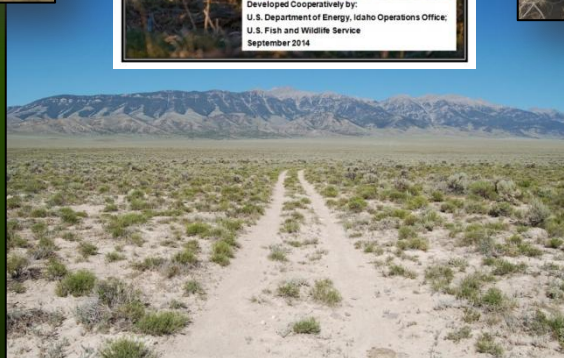
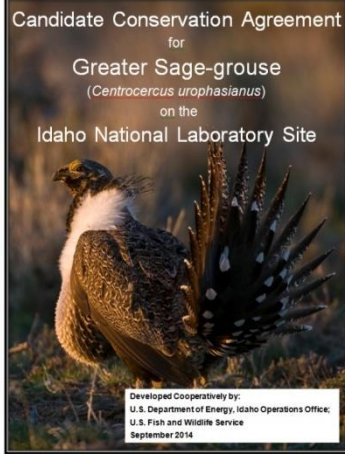
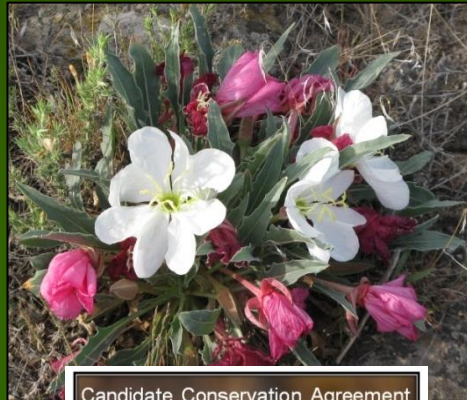


Implementing the Candidate Conservation Agreement for Greater Sage-Grouse on the Idaho National Laboratory Site: 2015 Summary Report



Environmental Surveillance, Education, and Research Program
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Implementing the Candidate Conservation Agreement for Greater Sage-Grouse on the Idaho National Laboratory Site: 2015 Summary Report

January 2016

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RECOMMENDED CITATION

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ACRONYMS

ATR	Advanced Test Reactor
AMWTP	Advanced Mixed Waste Treatment Project
BEA	Battelle Energy Alliance
CCA	Candidate Conservation Agreement
CFA	Central Facilities Area
CITRC	Critical Infrastructure Test Range Complex
DOE	U.S. Department of Energy, Idaho Operations Office
ESER	Environmental Surveillance, Education, and Research
GIS	Geographic Information System
GPS	Global Positioning System
IDFG	Idaho Department of Fish and Game
INL	Idaho National Laboratory
INTEC	Idaho Nuclear Technology and Engineering Center
LTV	Long-Term Vegetation
MFC/TREAT	Materials & Fuel Complex/Transient Reactor Test Facility
NAIP	National Agricultural Imaging Program
NOAA	National Oceanic and Atmospheric Administration
NRF	Naval Reactors Facility
RWMC	Radioactive Waste Management Complex
SGCA	Sage-grouse Conservation Area
SMC/TAN	Specific Manufacturing Capability/Test Area North
USFWS	U.S. Fish and Wildlife Service

1. INTRODUCTION, BACKGROUND, AND PURPOSE

In October 2014, The U.S. Department of Energy, Idaho Operations Office (DOE) and the U.S. Fish and Wildlife Service (USFWS) entered into a Candidate Conservation Agreement (CCA) for Greater Sage-grouse (*Centrocercus urophasianus*; hereafter sage-grouse) on the Idaho National Laboratory (INL) Site (DOE and USFWS 2014). The CCA stipulates that DOE submit a report annually summarizing results from eight monitoring tasks (Section 11), updating the USFWS on DOE's progress toward achieving stated conservation objectives (Section 10), and providing other relevant information prior to an annual meeting between the two agencies. This report briefly summarizes results from the 2015 inventory and monitoring tasks completed by DOE's Environmental Surveillance, Education, and Research (ESER) Program, and provides other information supporting sage-grouse conservation and the CCA. A companion report that includes a full description of methods, data, and discussion about results, was also prepared by ESER (Shurtliff et al. *In Prep.*) and can be found at <http://www.gsseser.com/index.htm> or by contacting ESER.

The primary purpose of this report is to summarize monitoring and inventory results and conclusions so DOE and USFWS can track population and habitat trends and make informed decisions relative to adaptive regulatory triggers outlined in the CCA. On the INL Site, the two triggers and criteria that would have to be demonstrated to initiate an automatic response by both agencies are:

- **Population Trigger:** Peak male attendance, averaged over three years on the 27 leks within the Sage-grouse Conservation Area (SGCA), decreases by 20% or more (i.e., ≤ 253 males) compared with the 2011 baseline ($n=316$ males);
- **Habitat Trigger:** Total area designated as sagebrush habitat within the SGCA is reduced by 20% or more (i.e. $\geq 15,701$ ha [38,798]) of the 2013 baseline (78,504 ha [193,988 ac]).

Information provided here will inform a dialogue between DOE and USFWS as the two agencies cooperate to achieve CCA objectives for sage-grouse conservation on the INL Site. Consistent re-evaluation and analysis of new information will ensure that the CCA continues to benefit sage-grouse on the INL Site, is continuously grounded in the best available science, and retains its value to both signatories.

This document groups related inventory and monitoring task reports into three chapters: Population Trigger Monitoring (Chapter 2), Habitat Trigger Monitoring (Chapter 3), and Threat Monitoring (Chapter 4). Each chapter summarizes results of pertinent monitoring tasks outlined in section 11.1 of the CCA. Chapter 5 documents how DOE and its contractors implemented the 13 conservation measures listed in the CCA during 2015. Chapter 6 summarizes the status of population and habitat triggers in a synthesis that combines information obtained from the eight monitoring tasks and the conservation measures. Finally, Chapter 7 succinctly outlines ESER's work plan for the upcoming year and highlights changes that will be made to the past year's activities.

2. POPULATION TRIGGER MONITORING

In 2013, DOE initiated the following three monitoring tasks designed to track the number of male sage-grouse at active leks and document additional active leks on the INL Site (DOE and USFWS 2014):

- 1) Lek Surveys – Surveys of all active leks on the INL Site. These include leks that are located in and out of the SGCA and leks on the three Idaho Department of Fish and Game (IDFG) survey routes;
- 2) Historical Lek Surveys – Surveys of historical leks on the INL Site to determine if grouse still use those areas;
- 3) Systematic Lek Discovery Surveys – Surveys of poorly sampled regions of the INL Site to discover additional active leks, especially in the SGCA.

Task 1 produces an index of peak male attendance across the 27 leks in the SGCA that were used to establish the baseline value of the population trigger (DOE and USFWS 2014). Task 1 also provides information about abundance trends across the three IDFG lek routes and all other active leks on the INL Site (DOE and USFWS 2014). The purpose of Tasks 2 and 3 is to identify unknown active leks on the INL Site. Our goal is to use information from the three tasks to establish new, permanent lek routes on the INL Site before the 2017 lek season (DOE and USFWS 2014).

2.1 Task 1 – Lek Surveys

Summary of Results: The 3-year average peak male attendance (2013-2015) across the 27 baseline leks in the SGCA was 340 (134% of trigger value) and has remained unchanged for the past two years.

2.1.1 Introduction

Task 1 consists of surveying all known active leks on the INL Site, including the 27 baseline leks located in the SGCA and all other known active leks on the INL Site (DOE and USFWS 2014). Leks on three IDFG survey routes (monitored annually since 1999; Figure 2-1) fall into one of these two categories, but are analyzed separately to maintain historical context. The primary purpose of Task 1 is to provide information that will allow us to track trends on the 27 baseline leks and monitor the population trigger.

2.1.2 Results and Discussion

SGCA Baseline Leks

We surveyed each of the 27 SGCA baseline leks 3–7 times (\bar{x} = 4.6 surveys, SD = 1.5; Figure 2-1). The sum of peak male attendance counts across the 27 leks was 335, and the three-year mean (2013-2015) was 340. This mean is identical to the 2014 mean (Figure 2-2), and remains at 134% of the population trigger point (i.e. 253 males).

Only 20 of the 27 baseline leks remain classified as active (two were reclassified as inactive in 2015). In each of the past three years, two or three baseline leks per year have been reclassified as inactive as the improving data set provides a more accurate classification for each lek. These results should not be interpreted as evidence that seven leks have been abandoned in the past three years but rather that five years of data have accumulated for most leks, allowing for more precise lek classifications.

Other Active Leks

We surveyed all 23 non-baseline leks classified as active on the INL Site 2–6 times each (\bar{x} = 3.3, SD =

1.1) and observed 244 males at peak attendance (Figure 2-1). For comparison, in 2014 we counted 264 males on 20 active non-baseline leks.

IDFG Lek Routes

Summed peak male attendance across all lek routes (which includes two leks outside INL Site boundaries) was 254. This count is slightly lower than the 2014 peak of 260 males, but still higher than any other year since the 2010 Jefferson Fire (Figure 2-3). Both the Lower Birch Creek and the Tractor Flats routes had higher counts of males in 2015 than in recent years ($n = 82$ and 76 , respectively) (Figure 2-3). The Lower Birch Creek count was higher than any year since 2007, and the Tractor Flats count was the highest since the Jefferson Fire (2010). Peak male attendance on the RWMC route was 96 males, a moderate decrease following two consecutive years of increased attendance.

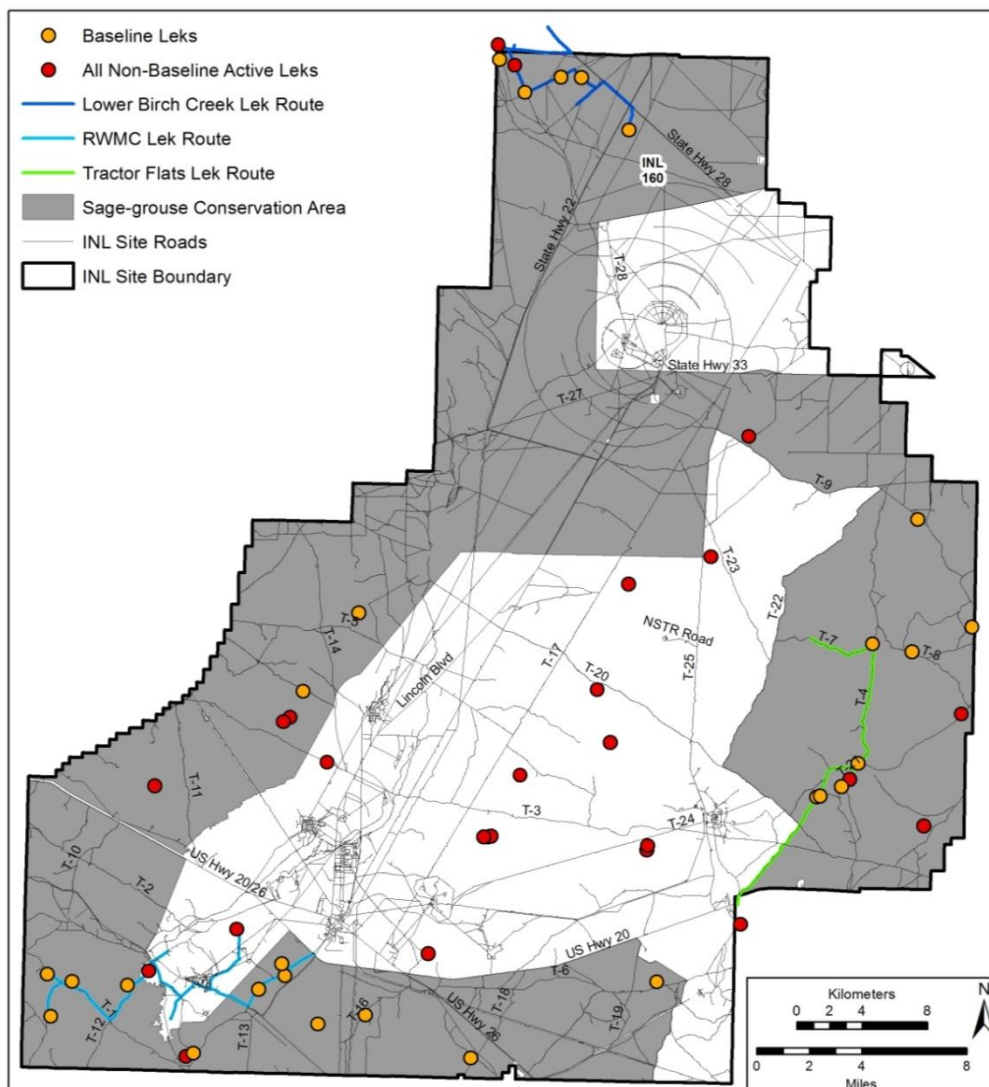


Figure 2-1. Leks surveyed on and near the INL Site in 2015. Twenty-two baseline leks (orange dots) and all non-baseline leks (red dots) were classified as active at the beginning of the survey period. Two baseline leks were subsequently reclassified as inactive following the surveys. A new active lek discovered in 2015 (INL160) is also shown.

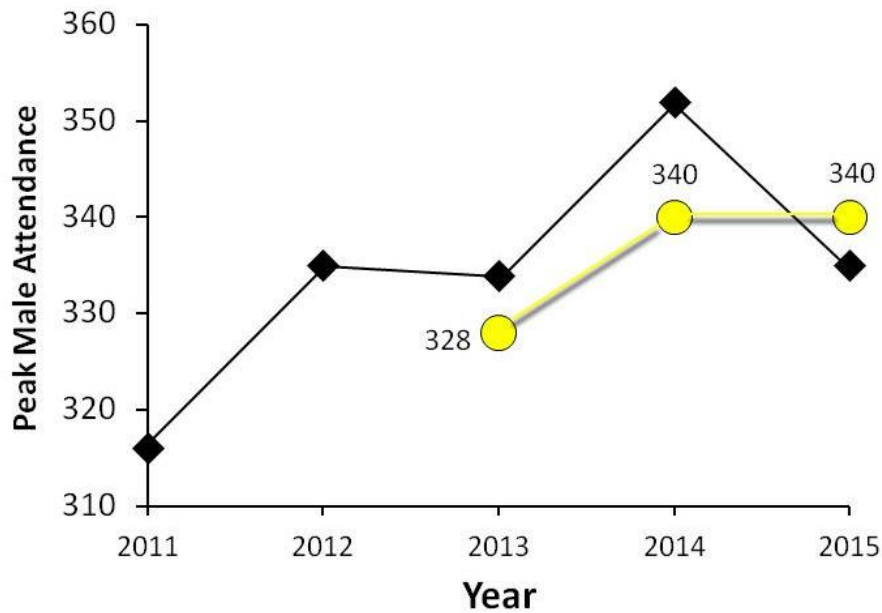


Figure 2-2. Peak male attendance on 27 leks in the SGCA used to calculate the original baseline value. Black squares are annual counts, and yellow dots represent the 3-year running average.

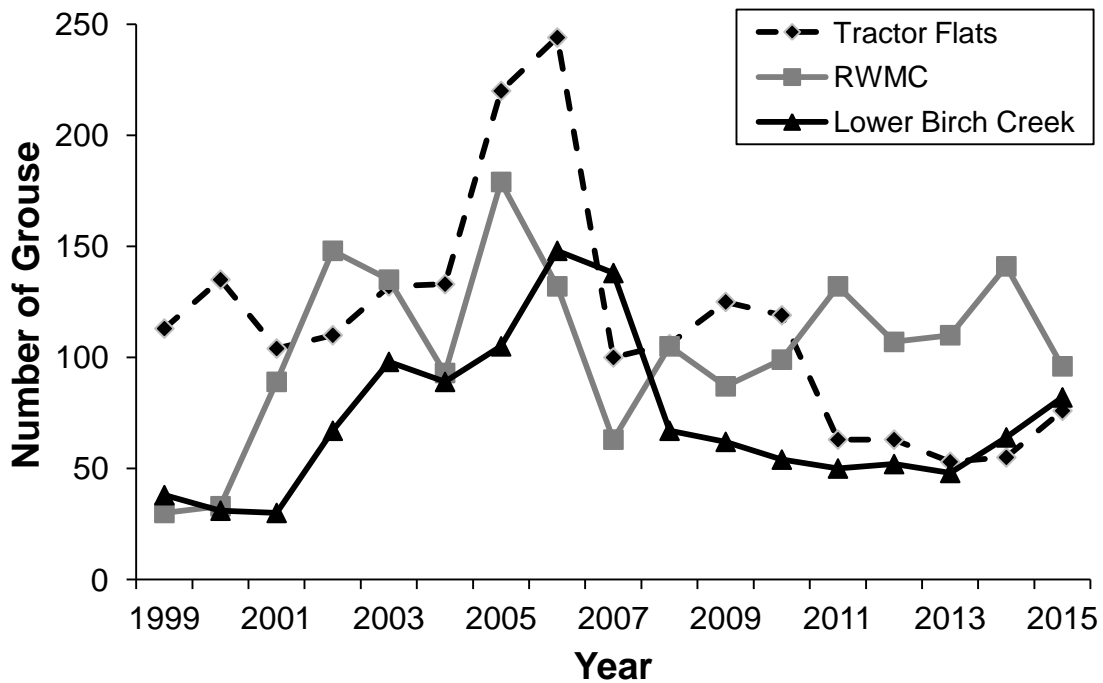


Figure 2-3. Number of male sage-grouse observed at peak attendance across three lek routes on the INL Site from 1999 to 2015. From 1999 – 2007, the number of leks surveyed increased from 12 to 21. Since 2008, the number of leks surveyed has increased to 24.

2.2 Task 2 – Historical Lek Surveys

Summary of Results: Two historical leks were classified as active and ten were classified as inactive (i.e. we observed sage-grouse displaying on the leks this year or we completed five years of surveys without having seen sage-grouse activity on the leks). Fourteen historical leks remain unclassified.

2.2.1 Introduction

During the past several decades, many leks have been documented on the INL Site as a result of surveys and opportunistic observations of displaying sage-grouse (Whiting and Bybee 2011). Prior to 2009, many of these historical lek sites had not been surveyed for nearly 30 years. Since 2009, ESER biologists have revisited a subset of historical leks each spring to determine if the leks remain active based on current criteria (DOE and USFWS 2014). The objective of Task 2 is to determine which historical leks are active before establishing new lek routes prior to the 2017 lek season (DOE and USFWS 2014).

2.2.2 Results and Discussion

We surveyed 15 historical leks in the SGCA an average of 2.2 times (range=2 to 3 surveys), and 11 historical leks outside the SGCA an average of 2.3 times (range=2 to 3 surveys). Across those 26 potential lek sites, we observed males displaying on one lek (INL 144) on two separate visits (three males during one visit and one male during another visit) and four males displaying on another lek during a single visit (INL 117) (Figure 2-4). Consequently, these two leks were reclassified as active.

After an historical lek has been surveyed for five years without at least two years of observed breeding activity, it is reclassified as inactive. Following the 2015 survey season, ten leks were reclassified as inactive. Fourteen leks remain classified as historical and will be surveyed again in 2016.

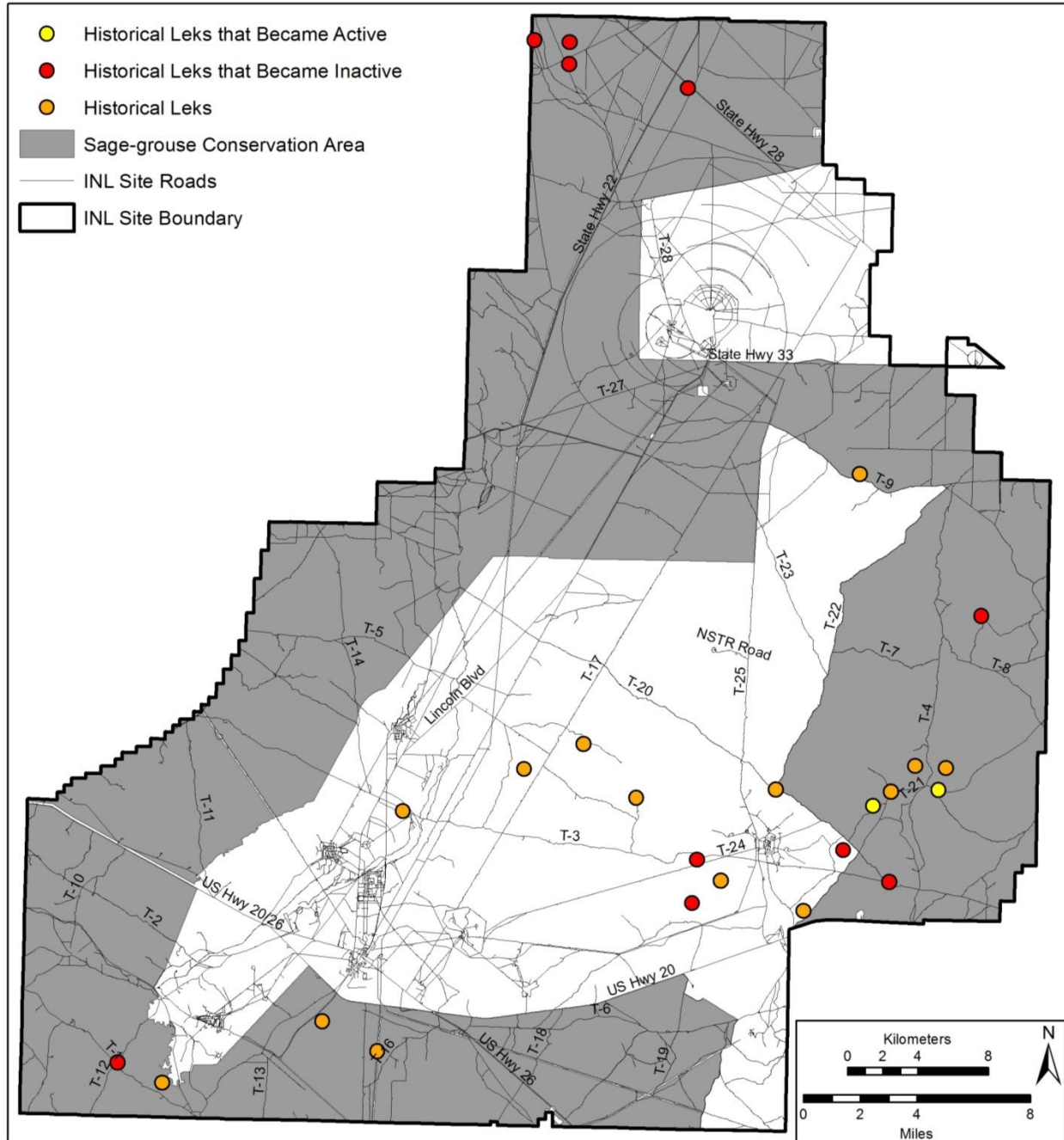


Figure 2-4. Historical leks surveyed on the INL Site in 2015. Leks reclassified as active or inactive following the field season are indicated.

2.3 Task 3 – Systematic Lek Discovery Surveys

Summary of Results: One new lek was discovered in 2015, the fourth found through Task 3 since 2013.

2.3.1 Introduction

Known lek sites are few or absent across large portions of the SGCA (Figure 2-1), even though habitat in these areas often appears to be adequate to support sage-grouse breeding and nesting activities (DOE and USFWS 2014). Since 2013, ESER has systematically searched for unknown lek sites each spring in areas where few or no leks are known. The objective of this task is to continue to search for active lek sites in an effort to find as many as possible before new lek routes are established (DOE and USFWS 2014).

2.3.2 Results and Discussion

Between 25 March and 6 May, 2015, we completed 74 surveys (29 road, 45 remote) within the northeastern section of the INL Site (Figure 2-5) and discovered one sage-grouse lek (N160). We counted two males on one visit to N160 and three males on a second visit, and on both occasions we observed 4 – 14 other sage-grouse of unknown gender.

Since surveys began in 2013, we have discovered four previously unknown leks through Task 3 monitoring.

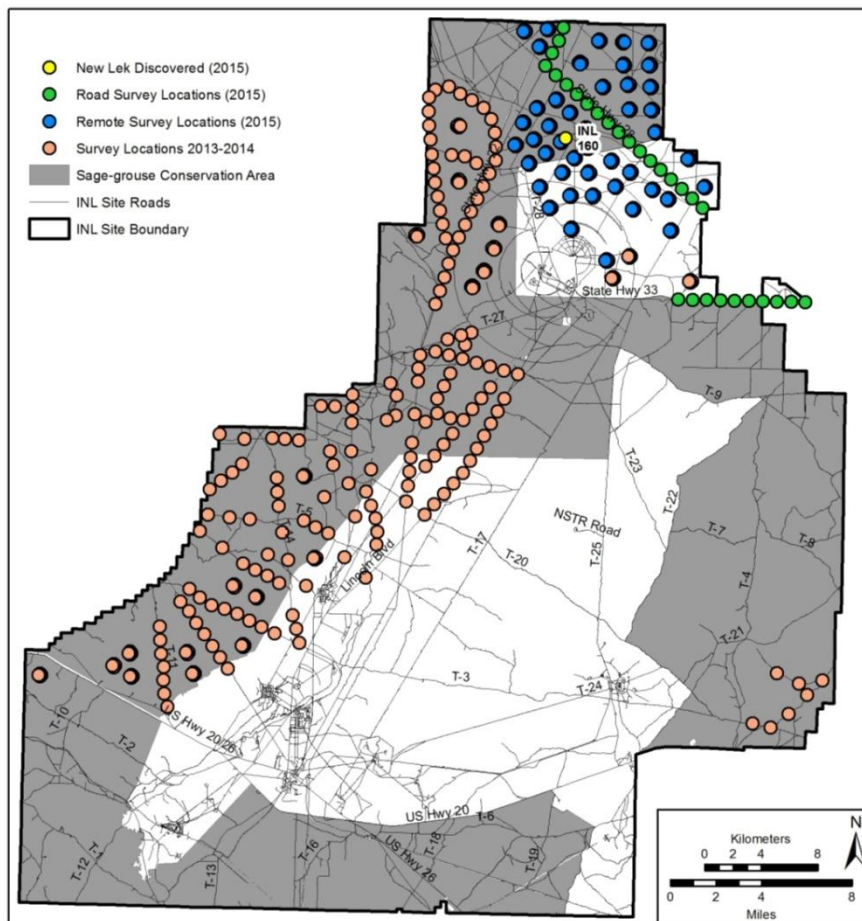


Figure 2-5. Locations where biologists performed acoustic and visual surveys for sage-grouse since 2013.

2.4 Summary of Known Active Leks

Prior to the start of the 2015 field season, 47 leks were classified as active on or near the INL Site, including two just outside the Site boundaries that are part of the IDFG survey routes. In 2015, we reclassified two active lek sites as inactive. However, we added three new active leks to the list (two confirmed during historical lek surveys and one documented during the lek discovery surveys), increasing the total number of known active leks on or near the INL Site to 48 (Figure 2-6).

Peak male attendance in 2015 across all leks on the INL Site was 589. This count represents the summed counts from SGCA baseline leks ($n=335$), all other active INL Site leks recognized as such at the beginning of the field season ($n=244$), the two historical leks reclassified as active in 2015 ($n=7$), and the newly discovered lek ($n=3$).

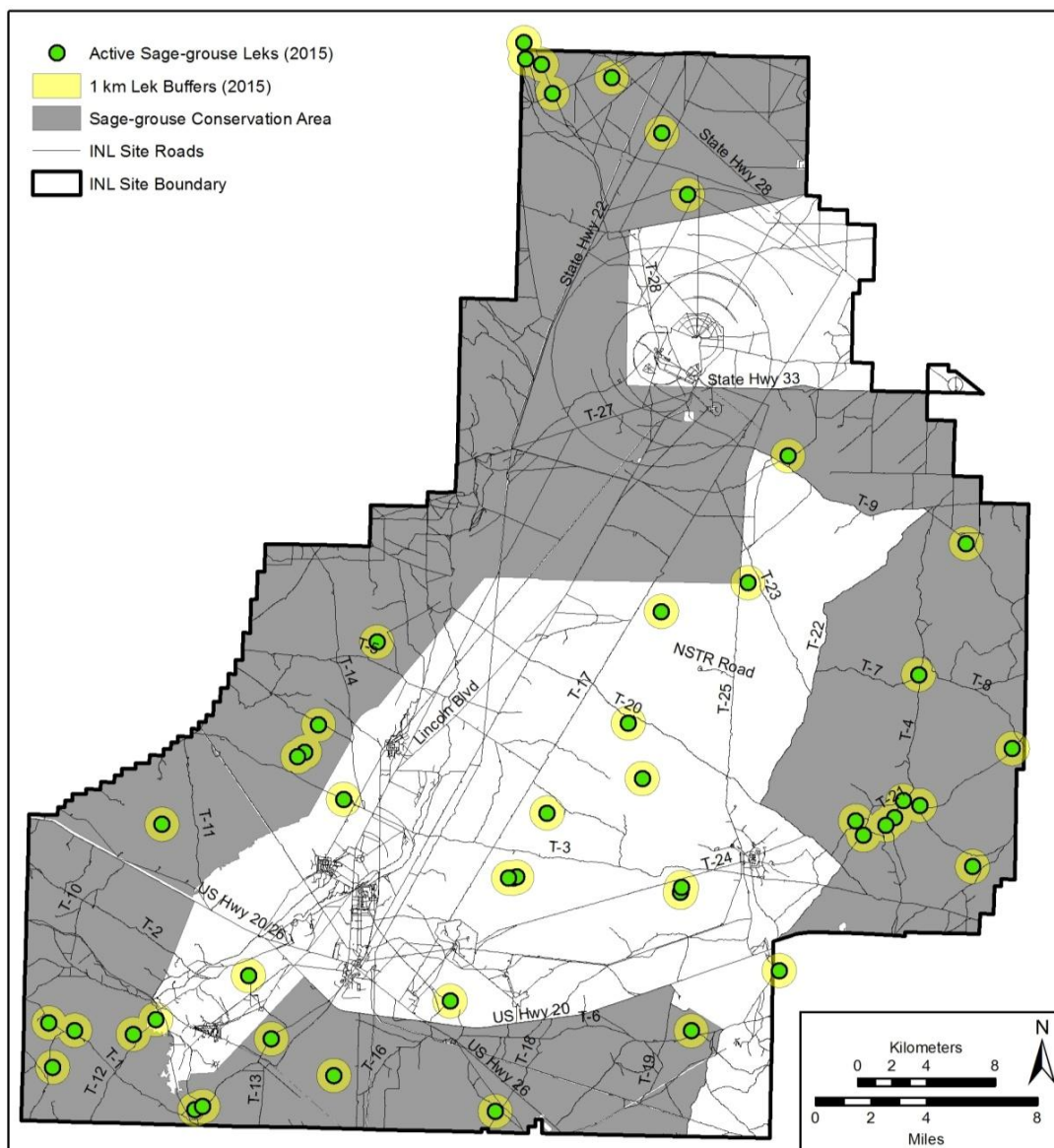


Figure 2-6. The 48 leks classified as active on or near the INL Site following the 2015 field season.

3. HABITAT TRIGGER MONITORING

All vegetation-based estimates for sagebrush habitat for the CCA were initially determined using a vegetation map completed in 2010 (Shive et al. 2011). Sagebrush habitat was designated by selecting all map polygons assigned to stand-alone big sagebrush or low sagebrush classes, and all map class complexes where one of the two classes is either a big sagebrush or low sagebrush class. The spatial extent of sagebrush habitat is dynamic and will reflect changes in plant communities or vegetation classes. Areas designated as sagebrush habitat will change through time based on gradual changes in vegetation composition and also from abrupt changes caused by wildland fire.

The current baseline value of the habitat trigger is defined as the total area designated as sagebrush habitat within the SGCA at the beginning of 2013. The trigger will trip if there is a 20% reduction in sagebrush habitat within the SGCA. In 2015, we analyzed new data and updated the habitat trigger baseline value to 78,504 ha (193,988 ac), 359 ha (887 ac) more than was estimated last year (see section 3.2 in this document). If a net of >15,701 ha (38,798 ac) of sagebrush habitat is lost in the future, the USFWS will conduct an evaluation of current habitat management on the INL Site and arrange a meeting with DOE to discuss plans for maintaining compliance with the CCA.

Two monitoring tasks identify vegetation changes across the landscape and assist in maintaining an accurate record of the quantity and distribution of sagebrush habitat within the SGCA to annually evaluate the habitat trigger:

Task 5: Sagebrush Habitat Condition Trends - The sagebrush habitat quality data will document gains in habitat as non-sagebrush map polygons transition back into sagebrush classes, or when compositional changes occur (e.g. non-native grass density) within sagebrush polygons that may require a change in the assigned map class. This task also allows for ongoing assessment of habitat quality, or condition, within polygons mapped as sagebrush habitat, which facilitates comparisons between sagebrush habitat on the INL Site and sage-grouse habitat guidelines (e.g. Connelly et al. 2000).

Task 6: Monitoring to Determine Changes in Sagebrush Habitat Amount and Distribution - The sagebrush habitat quantity monitoring task is intended to provide an update to the current sagebrush habitat distribution, and deals with losses to sagebrush habitat following events that alter vegetation communities. As updates are made to the map classes or vegetation polygon boundaries, the total area of sagebrush habitat available will be compared to the baseline value established for the habitat trigger to determine status with respect to the habitat threshold.

Together, these two monitoring tasks reflect the original mapping process and provide the basis for maintaining an accurate map and estimate of quality and quantity of sagebrush habitat on the INL Site. 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 condition 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 cover 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.

3.1 Task 5 – Sagebrush Habitat Condition Trends

Summary of Results: In polygons currently identified as sagebrush habitat, mean sagebrush cover and height are within suggested optimal ranges for breeding and brood-rearing habitat; perennial herbaceous height is at the lower end of its suggested range and perennial herbaceous cover was below guideline recommendations in 2015. Low herbaceous cover values, relative to habitat guidelines, do not appear to be a result of poor ecological condition, but rather the effect of soils and climate on the local ecosystem.

3.1.1 Introduction

The habitat condition monitoring task was developed to allow biologists to characterize broad-scale trends in habitat condition over time and to link vegetation composition data to polygons that represent sagebrush habitat on the INL Site. Seventy-five plots, 48 of which are located in polygons currently identified as sagebrush habitat and 27 of which are located in previously burned areas recovering to sagebrush habitat, are sampled annually for cover, height, sagebrush density, sage-grouse sign, and human-related disturbance. An additional 150 plots are sampled on a rotational basis to increase sample sizes and to address specific threats.

3.1.2 Results and Discussion

Data were collected on a total of 125 plots between June and August of 2015. Sampling was completed on all 75 annual plots and 50 of the rotational plots (Figure 3-1). In the interest of brevity, we focus on data only from the annual plots in this report (see Shurtliff et al. [In Prep.] for full results).

Mean sagebrush cover from annual sagebrush habitat plots, and represented sagebrush habitat polygons, is in the middle of the range suggested for optimal breeding and brood-rearing habitat in arid sites (Connelly et al. 2000). Mean sagebrush height is within, but at the lower end of the suggested optimal range (Table 3-1). This result is to be expected, as most INL Site sagebrush communities are dominated by Wyoming big sagebrush or even shorter statured species. Perennial grass/forb mean height values were also at the lower end of the range recommended in current sage-grouse habitat guidelines (Connelly et al. 2000). Average perennial grass/forb cover on sagebrush habitat plots was about 6% lower in 2015 than specified for breeding and brood-rearing habitat, but was much higher than it was on the same plots in 2014. Low herbaceous cover values, relative to habitat guidelines, do not appear to be a result of poor ecological condition, but rather the effect of soils and climate on the local ecosystem (Forman et al. 2013, Shurtliff et al. In Prep.).

In the plots from areas recovering to sagebrush habitat, about 11% absolute cover was from shrubs in 2015 and green rabbitbrush provided nearly all of that cover. Perennial grasses and forbs were responsible for much of the cover from native species on these plots in 2015 with about 20% absolute cover. Cover from native herbaceous species was about the same as that of non-native herbaceous species, but cover from natives was primarily from perennials, while cover from non-natives was primarily from annuals. Average cover and height of perennial grasses and forbs were greater in recovering habitat plots than in current sagebrush habitat plots (Table 3-1), but herbaceous cover was also much more annually variable in recovering habitat plots from 2013 through 2015, which had a greater impact on year-to-year stability of total vegetation cover in areas of recovering habitat.

Herbaceous functional groups are highly influenced by precipitation, and precipitation for three years prior to and up through most of the 2014 growing season, including sampling for this task, was far below

average. Although total precipitation eventually exceeded annual averages in 2014, a few abnormally wet months at the end of summer in 2014 and at the end of spring in 2015 affected vegetation on the INL Site during the 2015 growing season (Figure 3-2). As with perennial herbaceous species, mean cheatgrass (*Bromus tectorum*) cover and cover from all annual species was probably uncharacteristically low in 2014 (Shurtliff et al. 2015) and was probably much higher than normal in 2015. Increases in cheatgrass and Russian thistle (*Salsola kali*) between 2014 and 2015 are notable, particularly in the plots that are recovering to sagebrush habitat.

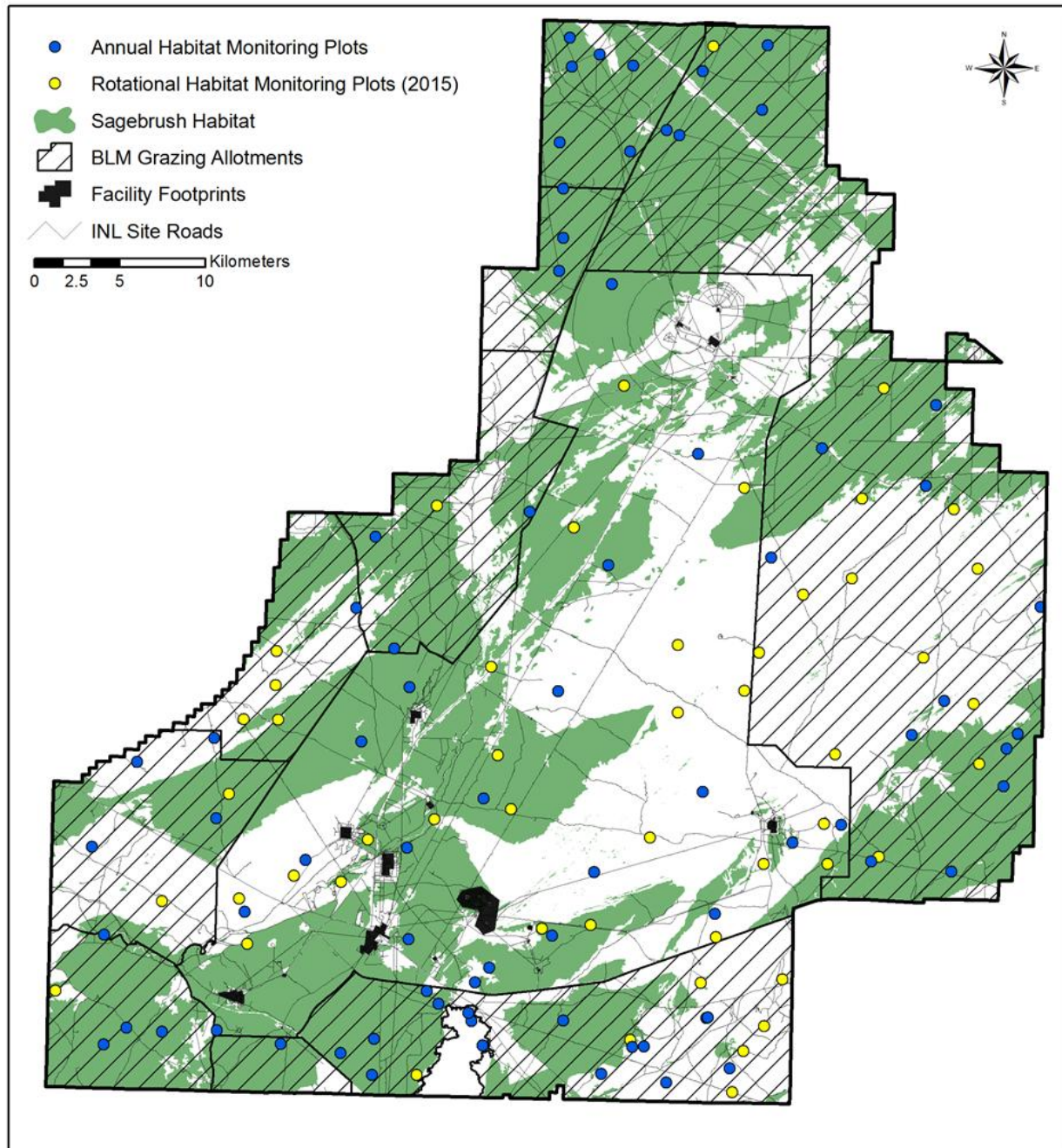


Figure 3-1. CCA sage-grouse habitat condition monitoring plots sampled in 2015 on the INL Site.

Table 3-1. Summary of selected vegetation measurements for characterization of condition of sagebrush habitat monitoring plots and non-sagebrush monitoring plots on the INL Site in 2015.

	Mean Absolute Cover (%)	Mean Height (cm)	Mean Density (individuals/m ²)
Sagebrush Habitat Plots (n = 48)			
Sagebrush	21.14	47.68	2.28
Perennial Grass/Forbs	9.28	19.99	
Non-sagebrush Plots (n = 27)			
Sagebrush	0.30	33.61	0.04
Perennial Grass/Forbs	22.31	35.27	

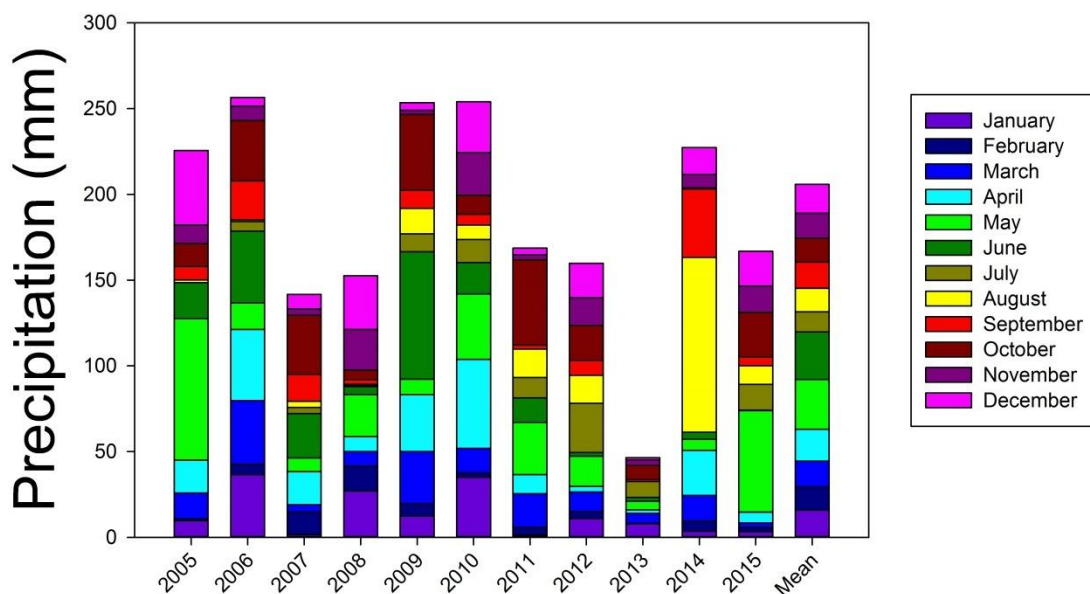


Figure 3-2. Annual precipitation by month from the CFA, INL Site. Mean monthly precipitation includes data from 1950 through 2015.

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

Summary of Results: We made final mapping updates to the Jefferson Fire, and the adjusted SGCA sagebrush habitat baseline is 78,503.8 ha (193,987.5 ac). There have been no mapped losses in sagebrush habitat since monitoring was initiated.

3.2.1 Introduction

A 20% loss of sagebrush habitat from the 2013 baseline has been identified as a conservation trigger in the CCA (DOE-ID and USFWS 2014). The goal of this monitoring task is to maintain an updated INL Site vegetation map to accurately document changes in sagebrush habitat area and distribution. The work accomplished on this monitoring task in 2015 included updating the wildland fire boundary and internal

unburned patches of vegetation within the 2010 Jefferson Fire, and collecting field data at plots distributed within the Jefferson Fire to assist with mapping the reestablished vegetation classes.

3.2.2 Results and Discussion

Jefferson Fire Mapping Updates

The fire boundary was updated slightly resulting in 31,498 ha (77,832 ac) of area burned excluding unburned patches (Figure 3-3). A total of 4,488 polygons of unburned vegetation patches were delineated within the Jefferson Fire, representing 1,168 ha (2,887 ac). The unburned vegetation patch total area includes polygons that are not big sagebrush classes and represented other native grassland or shrubland vegetation classes. The exported sagebrush habitat layer contained 2,168 polygons representing 561 ha (1,386 ac; Figure 3-3).

Sagebrush Habitat Update

Considering the mapping updates made to the Jefferson Fire, the new SGCA sagebrush habitat baseline value increased 113 ha (279 ac) from the reported amount in 2014 to 78,570 ha (194,151 ac; Shurtliff et al. 2015). There were also 66.2 ha (163.5 ac) of sagebrush habitat removed from infrastructure expansion (see Section 4.3 for more information). When this amount is subtracted from the updated baseline area presented above, the new sagebrush habitat baseline is 78,503.8 ha (193,987.5 ac). These results are the most accurate and up-to-date estimation of sagebrush habitat amount and distribution for the INL Site, and we do not anticipate making any additional adjustments to the 2013 sagebrush habitat baseline.

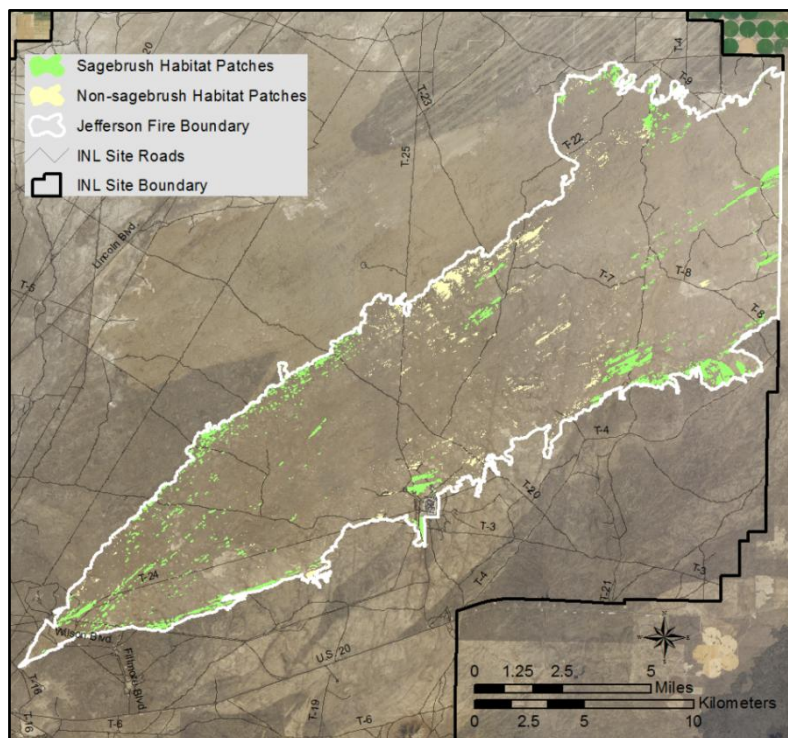


Figure 3-3. The mapped 2010 Jefferson Fire on the Idaho National Laboratory Site showing the distribution of unburned vegetation patches within the fire boundary. The fire boundary was manually digitized at a 1:12,000 scale and the unburned patches of vegetation were mapped at scales up to 1:1,000.

Jefferson Fire Field Sampling

We sampled 101 field plots throughout the Jefferson Fire burned area (Figure 3-4), which resulted in 505 individual subplot points of information. The vegetation class recorded most often at plot arrays was the Green Rabbitbrush/Streambank Wheatgrass (Western Wheatgrass) Shrub Herbaceous Vegetation class documented at 113 (22.4%) subplots. The second most abundant class was the Green Rabbitbrush/Desert Alyssum Shrub Herbaceous Vegetation class recorded at 92 (18.2%) subplots.

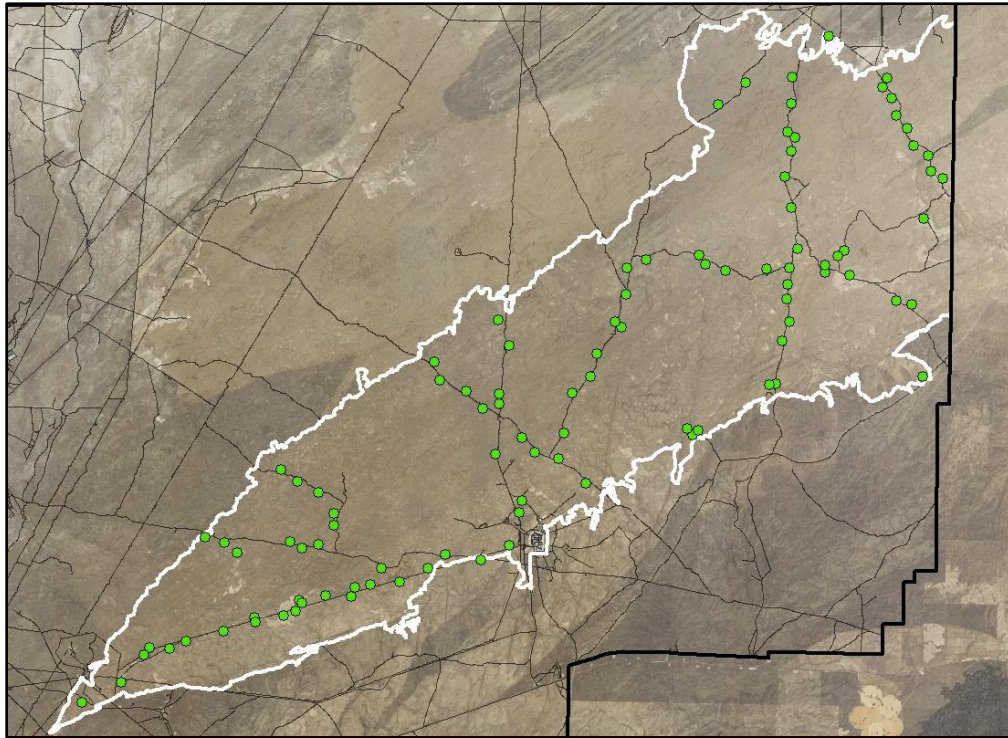


Figure 3-4. The distribution of 2015 field plot arrays sampled within the 2010 Jefferson Fire on the Idaho National Laboratory Site.

4. THREAT MONITORING

The CCA identifies and rates eight threats that impact sage-grouse and its habitats on the INL Site, either directly or indirectly. All threats are addressed to some extent by the 13 conservation measures that DOE is striving to implement (see Chapter 5). However, some measures developed for three threats – raven predation, annual grasslands, and infrastructure development – require baseline inventory and monitoring information to support associated conservation measures. The following sections report on Tasks 4, 7, and 8, and over time will provide information needed by DOE to make decisions about how to implement threat reduction measures.

4.1 Task 4 – Raven Nest Surveys

Summary of Results: We observed more raven nests on anthropogenic structures in 2015 than in the past two years, but it is still too soon to know if the increase represents a real trend or inter-annual variation. DOE will encourage responsible parties to take advantage of low-cost opportunities to deter raven nesting at perennial nest sites on towers and within facilities that are in or near the SGCA.

4.1.1 Introduction

In the CCA, DOE committed to support research aimed at developing methods for deterring raven nesting on utility structures (*Conservation Measure 10*; DOE and USFWS 2014). The objective of Task 4 is to annually survey all human structures on the INL Site that could potentially be used by ravens as nesting substrates and document the number and location of active nest sites. These data will allow DOE to determine the trend of raven nesting and decide how and when to install nest deterrents.

4.1.2 Results

We observed 39 active raven nests on anthropogenic structures (Table 4-1), 31 of which (79%) were on power line structures. Nearly all (29 out of 31) power line nests were on transmission structures, specifically three types: “Sloped H” ($n=14$), “Closed H-Cable” ($n=14$), and “Open H” ($n=1$) (Figure. 4-1). On distribution lines, one nest was supported by a single pole that had a double cross-arm, and the other was on a single pole with a single cross arm. We only observed the latter nest once before it fell to the ground.

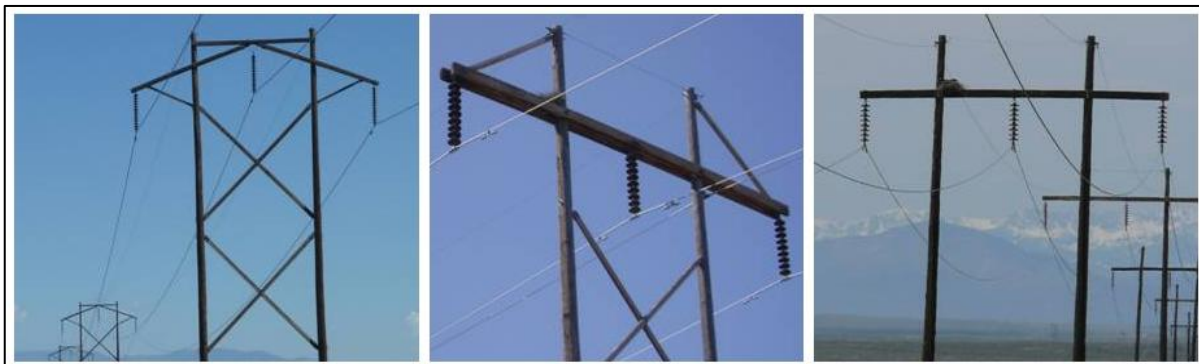


Figure 4-1. Transmission pole structures used as nest substrates by ravens in 2015. From Left to Right: Sloped H, Closed H-Cable, and Open H.

We observed six active raven nests at facilities (Table 4-2), primarily on horizontal platforms attached to buildings and effluent stacks. We also observed active raven nests on two towers outside of facilities, both of which were identical 15.2 m (50 ft) National Oceanic and Atmospheric Administration (NOAA) towers located within the SGCA in remote regions of the INL Site (Figures 4-2 and 4-3; Table 4-1).

4.1.3 Discussion

Results from three years of surveys (2013-2015) confirm that ravens prefer to nest on transmission line structures over other anthropogenic substrates. However, it is still too soon to determine whether raven nesting is increasing on INL Site infrastructure. We observed 32 active raven nests in 2013, 37 in 2014, and 39 in 2015. Though this appears to be an upward trend, the differences may be partly reflective of increased survey effort and effectiveness. In 2014, we started surveys a month earlier than in 2013 (DOE and USFWS 2014), though in 2015, our search effort was comparable to 2014 (however, we took weeks more to complete the same surveys). The number of raven nests on power lines in and out of the SGCA was exactly the same in 2014 and 2015.



Figure 4-2. Raven nest on one of the two NOAA towers.

We do not know to what extent the two breeding pairs that occupy towers in remote areas of the INL Site may impact sage-grouse. However, the presence of these towers provides an opportunity for ravens to nest in areas that may otherwise be unsuitable because of a lack of anthropogenic substrates. The nearest transmission lines are 7.5 km (4.7 mi) from the western tower and 11.3 km (7.0 mi) from the eastern tower (Figure 4-3). These towers occur in areas that have some of the lowest probability of raven occurrence based on resource selection analyses (Coates et al. 2014). If ravens are deterred from nesting on these two towers, sage-grouse nest predation risk may decrease in these areas.

Conservation Measure 10 in the CCA specifically identifies utility structures as the target for nest deterrent experiments. However, in light of data collected during the past three years, DOE will also promote opportunities to deter raven nesting on non-utility structures (i.e. towers, facilities) where the cost to do so would be minimal. Such actions would be most important for nests that are in or near the SGCA. Non-utility nest sites of highest priority are (1) the two NOAA towers occupied in 2015 (both are in the SGCA), (2) sites at AMWTP and TAN (within 1.8 km and 0.7 km, respectively, from the SGCA), and (3) nests at the Advanced Test Reactor (ATR) Complex and Naval Reactors Facility (NRF) (both are within 2.8 km of the SGCA and both have supported raven nests for three consecutive years).

ESER helped NOAA staff make a plan for deterring nesting on their towers during 2016 (See Section 5.1 for details). Although this action may prove successful, displaced raven pairs may simply move to the nearest suitable anthropogenic structures (probably transmission structures). The nearest structures (transmission lines or facilities) are outside the SGCA, so the outcome would be consistent with the central aims of the CCA.

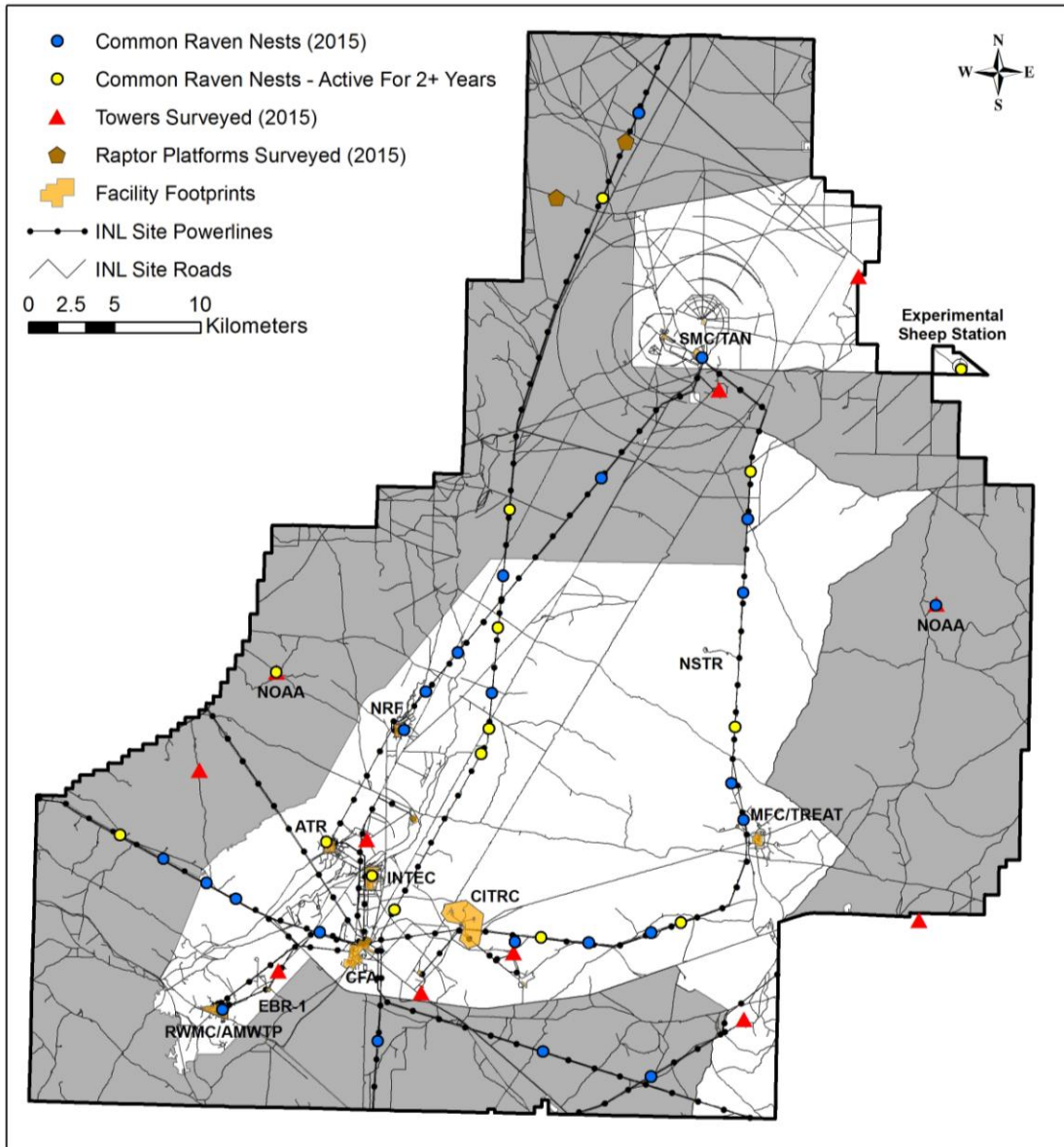


Figure 4-3. Results of 2015 raven nest surveys. Yellow dots represent active raven nests in 2015 that were also active in 2013, 2014, or both years.

Table 4-1. Active raven nests observed on anthropogenic features during 2015 surveys.

Species	# Active Nests	Substrate	Within SGCA	Outside SGCA
Common Raven	31	Power Line	11	20
	3	Building Platform	0	3
	2	Stack	0	2
	2	Tower	2	0
	1	Ornamental Tree		1
Totals	39		13	26

Table 4-2. Facilities surveyed for raven nests in 2015. The number of days between surveys is indicated, though individual nests with unconfirmed activity statuses were sometimes revisited more frequently.

Facility	# Times Surveyed	Days Between Surveys	Active Raven Nest Confirmed	Substrate Supporting Active Nest
AMWTP	1*	N/A	Yes	Building Platform
ATR Complex	2	22	Yes	Effluent Stack
CFA	2	14	No	N/A
Critical Infrastructure Test Range Complex (CITRC)	2	15	No	N/A
Idaho Nuclear Technology and Engineering Center (INTEC)	2	13	Yes	Effluent Stack
Experimental Breeder Reactor I (EBR-I)	2	20	No	N/A
Experimental Sheep Station	3	21, 12	Yes	Building Platform
Materials & Fuel Complex/Transient Reactor Test Facility (MFC/TREAT)	2	15	No	N/A
NRF	3	20, 15	Yes	Building Platform
RWMC	2	20	No	N/A
Specific Manufacturing Capability/Test Area North (SMC/TAN)	2	14	Yes	Ornamental Tree

*Most of AMWTP was surveyed more than once during the RWMC surveys. However, only later in the season did we find an escort at AMWTP so we could enter the property and complete a full survey.

4.2 Task 7 – Inventory and Monitoring of Sage-Grouse Habitat for Areas Dominated by Non-Native Annual Grasses

Summary of Results: We identified 19 new locations dominated by cheatgrass or other non-native annual species during 2015. Seventeen were mapped as points and two as polygons. The polygons covered 17.1 hectares (69 ac).

4.2.1 Introduction

The loss of habitat due to dominance by non-native annual grasses, primarily cheatgrass, is a substantial threat to sage-grouse across its range and was identified as a threat to sage-grouse in the CCA. Domination by annual grasses at the INL Site generally follows the loss of native herbaceous species, often due to soil disturbance associated with land use activities.

The goals of this inventory are to better understand the extent of annual grasses and other invasive plants on the INL Site associated with sage-grouse habitat, and to provide information on areas that may require additional management attention. The objectives of this task are to identify those areas that have been substantially affected by cheatgrass and attempt to identify the stressor that allows cheatgrass to continue to dominate.

We began the 2015 field work by revisiting many of the areas covered the previous year. Weather patterns had been more normal and we did not have the abundance of “green” that occurred ton 2014 and were

now looking for a more typical “light yellow” of senescent cheatgrass. We further expanded our search into areas across the INL Site that have known disturbances or cheatgrass dominated areas, while staying mostly within the SGCA (Figure 4-4)

In 2015, we revisited eight points and five areas identified in 2014 and confirmed that these areas were still dominated by cheatgrass. During the 2015 field surveys, 17 points and two polygons totaling 6.9 ha (17.1 ac) were recorded as dominated by cheatgrass (Figure 4-5). Points were considered to be areas less than about 400 m² each. No new line features were mapped 2015. In 2014, mapped disturbance areas that were dominated by cheatgrass or some combination of weedy species include the following disturbance designations: six livestock related, three animal use, two water related, one fire, and twelve unknown. In 2015, we were not able to determine a disturbance cause for any of the locations identified.

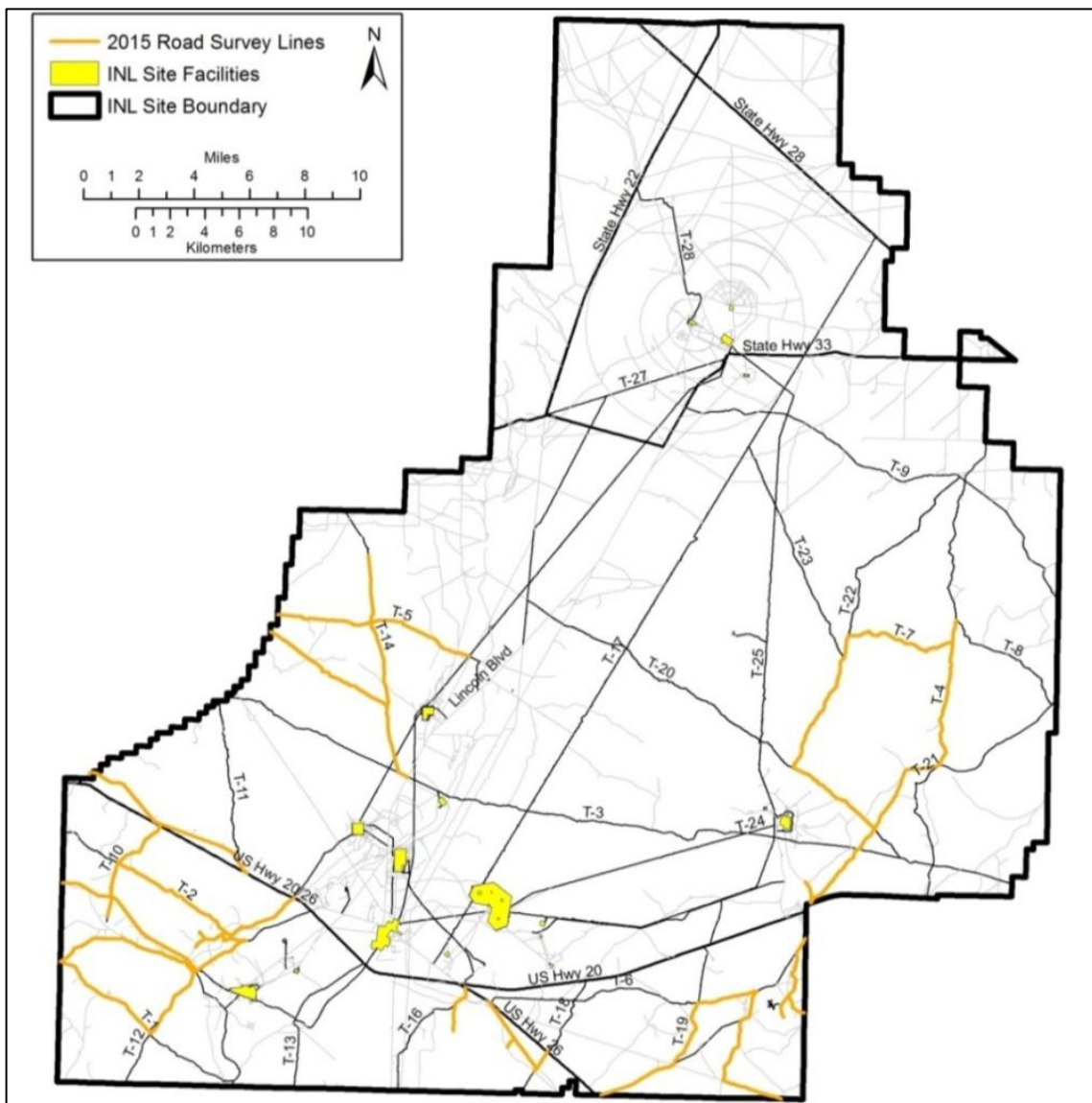


Figure 4-4. Extent of road surveys across the INL Site in search of cheatgrass and other non-native annual species.

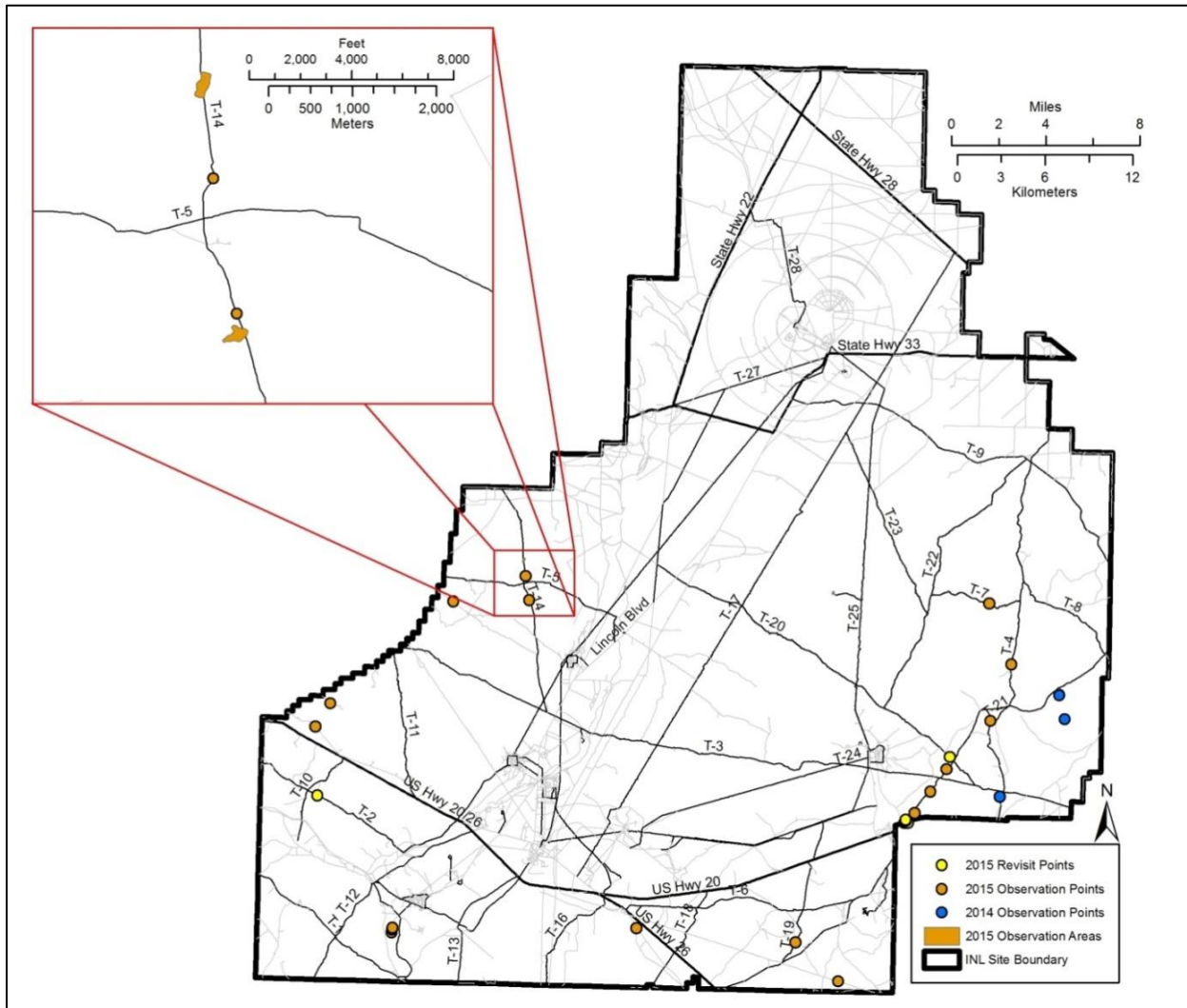


Figure 4-5. Results from field surveys. Areas of non-native annual grass smaller than 20m X 20m are mapped as points and areas larger than 20m X 20m are mapped as areas. Linear areas of non-native annual grass are mapped as lines.

4.3 Task 8 – Monitor Unauthorized Expansion of the Infrastructure Footprint within the SGCA and Other Areas Dominated by Big Sagebrush

Summary of Results: We added 505.5 km (314.1 mi) of previously unmapped two-track features to the INL Site roads data layer. Currently, 3,593.3 km (2,232.8 mi) of two-track and paved road features are on the INL Site, and this represents the baseline data that future monitoring will be compared against. We removed 66.2 ha (163.5 ac) from the sagebrush habitat layer, because our analysis showed these areas were affected by facility and gravel pit expansion between the time of the last mapping effort and the signing of the CCA.

4.3.1 Introduction

Infrastructure development is one of the two top threats to sage-grouse on the INL Site (see Table 3 in the CCA). Infrastructure expansion on the INL Site can be caused when facility or project footprints encroach into adjacent patches of sagebrush habitat or when new two-track roads are created in otherwise undisturbed areas. The goal of this task is to update sagebrush habitat distribution by identifying where unauthorized expansion of infrastructure has occurred and/or removed sagebrush habitat. In some cases, there has been authorized expansion at some facilities (e.g. new MFC ponds) that was not present when the INL Site vegetation map was originally being completed (Shive et al. 2011). Because the estimated amount of sagebrush habitat is generated from the vegetation map by cross-walking all classes dominated by sagebrush, there are regions currently mapped as sagebrush habitat which are not reflective of current ground conditions.

4.3.2 Results and Discussion

We digitized 505.5 km (314.1 mi) of linear disturbance features that were not included in the most recent roads data layer (Figure 4-6). Currently, 3,593.3 km (2,232.8 mi) of two-track and paved road features are on the INL Site. It is important to recognize that a vehicle two-track left from a single or a few minimal uses may not be considered an actual permanently established road. In fact, some of the faint roads delineated may be difficult to see on the ground and further use would be unexpected. The INL Site does not have an authorized roads layer to document which are considered official roads, and which roads were created from unauthorized activities. Because the origin of most new roads on the INL Site is unknown, it is hard to hold anybody accountable for past unauthorized expansion. Moving forward with this monitoring task, all new two-track roads mapped under this task in 2015 will be considered the 2013 ground condition (i.e. the year of the basemap imagery) baseline from which further expansion will be documented.

Sixteen polygons were delineated to document losses in sagebrush habitat due to infrastructure expansion. The total area of sagebrush removed from the sagebrush habitat layer was 66.2 ha (163.5 ac). The majority of the area removed was from excavated expansion at gravel pits and borrow sources (Figure 4-7). There was also sewage ponds developed since the completion of the INL Site vegetation map at both MFC and NRF facilities (Figure 4-8). In many cases, project footprints may only be provided as a written description in NEPA documents and no spatial boundary (e.g. CAD or GIS) exists to help determine if observed expansion is unauthorized. So, rather than assuming or proposing an expansion was unauthorized, all facility or project expansion documented under this task is considered authorized until further reviewed by someone with the authority or project understanding to know whether those activities had prior approval.

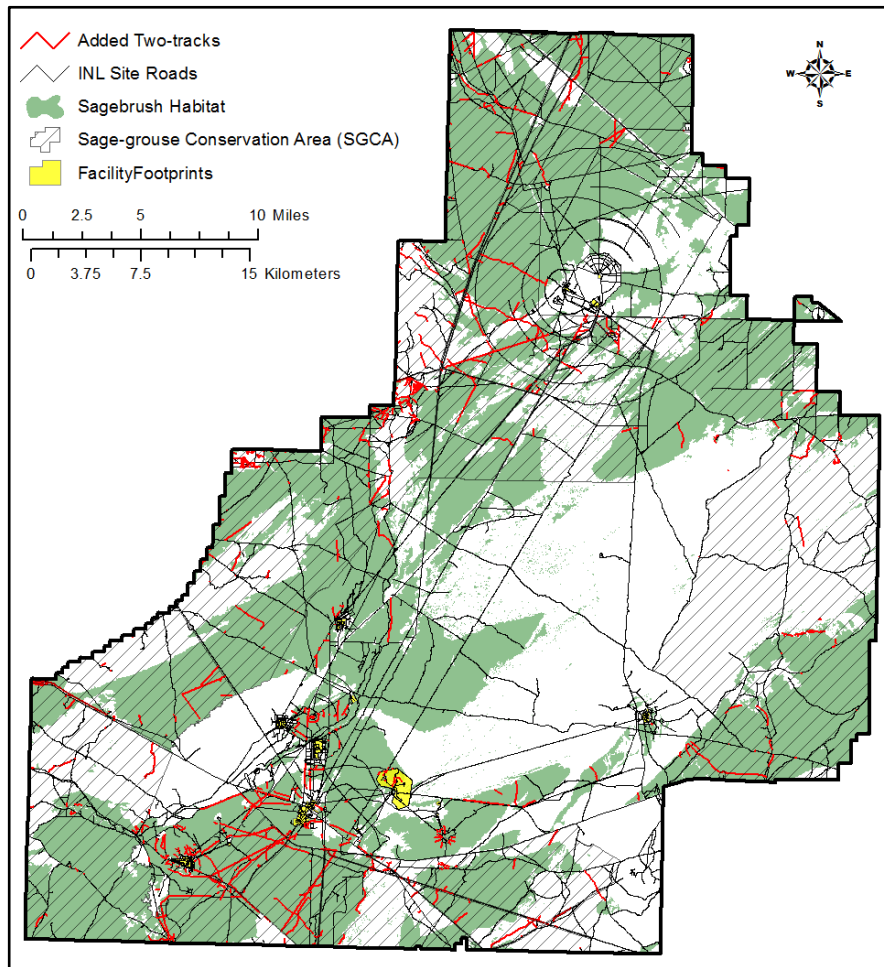


Figure 4-6. All of the mapped roads on the INL Site including two-track updates made in 2015 to support the CCA.

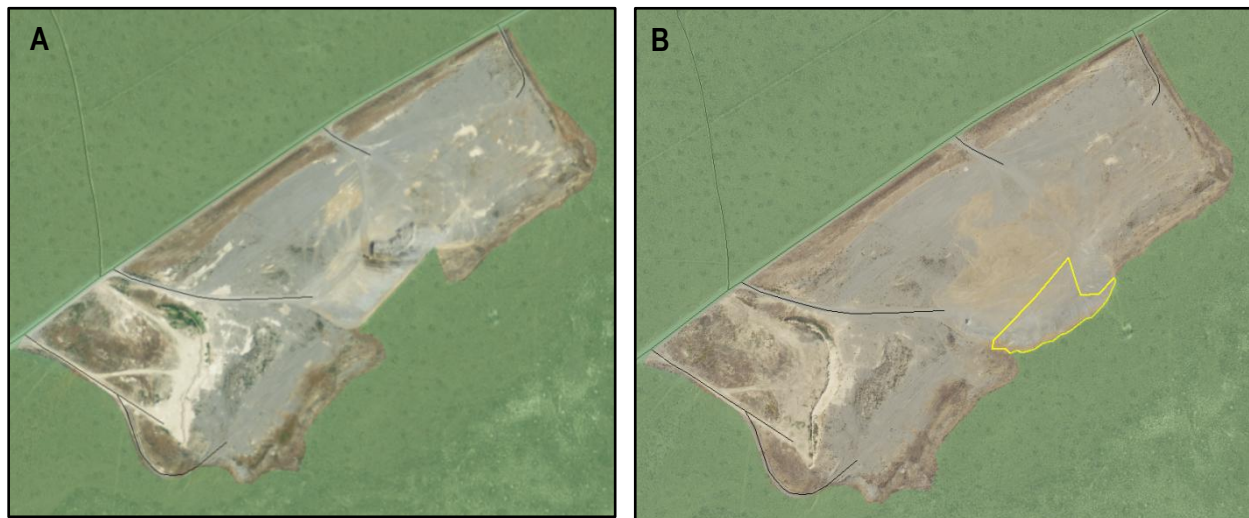


Figure 4-7. The light green overlay in both images represents sagebrush habitat as defined in the CCA. A) The subset image shows the T-12 gravel pit in 2011. B) The same area showing the expansion of the gravel pit in 2013, and the yellow polygon indicates the area of sagebrush habitat removed.



Figure 4-8. The light green overlay in both images represents sagebrush habitat as defined in the CCA. A) Image subset shows a portion of the NRF facility in 2009 prior to the construction of new ponds. B) The same are showing the newly constructed ponds in 2013 and the yellow polygon indicates the area of sagebrush habitat removed.

5. IMPLEMENTATION OF CONSERVATION MEASURES

5.1 Summary of 2015 Implementation Progress

Section 10 of the CCA describes eight threats to sage-grouse and its habitats on the INL Site. DOE is committed to implementing conservation measures that mitigate and reduce these threats where possible. In 2015, DOE began to implement the 13 conservation measures intended to ameliorate threats. These actions are summarized below. For a fuller description, see Shurtliff et al. (*In Prep.*).

THREAT: 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 ac).

Accomplishments and Noteworthy Events in 2015:

- The Wildland Fire Committee met with Battelle Energy Alliance (BEA) finance officials and developed an action plan that would be followed after a fire ≥ 40 ha.
- Two wildland fires occurred on the INL Site in 2015. Both were human-caused and total acreage burned was estimated at 4 ac (Unpublished wildland fire statistics summary for 2015; Eric Gosswiller, INL Fire Chief).

Associated Conservation Actions that Address the Wildland Fire Threat:

- ESER planted 5,000 sagebrush seedlings in a priority restoration area (See Section 5.2).
- INL developed and released several internal training videos. One focused on sage-grouse and mentioned the threat of wildland fire and what employees could do to reduce ignition risk. Another focused on sagebrush plantings on the INL Site.

THREAT: INFRASTRUCTURE DEVELOPMENT

Objective: 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.

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

Accomplishments and Noteworthy Events in 2015:

- BEA National and Homeland Security proposed to install new power poles and lines near CITRC outside the SGCA. BEA considered installing nest and perch deterrents on all structures, but a new study (unpublished; Sherry Liguori, Pacificorp, Pers. Comm.) suggests perch deterrents may increase the risk of raptors being electrocuted. Therefore, in cooperation with ESER, BEA National and Homeland Security proposed to install nest deterrents only on dead-end and corner poles (which are double cross-arm structures) and that INL would not install any nest or perch deterrents on other poles (which are all single cross-arm structures). The USFWS reviewed the proposal and agreed that the course of action was a good compromise that reduced nesting opportunities for ravens while protecting raptors from electrocution.
- Prior to commencing work on the CITRC power line project, an environmental checklist (INL-15-068, INL Smart Grid Test Bed) was approved with conditions and project specific instructions included. To meet the intent of the CCA, National Security personnel made every effort to reduce the size of the impact from the project by modifying the original design to stay within existing facility

boundaries. Contractors checked to see where the nearest leks were, but found none nearby (Pers. Comm., Jenifer Nordstrom and John Irving, INL Environmental Support & Services; October 2015).

- Some mowing near CITRC was delayed because the proposed area to mow would have doubled the buffer around buildings, which would have required cutting into sagebrush (Pers. Comm., Jenifer Nordstrom, INL Environmental Support & Services; October 2015).
- Approximately 12 miles of fiber optic cable were installed outside the SGCA (Pers. Comm., Wayne Ridgeway, Test Range Director, National & Homeland Security; November 2015). The installation used existing power poles and underground raceway and avoided new disturbances as much as possible (environmental checklist INL-14-070).

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.

Accomplishments and Noteworthy Events in 2015:

- The United States Geological Survey installed two new monitoring wells outside facility fences in 2015. Both were within the SGCA, though neither were within 1 km of a lek. In both instances, the USGS deliberately altered its original plans and shifted well sites into previously-burned areas to avoid mowing sagebrush (Pers. Comm., Roy Bartholomay, USGS INL Project Chief, Idaho Falls; Nov. 9, 2015).

THREAT: 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.

Accomplishments and Noteworthy Events in 2015:

- See Section 4.2 of this report.

THREAT: 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 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.

Accomplishments and Noteworthy Events in 2015:

- No grazing permits that overlap the INL Site were renewed in 2015, as none expired this year. (Bret Herres, BLM, Idaho Falls office; Nov. 12, 2015).
- On 1 May, 2015, ESER reported evidence of sheep on a lek approximately 700 m west of the eastern INL Site boundary (see Figure 2-6).
- ESER provided updated lek maps to the BLM by Feb. 1, 2015.

Conservation Measure 6: Communicate and collaborate with BLM to adequately maintain that the herbaceous understory on the INL Site to promote sage-grouse reproductive success and rangeland improvements follow guidelines in the 2006 State Plan and the current agreement.

Accomplishments and Noteworthy Events in 2015:

- In an effort to promote and maintain goodwill with the BLM, which will facilitate implementation of Conservation Measure 6, the following efforts occurred:
 - DOE and ESER met with local BLM officials in spring 2015 to discuss habitat data collection and how DOE might share data collected on the INL Site with the BLM.
 - ESER ecologists visited the field with two BLM officials during summer 2015 to talk about post-fire revegetation strategies for improving sage-grouse habitat.

Associated Conservation Actions that Address the Livestock Threat:

- Sheep permits on the Howe Peak and Deadman allotments (Fig. 10 in the CCA) were relinquished by permittees after the National Wildlife Federation paid permit holders, and it is unlikely that domestic sheep will be re-permitted in the near term (though the BLM could add cow permits). (Pers. Comm., Bret Herres, BLM, Idaho Falls office; Sept. 2015).

THREAT: 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.

Accomplishments and Noteworthy Events in 2015:

- ESER staff have communicated with individuals who would be interested in investigating mechanisms of crested wheatgrass invasion, but no funding has been secured for such a project.

THREAT: 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 (measure applies only to activities from 6 p.m. to 9 a.m., March 15 – May 15, within 1 km of active leks).

Accomplishments and Noteworthy Events in 2015:

- Activities in the T-12, Adams Blvd., and Ryegrass Flats borrow pits were restricted to daylight hours between 9am and 6:30pm, March 15 - May 15, 2015. All users in these pits were informed of the seasonal time-of-day restrictions through email and Form 450.AP01 (Gravel/Borrow Source Request), which must be completed before any work begins in the pits. BEA Roads and Grounds conducted periodic monitoring of compliance to the restrictions throughout the restricted period and observed no violations. (Pers. Comm., Brenda Pace, INL Borrow Source Coordinator; 10/15/2015).

Conservation Measure 9: Ensure that no net loss of sagebrush habitat occurs due to new borrow pit or landfill development. DOE accomplishes this measure by (1) avoiding new borrow pit and landfill development in undisturbed sagebrush habitat, especially within the SGCA; (2) ensuring reclamation plans incorporate appropriate seed mix and seeding technology, and (3) implementing adequate weed control measures throughout the life of an active borrow source or landfill.

Accomplishments and Noteworthy Events in 2015:

- No new borrow pits or landfills were developed at the INL Site, and expansion of borrow pits was restricted to footprint boundaries that are defined in Environmental Checklist (EC) INL-14-045, which requires DOE-ID ecological contractor review of any proposed expansion.
- No reclamation was completed at active borrow pits or the landfill in 2015.
- All INL borrow sources and the landfill are included in an active weed control program per PLN-611: Site-wide Noxious Weed Management Plan (Pers. Comm., Brenda Pace, INL Borrow Source Coordinator; 11/18/2015).

THREAT: 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.

Accomplishments and Noteworthy Events in 2015:

- No research proposals have been submitted to DOE because the first priority is to establish a baseline of raven nesting activity on the INL Site (Section 4.1). However, as a result of nest surveys and information sharing by ESER, during 2016, efforts will be made by the Sheep Experiment Station, the local National Oceanic and Atmospheric Administration Air Resources Laboratory, and INL Power Management to deter raven nesting on structures under their control on the INL Site.

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.

Accomplishments and Noteworthy Events in 2015:

- Idaho National Laboratory could not update their annual training refresher course to include Conservation Measure #11 before January 2015 because of conflicts with the course revision schedule. However, DOE and its contractors took the initiative to individually train their employees in 2015.
- The INL's learning objective is that employees will understand the link between sage-grouse conservation and DOE's ability to pursue its mission. This objective has now been included in the ES&H Site-Specific Training that will be disseminated in 2016. The instruction summarizes some of the recommendations provided in the training videos produced in 2014 including: (1) don't throw cigarette butts out car windows or park a vehicle over dry vegetation, (2) eliminate food subsidies to ravens near facilities, (3) keep outdoor garbage bins closed so as to reduce subsidies for ravens.
- Conservation Measure 11 is now complete because the ES&H Site-Specific Training will be perpetually delivered as part of the annual refresher course.

THREAT: HUMAN DISTURANCE

Objective: Minimize human disturbance of sage-grouse courtship behavior on leks and nesting females within the SGCA and 1 km Lek Buffers.

Conservation Measure 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 of the CCA):

- 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 the National Security Test Range from 9 a.m. – 9 p.m.
- No non-emergency disruptive activities allowed within Lek Buffers March 15 – May 15.

Accomplishments and Noteworthy Events in 2015:

- No meteorological, SODAR, or cellular (portable or permanent) towers were erected in the SGCA or within 1 km of leks (Pers. Comm., Robert A. Montgomery, Program Environmental Lead for R&D; 10/19/2015).
- UAV procedures were updated to comply with seasonal restrictions on vertical distances (305 m) above leks (Pers. Comm., Robert A. Montgomery, 10/20/15).
- No explosives >1,225 kg were detonated in 2015 (Pers. Comm., Robert A. Montgomery, 10/26/15).
- Both National and Homeland Security and the INL Roads and Grounds organization are unaware of any activity in 2015 that did not comply with the disruptive activity avoidance clause (Pers. Comm., Robert A. Montgomery, 11/10/15; Norman [Kip] Winter, 11/18/15).
- USGS wells near leks in need of annual monitoring were rescheduled so the wells would be visited in October rather than April. Staff were instructed not to start any well drilling work before 9 a.m. when their well sites are near leks (Pers. Comm., Roy Bartholomay, USGS INL Project Chief, Idaho Falls; Nov. 9, 2015).
- USGS field staff were instructed not to start any well drilling work before 9 a.m. when their well sites are near leks.
- DOE instructed ESER to begin sending the USGS an updated GIS layer each year that displays all active leks on the INL Site.

Conservation Measure 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.

Accomplishments and Noteworthy Events in 2015:

- No meteorological, SODAR, or cellular (portable or permanent) towers were erected in the SGCA or within 1 km of leks during 2015 (Pers. Comm., Robert A. Montgomery, Program Environmental Lead for R&D; 10/19/2015).
- Both National and Homeland Security and the INL Roads and Grounds organization are unaware of any activity in 2015 that did not comply with the disruptive activity avoidance clause (Pers. Comm., Robert A. Montgomery, 11/10/15; Norman [Kip] Winter, 11/18/15).

5.2 Reports on Projects Associated with Conservation Measures

5.2.1 Conservation Measure #1 – Sagebrush Seedling Planting for Habitat Restoration on the INL Site

Summary of Results: Five thousand big sagebrush seedlings were planted on an area that burned in 2000. This area had good native perennial native plant cover, but little natural sagebrush recruitment.

Planting sagebrush seedlings in areas with high ecological condition will hasten the reestablishing of sage-grouse habitat lost during past fires. DOE's objective is to continue to plant 5,000 seedlings each year, up to five years. At the end of five years, based on the 2015 stocking rate, this should provide a start on habitat restoration of 158 ha (390 ac).

Sagebrush seed was collected in 2014 across a wide area of the INL site to capture a broad representation of big sagebrush genotypes. We collected enough seed to provide sufficient container stock for planting efforts over the next five years plus some extra that can be grown for other INL projects if needed.

Although the CCA designates certain areas on the INL Site as Priority Restoration Areas (Figure 5-1) based on lack of sagebrush, proximity to sage grouse leks, low cultural resource impacts, and potential for success, we modified our final selection based on some additional criteria, such as ease of access and proximity to the seedling storage location at CFA.

Of the possible restoration sites (Figure 5-1) identified, we ultimately selected an area south of the rest stop on Hwy 26 (Figure 5-2). On the ground, this area boasted a range of native species, almost no invasive species, good soil, ease of access, and no conflicts with cultural resources.

Foothills Botanical, Inc. of Hamilton, Montana coordinated seedling procurement and logistics between seed collector, seed cleaner, seedling grower, and planting crew. The plants were inspected prior to shipping, and the seedlings were delivered by Kootenay Salish Tribal Forestry in October and stored at CFA during planting.

Foothills Botanical, Inc. and a two man crew from FGR, Inc. of Plains, Montana arrived the morning after the seedlings were delivered. Seedlings were planted randomly with a hoedad, at intervals of about 7 m (22 ft). Five thousand seedlings were successfully planted over four and one half days. Figure 5-2 shows the area actually planted. The weather was ideal for planting with rain previous to and just after the planting.

ESER employees followed the planters and mapped the locations of 767 seedlings. We will monitor the condition of these individuals after one year and again at five years. The condition of each seedling will be rated from 1 (dead or absent) to 5 (completely alive). We will also record the height and whether or not the individual is producing seed.

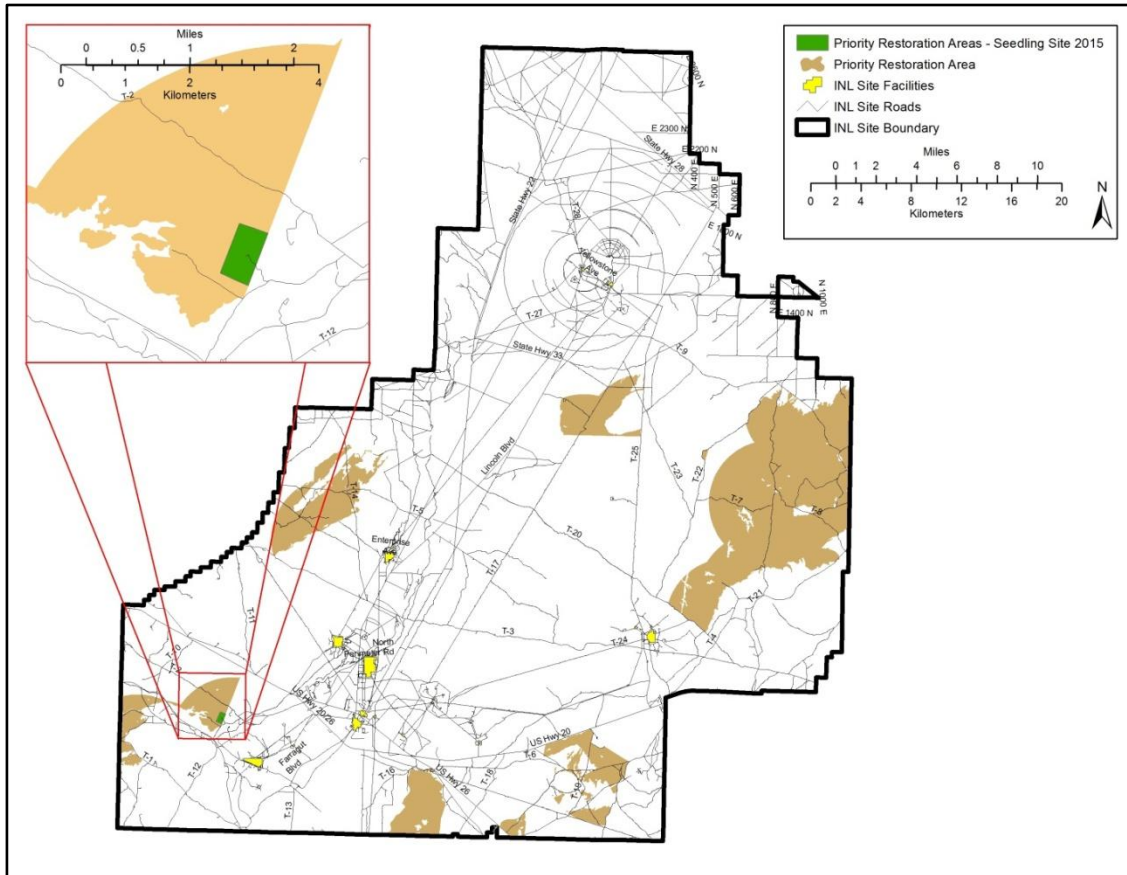


Figure 5-1. CCA Priority Restoration Area and the site that best met criteria for initial successful habitat restoration.

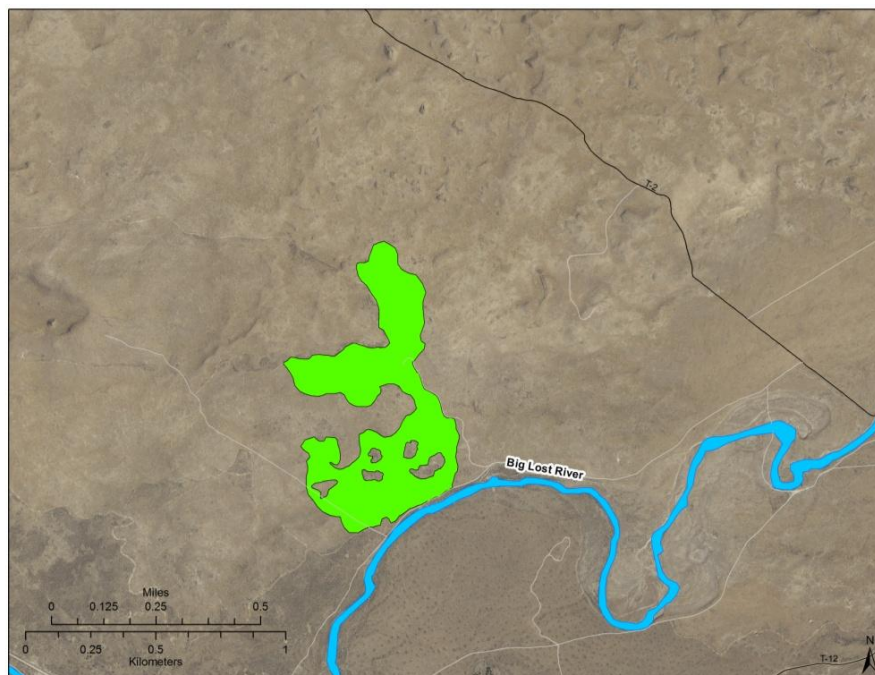


Figure 5-2. Actual area planted with big sagebrush seedlings in 2015.

6. CONCLUSIONS AND ADAPTIVE MANAGEMENT RECOMMENDATIONS

6.1 Status of Population and Habitat Triggers

The population trigger for sage-grouse would trip if the three-year average of peak male attendance falls below 253 males across the 27 baseline leks within the SGCA. This would represent a decrease of over 20% of the 316 males counted in 2011. The 3-year average peak male attendance (2013-2015) on the 27 baseline leks remains at 340 individuals, the same as last year's 3-year average. Thus, this index shows no evidence that sage-grouse abundance is declining on the INL Site.

Following the 2016 lek season, we should have sufficient lek data to create new, permanent lek routes that will be monitored annually in addition to the three existing IDFG routes. The routes will be surveyed in 2017, after which DOE and USFWS will meet and discuss whether the peak male attendance values represent a reasonable new baseline for the population trigger. Ultimately, the new routes will replace the interim population trigger that is based on 27 leks in the SGCA (Section 9.4.1, Shurtliff et al. 2015).

In 2015, we refined the Jefferson fire boundary and updated the INL Site infrastructure footprint to more precisely estimate the 2013 SGCA sagebrush habitat baseline value. The current estimate of sagebrush habitat in the SGCA is 78,504 ha (193,988 ac). Therefore, the habitat trigger would trip if a net of 15,701 ha (38,798 ac), representing 20% of the sagebrush habitat baseline within the SGCA, is lost or converted to a non-sagebrush-dominated vegetation class. In 2015, no wildland fires or other activities reduced the area of sagebrush habitat within the SGCA. In fact, less than two hectares (five acres) have burned on the INL Site in the past three years, so there is no need for DOE to compensate for habitat loss as outlined in section 9.4.3 of the CCA.

6.2 Threats Assessment

Monitoring and inventory tasks supporting threat assessment and reduction (i.e., Task 4: raven nest surveys; Task 7: non-native annual grass inventories; Task 8: delineation of infrastructure footprint) successfully established baseline values to which future results may be compared. DOE will encourage responsible parties to take advantage of low-cost opportunities to deter raven nesting at perennial nest sites on towers and within facilities that are in or near the SGCA. Highest priorities are two NOAA towers and specific structures within AMWTP, TAN, ATR Complex, and NRF. In fall, 2015, ESER initiated a conversation with local NOAA staff and presented a plan for installing devices that would discourage raven nesting on NOAA towers. Staff from NOAA agreed to install these devices prior to the nesting season. Task 4 will verify if those devices are effective.

6.3 Conservation Measures

DOE and INL Site contractor staff began to implement all 13 conservation measures in 2015, including fully completing conservation measure 11 by producing training modules and teaching employees to eliminate food subsidies for ravens and other wildlife. In support of conservation measure 1, employees with the ESER program coordinated the planting of 5,000 sagebrush seedlings during fall 2015 and mapped the locations of about 15% of these seedlings to facilitate survivorship monitoring in the future.

7. WORK PLAN FOR 2016

The following table describes activities or changes that are planned for the upcoming year. The purpose of this table is to highlight upcoming activities and analyses that will be different than the regular annual activities associated with each task.

Task	Schedule and Changes in 2016
1. Lek Surveys	<ul style="list-style-type: none"> All active leks on the INL Site and inactive leks that are part of the baseline suite will be monitored as in the past. Following the 2016 field season, DOE will establish (in consultation with the Idaho Department of Fish and Game) two or more additional lek routes in the SGCA (see section 9.4.1 of the CCA).
2. Historical Lek Surveys	<ul style="list-style-type: none"> 14 historical leks remain unclassified as active or inactive. These will be surveyed again in 2016.
3. Systematic Lek Discovery Surveys	<ul style="list-style-type: none"> Surveys will be performed on the north-east portion of the INL Site, south of Highway 33.
4. Raven Nest Surveys	<ul style="list-style-type: none"> Identify high-use raven nesting areas on power lines to better understand the effort required to deter nesting along a stretch of power lines. Determine whether efforts to deter raven nesting on two NOAA towers occupied in 2015 were successful. If not, adjust methods. Explore the feasibility of deterring raven nesting at priority locations identified in Section 4.1.4.
5. Sagebrush Habitat Condition Trends	<ul style="list-style-type: none"> Sample all annual monitoring plots (n=75). Conduct preliminary analyses for rotational plots focusing on potential impacts on allotments and in burn scars.
6. Monitoring to Determine Changes in Sagebrush Habitat Amount and Distribution	<ul style="list-style-type: none"> Begin mapping and updating the vegetation class boundary delineations within the entire Jefferson Fire. Collect field data within the 2010 Midway Fire boundary, and begin mapping and updating the vegetation class boundary delineations.
7. Inventory and Monitoring of Sage-grouse Habitat for Areas Dominated by Non-native Annual Grasses.	<ul style="list-style-type: none"> Continue surveys.
8. Monitoring Unauthorized Expansion of the Infrastructure Footprint within the SGCA and Other Areas Dominated by Big Sagebrush	<ul style="list-style-type: none"> Update after imagery becomes available.

8. LITERATURE CITED

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