000, Braun 1998, Schroeder 1997). At the local level, factors such as a lack of suitable seasonal rangeland sagebrush habitats may limit species production and survival thus further exacerbating local population declines.

The decline of sage-grouse populations and their associated habitats is of great concern to wildlife managers and private landowners. Current estimates suggest that private lands may constitute up to 30% of the remaining range wide habitat base for sage-grouse. In Utah, the Division of Wildlife Resources (DWR) estimates that up to 50% of the sage-grouse populations in the state inhabit private land. Thus, private land owned by ranchers is important to sage-grouse survival. Furthermore, the vast majority of those private lands are held by federal land grazing permit holders whose ranching operations are tightly tied to public land decisions regarding sage-grouse recovery. The unintended consequences of decisions that negatively impact public land grazing permits will also impact sage-grouse habitat on private lands. For example in the Grouse Creek Valley in Box Elder County, the privately held lands are important spring and summer habitats for sage-grouse. The same ranches rely on public allotments to sustain viable economic enterprises. (BARM 2006) A historical, landscape scale perspective of livestock stocking rate on public land is worth consideration in relationship to sage-grouse decline. Permitted Livestock AUMs have dropped dramatically on BLM lands from 1940 to today. Using Utah as an example; permitted BLM AUMs in 1940 were 2.75 million, by 1960 permitted AUMs

had dropped to 1.75 million, and by 2008 AUMs had dropped to .67 million. The 4-fold decrease in permitted livestock AUM's harvest occurred at the same time that sage-grouse populations have declined in Utah.

Varva (2005) reported that livestock grazing can change forage composition, production, and quality, such as increasing the availability of forbs. Second, the loss of the vast numbers of sheep that wintered on sage brush, killing some brush plants and pruning others, has resulted in a decline of multiple age classes of sagebrush from which grouse can select more favorable winter nutrition. Guttery (2011) found that sage grouse preferred brood-rearing habitat grazed by sheep the previous fall and winter. Peterson (2012) reported that livestock grazing of sagebrush during the dormant season increases the herbaceous understory the following spring.

The management literature clearly documents that the presence of large, contiguous intact sagebrush communities are paramount to ensuring that sage-grouse seasonal habitat needs are met (Braun et al. 1977, Connelly et al. 2000). The communities must contain an adequate sagebrush canopy with a forb-rich herbaceous understory. Such areas provide breeding (e.g., nesting and early brood-rearing), summer and fall transitional habitats. Large-scale manipulations that remove dense stands of sagebrush in sage-grouse winter habitat can be harmful.

The BLM states that grazing can be "used as a tool to protect intact sagebrush habitat and increase habitat extent and continuity which is beneficial to [the] Greater Sage-Grouse and its habitat." The BLM continues by indicating that "Given the potential financial constraints in addressing the primary threats identified by the FWS, enhanced management of livestock grazing may be the most cost-effective economic opportunity in many instances to improve Greater Sage-Grouse habitat on public lands." According to Natural Resources Conservation Service (NRCS), grazing "has been responsible for retaining expansive tracts of sagebrush-dominated rangeland from conversion to cropland" and can "stimulate growth of grasses and forbs, and thus livestock can be used to manipulate the plant community toward a desired condition."

The NRCS has developed several conservation practice programs through which private landowners can receive cost-share to manage sagebrush rangelands to improve wildlife habitat. These practices include Upland Wildlife Habitat Management (645), Prescribed Grazing (528), Prescribed Fire (338), Brush Management (314), and Grazing Land Mechanical Treatment (548). Each of these practices has specific criteria and standards NRCS planners must consider when developing landowner conservation plans. However, in the case of sage-grouse, additional considerations may be warranted because of their unique seasonal habitat requirements.

Sage-grouse Habitat Requirements

Sage-grouse depend on sagebrush-dominated landscapes yearlong. In addition, they prefer heterogeneous stands of sagebrush (Crawford et al. 2004, Aldridge and Boyce 2007). Unfortunately, dense stands of sagebrush reduce the biodiversity of forbs and grasses in the

understory (West 1993). Thus, sagebrush densities must be assessed and manipulated to provide adequate cover and nutrition for survival of sage-grouse and their chicks.

Lekking (Late February to May)

Leks may be open areas within sagebrush communities used by males during the breeding season to attract females to breed. The areas surrounding the leks exhibit sagebrush stands used for nesting, feeding, roosting, and escape cover. These areas may contain plants that green-up early providing pre-laying nutrition, which can increase initiation, hatching success, and chick survival.

Nesting (April to mid-June)

In the contiguous sagebrush habitats most hens nest within 4 miles of the lek where they are bred. In non-contiguous habitats hens may move greater distances to nest. Sage-grouse hens exhibit a strong preference to nest in the same general area every year. Research in Utah confirms that the overall production of sage-grouse populations is tied to survival of adult hens, which live for several years and produce multiple broods over time (Connelly et al. 2000, Fischer et al. 1993). Hens typically select nest sites under sagebrush plants that are taller than those in the surrounding area and in areas that exhibit 20-25 percent live sagebrush canopy cover.

Early Brood-Rearing (June to mid-July)

Research confirms that most sage-grouse chicks are capable of sustained flight three weeks after hatching. In contiguous sagebrush habitats that exhibit a diverse mosaic of green vegetation that also support abundant insects, chicks may spend most of their early life within a couple of miles of the nest. In non-contiguous habitats, hens may move their broods several miles in search of similar conditions. As the distance hens must move broods in search of food increases, both hen and chick mortality risks also increase. Early brood-rearing habitat typically exhibits more open patches (10-15-percent live sagebrush canopy cover) containing more forbs. Having dense stands of sagebrush close to these areas provides important escape cover and shelter from inclement weather. In Utah, research suggests that habitat manipulations that open small “resource” patches in dense sagebrush stands (> 30%) can provide important early brood-rearing habitats (Guttery 2011, Dahlgren et al. 2006).

Late Brood-Rearing (Mid-July to mid-September)

As temperature rises and precipitation decreases, green vegetation in early brood-rearing areas may dry out. Hens with broods and brood-less hens will often move considerable distances in search of green vegetation. In Utah, preferred late brood-rearing areas may include riparian areas, irrigated hay fields, upland seeps and springs, and open meadows. The presence of tall sagebrush stands in late brood-rearing areas can provide shelter for loafing and roosting. Sage-grouse mortality is typically low in Utah during late-brood rearing periods.

Livestock distribution patterns during late brood-rearing periods are tied to water availability. High livestock utilization levels in areas coupled with reduced water availability can reduce

green vegetation and long-term productivity if repeated year after year during the same season. However, both upland and riparian areas grazed by livestock in April, May, and June, followed by rest, can provide the protein needed by broods July through September. Sage-grouse will select grazed meadows over sites that have not been grazed for several years. Managing "time," "timing," and "intensity" of grazing across the broad landscape will provide for this need, not only in riparian, but also on uplands. In areas where time controlled grazing is not currently practiced any practice that will improve the quantity and quality of the green vegetation by delaying seed set and increased accessibility to low-growing broad leaf plants preferred by sage-grouse will be beneficial. (Examples include offsite watering facilities and mini-catchments.)

Fall (Mid-September to October)

The transitional habitats used by sage-grouse in the fall are largely dependent on weather conditions. As the green vegetation and insects disappear, the amount of sagebrush in their diet gradually increases. For most populations in Utah, fall habitats are those used during migration to winter areas. The time of use depends on temperatures and snow depths.

Winter (November to February)

During the winter, the primary requirement of sage-grouse is sagebrush available above the snow. Exposed sagebrush is used for food and cover; sage-grouse feed almost exclusively on sagebrush in the winter. Winter ranges are typically characterized by large expanses of dense sagebrush on flatter land with south to west-facing slopes or windswept ridges. During deep snow periods, steeper drainages with taller sagebrush and the deep soil canyon bottoms with basin big sagebrush may be the only areas with exposed sagebrush. Winter habitat may be limiting when deep snows occur; however, in most areas and years, sage-grouse will actually gain weight during winter. Sage-grouse select sagebrush habitat type with lower secondary metabolites (monoterpenes, sesquiterpene lactones, phenolics) at multiple spatial scales; black sagebrush selected over Wyoming big sagebrush, (Frye et al. in press).

Migration

Many sage-grouse populations in Utah are migratory. Some populations must cross non-habitat areas to reach their winter habitats. Other populations inhabiting contiguous sagebrush stands at lower elevations may not make long-distance movements between or among distinct seasonal ranges. In these areas, nesting habitats may also provide winter range. Thus, it is important to determine sage-grouse seasonal ranges prior to conducting habitat manipulations.

Leks

Be cautious of man-made structures on lek sites. However, it is important to recognize the current lek sites are often areas of heavy historical livestock use, such as watering locations, salt licks, corrals, and old sheep bed grounds. Biologists have mowed and used other types of disturbance on lek sites to reduce shrub encroachment and maintain the "open" area that

characterizes a typical lek site. Identify the location of leks through consultation with DWR biologists.

Nesting/Early Brood-Rearing

Maintain and enhance the existing sagebrush/plant communities. Manage these areas to increase herbaceous cover by sustaining a mosaic of sagebrush and open areas. Avoid repeated, annual heavy use of these areas by implementing periodic rest and/or deferment periods during the critical growing season.

Late Brood-Rearing

Summer sage-grouse habitat in Utah is tied to healthy wet meadows, riparian areas, hay fields and irrigated alfalfa. Avoid continuous (season-long) grazing of wet meadows and riparian habitats, especially under drought conditions when temperatures are high.

Winter

Grazing by cattle has limited effect on winter sage-grouse habitat. Patchy winter grazing of sagebrush by sheep can add nutritional diversity beneficial to sage-grouse. Carefully manage levels of browsing or activities in sagebrush areas that constitute sage-grouse habitat that would reduce sage-grouse access to these areas for food and cover. The potential impact of livestock grazing on winter habitat can be positive or negative depending on scale and location of use. As suggested earlier, areas winter grazed by sheep can provide diversity of sagebrush age class and nutritional opportunity needed by sage-grouse. Sagebrush manipulations in winter habitat must be carefully planned to assure the winter needs of grouse are met or enhanced. Also, grazing of herbaceous cover during the spring at high utilization rates may increase sagebrush density.

Special Considerations

Landscape Level Grazing Use Patterns – The Importance of Monitoring

The development and implementation of a monitoring plan that includes an understanding of how sage-grouse use the landscape and how the area is to be grazed is crucial to sustaining productive habitats.

Carefully managing the “time,” “timing,” and “intensity” of grazing in sagebrush/sage-grouse habitats will provide for the seasonal needs of sage grouse. Specific prescriptions can be applied through more intensive management to address special needs or weak links in the biological year of grouse production (e.g. winter sagebrush grazing by sheep).

A monitoring plan to assess the effects on sage-grouse seasonal needs will enhance the opportunity for effective adaptive management.

Where time controlled grazing is not an option, moderate use of occupied sage-grouse habitats will usually leave mosaic or patchy areas where some plants are ungrazed. Managing for moderate utilization levels (40%) after the period of rapid vegetation growth may provide

enough residual cover for sage-grouse nesting and early brood-rearing the subsequent spring (France et al. 2008).

Evaluation of sage-grouse nesting and escape cover must be determined on a site-specific basis. Livestock operations with a small amount of nesting habitat should consider special management activities to protect nesting and early brood-rearing areas. Lighter use of areas may be warranted. In areas with large tracts of contiguous habitat, livestock producers should manage the vegetation on a rotational grazing basis, which may leave 10 - 20 percent of the area ungrazed periodically in combination with deferring or altering timing of grazing in other areas. In areas where sage-grouse nesting is common, managing for moderate use of plant growth across the landscape would be appropriate. Well-managed ranches with comprehensive grazing strategies that include short-term or duration grazing, higher levels of use may be acceptable, provided these higher levels of use include rested vegetation in nearby areas.

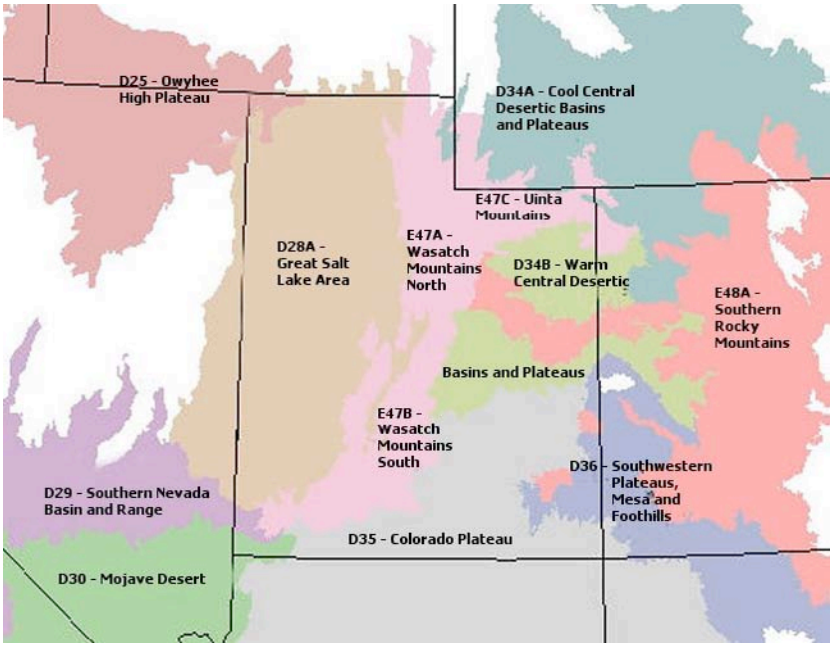


Figure 1. Utah Major Land Resource Areas (MLRAs), along with Utah Ecological Site Descriptions, should be referred to prior to developing site-specific grazing management plans to benefit sage-grouse.

Multi-species Grazing

One specific habitat type that may be limiting in some sage-grouse populations in Utah is brood-rearing habitat. Numerous studies have described the importance of high quality brood-rearing habitat to chick survival and population recruitment. Research conducted on Parker Mountain in Utah has documented that the proper application of mechanical and chemical (mainly

Tebuthiron) sagebrush treatments (NRCS 314) can enhance brood-rearing habitats in higher elevation (> 7000 feet) rangelands dominated by mountain big sagebrush (Dahlgren et al. 2006). While both chemical and mechanical treatments can reduce sagebrush cover and increase forb production within the levels suggested in the brood-rearing habitat guidelines, concerns have been expressed about the longevity, environmental impacts, and fossil fuel dependency of these methods.

One possible alternative method of managing sagebrush ecosystems is through grazing by livestock. When properly applied, grazing can promote vegetation change and alter community composition as well as ecosystem structure and function. Research conducted on Parker Mountain demonstrated that strategic intensive sheep grazing constituted a viable means of managing sage-grouse brood-rearing habitat at higher elevations that receive at least 16 inches of precipitation annually. The strategic component was actually two-fold. First, habitats and the need for management were clearly defined. Secondly, the timing of the application was chosen carefully to maximize the likelihood of achieving the desired goal. High grazing intensity during dormant growing season was key to the success of the method (Guttery 2011).

Research conducted at Utah State University has further demonstrated that livestock also may be conditioned over many successive generations to eat sagebrush. High stocking density may encourage animals to consume sagebrush more quickly and allows for the desired utilization level to be achieved quickly providing nutritional benefits to the animals (Dziba et al. 2007, Guttery 2011, Petersen 2012).

Most of the available literature on the impacts of grazing on wildlife species consists of observational studies. Thus, there is a need for designed, controlled experiments on the interaction between appropriate grazing regimes and wildlife.

Working Ranches as the Infrastructure of Sage-grouse Conservation in Utah

Rangeland plant communities in Utah are influenced by the long-term grazing management of the past. Grazing management in sage-grouse seasonal use areas need careful consideration to assure that the results will benefit sage-grouse. Well-planned grazing management strategies can achieve producer economic objectives while providing for sage-grouse habitat requirements. Utah is fortunate to have some long-term grazing management models that exemplify successful sage-grouse management.

Because sage-grouse are a landscape species, larger ranching operations that encompass multiple pastures managed to optimize plant productivity may offer better control of grazing time, timing, and intensity. Barriers to improved grazing programs on public land involve bureaucratic delays, regulations, and the greater investment in infrastructure, such as fencing and water development, and increased labor cost to implement active management.

Effective herding can substitute for a substantial portion of infrastructure if there are large enough herds to justify the required investment in full-time personnel. The final approach should be based on an individual livestock operation's site-specific strategy. From a sage-grouse

management perspective, revised management systems are only desirable if they are effective in promoting both rangeland health and seasonal habitat sage-grouse requirements.

There are benefits and risks associated with any management action. Implementing rotational landscape-level grazing management may require construction of fences and/or water developments. Care must be taken to assure the new infrastructure is sage-grouse friendly. Further information can be obtained through the Sage-Grouse Initiative sponsored by the NRCS. For example, the combination of several smaller grazing units to achieve scale can often meet this need without additional fences.

Grazing management based on the principles of "time," "timing," and "intensity" provide for improved ecological health of the land and the life cycle needs of sage-grouse. The landscape scale habitat benefits far out-weigh the risks from additional infrastructure required, as long the NRCS/SGI guidelines for fence and water developments are followed.

In areas where West Nile virus has been documented to be an issue, follow the guidance provided by NRCS/SGI for new water infrastructure.

Management plans to improved grazing management and sage-grouse habitat must be assessed on a case-by-case basis. The grazing management principles assembled by the UGIP Technical Committee will provide for the needs for nesting, early brood-rearing, late brood rearing, and wintering of Sage Grouse in sagebrush habitats while improving overall rangeland health. Use of the Grazing Response Index (GRI) can provide a good measuring method for managers.

Literature

Aldridge, C.L. 2000. Reproduction and habitat use by sage grouse (Centrocercus urophasianus) in a northern fringe population. M.S. Thesis. University of Regina. Regina, SK.

Aldridge, C.L. and M.S. Boyce. 2007. Linking occurrence and fitness to persistence: habitat-based approach for endangered greater sage-grouse. Ecological Applications 17: 508-526.

Braun C.E., T. Britt, and R.O. Wallested. 1977. Guidelines for maintenance of sage grouse habitats. Wildlife Society Bulletin 5:99–106.

Braun, C.E. 1998. Sage grouse declines in western North America: what are the problems? Proceedings of the Western Association of State Fish and Wildlife Agencies 78:139–156.

Connelly, J.W., M.A. Schroeder, A.R. Sands, and C.E. Braun. 2000. Guidelines for management of Sage Grouse populations and habitats. Wildlife Society Bulletin 28:967–985.

Crawford, J.A., R.A. Olson, N.E West, J.C. Mosley, M.A. Schroeder, T.D. Whitson, R.F. Miller, M.A. Gregg, and C.S. Boyd. 2004. Ecology and management of sage-grouse and sage-grouse habitat. Journal of Range Management 57: 2–19.

Dahlgren, D. K., R. Chi, and T.A. Messmer. 2006. Greater sage-grouse response to sagebrush management in Utah. Wildlife Society Bulletin 34:975-985.

Dziba, L.E., F.D. Provenza, J.J. Villalba, and S.B. Atwood. 2007. Supplemental energy and protein increase use of sagebrush by sheep. Small Ruminant Research 69:203-207.

Fischer, R.A., A.D. Apa, W.L. Wakkinen, K.P. Reese, and J.W. Connelly. 1993. Nesting-area fidelity of sage grouse in southeastern Idaho. Condor 95:1038–1041.

France, K.A., D.C. Ganskopp, and C.S. Boyd. 2008. Interspace/undercanopy foraging patterns of beef cattle in sagebrush habitats. Rangeland Ecology and Management 61: 389-393.

Frye, G.G., J.W. Connelly, D.D. Musil, and J.S. Forbey. In Press. Phytochemistry predicts habitat selection by an avian herbivore at multiple spatial scales. Ecology In Press.

Guttery, M.R. 2011. Ecology and management of a high elevation southern range greater sage-grouse population: vegetation manipulation, early chick survival, and hunter motivations. PhD Dissertation. Utah State University, Logan, UT.

Petersen, C.A. 2012. Cattle browsing sagebrush steppe during fall: effects on plant community structure and influence of experience on cattle foraging behavior and body weights. MS Thesis. Utah State University, Logan, UT.

Schroeder, M.A. 1997. Unusually high reproductive effort by sage grouse in a fragmented habitat in north-central Washington. Condor 99: 933-941.

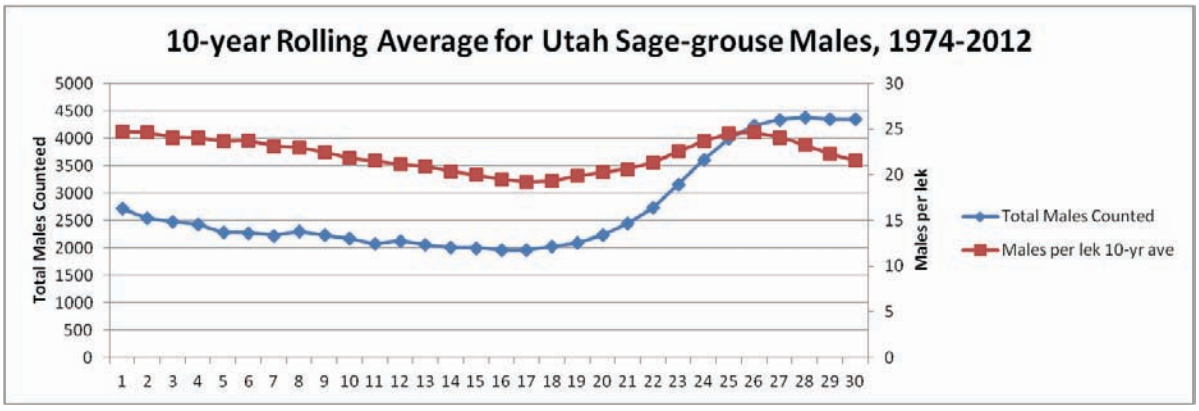
West, N.E. 1993. Biodiversity of rangelands. Journal of Range Management 46:2–13.

Appendix 3

Utah Greater Sage-grouse Baseline Male Lek Counts, 2003-2012

Each year, March-May, UDWR attempts to count all occupied leks in Utah. Most leks are counted a minimum of 3 times per year. Only males on the leks are recorded, the maximum number of males counted is recorded each year for each lek visited. All leks within each Sage-grouse Management Area are used in the analysis. The 10-year average, maximum and minimum are calculated for the years 2003-2012. Below is a summary of the number of males counted in each of the 11 Sage-grouse Management Areas.

Management Area	10-yr Average	10-yr Maximum	10-yr Minimum
Box Elder	755	1194	329
Bald Hills	68	118	29
Carbon	119	160	43
Hamblin Valley	89	129	50
Ibapah	39	84	0
Panguitch	304	490	153
Parker Mountain-Emery	851	1403	493
Rich	1219	1651	671
Sheeprock Mountains	92	190	43
Strawberry	82	158	34
Uintah	452	822	238
Statewide Total	**4070**	**6399**	**2083**



Appendix 4

Protocol for Private Landowners to Participate in Greater Sage Grouse Conservation Efforts

A number of different state and federal agencies and organizations make a variety of technical assistance available to private landowners interested in doing work on their lands to benefit the conservation of greater sage-grouse. The Utah Division of Wildlife Resources employs biologists and other staff with training and expertise in the conservation, ecology, and management of sage-grouse and their habitat. The Utah Department of Natural Resources has funding available through the Watershed Restoration Initiative. The Utah Department of Agriculture and Food has staff and funding available, particularly for landowners with livestock grazing on their property. The Natural Resources Conservation Service has staff dedicated to sage-grouse conservation on private lands. Some sage-grouse Local Working Groups can provide assistance through staff and members of the LWG. All can assist landowners with projects that can benefit both the landowner's needs and the conservation needs of sage-grouse. State and federal conservation programs are available to assist landowners with sage-grouse conservation efforts.

With all of these options, the biggest problem for a private landowner is to find the right person and program to meet their needs without getting lost in the quest. As a result, the State of Utah will provide a single point of contact for private landowners to request assistance with sage-grouse conservation projects, whether a habitat improvement project like removing pinyon-juniper encroaching in sage brush, or obtaining a conservation lease or easement to avoid development of sage-grouse habitat. The contact will forward the landowner's need to the correct person and agency.

Please check the website of the Public Lands Policy Coordination Office (http://governor.utah.gov/publiclands) or the Department of Natural Resources (http://naturalresources.utah.gov), or call the Public Lands Office at 801-537-9801 to obtain the latest contact information.

Appendix 5

Property Ownership Within Sage Grouse Management Areas in Utah

SGMA*	acres	Land type	acres	Owner	acres
Bald Hills	528,303	habitat**	342,799	BLM	265,371
				Private	48,592
				SITLA	28,705
				DNR	131
		opportunity	139,967	BLM	99,675
				Private	31,199
				SITLA	9,013
				DNR	80
Box Elder	1,520,564	habitat	1,227,339	Private	653,515
				BLM	439,150
				USFS	71,944
				SITLA	62,730
		opportunity	292,541	Private	149,778
				BLM	121,591
				SITLA	20,126
				DNR	1,046
Carbon	355,442	habitat	206,442	Private	146,728
				DNR	20,291
				BLM	19,855
				SITLA	11,670
				USFS	7,879
				UDOT	19
		opportunity	70,332	Private	38,756
				BLM	14,641
				USFS	8,419
				SITLA	5,861
				DNR	2,655

Hamlin Valley	341,523	habitat	143,219	BLM	100,981
				Private	24,038
				SITLA	13,291
				DNR	4,909
		opportunity	132,458	BLM	111,190
				SITLA	12,897
				DNR	5,351
				Private	3,020
Ibapah	98,801	habitat	88,797	BLM	48,034
				Tribal	27,991
				Private	9,138
				SITLA	3,634
		opportunity	9,855	BLM	5,476
				Tribal	3,856
				SITLA	432
				Private	91
Panguitch	607,210	habitat	343,377	BLM	163,044
				Private	90,619
				USFS	58,544
				SITLA	30,174
				DNR	990
				UDOT	6
		opportunity	220,244	BLM	99,768
				USFS	64,095
				Private	49,124
				SITLA	6,263
				DNR	994
Parker Mountain-Emery	1,121,725	habitat	844,487	USFS	377,773
				BLM	223,601
				SITLA	162,375

				Private	79,179
				NPS	895
				DNR	656
				UDOT	8
		opportunity	266,570	USFS	180,262
				BLM	50,026
				Private	23,272
				SITLA	8,332
				NPS	3,235
				DNR	1,443
Rich-Morgan-Summit	1,186,703	habitat	1,014,460	Private	757,752
				BLM	166,966
				SITLA	44,894
				DNR	28,615
				USFS	16,036
				BR	197
		opportunity	116,990	Private	64,091
				USFS	40,447
				BLM	4,836
				DNR	4,823
				SITLA	2,712
				BR	81
Sheeprock Mountains	611,129	habitat	535,233	BLM	325,280
				USFS	92,398
				Private	82,740
				SITLA	34,131
				DNR	684
				DOD	0
		opportunity	48,418	BLM	38,685
				Private	5,888
				SITLA	3,845

Strawberry	323,591	habitat	160,323	Private	67,891
				DNR	45,605
				USFS	40,723
				SITLA	6,104
		opportunity	44,883	Private	21,480
				USFS	12,547
				DNR	9,936
				SITLA	920
Uintah	793,559	habitat	541,024	BLM	262,488
				Private	130,801
				USFS	78,452
				SITLA	42,953
				DNR	14,013
				NPS	12,317
		opportunity	180,219	BLM	97,429
				USFS	31,355
				Private	24,513
				NPS	11,577
				SITLA	11,231
				DNR	3,905
				USFWS	209

*SGMAs based on SGMAs17a layer, Dec 19, 2012
**habitat is the summation of leks, nesting and brood-rearing , winter, and other habitat defined in the Utah Conservation Plan for Greater Sage-grouse.

Appendix 6

Rehabilitation and Restoration of Sage-grouse Habitat

Very little sagebrush within its range remains undisturbed or unaltered from its condition prior to EuroAmerican settlement in the late 1800s (Knick et al. 2003, and references therein). Due to the disruption of primary patterns, processes and components of sagebrush ecosystems since EuroAmerican settlement (Knick *et al.* 2003; Miller *et al*. 2011), the large range of abiotic variation, the minimal short-lived seed banks, and the long generation time of sagebrush, restoration of disturbed areas is very difficult. Not all areas previously dominated by sagebrush can be restored because alteration of vegetation, nutrient cycles, topsoil, and living (cryptobiotic) soil crusts has exceeded recovery thresholds (Knick *et al*. 2003; Pyke 2011). Sagebrush Ecosystems lacking resilience may cross ecological thresholds leading them to alternative stable communities, which differ considerably in structure and function from the original. Returning to original communities are unlikely without human intervention in the form of control of undesirable species or reintroductions of previously dominant species (Briske et al. 2006).

The use of ecological site descriptions and state and transition models can assist in determining if passive or active management might improve greater sage-grouse habitat, by determining a site's potential and its current state (Pyke 2011). Active revegetation and rehabilitation methods within greater sage-grouse habitats vary depending on the site's current state and potential. Different methods of revegetation, weed control and combinations of both are common (Monsen et al. 2004). Sagebrush ecology and restoration have been and continue to be researched extensively (see SageSTEP project website and bibliography http://www.sagestep.org/educational_resources/bibliographies/sagebrush.html). The Sage-Grouse Habitat Restoration Symposium also provides valuable information on sagebrush ecology and restoration (Shaw et al. 2005). There are advantages and disadvantages that should be considered before applying a particular set of techniques. Success is not guaranteed in semi-arid environments when conducting greater sage-grouse habitat restoration projects, often due to annual weather conditions - which can vary widely. It is necessary to follow useful guidelines in preparing and implementing a restoration project for best results (Pyke 2011).

Except for areas where active restoration is attempted following disturbance (e.g., mining, wildfire), management efforts in sagebrush ecosystems are usually focused on maintaining the remaining sagebrush (Miller *et al*. 2011; Wisdom *et al*. 2011). Landscape restoration efforts require a broad range of partnerships (private, State, and Federal) due to landownership patterns, and may require decades or centuries (Knick *et al.* 2003, and references therein).

Utah has been very active in rehabilitation and restoration efforts through the Utah Watershed Initiative, the Grazing Improvement Program and others. These efforts have shown success in bringing degraded habitat into use by sage-grouse in very short time frames.

References:

Briske, D. D., S. D. Fuhlendorf, and F. E. Smeins. 2006. A united framework for assessment and application of ecological thresholds. Rangeland Ecology and Management 59:225– 236.

Monsen, S. B., R. Stevens, and N. L. Shaw (compilers). 2004. Restoring western ranges and wildlands. USDA Forest Service RMRS-GTR-136. USDA Forest Service, Rocky Mountain Research Station, Fort Collins, CO.

Shaw, N. L., M. Pellant, S.B. Monsen., comps. 2005. Sage-grouse habitat restoration symposium proceedings; 2001 June 4-7, Boise, ID. Proc. RMRS-P-38. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Research Station. 130 p.7.

Appendix 7

The Use of Prescribed Fire to Manage Sage-grouse Habitat

PRESCRIBED FIRE AS A MANAGEMENT TOOL IN XERIC SAGEBRUSH ECOSYSTEMS: IS IT WORTH THE RISK TO SAGE-GROUSE?

A White Paper prepared by the Sage and Columbian Sharp-tailed Grouse Technical Committee for the Western Association of Fish and Wildlife Agencies

Executive Summary

The sagebrush biome has diminished and been fragmented across much of its historic range. Several factors are responsible including agricultural conversion, large wildfires, pinyon pine and juniper expansion, urban development and, more recently, energy development. Xeric sagebrush communities typically receive ≤12" precipitation and include Wyoming big sagebrush, low elevation mountain big sagebrush, and low or black sagebrush communities. These habitats are not adapted to frequent fire and an extensive amount of this habitat type has been lost to wildfire, particularly in the Great Basin, over the last two decades. Natural fire return intervals in these

settings have recently been estimated at 100 years or more. Invading exotic species such as cheatgrass are often spread as a result of fire, leading to vegetation type conversion, particularly where understory herbaceous vegetation is already depleted.

In the past, land managers implemented sagebrush eradication projects to enhance forage production for livestock. More recently managers have implemented habitat treatments, including prescribed fire, on remaining sagebrush grasslands to achieve a number of objectives, which at times have included benefits to sage-grouse. Although researchers have documented sage-grouse use of treated areas, no research has shown a direct benefit to sage-grouse survival or reproduction. Our review of scientific literature, however, includes considerable documentation revealing direct negative impacts of prescribed fires on sage-grouse nesting, wintering, and brood rearing habitats, which in some cases have resulted in population declines. Effects of fire on insect communities, important to juvenile sage-grouse, have been variable. No study presents a case where prescribed fire resulted in a significant increase in either ants or beetles for an extended period of time, diminishing the idea of using prescribed fire to improve insect abundance and diversity. In general, negative effects of prescribed fire appear more profound and prolonged in xeric sites. Numerous researchers have alternatively realized the need for maintaining sagebrush as a critical habitat component for sage-grouse and many other native species.

Managers considering treatments in xeric sage-grouse habitats that will result in a reduction in sagebrush cover should be aware of the negative impact this type of treatment could have, potentially for an extended period of time. Prescribed fire and other treatments can result in furthering habitat conversion or fragmentation. Aggressive vegetative treatments require a complete understanding of habitat availability and sage-grouse use of the treatment area and the broader landscape. Cumulative impacts to sage-grouse and other species should be well-understood and considered before proceeding with any treatment. As an example, a sagebrush habitat that lacks understory may be important for wintering sage-grouse. A treatment of the area for improving understory could inadvertently reduce or eliminate winter habitat, which may already be depleted as a result of other human activities. In general, smaller treatment sizes spread over multiple decades are likely to reduce negative impacts.

Prescribed burning may have application in pinyon and juniper woodlands. Vegetative thresholds pertaining to tree canopy cover and understory components directly affect potential for restoring sagebrush grasslands overtaken by conifers. The risk of invasion by annuals and associated factors affecting invasibility should be considered when assessing treatment appropriateness and technique. When prescribed fire is used to control pinyon pine and juniper woodland expansion, sagebrush stands should be protected to conserve sagebrush habitat and allow sagebrush recruitment into burned areas.

In some circumstances where sagebrush occurs but severely lacks herbaceous understory, chemical or mechanical treatments that reduce sagebrush cover and allow for mechanical seeding of native grasses and forbs may be necessary for accelerating sagebrush grassland habitat restoration. These sites would be characterized by: an absence of typical dominant native species and depleted seed bank; bare soils dominate–even under sagebrush; and long-term attempts to restore habitat through herbivore rest, deferment, and proper stocking have failed. Treatments are most appropriate where loss of topsoil is an imminent risk. Treatments should not be implemented without a high likelihood of success. From an ecological standpoint, treatments should always emphasize use of native species adapted to treatment areas to avoid eventual dominance by competitive exotic species and resultant loss of habitat function. Mechanical or chemical treatments that conserve sagebrush and enable re-establishment of native herbs is preferred. By comparison, fire treatments are less selective, tend to burn the best remaining habitats, and are at risk of invasion by cheatgrass or other invasive species in areas where they occur. The likelihood of habitat restoration success using aggressive vegetation treatments in areas lacking topsoil is very low. In these settings any remnant native cover should instead be protected.

Given the large losses of xeric sagebrush habitats that have occurred to date, we encourage managers to first consider protecting and improving vegetative integrity and habitat function in place of stand replacing treatments that further fragment degraded sagebrush habitats and face other risks. Realizing these habitats deteriorated over long periods of time and over large expanses, a long-term approach to large-scale restoration appears more feasible. A combination of fire suppression and conservative management techniques such as proper grazing strategies should be considered first. For most circumstances, this approach conserves sagebrush, allows herbaceous vegetation to recover –directly benefiting sage-grouse. This involves the least amount of risk and cost, both financially and ecologically. We question vegetation models that do not recognize sagebrush grasslands as an ecological endpoint or sustainable climax community. Instead we recommend such models be based on principles of plant ecology and iterative refinement involving scientific testing, observation, and adaptation. For those habitats in a healthy intact status, actively conserving these areas pays ecological dividends and avoids the future prospect of intensive treatments with uncertain outcomes.

Position Statement

With the attached white paper as justification provided by the Western States Sage and

Columbian Sharp-tailed grouse Technical Committee, the Western Association of Fish and Wildlife Agencies adopts the following position statement:

"Sagebrush grasslands, which support sage-grouse and a host of other wildlife species, have declined in area by more than 50%. Remaining habitats are becoming increasingly important to the sustainability of sage-grouse; however, they are facing considerable threats from wildfire, conversion, exotic plant invasion, and many forms of human development. In addition to these perturbations, treatments are often recommended to set back succession in sagebrush communities. Prescribed fire is often promoted to achieve this, which has the potential to alter sagebrush communities for long periods of time. As agencies responsible for conserving wildlife associated with these habitats, we strongly caution against the use of prescribed fire within xeric sagebrush communities. Such areas typically receive ≤12" precipitation and include Wyoming big sagebrush, low elevation mountain big sagebrush, and low or black sagebrush communities. Prescribed fire fragments and reduces available sagebrush stands and increases the risks for cheatgrass and other invasive weed establishment, leading to negative impacts to seasonal sage-grouse habitats, and can result in long term effects on sage-grouse populations. Further, we recommend maintaining sagebrush through a conservative long-term approach to management and habitat restoration."

Appendix 8

Greater Sage-grouse Research History in Utah, 1939-2012

Bambrough, D. J. 2002. Greater sage-grouse winter and male and female summer habitat selection in Strawberry Valley, Utah. Thesis. Brigham Young University, Provo, Utah.

Barber, H. A. 1991. Strutting behavior, distribution, and habitat selection of sage grouse in Utah. Thesis. Brigham Young University, Provo, Utah.

Baxter, J. J., Hennefer, J. P., Baxter, R. J., Larsen, R. T., and J. T. Flinders. 2013 – *Accepted with revisions*. Survival of Greater Sage-Grouse chicks in Strawberry Valley, Utah using micro-transmitters: Does handling time negatively influence survival rates? Western North American Naturalist.

Baxter, R. J. 2003. Greater sage-grouse brood and non-reproductive female habitat selection and population dynamics in Strawberry Valley, Utah. Thesis. Brigham Young University, Provo, Utah.

Baxter, R. J. 2007. The ecology of translocated greater sage-grouse in Strawberry Valley, Utah. Dissertation. Brigham Young University, Provo, Utah.

Baxter, R. J., J. T. Flinders, and D. L. Mitchell. 2008. Survival, movements, and reproduction of translocated greater sage-grouse in Strawberry Valley, Utah. Journal of Wildlife Management 72(1): 179-186.

Baxter, R. J., Bunnell, K. D., Flinders, J. T., and D. L. Mitchell. 2009. Impacts of predation on Greater sage-grouse in Strawberry Valley, Utah. Transactions of North American Wildlife. 72nd North American Wildlife and Natural Resources Conference. Portland, Oregon. February 2008.

Baxter, R. J., Flinders, J. T., Whiting, D. G., and D. L. Mitchell. 2009. Factors affecting nest site selection and nest success of translocated greater sage-grouse in Strawberry Valley, Utah. Journal of Wildlife Research 36:479-487.

Baxter, R. J., Larsen, R.T., and J. T. Flinders. 2013 – Accepted. Survival of Resident and Translocated Greater Sage-Grouse in Strawberry Valley, Utah: a 13-Year Study. Journal of Wildlife Management – In Press.

Beck, J. L., and D. L. Mitchell. 1997. Brief guidelines for maintaining and enhancing sage grouse habitat on private lands in Utah. Utah technical notes: UT190-7-3. U.S. Natural Resources Conservation Service, Salt Lake City, Utah.

Beck, J. L., D. L. Mitchell, and B. D. Maxfield. 2003. Changes in the distribution and status of sage-grouse in Utah. Western North American Naturalist 63: 203-214.

Belton, L. R. 2008. Factors related to success and participants' psychological ownership in collaborative wildlife management: A survey of sage-grouse local working groups. Thesis. Utah State University, Logan.

Boswell, R. L., and N. S. Frey. 2007a. Annual Report: The effects of tebuthurion on shrub steppe ecology and greater sage-grouse use in Lower Hamlin Valley, Utah. Southern Utah University, Cedar City.

Boswell, R. L., and N. S. Frey. 2007b. Annual Report: The effects of mechanical disking on shrub steppe ecosystems and greater sage-grouse use in Pine Valley, Utah. Southern Utah University, Cedar City.

Burnett, A.C., and N.S. Frey. 2012. Update: Modeling habitat use of a fringe greater sage-grouse population at multiple spatial scales. Utah State University, Logan.

Bunnell, K. D. 2000. Ecological factors limiting sage grouse recovery and expansion in Strawberry Valley, Utah. Thesis. Brigham Young University, Provo, Utah.

Cardinal, C.J. and T.A. Messmer. 2012. Annual Report: Factors influencing the ecology of greater sage-grouse inhabiting the Bear Lake Plateau and Valley, Idaho-Utah. Utah State University, Logan.

Caudill, D. 2011. Factors affecting greater sage-grouse (*Centrocercus urophasianus*) survival and movement in south-central Utah. Thesis. Utah State University, Logan.

Chi, R. Y. 2004. Greater sage-grouse reproductive ecology and tebuthiuron manipulation of dense big sagebrush on Parker Mountain. Thesis. Utah State University, Logan.

Christensen, B. 2003, 2005. Short Summary Report: Anthro Mountain sage grouse project. Ashley National Forest, Utah.

Crabb, B., T. Black. 2012. Annual Report: Development of statewide 30 meter winter sage-grouse habitat models for Utah. Utah State University, Logan.

Crompton, B., and D. L. Mitchell. 2005. The sage-grouse of Emma Park – Survival, production, and habitat use in relation to coalbed methane development. Utah Division of Wildlife Resources Report, Salt Lake City, Utah.

Cook, A., B. Wing, T. Black, and T.A. Messmer. 2012. Annual Report: Demography, vital rates, habitat-use, and seasonal movements of greater sage-grouse in the Ruby Pipeline HUC 8 Watershed. WRI Project ID: 2119. Utah State University, Logan.

Curtis, R., and B. Crompton. 2009. Draft Report: The effect of natural gas drilling on West Tavaptus Plateau sage-grouse. Utah Division of Wildlife Resources Report. Salt Lake City, Utah.

Dahlgren, D. K., R. Y. Chi, and T. A. Messmer. 2006. Greater sage-grouse response to sagebrush management in Utah. Wildlife Society Bulletin 34: 975-985.

Dahlgren, D. K. 2006. Greater sage-grouse reproductive ecology and response to experimental management of mountain big sagebrush on Parker Mountain, Utah. Thesis. Utah State University, Logan.

Dahlgren, D. K. 2009. *Greater sage-grouse Ecology, Chick Survival, and Population Dynamics, Parker Mountain, Utah.* Dissertation. Utah State University, Logan.

Danvir, R. E. 2002. Sage-grouse ecology and management in the northern Utah sagebrush steppe. Deseret Land and Livestock, Inc., Wildlife Research Report, Woodruff, Utah.

Dettenmaier, S., T. Black, and T.A. Messmer. 2012. Annual Report: greater sage-grouse response to season-long and prescribed grazing (NRCS Conservation Practice 528) on paired ecological sites (phase I). Utah State University, Logan.

Duvuvuei, O. and T.A. Messmer. 2012. Annual Report: Anthro Mountain greater sage-grouse. Utah State University, Logan.

Graham, S., T. Black, and T.A. Messmer. 2012. Annual Report: Greater sage-grouse habitat selection and use patterns in response to vegetation management practices in western Box Elder County, Utah. Utah State University, Logan.

Griner, L. A. 1939. A study of sage grouse (*Centrocercus urophasianus*), with special reference to life history, habitat requirements, and numbers and distribution. Thesis. Utah State Agricultural College, Logan.

Gruber, N. W. 2012. Population dynamics and movements of translocated and resident greater sage-grouse on Anthro Mountain, Utah. Thesis. Utah State University, Logan.

Guttery, M.R. 2011. Ecology and management of a high elevation southern range greater sage-grouse population: vegetation manipulation, early chick survival, and hunter motivations. Dissertation. Utah State University, Logan.

Guttery, M.R., D.K. Dahlgren, and T.A. Messmer. 2011. Evaluation of Alternative Methods to Estimate Greater Sage-grouse Populations. Project Completion **Report. Utah State University, Logan.**

Hennefer, J. P. 2007. Analyses of greater sage-grouse (*Centrocercus urophasianus*) translocation release methods and chick survival in Strawberry Valley, Utah. Thesis. Brigham Young University, Provo, Utah.

Kaze, J., C. Balzotti, S.L. Petersen, R.T. Larsen, and R.J. Baxter. 2012. Annual Report: Greater sage-grouse habitat selection at multiple spatial scales in Utah. Brigham Young University, Provo, Utah.

Knerr, J. S. 2007. Greater sage-grouse ecology in western Box Elder County, Utah. Thesis. Utah State University, Logan.

McPherron, H.H., and N.S. Frey. 2012. Update: Habitat utilization and movements of greater sage-grouse and the effects of fence lines on grouse and avian predators in Hamlin Valley, Utah. Utah State University, Logan.

Messmer, T. A., and J. Flory. 2002. Annual Report: Parker Mountain Adaptive Management working group. Utah State University, Logan.

Peck, R. D. 2011. Winter habitat selection and nesting ecology of greater sage-grouse in Strawberry Valley, Utah. Thesis. Brigham Young University, Provo, Utah.

Peck, R. D., Baxter, R. J., and R. T. Larsen. 2012. Nest-Area Fidelity by Greater Sage-Grouse in Strawberry Valley, Utah. Western North American Naturalist 72:425-431.

Perkins, C. J. 2010. Ecology of isolated greater sage-grouse populations inhabiting the wildcat knolls and horn mountain, Southcentral Utah. Thesis. Utah State University, Logan.

Robinson, J. D. 2007. Ecology of two geographically distinct greater sage-grouse populations inhabiting Utah's West Desert. Thesis. Utah State University, Logan.

Smith, L. S. 2009. Greater sage-grouse and energy development in northeastern Utah: implications for management. Thesis. Utah State University, Logan.

Stringham, R. B. 2010. Greater sage-grouse response to sagebrush reduction treatments in Rich County, Utah. Thesis. Utah State University, Logan

Taylor, J.M., and T.A. Messmer. 2011. Annual Report: Evaluation of mechanical, biological, and chemical treatments to restore sagebrush steppe in northeastern Utah. Utah State University, Logan.

Thacker, E. 2010. Greater sage-grouse seasonal ecology and responses to habitat manipulations in northern, Utah. Dissertation. Utah State University, Logan.

Westover, M.D. 2012. Habitat Selection of Greater Sage-Grouse (Centrocercus urophasianus) and Northern River Otters (Lontra canadensis) in Utah. Thesis, Brigham Young University, Provo.

Appendix 9

Utah Partners for Conservation and Development
Projects benefitting Greater Sage-grouse

The UPCD is a partnership of state and federal agencies who manage public natural resources (e.g. BLM, USFS, USFS, SITLA, UDNR) or have expertise in public natural resource management (NRCS, USU, RC&D, UDAF). In 2006, the partnership established as their mission to provide coordinated leadership in natural resource management and public service in cooperation with property owners and users for the long-term sustainability of Utah's natural resources. The partnership was implemented with the establishment of 5 regional teams to design and implement coordinated management projects in focus areas to improve watersheds, wildlife habitat and ecosystem health. Funding to initiate the highest priority projects came from several agencies and the Utah Legislature. The WRI, housed in the Utah Department of Natural Resources, is the implementation arm of the partnership that coordinates the program, including distributing funding and other resources. In FY2012, over 50 groups and individuals participated in WRI projects. Since 2006, the WRI with all of its partners has enhanced or restored over 1,000,000 million acres in Utah. Following is a list of projects and acres treated for FY2006-FY2012 that had greater sage-grouse a primary beneficiary of the project.

ID #	Project	Acreage
10	Taylor flat p/j removal	1040
17	Lower fish creek sagr habitat improve	418
22	Monument ridge p/j removal	1004
24	Deep creek valley sabr improve-yr2	647
28	Steinaker draw p/j project	612
31	Sand Wash/Sink Draw Conservation Easement	5762
32	Wildcat Canyon P/J removal	140
33	Warner Fence	0
39	Snake john greenstripping	173
52	Golden Stairs chain and seed	170
53	Asay Creek Stream enhancement	228
55	Bennion ranch sage demo project-yr1	443
64	Richmond WMA	161
66	Rabbit Gulch chain, herbicide, re-seed	167
69	Skitzy Canyon PJ chain and re-seed	530
73	Seep/Winter Ridge P/J removal	734
92	Heaton property 319 stream enhancement	18
93	Grey Wolf Mountain Rehab	463

101	Wallsburg WMA habitat improvement	577
103	Long Hollow PJ removal and seeding	1113
104	South Beaver Veg Enhance project Year 1	1646
115	The Neck	556
118	Bagley LIP	199
119	P-hill one-way harrow	1784
120	Alton Sink Valley	821
121	Sanford sagegrouse 2	488
123	Bald hills guzzler	0
155	Chokecherry springs	571
157	Etna mechum canyon	568
162	Arimo water project	82
163	Coldwater Ranch- Dees Inc.	1945
178	Ruple cabin sagr range enhancement	1680
188	Alton/Mill Creek sagebrush restoration-yr 1	1630
189	5 mile hollow sagebrush restoration yr 1	1542
205	Basque cross ranch	553
210	South Narrows Dix Harrow- west side	529
212	Tebbs Hollow sabr restore, p/j removal	456
212	Tebbs Hollow PJ and sagebrush removal	456
228	Price west benches-yr2	2658
229	Price west benches porphyry bench	1104
242	Buckskin valley hwy 20	270
249	Grouse creek grazing association	0
250	Hereford grazing association	1240
258	Snake john valley lop and scatter	1008
259	Wolf point lop and scatter	811
270	MR Spring Rehab	1
276	Lazy 8 land and livestock	345
291	Sage valley/vernon sabr enhance,yr1	500
296	Dry fork emergency fire rehab	469
297	Goslin mtn p/j encroachment removal	1677
298	Wolf Point phase II p/j removal	1323
299	Red creek flat lop and scatter	883
302	JG Discretionary Seed	84
305	Bunting discretionary seed, seed	122
310	V-canyon ridges lop and scatter project	1066
314	Kings point p/j removal	511
315	Brush creek bench sage restore	279
316	Chew-blue mtn sagr enhancement	236
317	Clay basin-daggett p/j removal	994
319	Winter Ridge-little asphalt p-j removal	673
323	Trout Creek sagebrush enhancement	168

328	Coyote draw pinyon and juniper thinning	1240
330	Sanford 2 UPD Fence	
333	Monroe sagebrush improve	815
333	DM Sagebrush Imrovement, disc and seed	815
340	JB seed contribution	114
346	Fruitland lop and scatter project	413
348	Park valley burn rehab	3152
349	Tanner Ranch	389
353	East onaqui bullhog	647
354	Discretionary seed for tribal p/j project	776
357	West Stuntz-Blue Mtn SAGR Enhancement	200
358	Winter Ridge Phase III	1988
359	Red Creek Flat Phase 2	503
369	Big Hollow Juniper Thinning and Seeding Yr. 1	511
392	Clay basin-daggett SITLA	411
393	Red Fleet-donkey flat seeding	24
394	Blue Knoll Lop and Scatter	1091
396	Bennion ranch sagr demo project-yr2	381
397	Anthro mtn SAGR project Y-1	1003
398	Smith dixie harrow 05	208
399	Chew/USU sheep grazing project	41
417	Sink Draw Interseeding	546
423	Woodruff co-op Crested wheatgrass conversion	96
442	East onaqui sabr improvement	159
445	JB sagegrouse yr 1	2333
452	Water for wildlife- box elder guzzlers	0
458	Tebbs hollow/mud springs	456
461	Sevier Plateau Dixie Harrow and re-seeding	516
465	Fishlake NF PJ Maint. & Sagebrush Enhancement	3505
467	Fivemile hollow sagebrush restor yr 2, L&S	1369
479	Salt cabin reseed	733
504	Pocatello Valley burn rehab	718
504	Pocatello Valley Burn Rehab, reseeding	718
513	Gordon creek roller chopping	199
514	Black Dragon	4358
562	Hall Well	0
563	Bowler chaining	854
566	SITLA burn seeding	458
589	Hardware ranch fencing project	0
594	Seven Mile/North Mtn. dixie harrow and seed	1650
606	Blind springs ranch	747
607	H Farms seeding	900
608	Ruple cabin wildfire rehab	1207

613	Rose ranch	350
659	Diagonal/Electric Dixie harrow project	993
661	Sage valley lop and scatter project	1297
662	Deep creek east pasture habitat improve	172
678	Blue Knoll phase II	1999
680	Goring ranches, disc and seed	50
682	Rees burn rehab	5063
685	Winter ridge bullhog	474
687	Diamond Mtn lop and scatter	972
691	Goslin Mtn phase II lop and scatter	1221
692	Teepee Mountain Bullhog	535
696	Nutters Ridge lop and scatter	1199
712	Clover creek habiat enhancement	409
730	Ibapah sabr improvement-yr 1	166
731	East terra junip Lop and scatter project	626
745	Hogup burn rehab, reseed	2700
757	Limekiln 2-Ut prarie dog	200
772	Mail Draw Fences Phase II	0
802	Southern Region Shrub Plantings Year 3	565
841	Anthro mtn prescrib burn	642
842	Dowd Mtn. Wildlife habitat improvement	1717
853	South cache cattleman's assoc. herbicide app.	259
862	Tebbs Hollow PJ encroachment, bullhog	1477
878	Mt. Terrill-harrow and reseed in silver sage	1732
883	5 mile habitat restor complex	336
887	Badger fire rehab project	649
895	S. beaver veg enhancement yr 3	385
900	Alton mill creek sagebrush restor yr 3	912
901	5 mile hollow sage restore yr3	6465
918	South Beaver SITLA, chain reseed	402
927	MW Fence Phase II	0
941	Hardware ranch seeding	474
967	ZV Discretionary Seed	200
973	Hardware ranch Plateau	474
978	Currant Creek fire rehabilitation	140
979	Cunningham chaining seed donation	129
980	Terza Flat et al. Seeding Trials	30
986	Greenville Fire Seeding	3806
987	Paradise Fire Reseeding	4249
992	Dairy Valley fire rehab	14633
993	Greenville Bench Aerial Seeding	11065
995	Clear creek burn rehab	5514
996	Johnson Canyon fire	2059

1006	Milford flat fire rehab	2896
1007	Missouri flat fire rehab	9613
1010	Kaufman fire rehab	786
1024	Paradise fire-Hall chain air reseed	331
1025	Paradise fire-Bowler, chain and air reseed	804
1026	Paradise fire-Schriever, chain and air reseed	92
1029	Milford Flat Circle 4 fire reseeding	3225
1033	Greenville Bench-Poorman qerial seed and chai	647
1034	Greenvill Bench-yardley aerial seed, chain	500
1035	Greenvill bench-barnes aerial seed	378
1043	Pine coanyon fire rehab	1148
1050	Sabie mtn habitat improve, lop and scatter	1312
1058	Henefer Echo burn rehab, reseed	92
1061	Mount bartles sagebrush enhancement	363
1076	Tabby mtn lop and scatter	1022
1077	Anthro mtn Lop and scatter	695
1078	3 pines lop and scatter	1943
1081	Deadman bench range improve, greenstrip	523
1082	Current creek lop and scatter	555
1084	Tolivers creek bullhog	195
1085	Scofield sagr habitat improve	151
1089	Agency draw lop and scatter	2348
1090	Goslin bullhog phase 2	2595
1093	Upper sevier river stream enahce-hatch area	59
1102	Tintic knapweed control, chemical spray	55
1103	Gilson Mtn drill seed	978
1104	Ibapah sagebrush improvement yr2	2189
1105	Shearing corrals lop and scatter	491
1106	Cherry mesa bullhog	576
1109	Mccook ridge cheatgrass control	384
1117	Grantsville chaining project	608
1131	James ranch bullhog project	473
1133	West onaqui bullhog phase 3	512
1137	Sand Wash/Sink Draw CE Fee Title Acquisition	5732
1140	Horse ridge lop and scatter	366
1149	Brotherson lop and scatter	1104
1150	Brotherson chaining and reseed	347
1152	Browns park fields, reseed	174
1153	Johnson mtn ranch chaining	526
1155	North narrows yr1, harrow reseed	1369
1159	Joe's Valley PJ Retreatment - bullhog	1313
1161	Wildcat knolls Hab. Improve.	810
1169	Five mile mtn habitat restor phase III	1310

1173	Spry sagebrush restore, lop and scatter	1746
1177	Diamond mtn-buckskin hills bullhog	208
1185	Hamlin Valley Flinspach	561
1199	North cottonwood canyon lop and scatter bullh	816
1201	Greens canyon lop and scatter	424
1206	Panguitch creek WMA PJ thinning	383
1215	Round Moutain Ranch PJ removal & seed	607
1216	Hereford juniper thinning	397
1218	Milford flat wildfire rehab	80818
1223	Greenville bench enhanc project	6358
1224	South Beaver Veg. Enhance Yr 4	1528
1236	Seep ridge bullhog	204
1260	Promontory ptn seed drilling	40
1266	Brotherson discret. Seed, forb seeding	208
1267	Sanford 2 utah p-dog yr 2	204
1280	Greenville bench-shrub seeding air seed	1297
1321	Duck Creek Allotment grazing mgt. changes	2730
1323	Johnson draw chaining,P/J chaining & seed	81
1327	Missouri flat reseed ph II, seed burned area	255
1337	Cedar camp lop and scatter	2042
1340	Red creek flat bullhog, P/J removal	250
1342	Johnson Canyon Greenstrips	104
1343	Marshall draw bullhog, remove P/J	344
1347	Wallsburg knapweed control, herbicide	929
1348	Tintic Junc knapweed II, control/reseed	227
1360	Strawberry valley SAGRhabitat improv, harrow	393
1361	Benmore pastures harrow project	731
1362	Terra east juniper thin II, bullhog & seed	2188
1377	Ibapah Sagebrush improvement yr3	1351
1380	Big hollow bullhog II, bullhog	363
1392	Wildcat SABR restore Project II,disc & seed	466
1396	Swasey wildlife/fuels 1	400
1420	Circleville Cove, sagebrush treatment	1305
1422	Nevershine 09 PJ thinning	202
1426	Jackson Draw fencing	0
1435	Woodruff coop. lawson aerator to thin sabr	103
1438	Crystal Ranch Riparian Improvement - fencing	0
1439	Lazy 8 ranch, chaining and seed	353
1441	Antimony seeding, reseed bullhog area	3891
1451	Sand ledges, chain P/J	977
1461	Upper sevier stream enhance,river work/reseed	11
1470	Middle fork WMA project,disc/seed/plantings	4
1471	Henefer-echo wma, ely chain and seed	30

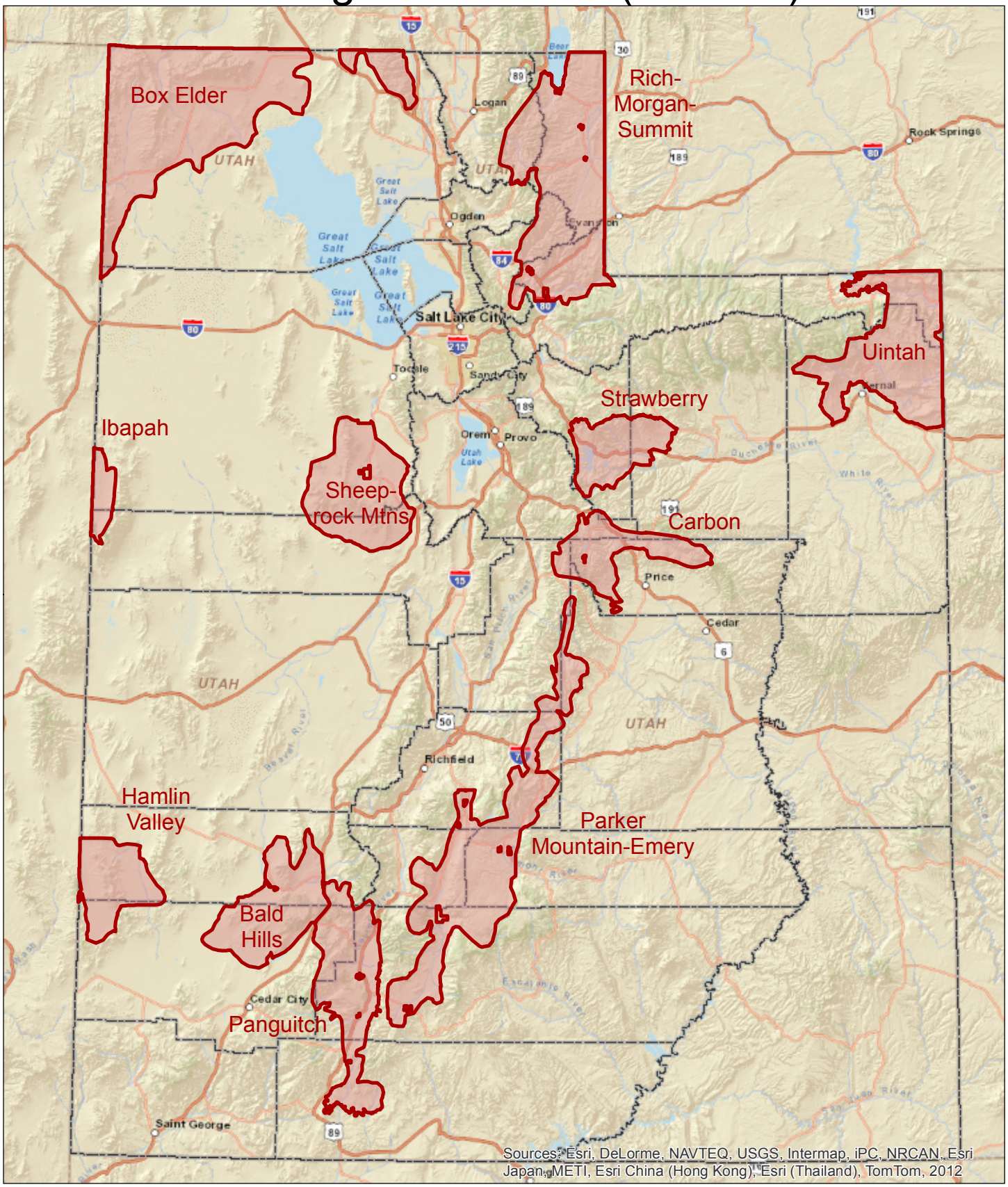
1474	Arimo burn rehab, drill seed	166
1477	Woodruff Longhill, reduce sabr cover	3193
1487	North narrows yr 2, harrow and seed sagebrush	1049
1491	Indian peaks, L&S of P/J	298
1499	Birch Creek fencing, brush treatment	558
1503	Morris ranch, dozing juniper trees	1311
1504	Morris ranch phase II, bulldozer junipers	798
1505	Medusahead control project & seeding	923
1533	Anthro Mtn CSI Project, P/J removal	1544
1564	Bitterbrush seedling project, increase sabr	19
1568	Marshall Draw Inholding Acquisition	1001
1582	Blind Canyon Fire Rehab - aerial seeding	2132
1583	Badger ISMF seeding	1554
1590	Cedarview harrow and seed	20
1593	Baboon Fire 2009 Rehab	189
1594	Sharps Valley lop & scatter / bullhog	997
1607	Garden Creek Fire Rehab - herbicide and seed	102
1610	Eagle Spring Discretionary Seed	142
1622	Badger Flat Greenstripping	837
1638	Nonument Ridge Bullhog	504
1652	Rock Springs Bullhog	553
1657	Upper Kanab Creek Maintenance - lop/scatter	2492
1658	Archy Bench pinyon/juniper lop and scatter	1122
1659	Brush Creek Bench Drill-Seeding	408
1671	Deadman Bench harrow, herbicide, seed	611
1675	Rock Spring/Cherry Mesa lop and scatter	717
1678	Grass Valley Brush Treatment and Seeding	2
1693	Mail Draw Lop and Scatter Phase 1	1347
1697	South Dutton Wildlife Water	0
1705	Swasey Wildlife Improvement and Fuels Reduce	686
1711	South Beaver PJ removal and seeding	2707
1715	Anthro Mtn. Lop and Scatter	1728
1716	South Canyon bullhog and seeding	1749
1722	Cedar City Riparian Exclosure Maintenance	0
1738	South Alton PJ removal and seeding.	782
1739	Kimball Creek-mower,lop/scatter,harrow, seed	142
1741	Curtis Ridge Prescribed Burn	134
1744	Tabby Mountain WMA Fencing	0
1754	South Strawberry Sagebrush Treatment	144
1772	South Hamlin PJ chaining and seeding	521
1787	Carrus/Birch Creek Chain and Seed	207
1790	Tushar Mtn Watershed Improvement-fencing	0
1794	Cow and Cottonwood Creek Lop & Scatter	2100

1816	Badger Hollow/Chicken Springs Ridge	439
1828	Crouse Reservoir Fence Phase I	0
1877	Chokecherry chaining and seeding	731
1879	Stanrod Chaining	308
1882	Badger and Hot Springs Fire Rehab	673
1887	Greenville Bench Chain and Seed	735
1904	Birch Creek Pond/Fenceline Rehab	18
1927	Shearing Corrals bullhog and seeding	2146
1928	Ibapah bullhog	152
1936	Crawford Mountain Bullhog	1015
1937	Grass Valley Revegetation Project	124
1938	Grouse Creek Bullhog	1031
1945	Red Creek (Clay Basin) Restoration	10
1966	Horse Ridge lop and scatter	328
1989	Raven Ridge Harrow	501
2020	Anthro Lop and Scatter-Jeep Trail/Gilsonite	567
2024	West Government pinyon/juniper removal	2582
2027	South Canyon bullhog and seeding	1901
2041	Trail Hollow East lop and scatter	1268
2050	Archy Bench Sagebrush Restoration	607
2061	Buck Camp Canyon PJ Removal	213
2091	Swasey Improvement and Fuels Reduction	1074
2124	Trail Hollow West Lop and Scatter	1043
2150	Atchison Creek Sage-grouse Project	496
2163	Interplanetary Airstrip Lop and Scatter	1295
2172	Yellow Mtn Fire Stabilization	262
2176	Jericho Fire Habitat Improvement	509
2181	Cave Creek Chain Harrow	201
2217	KP Private Land Seeding	126
2237	South Alton Browse Seeding	90

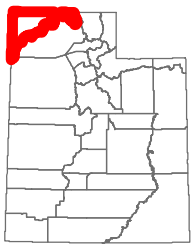
Total: 382,365 acres

Utah Sage-grouse Management Areas (SGMAs)

DRAFT Dec. 14, 2012

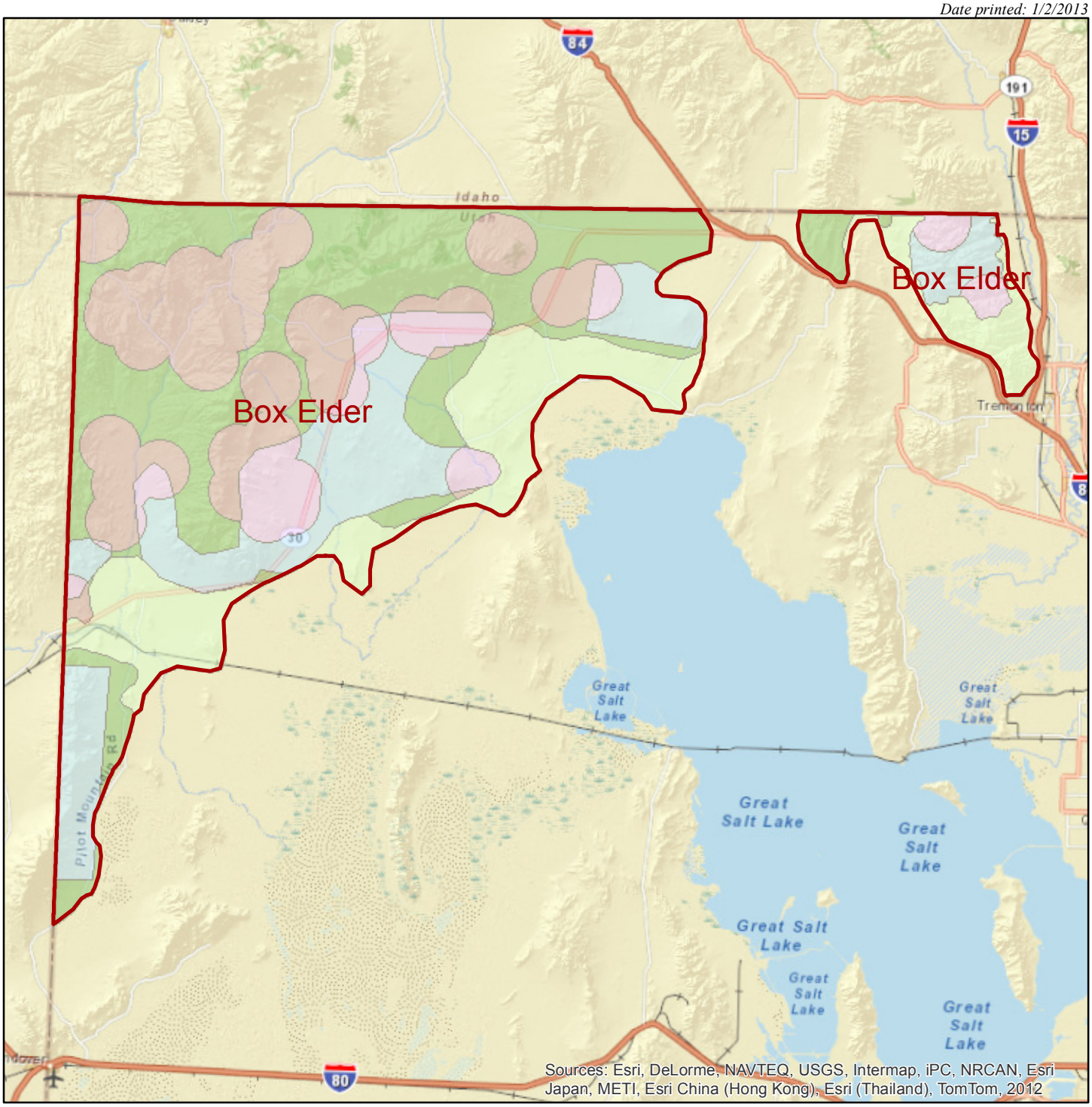


Box Elder Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

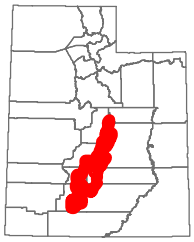
Date printed: 1/2/2013



0 5 10 20 Miles

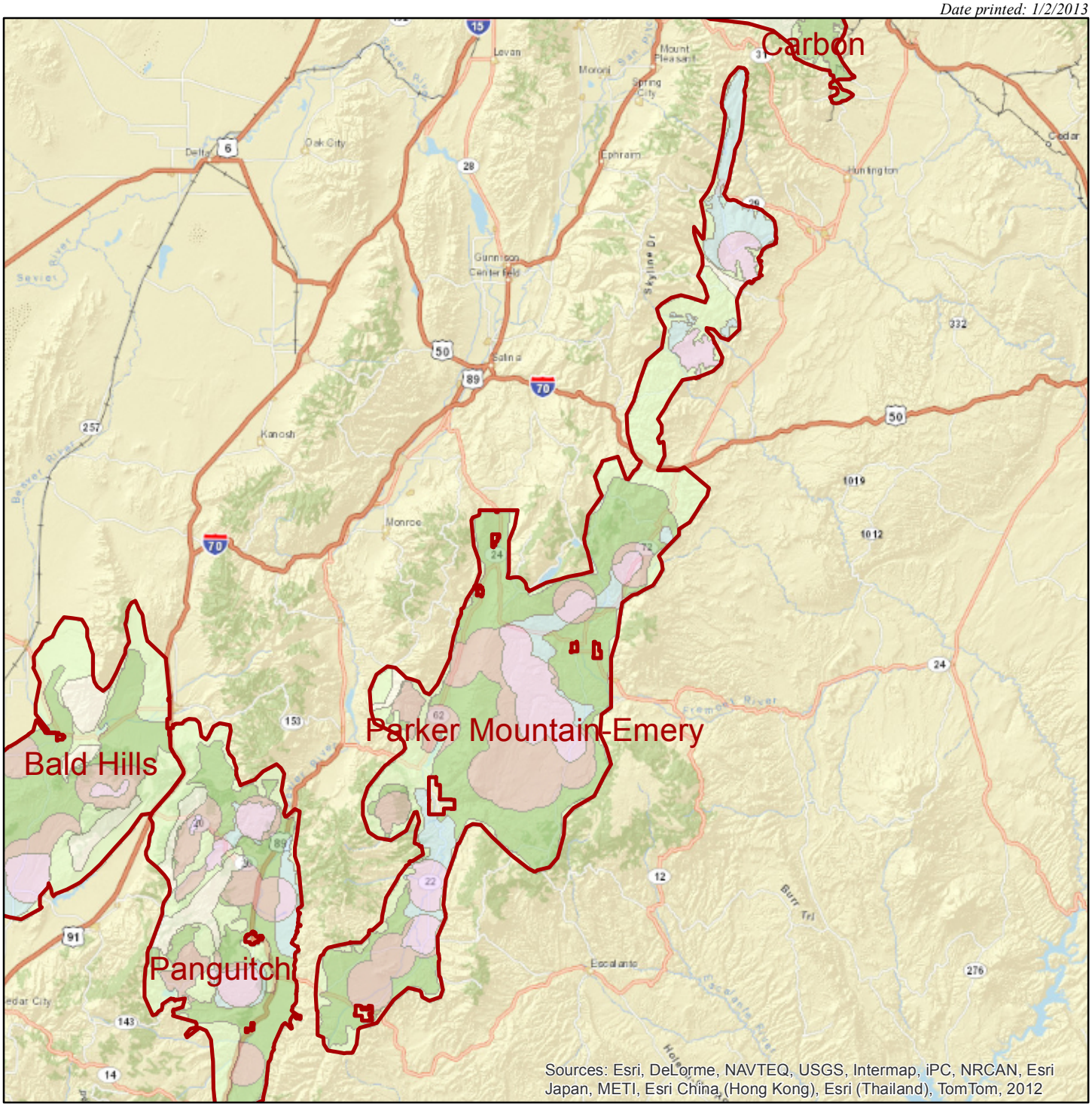
Scale: 1:914,000

Parker Mountain-Emery Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

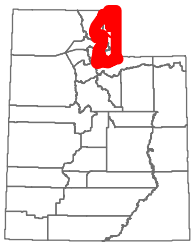
Date printed: 1/2/2013



0 5 10 20 Miles

Scale: 1:1,241,000

Rich-Morgan-Summit Sage-grouse Management Area



Nesting and brood-rearing

Nesting and brood-rearing with Winter habitat

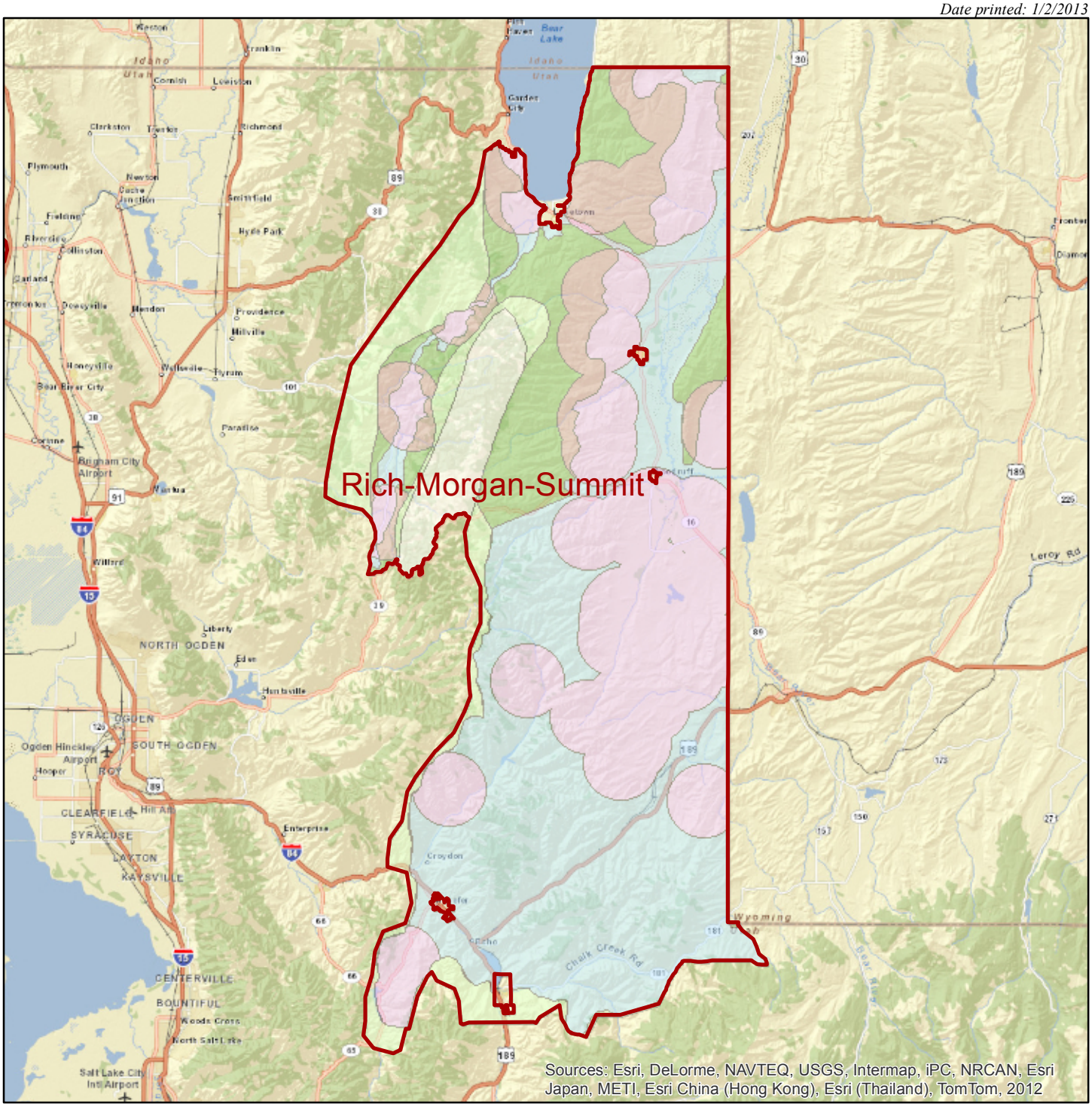
Winter

Other habitat

Opportunity

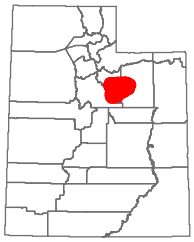
non-habitat

Date printed: 1/2/2013



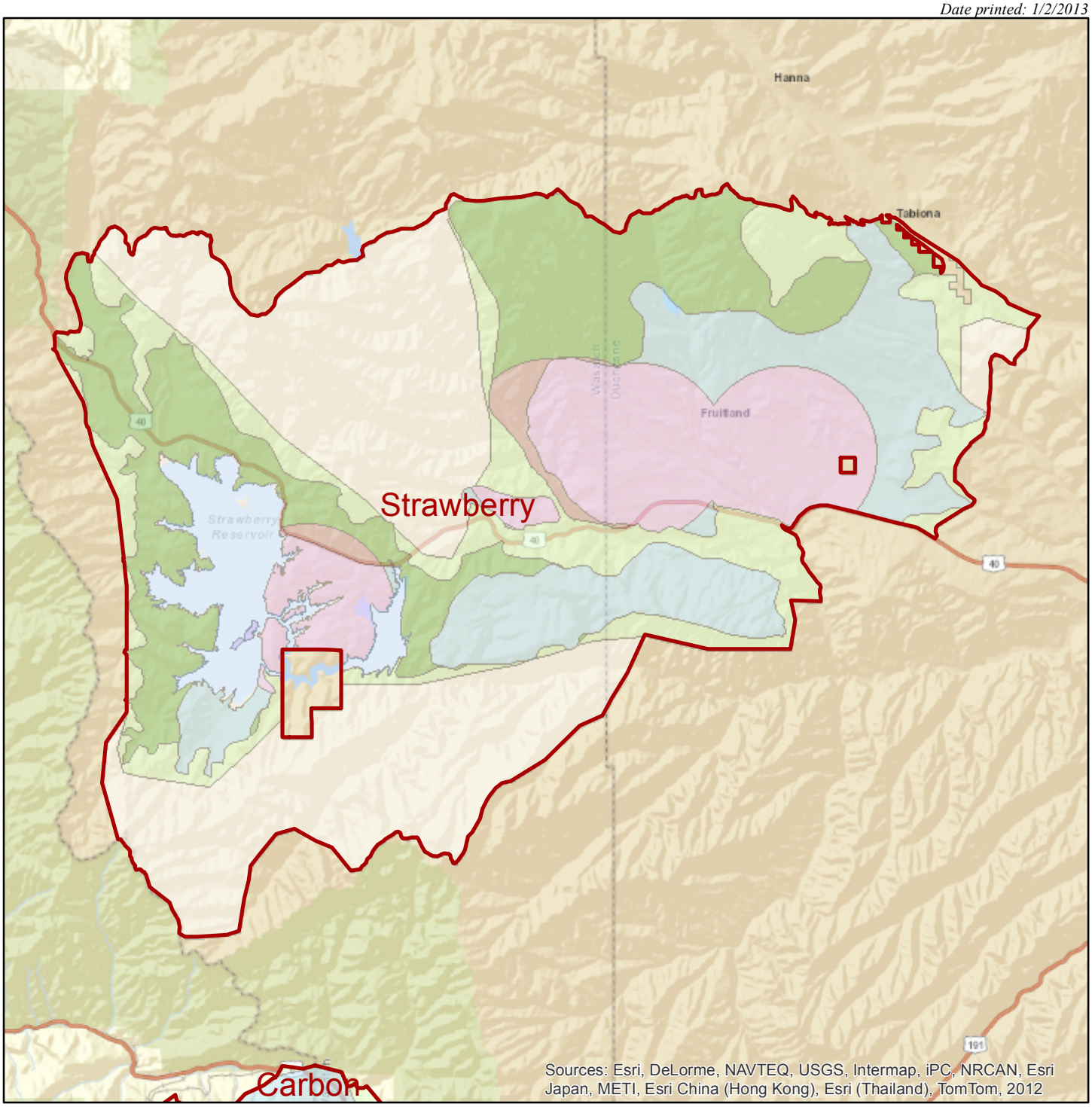
Scale: 1:742,000

Strawberry Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

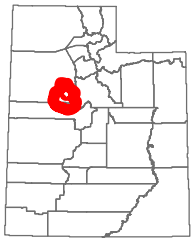
Date printed: 1/2/2013



0 5 10 20 Miles

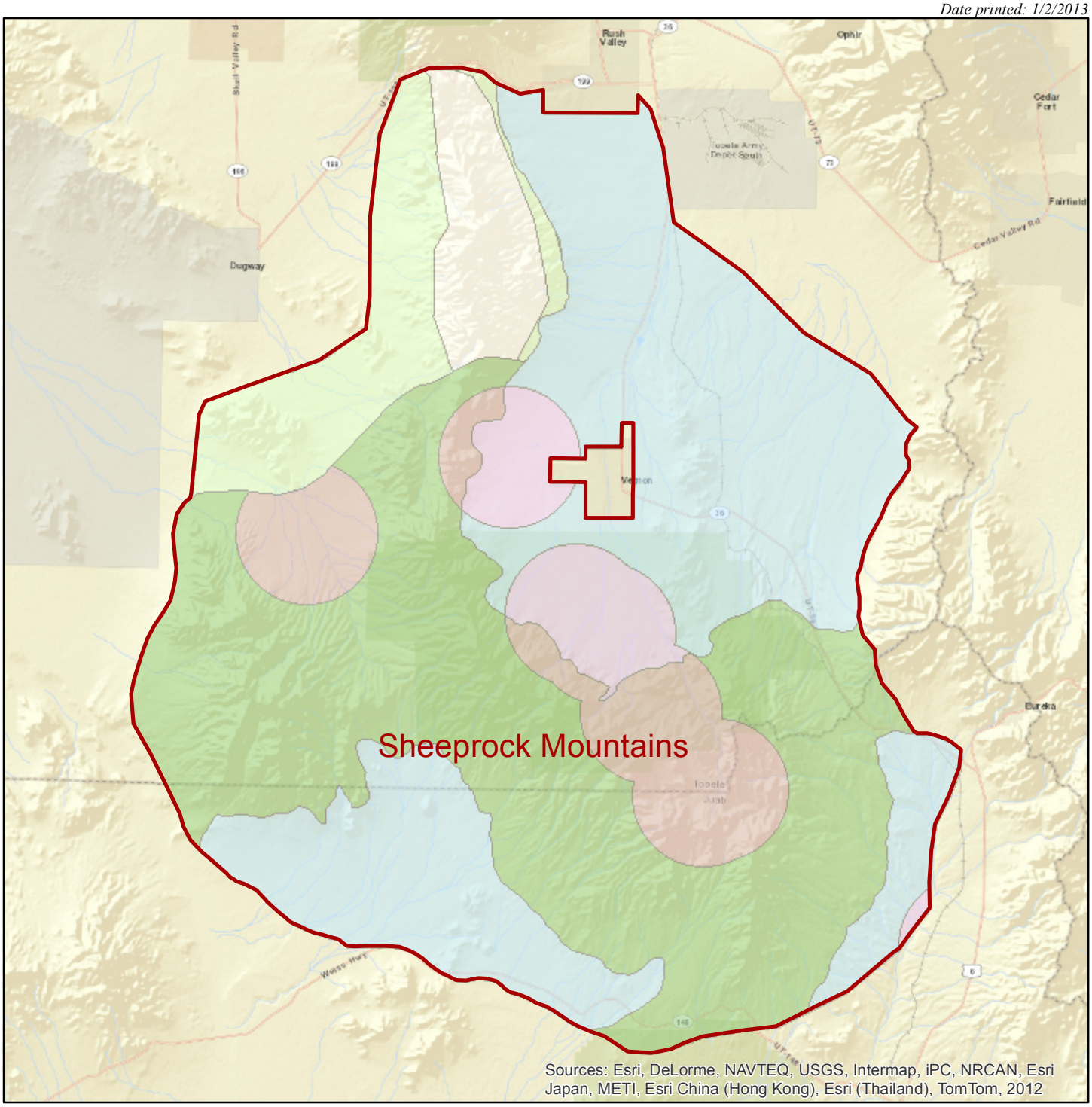
Scale: 1:311,000

Sheeprock Mountains Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

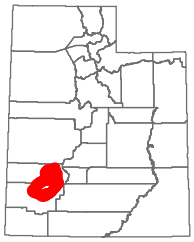
Date printed: 1/2/2013



0 5 10 20 Miles

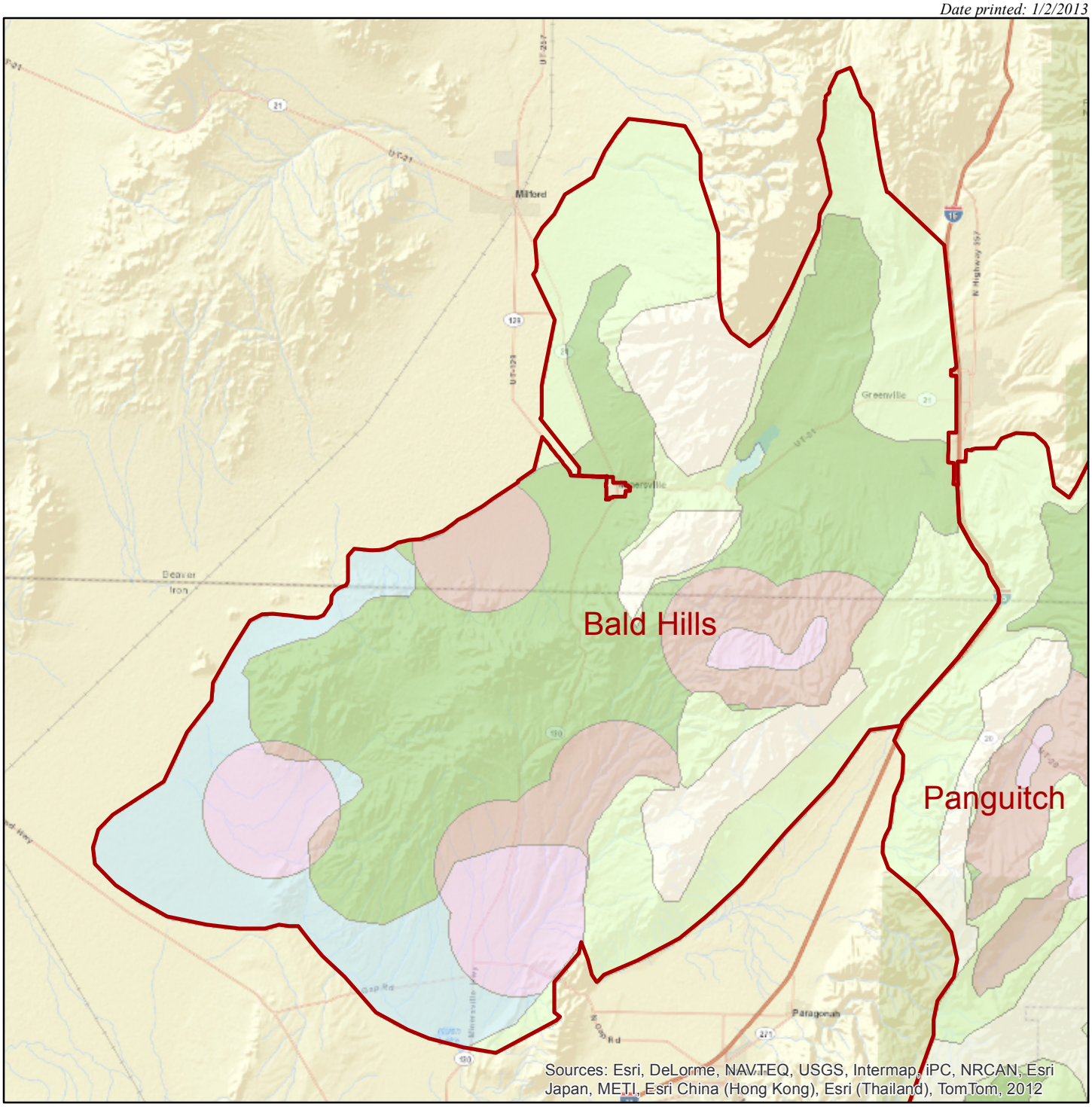
Scale: 1:387,000

Bald Hills Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

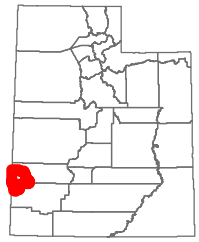
Date printed: 1/2/2013



0 5 10 20 Miles

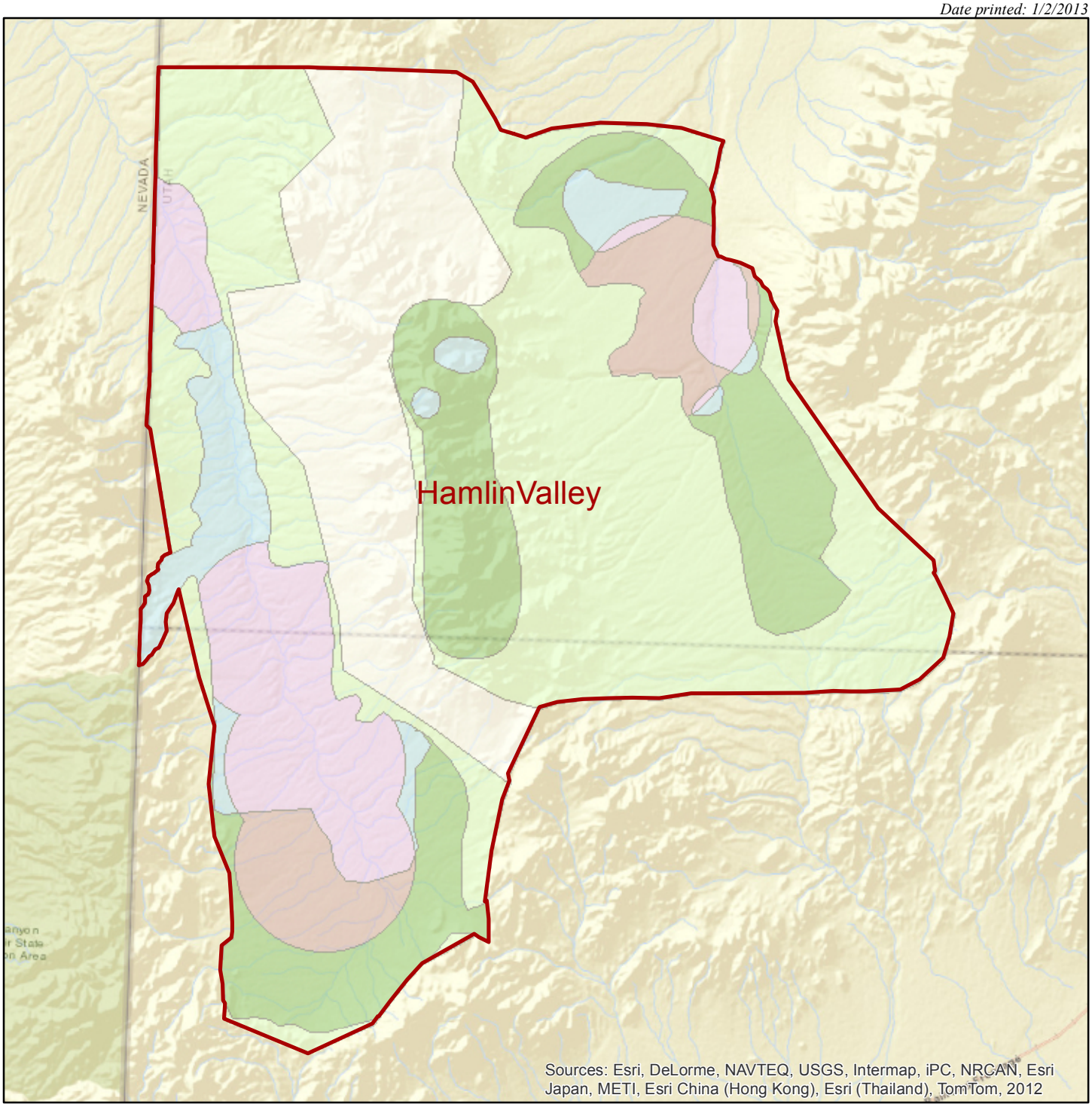
Scale: 1:401,000

HamlinValley Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

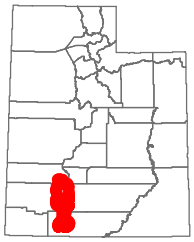
Date printed: 1/2/2013



0 5 10 20 Miles

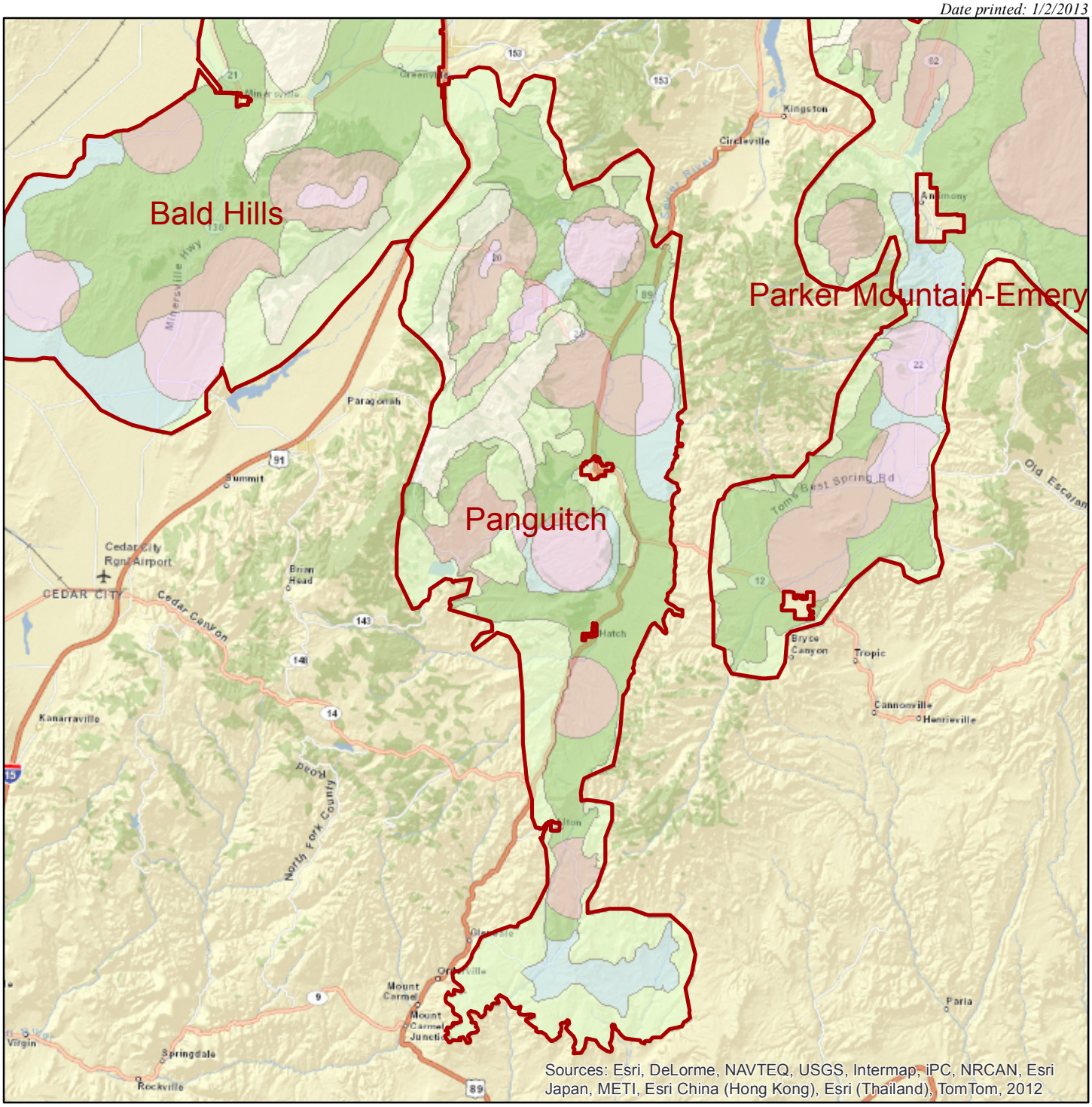
Scale: 1:304,000

Panguitch Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

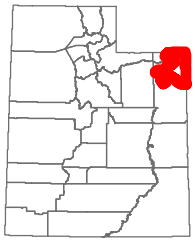
Date printed: 1/2/2013



0 5 10 20 Miles

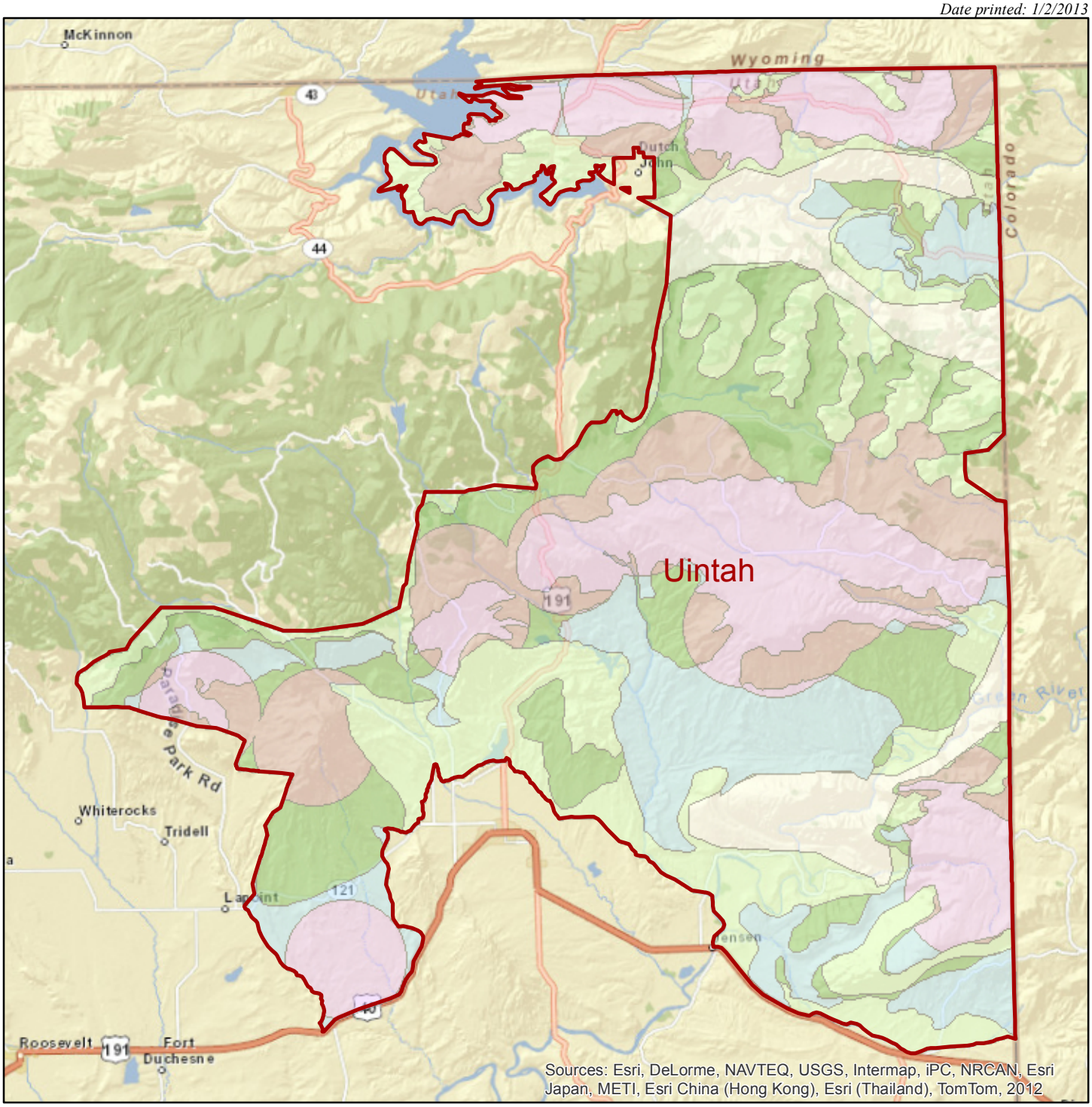
Scale: 1:679,000

Uintah Sage-grouse Management Area



Nesting and brood-rearing
Nesting and brood-rearing with Winter habitat
Winter
Other habitat
Opportunity
non-habitat

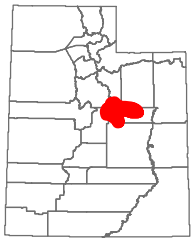
Date printed: 1/2/2013



0 5 10 20 Miles

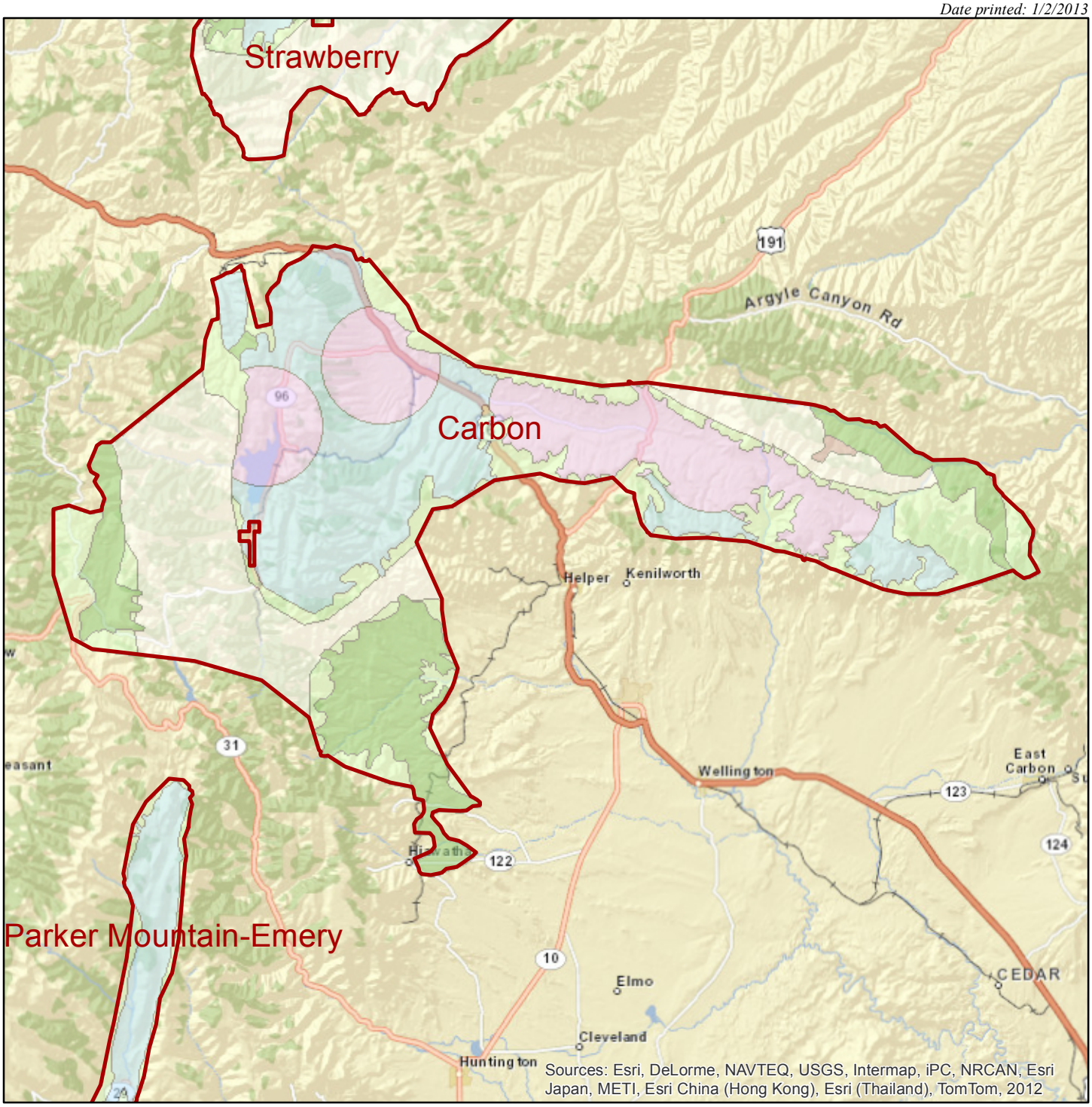
Scale: 1:456,000

Carbon Sage-grouse Management Area



- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

Date printed: 1/2/2013



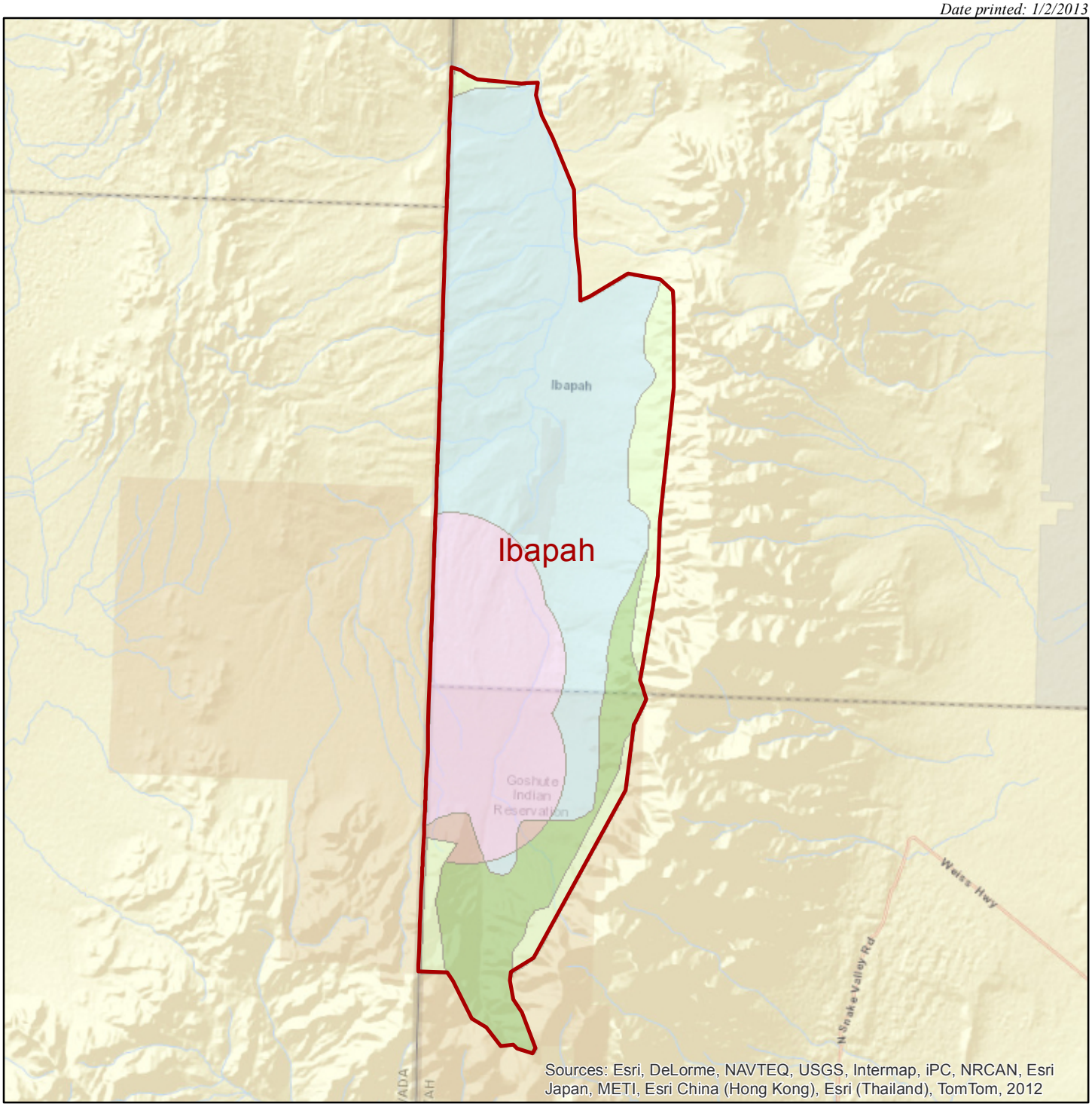
0 5 10 20 Miles

Scale: 1:463,000

Ibapah Sage-grouse Management Area

- Nesting and brood-rearing
- Nesting and brood-rearing with Winter habitat
- Winter
- Other habitat
- Opportunity
- non-habitat

Date printed: 1/2/2013



0 5 10 20 Miles

Scale: 1:278,000