PART III – SECTION J, ATTACHMENT M-11

CANDIDATE CONSERVATION AGREEMENT FOR THE GREATER SAGE-GROUSE ON THE IDAHO NATIONAL LABORATORY SITE (DOE/ID-11514) (DE-NE0000300)

Effective September 2014

Candidate Conservation Agreement

for

Greater Sage-grouse

(*Centrocercus urophasianus*)

on the

Idaho National Laboratory Site

Developed Cooperatively by:

U.S. Department of Energy, Idaho Operations Office;

U.S. Fish and Wildlife Service

September 2014

Candidate Conservation Agreement for Greater Sage-grouse (*Centrocercus urophasianus*) on the Idaho National Laboratory Site in Southeast Idaho

September 2014

Prepared by:

Gonzales-Stoller Surveillance, LLC, and Wildlife Conservation Society
Under the Environmental Surveillance, Education, and Research Program
(Contract No. DE-NE0000300),
and in Cooperation with
U.S. Department of Energy - Idaho Operations Office
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The Wildlife Conservation Society (WCS) was subcontracted under the ESER contractor from 2006 through June 2013 to perform research in support of this agreement and to take the lead in writing and editing the document. Quinn Shurtliff (WCS and ESER) was the lead author and editor, with substantial contributions by Jericho Whiting (ESER), Roger Blew (ESER), Amy Forman (ESER), and Jeremy Shive (ESER). Technical assistance was provided by individuals from DOE (Jack Depperschmidt, Betsy Holmes), U.S. Fish and Wildlife Service (Jason Pyron, Greg Burak, Kathleen Hendricks, Katie Powell), ESER (Douglas Halford), WCS (Kristy Howe), CH2M-WG Idaho (Jean Holdren), and Battelle Energy Alliance (John S. Irving). Jeremy Shive and Kurt Edwards (ESER) provided Geographic Information System assistance, Jackie Hafla (ESER) provided technical editing, and Brande Hendricks (Stoller) helped with document formatting. Eric Gosswiller, Idaho National Laboratory (INL) Fire Chief, reviewed and edited portions of the document relating to wildland fire. Members of the INL Site Land Use Committee provided valuable input and perspective on earlier drafts of this document.

PHOTO CREDITS

The front cover photo shows a male greater sage-grouse displaying on an eastern Idaho lek, used with permission from Idaho Falls photographer Terry R. Thomas.

All other photos used throughout this document were provided by Kristy Howe and Quinn Shurtliff.

EXECUTIVE SUMMARY

In March 2010, the U.S. Fish and Wildlife Service (USFWS) classified the greater sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse) as a candidate for listing under the Endangered Species Act (ESA) of 1973. This classification means that although the species warrants protection under the ESA, it is currently precluded from being listed due to higher agency priorities. However, in a 2011 U.S. district court lawsuit settlement, USFWS agreed to make a final listing decision on all candidate species by 2016. A resulting agency work plan commits USFWS to make a determination by 2015 to either list sage-grouse as threatened or endangered, or to remove it from the candidate list.

In its 2010 listing decision, USFWS determined that the primary reason sage-grouse warrants protection under the ESA is because the quantity and quality of sagebrush (*Artemisia tridentata*) habitat upon which these birds rely continues to decline, in large measure due to wildland fire and human infrastructure and associated activities. Another reason given by USFWS is that there are insufficient regulatory mechanisms in place to ensure the long-term survival of sage-grouse. One of the purposes of this Candidate Conservation Agreement (CCA) is to address these threat factors as they apply to the Department of Energy, Idaho Operations Office (DOE), and the Idaho National Laboratory (INL) Site, over which DOE has stewardship. DOE's hope is that implementation of conservation measures outlined in this agreement, coupled with efforts from other federal, state, and private entities, will preclude the need for USFWS to list sage-grouse under the ESA. However, if the sage-grouse is listed, this document will form the basis of a Biological Assessment associated with a subsequent ESA Section 7 consultation required for DOE activities described herein that may affect sage-grouse or its habitat should they be listed. Thus, this CCA will support ESA compliance and enable DOE to confidently make long-term land-use decisions, regardless of the future status of sage-grouse. Though DOE understands that a listing of sage-grouse may result in changes to the conservation measures outlined in this CCA, the land-use predictability provided through the CCA will increase the attractiveness of the INL Site to potential projects.

Conservation Framework for the INL Site

This CCA introduces a conservation framework for the INL Site patterned after the State Alternative developed in 2012 by Idaho Governor C. L. "Butch" Otter's Sage-grouse Task Force and submitted to U.S. Secretaries of Interior and Agriculture for incorporation into the National Greater Sage-grouse Land Use Planning Strategy. The INL Site conservation framework protects lands within a 1 km (0.6 mi) radius of all known active leks (i.e., traditional breeding grounds) on the INL Site and establishes a Sage-grouse Conservation Area (SGCA) that limits infrastructure development and human disturbance in approximately 68% of remaining sagebrush-dominated communities. Leks protected by the SGCA support an estimated 74% of the sage-grouse that breed on the INL Site.

USFWS and DOE (hereafter "parties") desire that sage-grouse abundance on the INL Site remains stable to increasing over time. To guard against declines, the conservation framework includes population and habitat triggers for the SGCA that, if tripped by declining lek attendance or loss of sagebrush habitat, would initiate an automatic response by the parties. If the population trigger is tripped, USFWS would review the effectiveness of conservation measures currently being implemented by DOE. The parties would then work cooperatively to determine the cause of sage-grouse declines and whether DOE can make changes to improve conservation

success. USFWS may suggest implementing new or adapting old conservation measures aimed at achieving better results, or it may suggest that the parties renegotiate SGCA boundaries or consider other mitigation options. If the habitat trigger is tripped, DOE will compensate for sagebrush habitat loss by implementing one or more of the following mitigation actions: (1) alter the boundary of the SGCA to include more sagebrush habitat, (2) participate in the State's "*Framework for Mitigation of Impacts From Infrastructure Projects on Sage-Grouse and Their Habitats*", or (3) initiate habitat restoration on Priority Restoration Areas the INL Site.

In addition to establishing a conservation framework, this document identifies primary threats to sage-grouse and its habitats on the INL Site and introduces a set of new conservation measures that DOE commits to implement to minimize those threats. Successful implementation will promote the preservation of sagebrush habitat, reduce or eliminate threats to sage-grouse, and increase understanding of habitat and population trends through long-term research and monitoring. Because of unpredictable funding cycles and changing mission priorities and requirements, it may not always be possible for DOE to perform all conservation measures described herein in a timely manner. As funding becomes available, conservation measures will be prioritized based on applicability to resolving the most immediate threats. If such situations arise, DOE will work closely with USFWS to develop alternatives that are consistent with the intent of this CCA while permitting DOE to pursue its mission.

New Conservation Measures

DOE herein commits to implement 13 conservation measures as it strives to achieve objectives set forth for each threat. These measures are designed to address the eight threats that impact sage-grouse and its key habitats on the INL Site. Conservation measures that have the greatest potential to affect DOE operations are those that address new infrastructure development (Section 10.2) and the potential for human disturbance of sage-grouse during the breeding season (Section 10.9). Lands within existing infrastructure footprints (e.g., near facilities, roads, power lines, and cellular towers, borrow sources) and ongoing DOE activities and operations are exempt from most conservation measures (except seasonal time-of-day restrictions within Lek Buffers) because these areas are considered mission-critical.

DOE's goal for the INL Site (including areas outside the SGCA) is that new infrastructure development results in no net loss of sagebrush habitat. To achieve this goal, DOE has two approaches that apply to areas outside the SGCA. First, DOE will be guided by best management practices when developing new infrastructure. These best management practices embody a commitment to: (1) avoid fragmenting contiguous tracts of sagebrush habitat, (2) minimize the amount of habitat edge created, (3) co-locate new infrastructure with existing infrastructure, where practical, (4) design structures to minimize perching and nesting opportunities for ravens, (5) avoid installing overhead power lines within 1 km of an active lek, and (6) revegetate disturbed areas as soon as possible following disturbance, and (7) mark guy wires and fences to minimize the risk of in-flight collisions. Second, DOE senior management will be included in decision making whenever an activity that would potentially impact sagebrush habitat is proposed outside the SGCA. DOE understands that protecting a conservation bank of sagebrush habitat outside of the SGCA is a preferred way to protect its mission interests in case of large-scale habitat losses within the SGCA (e.g., due to a wildland fire).

Within the SGCA and Lek Buffers, DOE commits to avoid constructing new infrastructure unless there are no feasible alternatives for accomplishing its mission objectives. If DOE determines that a project cannot reasonably be accomplished without being located within a Lek Buffer or the SGCA, DOE will contact USFWS early in the planning process and provide its staff with sufficient information to allow them to determine if the proposed project is sited to minimize impacts to sage-grouse within these areas. Depending on the scope and potential impact of the proposed project and the status of the sage-grouse population and its habitat, USFWS will determine whether an amendment to the CCA and/or associated Conference Opinion is necessary. If USFWS determines that a proposed action requires a minor amendment, it will complete the procedure within 60 days. However, a major amendment may take longer. Inherent in this process is the need for DOE to communicate with USFWS early in the project planning process to ensure that impacts to sage-grouse and its habitats are avoided, minimized, or mitigated appropriately. USFWS may also recommend other measures that would allow DOE to accomplish its mission while preserving the effectiveness of the CCA to successfully conserve sage-grouse and its habitat on the INL Site.

Document Structure

This CCA is comprised of four main divisions, some of which consist of multiple sections. The first division (Sections 1-3) explains what a CCA is and how it will benefit DOE. It also provides a biological background of sage-grouse and an overview of the INL Site, highlighting pertinent ecological research conducted on the Site over the past several decades. These sections clarify that this agreement is solely between DOE and USFWS, and that INL Site contractors remain accountable only to DOE.

The second division (Sections 4-8) briefly describes all INL Site projects, programs, routine maintenance and operations, monitoring, and support activities that have the potential to impact sage-grouse or the habitat upon which the species depends. The primary purpose of the second division is to provide sufficient information to USFWS about operations at the INL Site to enable its staff to draft a Conference or Biological Opinion. Sections 4-8 do not contain any new commitments by DOE.

The third division (Sections 9-10) has two main purposes. The first is to describe DOE's new conservation framework (Section 9), including adaptive regulatory triggers that, if tripped, would initiate additional cooperative action by DOE and USFWS. The second purpose (Section 10) is to describe and rate the primary threats to sage-grouse and its habitats on the INL Site. After each threat summary, conservation measures are listed that DOE currently (i.e., prior to the signing of the CCA) implements on the INL Site, followed by new conservation measures that DOE proposes to implement upon signing the CCA. Section 10 also identifies DOE mission-critical infrastructure and activities (i.e., constructed assets or activities deemed necessary to the primary missions assigned to a particular site, without which operations would be disrupted or placed at risk) that are excluded from certain conservation measures. Many of these measures require little or no additional funds to implement.

The final division (Section 11) describes the monitoring and reporting plan associated with this CCA. It also describes the process required to amend this agreement and the principle of adaptive management upon which the CCA is based. This section outlines inventory and monitoring tasks that DOE will support in upcoming years to track threats and indicators of sage-grouse population and habitat trends. The monitoring activities will also provide data to permit

critical evaluation of the success of implemented conservation measures and achievement of the CCA objectives. Each year, DOE will provide a written report to USFWS, and the two agencies will meet to discuss the latest monitoring results, changes in DOE activities and mission priorities, and other pertinent issues. Consistent re-evaluation and analysis of new information will ensure that this agreement continues to benefit sage-grouse on the INL Site, is continuously grounded in the best available science, and retains its value to both parties. The CCA is effective for 20 years from the date of signing or until one of the parties chooses to withdraw. Either party may withdraw from the agreement by providing the other party a written notice of intent to withdraw no later than 30 days prior to the proposed termination date. The terminating party will also include a written explanation of the reasons for withdrawal.

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ACRONYMS

ATRC	Advanced Test Reactor Complex
AMWTP	Advanced Mixed Waste Treatment Plant
BLM	Bureau of Land Management
BMPs	Best Management Practices
CCA	Candidate Conservation Agreement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFA	Central Facilities Area
CITRC	Critical Infrastructure Test Range Complex
COT	Conservation Objectives Team
DOE	Department of Energy, Idaho Operations Office
EA	Environmental Assessment
ESA	Endangered Species Act
ESR	Emergency Stabilization and Rehabilitation
ESER	Environmental Surveillance, Education, and Research
F&SS	Facility and Site Services
FFA/CO	Federal Facilities Agreement and Consent Order
GIS	Geographic Information System
GSS	Gonzales-Stoller Surveillance, LLC
IDFG	Idaho Department of Fish and Game
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
ISAC	Idaho Sage-grouse Advisory Committee
ISRH	Idaho Standards for Rangeland Health
LTV	Long-term Vegetation
MFC	Materials and Fuels Complex
NEPA	National Environmental Policy Act
NERP	National Environmental Research Park
NEW	net explosive weight
NOAA	National Oceanic and Atmospheric Administration
NRF	Naval Reactors Facility
N&HS	National and Homeland Security

NSTR	National Security Test Range
PBF	Power Burst Facility
RRTR	Radiological Response Training Ranges
RWMC	Radioactive Waste Management Complex
SGCA	Sage-grouse Conservation Area
SODAR	Sound Detection and Ranging
SOX	Stand-off experiment range
SSER	Sagebrush Steppe Ecosystem Reserve
Stoller	S.M. Stoller Corporation
TAN	Test Area North
TSF	Technical Support Facility
UAV	unmanned aerial vehicle
UGV	unmanned ground vehicle
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WAGs	Waste Area Groups
WCS	Wildlife Conservation Society
WNv	West Nile virus
WTB	wireless test bed

1. INTRODUCTION

1.1 The U.S. Fish and Wildlife Service and Greater Sage-grouse

Pursuant to the Endangered Species Act (ESA), the U. S. Fish and Wildlife Service (USFWS) is responsible for conducting status reviews of species that may be at risk of extinction. Although information on the biological status and threats to a species may be sufficient to warrant listing it as threatened or endangered under the ESA, often higher priority listing actions preclude USFWS from taking such action. Species that fall within this "warranted but precluded" category are known as candidate species. USFWS conducts an annual review of all candidate species' status including population changes and effectiveness of conservation measures implemented. Any changes may necessitate a change in the species' listing status. For example, the species listing priority may be upgraded or downgraded or the species may be completely removed from the candidate list (i.e., status has improved such that listing is no longer warranted).

Since 1999, multiple petitions have been submitted to USFWS requesting that the agency list greater sage-grouse (*Centrocercus urophasianus*– hereafter sage-grouse) under the ESA (Connelly et al. 2004). In March 2010, USFWS issued a finding that sage-grouse was warranted but precluded from listing due to higher priorities (Federal Register 2010). Thus, it is currently classified as a candidate species. In a U.S. district court lawsuit settlement of 2011, USFWS agreed to make a final listing decision for sage-grouse by end of September, 2016 (i.e., the species will either be removed from the candidate list or be listed under the ESA).

1.2 A Candidate Conservation Agreement for Sage-grouse on the Idaho National Laboratory Site

DOE's mission is to develop and deliver cost-effective solutions to both fundamental and advanced challenges in nuclear and other energy resources, national security, and environmental management.

Federal agencies with land management authorities may enter into a Candidate Conservation Agreement (CCA) with USFWS to conserve candidate or at risk species within their jurisdictions. A CCA is a voluntary agreement between USFWS and one or more public or private entities in which the partners identify threats to the candidate species and its key habitats and develop conservation measures and objectives aimed at avoiding or minimizing those threats. In 2007, with the sage-grouse having been petitioned multiple times for listing under the ESA (Connelly et al. 2004), the Department of Energy, Idaho Operations Office (DOE) recognized that the best way to maintain flexibility in performing its mission activities on the Idaho National Laboratory Site (INL Site or Site) was to enter into a CCA with USFWS and implement conservation measures designed to protect sage-grouse and its key habitats. DOE assigned the task of developing the CCA to its Environmental Surveillance, Education, and Research (ESER) Program, which subcontracted the Wildlife Conservation Society (WCS) to lead the effort. The ESER program collected substantial data on sage-grouse lek attendance, habitat distribution and quality, and sage-grouse patterns of use on the INL Site (Section 2.5).

1.3 Relationship between this CCA and the Endangered Species Act

If the sage-grouse is proposed for listing, DOE, under Section 7(a)(2) of the ESA, must ensure that actions it funds, authorizes, or carries out are not likely to jeopardize the continued existence of the species or adversely modify or destroy designated critical habitat. This would involve an in-depth biological assessment of a proposed action by DOE to determine what effects, if any, the proposed action would have on 'listed' sage-grouse within the action area (i.e., footprint plus a defined area of effect). If the results of the assessment indicate the proposed action 'may affect' sage-grouse or its designated critical habitat, DOE will be required under Section 7(a)(2) of the ESA to initiate consultation (or conference) with USFWS (before the sage-grouse becomes formally listed the process is referred to as conferencing; after listing, the same process is known as consultation).

Because sage-grouse is currently a candidate species, DOE is not required by the ESA to conference/consult with USFWS regarding mission activities on the INL Site. However, due to the ongoing possibility that sage-grouse could be proposed for listing, DOE has been proactive in developing this CCA cooperatively with USFWS. Furthermore, DOE understands that potential work delays and the development of additional conservation measures, should sage-grouse become listed, may be minimized through the development of this CCA. Although not required by the ESA, DOE and USFWS may choose to voluntarily move through the conference process while sage-grouse are still a candidate for listing, once the CCA has been signed. This collaboration will help ensure that a Conference Opinion, which analyzes the potential effects of DOE activities and the implementation of conservation measures identified in this CCA, is developed in advance of a possible sage-grouse listing.

With this CCA in place, a Conference Opinion would be relatively simple to accomplish because USFWS concludes that implementation of conservation measures described herein meet the conservation level necessary to comply with CCA policy and meet the conservation needs of sage-grouse. Should sage-grouse become listed, USFWS would review the Conference Opinion in coordination with DOE to determine whether the information used in the Conference Opinion remains relevant based on the status and threats to the species. If so, USFWS would confirm the Conference Opinion as the Biological Opinion and any take limitations or terms and conditions identified in the Incidental Take Statement would become binding. An Incidental Take Statement addresses adverse effects that lead to take of individuals, and provides a mechanism for a Federal agency (e.g., DOE), to proceed with mission activities with an exemption from take prohibitions outlined in section 9 of the ESA. Mission activities could proceed as outlined in the CCA, or as modified should minor changes be warranted to further minimize the level of take expected and to meet the conservation goals of the species. Future actions or activities that are outside the scope of this CCA would be discussed with USFWS early in project planning to ensure compliance with the ESA, and may include possible amendments to the CCA and/or additional section 7 consultation if the species is listed.

1.4 How Will This CCA Benefit DOE?

This CCA does not include assurances or guarantees by USFWS that no further conservation actions would be required should sage-grouse become listed in the future. However, as described above, if the sage-grouse becomes listed, the CCA will serve as a basis for the Conference Opinion and Biological Opinion, pursuant to Section 7 of the ESA. The conservation measures presented herein were developed with the goal of fulfilling the

requirements of Section 7 consultation; however, those requirements may change with new information regarding species status or conservation needs. Because there is extensive biological information and knowledge of sage-grouse on the INL Site and across the range, should the species become listed, it is likely that no further conservation measures would be required by USFWS, assuming that agreed-upon measures are being properly implemented.

This CCA not only promotes actions that will benefit sage-grouse, it also establishes a less onerous and more predictable process for DOE to comply with the ESA should sage-grouse become listed. Such a measure of certainty will allow DOE to make long-term plans with confidence knowing it is unlikely that additional land-use restrictions would be enacted if the sage-grouse becomes listed. Furthermore, this level of confidence will increase the attractiveness of the INL Site for new DOE programs and projects.

When a species is listed, USFWS designates habitat judged to be critical for the recovery of the species. If USFWS finds that a federal landowner is committed to conserving the listed species and has been proactively and effectively implementing conservation measures prior to a final listing decision, it may exempt lands under the agency's jurisdiction from being designated as critical habitat. Although there is no way to know beforehand whether suitable habitat on the INL Site would be exempt from such a designation if sage-grouse was listed, DOE's compliance with the conditions of this CCA may support such an exemption, if monitoring indicates that sage-grouse conservation goals are realized. At a minimum, the CCA will streamline the consultation process and reduce the workload of both USFWS and DOE.

DOE has already benefited from the process of developing this CCA through the positive working relationships that have been forged with USFWS officials. Through the process, USFWS officials have become familiar with the INL Site and its mission activities, and those officials are therefore better able to respond when DOE has inquiries about how the status of sage-grouse will affect its ability to accomplish its mission.

1.5 Goals and Adaptability of the CCA

USFWS recognizes that INL Site activities currently have a relatively low impact on sage-grouse compared to many activities that occur on nearby public and private lands. As such, this CCA is not intended to restrict DOE mission-critical activities in favor of sage-grouse conservation. Rather, the primary goal of this agreement is to identify objectives and associated conservation measures that DOE will implement to minimize threats to sage-grouse and its critical habitat on the INL Site. Successful implementation of these measures will provide a high level of confidence for DOE that it will retain maximum flexibility for continuing its mission to develop and deliver cost-effective solutions to challenges of nuclear and other energy resources, national and homeland security, and environmental management. In addition, this CCA aims to ensure adequate conservation measures, adaptive management potential, and monitoring obligations to allow a Conference Opinion to be converted into a Biological Opinion on the effective date of any decision to list the sage-grouse, thus preventing costly work delays for DOE.

This CCA is a voluntary and amendable document, intended to be adapted to conform with new sage-grouse and/or habitat data or changing circumstances at the INL Site. By signing this agreement, DOE commits to seek funding to implement conservation measures presented herein. However, given the uncertainty of annual budgets, it may not be possible to implement

some conservation measures in a timely manner. As funding becomes available, conservation measures will be prioritized based on applicability to resolving the most immediate threats. If new DOE mission requirements make it impossible to fully comply with or implement any conservation measure, DOE and USFWS will meet to discuss alternatives that would ensure the conservation intent of this CCA while allowing DOE to pursue its mission objectives.

2. BIOLOGICAL BACKGROUND AND RESEARCH HISTORY ON THE INL SITE

2.1 Range-wide Sage-grouse Biology and Population Trends

Populations of sage-grouse have declined in recent decades (Connelly et al. 2004, Garton et al. 2011), and the species' range-wide distribution across western North America has been reduced to nearly half of its historic distribution (Schroeder et al. 2004, Connelly et al. 2011*a*). Although the rate of decline of this species has slowed over the past two decades (Connelly et al. 2004, Garton et al. 2011), there is concern for the future of sage-grouse because of its reliance on sagebrush (*Artemisia* spp.), which is a central component in an ecosystem that has been greatly altered during the past 150 years and is currently at risk due to a variety of threats (Knick et al. 2003, Connelly et al. 2004). Not only are healthy stands of sagebrush necessary year-round for sage-grouse to survive, during summer, young sage-grouse require a diverse understory of native forbs and grasses as well. This vegetation provides protection from predators and supplies high-protein insects, necessary for rapidly growing chicks (Connelly et al. 2011*b*).

2.2 Conservation Needs

USFWS has concluded that sage-grouse warrant ESA protection primarily because of two factors: the impacts of habitat fragmentation and the inadequacy of existing regulatory mechanisms to protect the species (Federal Register 2010). Fragmentation of contiguous sagebrush-dominated habitat is caused by a variety of mechanisms including wildland fire, infrastructure development, and invasive weeds. In the eastern portion of the sage-grouse range, fossil fuel development is the primary driver of habitat fragmentation, whereas in the western portion, including southeast Idaho, wildland fire and invasive weeds are the greatest sources of fragmentation (Federal Register 2010). Hence, in Idaho, the greatest conservation needs for sage-grouse are that private and governmental landowners take actions to limit further fragmentation of sagebrush-dominated habitats and to rehabilitate and reconnect suitable habitat patches.

As stated above, the second factor contributing to the need to list sage-grouse is the inadequacy of existing regulatory mechanisms. This issue applies primarily to the Bureau of Land Management (BLM), because that agency manages over 50% of the land that is currently occupied by sage-grouse. However, other agencies with substantial land holdings in key sage-brush habitat, including DOE, can address the second factor by formally committing to set sage-grouse as a conservation priority when making land-use decisions.

2.3 Overview of the Idaho National Laboratory Site

2.3.1 Description, Climate Geomorphology

The INL Site encompasses 2,303 km^2 (889 mi^2) of land that was withdrawn from the public domain or purchased by the Department of Energy (Fig. 1). It is located at the northern extent of the Great Basin and is characterized as a sagebrush steppe ecosystem in a cold desert environment. Annual precipitation averages 208 mm (8.2 in.), with most precipitation typically falling in May and June. Snow cover may persist from 2 weeks to several months in the winter.

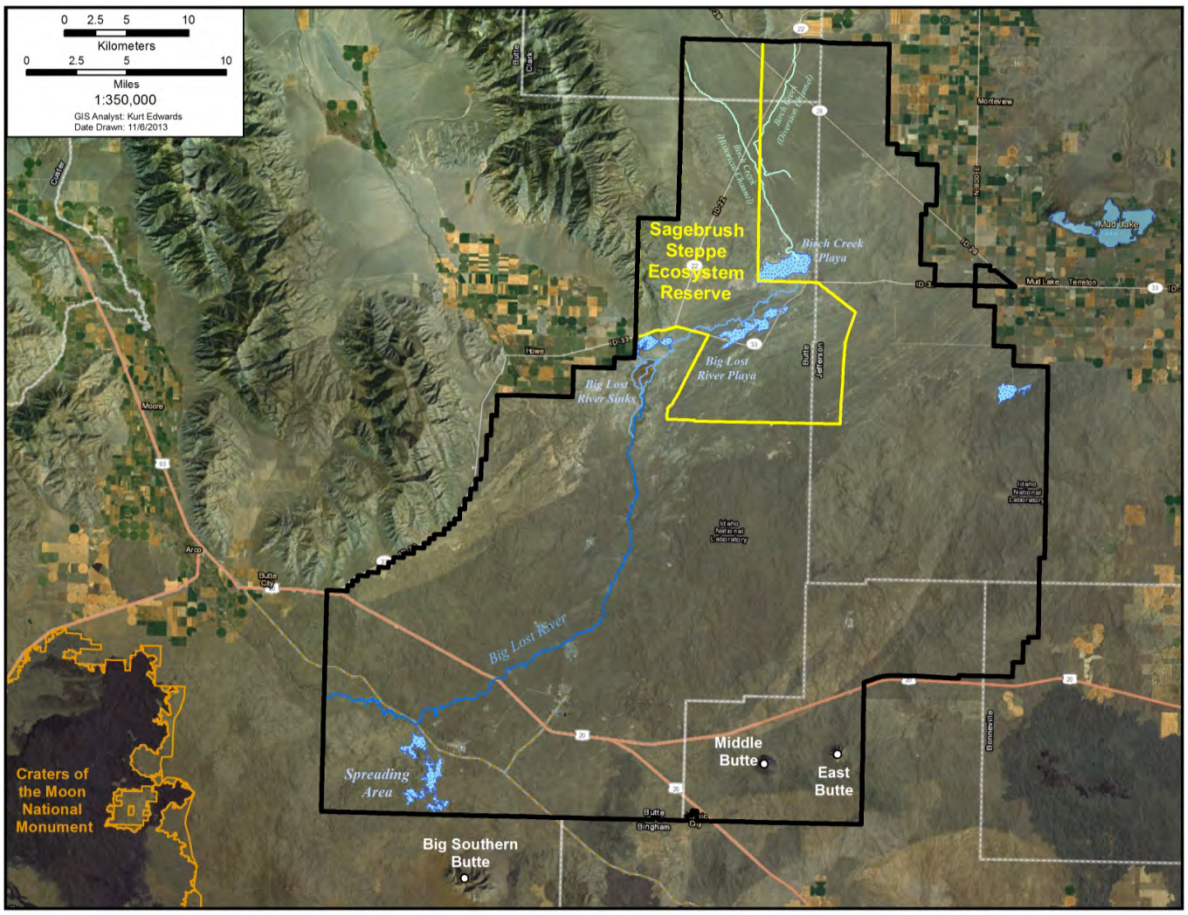

Figure 1. Boundaries of the INL Site with prominent geological sites, paved highways, and other jurisdictional boundaries highlighted. Historic and contemporary stream/river channels and playas on the INL Site are shown in blue. All natural surface water on the INL Site is ephemeral and in most years does not reach playas and spreading areas.

Mean maximum daily temperature on the southern end of the INL Site ranges from -2.2 °C (28 °F) in January to 30.6 °C (87 °F) in July, with extreme annual fluctuations ranging from 40.6 °C (105 °F) to -43.9 °C (-47 °F; http://niwc.noaa.inel.gov/climate.htm). Mean elevation of the INL Site is approximately 1,500 m (4,920 ft). Surficial geology is strongly influenced by volcanic deposits, and soils often include shallow, windblown sand or loess over basalt, although deeper aeolian deposits can be found on leeward sides of basalt outcrops. Because soil movement patterns are influenced by abundant basalt outcrops and frequent windy conditions, transitions between soils types and textures may be quite abrupt (Forman et al. 2010).

2.3.2 Rivers and Streams

Little surface water exists during spring and summer on the INL Site. The Big Lost River and Birch Creek drainages are both diverted upstream for agricultural purposes. Only during years of high flow does water from the Big Lost River reach the INL Site where it drains into an ephemeral wetland known as the Big Lost River Sinks. This ephemeral wetland is the only substantial water source on the INL Site, not including a number of man-made waste treatment ponds near facilities.

2.3.3 Vegetation

Plant communities on the INL Site have been classified into 27 vegetation types (Shive et al. 2011). Much of the INL Site is dominated by Wyoming big sagebrush (*Artemisia tridentata* ssp. *wyomingensis*), Basin big sagebrush (*Artemisia tridentata.* ssp. *tridentata*), or a combination of both subspecies. Many big sagebrush-dominated shrublands are accompanied by a diverse, native, perennial grass and forb understory. The most abundant understory grass species include: needle and thread grass (*Hesperostipa comata*), streambank wheatgrass (*Elymus lanceolatus*), bluebunch wheatgrass (*Pseudoroegneria spicata*), Indian ricegrass (*Achnatherum hymenoides*), Sandberg bluegrass (*Poa secunda*), and bottlebrush squirreltail (*Elymus elymoides*). Forb composition can be quite variable across the INL Site, but some of the most widely distributed and abundant species include: flaxleaf plainsmustard (*Schoenocrambe linifolia*), Hood's phlox (*Phlox hoodii*), cushion buckwheat (*Eriogonum ovalifolium*), and freckled milkvetch (*Astragalus lentiginosus*). Communities dominated by Utah Juniper (*Juniperus osteosperma*) also occur, but with limited spatial extent on the INL Site.

Plant communities dominated by herbaceous species and shrubs other than big sagebrush are numerous and widespread, but generally occupy less total area than those dominated by big sagebrush. Dominant shrubs in non-big sagebrush communities may include green rabbitbrush (*Chrysothamnus viscidiflorus*), sickle saltbush (*Atriplex falcata*), black sagebrush (*Artemisia nova*), three-tip sagebrush (*Artemisia tripartita*), low sagebrush (*Artemisia arbuscula*), spiny hopsage (*Grayia spinosa*), and shadscale (*Atriplex confertifolia*). Dominant grasses in native, herbaceous communities may include streambank wheatgrass, needle and thread grass, western wheatgrass (*Pascopyrum smithii*), Indian ricegrass, bluebunch wheatgrass, and Sandberg bluegrass. Non-native species tend to occur with high frequency but low relative abundance in plant communities across the INL Site (Forman et al. 2013); however, these species can become locally abundant within a community of native vegetation.

A few plant communities are entirely dominated by non-native species, which have replaced natives to the extent that remnants of the pre-invasion community are unidentifiable. The most common non-native plant communities are dominated by crested wheatgrass (*Agropyron cristatum* and *A. desertorum*), cheatgrass (*Bromus tectorum*), and tall tumblemustard (*Sisymbrium altissimum*).

2.3.4 Wildlife

The INL Site provides habitat for a diverse array of wildlife species, eight of which are sagebrush specialists that are restricted to sagebrush habitats during the breeding season or year-round (Paige and Ritter 1999, Rowland et al. 2006). Reynolds et al. (1986) documented 164 bird, 39 mammal, nine reptile, six fish, and one amphibian species on the INL Site (including single observations and accidental occurrences), for a total of 219 vertebrate species.

Several mammalian species that occur on the INL Site are common or potential predators of adult and juvenile sage-grouse, including coyote (*Canis latrans*), American badger (*Taxidea taxus*), bobcat (*Lynx rufus*), and long-tailed weasel (*Mustela frenata;* Patterson 1952, Schroeder et al. 1999). Predatory avian species on the INL Site include ferruginous hawk (*Buteo regalis*), golden eagle (*Aquila chrysaetos*), red-tailed hawk (*Buteo jamaicensis*), rough-legged hawk (*B. lagopus*), northern harrier (*Circus cyaneus*), and Swainson's hawk (*B. swainsoni*). The common raven (*Corvus corax*), coyote, and American badger are nest predators that commonly prey on sage-grouse eggs (Coates et al. 2008).

2.3.5 Research and Conservation Provisions

The INL Site provides unique ecological research opportunities, in part because it has been subjected to minimal anthropogenic disturbance for approximately 70 years. Anderson and Inouye (2001) concluded that the composition and cover of plant communities on the INL Site are similar to that of nearby ungrazed kipukas within Craters of the Moon National Monument (Tisdale et al. 1965, Passey et al. 1982), which are considered pristine. Additionally, the federal government has made provisions that include environmental research as one of the primary purposes for the land.

In 1975, the INL Site was designated as a National Environmental Research Park (NERP) with a primary research objective to develop methods for assessing the environmental impact of energy development activities and for predicting and mitigating those impacts. The NERP achieves these objectives by facilitating use of this outdoor laboratory by university and government researchers. In 1999, approximately 298 km^2 (115 mi^2) located in the northwest corner of the INL Site were set aside by a U.S. Secretary of Energy proclamation as a Sagebrush Steppe Ecosystem Reserve (SSER; Fig. 1). Like the NERP, the SSER is to provide opportunities to study a relatively undisturbed sagebrush steppe ecosystem. The SSER is to be managed for the primary purpose of maintaining current, native plant communities, which promote a diversity of plant species and vegetation types and are fairly representative of communities across the INL Site (Forman et al. 2003).

2.4 Vegetation and Habitat Research on the INL Site

2.4.1 Long-term Vegetation Plots

Vegetation research and monitoring have been conducted across the INL Site since 1950, when the Long-Term Vegetation (LTV) plots were established. The LTV project, as well as numerous additional studies, provides a basis for understanding the dynamics and processes of sagebrush-steppe vegetation specific to the INL Site. This information allows investigators to assess the habitat quality of plant communities, estimate the likelihood of change in response to stressors, and determine the efficacy of proposed habitat management strategies.

Data generated from the LTV transects comprises one of the oldest, largest, and most comprehensive vegetation data sets for the sagebrush-steppe ecosystem in North America. These data are an excellent resource for understanding patterns of vegetation change and the potential effects of long-term vegetation dynamics on habitat for sage-grouse. They also facilitate INL Site-specific assessments of the applicability of theoretical models to describe temporal change in sagebrush-steppe vegetation. Some of the most notable conclusions from analyses of the LTV data include:

- Native plant communities have an enormous capacity for short- and long-term temporal change in species composition in the absence of major disturbance (Anderson and Inouye 2001);
- Changes over the past 60 years have not been directional, nor have they been predictable based on successional models or the more contemporary state-and transition models (Anderson and Inouye 2001);
- Temporal variability in weather patterns and spatial heterogeneity in resources appear to affect the composition of native plant communities at the scale of the entire INL Site more than any other non-anthropogenic factor, including fire (Colket and Bunting 2003).

Trend analyses from the LTV data set indicate that big sagebrush cover across the INL Site began declining in the 1970s and has continued to decline in the decades since (Anderson and Inouye 1999, Forman et al. 2010). Its abundance is currently less than half of what it was when it was first sampled in 1950, making the ongoing trend a significant concern for sagebrush-obligate species. Initial declines were attributed to die-offs resulting from a combination of factors including: anoxic soil conditions and increased pathogen loads due to a series of wet years, increased herbivory because of exceptionally high vole (*Microtus* spp.) and leporid (*Sylvilagus* spp., *Lepus* spp, and *Brachylagus* spp.) populations, and increases in defoliating insects like aroga moths (*Aroga* spp.; Anderson and Inouye 1999). Following the initial die-off episode, additional sagebrush losses were attributed to wildland fire. During the most recent analysis of the LTV data set, however, data sampled over the last 2 decades were normalized to factor out sagebrush losses due to fire, and the trend in declining sagebrush abundance across the Site was unchanged (Forman et al. 2010). This suggests that the effects of fire on sagebrush populations are localized and that continued declines in abundance are more widespread. Ongoing sagebrush research at the INL Site reveals that individuals are not dying from advanced age, nor is a significant disturbance required for big sagebrush to regenerate. These two results are significant because management actions elsewhere in sagebrush steppe have been based on these assumptions. Hence, although it is not yet clear what mechanisms are responsible for big sagebrush population declines on the INL Site, researchers continue to eliminate incorrect hypotheses.

2.4.2 Post-fire Vegetation Re-establishment

Historically, wildland fire was a natural disturbance in the sagebrush steppe, with average fire rotation intervals of 200 to 350 years (Baker 2011). In recent years, however, the frequency of large fires is thought to have increased throughout western North America, in part due to non-native plant invasion and intensified human land use (which also increases the potential for human-caused ignition [Miller et al. 2011]). Consequently, sagebrush loss due to wildfire has become one of the major threats to the persistence of sagebrush-obligate species.

The effects of fire and the patterns of post-fire vegetation recovery have been documented repeatedly on the INL Site. Colket and Bunting (2003) indicated that the time required for sagebrush to re-establish to pre-burn abundance levels varied greatly from one stand to another and that recruitment events were highly episodic. Blew and Forman (2010), after monitoring the results of a post-fire aerial seeding of sagebrush, suggested that because of the

episodic nature of big sagebrush establishment, aerial seeding on the INL Site would likely have a 10% probability of success in any given year.

Blew and Forman (2010) also documented sagebrush recruitment patterns in unplanted burns. They found that seed availability may not necessarily be as prohibitive to re-establishment as previously thought, and that most burn scars they surveyed had at least some sagebrush establishment within the first 5 to 10 years post-fire. However, full recovery to pre-burn levels of big sagebrush cover takes decades (Colket 2003).

Additional studies from the INL Site and other southeast Idaho locations have demonstrated that when native plant communities are in good ecological condition prior to a burn, they generally recover as diverse, native plant communities within a few growing seasons post-burn (Ratzlaff and Anderson 1995, Blew and Forman 2010). Ratzlaff and Anderson (1995) also reported that revegetation efforts designed to expedite the recovery process, especially those involving soil disturbance, damaged native plants that had survived and resprouted post-fire, resulting in fewer native species and increased non-native species abundance. Data collected on the INL Site following drill seeding after a 1996 fire showed similar results (Jones and Blew 1998). Hoover and Germino (2012) reported that the spatial patterning at the micro scale of soil nutrient resources and other soil characteristics were retained following fire and subsequent erosion at the INL Site. They concluded that plant diversity is increased in this ecosystem by the microsite patterns of coppice (perennial-plant resource islands) and relatively bare interspace. Management that maintains this patterning is important for maintaining post-fire plant diversity. This includes maintenance of the surface crust formation on the interspaces, which contributes to the stability and resilience of the micro-scale spatial patterning of resources and plant community composition.

2.4.3 Non-native Plant Invasion

Sagebrush habitat loss due to non-native species invasions and the subsequent displacement of native plant species and communities is an increasing problem across the sagebrush-steppe ecosystem, and has the potential to adversely affect INL Site habitats as well. Eleven species designated as noxious weeds in Idaho have been documented on the INL Site. These species occur sporadically, and in some locations infestations on the scale of one to a few acres have been observed. Of greater concern are other non-native species (not classified as noxious) that are distributed widely across the INL Site. These are frequently encountered, but their total vegetative cover is low relative to native shrubs and grasses. However, they have been documented to form large, depauperate stands in a few locations on the INL Site (Shive et al. 2011). These species include crested wheatgrass, cheatgrass, and a number of introduced, annual forbs including saltlover (*Halogeton glomeratus*), Russian thistle (*Salsola kali*), desert alyssum (*Alyssum desertorum*), kochia (*Bassia scoparia*), and various mustards (*Sisymbrium* spp. and *Descurainia* spp.).

The distribution and dynamics of non-native plant populations and their effects on sagebrush-steppe habitats at the INL Site have been documented in vegetation maps (Shive et al. 2011), as a component of the LTV project (Forman et al. 2010), and in several species-specific studies (Perkins and Nowak 2010, Rew et al. 2012). Many of these species were documented on the INL Site as early as 1950, but their distributions and frequency of occurrence have increased through time (Forman et al. 2010). However, with the exception of crested wheatgrass, non-native species have generally only come to dominate areas that have been subject to repeated

disturbance events and/or severe soil disturbance. LTV researchers have postulated that high native plant species cover and low annual variability in total cover by native species have translated into plant communities of good-ecological condition that are somewhat resistant to invasion (Anderson and Inouye 2001). Thus, an emphasis on maintaining healthy, native, plant communities is likely an important strategy for limiting the risk of most non-native species invasions. Conversely, crested wheatgrass has been documented to move into otherwise healthy plant communities and displace native species (Marlette and Anderson 1986, Forman et al. 2010, Rew et al. 2012), forming near monocultures. Native plant communities appear to have very little resistance to crested wheatgrass encroachment on the INL Site.

2.5 Sage-grouse Research on the INL Site

Sage-grouse have been studied on the INL Site for more than three decades. During that time, a wide variety of questions have been addressed, providing insight into seasonal movements (Connelly and Ball 1982, Connelly et al. 1988), habitat use (Connelly and Ball 1982, 1987, Connelly 1982), the response of sage-grouse to disturbance and different land management practices (Connelly and Ball 1979, Connelly et al. 1981, Connelly 1982), and the movement of radionuclides off-site via sage-grouse vectors (Connelly and Markham 1983). Lek route surveys were performed sporadically during the 1970s-1990s until consistent, annual efforts began in the late 1990s. Connelly et al. (1981) reported that 51 leks were known to be active on or near the INL Site. In 2013, 49 leks were classified as active, including several that have been discovered as a result of increased monitoring efforts over the past five years.

2.5.1 Lek Route Surveys

As part of an effort to track trends of sage-grouse abundance in the region, three lek routes (Lower Birch Creek, Tractor Flats, and Radioactive Waste Management Complex [RWMC]) were established on the INL Site by the Idaho Department of Fish and Game (IDFG) in the mid-1990s, and have been monitored annually since. In addition, a variety of leks not associated with the current routes have been monitored sporadically since the early 1950s. Unfortunately, much of the data collected from leks that are not part of annually surveyed routes are of limited value for estimating historical trends, because methods of data collection are unknown or they varied substantially from year to year.

Currently, 19 (37%) of the known active leks on the INL Site are included in the three survey routes (Fig. 2). Since 1999, these routes have been surveyed in accordance with IDFG protocols. However, the number of leks monitored annually across the three routes has increased from 12 to 23 (including three inactive leks) during that time. Over the past 14 years, more birds were observed in 2005 and 2006 than have been recorded either before or since (Fig. 3).

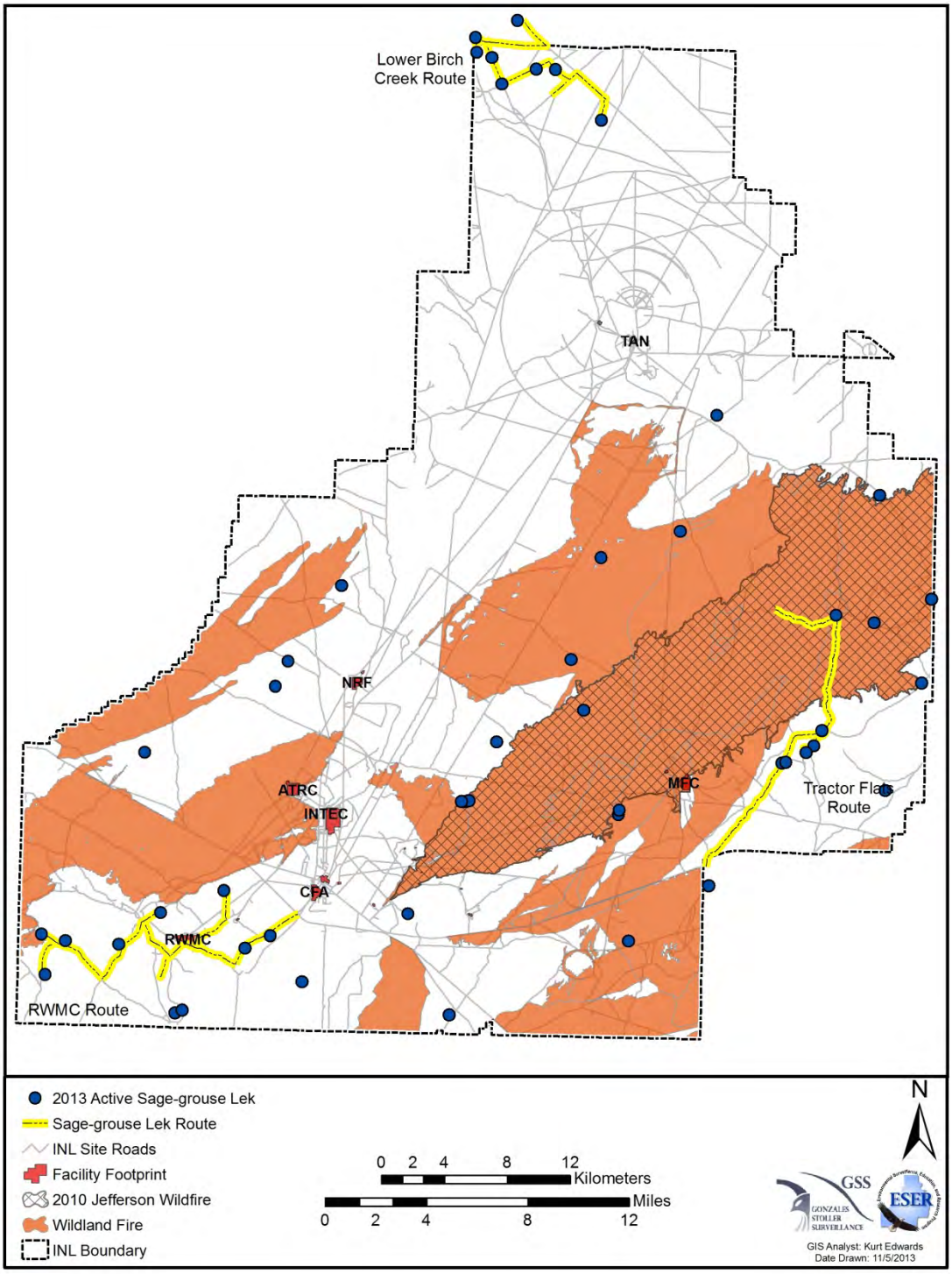

Figure 2. Sage-grouse leks and lek routes overlaid on wildland fire scars that have burned since 1994. The three lek routes (Lower Birch Creek, RWMC, and Tractor Flats) are monitored annually by ESER. Special emphasis has been placed on the 2010 Jefferson fire, the largest documented in INL Site history.

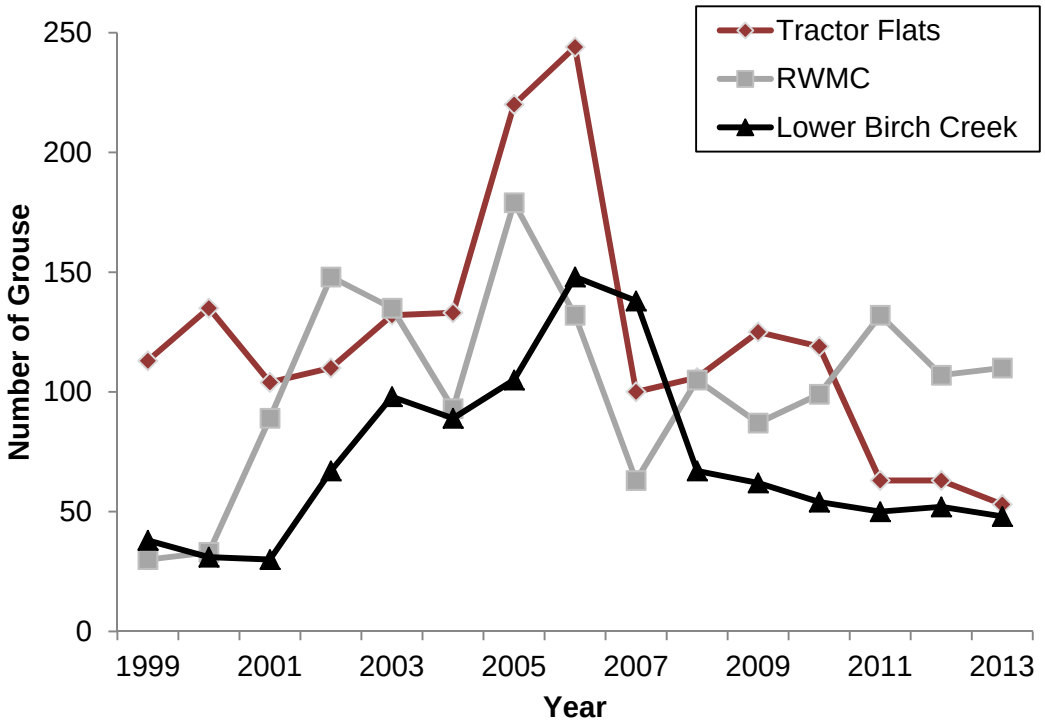

Figure 3. Observed peak attendance of male sage-grouse across three established lek routes on the INL Site.

2.5.2 Historical Lek Surveys

Beginning in spring 2009, ESER biologists began performing annual surveys of historical lek sites that had been originally documented by Connelly (1982), IDFG, BLM, and others. Many of these sites had not been surveyed in nearly 30 years. Biologists had surveyed 63 historic lek sites by 2011 and classified 17 of them as active (Shurtliff and Whiting 2009, Whiting and Bybee 2011). In addition, six new leks were discovered serendipitously while driving between lek sites. The historical lek surveys are scheduled to continue at least through 2016, at which time biologists will be able to identify which of the historical sites are used by sage-grouse.

2.5.3 Sage-grouse Movements and Reproductive Success

During spring 2008 and 2009, 52 sage-grouse (31 females, 21 males) were captured at 13 leks and equipped with radio-transmitting collars. Those birds were subsequently tracked throughout the year to obtain data regarding movements and seasonal habitat-use patterns (Fig. 4). Sage-grouse on the INL Site were seasonally migratory, as most of the birds moved off-Site after the breeding season. The fewest number of sage-grouse occurred on the INL Site in August and September (2-year mean of lowest monthly proportion of marked sage-grouse on the INL Site = 19.1% [N = 21.5]). These results were driven by female movement as most females, including those that successfully hatched a clutch, moved off-Site during summer in search of insects and forbs associated with moister habitats or higher elevations. By late fall (October - November), sage-grouse began to return to the INL Site, with highest numbers of grouse on the INL Site in March and April (Fig. 4; Whiting et al. 2014).

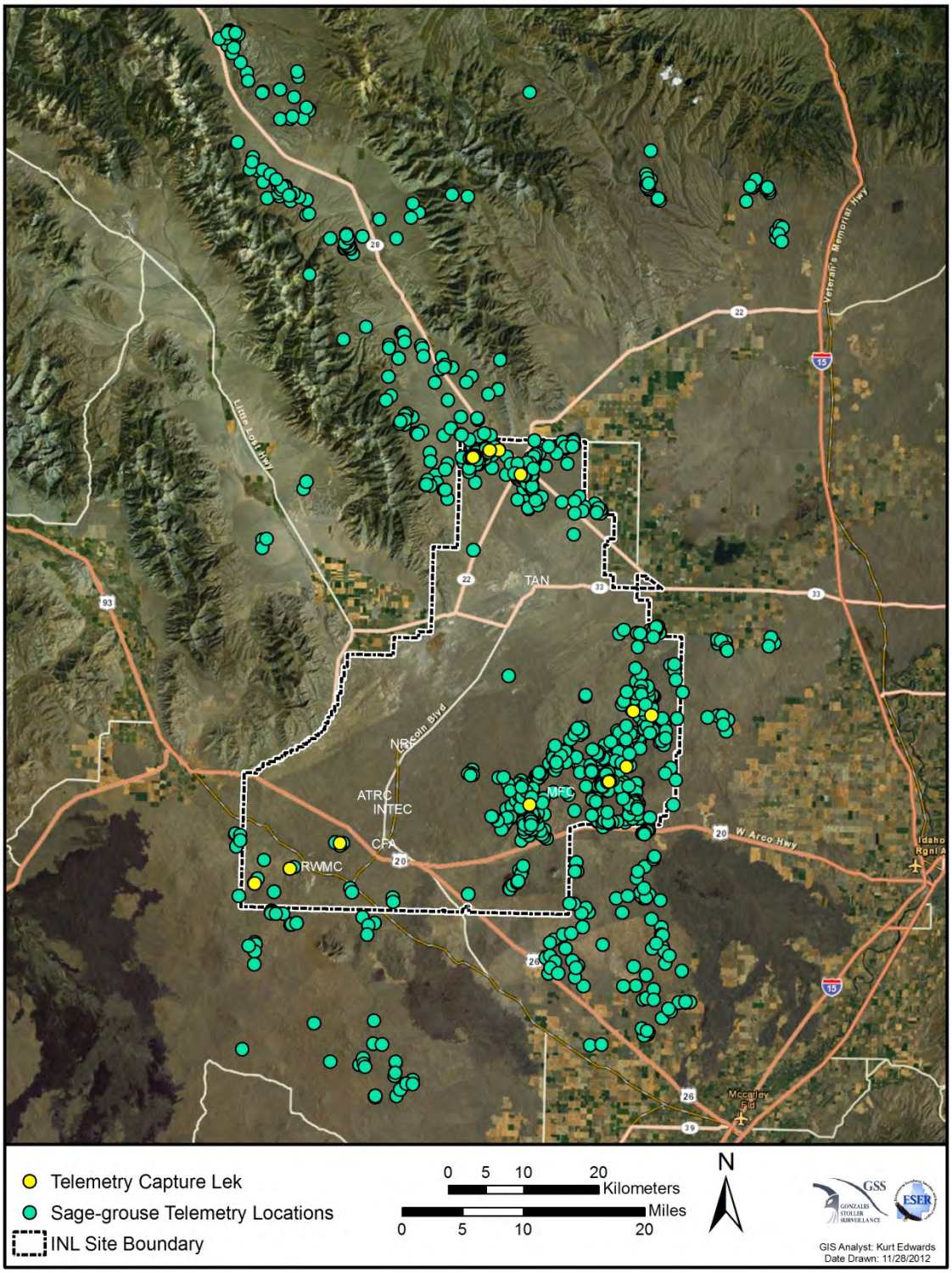

Figure 4. Locations of radio-collared sage-grouse from March 2008 to June 2010. Nearly all of the points north of the Site are from sage-grouse captured at the northern most leks, whereas most of the points east, south and south-west are from sage-grouse captured at the southeastern leks. Only six (11.5%) sage-grouse were captured on the three leks in the southwestern portion of the INL Site, and only 57 locations (4.7%) were recorded from those birds.

Some collared sage-grouse traveled greater distances between seasonal habitats than has been reported previously from the INL Site. The maximum seasonal distance (one-way) traveled by a male was ~108 km (67 mi), whereas the maximum seasonal distance (one-way) traveled by a female was ~66 km (41 mi; Whiting et al. 2014). Those results reinforce findings from an earlier study of sage-grouse on the INL Site (Connelly 1982; Connelly et al. 1988) and demonstrate that sage-grouse that use the INL Site occupy the landscape beyond the INL Site boundaries.

During 2008 and 2009, investigators located a total of 44 sage-grouse nests (20 in 2008, 24 in 2009) and documented 30% and 46% apparent nest success, respectively. When re-nest attempts were included, 33% of females in 2008 and 52% in 2009 successfully hatched at least one egg. Ten of the 44 nests were located off the INL Site, where hens had a total of 30% apparent nest success over the 2 years (Whiting et al. 2014).

Connelly et al. (2011*c*) examined 29 studies that reported sage-grouse nest success throughout its range. Average nest success in unaltered habitats was 51% whereas average nest success in altered habitats was 37%. Although the INL Site consists of relatively unaltered habitat, nest success during 2008 and 2009 (mean = 38%) was similar to that which is expected in altered habitats. Many factors may contribute to annual nest success of sage-grouse, and data from hunter-harvested birds in areas surrounding the INL Site suggest that nest success on the INL Site likely mirrors regional patterns. IDFG reported that juvenile/adult female ratios calculated from wing-barrel counts (i.e., surveys of hunter-harvested bird wings that provide sex and age information used to assess the survival of chicks) were relatively low in 2008 compared with other years, and higher in 2009 in two regions that border the INL Site (IDFG, unpublished data; Table 1). Those juvenile/adult female ratios indicate that chick survival was relatively low in 2008 throughout the region. Thus, although nest success was low on the INL Site, there is no evidence that threats to sage-grouse during the breeding season were greater on the INL Site than in surrounding areas.

Table 1. Juvenile:adult female ratios from wing-barrel count data from IDFG collected in two regions that border the INL Site. Research suggests that a ratio ≥ 2.25 reflects a stable to increasing population (Connelly et al. 2000*a*).

Region	2012	2011	2010	2009	2008	2007	2006	2005
Upper Snake	0.82	1.55	2.31	2.17	1.84	1.16	2.74	2.97
Big Desert	0.45	0.92*	2.76*	3.46*	1.64	0.85*	2.26	3.36

* Sample size was too small for accurate productivity estimates.

2.5.4 Characterization of Breeding Habitat

Male sage-grouse form leks in natural or man-made clearings within or adjacent to nesting habitat (Connelly et al. 2000*a*). As a result, biologists often characterize breeding habitat by calculating the distance that a pre-specified proportion of collared hens nest from their lek of capture. The median distance from a female's lek of capture on the INL Site to the location of her first nesting attempt was 4.1 km (2.6 mi; n = 26, range 0.1 to 49 km). Additionally, 62% of nests fell within 5 km (3.1 mi), 77% of nests fell within 7 km (4.3 mi), and 85% of nests fell within 9 km (5.6 mi) of the female leks of capture (Fig. 5).

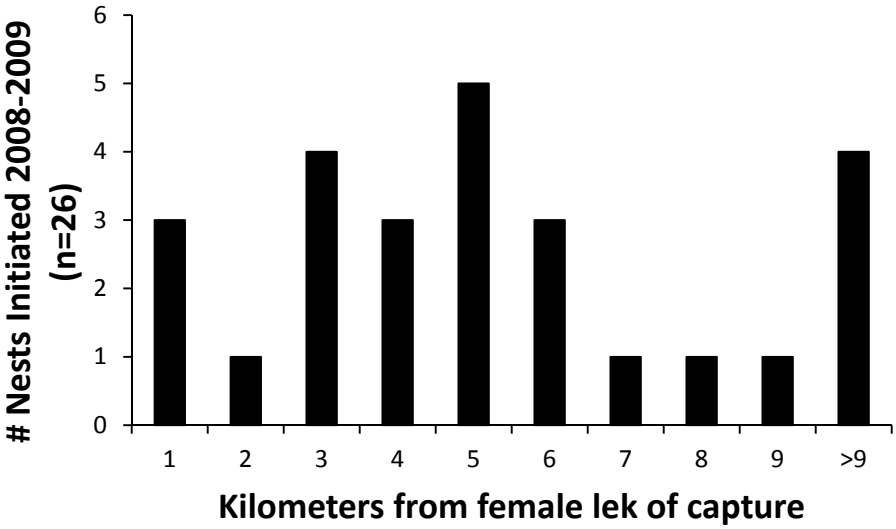

Figure 5. Distance from lek of capture to the site of a female's first nest of the year (1 km = 0.6 mi).

2.6 Current Status of Sage-grouse on the INL Site

Regionally (i.e., Snake, Salmon, and Beaverhead regions), sage-grouse populations are estimated to have declined 57% between 1965 and 2007, as indicated by male attendance at leks (Garton et al. 2011). The steepest declines occurred from the 1960s through the early 1990s (Connelly et al. 2004; Garton et al. 2011), but recent analyses indicate that population trends have stabilized since 1992 (Garton et al. 2011). Although standardized lek surveys were not conducted consistently on the INL Site prior to 1999, it is reasonable to assume that sage-grouse on the INL Site followed a similar trend relative to regional populations.

The radio telemetry study described above confirms previous findings (Connelly 1982) that many of the sage-grouse on the INL Site are seasonally migratory, and are therefore susceptible to threats outside the control of DOE. During the wintering and breeding seasons, sage-grouse return to the INL Site, so DOE can minimize its impact on sage-grouse by making land use decisions that avoid disrupting sage-grouse at lek sites and altering sagebrush-dominated habitat used for nesting and over-winter survival.

Although sage-grouse that occur on the INL Site appear to be stable, there is reason for concern regarding long-term population trends because of the large amount of sagebrush that has been lost due to wildland fire in recent years. In 2010, the Jefferson fire quickly grew into the largest fire ever recorded on the INL Site, burning 32,012 ha (79,103 acres) within Site boundaries (Fig. 2), 16,726 ha (41,330 acres) of which had been dominated by big sagebrush. The following summer, the second largest fire in recent INL Site history (T-17 fire) burned 17,807 ha (44,002 acres), including 12,443 ha (30,746 acres) of big sagebrush. Given the relatively pristine nature of some of the areas burned during those and other recent fires, sagebrush should be able to reestablish naturally over the next several decades. In the meantime,

a large amount of suitable nesting and wintering habitat has been lost, reducing the short-term capacity of the INL Site to support sage-grouse.

3. AUTHORITY

USFWS is authorized to enter into a CCA with federal agencies and other cooperating partners under Sections 2 and 7 of the ESA (16 U.S.C. Sections 1531 and 1536). Entering into this agreement does not constitute a transfer of authority from DOE to USFWS, nor does it authorize the latter to dictate how INL Site contractors should operate with regards to sage-grouse conservation. DOE retains that authority and is responsible for ensuring that contractors comply with conservation measures agreed upon herein (see Sections 9 and 10).

4. ROUTINE MAINTENANCE ON THE INL SITE

This section describes maintenance activities occurring regularly on the INL Site that have a potential to impact sage-grouse or its habitats. Conservation measures associated with each activity that are designed to protect sage-grouse and its habitats are listed in Sections 10.2 and 10.9.

4.1 Road Maintenance

Unpaved roads on the INL Site are routinely used by DOE, the United States Geological Survey (USGS), BLM, INL Site contractors, and rights-of-way grantees. These groups use the roads to conduct security exercises, perform mission-critical activities, evacuate facility areas, combat wildland fires, access power line and other easements, monitor wells, and perform cultural and biological surveys. The extent of road maintenance depends on the intended use, and can be categorized under the following priority levels:

- Priority 1: Roads used for emergency evacuation and security response activities. This level of maintenance requires grading roadways within existing rights-of-way. Priority 1 roads have a gravel surface.
- Priority 2: Provides graded access to the Idaho Nuclear Technology and Engineering Center (INTEC) percolation ponds, the Experimental Field Station, and the National Security Test Range (NSTR) from the Materials and Fuels Complex (MFC) facility. Roads and ground personnel will maintain Priority 2 roads passable and grade them as needed.
- Priority 3: Two-track roads maintained as passable to 4x4 vehicles for wildland fire access. Maintaining Priority 3 roads consists of filling pot holes by dumping gravel fill material in a hole or rut, and then using the dump vehicle to level and compact fill by driving back and forth over new material (“dump and level” method). These roads are not graded.
- Priority 4: Two-track roads receiving no maintenance except with appropriate reviews and surveys.

4.2 Water Control Structures

The INL Site maintains several stream diversion structures that were installed to direct water away from facilities and prevent flooding. The main diversion is on the Big Lost River near the RWMC facility, where a large portion of spring run-off water can be diverted onto playas called Spreading Areas (Fig. 1) to protect downstream facilities. This diversion has redirected water to the spreading areas 11 times since 1990. Other control structures are located near Test Area North (TAN), MFC, and the community of Howe. Birch Creek is diverted upstream of the INL Site for irrigation and hydropower. After the irrigation season ends, water returns to the INL Site in a ditch that terminates at the T-28 North gravel pit. Overflow from the gravel pit is diverted approximately 1 mi east, protecting the TAN and Specific Manufacturing Capability facility from possible flooding. Facility and Site Services (F&SS) inspects the main diversion near RWMC biannually, while the other three are checked annually. F&SS also performs regular preventative maintenance on the diversions during their inspections, including road grading, clearing obstructions from culverts, patching embankments, noxious weed control, and reseeding as needed with a native grass seed mix.

4.3 Weed Management

The INL Site conducts weed control 'patrols' throughout the spring, summer, and fall to help identify and control noxious (and sometimes invasive) weeds. F&SS maintains a database of known weed infestations and annually checks those locations to control weed growth. Naval Reactors Facility (NRF) also maintains a separate database for the same purpose. Most of the locations where F&SS identifies and eradicates weeds are off-road along INL Site boundaries, river channels, and in grazing allotments. These sites are accessed either on foot or using an all-terrain vehicle (all-terrain vehicles are not taken off two-track roads).

4.4 Power Line Maintenance

Maintenance of power lines and associated infrastructure (Fig. 6) by DOE and commercial utility companies requires travel on priority level roads 1-4 (Section 4.1). Maintenance activities include replacing power poles, maintaining lines, and servicing transformers. A 61 m (200 ft) diameter area is required around each structure to maneuver equipment and perform maintenance activities. Other activities may involve off-road travel under power lines or to reach power poles.

DOE has little to no interaction with utility companies regarding maintenance activities within utility power easements. However, stipulations are set forth in a Memorandum of Understanding between DOE and BLM Upper Snake field office requiring right-of-way grantees to take mitigating action to reduce potential impacts of construction and maintenance activities (see Section 10.2).

4.5 Railroads

There are approximately 46.7 km (29 mi) of railroad tracks on the INL Site, including main lines and spurs. DOE maintains 32.2 km (20 mi) of rail line from the southern boundary of the INL Site to NRF (including NRF spurs). Spurs leading to the Advanced Mixed Waste Treatment Plant (AMWTP) near RWMC, INTEC, Central Facilities Area (CFA), and RWMC are not used or maintained (Fig. 6). Weekly maintenance occurs on the main and spur lines along the length of INL Site's portion of the track. Vegetation control, which is in accordance

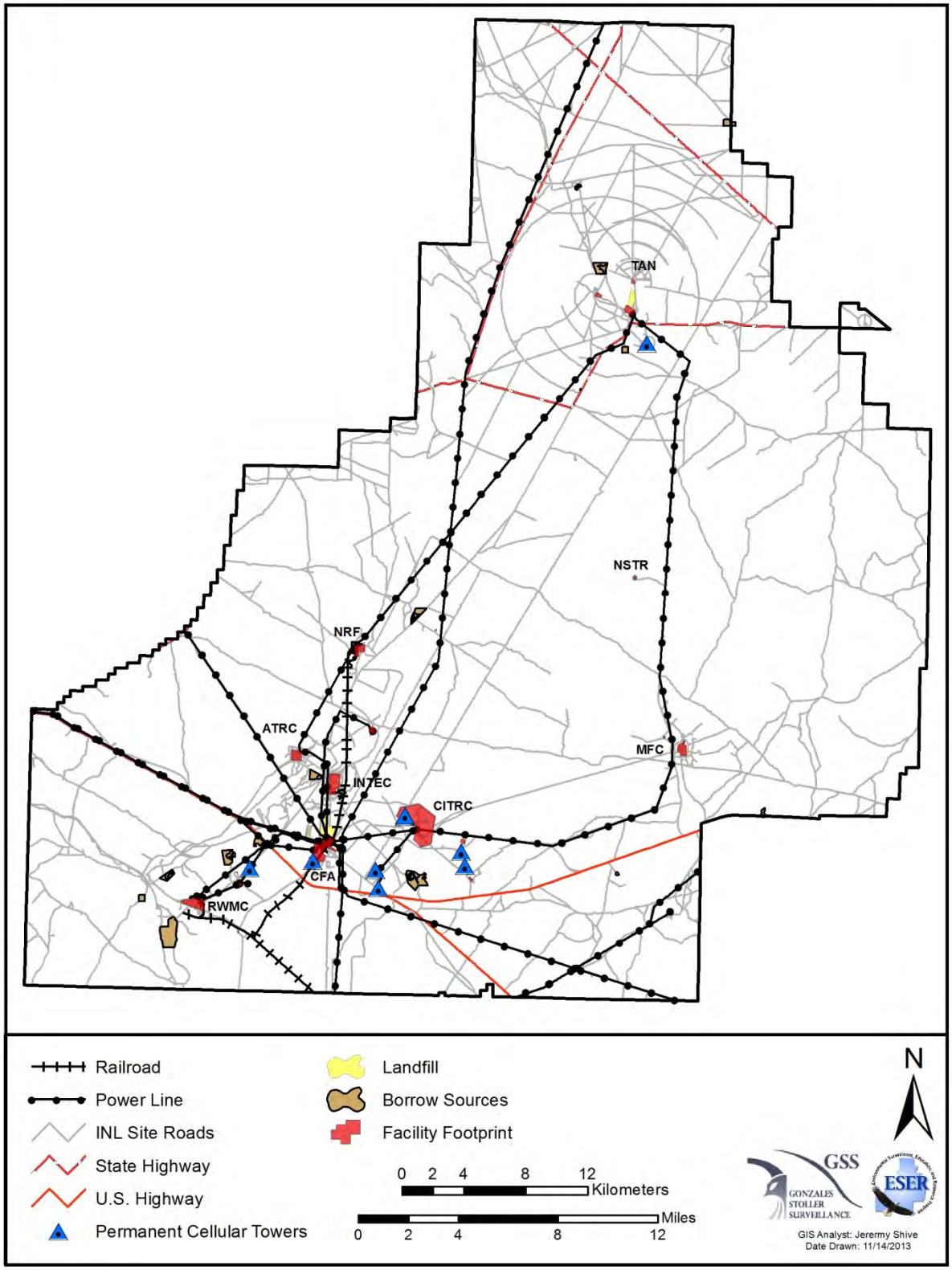

Figure 6. Infrastructure on the INL Site. Some active and closed landfills (yellow) are displayed, but data are not available for all landfills. However, unmarked, active landfills are all closely associated with facilities.

with the Federal Railroad Administration Track Safety Standard, aims to limit fire hazards along tracks. In addition, DOE uses sterilizing herbicide in spring and fall, and additional weed abatement throughout the summer growing season as needed.

Annual and monthly inspections of rail lines occur before any shipment. In the recent past, no more than 8-10 trains per year have used the tracks, and those only during summer months. In the foreseeable future, there may be a need to run one train per month year round. Activity along the railway is predominantly in the form of a maintenance vehicle that runs along the rails and heavy trucks and equipment on the adjacent access road. During rail shipments, vehicles accompany the train along the entire route using the adjacent roadway.

5. SUPPORT ACTIVITIES ON THE INL SITE

This section describes activities that support current INL Site operations and have a potential to impact sage-grouse or its habitats. Conservation measures associated with each activity that are designed to protect sage-grouse and its habitats are listed in Sections 10.1, 10.6., and 10.9.

5.1 Landfill Operations

Landfill operations consist primarily of picking up and burying industrial, construction, or municipal waste from around the INL Site. All landfills are located near facilities (Fig. 6), some of which were capped and revegetated after having been filled to capacity. Waste is dumped in designated areas within the landfill, and cover material is applied as needed.

5.2 Borrow Sources (gravel and silt/clay)

Borrow sources at the INL Site support a variety of activities including infrastructure maintenance, new construction, environmental restoration, waste management, and deactivation, decontamination, and decommissioning. Seven active INL Site pits produce gravel: T-28 North, T-28 South, Lincoln Blvd., Monroe Blvd., T-12, Adams Boulevard, and NRF pit (Fig. 6). One active pit (Rye Grass Flats) produces silt/clay. Several other borrow sources are inactive, undeveloped, or held in reserve for future needs. Material is hauled from active pits to various INL Site project areas at all times of the year, although extremely wet or cold conditions can limit operation capability in the pits. DOE completed an environmental assessment (EA) that defined the number and size of silt-clay borrow sources on the INL Site (DOE-ID 1997). Any time the dig face on an INL Site borrow source is expanded, a new environmental evaluation of that action is completed.

Borrow source needs will increase greatly when engineered surface barriers are constructed at INTEC and RWMC under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; 42 USC § 9601 et seq., 1980). As much as 3.2 million m^3 (4.2 million yd^3) of borrow materials will be required (Bean and Jolley 2009). Currently active borrow sources will not be adequate, either because sufficient types and volumes of materials are not available (e.g., topsoil and riprap) or because borrow sources are not proximal to construction sites. Expanding existing borrow sources and developing former or new borrow sources will be essential. In particular, spreading areas proximal to RWMC will be developed as a borrow source if surveys conclude the spreading areas can provide suitable

quantities of required materials. Mitigation offsets for seasonal and time-of-day restrictions on operations likely will be necessary to meet construction schedules.

5.3 Safeguards and Security Activities

The INL Site protective force patrols in vehicles on T-roads and secondary roads, primarily around the main Site facilities (e.g., MFC, INTEC, Advanced Test Reactor Complex [ATRC]), but could be anywhere on the INL Site. Personnel may need to drive or walk cross-country to apprehend or investigate trespassers anywhere on the INL Site, at any hour, and in any season.

During exercises (or a real security event), personnel may access areas up to several hundred yards outside a facility fence. There may be rare occasions, usually when training a Special Response Team, when a group of the protective force would perform a multi-mile cross-country training exercise on foot.

Contractors at the MFC Live Fire Range and the CFA Main Live Fire Range shoot an assortment of weapons, including handguns, various caliber rifles, and automatic weapons (machine guns). In addition, the main range has a section used for explosive training, primarily breaching. In support of this training (and a real security emergency), an explosive magazine storage area has been established 3.1 km (1.9 mi) north of MFC along T-25.

5.4 Pre-Fire Preparation, Suppression, and Post-Fire Evaluation Activities

The INL Site has in place a Wildland Fire Management Plan that details pre-fire, fire-suppression, and post-fire activities (INL 2011). Pre-fire activities include (1) making annual inspections on the INL Site wildland urban interfaces to identify defensible space measures such as mowing vegetation around buildings and structures; (2) annual mowing along main INL Site roadways, parking lots, facility fences, and explosives ranges to isolate human-caused ignition sources and improve man-made barriers to fire progression; and (3) annual inspection of a series of unpaved roads to ensure they are passable for effective response access to fire ignitions. In addition, the INL Fire Department has attempted to develop a fire detection system, which would remotely monitor areas following lightning strikes to detect smoldering fires and improve capability to contain fires before they become large. The research project attempted to use surveillance cameras positioned on the tops of Howe Peak and East Butte and had two objectives. One was to determine if the cameras could be successfully used to provide additional information on a reported smoke plume. The second was to use off-the-shelf change detection software to automatically identify a smoke plume. The second objective results suggest that the software confused dust with smoke and produced substantial false positives. Further development of the detection system is not currently planned, but the INL Fire Department will continue to use the system to gather intelligence to improve wildland fire detection and response times.

Once a fire has ignited, firefighters use a staged response for suppression. The fire department has established two preparedness levels. Preparedness Level 1 is implemented at the onset of wildland fire season and requires the initial dispatch of two wildland fire engines and a water tender to all confirmed wildland fires. Additional resources, including wildland engines and BLM resources, are available and requested by the incident commander when judged necessary. Preparedness Level 2 is implemented when the INL Site fire danger rating and fuel conditions indicate the sustained potential for fire ignition and significant growth development,

generally in July. Initial response is increased from two to four wildland engines during Preparedness Level 2 and BLM resources are requested for all fire ignitions. Additionally, an INL dozer and additional water tenders are staged and dedicated for wildland fire response during Preparedness Level 2.

Commonly employed fire-fighting techniques include the utilization of a direct attack using minimum impact suppression tactics that reduce or eliminate soil disturbance. These tactics have been successful for most INL Site fires, including all fires initiated by INL Site operations. When fires become large due to fuel and/or weather influence, the use of dozer-constructed containment lines and indirect tactics, including backfiring operations, are generally necessary to safely and effectively contain the fire.

The INL Site maintains its own fleet of wildland fire engines, heavy equipment, wildland fire trained personnel, an Emergency Communications Center, and a mobile Incident Command Center. DOE maintains a mutual aid agreement with BLM and other federal, state and local fire agencies.

6. MONITORING ACTIVITIES ON THE INL SITE

This section describes monitoring activities on the INL Site that have a potential to impact sage-grouse or its habitats. Conservation measures associated with each activity that are designed to protect sage-grouse and its habitats are listed in Section 10.9.

6.1 Environmental Surveillance Monitoring

Environmental surveillance monitoring is performed to identify key contaminants released into the environment, evaluate different pathways through which contaminants move in the environment, and determine the potential effects of these contaminants on the environment and the public. These site-wide environmental monitoring programs are supported by routine activities including air, soil, water, and biota sampling.

Training exercises designed to simulate an environmental spill or release are conducted periodically. During such exercises, the INL Site Emergency Response organization dispatches personnel around the affected area to take samples of air, water, soil, depositing contaminants, direct radiation, etc. In some exercises, sample teams are sent longer distances downwind. These sample teams generally stay on existing roads, with short distance foot travel off-road. Occasionally, off-road vehicle travel is necessary to reach a sample location quickly.

6.2 Ecological Monitoring and Research

Ecological monitoring and research activities are supported by the Environmental Surveillance and Land Management Support Tasks within the ESER program. Specific activities may include: conducting annual wildlife and periodic vegetation surveys, establishing small (< 2 ha [5 acre]) research plots, installing structures to house research instrumentation, small-scale excavation and soil coring, establishing telemetry stations to transmit data, conducting ground and aerial surveys of wildlife and habitat, capturing and marking wildlife, and performing other similar activities related to ecological, environmental, or radiological research consistent with the mission of the ESER program. Activities may be conducted in remote areas Site-wide or at the Experimental Field Station.

6.3 Cultural Resource Survey, Monitoring, and Research

Cultural resource surveys, monitoring, and research at the INL Site support DOE and contractor compliance with federal and state laws, regulations, and DOE-specific mandates. These regulations require consideration of cultural resources in the execution of INL Site projects and long term land management as outlined in the INL Cultural Resource Management Plan (DOE/ID-10997). Specific activities may include field surveys and cultural resource documentation, monitoring of known cultural resource locations, small-scale archaeological excavations using hand tools, geophysical surveys, tribal and stakeholder tours of cultural resource locations, and other activities consistent with the Cultural Resource Management Plan. Activities are conducted in a variety of on-Site locations, including remote, undeveloped areas and at INL Site facilities, roads, or other infrastructure.

6.4 Groundwater Monitoring, Well Maintenance, and Abandonment Activities

Approximately 800 monitoring wells in and around the INL Site are maintained by the USGS, INL, and Idaho Cleanup Project (ICP). These wells are used to monitor groundwater conditions within the eastern Snake River Plain aquifer. The monitoring-well network is supported through borehole drilling, well maintenance, abandonment, and other support activities. Most monitoring wells are located within INL Site facility boundaries, and it could become necessary to construct additional wells in the future. Newly constructed and existing monitoring wells require a mowed pad that is approximately 18 m (60 ft) by 27 m (90 ft). Monitoring wells are generally accessed by an established two-track road.

When new wells are required, they are installed according to applicable INL Site procedures and the Idaho Department of Water Resources requirements. The USGS constructs approximately two monitoring wells each year (Brian Twining, Supervisory Hydrologist, U.S. Geological Survey; Pers. Comm., Oct. 2012). ICP, however, has no plans to drill new wells on the INL Site for the remainder of the ICP extension contract (ending September 2015; Wendell Jolley, CWI Well Services Technical Lead; Pers. Comm., Oct. 2012). Additionally, several wells are decommissioned on an annual basis. New monitoring well construction and/or decommissioning activities are reviewed in advance through the INL Site environmental checklist process. Construction and decommission activities follow INL Site procedures and comply with the Idaho Department of Water Resources requirements, as applicable.

6.5 National Oceanic and Atmospheric Administration (NOAA) Grid Activities and Meteorological Stations

NOAA operates the Mesonet, which consists of over 30 meteorological towers (less than half of which occur on the INL Site) that support weather forecasts, emergency management operations, environmental monitoring, air permitting, and dose calculations. NOAA performs routine maintenance of this equipment at each station and makes sure the areas around each station are mowed during wildland fire season.

7. ONGOING PROJECTS AND PROGRAMS ON THE INL SITE

This section describes ongoing projects and programs occurring on the INL Site that have a potential to impact sage-grouse or its habitat. Conservation measures associated with each

project and program designed to protect sage-grouse and its habitats are listed in Sections 10.1, 10.2, and 10.9.

7.1 CERCLA Activities

Remediation of the INL Site under CERCLA has been ongoing for more than 20 years. The Federal Facility Agreement and Consent Order (FFA/CO) for the INL Site (DOE-ID 1991) established the procedural framework and schedule for developing, prioritizing, implementing, and monitoring appropriate response actions. The Action Plan attached to the FFA/CO divides the INL Site into 10 waste area groups (WAGs) to facilitate remediation, and these WAGs are further subdivided into individual sites and groups of sites (operable units). WAGs 1-9 generally correspond to primary facilities, while WAG 10 comprises the balance of the INL Site, including overall concerns with the Snake River Plain Aquifer and those surface and subsurface areas not included in WAGs 1-9 (Fig. 7). Ongoing response actions primarily involve activities within WAGs 1-9. These areas are generally disturbed, have frequent human and equipment activity, and do not provide suitable habitat for sage-grouse.

CERCLA response actions for the INL Site are documented in action memoranda and records of decision (available at http://ar.inel.gov/). In accordance with the FFA/CO, investigations and decision-making for each WAG concluded with a comprehensive record of decision. Comprehensive records of decision have been finalized for all 10 WAGs and the last planned record of decision for the INL Site has been published (DOE-ID 2009). Each CERCLA site has been evaluated, and a process is in place to address new sites that may be discovered in the future.

Though construction of engineered surface barriers at WAGs 3 and 7 will require excavating and transporting borrow materials in the future (see Section 5.2), only WAG 10 currently has routine activities (other than monitoring) outside of primary facilities. Those activities include:

- Groundwater monitoring;
- Inspecting and maintaining institutional control sites (i.e., sites that do not qualify for unlimited use and unrestricted exposure because of residual contamination or other hazard);
- Investigating potential new sites, including newly discovered munitions constituents and other discarded military munitions;

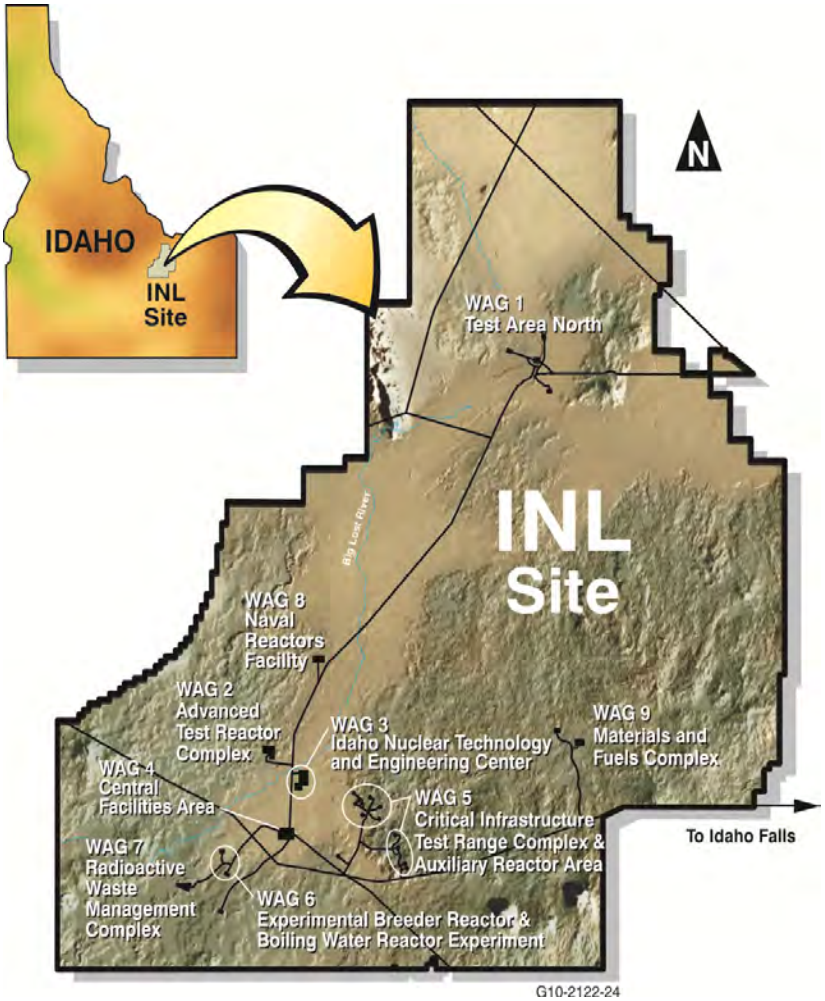

Figure 7. The INL Site in southeast Idaho, with depictions of rivers, paved roads, major facilities, and their respective WAGs. WAG 10 encompasses the entire Site.

7.2 National Security Test Range

The National Security Test Range (NSTR), located north of MFC and immediately west of T-25, consists of (1) a project access road, (2) two lay-down areas, (3) an observation and data acquisition area, and (4) a 274 m (900 ft) diameter test pad. Explosive work, monitoring, and storage of equipment occur within the lay-down areas, test pad, and along the roadway. During some tests, vehicles park along T-25 to observe the tests from a safe distance. Projectiles up to 120 mm (4.7 in.) are fired and explosives up to 9,071 kg (20,000 lb) net explosive weight (NEW) are detonated on the test pad. Small explosive events (up to 1,361 kg [3,000 lb] NEW) may occur weekly, mid-level explosive events (1,361-4,536 kg [3,000 – 10,000 lb] NEW) occur once or twice per month, and large explosive events (4,990-9,071 kg [11,000 –20,000 lb] NEW) are expected to occur once every 3 - 5 years.

7.3 Critical Infrastructure Test Range Complex

The Critical Infrastructure Test Range Complex (CITRC; Fig. 6) includes the facilities and infrastructure in the previously designated Power Burst Facility (PBF) area and numerous field locations throughout the INL Site. CITRC supports the INL National & Homeland Security (N&HS) missions, which are tasked to research, develop, demonstrate, deploy, and test systems and technologies that protect the nation's critical infrastructure. Existing facilities and infrastructure are leveraged to support these missions. Field locations include both permanent and temporary/portable installations. CITRC supports the following areas of technology: wireless communications, electric power reliability, nonproliferation, and unmanned vehicles (aerial and ground).

Figure 8. Portable communication tower

7.3.1 Wireless Test Bed

Much of the CITRC work on the INL Site most likely to impact sage-grouse involves the wireless test bed (WTB), a system of fixed and portable radio or wireless communication transmitters and receivers. The WTB currently has fixed-location towers and portable towers (Fig. 8). The current fixed-location towers are at the following locations: CFA, the main guard gate, Water Reactor Research Test Facility, Security Training Facility, Fillmore Test Facility, Cell Site 6, Cell Site 9, Real Time Monitoring Facility, East Butte, and along the road leading to the Experimental Breeder Reactor No.1 (Fig. 6). Portable towers are typically deployed in a variety of locations, as long as they are accessible by road. Current planning has identified the need to increase the number of both types of towers in the future. Candidate locations include areas near the east and west borders of the INL Site, with possibilities throughout the INL Site. For permanent and some portable locations, connectivity for power and communications is required.

Portable towers are typically 18.3 m (60 ft) tall and require a gas-powered generator running continuously as a power source. During operation, a truck generally refuels the generator daily; otherwise, personnel are not normally required at these locations. Portable tower sites are chosen based on a specific set of criteria, including remoteness, availability of high points, and clear line-of-sight to fixed or other portable towers. Although a customer-specified cellular grid pattern leaves few options for the general configuration of portable towers, there is often flexibility with regard to site-specific placement. Before mobile antennas are deployed for a new WTB series of tests, a DOE National Environmental Policy Act (NEPA) review is performed, including appropriate environmental surveys at each proposed portable tower site. In addition, CITRC activities conducted in areas with natural or naturalized vegetation (i.e., non-native but self-sustaining plant communities) require a survey for ecological

resources. Occasionally, a mobile tower platform is used instead of a portable tower. It has the same basic footprint as a portable tower, but is 49 m (160 ft) high.

To support WTB activities, N&HS personnel conduct drive tests wherein an individual navigates a section of road, stopping periodically to step away from the vehicle and evaluate signal strength using hand-held equipment. N&HS personnel also conduct tests using High Frequency towers, which are relatively short compared to fixed or portable towers. One site north of Highway 20 near the eastern INL Site boundary consists of 6 white PVC tubes/towers positioned vertically several meters apart with a single wire strung between them (Fig. 9). The site is located within an old burn scar and is devoid of sagebrush. While operational, the site may be occupied by N&HS personnel.

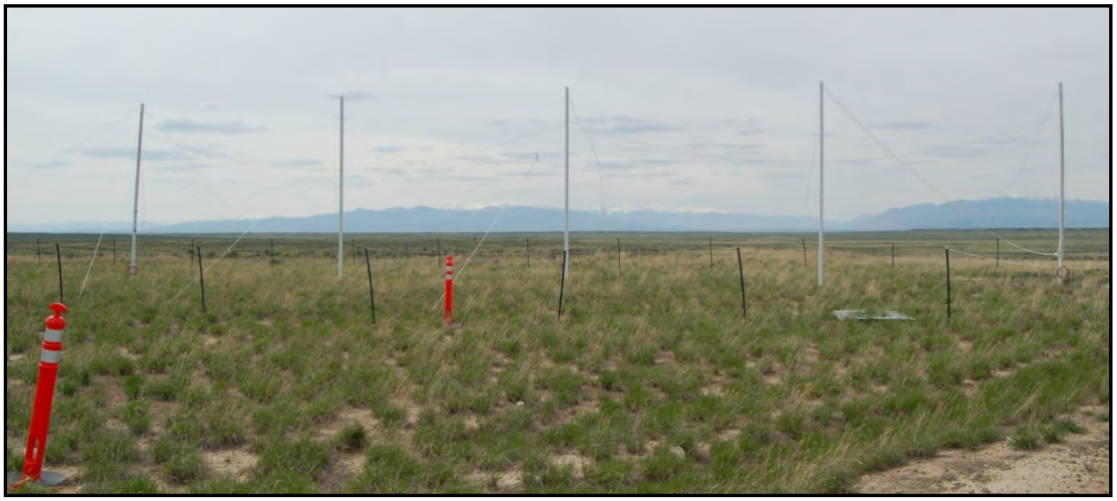

Figure 9. High Frequency towers on T-21 near the southeast border of the INL Site.

7.3.2 Electric Power Reliability

Existing electric power transmission and distribution systems at the INL Site are leveraged to support electric power reliability testing. The CITRC area has an existing distribution system that does not routinely support other missions at the INL Site, making it available for N&HS power system testing. In order to minimize power delivery impacts to the other missions at the INL Site, N&HS plans to expand the existing power infrastructure to include: a dedicated 138kV transmission line from CFA to CITRC, expansion of the existing CITRC Substation, additional 13.8kv power lines, and support infrastructure (buildings, communication lines, utilities, etc.). Most of these modifications will be located along or adjacent to existing installations, however, some proposed modifications may require connections across previously undisturbed areas.

Electric power testing may require portable generators for support equipment or to provide power for the test. In some instances, equipment may fail during a test. Under these circumstances, the potential hazards are evaluated and mitigations are put in place, including staging fire department equipment response during testing, if necessary.

7.3.3 Nonproliferation

N&HS utilizes CITRC to support technology development and demonstration, and first responder radiological/nuclear incident training. Typically, no significant infrastructure

modifications are needed. Testing and training involves mobilization of equipment and radiological materials. Human disturbance is usually the most significant impact from this activity. The Radiological Response Training Ranges (RRTR; Section 7.6) and Stand-off experiment (SOX) range (Section 7.5) are specifically established to support these types of activities.

7.3.4 Unmanned Aerial and Ground Vehicles

The INL Site maintains a 305 x 30.5 m (1,000 x 100 ft) airfield and tactical support facility for testing unmanned aerial vehicles (UAVs) and unmanned ground vehicles (UGVs) (see http://www.inl.gov/nationalsecurity/factsheets/docs/critical_infrastructure_test_range.pdf) north of the CITRC near the middle of the INL Site. Small aircraft (usually 9-23 kg [20-50 lb]) are flown from this location a few times each month, typically from 152-305 m (500 – 1,000 ft) above the ground, although some flights may exceed an altitude of 1,000 m (3,281 ft). Any airspace across the INL Site can potentially be used as a flight path, but most flights are performed over the UAV test range, which encompasses a 1.6 km (1 mi) radius around the runway. Some operations also include the use of UGVs, but these remain on paved or otherwise disturbed areas of the test range. Potential future expansion to provide multiple airfields with support facilities is envisioned, though specific locations have not been determined. These would need to be located to support concurrent operations and provide physical separation. Currently, no active leks are known within 6 km (3.7 mi) of the UAV runway.

7.4 Meteorological and Sound Detection and Ranging Towers

Four meteorological towers (i.e., anemometer towers) 10.1 – 60.0 m (33 - 197 ft) tall were installed on the INL Site in 2008 and 2011 for the purpose of gathering wind data. All towers are temporary (i.e., non-permanent and portable) and located near roads. The towers are secured to the ground using four or more guy wires that are marked with safety indicators, which are designed to increase visibility for birds. There are also two Sound Detection and Ranging (SODAR) units temporarily deployed at the INL Site. SODAR units are 2.1 m (7 ft) towers attached to trailers.

7.5 Stand-Off Experiment Range

An EA was completed in 2011 for the SOX Range which is located immediately northeast of the TAN Technical Support Facility (TSF) (DOE-ID 2011). This program was designed to support research and development of active interrogation systems capable of detecting nuclear and explosive materials from great distances. The SOX range houses linear particle accelerators that direct high-energy x-ray beams at a distant target. The perimeter of the inner part of the SOX range (known as the down range area) is fenced and the interior is highly disturbed, containing more than 30 two-track roads (DOE-ID 2011). The dominant vegetation within the fenced area is crested wheatgrass and salt desert shrub, so it is not an area that currently provides optimal sage-grouse habitat. Within the fence, new construction would include a 12.2 x 18.3 m (40 x 60 ft) building, a 15.2 m (50 ft) wide gravel road that extends approximately 2.4 km (1.5 mi) from the building to the targets, a 15.2 x 18.3 m (50 x 60 ft) concrete pad, and an overhead electrical power supply from TAN. Infrastructure improvements at the SOX range have not been completed and are pending mission direction and funding availability.

Nearly all activities at the SOX range would occur within the fenced area, primarily within a few hundred feet of the building and along the down-range access road (DOE-ID 2011). An additional range and buffer area extends approximately 3.2 km (2 mi) northwest and southeast of the down range area, and DOE has encouraged that no development occur in this area. An EA concluded that the SOX range would result in "little additional impact on cultural and biological resources" (DOE-ID 2011).

7.6 Radiological Response Training Ranges

The RRTR are located at three outdoor ranges on the INL Site: T-28 Training Range, TAN Training Range, and the Infiltration Pond Training Range. The TAN and T-28 ranges are located at the north end of the INL Site near TAN and the south RRTR is located near RWMC. There is a broad based need by United States national security agencies to have a training range where they can safely conduct realistic training exercises and demonstrate technologies in radiologically controlled environments that simulate major incidents. Responders to any major radiological incident must be able to effectively use a variety of specialized equipment in a timely and integrated manner to collect the necessary information to characterize the event. These sites will be used to train personnel, test sensors, and develop detection capabilities (both aerial and ground based) under a variety of dispersion scenarios using short-lived radioactive source materials. These tests are typically of short duration and may occur up to 12 times per year. Each event requires the erecting of temporary structures, which are removed at the end of the test. Some vegetation mowing may be required, but this would be the only visual change remaining after each test. While the placement of command posts along a roadway in the T-28 Training Range would remove vegetation, the impacts to sage-grouse and their habitat would be minimal due to the limited amount of disturbance. All tests are conducted on previously disturbed areas including roads, parking lots, and gravel pits. The EA concluded that the RRTR range would result in "little additional impact" on cultural and biological resources" (DOE-ID 2010).

7.7 Construction of Remote-handled Low-level Radioactive Waste Facility

DOE has an ongoing need to properly dispose of remote-handled low-level radioactive waste, which is waste that has a potential radiation dose high enough to require workers to use shields or distance for protection (DOE-ID 2011). The existing location for disposal of remote-handled waste is RWMC, but that facility will not be available after 2017. DOE has chosen a location less than 0.8 km (0.5 mi) southwest of ATRC to build a new remote-handled waste facility and will begin construction in 2014. The area will be cleared of vegetation and a security fence will be erected. Within the facility, roads, buildings, and other supporting infrastructure will be constructed.

The proposed site is located within an area burned by the Tin Cup wildland fire in 2000. Consequently, little sagebrush remains and the area is currently unsuitable for sage-grouse nesting, brood-rearing, or wintering. Surveys conducted in June 2010 in support of an EA did not find evidence of recent use by sage-grouse (DOE-ID 2011), and DOE determined that a Finding of No Significant Impact was appropriate.

8. NON-DOE ACTIVITIES ON THE INL SITE

This section describes activities not associated with DOE that occur on the INL Site, which may potentially impact sage-grouse or its habitat. Conservation measures associated with each activity designed to protect sage-grouse and its habitats are listed in Sections 10.2, 10.4, and 10.9.

8.1 Maintenance of Commercial Power Line Rights-of-Way

See Section 4.4.

8.2 Elk and Pronghorn Hunting

DOE allows limited access for elk and pronghorn hunting from 1 September through December 31 along some of the northern borders of the INL Site (Fig. 10). These hunting activities involve vehicle travel on unpaved roadways and foot traffic.

8.3 Livestock Grazing, Weeds, and BLM Range Improvements

The BLM Upper Snake field office manages grazing activities on allotments that comprise approximately 60% of the INL Site (Table 2, Fig. 10). BLM issues grazing permits and provides DOE an advance copy of each, including any modifications. These permits are valid for up to 10 years, during which time BLM provides grazing use supervision as required by the Federal Land Policy and Management Act (43 USC 1701 et seq.). BLM coordinates with DOE during the grazing permit renewal process and incorporates terms and conditions of use applicable to INL Site lands into the grazing permits. With advance notice to BLM, DOE may revise areas open to grazing if such activity conflicts with DOE missions or security requirements.

BLM and DOE coordinate efforts to control noxious weeds on the INL Site, with BLM taking the lead role on grazing allotments. In the past, BLM has chemically treated weeds on the INL Site, and application records are available in the Upper Snake field office. Each year, BLM selects a subset of treatment areas (which may or may not include INL Site lands) for evaluation to determine effectiveness of treatments.

BLM may propose rangeland improvements that facilitate effective and economical grazing use (corrals, wells, fences, etc.) to INL Site lands or vegetation (reseeding with native or non-native species, brush control, prescribed fire, etc) at any time, although DOE will review such proposals and must give approval. Proposals are likely to be approved unless they conflict with DOE missions, ecosystem management goals, the current CCA, security requirements, or DOE's Comprehensive Land Use and Environmental Stewardship Report. BLM or an authorized operator is responsible for making the improvements.

Table 2. Grazing allotments that include INL Site land. The fifth column from the left shows how much each allotment contributes to the total area on the INL Site under grazing management. The column on the far right identifies when BLM plans to review the condition of each allotment based on Idaho Standards for Rangeland Health (ISRH), assuming no serious resource issues (e.g., wildland fire) trigger an earlier review.

Allotment Name	Total Acres	Acres on INL Site	% of allotment on INL Site	Allotment contribution (%) to total area managed for livestock on INL Site	Next Scheduled ISRH[a] review
Big Butte	48,768	5,651	11.6	1.7	2013
Twin Buttes	317,857	204,274	64.3	60.5	2014
Sinks	30,617	30,571	99.9	9.1	2015
Wigwam Butte	15,438	10,575	68.5	3.1	2015
Mahogany Butte	56,662	17,584	31.0	5.2	2016
Deadman	58,469	30,077	51.4	8.9	2020
Howe Peak	35,544	19,786	55.7	5.9	2020
Quaking Aspen	81,460	19,072	23.4	5.6	2020

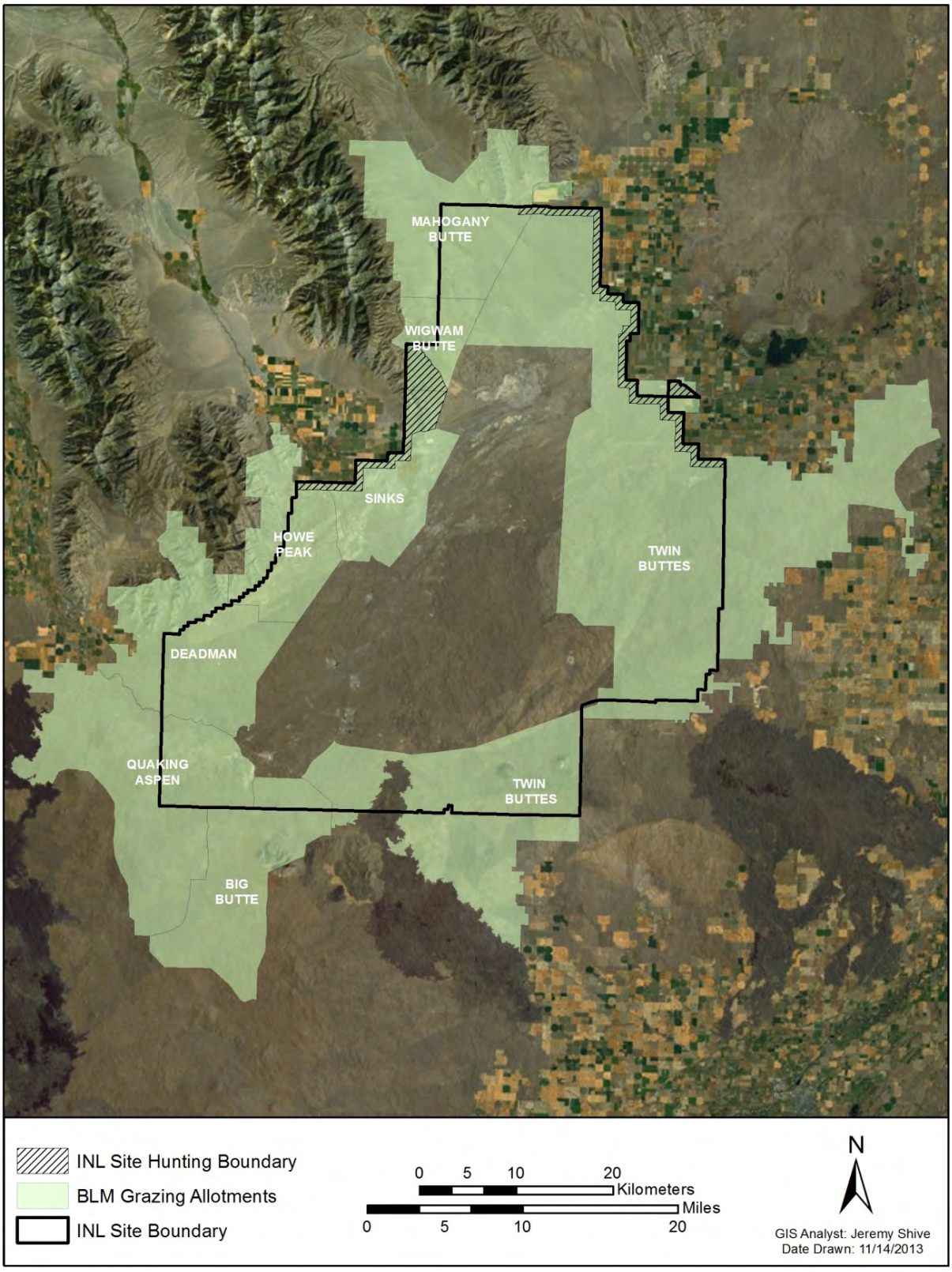

Figure 10. BLM grazing allotments and seasonal big game hunting areas on the INL Site.

9. CONSERVATION FRAMEWORK FOR THE INL SITE

9.1 Background

USFWS considers evidence under five factors or threat categories (Sec 4[a][1] of the ESA) to determine if a species should be listed as threatened or endangered. These factors are: A) the present or threatened destruction, modification, or curtailment of a species habitat or range; B) overutilization for commercial, recreational, scientific, or educational purposes; C) disease or predation; D) inadequacy of existing regulatory mechanisms; E) other natural or manmade factors affecting species continued existence. In its 2010 decision, USFWS reported that sage-grouse warrant ESA protection because there is substantial evidence that factors A and D threaten the persistence of the species across its range (Federal Register 2010).

This CCA signifies DOE's desire to work in concert with other government agencies and private entities to address factors A and D in an attempt to preclude the need to list sage-grouse under the ESA. Section 10 of this CCA describes conservation measures that DOE will implement to address factor A. The current section introduces a conservation framework that DOE will adhere to in order to address factor D. This is one of many efforts across the western United States to address factor D. In Idaho, perhaps the most influential effort comes from Governor C. L. "Butch" Otter's office, which in 2012 submitted the State of Idaho's Alternative (Idaho Alternative) for incorporation into the BLM and U.S. Forest Service National Greater Sage-grouse Land Use Planning Strategy (available at http://fishandgame.idaho.gov/public/wildlife/SGtaskForce/alternative.pdf). Idaho's Alternative (including revisions made by the Governor's office in March 2013) establishes four sage-grouse Conservation Areas that were subdivided into three habitat management zones (Core, Important, General) based on modeling of sage-grouse breeding bird density, habitat connectivity and persistence, and other scientific and non-scientific information. Idaho's Alternative identifies land-use restrictions and other conservation measures that the State is willing to implement in the various zones. USFWS has encouraged DOE to establish a similar conservation framework on the INL Site to achieve consistency across agencies.

DOE agrees that consistency in management decisions across agencies is important for the conservation of sage-grouse. Therefore, DOE hereby establishes a conservation framework patterned after Idaho's Alternative. The framework is less complex than Idaho's Alternative, in part because (1) the INL Site is much smaller than the area considered by Idaho's Alternative; (2) DOE knows where the vast majority of its primary activities will be conducted over the next several years; (3) DOE has more Site-specific data for sage-grouse and habitat on the INL Site than is currently available for many parts of Idaho; and (4) some of the threats to sage-grouse that are typical on public lands are low or non-existent on the INL Site, as access to the INL Site is restricted and all land users are required to comply with DOE directives.

DOE's management objective is to reduce threats and maintain sufficient seasonal habitat to ensure the long-term persistence of sage-grouse on the INL Site. The conservation framework presented below is designed to achieve this objective. It consists of two central components: (1) protection of all lek sites and nearby nesting habitat across the INL Site, and (2) establishment of a conservation area where DOE commits to provide a high level of protection for sage-grouse breeding and wintering habitat. Regulatory triggers are defined that will initiate further analyses and actions if sage-grouse abundance and habitat decline below a pre-defined level. Finally, DOE has designed a monitoring strategy (Section 11.1) that will provide feedback on population

and habitat trends so that principles of adaptive management may be followed throughout the life of this agreement.

9.2 Protection of Active Leks

All known active leks on the INL Site, regardless of location, will have seasonal time-of-day restrictions on activities occurring within 1 km (0.6 mi) of a lek (Lek Buffer) to minimize disturbance of sage-grouse courtship and breeding activities. Restrictions will be in effect 6 p.m. – 9 a.m., March 15 – May 15 (see Sections 10.2 and 10.9 for details on restricted activities). These dates are generally consistent with IDFG lek route survey protocols, and they include the range of dates (23 March – 7 May) upon which annual peak male attendance has been documented on INL Site leks in recent years.

In addition to seasonal restriction of activities that could disturb sage-grouse, DOE will avoid erecting permanent infrastructure within the Lek Buffer (see Section 10.2 for additional details). Some of the Lek Buffers overlap power-line corridors, roads, and other areas that are necessary for DOE mission activities both now and in the foreseeable future (i.e., mission-critical). Because these mission-critical areas are often ecologically degraded to a degree that they are no longer suitable as nesting habitat, multiple exclusions exist that will make it easier for INL Site project managers to complete their activities without impacting sage-grouse, even within these Lek Buffers. Sections 10.2, 10.4, 10.6, and 10.9 discuss conservation measures in the context of Lek Buffers, and list mission-critical areas and activities excluded from certain conservation measures.

9.3 Establishment of a Sage-Grouse Conservation Area

The primary purpose for establishing Lek Buffers is to protect lek sites from human disturbance and habitat degradation that would impact sage-grouse during the breeding season, and to protect a minimal amount of nesting habitat. DOE recognizes that Lek Buffers alone do not protect sufficient nesting, brood-rearing, and wintering habitat to ensure population persistence on the INL Site. For this reason, DOE herein establishes a Sage-grouse Conservation Area (SGCA; Fig. 11) that encompasses 132,020 ha (326,229 acres), or approximately 57% of the INL Site. Like the Core Habitat Zone in the Idaho Alternative, the SGCA is designed to promote a high degree of protection for sage-grouse and its seasonal habitats by restricting activities linked to threats. Conversely, DOE places few land-use restrictions on areas outside the SGCA (except within 1 km Lek Buffers), because these areas contain most of the INL Site infrastructure and are the locations for the majority of activities necessary for DOE to pursue its mission objectives. DOE recognizes that sagebrush-dominated communities outside the SGCA also serve as important habitats for sage-grouse on the INL Site, so in addition to the SGCA, DOE has developed Best Management Practices (BMPs) that apply to the entire INL Site, which guide infrastructure development and other land-use decisions (see Section 10.2). This conservation framework will allow DOE flexibility and land-use predictability in the central portion of the INL Site where most future projects are likely to occur, while ensuring that a majority of important sage-grouse seasonal habitats are protected.

DOE considered the following factors when establishing the SGCA boundary (Fig. 11):

1. Conservation of the Sagebrush Steppe Ecosystem Reserve – The SSER was set aside by a U.S. Secretary of Energy proclamation in 1999. Because DOE is already committed to

preserving this area, and it encompasses 29.2% (34,128 ha [84,332 acres]) of the remaining sagebrush-dominated habitat, it is appropriate to include the SSER in the SGCA.

2. Conservation of Leks on Annual Survey Routes – To preserve ESER's ability to monitor sage-grouse long-term trends across the INL Site, DOE must conserve lekking, nesting, and brood-rearing habitat associated with 19 active leks that are part of the three established lek routes on the INL Site (Fig. 11). These lek routes have been systematically monitored each year since 1999 and provide important population abundance information for the INL Site. All but two of the 19 leks are within the SGCA. The exceptions are two leks located in active gravel pits (Fig. 11).
3. Protection of High-priority Leks – DOE considered where the 10 leks with highest male attendance in 2011 were located, and ensured that the SGCA encompassed nine of these high-priority leks.
4. Exclusion of Mission-Critical Areas – For DOE to fulfill its obligations and perform primary mission activities, existing facilities and support infrastructure must be excluded from most restrictions associated with the SGCA. In addition, DOE needs an assurance that it can develop lands in the future as new mission-related tasks arise. For this purpose, the SGCA excludes existing facilities (i.e., INL Site campuses or other locations where permanent infrastructure exists to support INL Site activities), most supporting infrastructure such as roads, railroads, borrow sources, and power lines (see section 10.2.3), and areas most likely to be developed in the foreseeable future (i.e., the central portion of the INL Site where most facilities already exist).
5. Sagebrush-Dominated Communities – DOE and USFWS agree that the SGCA must include the majority of remaining sagebrush habitat. By so doing, DOE will conserve most of the remaining winter, nesting, and brood-rearing habitats on the INL Site. At the end of 2013, the SGCA included 78,882 ha (194,922 acres) of sagebrush habitat, representing 68% of the remaining areas dominated by sagebrush communities on the INL Site.

To achieve consistency with the State Alternative, the SGCA protects a sufficient number of leks and associated nesting and brood-rearing habitat to conserve a large majority of the sage-grouse population on the INL Site. The SGCA encompasses 27 leks representing 59% of all leks on the INL Site that were active in 2011. These leks supported approximately 74% (n = 316) of males observed on the INL Site during lek surveys in 2011. In comparison, the Core Habitat Zone in the Idaho Alternative protects 65% of known active leks that are occupied by 73% of male sage-grouse in Idaho.

9.4 Adaptive Regulatory Triggers

As in the Idaho Alternative, the current agreement establishes adaptive regulatory triggers that, if tripped, would initiate an automatic response by both signatories. DOE and USFWS agree that trigger criteria and agency responses after a trigger has been tripped should be consistent with the framework in the Idaho Alternative, though some differences are inevitable given the size and jurisdictional differences between the INL Site and management zones across the state. On the INL Site, the two triggers and criteria that must be demonstrated to initiate an automatic response are:

- Population Trigger: Peak male attendance on the 27 leks within the SGCA, averaged over three years, has decreased by 20% or more;
- Habitat Trigger: Total area designated as sagebrush habitat within the SGCA has been reduced by 20% or more.

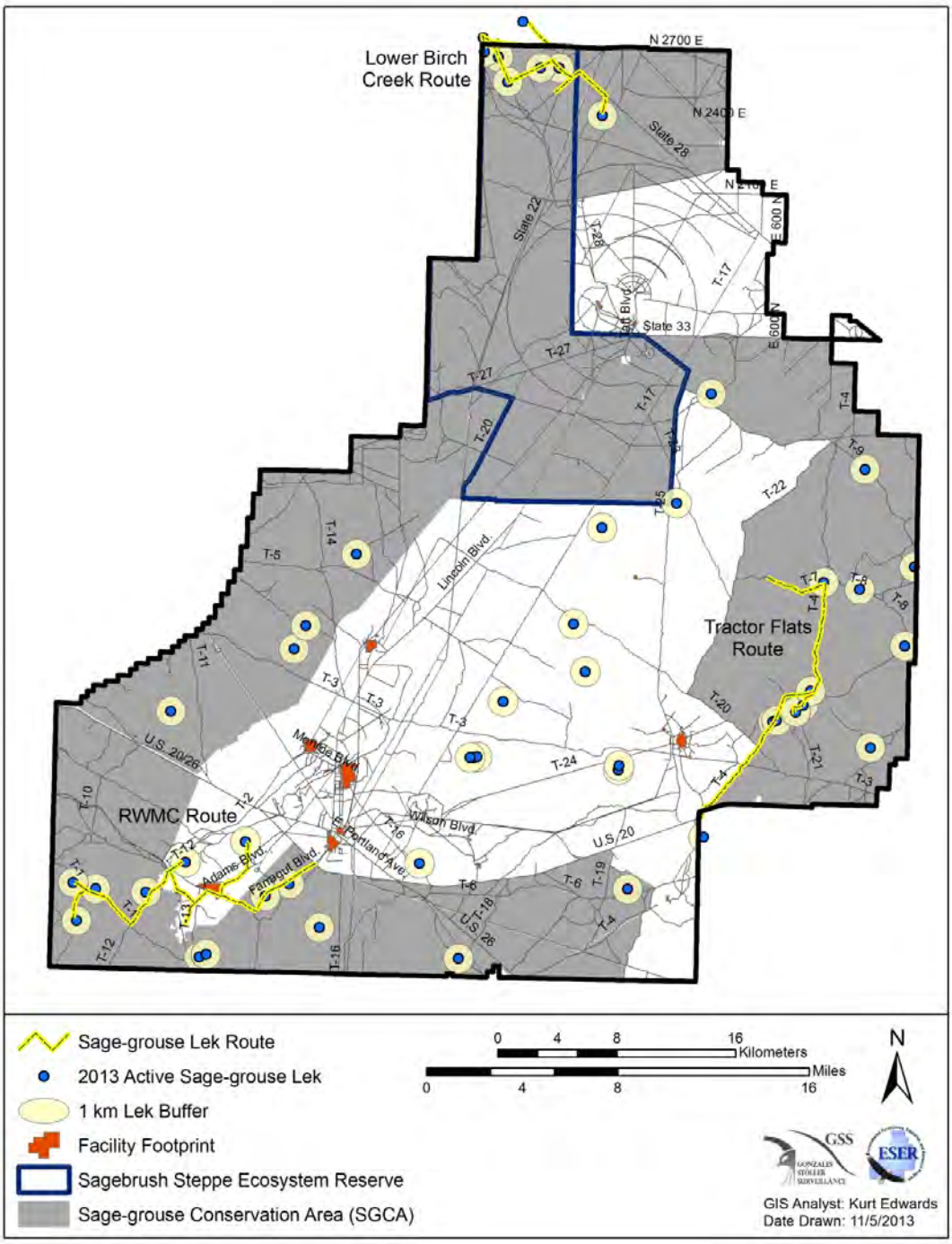

Figure 11. Known active sage-grouse leks on the INL Site in relation to the SGCA. Facilities and existing infrastructure (e.g., power lines, railroads, highways, landfills, and borrow sources) that fall within the SGCA are excluded from most conservation measures outlined in Sections 10.2 and 10.9.

9.4.1 Population Trigger

The measure that will eventually be used as DOE's population trigger for sage-grouse in the SGCA will be determined after the 2017 lek season. The baseline for the interim population trigger is based on the maximum number of males (n = 316) counted on 27 active leks (15 of those leks are on the three lek routes) in the SGCA during 2011. The interim population trigger would be tripped if a 3-year average of < 253 males is observed on those 27 active leks. This threshold, if crossed, would warrant additional conservation measures by DOE (see Section 9.4.3). The main reason for this interim population trigger is that DOE will continue to conduct systematic lek discovery surveys and historical lek surveys through the 2016 lek season and may find additional active leks in the SGCA (Sections 11.1.2 and 11.1.3). Consequently, the interim population trigger will be used through the 2016 lek season. Before the 2017 lek season, DOE will establish (in consultation with IDFG) ≥ 2 additional lek routes in the SGCA based on the results of the systematic lek discovery surveys and historical lek surveys (Sections 11.1.2 and 11.1.3). During 2017 lek season, DOE will survey all of those lek routes (≥ 5 routes) in the SGCA and calculate the maximum number of males counted during peak attendance on those routes. After the 2017 lek season, DOE and USFWS will meet and discuss if that number represents a reasonable new baseline for the population trigger or if additional data are necessary to begin using the SGCA lek routes. Once a baseline is agreed upon by DOE and USFWS, the population trigger for sage-grouse would be tripped if the 3-year average of the maximum number of males counted during peak attendance on lek routes within the SGCA is > 20% lower than the new baseline of males counted on lek routes within the SGCA in 2017.

9.4.2 Habitat Trigger

The habitat trigger would be tripped if more than 20% of sagebrush habitat within the SGCA was lost or converted to a non-sagebrush-dominated vegetation class. As of 2013, 78,882 ha (194,922 acres) were designated as sagebrush habitat in the SGCA. If a net of 15,776 ha (38,983 acres) of sagebrush habitat were lost, DOE and USFWS would follow procedures outlined in Section 9.4.3 to evaluate the cause and develop new conservation measures. Habitat losses would be documented through changes to the vegetation map which is used to spatially estimate sagebrush habitat within the SGCA and across the INL Site.

Designation of Sagebrush Habitat

All vegetation-based estimates for habitat were calculated using a vegetation map completed in 2010 (Shive et al. 2011). The vegetation map and classes depicted therein were developed according to Federal Geographic Data Committee guidelines (2008), which are commonly accepted as the standard process for vegetation mapping by federal government agencies. The mapping process includes: (1) identifying vegetation classes using multivariate clustering techniques and cross-walking classes to a national standard (National Vegetation Classification), (2) defining the spatial distribution of those classes on the project area, and (3) completing a quantitative assessment to characterize the accuracy of the map. In many cases, there is a one-to-one relationship between a delineated polygon and the vegetation class assigned to it (stand-alone class). However, classification data were collected on relatively small scale plots (less than one hectare), while map polygons are often much larger in extent (hundreds or thousands of hectares). To overcome some of the issues associated with spatial scale, numerous polygon are assigned two classes (class complex). Polygons assigned to class complexes contain

a substantial amount of each component vegetation class, but the distribution of each class within a complexed polygon may range from patches of one class situated within a matrix of another, to gradual gradation from one class to another based on subtle shifts in the relative abundance of the dominant species.

Sagebrush habitat was estimated by selecting all map polygons assigned to stand-alone big sagebrush classes and all class complexes where one of the two classes was a big sagebrush class. The low sagebrush class and its complexes were also included as habitat within the SGCA, though polygons represented by low sagebrush classes contribute only about 0.91% to the total habitat area. About 50% of the sagebrush habitat in the SGCA is represented by a stand-alone sagebrush class. There were three big sagebrush classes identified for the INL Site; Wyoming Big Sagebrush Shrubland (*A. tridentata* spp. *wyomingensis* cover; $\overline{x}$=21.2%, 95% CI=2.4%), Basin Big Sagebrush Shrubland (*A. tridentata* spp. *tridentata* cover; $\overline{x}$=19.9%, 95% CI=6.2%), and Big Sagebrush Shrubland - where big sagebrush subspecies are mixed (*A. tridentata* spp. cover; $\overline{x}$=27.4%, 95% CI=9.3%). Low Sagebrush Dwarf Shrubland (*A. arbuscula cover;* $\overline{x}$=14.0%) was the only low sagebrush class identified for the INL Site. The remaining 50% of habitat in the SGCA is represented by one of the sagebrush classes complexed with another shrub or herbaceous class. These complexes generally have lower big sagebrush cover than stand-alone classes, but cover from other shrubs like green rabbitbrush, three-tip sagebrush, and salt desert shrubs often make up the difference. For example, the two largest complexed polygons in the SGCA are a complex between Big Sagebrush Shrubland and Green Rabbitbrush/Bluebunch Wheatgrass Shrub Herbaceous Vegetation and a complex between Wyoming Big Sagebrush Shrubland and Three-tip Sagebrush Shrubland. There were seven classification plots in the first polygon and mean cover for the two dominant shrub species combined in those seven plots is 19.7% (*A. tridentata* spp. cover; $\overline{x}$=7.9%, 95% CI=3.7%). There were eight classification plots in the second polygon and mean cover for the two dominant shrub species combined is 19.9% (*A. tridentata* spp. cover; $\overline{x}$=12.0%, 95% CI=11.3%).

Commonly accepted guidelines suggest optimal big sagebrush cover in arid big sagebrush sites ranges from 10-30% and occupy at least 40-80% of a management area, depending on the season of use (Connelly et al. 2000*a*). In terms of big sagebrush cover, habitat that is estimated by stand-alone big sagebrush vegetation classes on the INL Site is often at the upper end of the sagebrush cover and spatial occupancy ranges provided in sage grouse habitat guidelines. Complexed sagebrush vegetation classes are also consistent with Connelly et al. (2000*a*) guidelines, but are generally at the lower end of the sagebrush cover and spatial occupancy range for breeding habitat. Habitat estimated using complexed vegetation classes on the INL Site are well within the guidelines suggested for brood-rearing habitat, and some portions of polygons assigned to complexed big sagebrush vegetation classes may have higher sagebrush cover and include important breeding and/or winter habitat as well.

A radio-telemetry study was conducted on the INL Site (Section 2.5.3) from 2008 through early 2010 to document seasonal habitat use and identify nesting locations selected by sage-grouse on the INL Site. These data were used to empirically assess whether the sagebrush habitat data layer encompassed known wintering and nesting habitat used by sage-grouse. A total of 113 locations were recorded during the winter season, and 97 (85.8%) fell within what Shive et al. (2011) classified as sagebrush classes or complexes. Nineteen sage-grouse hens were regularly monitored during the spring nesting season and 34 unique nesting locations were identified on the INL Site, including five locations representing re-nesting efforts following a

previously failed attempt that season. Sagebrush habitat contained 29 (85.3%) of the documented nesting locations. These results suggest that the sagebrush habitat layer developed for the INL Site represents the majority of known seasonal habitat locations by collared sage-grouse.

Documenting Changes in Sagebrush Habitat Extent

The spatial extent of sagebrush habitat is dynamic and should reflect changes in plant communities, or vegetation classes. Areas designated as habitat will change through time based on changes in vegetation classes and the polygons assigned to those classes. Polygons that are currently mapped as perennial grasslands and/or green rabbitbrush shrublands, will be reassigned to sagebrush classes, or complexes containing sagebrush classes, when species composition of those polygons is consistent with cover values that defined sagebrush classes during the original classification and mapping effort. Conversely, polygons that are currently mapped as sagebrush classes may be changed to grassland or other shrubland classes when sagebrush cover has decreased to a cover level below that which is consistent with the parameters established by the original classification effort. The mechanisms driving potential changes in polygons from one class to another may include wildland fire, sagebrush recovery on burned areas, and sagebrush population decline.

There are two monitoring tasks (Sections 11.5 and 11.6) associated with the CCA that may be used to identify vegetation changes, which would prompt reevaluation of vegetation classes. The habitat quality monitoring data will be used to track sagebrush cover trends and identify when polygons may need to be re-delineated and/or vegetation classes reassigned based on local vegetation composition. The habitat quantity monitoring task will also be used to identify changes in sagebrush classes. For example, if imagery from burned areas suggests there have been changes in vegetation classes or distribution of those classes several years post-burn, sagebrush cover will be assessed using habitat quality monitoring data from plots located within a burned area. Once substantial increases in big sagebrush cover have been identified from either the plot data or the imagery, a dichotomous key to vegetation classes will be used at numerous locations within the polygon to determine whether it has enough big sagebrush over a substantial enough area to redefine the polygon as a big sagebrush class or complex, or whether re-delineating smaller sagebrush-dominated polygons within the burn area is appropriate. The dichotomous key is based on the classification results and was developed to support the accuracy assessment process for the vegetation mapping project (Shive et al. 2011).

9.4.3 Response if Triggers are Tripped

If the population trigger is tripped, the initial response will be for USFWS to complete a thorough review of the sage-grouse management approach on the INL Site. DOE and USFWS will then meet to:

- Determine if DOE activities at the INL Site were responsible for the population decline or if factors unrelated to INL Site operations were the cause;
- Identify and negotiate conservation measures that DOE could implement to improve the situation and;
- Determine if renegotiation of the SGCA boundary and threshold levels is necessary so that the CCA remains effective and beneficial for sage-grouse.

If the habitat trigger is tripped, DOE will be asked by USFWS to take action to compensate for the loss of habitat. Such compensation may include one or more of the following:

- DOE would alter the boundary of the SGCA to include more sagebrush habitat under protection in the terms of the CCA.
- DOE would participate in the State's "*Framework for Mitigation of Impacts From Infrastructure Projects on Sage-Grouse and Their Habitats*" (December 2010). Such participation would include in-lieu fee payments into the State's Mitigation Fund for compensatory mitigation.
- DOE would initiate habitat restoration on Priority Restoration Areas the INL Site (see Section 9.4.4).

The assessment and subsequent actions listed above provide a minimum standard. In reality, if the INL Site experienced declining trends in lek attendance or incremental loss of sagebrush habitat, DOE would invite IDFG to meet with USFWS and DOE to discuss those declines, even if the population trigger had not yet been tripped. Following adaptive management principles outlined in Section 11, the agencies would work towards agreement on actions that could be implemented to stabilize population and habitat trends.

9.4.4 Priority Restoration Areas

For the foreseeable future, the INL Site will continue to serve as a refuge from many human-caused factors that threaten the persistence of sage-grouse and sagebrush habitat (Section 10) in the upper Snake River Plain. This long-term stability makes the INL Site an ideal location for mitigation and habitat restoration because of the relative certainty that treated areas will remain unaffected by avoidable human-caused impacts. The following paragraphs describe DOE's criteria and methods for identifying and prioritizing areas for restoration of sagebrush habitat.

Many perennial grasslands and green rabbitbrush shrublands on the INL Site occur where wildland fire has recently burned. DOE identified some of these areas within the SGCA that, if restored to sagebrush-dominated communities, would expand the amount of usable breeding and wintering habitat for sage-grouse (Fig. 12). A GIS was used to spatially filter the landscape and prioritize regions of perennial grasslands and green rabbitbrush shrublands for potential sagebrush habitat restoration projects. The spatial selection method consisted of a three-step process. The first step was to estimate areas of the INL site that represent sage-grouse breeding and nesting habitat. The second step was to identify the current distribution of native perennial grassland and green rabbitbrush shrublands across the INL Site. The final step was to intersect the resulting data layers to determine the regions of the INL Site where restoration efforts should be focused in the future.

To estimate breeding and nesting habitat, all currently active sage-grouse leks were buffered using a 5 km radius. During a recent study centered on the INL Site, 62% of sage-grouse nests were established within 5 km of the female's lek of capture (Section 2.5.4; Whiting et al. 2014). Likewise, others have suggested that 5 km is an appropriate conservation buffer for protecting nesting habitat (Holloran and Anderson 2005). DOE therefore considers all sagebrush habitat within 5 km of a lek potential nesting and early brood-rearing habitat (see Section 2.5.4).

There are clusters of active leks located within close proximity to one another, and it is assumed that regions of Lek Buffer overlap represent more important nesting habitat because restoring that area would theoretically provide nesting habitat to support multiple leks. For further consideration during the process of selecting a restoration site, all nesting buffer areas of overlap were tallied and assigned to the intersected polygon area.

The second step was to select all vegetation classes that represent areas that were previously sagebrush habitat or have the potential to return to sagebrush habitat. We used the INL Site wildland fire GIS data layer to identify the areas where major fires have burned since 1994. The wildland fire layer was intersected with the existing vegetation map and we selected all of the polygons that were within recent fire boundaries. All vegetation classes that are not likely to transition or recover to sagebrush classes (e.g., shadscale), non-native grasses, or areas mapped as a degraded class were removed because these areas would be difficult or nearly impossible to reestablish as sagebrush habitat in the foreseeable future. The remaining vegetation map polygons represented all native vegetation classes that were previously sagebrush habitat or have the potential to return to sagebrush habitat.

The results from the previous processing steps were spatially intersected to delineate the area where important breeding and nesting habitat overlaps with vegetated regions of perennial grasslands and green rabbitbrush shrublands (Fig. 12). The resulting extent and distribution represents the Priority Restoration Areas. Determining the final restoration site will depend on a number of additional factors described below.

If it becomes necessary for DOE to actively or passively restore sagebrush to a vegetation community (e.g., mitigation following wildland fire), DOE will select restoration sites from within the Priority Restoration Areas. Selecting a restoration site will depend on a number of factors such as project specific goals, and funding. The restoration site selection process will consider three additional criteria: (1) lek persistence and density, (2) feasibility of success, and (3) accessibility.

Lek Persistence and Density – When considering areas to restore to sagebrush habitat, DOE will also take into account peak male attendance and density of leks as an indicator of the probability of lek persistence. The goal of this criterion will be to select restoration sites that would benefit multiple leks, while considering the relative importance of those leks.

Feasibility of Success – Areas with the greatest potential to be successfully restored to sage-grouse habitat are prioritized. Factors that influence the probability of successful restoration include soil type, presence of crested wheatgrass or cheatgrass, the probability of post-restoration livestock disturbance, and infrastructure development.

Accessibility – Though not necessarily as important as the previous two criteria, accessibility of a site will be considered when selecting areas for restoration. Roads provide access for people and equipment, and the cost of restoration will be influenced by ease of access. In addition, where restoration occurs near roads, water trucks can be deployed to reduce reliance on natural precipitation.

All restoration plots will be monitored across years to evaluate the success of the efforts. Periodic monitoring (Section 11) will inform the adaptive management process and allow DOE to make changes where necessary to ensure that restoration efforts are effective and efficient.

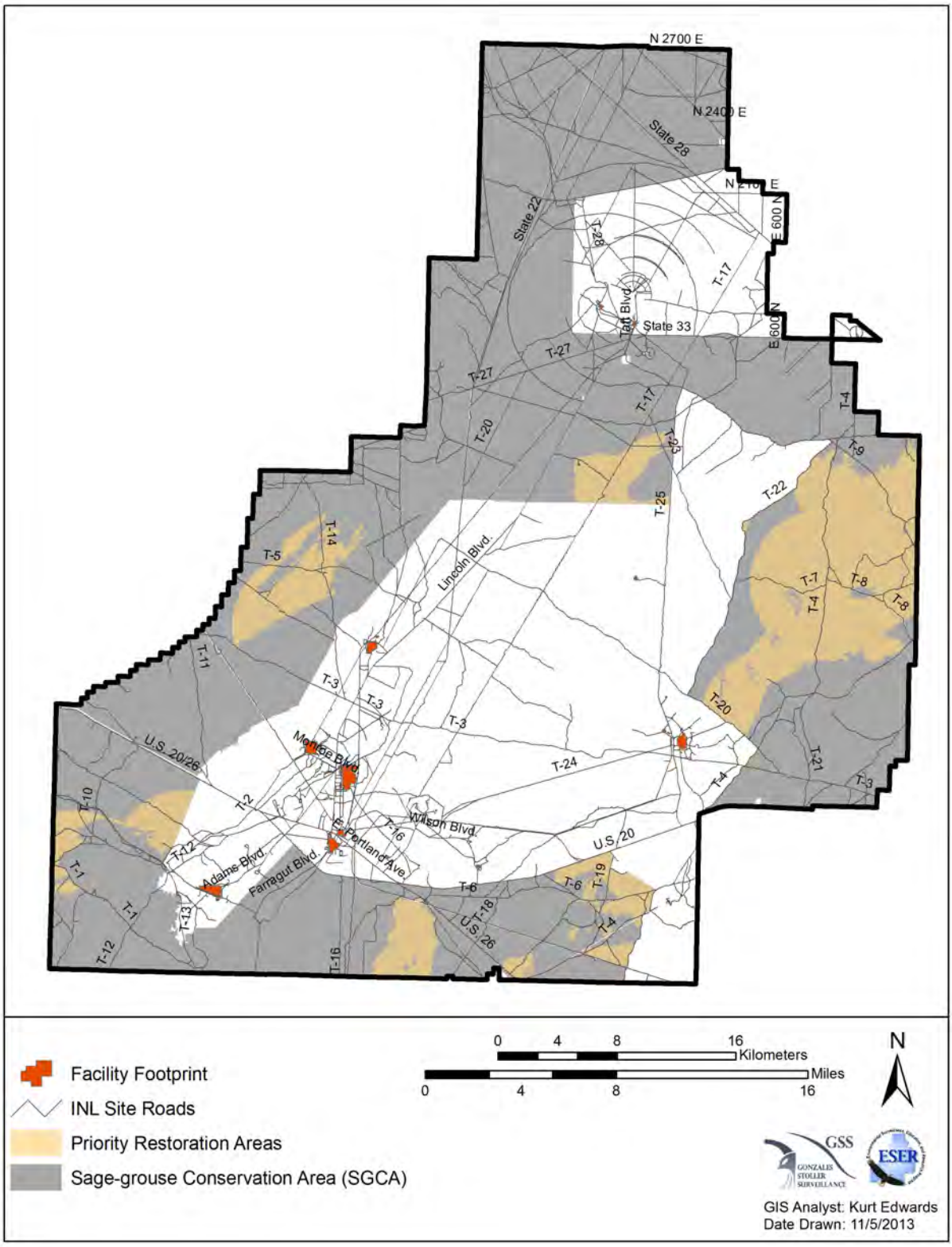

Figure 12. Priority Restoration Areas identified for active or passive restoration of sagebrush.

10. NEW CONSERVATION MEASURES AND OBJECTIVES BASED ON AN ANALYSIS OF THREATS

DOE considered four sources of information to identify the primary threats to sage-grouse and its habitats on the INL Site and to facilitate the prioritization of conservation measures:

- Idaho State Plan – In 2006, the Idaho Sage-grouse Advisory Committee (ISAC), under the direction of the Idaho Fish and Game Commission, completed a statewide sage-grouse management plan called the Idaho Conservation Plan (ISAC 2006; hereafter "2006 State Plan"). The 2006 State Plan identified and ranked 19 threats to sage-grouse across Idaho (Table 3).
- Warranted-But-Precluded Finding – Included in the USFWS warranted-but-precluded finding for sage-grouse (Federal Register 2010) is a substantial literature review and analysis of threats to sage-grouse.
- Conservation Objectives Team Report – USFWS recently tasked a Conservation Objectives Team (COT), comprised of state and USFWS representatives, to develop a conservation framework and identify conservation objectives for the sage-grouse across its range. The ensuing report (USFWS 2013) included a population-level assessment of the presence of 13 threats to sage-grouse, most of which were considered in the 2006 State Plan (ISAC 2006).
- INL Site Data and Expert Opinion – The COT emphasized that management plans developed in coordination with USFWS should use local data on threats and ecological conditions to address factors that impact sage-grouse. Therefore, DOE assessed threats in light of ecological data collected on the INL Site and expert opinion of ESER ecologists who have decades of combined experience studying and monitoring the flora and fauna of the INL Site.

The 19 ranked threats listed in the 2006 State Plan provide a good basis for threat assessment on the INL Site, in part because of the regional context of the State Plan (Table 3). The warranted-but-precluded finding and the COT report represent up-to-date threat assessments and USFWS concurrence regarding factors that threaten sage-grouse persistence. When these sources were considered in light of local information and understanding of the ecology of the INL Site, there was substantial agreement about the primary threats to sage-grouse on the INL Site.

For the Snake-Salmon-Beaverhead population, the COT identified five threats that are present and widespread: fire, weeds/annual grasses, energy development (renewable and non-renewable), livestock grazing, and free-roaming equids. In addition, the report suggests that the following threats could be present (i.e., present but localized): sagebrush elimination, agriculture conversion, conifer expansion, infrastructure, and recreation. Because of the unique character of DOE operations and the restrictive land-use policy, sagebrush elimination, agriculture conversion, conifer expansion, energy development, free-roaming equids, and recreation are threats that are either very low or non-existent on the INL Site. Thus, only four of the threats identified by the COT (fire, weeds/annual grasses, livestock grazing, and infrastructure) are of significance on the INL Site, and these coincide with the top four state-wide threats identified by the 2006 State Plan (Table 3).

Ecologists with the ESER program developed a final threat assessment after considering peer-reviewed literature, INL Site-based research, local knowledge of DOE operations, and the assessments discussed above. The threats listed in the 2006 State Plan were rated (High, Med, Low, or Very Low) and each rating was explicitly justified (Table 3). Ecologists considered any threat receiving a 'Very Low' rating (nine instances) as irrelevant on the INL Site, so these are not discussed further in this agreement. Sections 10.1-10.10 summarize each of the 10 relevant threats and explain how each threat impacts sage-grouse or its habitat on the INL Site.

DOE has already implemented many conservation measures (labeled herein as "current conservation measures") into its standard operating procedures. Conservation measures are generally considered to be actions directed at managing or restoring one or more species. Current conservation measures help to mitigate impacts of INL Site activities, primarily through avoidance and minimization of threats utilizing BMPs. BMPs, or best management practices, are actions which limit impacts of activities on environmental resources and are implemented at the INL Site using institutional controls in planning and operations. For example, avoiding vehicle travel outside of established roads and two track trials or locating a project that will disturb soil in an area which has already been impacted are BMPs commonly used across the INL Site. Most BPMs can be considered conservation measures as they address threats to sage-grouse, but several conservation measures beyond those defined as BMPs are also utilized. Current conservation measures are listed in Section 10 under the threat that they most fully address. NRF, which is managed by Naval Reactors, may employ conservation measures that are different in detail than those listed in the following sections, but have the same intent and conservation result.

Section 10 builds on DOE's proactive approach by introducing 13 new conservation measures that DOE will implement to further reduce threats to sage-grouse and its habitats. By implementing these conservation measures, DOE will ensure, to the extent possible, that it will retain regulatory flexibility to accomplish its mission.

Table 3. Nineteen threats to sage-grouse on the INL Site, including Site-specific threats and those identified by the Idaho Sage-grouse Advisory Committee (ISAC 2006) and the COT (USFWS 2013). Threats are grouped by one of the five factors (A-E) used by USFWS to determine listing status of a species, and each threat is rated according to its relative impact on the INL Site. Within each factor grouping, threats are listed from highest to lowest based on the ISAC ranking. Threats identified by the COT (USFWS 2013) as "present but localized" are marked by a single asterisk and "present and widespread" by a double asterisk.

Threat	ISAC Ranking	INL Site Rating	Justification for INL Site Rating
A. Present or threatened destruction, modification, or curtailment of its habitat or range			
Wildland Fire**	1	High	The potential of wildland fire to eliminate sagebrush from large areas of the INL Site is the greatest threat to sage-grouse in the near term. An example of how wildland fire can drastically impact the quantity of sage-grouse habitat occurred in 2010 and 2011, when three large fires burned 20% of sagebrush habitat on the INL Site.
Infrastructure Development*	2	High	This threat is high on the INL Site because it causes direct loss of habitat, habitat fragmentation, and possible increased predation resulting from existing and proposed transmission lines, roads, new facility construction, and wind farms.
Annual Grasses and Other Weeds**	3	Medium	Currently, cheatgrass is widely distributed on the INL Site, but is present in low densities. This grass is not affecting the fire regime on the INL Site. The greatest risk factor for cheatgrass dominance on the INL Site is loss of native perennial herbaceous plants through mechanical disturbance and improper grazing practices.
Livestock**	4	Medium	Confirmed domestic sheep presence on leks across multiple years poses a threat to sage-grouse and inhibits population monitoring. Grazing allotments cover 60% of the INL Site, and grazing may increase the risk of cheatgrass dominance on these allotments, thereby decreasing habitat value and increasing the potential for habitat loss. Despite these potential impacts, this threat is rated medium on the INL Site because the direct impacts of grazing on sage-grouse populations are not well understood, and, unlike wildland fire and infrastructure development, impacts occur at a relatively gradual rate.
Seeded Perennial Grasses (especially crested wheatgrass)	8	Medium	Research conducted on the INL Site suggests that crested wheatgrass is highly invasive and will expand into adjacent native vegetation. The threat of conversion from native perennial to crested wheatgrass communities may be the greatest long-term threat to sage-grouse habitat. However, during the lifespan of this agreement, it is not likely to have as great of an impact on sage-grouse

Threat	ISAC Ranking	INL Site Rating	Justification for INL Site Rating
			populations as wildland fire or improperly sited infrastructure.
Conifer Encroachment*	10	Very Low	The vast majority of the Site is devoid of trees. The boundaries of juniper stands on the INL Site appear to be stable over the past 60 years.
Urban/Suburban Expansion	13	Very Low	There is little threat to sage-grouse or their habitat on the INL Site due to urban or suburban expansion.
Sagebrush Management (including Prescribed Fire[1])*	14	Very Low	Unlike other lands (both public and private), sagebrush management in the form of mechanical, chemical, or fire treatment is not performed on the INL Site.
Agricultural Expansion*	16	Very Low	No agricultural expansion is expected on the INL Site.
Landfills and Borrow Sources	18	Low	Three leks occur in borrow sources; however, with current conservation measures, the threats can be minimized.
B. Overutilization for commercial, recreational, scientific, or educational purposes			
Sport Hunting	17	Very Low	Sport hunting for sage-grouse is not allowed on the INL Site. However, birds that migrate off-Site are potentially hunted.
Falconry	19	Very Low	Falconry is not allowed on the INL Site.
Scientific Research[2]	INL Site specific.	Very Low	There is a potential for birds to flush during cultural resource surveys, lek monitoring, or other sage-grouse research activities, disrupting the birds' courtship behavior. However, the probability that a cultural resource survey would occur near a lek during the early morning hours in April or May is low; during lek surveys, birds do not usually flush, and leks are only visited a maximum of once per week. Finally, no other research on sage-grouse presently occurs on the INL Site, but all new proposals would be evaluated for their potential to disrupt sage-grouse prior to project initiation.
C. Disease or Predation			
Disease (West Nile Virus [WNv])	6	Very Low	WNv has never been detected on the INL Site and there are few water sources that could be used by mosquitoes
Predation	12	Medium	Recent research has confirmed that ravens are effective nest predators of sage-grouse. Data collected on the INL Site show that raven abundance has increased nine-fold since the late 1980s.
D. Inadequacy of existing regulatory mechanisms			

Threat	ISAC Ranking	INL Site Rating	Justification for INL Site Rating
Livestock (see factor A).			
Human disturbance from site-specific threats such as firing ranges, security systems testing, CERCLA activities, and UAVs.	5	Medium	Only a small portion of the INL Site is impacted by DOE activities, and because public access is restricted, the overall threat to sage-grouse from human disturbance is generally much lower than in similar habitats on public lands. Additionally, time-of-day restrictions are currently in place to minimize human disturbance at lek sites during the breeding season. Still, some DOE activities increase the risk of fire ignition and introduction of invasive species in remote areas of the INL Site.
E. Other natural or manmade factors affecting species continued existence			
Climate Change	9	Very Low	The best available science suggests that climate change is likely to have a substantial impact on the ecology of semi-arid ecosystems over the next century (for a review, see Federal Register 2010). However, for conservation planning, it is typical to view threats based on the planning horizon of a project (20 years for this CCA [see Section 11.5]; TNC 2007). Compared to other regions in southern Idaho, the ecosystem of the upper Snake River Plain is expected to be relatively resistant to climate change (Neilson et al. 2005). Thus, the threat to sage-grouse persistence on the INL Site over the next 20 years is very low.
Isolated Populations	11	Very Low	Populations across southeast Idaho are relatively contiguous, so there is a low probability of detrimental effects due to low migration rates.
Chemical Application	15	Very Low	Some of the public land orders withdrawing INL Site land from public domain allow for the spraying of pests, including Mormon crickets (*Anabrus simplex*) and grasshoppers. However, DOE is unaware of any instance since the establishment of the INL Site wherein insecticides have been applied outside of facility footprints. If recent history is a valid indicator, future insecticide use on the INL Site is unlikely.

[1] Threats 7 (Prescribed Fire) and 14 (Sagebrush control) were acknowledged in the 2006 State Plan to have similar management objectives, so they are merged here.

[2] This threat was not considered in the 2006 State Plan, but DOE and USFWS agree that it should be acknowledged as a potential threat.

10.1 Wildland Fire

10.1.1 Threat Summary

Many researchers, land and wildlife managers, and policy-makers agree that the loss of sagebrush cover resulting from wildland fire is among the greatest threats to the persistence of sage-grouse (Federal Register 2010; Connelly et al. 2011*a*). When healthy sagebrush-dominated habitat burns on the INL Site, the amount of potential sage-grouse nesting and wintering habitat is reduced. It is not clear how much net sagebrush loss could be sustained before measurable declines of peak male attendance would be detected, but if sagebrush communities burn at a higher rate than sagebrush establishment, the sage-grouse population is likely to decline over time.

Conversion of sagebrush steppe to annual grasslands is a concern following wildland fire across the Great Basin. Domination by annual grasses changes the fire regime, because with an increase in continuity of fine fuels, both the frequency and size of fires tend to increase. However, on the INL Site, research has demonstrated that the plant community that is present after a fire reflects that which was present before the fire, minus sagebrush (Ratzlaff and Anderson 1995, Buckwalter 2002, Blew and Forman 2010). Thus, if a wildland fire burns a sagebrush-dominated community that has a diverse understory comprised of native grasses and forbs, there is little risk of post-fire domination by annual grasses such as cheatgrass. However, pre-fire disturbance resulting in the loss of herbaceous perennial plant cover and firefighting efforts that disturb the soil during construction of containment lines and other activities create optimal conditions for annual grasses to dominate.

10.1.2 Fire History on the INL Site

Recent wildland fires on the INL Site removed tens of thousands of hectares of big sagebrush cover, eliminating seasonal habitat for sage-grouse and other sagebrush obligate species. In some cases, extreme environmental conditions (e.g., high wind) caused tens of thousands of hectares to burn within a few hours. In 2010, the Jefferson and Middle Butte fires (both human-caused) burned 16,726 ha (41,330 acres) and 775 ha (1,915 acres), respectively, of big sagebrush-dominated communities on the INL Site. In 2011, the T-17 fire (lightning-caused) burned an additional 12,443 ha (30,746 acres) of big sagebrush-dominated communities. Those three fires spread rapidly, driven by high winds, despite a strong response by the INL and BLM Wildland Fire Units. Together, they burned over 20% of INL Site vegetation communities that had been previously mapped as being dominated by big sagebrush (see Shive et al. 2011).

Clearly, both human and lightning-caused wildland fires have the potential to burn large tracts of sagebrush on the INL Site. Because little can be done to prevent lightning-caused fires, we focus primarily on two categories of human-related fire origins: Public and INL Site-related (Box 1). From 2001-2011, 56% of human-caused fires were attributed to the public (n = 30), while

Box 1: Fire Origin Definitions

Lightning: Fire origin determined to be from lightning.

Public: Fire origin determined to be human caused; along a public highway (e.g., HYW-20, 20/26, 28, or 33; Fig. 6).

INL-Related: Fire origin is human-caused, may be on an INL-improved roadway, but may or may not be directly related to INL-controlled operational activity.

44% were INL Site-related (*n* = 24; Fig. 13). Public fire starts were primarily attributable to vehicle malfunction, use of construction equipment, discarded smoking material, and public utility companies working within easements. INL Site-related fire origins resulted from mowing alongside roadways, tracers from gun range activities, welding activities, denotation on a test range, and other activities.

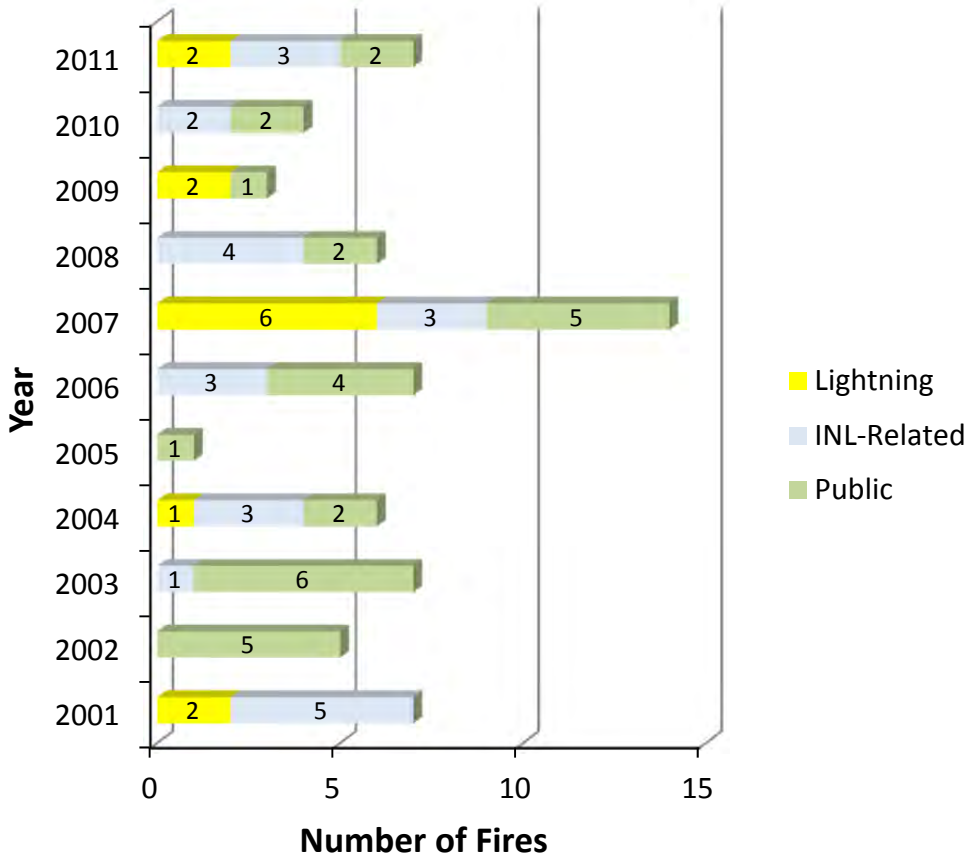

Figure 13. Number of fires on the INL Site by origin type (*n* = 67), from 2001 through 2011.

An analysis of INL Site wildland fire data from 2001-2011 provides insight into the risks to sage-grouse from wildland fire that can be attributed to human-caused fire starts. A median of five human-caused wildland fires (public and INL Site-related) occurred every year (range 1 – 8). Fire starts attributed to the public account for 45% (*n* = 30) of all fire starts, compared to 36% (*n* = 24) that were INL Site-related. Regardless of how these wildland fires began, 89% (*n* = 48) were extinguished before they had burned more than 20 ha (50 acres). However, the six fires that were not contained to 20 ha accounted for 99.8% (38,739 ha [95,727 acres]) of the total area burned (including both sagebrush and non-sagebrush-dominated lands) as a result of human activity. Eighty-one percent of wildland fires on the INL Site were human-caused, with 51% (*n* = 34) of those originating near paved roads. In summary, these data suggest that while most human-caused wildland fires were extinguished before they burned a substantial amount of land, some were not contained (usually due to extreme environmental conditions), and large amounts of land were impacted.

10.1.3 Effects of Wildland Fire on Lek Persistence

Sage-grouse have high annual fidelity to lek sites, and will return even when an area has experienced severe disturbance, such as wildland fire. Because of this, the spatial distribution and trend of sage-grouse numbers may not show a response immediately following a fire. In 2007, the Murphy Complex Fire burned approximately 263,046 ha (650,000 acres) in south-central Idaho and northern Nevada, including 110,722 ha (273,600 acres) of key sage-grouse habitat (Moser and Lowe 2011). As a result, 71 known sage-grouse lek sites were burned. For 3 years following the fire, IDFG monitored leks within and adjacent to the burn. Agency biologists observed declines in male attendance by the third year following the fire at lek sites within the burn. Similar results have been documented in the Big Desert south of the INL Site (Connelly et al. 2000*b*). Furthermore, leks declined up to 5 km (3.1 mi) outside of the burn boundary of the Murphy Complex Fire, supporting the notion that a disturbance footprint is often greater than the fire boundary.

It is not yet clear what effects the large fires that burned on the INL Site in 2010 and 2011 will have on sage-grouse that use the INL Site. Lek route surveys have already detected a shift in peak male attendance away from the burned area (i.e., Tractor Flats lek route). Simultaneously, the RWMC lek route has seen higher peak male attendance in the past 2 years than ever before, suggesting at least some flexibility in lek usage. As DOE continues to monitor lek routes annually, the data will more fully elucidate the impacts of recent wildland fires.

10.1.4 Current Conservation Measures

Railroads (Sec. 5.1)

- Fuels management is performed along maintained portions of the railroad tracks.

Pre-Fire Preparation, Suppression, and Post-Fire Evaluation Activities (Sec. 5.4)

The INL Wildland Fire Management Plan (INL 2011) establishes two stages of restrictions that are enacted whenever fire danger ratings reach pre-specified levels. Stage I fire restrictions are in effect from May 1 through the end of the fire season (dependent on weather) to minimize the potential for human-caused wildland fires. The restrictions include the following as a minimum:

- Curtailment of INL Site gun range operations involving tracer rounds or other significant fire hazards unless specifically authorized by the INL Fire Marshal's Office;
- Vehicles used for fieldwork activities are required to carry a shovel or fire extinguisher and means of two-way communications;
- Lay-down areas, fieldwork parking, and similar operational sites in vegetated areas are required to be provided with sufficient defensible space to minimize spread of fire to adjacent rangelands.

Stage II fire restrictions are implemented when the Eastern Idaho Interagency Fire Center has established regional fire restrictions, the INL Site fire danger rating reaches sustained, Very High conditions, or as otherwise judged necessary by the INL Fire Marshal. Stage II fire restrictions include the following:

- The use of off-road vehicles is restricted to designated roads and trails;
- Welding, cutting, and other hot work activities in the field are only conducted upon written approval of the Fire Marshal or designee.

Pre-fire Preparation

- Seasonally maintain all primary T-roads to ensure accessibility to remote areas of the INL Site.
- Maintain a 9.1-m (30-ft) minimum defensible space around INL Site buildings, parking lots and equipment at the wildland-urban interface to minimize fuel loads where fire ignition potential is greatest.
- Mow roadsides of all paved INL Site roads to isolate ignition sources on roads from rangeland fuels.
- Maintain fuel management zones and reduce vegetation at all gun and explosive testing ranges.
- Employ the mountain-top fire detection system to gather intelligence to improve wildland fire detection and response times (Section 5.4).
- Communicate regularly with all INL Site employees regarding the current fire danger and associated precautions, and promote public awareness campaigns including road side signs that show current fire danger and marquee messages during extreme conditions.
- Allow personnel access to unimproved roads and wildlands for official business only
- Activities judged to be of high fire potential that cannot be adequately controlled through the above methods are executed only under supervision by an INL Fire Department wildland firefighting crew.
- Coordinate NSTR detonations that have been determined by a hazards analysis to have fire ignition potential with the INL Fire Marshal so that appropriate blast-specific precautions can be put in place. Examples of such precautions include seasonal and time-of-day restrictions and placement of dedicated fire crews at the detonation site.
- Continue to pay the State of Idaho for minimum width mowing along public highways on the INL Site.
- Review fire preparation procedures and lessons learned from previous fires each spring (INL Fire Department and the Wildland Fire Management Committee).

Suppression Activities

- Where possible, use suppression techniques that minimize ecological impacts.
- Construct bladed containment lines only when deemed necessary by the Incident Commander.
- Conduct after-action reviews following each fire, to evaluate the effectiveness of the response and identify ways to improve.

Post Fire Activities (following all large fires and fires in which containment lines were constructed)

- Re-contour containment lines (dozer line "Ricks") with the exception of those in culturally sensitive areas;
- Restrict post-fire vehicle travel on containment lines;
- Purchase and process high resolution imagery of fire area.

National Security Test Range (Sec. 7.2)

The INL Fire Department manages wildland fire risk as outlined in the INL Wildland Fire Management Plan (2011). Consequently, many of the most pertinent conservation measures with regard to wildland fire that apply to the NSTR are listed under the previous heading (Pre-Fire Preparation, Suppression, and Post-Fire Evaluation Activities). In addition, the following measures are currently taken to minimize the risk of wildland fire at the NSTR:

- Limit vehicular traffic to established roadways (such as T-25 and the new access road), lay-down and turn-around areas, and the test range;
- When a hazards analysis concludes that a significant fire hazard exists, a fire crew is present during the detonation so they may promptly extinguish fire starts.

As required by the NSTR EA, other mitigation measures will be performed as necessary following guidelines outlined by the Idaho Sage-grouse Advisory Committee (2006). Those that are currently being implemented include:

- Mow the test pad to reduce the probability of accidental range fires;
- Control invasive and noxious weeds at all disturbed areas, including mowed areas, lay-down areas, the earthen berm, and along access roads;
- Conduct lek discovery surveys and monitor leks in the area around NSTR.

10.1.5 New Conservation Measures – Wildland Fire

Objective: Minimize the impact of habitat loss due to wildland fire and firefighting activities.

Conservation Measure 1 – Prepare an assessment for the need to restore the burned area. Based on that assessment, DOE would prepare an approach for hastening sagebrush reestablishment in burned areas and reduce the impact of wildland fires > 40 ha (99 acres).

The assessment will be initiated by a relatively rapid assessment of the burned area that identifies immediate and long-term threats to soil, plant, and wildlife resources and the actions needed to reduce those threats. At a minimum, this initial assessment will include:

- An assessment of resource conditions as well as realistic and cost-effective emergency stabilization treatments that are needed;
- A risk analysis that assesses the value of treatment options compared to the value of a no-action alternative.

If determined appropriate, an approach to reestablish sagebrush in the burned area would be prepared and include a map of the burned area, a blueprint for restoration, and a work

schedule for implementing rehabilitation measures aimed at shortening the time between burn and sagebrush reestablishment. Because each fire is unique in regard to size, location, completeness of burn (i.e., Are there many or few unburned islands?), composition of pre-burn vegetation communities, soil type, and level of disturbance from suppression activities, the approached will be tailored to provide a cost effective means of habitat recovery and to reduce threats to sage-grouse. DOE will invite IDFG to review and provide comment on the assessment and approach, recognizing that IDFG has primary authority over sage-grouse management in Idaho. The following are examples of treatments that could be included in an approach:

- Restoration of areas damaged by firefighting activities and those not likely to recover to meet management objectives;
- Control of noxious weeds and invasive species;
- Aerial seeding of sagebrush;
- Strategic planting of sagebrush seedlings, especially near sage-grouse leks;
- Intensive restoration efforts following human-caused fires in areas lacking a native, perennial understory.

Each burned area will be evaluated using the best available science to determine the procedures most likely to successfully reestablish sagebrush while promoting the reestablishment or restoration of a native perennial understory. The first priority of post-fire restoration will be to avoid causing additional negative impacts to surviving native, perennial vegetation.

10.2 Infrastructure Development

10.2.1 Threat Summary

The Idaho Alternative defines infrastructure as "discrete, large-scale anthropogenic features, including highways, high voltage transmission lines, commercial wind projects, energy development (e.g., oil and gas development, geothermal wells), airports, mines, cell phone towers, landfills, residential and commercial subdivisions, etc." This CCA adopts this definition and further refines it within the context of the INL Site. Thus, on the INL Site, infrastructure includes discrete, anthropogenic features including roads, railroads, utility lines, wind turbines, communication towers, nuclear energy resources and facilities, fences, and any feature wherein construction results in surface disturbance (Fig. 6). Surface disturbance is an action that substantially alters vegetation, surface soil, or surface geologic features, beyond natural site conditions. Examples may include: operation of heavy equipment to construct concrete pads, roads, gravel pits, installation of power lines, and vegetation treatments, including prescribed fire. Small-scale excavations using hand tools *do not* substantially alter vegetation, soil surface, or geologic features.

Infrastructure development is considered one of the highest threats to sage-grouse persistence on the INL Site (Table 3), throughout Idaho, and across its range (ISAC 2006; Federal Register 2010). Primarily, this is because infrastructure causes habitat fragmentation, resulting in either a direct or functional loss of sage-grouse habitat (i.e., where close proximity to a disturbance causes otherwise suitable habitat to be of low value for sage-grouse).

Although much sagebrush habitat on the INL Site is remote, there are a variety of anthropogenic features bisecting otherwise suitable sage-grouse habitat. Many of these features are described in Sections 4-8. Utility lines and other vertical structures outside facility footprints may be the greatest source of functional habitat loss, because sage-grouse tend to avoid areas near tall structures due to a greater perceived predation risk (Braun 1998). In addition, structures near suitable sage-grouse habitat that are supported by guy wires may pose a collision risk. Linear features such as roads are a primary vector for non-native species invasion, which adversely affects habitat quality. Other impacts associated with infrastructure are relatively low on the INL Site. For example, unlike most regions in western North America, fences are virtually non-existent outside facility boundaries.

High-resolution imagery shows that the number of roads in grazing allotments on the INL Site continues to increase. Many of these roads are probably created by herders or permittees creating new camp or water locations. Because 82% of the SGCA is coincident with grazing allotments, unauthorized road expansion in these areas contributes to the sage-grouse threat that is attributable to infrastructure development.

10.2.2 Current or Planned (for infrastructure not yet constructed) Conservation Measures

Wind Farm Meteorological Towers (Sec. 7.4)

- Disturbed areas are to be revegetated.

Stand-Off Experiment Range (Sec. 7.5)

- Disturbed areas will be promptly revegetated using a diverse mix of native species similar in composition to nearby plant communities (DOE-ID 2011);
- Undesirable plants will be managed according to requirements cited in DOE-ID (2011).

Construction of Remote-handled Low-level Radioactive Waste Facility (Sec. 7.7)

- Limit size of area disturbed through controls on the extent of excavation;
- Revegetate disturbed areas (bare soils) with native species;
- Implement noxious weed management plan.

Power Line Maintenance (Sec. 4.4)

Both DOE and commercial utility companies (i.e., rights-of-way grantees) may install power lines and associated infrastructure on the INL Site. Stipulations are set forth in a Memorandum of Understanding between DOE and BLM Upper Snake field office requiring the right-of-way grantee to take mitigating action to reduce potential impacts of construction and maintenance activities. Where applicable, the following conservation measures also apply to DOE.

- Grantee must comply with standard DOE requirements for the protection of wildlife within the INL Site, including but not limited to: (1) bury utility lines in important habitat areas, and (2) limit the construction of utility lines, guy wires and fences in important habitat areas (and if their construction is absolutely necessary, mark them to minimize collisions with sage-grouse, raptors and other protected species).
- Grantee is responsible for establishing limiting conditions and mitigation activities for the area within the Right-of-Way, consistent with other measures across the INL Site. This responsibility includes keeping the area free from accumulations of rubbish, debris, and weeds or other non-indigenous plants.
- Grantee must remove all facilities and equipment and restore the site to its pre-Right-of-Way condition no later than 120 days after it permanently stops activities under this Right-of-Way. Lands disturbed by the Grantee's activities and final restoration of the site includes an obligation to re-establish native vegetation (native seeds or seedlings) for those areas disturbed by Grantee operations. Grantee must obtain a list of appropriate native species from DOE's ESER contractor.
- Grantee must use existing roads. Any necessary travel off existing roads is allowed only with advance permission from DOE.

10.2.3 New Conservation Measures – Infrastructure Development

Objective: Avoid new infrastructure development within designated conservation areas, and minimize the impact of infrastructure development on all other seasonal and potential habitats on the INL Site.

Conservation Measure 2 – Adopt BMPs outside facility footprints for new infrastructure development.

DOE has been proactive in implementing conservation measures aimed at reducing threats to sage-grouse that result from existing infrastructure on the INL Site (Sections 4-8). New infrastructure development outside of a facility footprint will be designed, sited, and constructed to avoid or minimize adverse impacts to sage-grouse or its habitats. DOE's goal is to have no net loss of sagebrush on the INL Site. To achieve this goal, DOE will adopt the following BMPs for new infrastructure developed outside facility footprints:

All areas within existing facility footprints, including MFC, CFA, ATRC, INTEC, RWMC, PBF/CITRC, TAN, NRF, and NSTR, are excluded from conservation measures established by this CCA.

- Avoid fragmenting contiguous tracts of sagebrush habitat or areas where sagebrush is expected to become reestablished;
- Design infrastructure projects so that the total distance of habitat edge (i.e., abrupt transition between sagebrush and non-sagebrush habitat) caused by construction and project activities is minimized;
- Where practical, co-locate new infrastructure with existing infrastructure, such as within the footprint (i.e., area of impact) of facilities, utility lines, paved roads, and railroads.

Areas dominated by non-native grasses and other exotic species are also preferred locations for development;

- Towers, utility poles, and other vertical structures should be designed to minimize the opportunity for perching and nesting by ravens or raptors (e.g., use tubular supports with pointed tops rather than lattice supports). Where it is not possible to eliminate nesting substrates, effective deterrents should be installed to eliminate nesting opportunities;
- Avoid installing overhead power lines within 1 km of an active lek;
- Revegetate disturbed areas as soon as possible following disturbance;
- Appropriately mark guy wires and fences to render them more conspicuous and minimize the risk of in-flight collisions by sage-grouse and other birds.

To maintain a conservation bank of sagebrush outside of the SGCA, DOE will take measures to minimize loss of habitat with a goal of achieving a no net loss of sagebrush in areas outside of the SGCA. For activities that would have the potential to impact sagebrush habitat, senior management will be brought into the decision making process before a decision is made to proceed with the activity. Mitigation of sagebrush habitat loss within the SGCA is addressed in Section 9.4.3.

Conservation Measure 3 – Infrastructure development within the SGCA or within 1 km (0.6 mi) of an active lek will be avoided unless there are no feasible alternatives

In the event that DOE has no reasonable option but to construct permanent infrastructure within these protected areas, DOE will contact USFWS early in the planning process and provide its staff with sufficient information to allow them to determine if the proposed project is sited and configured in a way that minimizes impacts to sage-grouse within these areas. Depending on the scope and potential impacts of the proposed project, as well as the status of the sage-grouse abundance and habitat targets relative to the triggers, USFWS will make a recommendation that may include, but is not limited to, one of the following options:

- Proceed with the proposed project without modifying the CCA;
- Modify slightly or amend the CCA (see section 11.4);
- Amend both the CCA and associated Conference Opinion;
- Reconfigure the SGCA boundaries; or
- Implement compensatory mitigation (section 10.2.4).

USFWS will determine which recommendation is appropriate on a case-by-case basis.

There is no need for DOE to submit a proposal for new infrastructure development within a Lek Buffer or the SGCA if the proposed site would occur within exempted corridors (i.e., within 100 m (328 ft) of a facility footprint, landfill, or borrow source, 50 m (164 ft) of power lines and permanent cellular towers, and 15.24 m (50 ft) of paved roads or railroads; Fig. 11).

10.2.4 Mitigation

In its broadest sense, mitigation is a hierarchical process in which the highest priority is to avoid impacts to natural resources, or to minimize impacts if avoidance is not possible. When

impacts can neither be avoided nor minimized, they may be offset through replacement or substitution of resources or environments (i.e., compensatory mitigation [Federal Register 1981]). In this CCA, most of the current and new conservation measures listed in Section 10 are mitigation actions that avoid or minimize impact. However, when new infrastructure must be developed, there may be instances where impacts to sage-grouse and sagebrush habitat cannot be avoided or minimized, even within the SGCA and Lek Buffers. In those instances, DOE will offset impacts through compensatory mitigation.

Compensatory Mitigation for Unavoidable Infrastructure Development within Protected Areas.

As described in section 10.2.1, infrastructure is defined in this CCA as a discrete anthropogenic feature, including roads, railroads, utility lines, wind turbines, communication towers, nuclear energy resources and facilities, fences, and any feature wherein construction results in surface disturbance. In the event that DOE has no reasonable option but to construct permanent infrastructure within the SGCA or a Lek Buffer, DOE will implement one or more of the following actions to offset the loss of sage-grouse habitat.

- Restore sagebrush to areas on the INL Site that are not currently designated as sagebrush habitat, but that historically contained sagebrush stands.
- Incorporate non-SGCA sagebrush habitat into the SGCA.
- If the state of Idaho Mitigation Framework Program becomes viable, pay a compensatory in-lieu fee as identified in the plan "*Framework for Mitigation of Impacts From Infrastructure Projects on Sage-Grouse and Their Habitats"* (December 2010) developed by the Idaho Sage-Grouse Advisory Committee. If mitigation is not conducted on the INL Site, the amount of habitat lost will not count against DOE's habitat trigger percentages.

The amount of compensatory mitigation necessary to offset the impact of each project will be dependent on the scope of the infrastructure and where it is located within the SGCA and shall be determined in consultation with USFWS.

10.3 Annual Grasslands

10.3.1 Threat Summary

Several non-native annual grasses and forbs are known to be weeds in sagebrush steppe, but cheatgrass probably has the greatest impact on sage-grouse across the bird's range. Cheatgrass replaces native perennial grasses and forbs as ecological condition declines. Where cheatgrass occurs at high densities, its dominance is re-enforced by a shortened fire-return interval. Invasion by non-native annual plants, including cheatgrass, is considered one of the major threats to sagebrush ecosystems on a landscape level (Bradley 2010). Several of the threats listed in the current section, including wildland fire, livestock grazing, and infrastructure development, potentially increase the invasibility of semi-arid lands by annual grasses.

Fortunately, the upper Snake River Plain, including the INL Site, has largely escaped cheatgrass domination. On the INL Site, cheatgrass is distributed widely, but it generally occurs at low densities. Long-term vegetation data show that cheatgrass density has varied over the past several decades; in some years it was common or even dominant in a few plots, but in other

years it was nearly absent from the same plots. Regardless, it is important to note that in places where the native perennial grasses and forbs have been lost, non-native annual plants such as cheatgrass dominate and persist.

10.3.2 New Conservation Measures – Annual Grasslands

Objective: Maintain and restore healthy, native sagebrush plant communities.

Conservation Measure 4 – Inventory areas dominated or co-dominated by non-native annual grasses, work cooperatively with other agencies as necessary to identify the actions or stressors that facilitate annual grass domination, and develop options for eliminating or minimizing those actions or stressors.

DOE will work closely with the ESER contractor to delineate annual grasslands (primarily cheatgrass) not already identified in the INL Site vegetation map (Shive et al. 2011). The ESER contractor and DOE will work cooperatively with BLM and other agencies as necessary to identify stressors that have caused native perennial grasses, shrubs, and forbs to be lost in each of these areas and identify options and schedules for removing the stressors. Doing so will allow for recovery of native perennial species.

10.4 Livestock

10.4.1 Threat Summary

Historically, poor livestock management and grazing practices negatively impacted some sagebrush steppe habitats (ISAC 2006). These impacts included alteration of the proportion of shrub, grass and forb functional groups, increased risk of domination by invasive non-native species, and decline in ecological potential due to erosion and altered fire regime. Following wildland fire, habitat recovery goals may be compromised if livestock are permitted to graze a site before it has recovered adequately. The 2006 State Plan notes that maintaining good sagebrush habitat should be a primary management objective because of the difficulty in restoring these habitats, and that monitoring activities should evaluate impacts of current livestock management on sagebrush habitat.

Livestock on the INL Site, particularly sheep and the associated presence of herders and guard dogs, occasionally disrupt sage-grouse on leks during the breeding season. Although cattle have been observed on or near leks, they occur at relatively low densities and likely do not pose a significant threat of disrupting sage-grouse breeding behavior. Since 1996, 19 instances were recorded during spring lek surveys wherein livestock, sheep camps, or livestock feed (corn) were observed on or near leks. Although it is difficult to quantify the effect of such disruptions on sage-grouse reproductive success, it is known that high concentrations of sheep, as well as associated herders and dogs, can disturb lek activity and nesting hens in the vicinity of the lek (Patterson 1952).

Sage-grouse reproduction may be impacted by livestock when overgrazing of grass and forbs during the spring reduces the availability of suitable nesting and early brood-rearing habitat for sage-grouse, increases vulnerability to predators, and increases risk of invasion by annual grasses. In particular, the timing of herbivory can result in reduction of vigor in individuals of some native plant species that are important components of sage-grouse habitat. Herbivory that results in loss of vigor can over time result in the removal of susceptible species from the

community. Bluebunch wheatgrass is one such example of a species common in sagebrush steppe and is the dominant grass on certain ecological sites in Idaho. Bluebunch wheatgrass gains most of its stored carbohydrates from photosynthesis associated with leaves on the flower stalks. Grazing that damages the flower stalks in the spring reduces the photosynthetic capacity of the plant and its ability to produce and store carbohydrates. Recovery of vigor following removal of flower stalks in the spring of one year has been demonstrated to require several years rest. Removal of flower stalks in the spring annually will result in the loss of this co-dominant from the plant community (Anderson 1991).

The practice of placing and maintaining mineral blocks and water troughs within allotments on the INL Site, especially within undisturbed sagebrush habitat, can potentially impact sage-grouse in at least two ways. First, these sites are generally used intensively by livestock, which could result in localized habitat degradation. Second, new roads may be created to access a water trough location (section 10.2.1).

10.4.2 Current Conservation Measures

Livestock Grazing, Weeds, and BLM Range Improvements (Sec. 8.3)

- Following a wildfire, BLM develops and implements an Emergency Stabilization and Rehabilitation (ESR) Plan in compliance with the programmatic Normal Fire Rehabilitation Plan (EA-ID-074-2004-003). The ESR plan specifies areas closed to livestock grazing and may list closure periods and recovery objectives to be achieved prior to authorization of continued grazing. Affected areas remain closed to livestock grazing until monitoring demonstrates that resource objectives have been met. As an example, the ESR Plan for the 2010 Jefferson Fire states that grazing can resume when "native perennial herbaceous cover is at least 70% of what is found in the unburned islands and adjacent areas, and 80% of the herbaceous perennial plants are producing seed." ESR plans vary according to the level of resource impact.
- Grazing Authorizations are renewed following ISRH, with multiple opportunities for input and participation from operators, interested publics, and local, state, and federal agencies. An interdisciplinary team of resource specialists completes a field assessment of the allotment. The findings of the field assessment and other available monitoring data are provided in the Allotment Assessment. Based on the Allotment Assessment, an Allotment Evaluation relative to achieving ISRH is completed. Following scoping with the parties identified above, an EA is completed which identifies and analyzes potential impacts of a range of alternatives relative to livestock grazing in the allotments. During this process, actions or alternatives are developed through consultation with all parties to address the potential impacts of the various actions on sage-grouse, as appropriate.
- Water for livestock grazing within allotments is hauled or piped to established sites. In addition, mineral supplements are used as a tool to improve distribution across pastures and BLM typically specifies that mineral supplements may not be placed within 402 m (0.25) mi of water sources.
- The Mahogany Butte allotment includes the following as one of its terms and conditions for permit renewal: "Livestock use on the area of the allotment west of Highway 28 to 805 m (0.5 mi) west of the Birch Creek channel would be limited between April 1 and

June 15, to protect core sage-grouse breeding habitat in the Birch Creek Valley. No sheep camps, bedding grounds, or water hauls would be authorized in this area during the specified timeframe." The area described here includes all of the known, active leks on the northern portion of the INL Site.

10.4.3 New Conservation Measures – Livestock

Objective: Limit direct disturbance of sage-grouse on leks by livestock operations and promote healthy sagebrush and native perennial grass and forb communities within grazing allotments.

Conservation Measure 5 – Encourage BLM to seek voluntary commitments from allotment permittees and to add stipulations during the permit renewal process to keep livestock at least 1 km (0.6 mi) away from active leks until after May 15 of each year. Regularly provide updated information to BLM on lek locations and status to assist in this effort.

DOE will encourage BLM to include stipulations during grazing permit renewal that restrict sheep grazing and associated herding activities within 1 km of an active lek (Fig. 11), March 15 – May 15 (though herders would be allowed to trail livestock in these areas from 9 a.m. – 6 p.m.). In addition, DOE will encourage BLM to develop stipulations that identify alternative sites or herding routes to minimize disturbance near active leks in the spring. While performing weekly lek route surveys, ESER biologists will inform BLM whenever sheep are observed within 1 km of an active lek before May 15 so that BLM can contact the permittee and ask him to move his livestock. ESER will meet annually with BLM to discuss whether permittees kept livestock away from leks during the previous spring and to decide if further actions are needed.

To ensure that permittees have up-to-date information regarding the locations of active sage-grouse leks on the INL Site, DOE will provide ecological and INL Site-specific information (including an updated lek map) to BLM by Feb 1 of each year and will request that the information be included in the annual letters sent out to permittees. During late winter, ESER biologists will offer to contact permittees and provide an opportunity for them or their employees to accompany ESER biologists into the field to show them lek locations (see guidelines in ISAC 2006).

Conservation Measure 6 – Communicate and collaborate with BLM to ensure that the herbaceous understory on the INL Site is adequately maintained to promote sage-grouse reproductive success and that rangeland improvements follow guidelines in the 2006 State Plan and this CCA.

DOE will proactively engage BLM in an effort to ensure that DOE's commitment to conserve sage-grouse breeding habitat is not compromised by a lack of communication or use of existing data. The following activities support Conservation Measure 6:

- ESER participates in BLM-sponsored field assessment meetings and other public venues where ESER vegetation and sage-grouse data can be shared to inform livestock management decisions.
- DOE encourages BLM to ensure that livestock management actions and strategies are in accordance with conservation measures outlined in the 2006 State Plan (ISAC 2006). Some of the strategies that may be appropriate include: (1) maintain or enhance cover,

height, and species diversity of herbaceous understory during the spring nesting and early brood-rearing season (approximately April 1 – June 30); (2) reduce or eliminate spring grazing within high-quality sage-grouse breeding habitat; (3) defer grazing activity within breeding habitat.

- During grazing permit renewal, DOE requests that BLM include the following stipulation: "Mineral supplements and water troughs should be placed in previously disturbed areas."
- DOE conveys to BLM that proposed fencing projects on the INL Site must comply with guidelines in the 2006 State Plan (or superseding documents) and the current CCA. Stipulations included in permit renewals may include distance requirements from active leks, limitations on the timing of construction, and fence marking.

10.5 Seeded Perennial Grasses

10.5.1 Threat Summary

Research conducted on the INL Site has demonstrated that crested wheatgrass, a non-native perennial grass, invades high quality sagebrush steppe habitat (Forman et al. 2010, Rew et al. 2012). This conversion appears to be permanent because native plants are unlikely to naturally reestablish (Marlette 1982, Marlette and Anderson 1986) once crested wheatgrass has become abundant in the understory. Even the most recent research on how to restore areas dominated by crested wheatgrass to native plant communities has failed to find methods that accomplish this task (Waldron et al. 2005, Hulet et al. 2010).

Because communities dominated by crested wheatgrass are less likely to be used by sage-grouse, especially for brood-rearing, the invasion of crested wheatgrass represents both a direct loss of habitat and an increase in habitat fragmentation. Rew et al. (2012) concluded that crested wheatgrass is one of the few truly invasive plant species on the INL Site. They reported that it is not restricted by specific habitat requirements, which means that it can and does invade into otherwise good condition native communities. Where it does invade, it will eventually dominate by out-competing the native perennial grasses. This is unlike the non-native annual grasses that dominate in response to the loss of native species rather than causing it. Rew et al. (2012) reported that crested wheatgrass is among the most problematic invasive species for land managers to control because targeting specific habitats is not a viable strategy because it does not exhibit specific habitat requirements and it has the potential to occupy the entire INL Site.

Crested wheatgrass was intentionally planted on the INL Site and elsewhere in the Great Basin where it was used on roadsides and landfill caps and as a restoration species on degraded lands. It was used successfully in these applications because it establishes quickly in harsh conditions and it is a prolific seed producer. These qualities also make it successful as an invasive species. A recent analysis (Shive et al. 2011) mapped communities with a substantial component of crested wheatgrass as covering 13,663 ha (33,762 acres), or about 6% of the INL Site.

Invasion by crested wheatgrass was first reported in sagebrush steppe based on surveys conducted on the INL Site and confirmed by more recent surveys (Forman et al. 2010, Rew et al. 2012). The phenomenon appears to be a land management problem unique to the INL Site and perhaps other parts of the upper Snake River Plain. It does not appear to be a substantial

problem in other parts of the sagebrush steppe ecosystem further west and south. Because this has only recently been reported and it appears to be a significant problem only in the upper Snake River Plain, invasion by crested wheatgrass has not been addressed by other land management agencies as a priority and therefore little research has yet been conducted that would lead to effective control strategies. The mechanisms facilitating invasion have not been reported in the literature and no control mechanism has been developed. As noted above, this species has the potential to eventually occupy the entire INL Site, and this conversion is considered to be permanent and irreversible.

10.5.2 New Conservation Measures – Seeded Perennial Grasses

Objective: Maintain the integrity of native plant communities by limiting the spread of crested wheatgrass.

Conservation Measure 7 – Cultivate partnerships with other agencies to investigate the mechanisms of crested wheatgrass invasion so that effective control strategies can be developed.

Because crested wheatgrass invasion leads to direct loss of sage-grouse habitat on the INL Site, developing a control strategy will be important to the success of sage-grouse conservation in the long-term. Understanding the mechanisms of invasion is necessary for developing potential control strategies. Unique research opportunities exist on the INL Site for understanding crested wheatgrass ecology and its mechanisms of invasion into native plant communities. Ecologists within the ESER will promote this research potential among colleagues at universities and other agencies, and encourage these individuals to design studies and seek external funds to conduct research on the INL Site. Conclusions from such research could be applied on the INL Site as appropriate.

10.6 Landfills and Borrow Sources

As described in Section 5.3, eight borrow sources are actively used on the INL Site (Table 4). Although sagebrush is no longer abundant within the borrow sources, the fact that three pits support active leks suggests that with proper time-of-day and seasonal access restrictions in place, these sites can still provide functional lekking habitat for sage-grouse.

A recent report indicated that there is sufficient gravel and silt/clay in existing borrow sources to meet the projected requirements of CERCLA remediation and other miscellaneous work through 2035 (Bean and Jolley 2009). Construction or other activities may deplete the borrow sources more rapidly than projected for CERCLA work, but it is likely that the current borrow sources, as well as landfills, will be adequate for the duration of the current CCA. If, however, it becomes necessary for contractors to search for a new site to serve as a borrow source or landfill, guidelines are provided below that will help to minimize impacts to sagebrush habitat.

Table 4. Active and inactive borrow sources on the INL Site (see also Fig. 6). The pit boundary is the official boundary around each pit that represents the area authorized for excavation (i.e., pit footprint), whereas the excavated area is the amount of land that had been disturbed through 2011. New seasonal time-of-day restrictions are listed in the last column. Asterisks indicate where active sage-grouse leks are within 1 km (0.6 mi) of the pit.

Borrow Source	Description	Pit Status	Excavated (ha)	Pit Boundary (ha)	Restrictions (i.e., when heavy equipment will not be operated in borrow sources)
*Adams Blvd.	Gravel	Active	11.7	60.8	6 p.m.-9 a.m., Mar 15-May 15
*T-12	Gravel	Active	10.4	30.3	6 p.m.-9 a.m., Mar 15-May 15
Spreading Area B	Silt/Clay	Inactive	~61	159.3	None
Spreading Area A	Silt/Clay	Potential	N/A	16.2	Seasonal time-of-day restrictions listed above would apply only to a small fragment of this borrow source.
Radio Butte Cinder Pit	Cinder	Potential	N/A	11.8	None
*Rye Grass Flats	Silt/Clay	Active	9.3	102.6	6 p.m.-9 a.m., Mar 15-May 15
Twin Buttes Cinder Pit	Cinder	Potential	N/A	3.2	None
Jefferson County	Gravel	Potential	N/A	27.2	None
T-28 North	Gravel	Inactive	3.0	8.5	None
T-28 South	Gravel	Active	15.5	54.9	None
Unnamed (WAG 10)	Sand	Potential	N/A	0.4	None
Water Reactor Research Test Facility	Gravel	Potential	N/A	16.2	None
Lincoln Blvd.	Gravel	Active	13.2	42.4	None
NRF Pit	Gravel	Potential	N/A	1.6	None
Monroe Blvd.	Gravel	Active	6.0	32.5	None
CFA	Silt/Clay	Potential	N/A	22.6	None

10.6.1 Threat Summary

Landfills and borrow sources can potentially impact sage-grouse in several ways. First, heavy equipment operation and other human activity that occur near borrow sources while sage-grouse are involved in courtship displays can disrupt breeding activity. This could be especially detrimental if such disruption occurs regularly during the spring breeding season. Second, direct loss of sagebrush habitat when a new pit is excavated or an existing pit is expanded can also impact sage-grouse. However, if appropriate rehabilitation occurs when pits are no longer

active, the long-term impacts of landfills and borrow sources is greatly reduced. Third, if not properly managed, landfills and borrow pits can become infested by weeds, thereby promoting the spread of invasive species into bordering habitats. Finally, landfills containing municipal waste may attract scavengers such as the common raven, which is an effective sage-grouse nest predator (see Section 10.8).

10.6.2 Current Conservation Measures

Landfill Operations (Sec. 5.2)

- Waste is compacted and covered each day that it is received at the landfill to discourage use by scavengers.

Borrow Sources – gravel and silt/clay (Sec. 5.3)

- Borrow sources used by sage-grouse during the breeding season currently have seasonal time-of-day guidelines that restrict operation of heavy equipment.
- Pits are monitored regularly to verify that operations remain within approved footprints. Before a pit can be expanded into undisturbed habitat, cultural and biological survey results must be approved, including an assessment of potential impacts to sage-grouse.
- The F&SS has developed a permitting process to regulate excavations within all active INL Site borrow sources (except NRF) and direct pit expansion within approved footprints that ensures appropriate revegetation, weed control, and biological resource protection measures.
- NRF controls the use of the NRF borrow source in accordance with the facility's Environmental Controls Manual. This manual imposes requirements for control of noxious weeds and for the protection of wildlife on operations occurring at NRF, including the borrow source.

10.6.3 New Conservation Measures – Landfills and Borrow Sources

Objective: **Minimize the impact of borrow source and landfill activities and development on sage-grouse and sagebrush habitat.**

Conservation Measure 8 – Eliminate human disturbance of sage-grouse that use borrow sources as leks.

From March 15 – May 15, operation of heavy machinery and other similar activities at borrow sources that are within 1 km (0.6 mi) of an active lek is not allowed from 6 p.m. to 9 a.m. (Table 5). After May 15, no time-of-day restrictions apply to borrow sources. Because landfills and borrow sources are mission-critical areas, there are no restrictions on their use beyond the 1 km Lek Buffer.

Conservation Measure 9 – Ensure that no net loss of sagebrush habitat occurs due to new borrow pit or landfill development.

To achieve Conservation Measure 9, DOE will:

- Avoid establishing new borrow pits and landfills in undisturbed sagebrush habitat, especially within the SGCA. If DOE determines that a new borrow pit or landfill must be established within the SGCA, it will follow the procedures outlined in section 10.2 for infrastructure development within the SGCA. If sagebrush habitat must be destroyed to open a new pit, DOE will rehabilitate degraded habitat within the SGCA so that there is no short-term net loss of nesting habitat (i.e., it is not sufficient to simply plan to reclaim the pit after use because it may be decades before the pit is ready to be reclaimed).
- Ensure reclamation plans incorporate the appropriate seed mix and seeding technology to re-establish sagebrush habitat suitable for sage-grouse use.
- Ensure adequate weed control measures are implemented throughout the life of an active borrow source or landfill.

10.7 Raven Predation

10.7.1 Threat Summary

USFWS has concluded that predation is not a significant threat to sage-grouse where good habitat is abundant (Federal Register 2010). However, infrastructure and human-altered habitats often favor generalist predators, such as the common raven, by providing resource subsidies in the form of food (e.g., road kills, landfill refuse) and nesting and perching substrates (Knight and Kawashima 1993). Ravens are a cause for concern in the west because they are effective sage-grouse nest predators (Coates et al. 2008), and low nest success has been implicated as one of the primary constraints on sage-grouse population growth (Autenrieth 1981, Crawford and Lutz 1985, Aldridge and Brigham 2001). Where researchers and wildlife agencies systematically removed ravens in Nevada through poisoning or by other methods, sage-grouse nest success in the treated areas was significantly higher than control areas (Coates and Delehanty 2004, 2010). Although these results suggest a correlation between raven density and sage-grouse nest success, killing ravens is not an effective long-term solution because dispersing ravens rapidly colonize an area after persecution ceases.

Raven populations have increased steadily across the west as humans have increasingly altered landscapes and built infrastructure. Since 1980, raven numbers have increased 300% in the western United States (Sauer et al. 2008). On the INL Site, annual breeding bird surveys conducted on 13 routes have shown a nine-fold increase in raven counts since the mid-1980s (Fig. 14). Although raven populations are increasing, the threat to nesting sage-grouse may be predominately from territory-holding (i.e., nesting) ravens. A recent study in western Wyoming found that sage-grouse nest success was more highly correlated with raven occupancy than density (Bui et al. 2010). In other words, territory-holding residents, rather than large foraging groups of ravens, were primarily responsible for most of the depredation of sage-grouse eggs and chicks. Hence, although observations of ravens during the spring continues to increase on the INL Site, the best indicator of the threat level of sage-grouse nest depredation may be the number of active raven nests within sage-grouse nesting areas.

Recently, Howe (2011) conducted three annual surveys to count raven nests across the INL Site. She documented 24 nests in 2007, 33 in 2008, and 40 in 2009, and reported that she was confident that by 2009 the nest tally represented all raven nests that occur on the INL Site (K. Howe, Wildlife Biologist, Wildlife Conservation Society; Pers. Comm., June 2011).

Seventy-eight percent of nests (n=76) were found on anthropogenic structures (including ornamental trees), whereas 22% (n=21) were on natural substrates. Fifty-three percent of nests were on utility poles, supporting previous findings that ravens are attracted to these structures (Knight and Kawashima 1993; Steenhof et al. 1993).

In summary, to the extent that previously cited research is applicable to the INL Site, it is likely that territory-holding ravens reduce sage-grouse nest success by preying on eggs and young chicks. Furthermore, the increase in raven numbers on the INL Site may be driven in part by the availability of anthropogenic nest substrates, especially along utility line corridors. Steps may need to be taken to reduce the attractiveness of these substrates while enhancing habitat quality in order to reduce the threat of predation to sage-grouse on the INL Site (Bui et al. 2010; Coates and Delehanty 2010).

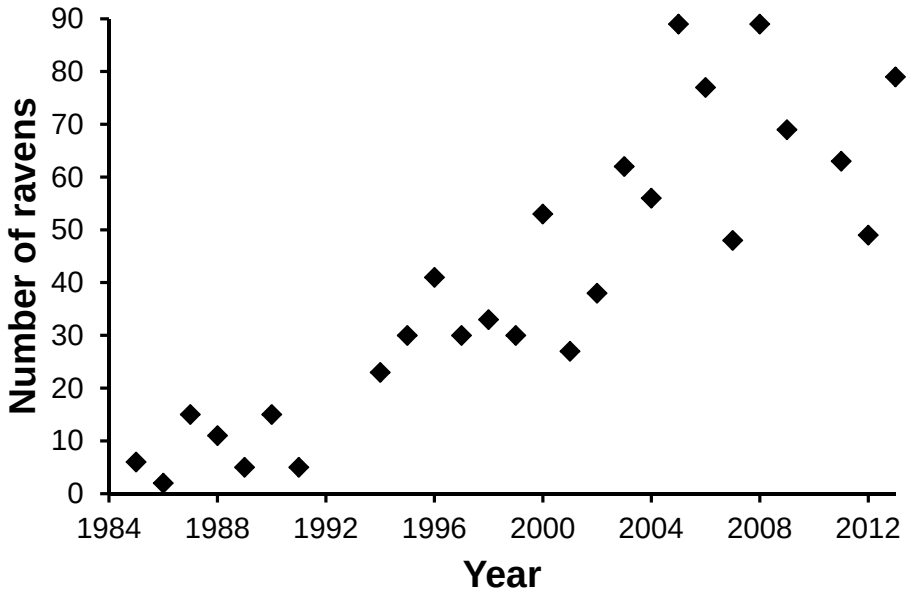

Figure 14. Number of ravens observed during annual spring breeding bird surveys on the INL Site from 1985 to 2013. No data were collected in 1992 and 1993. The count in 2010 was an outlier and was not included. That year, 280 ravens were observed, most of which were in a single flock.

10.7.2 New Conservation Measures – Raven Predation

Objective: Reduce food and nesting subsidies for ravens on the INL Site.

Conservation Measure 10 – Support research that aims to develop methods for deterring raven nesting on utility structures.

Ravens on the INL Site generally build their nests on power line crossbeams near the supporting vertical pole. Based on available funding, DOE will support collaborators in testing the effectiveness of nest deterrents on utility poles in areas of high raven occupancy on the INL Site. When a successful deterrent has been identified, DOE will develop a plan and request funding to install nest deterrents on utility poles within important nesting habitat. If possible,

funding from both DOE and other sources will be used to test the effects of reducing raven nest density on sage-grouse nest and brood success.

Conservation Measure 11 – Instruct the INL to include an informational component in its annual Environment, Safety, and Health training module by January 2015 that teaches the importance of eliminating food subsidies to ravens and other wildlife near facilities.

There have been reports of individuals feeding ravens food scraps at INL Site facilities. These individuals probably do not understand that subsidizing ravens may help to strengthen the raven population on the INL Site, to the detriment of sage-grouse. Therefore, INL will begin to include information in its annual Environment, Safety, and Health training module on the importance of not feeding ravens (or any other wildlife) and in keeping garbage containers closed.

10.8 Human Disturbance

10.8.1 Threat Summary

The INL Site is unique among sagebrush steppe landscapes because of its limited access by the general public. As such, some of the threats to sage-grouse generally associated with human disturbance on public lands (USFWS 2013; ISAC 2006) are minimal or non-existent on the INL Site. Conversely, unique research and training activities, routine maintenance and operations, and other DOE activities may have a negative effect on sage-grouse if appropriate actions are not taken to avoid, minimize, or mitigate impacts. In most cases, activities that occur outside facility fences cause minimal direct impacts on sagebrush habitat. However, human activity in remote areas of the INL Site may increase the risk of fire ignition and introduction of invasive species.

The primary way in which INL Site activities may potentially impact sage-grouse is through disturbance of courtship and breeding activities on leks during early morning hours in the spring, and through disturbance of nesting females. These activities include road maintenance, inspection and maintenance of water control structures and meteorological equipment, weed management, vegetation mowing, power line maintenance, operation of heavy equipment in borrow sources, safeguard and security operations and training, environmental and ecological monitoring, and CERCLA tasks. Few leks are in locations where chronic disturbance is a concern, and only an occasional female sage-grouse would be forced from her nest by off-road activities. These concerns are minimal and to a large degree are easily remedied by instituting seasonal time-of-day restrictions (Table 5).

10.8.2 Current Conservation Measures

Road Maintenance (Sec. 4.1)

- To minimize impact to sage-grouse reproduction, no road maintenance activities occur until after 9 a.m., March 15 through May 15.
- Project personnel and equipment must stay within the current width of existing roads, so that no maintenance activities damage roadside vegetation.

- Project personnel must control undesirable plant species on all roads to avoid encroachment of non-native plant species (including noxious weeds) into areas with native vegetation.
- Maintenance activities beyond the "dump and level" method on Priority 3 roads, and any maintenance on Priority 4 roads require new surveys for ecological resources and would include applicable mitigation measures.

Water Diversion at Spreading Areas (Sec. 4.2)

- Inspection and maintenance activities do not occur between 6 p.m. and 9 a.m., March 15 through May 15.

Weed Management (Sec. 4.3)

- The weed management program does not spray weeds between 6 p.m. and 9 a.m., March 15 through May 15.

Power Line Maintenance (Sec. 4.4)

- Personnel are instructed to minimize off-road travel.
- If a large maintenance or repair effort is required, an environmental review that includes specific mitigation actions will be completed.

Safeguards & Security Activities (Sec. 5.4)

- Snowmobiles and all-terrain and utility vehicles, including tracked utility vehicles, are normally used only on paved roads and unimproved T-roads. However, during an emergency response these vehicles may be used off-road where snow conditions or terrain allow.
- Live-fire activities occur in developed areas of firing ranges and blank-fire activities occur in and near facilities.
- Vegetation near the main range is regularly mowed to reduce fine fuels.

Environmental Monitoring (Sec. 6.1)

- All non-routine environmental monitoring activities outside of facility footprints are reviewed and evaluated by the ESER program for their potential to impact sage-grouse or its habitat and would include applicable mitigation measures.

Ecological Monitoring and Research (Sec. 6.2)

- All activities are reviewed and evaluated by ESER biologists for their potential to impact sage-grouse or its habitat and would include applicable mitigation measures.

Cultural Resource Survey, Monitoring, and Research (Sec. 6.3)

- Cultural resource teams utilize existing roads for access to study areas and typically conduct field surveys on foot.
- All excavations are completed by hand.
- All potential off-road or ground disturbing activities are reviewed and evaluated by the ESER program for the impact they could have on sage-grouse or important seasonal habitats and would include applicable mitigation measures.

Groundwater Monitoring, Well Maintenance, and Abandonment Activities (Sec. 6.4)

- Only native plant seed is used to revegetate well pad sites. Contractors consult with ESER ecologists prior to reseeding to ensure that appropriate species are included in the seed mix.
- Vehicles remain on existing roads and parking areas.
- A nesting bird survey is required for any vegetation removal between April 15 and September 1. If an active nest is found of any bird species, work is stopped at the site until the brood has fledged.
- Existing roadways are used to the extent possible when constructing new monitoring wells.
- Equipment is staged within the defined well pad area.

Monitoring of NOAA Grid Activities and Meteorological Stations (Sec. 6.5)

- DOE contracts ESER to review and evaluate NOAA activities outside of facility boundaries for their potential to impact sage-grouse and its habitat using an Environmental Checklist process.
- Depending on the activity, degree of disturbance, and value of the area to sage-grouse, ESER may recommend, through the DOE NEPA process, that ecological restoration (e.g., revegetation) and other applicable mitigation measures be included in project scope.
- Through the DOE NEPA process, ESER provides guidelines to minimize activities that disturb sage-grouse breeding behavior within 1 km (0.6 mi) of active leks between 6 p.m. and 9 a.m., March 15 to May 15.

CERCLA Activities (Sec. 7.1)

- DOE contracts ESER to review and evaluate CERCLA activities outside of facility boundaries for their potential to impact sage-grouse and its habitat using an Environmental Checklist process.
- Depending on the activity, degree of disturbance, and value of the area to sage-grouse, ESER may recommend, through the DOE NEPA process, that ecological restoration (e.g., revegetation) and other applicable mitigation measures be included in project scope.

- Through the DOE NEPA process, ESER provides guidelines to minimize activities that disturb sage-grouse breeding behavior within 1 km (0.6 mi) of active leks between 6 p.m. and 9 a.m., March 15 to May 15.

Elk and Pronghorn Hunting (Sec. 8.2)

Hunters that obtain a pass to hunt on the INL Site are provided an information packet containing maps and a list of restrictions by which they must abide while within the Site boundaries (Fig. 10). Pertinent restrictions include:

- No fires.
- No motorized vehicle traffic (including motorcycles and all-terrain vehicles) off well established roads (single track trails are not considered roads).
- No disturbance of other wildlife.

10.8.3 New Conservation Measures – Human Disturbance

Human disturbance of sage-grouse during the winter may be detrimental, but generally, most activities occurring outside facility fences and in remote areas of the INL Site are not performed during the winter. Similarly, INL Site telemetry data indicate that during summer and fall much of the sage-grouse population moves off-site in search of forbs and insects associated with more mesic (moister) habitats, so the threat of human disturbance on the INL Site during these seasons is minimal (Section 2.5.3). Therefore, new conservation measures described below are primarily directed towards protection of breeding habitat and behavior within 1 km Lek Buffers across the INL Site and within the SGCA (Fig. 11), as described in Section 9.

Objective: Minimize human disturbance of sage-grouse courtship behavior on leks and nesting females within the SGCA and Lek Buffers.

Conservation Measure 12 – Seasonal guidelines (March 15 – May 15) for human-related activities within 1 km Lek Buffers (0.6 mi) both in and out of the SGCA.

- Avoid erecting portable or temporary towers, including Meteorological, SODAR, and cellular towers. If a cellular grid configuration requires that a mobile cell tower be erected within a Lek Buffer (in or out of the SGCA) between March 15 and May 15, and if DOE demonstrates to USFWS that there are no other feasible options (spatially or seasonally) for achieving the desired configuration, project personnel will be allowed to erect a tower after consulting with ESER biologists to identify locations and a duration within the Lek Buffer that would be least likely to impact sage-grouse courtship and breeding activities. A feasible option is one that could be implemented from a technological and economic standpoint. Human activity associated with erection of the above-mentioned towers will only be conducted between 9 a.m. and 6 p.m.
- UAVs flights conducted before 9 a.m. and after 6 p.m. will be programmed so that flights conducted at altitudes < 305 m (1,000 ft) will not pass over land within 1 km of a lek. Therefore, no time-of-day restrictions need apply to UAV flights. Flights performed between 9 a.m. and 6 p.m. or at altitudes > 1 km are exempt from restrictions.

- Explosives > 1,225 kg (2,700 lb) may only be detonated at NSTR between 9 a.m. and 6 p.m. No other restrictions apply for these large detonations during the remainder of the year.
- No non-emergency disruptive activities are allowed (Fig. 15);

DISRUPTIVE ACTIVITY: A surface disturbance, surface occupancy (by humans, livestock, or equipment), or any site-specific activity lasting > 1 hour during a 24 hour period.

EMERGENCY USE: Activities driven by imminent concerns for human health and safety, or protection of property (e.g., wildfire suppression, HAZMAT response, disease outbreak, etc.).

SURFACE DISTURBANCE: An action that substantially alters vegetation, surface soil, or surface geologic features, beyond natural site conditions. Examples may include: operation of heavy equipment to construct concrete pads, roads, gravel pits, installation of power lines, and vegetation treatments, including prescribed fire. Small-scale excavations using hand tools do not substantially alter vegetation, soil surface, or geologic features.

Figure 15. Definitions of some terms used in Section 10.9, which have been modified from a list of standardized surface use definitions used by Wyoming BLM (see Information Bulletin No. WY IB 2007-029, available at http://www.blm.gov/pgdata/etc/medialib/blm/wy/resources/efoia/IBs/2007.Par.50407.File.dat/wy2007-029.pdf)

Exemptions

- The following activities are either not considered disruptive because of their low impact on sage-grouse, or they are exempt because they are considered mission-critical:
    - Vehicle travel along roadways (not disruptive);
    - Foot traffic or automobiles parked along roadways between 9 a.m. and 6 p.m. (not disruptive);
    - Road maintenance and mowing, weed spraying, and utility line maintenance from 9 a.m. – 6 p.m. In the event that an incoming storm halts power line repair work while a loop is open, workers may return to finish the repair and close the loop once conditions become safe, even if that means the work continues past 6 p.m. (mission-critical);
    - Monitoring and research associated with sage-grouse and other wildlife (mission-critical);
    - Cultural resource surveys and associated activities (see INL Cultural Resource Plan) conducted between 9 a.m. and 6 p.m. (not disruptive);
    - Monitoring of groundwater wells between 9 a.m. and 6 p.m. (not disruptive);

- Inspection of Institutional Control sites between 9 a.m. and 6 p.m. (not disruptive);
- Operation of UGVs between 9 a.m. – 6 p.m. (not disruptive).

Detonation of explosives at NSTR < 1,225 kg (2,700 lb) may occur at any time of the day or night, year-round. Although there is a potential for noise from explosions to negatively affect sage-grouse, especially during the breeding season, no data are available that would clarify whether sage-grouse are impacted by sporadic detonation noises. From the NSTR detonation pad, the nearest lek is 3.8 km (2.4 mi) away. At this distance, a 1,225 kg detonation produces < 140 dB, the level at which ear protection is required for humans. If a lek is discovered within 3.8 km (2.4 mi) of NSTR, this exclusion will be re-evaluated.

Conservation Measure 13 – Guidelines for Human-related Activities within the SGCA

The following conservation measures apply within the SGCA, April 1 – June 30, unless otherwise stated. Conservation measures listed for the Lek Buffers (see above) supersede measures listed in this section for the area within 1 km (0.6 mi) of a lek, until the end of the breeding season (May 15). Between May 16 and June 30, all lands within the SGCA are subject to the following conservation measures.

Seasonal (April 1 – June 30):

- Avoid non-emergency disruptive activities (Fig. 15). If a disruptive activity is necessary, project managers will consult with ESER biologists to identify locations where the activity will have the lowest probability of adversely impacting sage-grouse nesting and early brood-rearing success. This consultation will be part of INL Site NEPA processes (a provision will be added to the INL Site Environmental Checklist requiring a determination be made as to an activity's potential to impact sage-grouse nesting and early brood-rearing). Similar reviews are currently required for any project with the potential to impact areas with native or naturalized vegetation (i.e., non-native but self-sustaining plant communities). Any activity determined to be potentially disruptive or to cause surface disturbance will receive further review by USFWS biologists. This last provision applies only to new activities, rather than routine maintenance and ongoing operations, because appropriate safeguards and conservation measures are already in place for the latter (see Sections 4-8).
- Avoid erecting mobile cell towers in the SGCA, especially within sagebrush-dominated plant communities. Outside of the breeding season, mobile cell towers may be erected, though they should be removed prior to April 1. If DOE mission needs require that mobile cell towers be erected or remain in operation within the SGCS during the April – June timeframe, national security personnel will consult with ESER biologists to identify alternative sites within the SGCA or other conservation measures that would reduce the likelihood of impact to nesting hens or young broods.

Exemptions

- The following activities are either not considered disruptive because of their low impact on sage-grouse, or they are exempt because they are considered mission-critical:

- Vehicle travel along roadways (not disruptive);
- Foot traffic or automobiles parked along roadways (not disruptive);
- Road maintenance and mowing, weed spraying, and utility line maintenance (mission-critical);
- Monitoring and research associated with sage-grouse and other wildlife (mission-critical);
- Cultural resource surveys and associated activities (DOE-ID 2013; not disruptive);
- Monitoring of groundwater wells (not disruptive);
- Inspection of Institutional Control sites (not disruptive);
- Any activity within 100 m (328 ft) of a facility footprint, including NSTR and CFA landfills and borrow sources (mission-critical);
- Any activity within 50 m (164 ft) of a power line or permanent cellular tower (mission-critical);
- Any activity within 15.24 m (50 ft) of paved roads and railroads (mission-critical);
- Off-road operation of UGVs where sagebrush is absent or occurs at low density (<10% cover; not disruptive).

Table 5. Summary of conservation measures that DOE will implement, which are designed to ameliorate threats identified in Section 10. For each threat, DOE has established an overarching conservation objective. The comparable objective from the COT report (USFWS 2013) is also provided, where applicable.

DOE Conservation Objectives	COT Threat-Specific Conservation Objective	Conservation Measures	Expected Conservation Benefit
Wildland Fire (Sec. 10.1)			
Promote the reestablishment or restoration of sagebrush and native perennial understory following wildland fire.	Retain and restore healthy native sagebrush plant communities within the range of sage-grouse.	1) Prepare an assessment for the need to restore the burned area. Based on that assessment, DOE would prepare an approach for hastening sagebrush reestablishment in burned areas and reduce the impact of wildland fires > 40 ha (99 acres).	The approach will provide a work schedule and a blueprint of appropriate rehabilitation strategies aimed at shortening the time between burn and sagebrush reestablishment. Speeding the reestablishment of sagebrush, especially in nesting areas, will reduce the likelihood of exotic species invasion into native sagebrush steppe communities and minimize impacts of wildland fire on sage-grouse.
Infrastructure Development (Sec. 10.2)			
Avoid new infrastructure development within the SGCA and 1 km of active leks, and minimize the impact of infrastructure development on all other seasonal and potential habitats on the INL Site.	Avoid development of infrastructure within Priority Areas of Conservation.	2) Adopt BMPs outside facility footprints for new infrastructure development.	Adherence to these guidelines will ensure that impacts of new infrastructure on sage-grouse and its habitats are minimized across the INL Site.
		3) Infrastructure development within the SGCA or within 1 km (0.6 mi) of an active lek will be avoided unless there are no feasible alternatives (see section 10.2 for an explanation of procedures if DOE determines that no reasonable alternative to building in these conservation areas exists).	Limiting infrastructure development in the SGCA and within 1 km of active leks will conserve nearly 60% of the seasonal habitat for sage-grouse on the INL Site.
Annual Grasslands (Sec. 10.3)			
Maintain and restore healthy, native sagebrush plant	Maintain and restore healthy, native sagebrush plant	4) Inventory areas dominated or co-dominated by non-native annual grasses, work cooperatively with other agencies as necessary to identify the actions	Recovery of diverse native plant communities will increase resistance and resilience to disturbance, increase

DOE Conservation Objectives	COT Threat-Specific Conservation Objective	Conservation Measures	Expected Conservation Benefit
communities.	communities. (Threat: *Non-native, Invasive Plant Species*)	or stressors that facilitate annual grass domination, and develop options for eliminating or minimizing those actions or stressors.	insect diversity and abundance, and provide better cover from predators.
Livestock (Sec. 10.4)			
Limit direct disturbance of sage-grouse on leks by livestock operations and promote healthy sagebrush and native perennial grass and forb communities within grazing allotments.	Conduct grazing management for all ungulates in a manner consistent with local ecological conditions that maintains or restores healthy sagebrush shrub and native perennial grass and forb communities and conserves the essential habitat components for sage-grouse (e.g. shrub cover, nesting cover).	5) Encourage BLM to seek voluntary commitments from allotment permittees and to add stipulations during the permit renewal process to keep livestock at least 1 km away from active leks until after May 15 of each year. Regularly provide updated information to BLM on lek locations and status to assist in this effort.	Voluntary commitments to adjust grazing near leks by all permittees could rapidly eliminate disturbance by livestock at leks and nearby nesting areas, potentially contributing to increased reproductive success.
		6) Communicate and collaborate with BLM to ensure that the herbaceous understory on the INL Site is adequately maintained to promote sage-grouse reproductive success and rangeland improvements follow guidelines in the 2006 State Plan and the current agreement.	Allotments will be managed based on the best available science and up-to-date guidelines, promoting improved habitat conditions (especially understory cover), which may lead to increased sage-grouse reproductive success and survivorship.
Seeded Perennial Grasses (Sec. 10.5)			
Maintain the integrity of native plant communities by limiting the spread of crested wheatgrass.	Seeded perennial grasses were not identified as a threat in the COT.	7) Cultivate partnerships with other agencies to investigate the mechanisms of crested wheatgrass invasion so that effective control strategies can be developed**.**	Encouraging investigation of mechanisms that facilitate crested wheatgrass invasion may lead to the development of effective control strategies. If native sagebrush habitat could feasibly be restored following crested wheatgrass invasion, increased insect diversity and abundance and increased cover from predators would likely result.
Landfills and Borrow Sources (Sec. 10.6)			
Minimize the impact of borrow source and	Landfills and Borrow Sources were not	8) Eliminate human disturbance of sage-grouse that use borrow sources as leks.	Sage-grouse attending leks in existing borrow sources will remain undisturbed

DOE Conservation Objectives	COT Threat-Specific Conservation Objective	Conservation Measures	Expected Conservation Benefit
landfill activities and development on sage-grouse and sagebrush habitat.	identified as a threat in the COT.		during the breeding season.
		9) Ensure that no net loss of sagebrush habitat occurs due to new borrow pit or landfill development.	The quantity of winter and breeding habitat will remain unchanged, even if new development becomes necessary.
Raven Predation (Sec. 10.7)			
Reduce food and nesting subsidies for ravens on the INL Site.	Predation was not identified as a threat in the COT.	10) Support research that aims to develop methods for deterring raven nesting on utility structures.	Decreasing food and nesting subsidies may reduce the number of ravens on the INL Site and levels of sage-grouse nest predation.
		11) Instruct the INL to include an informational component in its annual Environment, Safety, and Health training module by January 2015 that teaches the importance of eliminating food subsidies to ravens and other wildlife near facilities.	
Human Disturbance (Sec. 10.8)			
Minimize human disturbance of sage-grouse courtship behavior on leks and nesting females within the SGCA and 1 km Lek Buffers.	Human disturbance is not specifically identified as a threat by the COT, but impacts of human disturbance are addressed under the threat entitled "Recreation". The Conservation Objective for the Recreation threat reads in part: "manage direct and indirect human disturbance (including	12) Seasonal guidelines (March 15 –May 15) for human-related activities within 1 km Lek Buffers both in and out of the SGCA (exemptions apply – see section 10.9.3): • Avoid erecting portable or temporary towers, including Meteorological, SODAR, and cellular towers. • UAVs flights conducted before 9 a.m. and after 6 p.m. will be programmed so that flights conducted at altitudes < 305 m (1,000 ft) will not pass over land within 1 km of a lek. • Detonation of explosives > 1,225 kg (2,700 lbs) will only occur at NSTR from 9 a.m. – 9 p.m. • No non-emergency disruptive activities allowed within Lek Buffers March 15 – May 15.	Reduced risk that courtship and breeding activities will be disturbed or that nesting and early brood-rearing hens will be disturbed. These actions therefore may result in increased sage-grouse reproductive success.

DOE Conservation Objectives	COT Threat-Specific Conservation Objective	Conservation Measures	Expected Conservation Benefit
	noise) to avoid interruption of normal sage-grouse behavior."	13) Seasonal guidelines (April 1 – June 30) for human-related activities within the SGCA (exemptions apply – see section 10.9.3): • Avoid non-emergency disruptive activities within the SGCA. • Avoid erecting mobile cell towers in the SGCA, especially within sagebrush-dominated plant communities.	

11. ADAPTIVE MANAGEMENT

The INL Site Conservation Framework, as outlined in Sections 9 and 10, is based on principles of adaptive management. In general, this means that DOE and USFWS followed a systematic approach in planning for improved sage-grouse management on the INL Site, and future management actions will be based on feedback from an appropriately designed monitoring program (Williams et al. 2009; Nie et al. 2012). Specifically, the INL Site Conservation Framework allows for adaptive management by:

- listing the primary threats to sage-grouse and sagebrush habitat and articulating how these resources are impacted by Site-specific activities (Section 10);
- developing feasible conservation measures, including the establishment of conservation areas wherein protection of sage-grouse and its habitats are prioritized (Sections 9 and 10);
- establishing population and habitat triggers that would initiate specified actions if tripped (Section 9);
- instituting a monitoring program that provides feedback directly related to triggers and factors that help elucidate trends affecting triggers (see below);
- outlining a reporting mechanism that will ensure accountability (Section 12.3).

11.1 Monitoring Strategy

The INL Site monitoring strategy informs both the population and habitat triggers and tracks several important threats to sage-grouse. The ESER program will continue to conduct annual lek route surveys in order to monitor sage-grouse abundance on the INL Site. For a limited number of years, the ESER program will also survey other active and historical leks and perform lek discovery surveys in the SGCA, in preparation for establishing additional lek routes in 2017. Having more lek routes will enhance DOE's ability to accurately track sage-grouse population trends, especially within the SGCA.

ESER initiated a habitat monitoring program in 2013 that includes annual surveys to estimate the amount of sagebrush-dominated land either gained or lost each year. Another task initiated in 2013 will provide data about the quality of plant communities currently designated as sagebrush habitat and will also be used to support changes in spatial designations of habitat. This task will allow DOE to determine when rehabilitated grasslands and/or green rabbitbrush shrublands meet the criteria of sagebrush-dominated vegetation classes or when populations have declined in designated habitats to a point they no longer provide sage-grouse with adequate cover and forage to be considered quality habitat. Combined, these tasks will directly inform the habitat trigger.

In addition to monitoring sage-grouse abundance and changes in the amount of sagebrush habitat on the INL Site, DOE's strategy includes inventory and monitoring tasks that measure the status of some of the direct and indirect threats to sage-grouse and its habitats on the INL Site. The purpose of these tasks is to monitor factors that could impact sage-grouse reproduction directly or contribute to a decline in sagebrush habitat. Information derived from such activities could provide critical information and direction to DOE in the future if population or habitat

trends decline. These tasks will also allow DOE to determine the effectiveness of select conservation measures in ameliorating threats.

11.1.1 Task 1 – Lek Surveys

Currently, three lek routes are surveyed annually on the INL Site, but there are additional active leks not included on a lek route and are not surveyed with the same frequency. ESER biologists will continue to monitor the three existing routes, visiting each lek at least four times during the breeding season. Following 2016 and the completion of Tasks 2 and 3 (see below), ESER will establish additional lek routes, resulting in the majority of known active leks on the INL Site being monitored annually as part of a lek route. In addition, DOE will monitor other active leks both within and outside the SGCA that are not assigned to a lek route. These surveys will allow DOE to continue to closely track trends of breeding male sage-grouse and to document if declines occur. This information will allow DOE and USFWS to evaluate the status of the sage-grouse population in the SGCA relative to the population trigger.

Threats addressed by Task 1: Infrastructure Development, Livestock, Landfills and Borrow Sources, Human Disturbance.

11.1.2 Task 2 – Historical Lek Surveys

The ESER program searched its archives to compile paper and digital records of sage-grouse leks, as well as undocumented GIS shapefiles showing locations of putative leks across the INL Site (i.e., historical leks). These historical leks, some of which had not been surveyed for 30 years, were of an unknown status. Since 2009, ESER biologists have revisited a subset of these historical sites 1-3 times each spring to determine if sage-grouse still congregate at those sites. Task 2 consists of biologists continuing to survey historical lek sites as part of the overall effort to document all active leks before setting up permanent lek routes (see Task 1). Connelly et al. (2000*a*) suggested a lek be designated active only if it is attended by ≥ 2 male sage-grouse in at least 2 of the previous 5 years. Following the 2016 surveys, biologists will have revisited historical lek sites enough times to confidently determine which are still active. The information derived from this monitoring task will be used to support the lek route monitoring to address the population trigger.

Threats addressed by Task 2: Infrastructure Development, Livestock, Human Disturbance

11.1.3 Task 3 – Systematic Lek Discovery Surveys and Lek Route Establishment

There are large portions of the INL Site where few or no active leks have been identified (e.g., the western side; Fig. 2) even though a cursory examination suggests that the habitat is adequate for breeding and nesting. ESER biologists will perform systematic surveys in poorly sampled regions during April and May for three years (beginning in 2013) for the purpose of discovering active leks sites. As previously described (Task 1; Section 9.4.1), following the lek discovery effort, DOE will establish enough new lek routes to ensure that most known active leks in the SGCA are monitored annually. Data produced during these surveys will provide a more complete and accurate picture of the spatial distribution of sage-grouse during the breeding season. The information derived from this monitoring task will be used to support the lek route monitoring to address the population trigger.

Threats addressed by Task 3: Infrastructure Development, Livestock, Human Disturbance

11.1.4 Task 4 – Raven Nest Surveys

Section 9.8 describes predation threats associated with the growing raven population on the INL Site. Currently, our understanding of raven population trends on the INL Site is based primarily on breeding bird surveys that have been conducted most years since the mid-1980s. The weakness of this approach is that the breeding bird surveys count all ravens, but territory-holding ravens (i.e., nesting pairs) probably are responsible for the majority of sage-grouse nest depredation (Bui et al. 2010**)**. Therefore, to better track the raven population trend as it relates to sage-grouse predation, it is important to conduct annual surveys for raven nests across the INL Site. Routes will be established so that data are comparable to past nest surveys (Howe 2011). Annual monitoring will allow DOE to determine the effectiveness of conservation actions aimed at reducing raven occupancy.

Threat addressed by Task 4: Predation

11.1.5 Task 5 – Sagebrush Habitat Condition Trends

Annual monitoring of sagebrush habitat will be necessary to determine vegetation trends specific to the quality of habitat for sage-grouse on the INL Site. If there are declines in habitat quality, these data may also be used to evaluate which threats are contributing to those declines and assist in developing appropriate adaptive management strategies. Trends in plot-level vegetation composition, which will be assessed as a component of this task, will be used to support task 6 as well. Increasing or decreasing trends in sagebrush cover will be monitored using this data set, and these trends will be used to help guide the sagebrush habitat distribution monitoring effort. Specifically, increases or decreases in sagebrush cover in some plots or groups of plots may prompt reevaluation of a map class around that location.

Many of the plots established for the recently completed vegetation community map will be used for annual monitoring to address issues specific to habitat quality (e.g., sagebrush cover, forb diversity, vegetation height, invasion by non-native species, etc.). This monitoring effort is focused on current sagebrush habitat and burned areas that have the potential to return to sagebrush habitat in the future. Some of the plots used for the vegetation mapping effort will not be used for habitat condition monitoring because they don't meet these criteria, and some supplemental plots will be added to areas of current sagebrush habitat in order to increase sample sizes to meet monitoring goals. A subset of these monitoring plots will be surveyed annually, with the remainder surveyed on a rotating basis over 5 years. Ecologists will begin by visiting these monitoring plots over three years (2013 through 2015).

ESER ecologists will also continue to utilize the existing Long-Term Vegetation (LTV) Transect plots to provide historical context and gross trends for vegetation community change on the INL Site. For example, the LTV plots are used to answer questions like; are there general trends in vegetation across the INL Site for a given time period?, how quickly does vegetation composition change?, and how does precipitation affect various functional groups? Sampling occurs once every five years for this purpose. The next data collection effort on the LTV plots is scheduled in 2016. This task, in combination, with Task 6 will be used to assess the habitat trigger.

Threats addressed by Task 5: Wildland Fire, Annual Grasses and Other Weeds, Seeded Perennial Grasses, Livestock, Climate Change, Infrastructure Development, Conifer Encroachment.

11.1.6 Task 6 – Monitoring to Determine Changes in Sagebrush Habitat Amount and Distribution

Loss of sagebrush-dominated habitat has been one of the primary causes of decline in sage-grouse. Direct loss of sagebrush habitat has occurred through several mechanisms including infrastructure development and wildland fire. Indirect losses of sagebrush habitat may also occur through process like non-native species invasions and sagebrush population declines. In the near future we expect the total area and extent of sagebrush habitat to change following wildland fires, as new projects are developed on the INL Site, and as lands are restored or recover following decommissioning of existing facilities. These changes in land cover can be determined using aerial imagery that is readily available at little or no cost. ESER GIS analysts will compare new aerial imagery, as it becomes available, with existing land cover data from the recently completed vegetation classification and mapping project, as well as trends from habitat condition monitoring plots (Task 5), to document changes in the distribution of sagebrush habitat. Ground-based point surveys and changes in species cover and composition documented through the sagebrush habitat condition monitoring data (Task 5) will provide spatial information to assist with periodic map updates needed to monitor the habitat trigger.

Threats addressed by Task 6: Wildland Fire, Annual Grasses and Other Weeds, Seeded Perennial Grasses, Livestock, Climate Change, Infrastructure Development, Conifer Encroachment.

11.1.7 Task 7 – Inventory and Monitoring of Sage-grouse Habitat for Areas Dominated by Non-native Annual Grasses

The loss of habitat due to the invasion by non-native grasses is a substantial threat to sage-grouse across its range. Understanding the status of these weeds on the INL Site is an important aspect of tracking the quality of habitat on the INL Site. The new vegetation community map will be used to identify weedy areas and vegetation types that are particularly susceptible to increases in non-native annual grasses within the SGCA. This information will be used to guide ground-based surveys for areas substantially impacted by invasive plants. These areas will be mapped using a GPS and the size and condition of each monitored through time. This information would also assist with the site selection process for restoration of herbaceous understory.

Threats addressed by Task 7: Annual Grasslands, Livestock

11.1.8 Task 8 – Monitor Unauthorized Expansion of the Infrastructure Footprint Within the SGCA and Other Areas Dominated by Big Sagebrush.

ESER GIS analysts will quantify the INL Site infrastructure footprint once every two to five years when the National Agriculture Imagery Program makes digital ortho-photography updates of the State freely available on the internet. A GIS will be used to process and analyze imagery to identify fine-scale habitat disturbances associated with facilities, roads, and other infrastructure on the INL Site. This periodic analysis will become the basis for determining if the total infrastructure footprint is expanding (and at what rate), where the most impacted areas

are, and how many (if any) hectares should be restored or rehabilitated to mitigate impacts. If new roads are detected that appear to be associated with livestock grazing management, DOE will work with BLM to address the problem. If unauthorized expansion is associated with INL Site infrastructure (i.e., scope-creep), DOE will take steps internally to eliminate its occurrence.

Threat addressed by Task 8: Infrastructure Development

11.2 Comparison to the Monitoring Strategy of the State Alternative

In the State Alternative, the population trigger is tied to two indicators (maximum number of males counted on lek routes and the average finite rate of change of the maximum number of males,) and the habitat trigger is linked to the amount of nesting and wintering habitat. IDFG will continue to conduct lek route surveys across the state and compile lek route data collected by other agencies, allowing the State to assess the two indicators of the sage-grouse population triggers. Federal land management agencies are responsible for monitoring habitat gains or losses, and will likely do so by tracking the number of acres burned by wildland fire, lost through permitted development, and either gained or lost through juniper expansion or mastication projects (Don Kemner, Wildlife Program Coordinator, IDFG; Pers. Comm., Oct. 2013).

Similar to State and Federal efforts across Idaho, DOE will continue to conduct lek route surveys annually on the INL Site to inform decision making relative to the population trigger. The habitat trigger will also be adequately monitored as the tasks described above will provide sufficient data to enable DOE to accurately monitor the number of sagebrush-dominated hectares lost through wildland fire and infrastructure development. In addition to these minimum objectives that match monitoring efforts across the State, DOE's monitoring tasks will provide data that increase its knowledge of the number and spatial distribution of active leks, track predator population trends, and monitor several indicators of habitat quality. Thus, the INL Site monitoring strategy goes beyond the standard set by the State of Idaho to track the status of population and habitat triggers.

11.3 Reporting

By January 31 of each year, DOE will provide a document to USFWS that reports on the monitoring activities occurring within the preceding twelve months and:

- addresses adaptive regulatory triggers established in Section 9;
- documents progress towards achieving objectives and completing monitoring tasks outlined in Sections 10 and 11;
- includes a work plan showing how DOE intends to implement conservation measures in the upcoming year;
- proposes changes (if any) that would increase effectiveness in achieving objectives and furthering the goals of this CCA.

DOE and USFWS will meet no later than the end of February each year to discuss DOE's report and to assess the results of the previous year's monitoring and progress towards achieving conservation objectives. The report and subsequent meeting will also provide an opportunity for

DOE to update USFWS on plans for new INL Site activities and infrastructure projects that could potentially impact sage-grouse and to agree upon appropriate avoidance or mitigation actions that do not jeopardize mission-critical activities.

11.4 Amendments

The SGCA boundary is not necessarily intended to remain static throughout the life of this agreement. Rather, the boundary may be adapted as population and habitat statuses change over time. Although DOE's goal is to conduct future mission-related activities preferentially outside the SGCA, circumstances may arise that would make it impossible to fully realize that goal. If DOE has a need for new activities outside the scope of this agreement or permanent infrastructure within the SGCA, it shall open a dialogue with USFWS early in the planning process so that potential impacts to sage-grouse can be avoided, minimized, or mitigated (i.e., offset) while still achieving DOE's mission objectives. If necessary, the CCA may be amended to allow DOE and USFWS to respond to changing conditions on the INL Site with regard to sage-grouse trends, habitat conditions, and DOE priorities. If DOE proposes an activity not described in the CCA that could potentially affect sage-grouse or its habitat, DOE will work with USFWS to amend the CCA to include the activity. To be included, the activity must fit within the range of effects as analyzed within the CCA/Conference Opinion and for which the stipulated conservation measures will be applied. Because a majority of the analysis will have been completed through the CCA/Conference Opinion, the parties assume that such an amendment can be expedited if the activity fits within the scope of the CCA/Conference Opinion. If the proposed activity does not fit within the scope of the CCA/Conference Opinion, the parties will discuss the activity and possible options that would ensure DOE mission and conservation goals are met.

USFWS will determine whether the proposed amendment is a minor or major modification. Minor amendments would include routine administrative revisions, changes to the operation of the CCA, or other alterations that would not be in conflict with the purposes of the CCA or result in some material change to USFWS's analysis as represented in the associated Conference Opinion. Major amendments are likely to be subject to procedural requirements of Federal laws and regulations, such as NEPA, and to require additional analysis by USFWS, public notification in the Federal Register, and a formal CCA amendment process.

To propose an amendment, the party initiating the action shall provide written notice to and obtain the written concurrence of the other party. The notice should describe the proposed amendment, the reason(s) for it, and its expected results. A minor amendment may be able to be completed within 60 days but a major amendment may take longer. USFWS could commit to a specific timeline to address proposed amendments once a proposal is received. Within the agreed upon timeframe, the party receiving the amendment notice shall provide a response of concurrence, request additional information and/or a time extension, or provide an explanation for why it does not concur. Additional discussion and negotiation between the two parties may be necessary before concurrence can be achieved.

11.5 Duration of Agreement

This agreement is in effect for 20 years or until one of the parties elects to withdraw. Either party may withdraw from the agreement by providing the other party with a written notice

of intent to withdraw no later than 30 days prior to the proposed termination date. The terminating party will also include a written explanation of the reasons for withdrawal.

12. SIGNATURES

U.S. Department of Energy, Idaho Operations Office

Richard Provencher — 9/23/14 Date

U. S. Fish and Wildlife Service

Michael Carrier — 10-2-14 Date

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