

Chapter 9: Natural and Cultural Resources Conservation and Monitoring



CHAPTER 9

Natural resource information is used to demonstrate compliance with applicable rules and regulations and to ensure that the Idaho National Laboratory (INL) Site mission and goals can be achieved with few-to-no impacts to natural resources. There are four key areas of emphasis: (1) conservation planning, (2) special status species, (3) natural resource monitoring and research, and (4) land stewardship.

For species of elevated concern or with extensive populations and key habitats on the INL Site, DOE-ID has developed conservation plans to protect species and the valuable ecosystems they inhabit. These efforts include: (1) the Candidate Conservation Agreement (CCA) for Greater Sage-grouse (*Centrocercus urophasianus*) on the INL Site, (2) the INL Site Bat Protection Plan, (3) the Sagebrush Steppe Ecosystem Reserve, (4) the Migratory Bird Conservation Plan and Avian Protection Planning documents, and (5) the implementation of the U.S. Department of Energy (DOE) Conservation Action Plan. The U.S. Department of Energy's Idaho Operations Office (DOE-ID) also addresses conservation concerns by continually evaluating the regulatory rankings, abundance, and distribution of special status plant and animal species.

Natural resource monitoring and research has been conducted for more than 70 years on the INL Site, with some studies dating back to the 1950s. The focus of this work is to better understand the INL Site's ecosystem and biota and to determine the impact on these species' populations from activities conducted at the INL Site. Natural resource monitoring activities include: (1) breeding bird surveys, (2) midwinter raptor survey, (3) long-term vegetation transects, and (4) vegetation mapping. Additionally, the INL Site was designated as a National Environmental Research Park (NERP) in 1975 and serves as an outdoor laboratory for environmental scientists to study Idaho's native plants and wildlife in an intact and relatively undisturbed ecosystem. Ongoing NERP activities include: (1) addressing ecohydrology in sagebrush steppe, (2) evaluating beta diversity within the context of fire severity, (3) identifying high-quality foodscapes critical to sage-grouse, and (4) validating pygmy rabbit habitat distribution models.

Land stewardship involves managing ecosystems on the INL Site through planning, assessment, restoration, and rehabilitation activities. Areas where DOE-ID is actively employing land stewardship activities include: (1) wildland fire protection planning, management, and recovery; (2) restoration and revegetation; (3) weed management; and (4) ecological support for the National Environmental Policy Act (NEPA).

The INL Cultural Resource Management Office (CRMO) coordinates cultural resource-related activities at the INL Site and implements the 2023 Programmatic Agreement (2023 PA) (DOE-ID 2023) and INL Cultural Resource Management Plan (CRMP) (DOE-ID 2016) with oversight by DOE-ID's Cultural Resource Coordinator. Cultural resource identification and evaluation studies in calendar year 2023 included: (1) archaeological field surveys, (2) cultural resource monitoring and site record updates related to INL Site project activities and research, (3) comprehensive evaluations of pre-1980 built environment resources, and (4) meaningful collaboration with members of the Shoshone-Bannock Tribes and public stakeholders.



9. NATURAL RESOURCES CONSERVATION AND MONITORING

The INL Site is in the Upper Snake River Plain, near the southern extent of the Beaverhead Mountains and the Lemhi and Lost River Ranges. It is host to a variety of wildlife species including, but not limited to, large ungulates, such as elk (*Cervus canadensis*) and pronghorn (*Antilocapra americana*); ten species of bats, commonplace being the western small-footed myotis (*Myotis ciliolabrum*); and sagebrush obligates, such as the sagebrush lizard (*Sceloporus graciosus*) and the Greater Sage-grouse. Herpetofauna, such as the Great Basin rattlesnake (*Crotalus oreganus lutosus*) and the Great Basin spadefoot (*Spea intermontana*), use locally appropriate habitats, as do over 100 species of birds (e.g., raptor, waterfowl, passerine, upland game species). The natural vegetation of the INL Site consists of an overstory of shrubs and an understory of grasses and forbs, or wildflowers. Big sagebrush (*Artemisia tridentata*) and green rabbitbrush (*Chrysothamnus viscidiflorus*) are the most common shrubs, while perennial grasses, such as needle and thread (*Hesperostipa comata*), Sandberg bluegrass (*Poa secunda*), and thickspike wheatgrass (*Elymus lanceolatus*), are generally the most abundant understory species. A diversity of flowering herbaceous forbs occurs in most plant communities, especially under favorable precipitation conditions.

The primary ecosystem of the INL Site is characterized as sagebrush steppe. Approximately 94% of the land on the INL Site is undeveloped (DOE-ID and USFWS 2014), with approximately 60% open to livestock grazing. Over the past two decades, wildland fire has affected natural resources across a substantial portion of the INL Site. Because of threats like these, the sagebrush ecosystem is considered one of the most imperiled ecosystems in the United States (Noss et al. 1995), and these ecosystems are being lost at an alarming rate. In fact, by the early 2000s, only about 56% of their historic range was occupied (Knick et al. 2003; Schroeder et al. 2004). Consequently, natural resources on the INL Site are a high conservation priority for the survival of species that are dependent upon sagebrush steppe (Smith et al. 2023), some of which may be at the risk of local extirpation or even regional loss (Davies et al. 2011). As such, effective natural resource monitoring and land stewardship are imperative to executing the INL Site's mission with minimal impacts to the local flora and fauna.

Natural resources conservation, monitoring, and land stewardship activities on the INL Site can be organized in four categories: (1) planning and implementing conservation efforts for high-priority natural resources; (2) frequently evaluating the regulatory rankings, distribution, and populations for special status species; (3) ongoing monitoring and research to provide baseline and trend data for specific taxa and broader ecological communities; and (4) conducting land stewardship activities to minimize impacts to natural resources and restore ecological condition, where appropriate. Natural resource data collected on vegetation and key wildlife species provide DOE-ID with an understanding of how species use the INL Site and context for analyzing trends. These data are often used in NEPA analyses and enable DOE-ID to make informed decisions for project planning and to maintain up-to-date information on potentially sensitive species on the INL Site. The data are also summarized and reported to support DOE-ID's compliance with environmental regulations, agreements, policies, and Executive Orders (EOs). Finally, conservation management, wildland fire recovery, and vegetation management plans are developed and maintained to provide land management guidance for a variety of land stewardship concerns.

9.1 Conservation Planning

9.1.1 Conservation Action Plan, Ecological Connectivity, and Nature-Based Solutions

EO 14008 (2021), "Tackling the Climate Crisis at Home and Abroad," establishes the need for the United States to increase the speed and scale of necessary actions to mitigate the effects of the climate crisis. This EO states, "The United States will also move quickly to build resilience, both at home and abroad, against the impacts of climate change that are already manifest and will continue to intensify according to current trajectories." Additionally, it requires federal agencies to identify strategies that will encourage broad participation in the goal of conserving 30% of the Nation's lands and waters by 2030.

To address EO 14008 and its requirements, the "Conserving and Restoring America the Beautiful" report was developed by federal resource agencies and the Council on Environmental Quality. The report outlines seven focus areas for early action, and DOE developed a Conservation Action Plan to summarize ongoing and planned conservation projects within



each of those focus areas that are broadly applicable across DOE lands. The focus areas that are specifically addressed at each DOE site are related to the complexity and sensitivity of the mission at that site. The following are long-term and ongoing projects that are conducted on the INL Site to address some of these focus areas:

- **Support Tribal Led Conservation and Restoration Priorities** – The lands now designated as the INL Site are included in the ancestral homelands of the Shoshone and Bannock people. Archaeological sites on the INL Site and far beyond are held by the Shoshone-Bannock Tribes as evincing their cultural heritage and a reflection of their ancestors. Landmarks, such as the Middle Butte, define home and territory, figure in oral histories that tell how the world came to be the way it is, and provide a living link between contemporary Shoshone and Bannock people and their ancestral homelands. This landscape is part of the tribe’s past subsistence and settlement, seasonal grounds for hunting (e.g., bison), plant gathering, travel and trade routes, tool sources (i.e., obsidian), and features many areas that are of great importance or are sacred to them. As a signatory to the “Memorandum of Understanding Regarding Interagency Coordination and Collaboration for the Protection of Indigenous Sacred Sites Among the U.S. Department of the Interior, U.S. Department of Agriculture, U.S. Department of Transportation, U.S. Department of Energy, U.S. Environmental Protection Agency, White House Council on Environmental Quality, Advisory Council on Historic Preservation, and Tennessee Valley Authority,” DOE-ID works to provide access to and protection of such sites.

DOE-ID’s long-term relationship with the Shoshone-Bannock Tribes is documented in an Agreement in Principle that formalizes tribal involvement in DOE-ID planning and implementation of environmental restoration, long-term stewardship, cultural resources protections, waste management operations, and nuclear energy programs. For example, the tribes, DOE-ID, the INL contractor, and Bureau of Land Management (BLM) staff are collaborating on restoration efforts at the Birch Creek site to stabilize soils and vegetation in the area. In 2022, soil samples were collected and analyzed so that nutrient deficiencies could be addressed prior to planting. During the spring of 2023, nutrient supplements were applied to the soil surface. The site was hydroseeded with locally appropriate grasses and planted with sagebrush and juniper seedlings during the fall of the same year. In addition, almost 75,000 sagebrush seedlings were planted in the vicinity of the Middle Butte Cave during the fall of 2023 (Section 9.4.2).

- **Expand Collaborative Conservation of Fish and Wildlife Habitats and Corridors** – The Idaho Department of Fish and Game (IDFG) has identified sagebrush steppe as one of the most important ecosystems for wildlife in Idaho (IDFG 2023) and the INL Site remains one of the best remaining examples of an intact sagebrush steppe ecosystem in the region. DOE-ID is working to restore these important habitats where they have been impacted by wildland fires or other disturbances by planting sagebrush seedlings (Section 9.4.2), reducing invasive species and noxious weeds (Section 9.4.3), and implementing conservation plans for key species, such as sage-grouse (Section 9.1.2) and bats (Section 9.1.3). DOE-ID has also set aside 29,945 ha (74,000 ac) of sagebrush steppe habitat as an ecosystem reserve (Section 9.1.4). In many cases, these conservation efforts are undertaken in collaboration with federal and state stakeholders, such as the United States Fish and Wildlife Service (USFWS), BLM, IDFG, and the Idaho State Office of Species Conservation.

Over the past two years, DOE-ID and the INL contractor have been partnering with agency stakeholders to restore important sage-grouse habitat across jurisdictional boundaries using Bipartisan Infrastructure Law (BIL) funds. These restoration efforts will help reestablish ecological integrity and habitat connectivity where it has been impacted by wildfire. Specific restoration treatments include using herbicide to control cheatgrass in the limited areas where it has become abundant and planting sagebrush where it has been slow to recover naturally (Section 9.4.2). In addition to these ongoing efforts, several new conservation opportunities were identified in the Climate Vulnerability and Resilience Planning for INL (see Other Actions Supportive of the America the Beautiful Campaign in this section below).

- **Increase Access for Outdoor Recreation Opportunities** – The INL is a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Site. Public access to the INL Site is restricted under the CERCLA program, which establishes a remedial action object to prevent any inadvertent contact with potential unexploded ordnance by members of the public. Currently limited access is allowed for public recreational hunters in designated portions of the INL under the CERCLA program due to crop depredation on surrounding agricultural lands by elk and antelope using the INL Site as refuge. The designated hunting zones are located along the northern and western boundaries of the INL Site adjacent to agricultural lands. Access to the INL Site is administered by the IDFG under



an agreement with DOE-ID that establishes specific restrictions for hunting onsite. A valid hunting license and an IDFG-issued INL Site hunting permit are required to access these areas.”

- **Incentivize and Reward Voluntary Conservation Efforts of Fishers, Ranchers, Farmers, and Forest Owners** – Livestock grazing permits for cattle and sheep are administered by BLM on eight allotments that overlap the INL Site boundary, resulting in approximately 60% of the INL Site that is open to ranching operations. DOE-ID and the INL contractor collaborate with BLM and allotment permittees by attending allotment reviews, providing vegetation monitoring data, reviewing Environmental Assessments (EAs) for activities that may impact the INL Site, and sharing resources for fire recovery of sagebrush ecosystems and sagebrush habitat restoration. These parties also cooperate to ensure that conservation measures, such as ensuring that fences are wildlife-compatible and water troughs are located to minimize impacts to vegetation, are implemented and yield the desired outcome. In many cases, these conservation measures have the potential to reduce impacts from livestock operations on natural resources and increase efficiencies for permittees.
- **Other Actions Supportive of the America the Beautiful Campaign** – Along with the Conservation Action Plan (DOE 2021a), DOE also developed the Climate Adaptation and Resilience Plan (CARP; DOE 2021b) in response to EO 14008. The CARP provides a framework for developing a Vulnerability Assessment and Resilience Plan for each DOE site. The INL Vulnerability Assessment and Resilience Plan, or “Climate Vulnerability Assessment and Resilience Planning for Idaho National Laboratory” (Ischay and Nate 2022), identifies programmatic and technological solutions to increase resilience to climate change across INL Site facilities (see Chapter 3), and it also includes opportunities to increase climate resilience across the natural landscape through inventory, monitoring, and implementing resource management plans. Finally, DOE-ID and the INL contractor are participating in DOE’s Sustainable Climate-Ready Sites program, which is a voluntary recognition program designed to foster excellence in sustainability, climate resilience, and natural resource protection. This program supports implementation of the Conservation Action Plan and the CARP.

In addition to EO 14008 (2021), DOE-ID and the INL contractor are addressing several other federal strategies for improving the health of the ecosystem and enhancing climate resilience of the sagebrush steppe native to the INL Site. These strategies include direction and guidance for developing nature-based solutions, outlined in EO 14072 (2022); Council of Environmental Quality Guidance on Ecological Connectivity and Wildlife Corridors (2023), and aspects of DOE Order 436.1A (2023), Departmental Sustainability, that pertain to land and natural resource management. Many facets of the INL’s current Natural Resources Program support these conservation-based strategies; however, more recent initiatives include the development of a comprehensive wildland fire recovery framework (Section 9.4.1) and enhancing habitat connectivity through cooperative restoration efforts (Section 9.4.2). Because DOE has identified their NERPs as important venues for facilitating research partnerships to enhance ecosystem services and develop innovative nature-based solutions, the INL contractor continues to improve NERP processes and pursue opportunities for collaborative ecological research (Section 9.3.5).

9.1.2 Candidate Conservation Agreement for Greater Sage-grouse

Populations of greater sage-grouse (hereafter, sage-grouse) have declined in recent decades (Coates et al. 2022), and the species range-wide distribution across western North America has been reduced to nearly half of its historical distribution (Schroeder et al. 2004, Connelly et al. 2011a). Healthy stands of sagebrush (*Artemisia* spp.) are necessary for sage-grouse to survive throughout the year; however, young sage-grouse also require a diverse understory of native forbs and grasses during the summer months. Sagebrush habitats that consist of a diversity of vegetation provide protection from predators and supply high-protein insects necessary for rapidly growing chicks (Connelly et al. 2011b). Sagebrush habitats have been greatly altered during the past 150 years and are currently at risk from a variety of pressures (Connelly et al. 2004; Davies et al. 2011; Knick et al. 2011). Because of sage-grouse reliance on broad expanses of sagebrush, there is concern about the trajectory of sage-grouse populations.

When sage-grouse were petitioned for listing under the Endangered Species Act of 1973 (ESA), DOE-ID recognized the need to reduce the potential for impact to existing and future mission activities. In 2014, DOE-ID entered into a CCA with the USFWS to identify threats to the species and their habitat and develop conservation measures and objectives to avoid or minimize threats to sage-grouse. This voluntary agreement established a Sage-Grouse Conservation Area (SGCA; Figure 9-1), and DOE-ID committed to deprioritize the SGCA when planning infrastructure development and to



establish mechanisms for reducing human disturbance of breeding and nesting sage-grouse (DOE-ID and USFWS 2014).

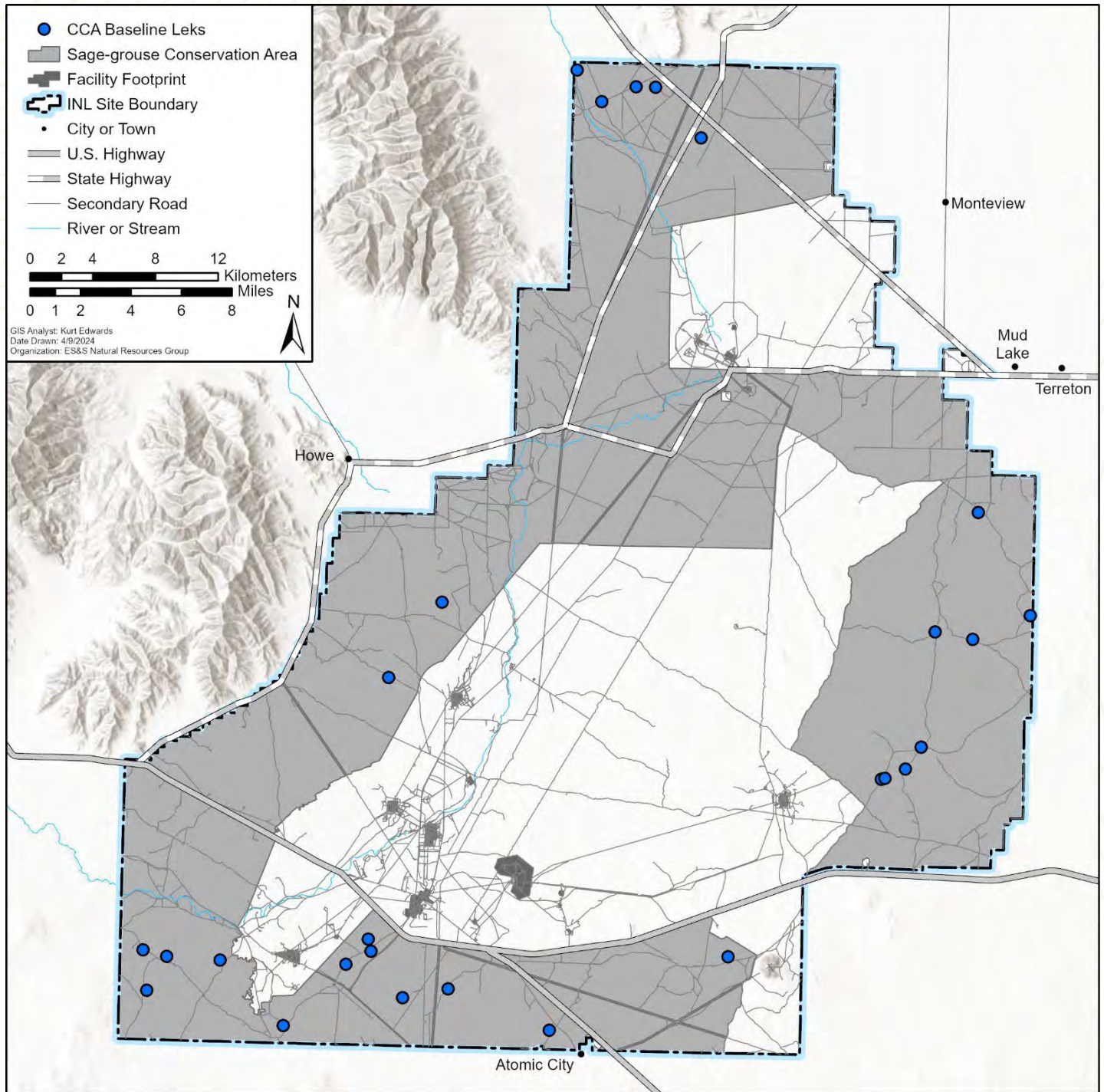


Figure 9-1. Area defined by the CCA for Greater Sage-grouse onsite as a SGCA and location of baseline leks used for determining the population trigger.

To evaluate sage-grouse population declines with respect to their natural range of variation, the CCA established population and habitat triggers. The baseline value for the sage-grouse population trigger for the INL Site equals the number of males counted in 2011 during peak male attendance on 27 active leks within the SGCA (i.e., 316 males). The



population trigger will be tripped if the three-year running average of males on those 27 baseline leks decreases $\geq 20\%$ (i.e., ≤ 253 males). The baseline value of the original habitat trigger was equivalent to the amount of area within the SGCA that was characterized as sagebrush-dominated habitat at the beginning of 2013. After a CCA stakeholder meeting in February 2022, it was agreed upon that the sagebrush habitat trigger baseline would be updated using the most recent vegetation map (Shive et al. 2019). The updated baseline value for sagebrush habitat is 72,300 ha (178,656 ac) and the habitat trigger will trip if there is a reduction of $\geq 20\%$ (14,460 ha [35,731 ac]) of sagebrush habitat within the SGCA. Total sagebrush habitat area and distribution are monitored using aerial imagery and a geographic information system (GIS). If a trigger is tripped, an automatic response by both DOE and USFWS would be initiated, as described in the CCA (DOE-ID and USFWS 2014).

The INL contractor biologists monitor sage-grouse populations, sagebrush habitats, and activities that are considered threats to sage-grouse survival on the INL Site. For details about the most recent annual results, refer to Implementing the Candidate Conservation Agreement for Greater Sage-Grouse on the Idaho National Laboratory Site 2023 Full Report (INL 2024a).

Population and Habitat Status

Each spring, biologists monitor sage-grouse that have congregated on leks for breeding purposes. Baseline and all other active leks are monitored multiple times from March 20 until peak male attendance has been determined and recorded. Inactive leks are also surveyed every five years to determine whether the lek status has changed. During 2023, the peak male attendance on baseline leks was 304—a 23.6% increase of males observed in 2022. The three-year (2021–2023) running average of peak male attendance on baseline leks increased 11.2% to 259 males, exceeding the population trigger threshold of 253 males. This was the first year since 2018 that the three-year average has increased, returning the running average above the population threshold, which effectively reset the population trigger that had tripped in 2022. Furthermore, male sage-grouse attendance on lek routes monitored by IDFG increased 8% when compared to 2022 (Kemner 2023) with the INL contractor observing a lek route attendance increase of 13.5% during the same period (INL 2024b).

Two monitoring tasks are designed to identify vegetation changes across the landscape and assist in maintaining an accurate record of the condition and distribution of the sagebrush habitat within the SGCA to facilitate annual evaluation of the habitat trigger: (1) sagebrush habitat condition, and (2) sagebrush habitat amount and distribution. Monitoring sagebrush condition provides data used to track annual changes in sagebrush habitat on the INL Site. Data collected to support this task may also be used to document gains in habitat as non-sagebrush map polygons transition back into sagebrush classes or to document losses when compositional changes occur within sagebrush polygons that may require a change in the assigned map class. This task is also designed to track losses to sagebrush habitat following events that alter vegetation communities, such as wildland fires and land development. As updates are made to map classes (e.g., vegetation polygon boundaries), the total area of mapped sagebrush habitat is compared to the baseline value established for the habitat trigger to determine the status with respect to the habitat threshold.

Together, these two monitoring tasks provide the basis for maintaining an accurate map and estimate of the condition and quantity of sagebrush habitat on the INL Site. The condition of sagebrush habitat remained high in 2023. Sagebrush cover was near the upper range of its historical range of variability. Herbaceous cover exceeded its range of variability, and the abundance of non-natives was generally low. The total area of sagebrush habitat in the SGCA on the INL Site remained unchanged from 2022 to 2023, with 71,358.8 ha (176,331.4 ac). To date, a total loss of sagebrush habitat in the SGCA of approximately 1.3% has been reported.

Threats and Associated Conservation Measures

The CCA identifies and rates eight threats that potentially impact sage-grouse and their habitats on the INL Site, including wildland fire, grazing, infrastructure development, and raven predation. Conservation measures have been assigned to each threat and consist of actions aimed toward mitigating impacts to the sage-grouse and its habitat by INL Site activities. This is accomplished through the avoidance and minimization of threats by using best management practices (BMPs) such as setting seasonal and time-of-day restrictions. DOE-ID also recognizes that sagebrush-dominated communities outside of the SGCA serve as important habitats for sage-grouse, so BMPs that guide infrastructure development and other land use decisions were developed and applied to the entire INL Site.



9.1.3 Bat Protection Plan

Over the past several decades, newly identified threats to bat populations (e.g., white-nose syndrome and large-scale commercial wind energy development) have caused widespread mortality events in bats and resulted in precipitous declines of numerous common bat species and elevated conservation concern for bats across the United States, including additional listings under the ESA. Bats represent over 30% of mammal species described for the INL Site. Large undisturbed areas of shrub-steppe habitat, basalt outcrops, lava caves, juniper uplands, and ponds and landscape trees at industrial facilities provide complex and abundant foraging and roosting habitat for a variety of resident and transient bat species. Since the early 1980s, the INL Site has supported bat research either through program funding or through outside-funded projects managed under the NERP. These efforts have promoted general bat conservation and provided critical conservation data to DOE-ID decision-makers and state and federal resource agencies. The result of numerous publications, reports, conservation assessments, and theses has been the recognition of the INL Site and surrounding desert as crucial bat habitat.

In 2011, DOE-ID and the Naval Reactors Laboratory Field Office/Idaho Branch Office decided to increase the attention they give to bat resources and initiate the development of a comprehensive INL Site-wide bat protection and monitoring program. In 2018, the INL Site Bat Protection Plan was finalized (DOE-ID 2018), which provides a framework for eliminating mission impacts associated with protected bat species, monitoring the status of bat populations, providing current data for environmental analyses, and engaging resource agency stakeholders such as the USFWS, BLM, and IDFG on bat issues. The Idaho National Laboratory Site Bat Protection Plan Annual Report 2023 provides the most current INL Site bat data (INL 2023).

During 2023, work performed under the INL Site Bat Protection Program scope included the following activities: there were 2,665,618 total files collected from acoustic monitoring stations; five caves were monitored year-round, four additional caves were monitored during the winter (November–April) months, two additional caves were monitored during the summer (May–October) months, two locations around the Middle Butte were also monitored during the summer (May–October) months, and eight facilities were monitored during the summer (May–October) months. Of the total number of files, 813,261 files (105,472 identifiable as bat files) were from facilities, while the remaining 1,852,357 files (141,579 identifiable as bat files) were from caves. Ongoing monitoring efforts show consistent patterns in seasonal bat distribution. The summer resident bat community consists predominantly of western small-footed myotis, Townsend's big-eared bat (*Corynorhinus townsendii*), big brown bat (*Eptesicus fuscus*), and western long-eared myotis (*Myotis evotis*) with some little brown myotis (*Myotis lucifugus*) and silver-haired bat (*Lasionycteris noctivagans*) detected at moderate levels at a few locations. Low levels of summer activity of hoary bat (*Lasiurus cinereus*) were detected at many monitoring locations. Western small-footed myotis was the most detected bat species at all surveyed features (facilities and caves). Little brown myotis are more commonly detected at facilities than at cave sites. Tree bats (hoary bats and silver-haired bats) were detected more frequently at facilities than caves. The results of the passive monitoring program are providing critical information regarding bat distribution, ecology, and conservation on the INL Site. The INL Site also participated in the North American Bat Monitoring program, facilitated by the United States Geological Survey (USGS) in 2023, collecting acoustic data in two priority grid cells as part of a nationwide sampling framework. These data were provided to IDFG.

In addition to acoustical bat monitoring at the INL Site, several other activities were performed to address bat conservation. To support surveillance for white-nose syndrome (a disease impacting hibernating bats), humidity/temperature dataloggers were checked and reset in eight monitored hibernacula during the summer of 2023. Two live bats were found in areas of facilities that were disrupting work and were relocated to safe areas. There was one other bat that was not interfering with work activities and left to disperse on its own. Thirty bat carcasses were recovered from facilities and submitted for radiological testing. Additionally, multiple public events were held at the Idaho Falls Zoo, Harriman State Park, and Museum of Idaho.

9.1.4 Sagebrush Steppe Ecosystem Reserve

On July 19, 2004, DOE-ID signed a Finding of No Significant Impact for an EA and Management Plan that outlined a framework to collaboratively manage the Idaho National Engineering and Environmental Laboratory (INEEL) Sagebrush Steppe Ecosystem Reserve (SSER) with the BLM, USFWS, and IDFG. The SSER includes 29,945 ha (74,000 ac) of high desert land in the north central portion of the INL Site. In the 1999 Proclamation establishing the SSER, then



Secretary of Energy Bill Richardson recognized that the “Reserve is a valuable ecological resource unique to the Intermountain West and contains lands that have had little human contact for over 50 years. The sagebrush steppe ecosystem across its entire range was listed as a critically endangered ecosystem by the National Biological Service in 1995, having experienced greater than a 98% decline since European Settlement.” Because the SSER represents a unique ecological resource, “conservation management of the area is intended to maintain the current plant community and provide the opportunity for study of an undisturbed sagebrush steppe ecosystem.” The Proclamation also specified that traditional rangeland uses will be allowed to continue under the SSER management designation and that Public Land Orders, which withdrew INL lands, would supersede SSER management objectives if the land was needed to support INL’s nuclear energy research mission (DOE-ID 2004).

Specific actions to guide the SSER management according to its mission and management goals were provided in the INEEL Sagebrush Steppe Ecosystem Reserve Final Management Plan (DOE-ID 2004). The primary actions included in the preferred alternative for managing the SSER were as follows: (1) establishment of a Reserve Management Committee, (2) reduction in road access and use, (3) implementation of an integrated weed management plan, (4) limitation of restoration actions to locally collected plant materials, (5) no changes in livestock class or increase in stocking levels, (6) no construction of wells for livestock watering purposes, (7) minimization of anthropogenic structures for raptor perching, and (8) responding to wildland fire suppression and post-fire restoration in a manner that is consistent with INL’s Wildland Fire EA.

Implementation of the SSER Management Plan and associated actions were contingent on funding allocations from the cooperating agencies because those agencies recognized that innovative funding sources would likely be required for timely implementation. To date, the cooperating agencies have been unable to identify funding resources sufficient to establish the SSER managing committee and fully implement the SSER Management Plan. As such, DOE-ID is currently evaluating actions to improve the management of the SSER. However, DOE-ID and the INL contractor continue to consider the mission and goals of the SSER Management Plan in their planning processes and land management decisions on the INL Site. When federal actions are proposed by DOE-ID on or including portions of the SSER, the restrictions on travel, infrastructure development, and other activities described in the SSER Management Plan are documented and applied to any proposed actions through the INL NEPA process.

9.1.5 Migratory Bird Conservation and Avian Protection Planning

Most activities at the INL Site are conducted within fenced, industrial complexes that are up to several hundred acres in size. General actions from day-to-day operations that may affect migratory birds include mowing vegetated areas for wildland fire protection, maintenance of utilities and infrastructure, and moving equipment such as trailers and nuclear fuel casks. It is not unusual to encounter a variety of animals, including migratory birds, while conducting these activities. As directed in EO 13186 (2001) and outlined in a 2013 Memorandum of Understanding between the DOE and USFWS (Federal Register 2013), DOE-ID has developed a Migratory Bird Conservation Plan (DOE-ID 2022) that provides a framework for protecting and conserving migratory birds and their habitat in accordance with the Migratory Bird Treaty Act of 1918 and the Bald and Golden Eagle Protection Act of 1940 while accomplishing critical DOE-ID and Naval Reactors Laboratory Field Office/Idaho Branch Office missions.

DOE-ID maintains a Special Purpose Permit issued by USFWS that allows for the destruction or relocation of a pre-determined number of migratory bird nests, when permit conditions are met. Additionally, a Scientific Collection Permit issued by IDFG allows for the retrieval or harvest of certain migratory birds with the intent of using them for scientific and monitoring purposes. All practicable minimization and avoidance efforts identified in the Migratory Bird Conservation Plan are to be implemented before parties exercise their ability to take migratory birds under these permits. The conservation plan identifies measures that are designed to eliminate or minimize impacts on migratory birds and to protect their habitat. These measures include the protection of native vegetation, avoiding disturbing nesting birds, reducing the potential for conflicts with INL missions, and enhancing native habitat as practical. Conservation measures are identified through the NEPA process, which assesses the potential impacts on migratory birds during the implementation of a project or activity. The plan also identifies BMPs that are implemented across the INL Site. These BMPs include routine surveys of structures, equipment, and vegetated areas conducted during nesting season (i.e., April 1 to October 1) to ensure project activities do not disturb or otherwise interfere with active nests. If an active nest with eggs or chicks is discovered, all work that could result in the abandonment or destruction of the nest is suspended



and the appropriate environmental personnel are contacted for assistance and guidance. Until a determination is made whether to remove the nest, actions are conducted to ensure the nest is not abandoned due to work activities.

In 2019, DOE-ID established a Migratory Bird/Wildlife Conservation Working Group to provide a forum for discussing, resolving, and collaborating on all activities related to migratory bird and other wildlife matters arising on the INL Site. The primary task of this group is to promote the conservation of migratory birds, share ideas to minimize the impact of nesting birds to operations, and ensure compliance with permit requirements. Accomplishments to date include the development of online Migratory Bird Awareness Training for environmental staff, facility maintenance, operations, and program managers; mitigation actions, such as incorporating critical equipment inspections into daily operations orders to identify nesting activities; use of window dressings to reduce mortality from window collisions; and effectively exchanging information regarding the use of relocating bird eggs or young to licensed rehabilitators are used as options in lieu of unavoidable destruction and take situations.

The INL contractor has developed an Avian Protection Plan and Bird Management Policy (MCP-3367 2016) in accordance with Avian Power Line Interaction Committee requirements (Avian Power Line Interaction Committee 2006). This plan includes documenting, tracking, and correcting conditions that resulted in a migratory bird's death. When birds are electrocuted, power poles are either retrofitted or modified with avian protection devices during the next scheduled power outage. These efforts help to reduce future electrocutions. Avian interactions are also considered when siting new power line locations and when replacing existing power poles to reduce risks to migratory birds through proactive and innovative resolutions.

On July 14, 2022, an unauthorized removal of swallow nests occurred at a bus stop at the Central Facilities Area (CFA) that resulted in the take of seven nests with viable eggs and 10 hatchlings.

Additional corrective actions taken in 2023 related to the incident included:

- A nest inspection form was developed for use at all mission centers. This form allows personnel to identify areas where nesting birds may impact mission or personnel, areas where deterrents may be installed, locations where nests have been located, and whether eggs were present within the nests.
- Signage was developed and provided to mission centers that alerts employees to the presence of an active nest and identifies the appropriate point of contact for any activities that may need to occur within the area.
- A Corrective Action Review Board meeting was held where the corrective actions taken related to this event were evaluated and subsequently approved.

On May 2, 2023, INL personnel located two dead great horned owls (*Bubo virginianus*) near a tree used for nesting at CFA. Staff from the Natural Resource Group (NRG) were notified and made the determination to submit the owls to IDFG for necropsies to determine cause of death. Initial observations by IDFG wildlife health personnel were consistent with the exposure to anticoagulants with subsequent toxicology analyses indicating secondary poisoning of the owls from rodenticide.

Corrective actions taken in 2023 related to this incident included:

- The INL temporarily suspended the use of rodenticides
- The INL began reviewing all pesticides for potential impacts to wildlife
- The INL initiated an improvement agenda to help ensure events similar to this do not occur in the future.

On July 26, 2023, the Naval Reactors Facility reported the unauthorized destruction of seven active barn swallow (*Hirundo rustica*) nests at the facility. This event is currently under evaluation.

In 2023, a total of 211 birds, 10 nests, and 15 eggs were salvaged near INL facilities. Information collected about the location of these birds is used to inform the placement of visual deterrents that may reduce bird collisions with infrastructure. One great horned owl was found dead along the powerlines. The power poles will either be retrofitted or modified with avian protection devices during the next scheduled power outage. An additional three migratory species (waterfowl) were collected for radionuclide analysis; details of this effort can be found in Section 7.2.8 of this report.



9.2 Special Status Species

9.2.1 Wildlife

The INL Site provides breeding and foraging habitat for a variety of species, including 28 species of birds and 11 species of mammals, one reptile, and one amphibian species that are of elevated conservation concern by state or federal agencies. Several of these species are sagebrush obligates, while others use habitats that are very localized on the INL Site, such as juniper woodlands or surface water features. Many of these species are detected or monitored during annual survey efforts, including the midwinter raptor counts, sage-grouse lek counts, breeding bird surveys, and bat acoustical monitoring.

Federally Listed Wildlife Species

Several species currently listed according to the ESA have been documented in the state of Idaho, including the North American wolverine (*Gulo gulo luscus*) and the Canada lynx (*Lynx canadensis*); however, due to habitat requirements of these and other listed species, they are not likely to occur on the INL Site. Several species that have either been proposed for listing under the ESA or have been recovered and delisted occur seasonally or are considered residents of the INL Site. The bald eagle (*Haliaeetus leucocephalus*), delisted in 2007, is commonly seen during the winter months on or near the INL Site. Species associated with sagebrush habitats, such as the pygmy rabbit (*Brachylagus idahoensis*) and the sage-grouse, have been proposed for listing under the ESA in recent years. In 2015, the USFWS deemed the listing of sage-grouse unwarranted because “the primary threats to sage-grouse have been ameliorated by conservation efforts implemented by federal, state, and private landowners” (Federal Register 2015). On March 6, 2023, the USFWS received a petition to list the pygmy rabbit under the ESA, however, a final determination as to the status of this species has yet to be made.

While no wildlife species currently listed under the ESA are known to occur on the INL Site, there are at least 27 wildlife species of conservation concern identified by the BLM as special status species (Type 2) that have been documented on the INL Site (see Table 9-1). A BLM ranking of Type 2 indicates that a species is a candidate, was delisted within the past five years, is an experimental population, or has a proposed critical habitat by the USFWS (BLM 2008). Some of these species would also be considered sensitive if they were assigned a global or state conservation status ranking of three or less by NatureServe (2023). Of these BLM Type 2 species, some of the most common at the INL Site include the sage thrasher (*Oreoscoptes montanus*), the loggerhead shrike (*Lanius ludovicianus*), the ferruginous hawk (*Buteo regalis*), and the sage-grouse. Currently, DOE-ID and the USFWS are signatories on a CCA for the sage-grouse and sage-grouse habitat; details of this agreement are discussed in Section 9.1.2.

State Sensitive Wildlife Species

At least 36 wildlife species identified in the Statewide Wildlife Action Plan (IDFG 2024a) by the IDFG as Species of Greatest Conservation Need (SGCN) or Species of Greatest Information Need have been documented on the INL Site (see Table 9-1). These include occasional sightings of species, such as the American white pelican (*Pelecanus erythrorhynchos*) and the ring-billed gull (*Larus delawarensis*), to more commonly observed species, such as the sage-grouse and the burrowing owl (*Athene cunicularia*). As with BLM special status species, many SGCN species are detected or monitored during annual survey efforts at the INL Site; additional details of these survey efforts are discussed in Sections 9.3.1 and 9.3.2.



Table 9-1. Special status animal taxa documented to occur on the INL Site.

COMMON NAME	SCIENTIFIC NAME	GLOBAL RANK†	STATE RANK†	BLM RANK‡	IDFG RANK	USESA STATUS	SEASONAL OCCURRENCE
American white pelican	<i>Pelecanus erythrorhynchos</i>	G4	S3B	—	I	Species of Concern	Migrant
bald eagle	<i>Haliaeetus leucocephalus</i>	G5	S5	Type 2	—	Delisted / Recovery	Migrant, Winter
big brown bat	<i>Eptesicus fuscus</i>	G5	S3	Type 2	I	Species of Concern	Year-round
black-throated sparrow	<i>Amphispiza bilineata</i>	G5	S2B	Type 2	—	Species of Concern	Migrant, Summer
Brewer's sparrow	<i>Spizella breweri</i>	G5	S3B	Type 2	C	Species of Concern	Migrant, Breeding
bobolink	<i>Dolichonyx oryzivorus</i>	G5	S2B	—	C	—	Summer
burrowing owl	<i>Athene cunicularia</i>	G4	S2B	Type 2	C	Species of Concern	Migrant, Breeding
California gull	<i>Larus californicus</i>	G5	S2B, S5N	—	C	—	Migrant
California myotis	<i>Myotis californicus</i>	G5	S3	Type 2	—	Species of Concern	Unknown
Clark's nutcracker	<i>Nucifraga columbiana</i>	G5	S3	—	C	Species of Concern	Year-round
cinnamon teal	<i>Spatula cyanoptera</i>	G5	S3B	—	C	—	Migrant
common nighthawk	<i>Chordeiles minor</i>	G5	S3B	—	C	Species of Concern	Migrant, Breeding
desert horned lizard	<i>Phrynosoma platyrhinos</i>	G5	S3	—	I	—	Year-round
eared grebe	<i>Podiceps nigricollis</i>	G5	S3B, S3N	—	C	—	Migrant
evening grosbeak	<i>Coccothraustes vespertinus</i>	G5	S4	—	I	—	Year-round
ferruginous hawk	<i>Buteo regalis</i>	G4	S3B	Type 2	C	Resolved	Migrant, Breeding
flamulated owl	<i>Psiloscoops flammeolus</i>	G4	S3B	Type 2	—	—	Migrant
Franklin's gull	<i>Leucophaeus pipixcan</i>	G5	S2B	—	C	Species of Concern	Migrant
fringed myotis	<i>Myotis thysanodes</i>	G4	S3	Type 2	—	Species of Concern	Summer
golden eagle	<i>Aquila chrysaetos</i>	G5	S3	Type 2	C	Species of Concern	Migrant, Summer, Winter
grasshopper sparrow	<i>Ammodramus savannarum</i>	G5	S3B	Type 2	C	Species of Concern	Migrant, Breeding
Great Basin spadefoot	<i>Spea intermontana</i>	G5	S3	—	I	—	Year-round, Breeding
greater sage-grouse	<i>Centrocercus urophasianus</i>	G3, G4	S2	Type 2	C	Resolved	Year-round, Breeding
green-tailed towhee	<i>Pipilo chlorurus</i>	G5	S4B	Type 2	—	Species of Concern	Summer
hoary bat	<i>Lasiurus cinereus</i>	G3, G4	S3	Type 2	C	—	Summer, Migratory
little brown myotis	<i>Myotis lucifugus</i>	G3	S3	Type 2	C	Petitioned for Listing	Summer
loggerhead shrike	<i>Lanius ludovicianus</i>	G4	S3	Type 2	C	Species of Concern	Migrant, Breeding
long-billed curlew	<i>Numenius americanus</i>	G5	S2B	Type 2	C	Resolved	Migrant, Breeding
long-legged myotis	<i>Myotis volans</i>	G4, G5	S3	Type 2	I	Species of Concern	Summer



Table 9-1. continued.

COMMON NAME	SCIENTIFIC NAME	GLOBAL RANK†	STATE RANK†	BLM RANK‡	IDFG RANK	USES STATUS	SEASONAL OCCURRENCE
northern pintail	<i>Anas acuta</i>	G5	S3B, S3N	—	C	—	Migrant
pronghorn	<i>Antilocapra americana</i>	G5	S3	—	C	—	Resident
pygmy rabbit	<i>Brachylagus idahoensis</i>	G4	S3	Type 2	C	Petitioned for Listing	Resident
ring-billed gull	<i>Larus delawarensis</i>	G5	S3B, S5N	—	C	Species of Concern	Migrant
sage thrasher	<i>Oreoscoptes montanus</i>	G4	S3B	Type 2	C	Species of Concern	Migrant, Breeding
sagebrush sparrow	<i>Artemisiospiza nevadensis</i>	G5	S2B	Type 2	C	—	Migrant, Breeding
short-eared owl	<i>Asio flammeus</i>	G5	S3	Type 2	C	Species of Concern	Year-round, Breeding
silver-haired bat	<i>Lasionycteris noctivagans</i>	G3,G4	S3	Type 2	C	Species of Concern	Summer, Migratory
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	G4	S3	Type 2	C	—	Winter
western grebe	<i>Aechmophorus occidentalis</i>	G5	S2B	—	C	Species of Concern	Migrant, Summer, Winter
western long-eared myotis	<i>Myotis evotis</i>	G5	S3	Type 2	—	—	Year-round
western small-footed myotis	<i>Myotis ciliolabrum</i>	G5	S3	Type 2	C	—	Migratory
white-faced ibis	<i>Plegadis chihi</i>	G5	S2B	—	C	Species of Concern	Migrant, Summer
Yuma myotis	<i>Myotis yumanensis</i>	G5	S3	Type 2	C	—	Year-round

†See NatureServe for a description of rankings (NatureServe 2024)

‡See BLM Manual 6840 – Special Status Species Management for a description of rankings (BLM 2008)

*See IDFG SWAP for a description of rankings (IDFG 2024a)

— = Not applicable



9.2.2 Plants

During the establishment of the INL Site research facilities in the 1950s, the flora and fauna were required to be monitored by the Atomic Energy Commission (Singlevich et al. 1951). Plant specimen collections were made during field surveys and the Plants of the INL herbarium was founded. The herbarium contributes to the knowledge of species historically present across the INL Site. When the ESA was enacted, a list of proposed plant species for conservation protection was developed for the state of Idaho, but botanical professionals indicated there were state-specific data gaps (Henderson et al. 1977). On the INL Site, a concerted effort to survey rare and sensitive plant species was undertaken in the early 1980s, and another similar effort was completed during the early 1990s to fill data gaps and to inform both state and federal assessments (Cholewa and Henderson 1984; Anderson et al. 1996). The INL contractor continues to conduct botanical surveys for special status plant species to support state and federal conservation efforts, to provide information for the NEPA assessment, and to facilitate mission critical activities in a manner that minimizes impacts to sensitive species (Atwood 1969; Cholewa and Henderson 1984; Anderson et al. 1996; Forman 2015).

There are currently 28 special status plant species that have been documented to occur on the INL Site. Many of those species are rare and occur very infrequently within their optimal habitats. Others may have slightly larger population sizes but are restricted by unique habitat requirements. A few special status plants have a widespread distribution across the INL Site.

Federally Listed Plant Species

The state of Idaho is host to five federally listed plant species under the ESA. None of the federally listed species are known to occur on the INL Site. Population occurrences of Ute ladies'-tresses (*Spiranthes diluvialis*) and whitebark pine (*Pinus albicaulis*) have been documented within proximity to the INL Site, but these species require specific habitats, which are negligible or nonexistent within the cold desert steppe site. Although appropriate slickspot peppergrass (*Lepidium papilliferum*) habitat is available on the INL Site, the only known populations do not occur on the INL Site and are located hundreds of miles to the west. There are eight plant species with BLM rankings that are known to occur on the INL Site. Most of these species have very limited distribution and are restricted to areas with unique soils, topography, and associated plant communities.

State Sensitive Plant Species

In addition to those species that receive federal regulatory support, State agencies also maintain a list of sensitive species. The list is a tool for agencies to prioritize conservation efforts and to promote a unified conservation approach statewide, which can be used proactively to avoid potential ESA listings. The Idaho Natural Heritage Program (IDFG 2024b) and the Idaho Native Plant Society established this list of state sensitive species for Idaho in the 1980s at the Idaho Rare Plant Conference (e.g., INPS 2024). Since then, Idaho Rare Plant Working Groups were established, and members currently use the National NatureServe Network framework to assemble species accounts (Faber-Langendoen et al. 2012). The conference provides a collaborative platform for experts from different federal, state, academic, and private organizations to present and evaluate species accounts to determine their conservation status. The state of Idaho manages the associated spatial data within the Idaho Fish and Wildlife Information Systems program and disseminates species' specific information to make species account evaluations available to support special status plant species conservation and assist in assessments of potential environmental impacts for project activities. Additionally, the special status plant list is made publicly available after each list revision by the Idaho Native Plant Society. Species are assigned a global (Global Rank) and subnational ranking (State Rank) to indicate the level of conservation concern. Flora denoted with either a vulnerable rank (G3 or S3), imperiled rank (G2 or S3), or a critically imperiled (G1 or S1) are considered as special status plant species. There have been 28 special status species documented on the INL Site within its diverse composition of sagebrush steppe habitats (see Table 9-2).



Table 9-2. Special status plant taxa documented to occur on the INL Site.

COMMON NAME	SCIENTIFIC NAME	GLOBAL RANK†	STATE RANK†	BLM RANK‡	IDFG RANK*	USESA STATUS	ABUNDANCE
white sand verbena	<i>Abronia mellifera</i>	G4	S1	—	—		Rare
Swallen's mountain-ricegrass	<i>Achnatherum swallenii</i>	G3	S3	—	—	—	Rare
Webber's needlegrass	<i>Achnatherum webberi</i>	G4	S3	—	—	—	Rare
Lemhi milkvetch	<i>Astragalus aquilonius</i>	G3	S3	Type 2	—	—	Rare
painted milkvetch	<i>Astragalus ceramicus</i> var. <i>apus</i>	G4T3	S3	—	—	Resolved	Widespread
plains milkvetch	<i>Astragalus gilviflorus</i>	G5	S2	Type 4	—	—	Rare
wingfruit suncup	<i>Camissonia pterosperma</i>	G4	S2	Type 4	—	—	Localized
hairy suncup	<i>Camissonia pubens</i>	G3	SNR	—	—	—	Rare
Coville's Indian paintbrush	<i>Castilleja covilleana</i>	G3	SNR	—	—	—	Rare
smooth goosefoot	<i>Chenopodium subglabrum</i>	G3	—	—	—	—	Rare
rosy pussypaws	<i>Cistanthe rosea</i>	G5	S2	—	—	—	Rare
desert dodder	<i>Cuscuta denticulata</i>	G4G5	S1	—	—	—	Rare
Hooker's buckwheat	<i>Eriogonum hookeri</i>	G5	S1	Type 2	—	—	Localized
imperfect buckwheat	<i>Eriogonum mancum</i>	G4	S2	—	—	—	Localized
nakedstem gymnosteris	<i>Gymnosteris nudicaulis</i>	G4	S3	—	—	—	Localized
fineleaf hymenopappus	<i>Hymenopappus filifolius</i> var. <i>idahoensis</i>	G5T3	S3	—	—	Resolved	Localized
manybranched ipomopsis	<i>Ipomopsis polycladon</i>	G4	S2	Type 3	—	—	Localized
King bladderpod	<i>Lesquerella kingii</i>	G5	S3	—	—	—	Rare
Middle Butte bladderpod	<i>Lesquerella obdeltata</i>	G2	S2	Type 4	—	—	Rare
sand wildrye	<i>Leymus flavescens</i>	G3	SNR	—	—	—	Localized
Torrey's desert dandelion	<i>Malacothrix torreyi</i>	G4	S2	—	—	—	Rare
shortflower monkeyflower	<i>Mimulus breviflorus</i>	G4	S2	—	—	—	Rare
narrowleaf oxytheca	<i>Oxytheca dendroidea</i>	G4	S3	—	—	—	Rare
mountain ball cactus	<i>Pediocactus simpsonii</i>	G5?	S3	Type 4	—	—	Localized
hoary phacelia	<i>Phacelia incana</i>	G3	SNR	—	—	—	Rare
hidden phacelia	<i>Phacelia inconspicua</i>	G2	S1S2	Type 2	—	Species of Concern	Rare

**Table 9-2. continued.**

COMMON NAME	SCIENTIFIC NAME	GLOBAL RANK†	STATE RANK†	BLM RANK‡	IDFG RANK*	USES STATUS	ABUNDANCE
silver chickensage	<i>Sphaeromeria argentea</i>	G3	SNR	—	—	—	Localized
green princesplume	<i>Stanleya viridiflora</i>	G4	S3	—	—	—	Widespread

†See NatureServe for a description of rankings (NatureServe 2024)

‡See BLM Manual 6840 – Special Status Species Management for a description of rankings (BLM 2008)

*See IDFG SWAP for a description of rankings (IDFG 2024a)

— = Not applicable



9.3 Natural Resource Monitoring and Research

9.3.1 Breeding Bird Surveys

The North American Breeding Bird Survey (BBS) was developed by the USFWS and the Canadian Wildlife Service to document trends in bird populations. Pilot surveys began in 1965 and immediately expanded to cover the United States east of the Mississippi and Canada, and by 1968 included all of North America (Sauer and Link 2011). The BBS program in North America is managed by the USGS and currently consists of over 5,100 routes, with approximately 2,500 of these being sampled each year (Sauer and Link 2011).

BBS data provide long-term species abundance and distribution trends for more than 420 species of birds across a broad geographic extent. These data have been used to estimate population changes for hundreds of bird species, and they are the primary source for regional conservation programs and modeling efforts for birds. The BBS provides a wealth of information about population trends of birds in North America and is the foundation for broad conservation assessments extending beyond local jurisdictional boundaries (Sauer and Link 2011).

Five official USGS BBS routes (i.e., remote routes) are on the INL Site and have been surveyed nearly each year since 1985 (except 1992 and 1993). In 1985, DOE-ID also established eight additional routes around INL Site facilities to monitor birds near human activity centers (i.e., facility routes; see Figure 9-2). These routes are also surveyed annually using the same techniques and methods as those indicated by USGS. Surveys are conducted from late May until early July and are scheduled to be conducted as close to the same day each year. All birds seen and heard during the survey are recorded regardless of breeding status (e.g., flyovers). BBS data can directly benefit INL Site managers by providing information on local breeding bird populations, which may be useful as they consider new activities and comply with the NEPA assessment process.

A total of 5,269 birds and 66 species were documented during the 2023 surveys. Total observations were 14.1% higher than the 37-year mean of 4,617 birds (1985–1991 and 1994–2023). The total number of species recorded was also higher than the 37-year mean of 56 species.

Nine species observed during the 2023 BBS are considered by the IDFG as SGCN, which includes the sage thrasher ($n=341$), Franklin's gull (*Leucophaeus pipixcan*, $n=138$), sagebrush sparrow (*Artemisiospiza nevadensis*, $n=136$), common nighthawk (*Chordeiles minor*, $n=89$), ferruginous hawk ($n=45$), grasshopper sparrow (*Ammodramus savannarum*, $n=22$), short-eared owl (*Asio flammeus*, $n=11$), long-billed curlew (*Numerius americanus*, $n=7$), and burrowing owl ($n=4$). When Franklin's gulls are observed, they are often in large flocks foraging on the INL Site, and it is unlikely they are nesting.

The five most abundant birds across all routes were horned lark (*Eremophila alpestris*, $n=2,320$), western meadowlark (*Sturnella neglecta*, $n=680$), Brewer's sparrow (*Spizella breweri*, $n=356$), sage thrasher ($n=341$), and the common raven (*Corvus corax*, $n=270$). These five species were observed on every route (INL 2024b).

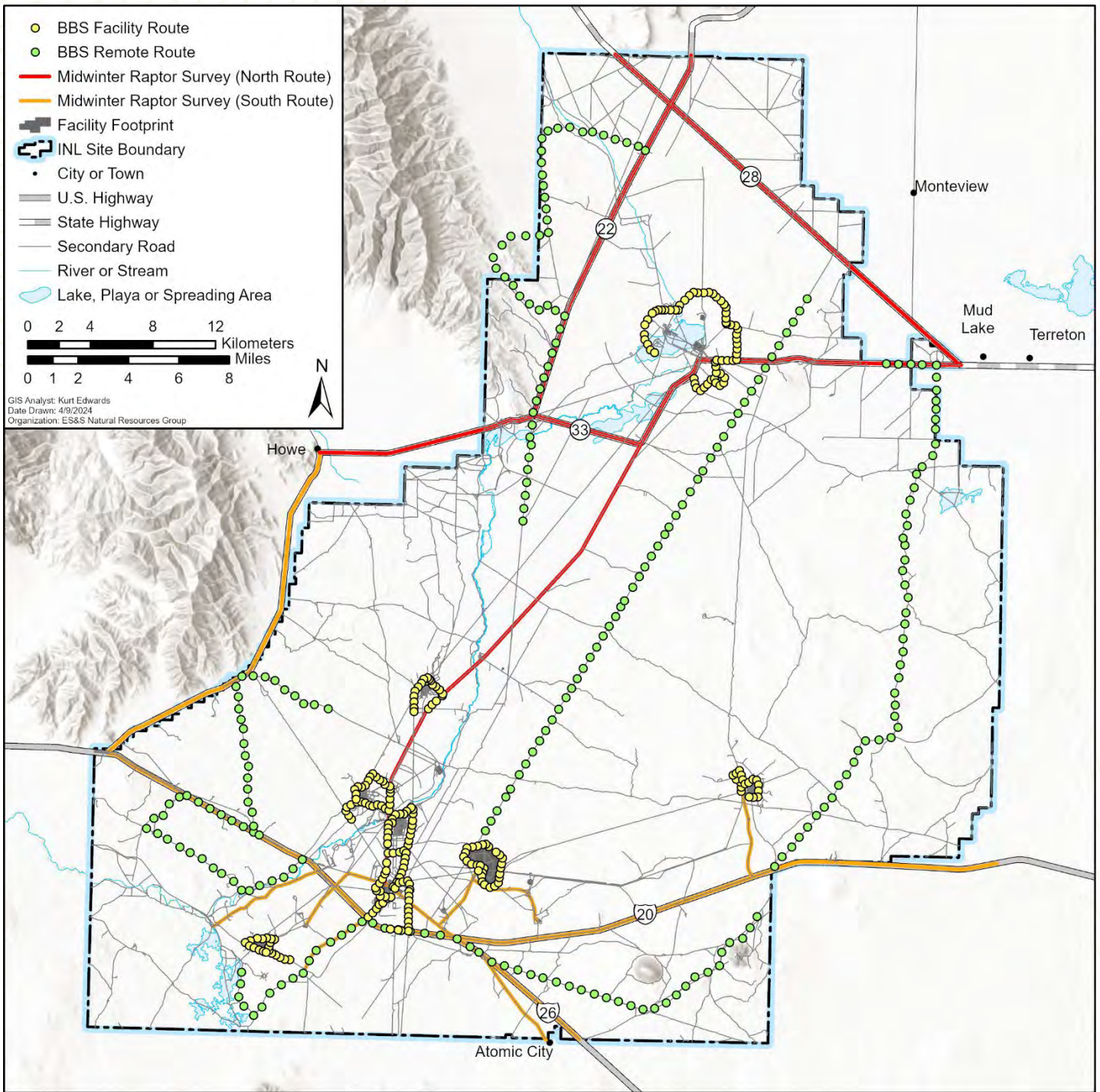


Figure 9-2. Remote and facility BBS routes and north and south midwinter raptor survey routes on the INL Site.

9.3.2 Midwinter Raptor Survey

Midwinter eagle surveys were initiated during 1979 by the USGS to develop a population index of wintering bald eagles in the lower 48 states, determine bald eagle distribution, and identify previously unrecognized areas of important wintering habitat. In 1983, two midwinter eagle survey routes were established on the INL Site, one that encompasses the northern portion of the INL Site and one that encompasses the southern portion (see Figure 9-2). Initially, the counts



focused on eagle populations; however, biologists recognized the importance of collecting data on raptor abundance during this survey and started recording all raptors, including owls, hawks, and falcons in 1985. In 1992, the list of recorded species expanded to include corvids and shrikes.

In early January of each year, biologists survey the two established routes to detect any target species perched, hovering, or soaring. The number of individuals per species is counted for each of the target species detected. A total of 284 birds representing seven species were observed during the 2023 midwinter raptor surveys. One hawk that was not positively identified during the survey was omitted from the final count. Common ravens and rough-legged hawks are typically the most observed species during this survey and made up 68% and 21% of the observations in 2023, respectively. Two roads on the south route were inaccessible and not surveyed.

9.3.3 Long-term Vegetation Transects

The long-term vegetation (LTV) transects and associated permanent plots were established on what is now the INL Site in 1950 for the purposes of assessing impacts of nuclear energy research and production on the surrounding ecosystems (Singlevich et al. 1951). Initial sampling efforts focused on potential fallout from nuclear reactors and the effects of radionuclides on the flora and fauna of the Upper Snake River Plain. After several years of sampling, however, the concentrations and any related effects of radionuclides on the sagebrush steppe ecosystem of the INL Site were determined to be negligible (Harniss 1968). Because the LTV plots were widely distributed across two transects that bisect the INL Site, as shown in Figure 9-3, and vegetation abundance data had been collected periodically since their establishment, the LTV plots' utility as a basis for monitoring vegetation trends in terms of species composition, abundance, and distribution was eventually recognized. Regular vegetation data collection has continued on the LTV plots—occurring about once every five years. Eighty-nine LTV plots are still accessible, and most have been sampled consistently between 1950–2022, making the resulting dataset one of the oldest, largest, and most comprehensive for sagebrush steppe ecosystems in North America.

As the mission of the INL Site has grown and changed over the past 70 years, so too has the purpose and utility of the LTV project. Although the LTV project was initiated to address energy development at the INL Site, it is unique in its capacity to allow investigators to observe long-term vegetation change and the potential impacts of that change at the INL Site and across the region. Abiotic and biotic conditions (e.g., conditions created by the physical environment and by other living organisms) have been characterized by rapid change over the past few decades. These changes include shifts in land cover, land use, and weather patterns. Several wildland fires have removed sagebrush from a large portion of the Upper Snake River Plain over the past few decades; approximately 99,000 ha (250,000 ac) have burned on the INL Site since 1994. Soil disturbance associated with fighting wildland fires and disturbance associated with general increases in the use of remote backcountry areas are notable at INL and throughout the Intermountain West. Concurrently, many of the hottest and driest years during the 70-year INL Site weather record occurred during the past decade. All these factors contribute to increasing stress on native plant communities and potentially set the stage for a period of dramatic change in vegetation across the region. The LTV project is documenting this change and may provide some context for understanding resistance and resilience in the local sagebrush steppe.

Data were collected across the 89 active LTV plots for the fourteenth time between June and August of 2022. Plots were sampled for cover and density by species according to methodologies developed in 1950, with supplemental sampling protocols added in 1985 (see Forman and Hafila [2018] for details of the project sample design). The 2022 data will be integrated into the larger LTV dataset, and summary results will be presented in a technical report scheduled to be released in 2024. Notable changes between the 2011 and 2016 sample periods (the most recent sample periods for which data have been published) include decreases in shrub cover and particularly big sagebrush, increases in native grass cover, and declines in the densities of introduced annual grasses and forbs. In terms of long-term trends, big sagebrush cover was at its lowest point in the 66-year history of the dataset, and native, perennial grasses were near the upper end of their historical range of variability. Introduced annuals, primarily cheatgrass (*Bromus tectorum*), exhibited fluctuations with greater magnitudes of change from one sample period to the next over the past two decades when compared with earlier sample periods.

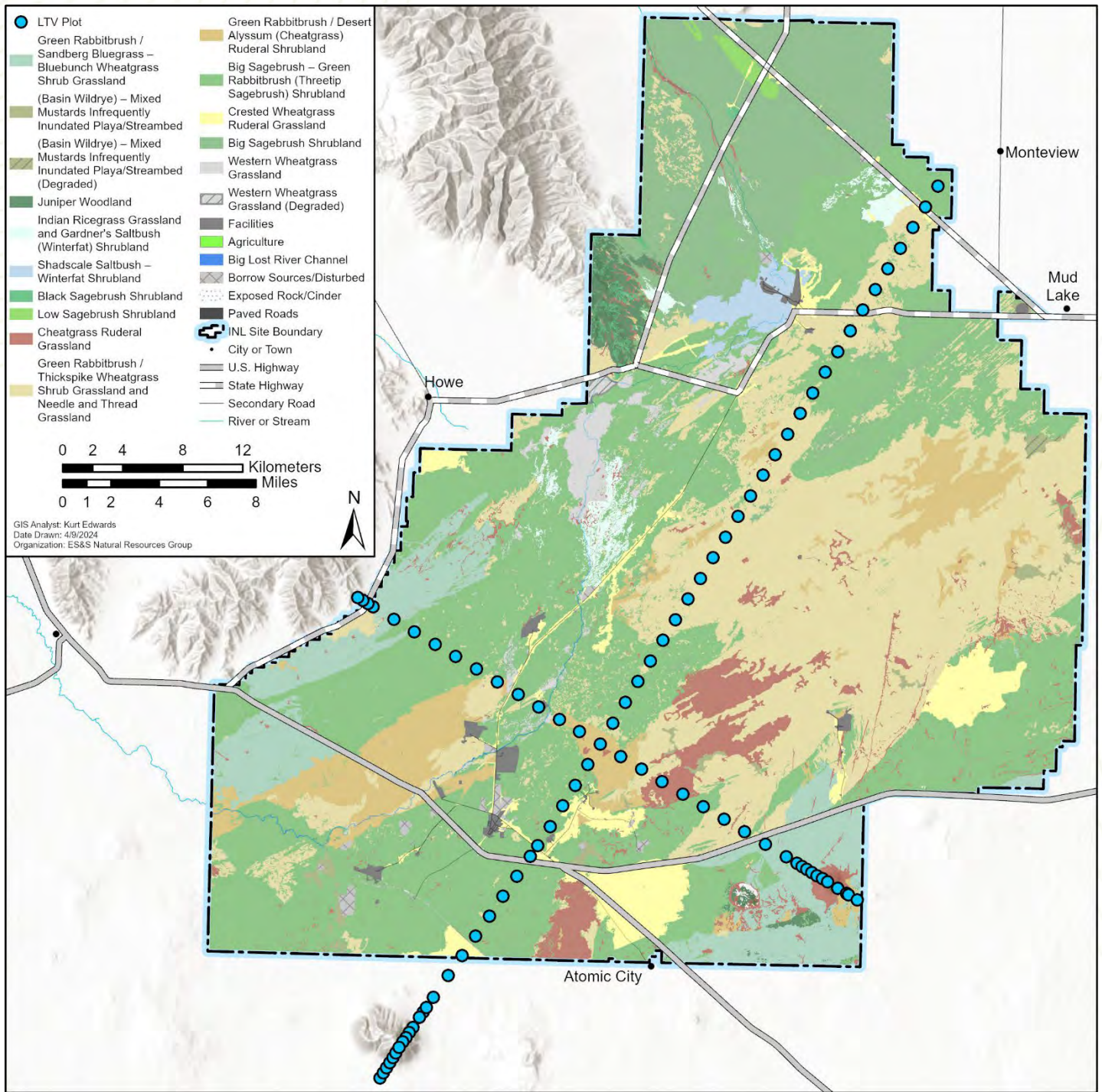


Figure 9-3. Locations for the LTV plots established on the INL Site in 1950 and sampled regularly over the past 70 years shown with the INL Site vegetation community classification map published in 2019.

9.3.4 Vegetation Map

A comprehensive update to the 2011 vegetation map (Shive et al. 2011) was initiated in 2017 and involved three steps: (1) a plant community classification to define vegetation classes, (2) manual map delineations of those classes, and (3) an accuracy assessment of the completed map. A total of 16 unique vegetation classes resulted from the plant



community classification, in which 12 represented natural vegetation classes and four were ruderal classes (e.g., classes dominated by non-native species; Shive et al. 2019). Within the native classes, there was one woodland class, six shrubland classes, two shrub grasslands, and three grasslands. Within the ruderal classes, there was one shrubland, two grasslands, and a class characterized by mixed weedy forbs that tend to dominate areas with a specific hydrologic regime, namely playas.

Some plant community classes were combined prior to the map accuracy assessment because those classes were known to be difficult to map with imagery. This resulted in 13 map classes that were evaluated through an independent map accuracy assessment. Overall map accuracy across all classes was 77.3% with a Kappa value of 0.75. These results indicate the new vegetation map is not only the highest spatial resolution (i.e., 1:6,000), but also the most accurate map ever produced for the INL Site (see Figure 9-3). The vegetation map continues to be an integral dataset to support a variety of natural resources work on the INL Site. For more information about vegetation classification and mapping results see Shive et al. 2019.

After the new vegetation map was published in 2019, the Sheep Fire burned 40,403 ha (99,839 ac) across the interior region of the INL Site later that year. Four more fires burned in 2020 that met the criteria for post-fire ecological recovery planning and affected 1,561 ha (8,494 ac). The fires in 2019–2020 burned about 18% of the Site, and those regions of the map are now outdated and no longer representative of current ground conditions. Rather than conducting new statistical classifications and delineating new class boundaries across the entire Site, the defined vegetation classes will remain the same and only new map class boundaries will be updated within the 2019–2020 burned areas.

The new map class boundaries will be manually delineated in a GIS using National Agricultural Imagery Program (NAIP) high-resolution multispectral imagery as the basemap data source. NAIP imagery was scheduled for acquisition in Idaho during the summer of 2023 and will be used to delineate new map class boundaries. The 2023 Idaho NAIP imagery will not be disseminated to the public until 2024 and mapping will commence when the imagery is available. Once new boundaries are mapped, those areas will need to be validated for accuracy so the map user can consider any limitations and determine whether the data are appropriate for an anticipated use. The imagery is representative of ground conditions during the summer of 2023, which corresponds to when ground validation data were collected allowing for a direct comparison of mapping results to field data.

The total number of ground validation plots collected to quantify the original 2019 vegetation map was 453. Considering the need to update 18% of the map due to wildland fire, that percentage was used to calculate the number of ground validation plots to be sampled. This resulted in 81.5 plots and was rounded up to 85 total plots. A couple iterations were run to select random points across the sampling area. The three smallest fires (e.g., Telegraph, Howe Peak, Lost River Fires) had one or no points selected within their footprint using the first random selection process, and the remainder of points all fell within the much larger Sheep Fire footprint. Plot locations needed to be representative across all fires, so an additional five plot locations were assigned to each smaller fire using the same random selection process. These 15 plots combined with the 85 plots resulted in a total of 100 plots selected for sampling in summer 2023.

Plot size was kept consistent with the data collected to conduct the original accuracy assessment of the 2019 vegetation map. Validation plots were circular with a 28 m (91.9 ft) radius encompassing 0.25 ha (0.62 ac). At each validation plot, the location coordinates were collected, the vegetation class present was recorded using a dichotomous key developed for the 2019 vegetation map validation (Shive et al. 2019), indication of whether the dichotomous key worked well characterizing the vegetation class present at the plot was noted, and a second vegetation class call was entered if the key did not characterize the plot well. Four representative landscape photos were also taken in the cardinal directions from each plot center point.

Ground validation plot data collection began on July 10 and concluded on July 31, 2023. All 100 plots were visited and sampled across the burned areas from 2019–2020. The field data were internally reviewed for accuracy and any plot that keyed to a class that seemed questionable was investigated further to determine whether the class designation was correct. Once the 2023 Idaho NAIP imagery becomes available, it will be imported to a GIS where manual delineations will be digitized to spatially define the vegetation class boundaries. The ground validation plot data from 2023 will be used to conduct a formal accuracy assessment of the newly mapped areas, and the corresponding accuracy assessment results and project report will be presented in 2024.



9.3.5 National Environmental Research Park

The INL Site was designated as a NERP in 1975 through a NERP Charter, the Energy Reorganization Act, and the Non-nuclear Energy Research and Development Act. The Idaho NERP and NERPs at other DOE sites are outdoor laboratories that provide opportunities for environmental studies on protected lands that act as buffers around DOE facilities. The objective of the NERP system is to facilitate research and education, particularly to demonstrate the compatibility of energy technology development and a quality environment. INL's NERP designation has allowed the INL Site to host environmental scientists to study Idaho's native plants and wildlife in an intact and relatively undisturbed ecosystem (see Figure 9-4). The Idaho NERP provides exceptional opportunities for research because of its established facilities, a security buffer that protects research areas, extensive historical data, and partnerships with universities. In 2023, the INL contractor facilitated university-led research on four ecological research projects through the NERP: (1) addressing ecohydrology in sagebrush steppe, (2) evaluating beta diversity within the context of fire severity, (3) identifying high-quality foodscapes critical to greater sage-grouse, and (4) validating pygmy rabbit habitat distribution models.



Figure 9-4. A diverse plant community recovering from wildfire, an adult pygmy rabbit, a NERP research partner sampling sagebrush to understand local habitat nutritional characteristics.

The INL Site and other landscapes with sagebrush steppe vegetation are experiencing a simultaneous change in climate and plant community composition that is impacting habitat for wildlife, wildfire risks, and ecosystem services such as forage. Determining the separate and combined/interactive effects of climate and vegetation change is important for assessing future changes on the landscape and for hydrologic processes. Since the early 2000s, investigators have used an existing INL ecohydrology research facility, the former Protective Cap/Biobarrier Experiment, to study vegetation change with respect to precipitation regime, vegetation type, and soil depth. The focus of the current research is to compare the impacts of grass invasion and shifts in timing of precipitation to the function of the whole ecosystem, including biogeochemistry, carbon storage, and other attributes that relate to resistance and resilience in a changing environment. The experiment site was burned in its entirety by the 2019 Sheep Fire, which created an exceptional opportunity to test the underlying basis for the theory on resistance to exotic annual-grass invasion (cheatgrass) and resilience of sagebrush steppe. The long-term treatments conveniently create a gradient of pre-fire climate differences, and the cessation of treatment application has induced large differences in simulated drought conditions on the experiment. Researchers continue to sample the differences in cheatgrass among the treatments along with the



corresponding soil nutrients and water. The research team includes Dr. Matthew Germino from the USGS Forest and Rangeland Ecosystem Science Center and Dr. Toby Maxwell and Dr. Marie-Anne DeGraff from Boise State University; their research continues to use a facility that has been in operation since 1994. They will continue to collect data for at least the next few years.

In 2017, vegetation abundance data were collected from over three hundred plots across the INL Site to support an update to the INL Site vegetation map. These plots were used to classify plant communities into mappable units and were therefore distributed across a range of representative vegetation types. The plant communities sampled during this survey effort included intact sagebrush steppe and recovering post-fire assemblages from areas that burned at various times and intensities prior to data collection. In 2022, an effort to revisit these data and summarize them for publication in the peer-reviewed literature was initiated. The purpose is two-fold. The first objective of this research effort is to document and describe the methodologies used to develop the INL Site plant community classification. The second objective is to evaluate changes to beta diversity in the context of fire severity across the INL Site. The principal investigator for this project is Dr. Ken Aho from Idaho State University, and his work to complete analyses and develop manuscripts related to this study is ongoing.

The Idaho NERP is collaborating in a multiagency research project focused on identifying high-quality foodscapes critical to sage-grouse habitat conservation across the sagebrush steppe ecosystem. The project has been conducted for several years and spans across multiple western states. The research team aims to identify the chemical phenotype (or chemotype) of sagebrush species linked with high-sage-grouse forage fidelity to identify which habitats are crucial dietary hotspots for sage-grouse that should be prioritized for conservation and where seed collection should occur for local restoration of plants that are palatable to local sage-grouse populations. Field research is conducted during the winter and spring months to identify the seasonal changes in chemotypes of sagebrush consumed by sage-grouse. Browsed vegetation and excreta of sage-grouse are collected and used to determine diet quality using Near-Infrared Spectroscopy and analytical chemistry of plants, diet composition using DNA barcoding of feces, digestibility of food using a particle size analysis of feces, and detoxification capacity by analyzing renal metabolites in uric acid. Overall, the project is focused on supporting preventative management actions, protecting functional biodiversity and palatable sagebrush, and improving the availability of locally adapted seed sources most appropriate in habitat restoration projects that aim to promote health populations of sage-grouse. The principal investigator is Boise State University researcher, Dr. Jennifer Forbey, and her work is anticipated to continue at the INL Site.

Pygmy rabbits are a sagebrush specialist, endemic to the western United States, and are considered threatened by habitat alteration, habitat loss, climate change, and disease (Rachlow et al. 2021; Crowell et al. 2023). Formalized pygmy rabbit surveys were last conducted on the INL Site in 2009; however, the current distribution and habitat usage of the pygmy rabbit on the INL Site is relatively unknown. With the proposed listing of the species under the ESA in 2023, current data regarding pygmy rabbit occurrence on the INL Site is invaluable. University of Idaho researchers have developed statewide pygmy rabbit habitat distribution models and validating those models in the field provides an opportunity to collect some INL Site-specific occurrence data and to understand the utility of occupancy models locally. Over two winter seasons (2023–2024 and 2024–2025), the University of Idaho is conducting pygmy rabbit surveys at approximately 800 sites statewide and the INL contractor is supporting a subset of those surveys on the INL Site. Pygmy rabbit occupancy rates and dynamics will be estimated using detection/non-detection surveys based on burrow and fecal pellet observations and the subsequent DNA confirmation of species presence. By refining existing pygmy rabbit habitat modeling methodologies, this study will allow for the estimation of potential pygmy rabbit habitat in Idaho that is currently occupied, the ability to model trends in occupancy over the last 20 years (i.e., extinction/colonization rates), and assess if fine-scale climate and weather variables predict occupancy, extinction, or colonization rates. These data on species occupancy and trends can inform land management plans and conservation actions for pygmy rabbits both on and off the INL Site. The research team for this project includes Dr. Janet Rachlow, professor in the Department of Fish and Wildlife Sciences at University of Idaho; Dr. Leona Svancara, researcher at USGS and University of Idaho; and Fiona McKibben, doctoral student at University of Idaho.



9.4 Land Stewardship

9.4.1 Wildland Fire Protection Planning, Management, and Recovery

The INL Fire Department provides wildland fire suppression services on the rangeland within the INL Site boundary, as well as a five-mile buffer outside of the INL Site boundary. The INL Fire Department employs pre-incident strategies, such as the identification of special hazards, mitigation procedures, and mapping necessary to facilitate response to fires. DOE-ID maintains mutual aid agreements with regional agencies, including the BLM, to assist in response to high-challenge wildland fires. Additionally, the INL contractor implements PLN-14401 (INL 2015), “Idaho National Laboratory Wildland Fire Management Plan,” which incorporates essential elements of various federal and state fire management standards, policies, and agreements. A balanced fire management approach has been adopted to ensure the protection of improved laboratory assets in a manner that minimizes effects on natural, cultural, and biological resources. The INL contractor has established a Wildland Fire Management Committee (WFMC) to review seasonal fuel management activities and the potential impact of all fires greater than 40.5 ha (100 ac).

A primary responsibility of the WFMC is to determine whether a post-fire recovery plan is warranted for a given fire. Once an ecological resources post-fire recovery plan is requested, the INL NRG completes an ecological resource assessment to evaluate the resources potentially impacted by a wildland fire and drafts a recovery plan for treatment prioritization and implementation by the WFMC. After the 2019 Sheep Fire, WFMC members expressed an interest in a recovery plan where implementation is phased over five years and is flexible, in that actions can be implemented individually depending on specific resource concerns and funding availability. The resulting plan was organized into four natural resource recovery objectives: (1) soil stabilization for erosion, (2) cheatgrass and noxious weed control, (3) native herbaceous recovery, and (4) sagebrush habitat restoration. Multiple treatment options were provided in the plan for improving post-fire recovery. Because the structure and organization of the plan, as well as the options of prioritizing treatment actions, were useful to the WFMC, subsequent post-fire ecological recovery plans continue to use this framework. There is one active post-fire recovery plan for four wildfires that burned in 2020, and one fire recovery plan for the 2019 Sheep Fire that recently sunset.

In 2020, the WFMC requested an ecological assessment and fire recovery plan for four fires ranging in size from 11 ha (27 ac) to 678 ha (1,675 ac): the Howe Peak Fire, the Telegraph Fire, the Cinder Butte Fire, and the Lost River Fire. Under approved emergency stabilization actions listed in the existing Wildland Fire EA (DOE 2003), the INL contractor completed several activities during the fall of 2020, including recontouring containment lines on the fires where they were used, reseeding containment lines with native grass seed, and spraying noxious weeds, especially in disturbed soils on and around containment lines. Upon completion and review of the ecological resource recovery plan (Forman et al. 2021), additional recovery actions were prioritized by INL’s WFMC, including: (1) monitoring temporary fire suppression access roads for natural recovery, (2) installing signs, (3) replanting those access roads, if necessary, and (4) ongoing noxious weed inventory and treatment across all four fires. Additionally, sagebrush restoration was recommended on the Telegraph Fire because it would improve habitat value in proximity to an active sage-grouse lek, and it would improve habitat connectivity across the burned area. A total of 41,300 sagebrush seedlings were planted in the Telegraph Fire footprint in October 2022.

The Sheep Fire burned more than 40,000 ha (98,842 ac) of land on the INL Site in July 2019. Under the direction of the WFMC, several restoration efforts outlined in the Sheep Fire Ecological Resources Post-Fire Recovery Plan (Forman et al. 2020) were completed. Soil stabilization efforts were finished on the Sheep Fire containment lines in 2020, and the WFMC prioritized additional restoration/treatment actions within two post-fire recovery objectives: noxious weed/cheatgrass control and big sagebrush habitat restoration. Noxious weed treatment continued opportunistically throughout the Sheep Fire footprint in 2023. Cheatgrass treatments were completed adjacent to approximately 13.7 km (8.5 mi) of a two-track road in 2021 and was revisited to assess treatment efficacy in 2022. DOE-ID and agency stakeholders collaborated to seed sagebrush on portions of the Sheep Fire during the winter of 2019/2020. The seeding was completed across a target area of approximately 10,100 ha (25,000 ac) in and adjacent to the SGCA. Because of poor initial germination and establishment from the aerial seeding, a total of 45,000 seedlings were planted in the Sheep Fire in October 2021, and an additional 45,000 seedlings were planted in October 2022. Although cheatgrass control treatments had not been implemented in their entirety prior to the end of the five-year timeframe implementation



associated with the Sheep Fire recovery plan, DOE-ID, the INL contractor, and agency partners continue to pursue treatment options through BIL funding initiatives.

Emergency wildland fire response and associated soil stabilization actions are addressed in the INL Wildland Fire EA (DOE 2003). Because there have been changes in vegetation condition and land cover over the past twenty years, updates to the wildland fire management and recovery plans are necessary. The INL contractor is currently in the process of updating wildland fire management plans and developing a scientifically based framework for post-fire ecological resource assessment and treatments to be considered for use in post-fire recovery plans. These updates are based on the recommendations by the WFMC after the Sheep Fire and the 2020 fires. DOE will perform the necessary NEPA analysis to assess any potential impacts attributed to the implementation of updated plans. Updated plans and additional NEPA analysis will facilitate a more comprehensive and effective response to wildland fire management and post-fire restoration in the future.

9.4.2 Restoration and Revegetation

Revegetation for Soil Stabilization

Revegetation with native species is required on the INL Site for activities that disturb or remove soil and vegetation where the area will not be physically stabilized and maintained as sterile. These areas are left exposed and vulnerable to erosion and to infestations of invasive or noxious weeds. Areas requiring revegetation are evaluated for appropriate revegetation methods based on site condition and disturbance size. The baseline condition of areas that may be disturbed are characterized prior to disturbance, partly to assess the native species present. The native species observed inform an appropriate seed mix that is to be used during revegetation efforts following the disturbance. Revegetation strategies on the INL Site include, but are not limited to, hand-broadcasting seed, seedbed preparation, soil augmentation, drill seeding, and planting nursery stock.

In 2023, one revegetation project was initiated by INL's Facility and Site Services (F&SS), NRG, and CRMO on approximately 0.20 ha (0.5 ac) to address soil stabilization. The project occurred in a culturally sensitive area impacted by livestock and contained little to no vegetation along the historic Birch Creek channel. Because of the cultural resource sensitivities, F&SS and NRG staff coordinated closely with the CRMO to minimize impacts to the soil surface throughout the project footprint. Restoration treatments were implemented as described in Section 9.1.1 and initial treatment results will be assessed in 2024.

Revegetation projects on the INL Site are revisited at least one growing season after the initial revegetation effort, and revegetation assessments are used to determine whether further actions need to be taken. The initial assessment includes collecting qualitative data to provide a rapid characterization of the area. This initial assessment is used to determine whether a more rigorous quantitative assessment is warranted or if the initial revegetation actions were unsuccessful and further revegetation actions are needed. When the initial results indicate substantial progress towards successful stabilization, a quantitative assessment is completed to provide data for a detailed estimate of ground cover by species of the revegetated area for comparison to the background vegetative cover of the surrounding plant community. Revegetation is considered successful if the vegetative cover of desirable species is within an acceptable threshold of background values.

There were two revegetation projects evaluated in 2023 with an initial qualitative assessment. The first revegetation project evaluated was for two areas totaling approximately 0.4 ha (4.75 ac) to address soil stabilization following the placement of excess soil removed during the construction of a new parking lot at Materials and Fuels Complex (MFC). The initial assessment of this area indicated that vegetative cover was relatively high across the revegetation areas; however, undesirable introduced annual species such as saltlover (*Halogeton glomeratus*) and kochia (*Bassia scoparia*) were the most abundant species. Because the most abundant plant species across the revegetation area were non-desirable introduced species, and native species were only sparsely distributed across the area, an additional revegetation plan was recommended to be developed and implemented for this area. The second project that was evaluated was for revegetation of areas impacted by the construction of a new power line totaling about 0.13 ha (0.33 ac). The initial assessment of these areas indicated that vegetative cover ranged from relatively high to very sparse across the areas, and the most abundant plant species were undesirable, introduced species. In the limited areas where



they did occur, native species abundance was ranked low, but their presence was encouraging. Native species cover is typically low during the first few years post-planting, and cover from native species would be expected to increase in response to favorable conditions. These areas were recommended to be reevaluated using semi-quantitative methods again in fiscal year (FY) 2025 and additional revegetation actions should be taken where necessary.

Sagebrush Habitat Restoration

Sagebrush habitat restoration on the INL Site is conducted in response to DOE-ID's goal of no net loss of sagebrush habitat. The potential to lose sagebrush habitat on the INL Site occurs primarily from two mechanisms. The first is due to wildland fire, as discussed in Section 9.4.1, which has the potential to remove large tracts of sagebrush habitat and can take more than 100 years to recover naturally (Blew and Forman 2010). The second instance where sagebrush habitat is lost is due to infrastructure expansion and mission critical project activities. The INL contractor implements multiple BMPs to minimize sagebrush habitat loss, such as co-locating infrastructure, but in some cases, removal of sagebrush habitat is necessary to support the INL mission. The INL contractor carries out a compensatory sagebrush mitigation strategy for projects that must remove sagebrush habitat. This strategy outlines an approach for projects to provide funds for sagebrush to be restored in designated priority areas where they can provide the greatest habitat benefit.

Sagebrush habitat restoration has been conducted using containerized sagebrush seedlings (see Figure 9-5) and aerially applying sagebrush seed. Due to the semiarid nature of the local ecosystem, the INL contractor has found that planting sagebrush seedlings results in higher survivorship than trying to establish sagebrush from seed. Therefore, current efforts focus on containerized planting, but DOE-ID and the INL contractor continue to partner with agencies to test and develop additional planting methods.



Figure 9-5. Planters using hoedads to install big sagebrush seedlings on the INL Site.

In 2023, a total of 74,875 sagebrush seedlings were planted. The seedlings were planted across four adjacent strips within a general area totaling 170.6 ha (421.7 ac). Seedlings were funded and acquired in anticipation of the need for compensatory mitigation in response to future INL projects that will remove sagebrush habitat. The 2023 planting was located within portions of the 2010 Middle Butte Fire and the 2007 Twin Buttes Fire. To inform and improve future plantings, different treatments were tested in each strip of the area planted. These treatments include the standard soil medium used over the past several years (control), the addition of vermiculite in the soil medium, the addition of a hydrogel in the soil medium, the addition of a more locally appropriate mycorrhizal inoculant in the soil medium, and the installation of protective cages around a subset of the control group seedlings. As a result of sagebrush habitat restoration on the INL Site since 2015, 330,625 sagebrush seedlings have been planted across 1,159.3 ha (2,864.7 ac).



Seedlings planted on the INL Site are monitored one year and five years after planting to assess survivorship, and planting strategies are adjusted according to past survivorship data.

In addition to planting sagebrush seedlings, INL continued to pursue sagebrush habitat restoration in the Tractor Flats area of the INL Site and adjacent BLM land. In 2023, DOE-ID, INL, USFWS, and BLM received BIL funding to use a commercial seed collection vendor to collect sagebrush seed within the unburned areas of the southern and eastern portion of the INL Site and on adjacent BLM land. In total, 4,467 kg (9,850 lb.) of bulk cleaned seed was collected with 2,608 kg (5,750 lb.) being collected on the INL Site. The seed was cleaned and stored in a BLM seed warehouse and will be used for mechanical planting of approximately 810 ha (2,000 ac) on the INL Site in 2024, as well as a slightly larger area on adjacent BLM land. Seed collection will occur again in 2024, and both agencies will plant again in 2025.

9.4.3 Weed Management

The INL contractor maintains and funds a noxious and invasive weed management program to address the requirements of federal agencies described in EO 13112, “Invasive Species,” as amended by EO 13751, “Safeguarding the Nation from the Impacts of Invasive Species.” The Noxious and Invasive Weed Species Management program on the INL Site fulfills these requirements by first ensuring that prevention of the introduction, establishment, and spread of invasive species is prioritized during all activities. The risks from noxious weeds and invasive species are also minimized by discouraging unnecessary actions that can create spreading vectors or new introductions. Another strategy the INL contractor uses to prevent the introduction of noxious weeds to unaffected areas is focusing treatment efforts along potential vectors, such as perimeter roads, along highways, interior two-track roads, and within facility footprints.

Trained INL Applicators can detect, identify, mark, and in most cases, treat invasive weed species quickly in cooperation with the NRG. Each time noxious and invasive weeds are encountered, INL Applicators use integrated pest management principles that determine whether treatment actions are required and what type of treatment is needed (i.e., biological, cultural, physical, mechanical, or chemical). Noxious weed species and invasive species are typically treated differently from one another on the INL Site. INL Applicators generally treat noxious weeds with pesticide application when the pesticide label allows but, in some cases, certain species are treated using manual or mechanical treatments. Most treatments targeting invasive species that are not designated noxious take place in the form of mechanical removal, such as mowing or trimming. These treatments are often conducted for defensible space around infrastructure. In some cases, following the removal of large infestations of noxious weeds, the INL contractor will revegetate the area with appropriate native species to prevent invasive weeds from returning and promote soil stabilization.

INL Applicators monitor known noxious weed and invasive species locations along with the results of any treatments that have been conducted. This capability allows INL Applicators to understand where, how, and which noxious weeds are spreading on the INL Site so they can more effectively allocate time and resources. This information can be used to determine whether additional treatments are necessary and identify which treatment methods can be applied to achieve greater control and to ensure they are the most effective, cost-efficient, and present little to no risk to people or the environment.

Along with directly targeting and treating weeds, INL has implemented programmatic strategies to reduce the potential introduction and spread of weeds. These include both employee education and work controls. Every year, employees are provided briefings and training material about how to identify, report, and minimize the spread of weeds. Work controls to limit risks of weed introduction and spread during work activities are implemented through the Biological Resource Review (BRR) process. During the BRR process, a natural resource scientist reviews and identifies projects with the potential to create weed vectors or that may require monitoring for noxious weeds and invasive species and provides strategies for addressing those concerns.

All pesticide applications on the INL Site are conducted according to specific pesticide label instructions in compliance with the Federal Insecticide, Fungicide, and Rodenticide Act (1996). All records associated with pesticide applications on the INL Site are kept for a minimum of three years in accordance with Idaho Administrative Procedures Act, “Rules Governing Pesticide and Chemigation Use and Application” (IDAPA 02.03.03). In 2023, 120 new noxious weed observations were made, and 79 pesticide applications were conducted. Additionally, weeds were controlled via shoveling and hand-pulling when appropriate. Noxious weed species targeted and controlled in 2023 were rush skeletonweed (*Chondrilla juncea*), scotch thistle (*Onopordum acanthium*), musk thistle (*Carduus nutans*), Russian



knapweed (*Acroptilon repens*), spotted knapweed (*Centaurea stoebe*), leafy spurge (*Euphorbia esula*), plumeless thistle (*Carduus acanthoides*), whitetop (*Lepidium draba*), and Canada thistle (*Cirsium arvense*).

9.4.4 Ecological Support for National Environmental Policy Act

Individual actions performed under Categorical Exclusions at the INL Site are addressed in Environmental Compliance Permits (ECPs). There were 168 new ECPs initiated in 2023. Ecological support for ECPs is carried out predominantly through Technical Point of Contact review and the BRR process for activities outside of facility footprints with the potential to disturb wildlife, vegetation, or soils. There were 16 BRRs initiated in support of ECPs in 2023. The BRR is intended to assess the biological impacts and fulfill any regulatory compliance requirements associated with the project. The first part of the BRR process is collecting a baseline condition of the project site prior to conducting activities. The second part is conducting a follow-up survey of project activities to assess project impacts. The BRR also acts as a tracking mechanism for multiple monitoring requirements that must be reported at the end of the year. Some monitoring requirements that are documented in the BRR include identifying noxious weed locations, evaluating areas requiring soil stabilization, quantifying areas where compensatory sagebrush mitigation may be required, completing nesting bird surveys for compliance with the Migratory Bird Treaty Act, and identifying native plant species that should be used for revegetation.

9.5 INL Site Cultural Resource Management

The INL CRMO resides within the INL Management and Operating contractor, Battelle Energy Alliance, LLC (BEA). Cultural resource professionals within the INL CRMO coordinate cultural resource-related activities at the INL Site and implement the INL Cultural Resource Management Plan (DOE-ID 2016) with oversight by DOE-ID's Cultural Resource Coordinator. Provisions to protect the unique cultural resources of the land and facilities at the INL Site are included in environmental policies issued by BEA and other INL Site contractors and in company procedures that guide work completion. Cultural resource identification and evaluation studies in 2023 included archaeological field surveys, monitoring, and site updates related to INL Site project activities, and the studies supported DOE-ID in facilitating meaningful collaboration with members of the Shoshone-Bannock Tribes and public stakeholders.

9.5.1 Procedure Issuance and Revisions

In 2023, seven internal INL CRMO Management Control Procedures (MCPs) were updated and re-issued that pertain to the comprehensive INL Historic Preservation Program, including Section 106 and Section 110 responsibilities. In addition to the seven MCPs, 13 associated forms (FRMs) were issued or revised in conjunction with procedural updates.

MCP-8008, "Section 106 Compliance," and associated FRMs documenting the Section 106 process were revised for consistency with the fully executable 2023 Programmatic Agreement (2023 PA). These revisions focused on the Stipulation IV Approach to Section 106 Compliance and Appendices C and D of the 2023 PA. Based on the results of two 2022 assessments conducted by INL CRMO, revisions of MCP-8011, "Documentation of a Cultural Resource," and MCP-8012, "Preparation of the Annual Report, Contract Data Requirements List (CDRL F.46)," were undertaken and completed in July 2023 and August 2023, respectively. When the Cultural Resource Database (CRDB) went into production in May 2023, Guide (GDE)-895, "CRDB Field Client Guide," was not up-to-date with modifications made to the CRDB since issuance of the procedural document in September 2021. INL CRMO staff created FRM-3313, "Cultural Resource Database (CRDB) Checklist," as a stop-gap feature to utilize until the CRDB procedure is revised. MCP-8009, "Visual Effects Analyses," was assessed during 2023 and recommended to be revised to bring this document into compliance with MCP-8008, Rev 1. Revisions to these documents are planned for 2024. An assessment for MCP-8016, "Management and Curation of DOE Administered Archaeological Collections," is planned for 2024.

Also planned for 2024, the INL CRMO will proactively revise three procedures related to new information on processes for LI-1017, "Field and Benchtop Use of the Olympus Vanta X-Ray Fluorescence Spectrometer (XRF);" MCP-8003, "Native American Grave Protection and Repatriation Act Inadvertent Discoveries," based on the pending rule change for the Native American Grave Protection and Repatriation Act, 43 CFR 10 (anticipate in January 2024); and, MCP-8005, "Managing Paleontological Resources," as well as issuance of an Emergency Action Plan for INL CRMO Fieldwork activities, and update Section 106 and Section 110 monitoring forms (FRM-2898 and FRM-3001) to align with the CRDB.



9.5.2 Cultural Resource Database and Development Progress

Since March 2023, creation and management of digital project and resource data has been consolidated in the INL CRMO CRDB. Two integrated applications form the structure of the CRDB: a web application, available to authorized users on the INL network, and a Field Client, installed locally on a device for use when disconnected from the INL Site network during fieldwork. When in the field, cultural resource data can be collected on site with multiple devices, reconciled and uploaded to the database server, and accessed by all INL CRMO staff in the web application. With import and export capabilities, resource data can be moved between State Historic Preservation Office (SHPO) Archaeological Site Inventory and Idaho Historical Sites Inventory Access databases and the CRDB for consultation and review as required. The Idaho Cultural Resource Information System is planned for an online launch in the spring of FY 2024, and the INL CRMO anticipates changes in the submission guidelines.

As phased development of the CRDB continues, the following are planned additions to functionality of the database applications:

- **Reporting.** The CRDB is designed to collect key information about projects undertaken as part of Section 106 and Section 110 of the National Historic Preservation Act. Reporting capability for both benchmarks and internal tracking is among the functionality planned for the next development phase.
- **Environmental Review Process (ERP) integration.** The ERP system provides for the implementation of NEPA at INL. Since 2022, Section 106 review conducted by the INL CRMO has been integrated into the ERP system and, by extension, the NEPA process. As a result, INL CRMO staff are notified of projects entered in the ERP for environmental and cultural review by email. Future capabilities for the CRDB will include integration with the ERP system, allowing INL CRMO staff to be notified, review, and respond to ERP entries without leaving the CRDB.
- **Cultural Resource Review (CRR) completion.** The CRR FRM-3004 documents a Section 106 review completed by the INL CRMO. The currently implemented version of the CRDB was designed to collect information required to complete the CRR. A third development phase is dedicated to the automatic generation of the CRR from the project level data entered by the principal investigator.

As part of the 2023 launch of the CRDB, a Cultural Resource Database Checklist (FRM-3313) was issued, along with a workshop held for all INL CRMO staff on March 27, 2023, to aid in the adoption of the database. In 2024, a full user guide for the CRDB (GDE-895) will be issued by INL CRMO staff and additional training offered, as required.

9.5.3 INL Section 106 Project Reviews

During 2023, the INL CRMO reviewed approximately 450 projects under Section 106 of the National Historic Preservation Act. Increased efficiencies in the review process grew from CRMO integration into the NEPA review process via the rollout of the new ERP system. Until the 2023 PA was fully executed on May 8, 2023, DOE-ID was performing Section 106 responsibilities according to the 2004 PA and the INL Cultural Resource Management Plan (DOE-ID 2016).

As a result of the implementation of the 2023 PA, the INL CRMO revised MCP-8008 (MCP-8008, Rev 1) to better guide the project review process within the one-stop, multidisciplinary, ERP system. The review process includes an analysis for possible exclusions for activities and property types that do not have the potential to affect historic properties. These exclusions are listed in Appendices C and D of the PA (2023) and implemented as part of MCP-8008, Rev 1 (Appendices A, B, and C).

Appendix A in MCP-8008, Rev. 1, includes those actions which do not meet the threshold of a federal undertaking with the potential to affect historic properties according to the Advisory Council on Historic Preservation's 1991 *Balancing Historic Preservation Needs with the Operation of Highly Technical or Scientific Facilities* (Advisory Council on Historic Preservation 1991). Appendix B includes those undertakings that are excluded from project-specific consultation with the SHPO, provided the activity does not affect or have the potential to affect those qualities or settings that make a historic property eligible for the National Register of History Places (NRHP). Appendix C pertains to property types excluded from NRHP evaluation. However, if these property types are associated with an NRHP-eligible site or district, the INL CRMO staff will document the property and submit a CRR and associated Archaeological Site Inventory and/or Idaho Historical Sites Inventory to the INL CRMO manager and DOE for review and concurrence.



INL CRMO staff review project scopes of work and proposed activities and recommend the applicability of these activity type exclusions and document their review and recommendation for each project within the ERP system and internal ERP Tracking Worksheet. Note that all activities under these exclusions are subject to the INL Timeout and Stop Work Authority should cultural resources be unexpectedly encountered at any time. No activities at Experimental Breeder Reactor-I (EBR-I), other than ground disturbance, are excluded due to its National Historic Landmark status.

These changes to the CRMO Section 106 review process streamlined sharing project information and communication, resulting in shorter review times and integration of information required to support decisions. Sixty-one Section 106 reviews (e.g., 33 built environment and 27 archaeological) were issued CRMO project numbers. Of these, three resulted in No Adverse Effect to historic properties and nine required hold points for further review or project-specific instructions. The remainder of the projects resulted in findings of No Historic Properties Affected. Section 106 reviews that did not involve exempt activities and property types were provided to the DOE-ID Cultural Resource Coordinator for review and approval as the 36 CFR 800 agency official prior to completion of the NEPA reviews.

9.5.4 INL Section 110 Research

Class III inventories for Section 110 surveys related to areas identified by the Shoshone-Bannock Tribes and INL CRMO research interests. These interests include the acquisition of data to support the ongoing development of the Precontact Context, Pre-WWII Historic Context, and other active research proposals, in coordination with the Shoshone-Bannock Tribes.

Precontact Context Initiation

As part of DOE-ID commitments to strengthen the INL Site historic preservation program, the INL CRMO, DOE-ID, and Shoshone-Bannock Heritage Tribal Office (HeTO) staff initiated efforts on the Precontact Context (PCC). Precontact refers to the period when the Shoshone and Bannock Tribes occupied North America prior to contact with Europeans and Euroamericans. The Precontact Context identifies the time span as roughly 13,000 years before the present to contact with Lewis and Clark in 1805.

In adherence with commitments outlined in the 2023 PA, as well as the *Secretary of Interior's Standards and Guidelines for Archaeology and Historic Preservation* (Federal Register, Vol. 48, No. 190, 1983), and in partnership with the Shoshone-Bannock Tribes, the INL CRMO is currently developing a context to address the Precontact period. The Shoshone and Bannock PCC will span the vast time frame between 13,000 and 200 years ago, when the ancestral Shoshone and Bannock people first encountered Euroamerican explorers and fur traders in their territory. A proposal outlining the PCC themes, research, and draft property types was submitted to SHPO for review on January 24, 2023. DOE-ID and INL CRMO provided a PCC progress briefing to the Language and Cultural Committee on March 14, 2023. In addition, a meeting with the BLM was hosted by DOE-ID on April 21, 2023. DOE-ID hosted a PCC briefing and discussion with INL CRMO and SHPO staff on May 12, 2023. In June 2023, HeTO staff Anna Bowers and Kyle Denny accompanied INL CRMO and BLM staff to revisit two sites within the Precontact Context study area located in the Upper Snake Field Office. The sites were chosen based on the presence of rock writing and surface artifact density.

The Shoshone and Bannock PCC represents an organizational framework for the identification of Precontact archaeological resources within the 8-million-acre study area, with the understanding that the Eastern Snake River Plain (ESRP) and surrounding regions were included in the ancestral seasonal round of the Northern Shoshone and Bannock people spanning millennia. Although there is the possibility that other tribes visited the ESRP, the site types identified in this document were developed in collaboration with the Shoshone-Bannock Tribes and directly reflect ancestral Northern Shoshone and Bannock land use patterns, as evidenced by oral histories, oral traditions, historic documents, and ethnographic information.

The final document will serve as a framework for: (1) the identification and characterization of Shoshone and Bannock Precontact archaeological resources/properties within the study area; (2) guidelines regarding the criteria used to evaluate their NRHP significance; and (3) comprehensive preservation planning at the INL Site.



The “*Assessing, Synthesizing, and Identification*” phase of the PCC is nearly complete. Roughly 4,000 archaeological localities in the study area have been characterized based on the Shoshone and Bannock seasonal round. Roughly 2,000 diagnostic volcanic glass projectile points housed in the Idaho Museum of Natural History have been analyzed via x-ray fluorescence and assigned a source attribution and 25 bone samples were submitted to an Accelerator Mass Spectrometry laboratory to refine the regional cultural chronology. Phase II (Characterization) will begin in early 2024 and include a comprehensive analysis of geospatial data to address research questions and predictions outlined in the PCC proposal. Although the INL CRMO staff is already utilizing relevant themes and research questions to evaluate NRHP eligibility under Criterion D, formal eligibility, and integrity guidelines (Phase III) will be developed in early spring of 2024.

Pre-WWII Historic Contexts at INL

As part of DOE-ID’s commitments to strengthen the INL Site Historic Preservation Program in the 2023 PA, the INL CRMO and DOE-ID initiated efforts to create the pre-WWII historic context in 2023. A proposal was completed and submitted by DOE-ID to SHPO on April 30, 2023. A virtual brief to SHPO was completed on May 12, 2023. To represent the breadth and depth of historic activities at the INL Site during the 1852–1942 period, two context statements were outlined: “Historic Networks: Migration, Transportation, and Trade across the Eastern Snake River Plain, 1852-1942” and “Home on the Plain: Homesteading and Agricultural Settlement on the Eastern Snake River Plain, 1855-1942.” Definition of the context statements and associated time periods included establishing a six-million-acre study area, including the INL Site. A review of the current inventory of historic resources at the INL Site allowed for the summation of site types applied in recording historic archaeological resources to date, as well as identifying possible type sites to re-record. The record review found 245 archaeological sites previously recorded at the INL Site in the context time periods, not including linear resources. Based on previously assigned site types and descriptions for these resources, 33 site types were identified from the current inventory of historic archaeological resources, with one additional category for those resources where no type was given (n=1).

The initial research for historic narratives has focused on the acquisition of primary sources from libraries, archives, and special collections relevant to the study area and period of interest. So far, collections held by the following repositories have been reviewed:

- Idaho State University Archives and Special Collections, Pocatello, Idaho
- Bingham County Historical Society, Blackfoot, Idaho
- Brigham Young University—Idaho, Archives and Special Collections, Rexburg, Idaho
- Boise State University Archives and Special Collections, Boise, Idaho
- Idaho State Historical Society Archives, Boise, Idaho.

In addition, research continues to utilize and request items from digital and physical collections, including historic photographs, land entry records, and company minutes (Utah Construction Company), from the following institutions:

- The Library of Congress
- National Archives and Records Administration
- Weber State University
- University of Idaho
- University of Utah.



Other Active Research

There are currently five active multi-year Section 110 research proposals including: “Pluvial Lake Terreton: Building a Multidisciplinary Dataset to Understand Human Land Use During the Terminal Pleistocene” (INL 2017a); “Decoding the Southern Idaho Cultural Landscape Through Volcanic Glass Source Analysis” (INL 2017b); “Pewaishe suakiga/Pekwanishu songaha - It Still Breathes, 10BT1449” (INL/RPT-22-65966); “Examining the Chronology, Distribution, and Source Attributions of Volcanic Glass Haskett Point in the Pioneer Basin of Idaho” (INL/PRO-23-71899); and “Mobility on the Eastern Snake River Plain During the Early Holocene/Middle Holocene Transition: Obsidian Conveyance and Spatial Analysis of Early Holocene and Northern Side-notched Projectile Points.”

Pluvial Lake Terreton: Building a Multidisciplinary Dataset to Understand Human Land Use During the Terminal Pleistocene

To better understand the land use practices of the ancestral Shoshone and Bannock people during the Late Pleistocene era, the INL CRMO continues to investigate Lake Terreton and the Big Lost River Trough. Analyses are ongoing and will be integrated with the PCC. The existing collections for Owl Cave (10BV30), now curated at the Museum of Idaho, are also being utilized to address research questions related to the PCC. In FY 2023, a total of 15 bone samples from Owl Cave were dated using Accelerator Mass Spectrometry by the University of Georgia Center for Applied Isotope Studies. These data will be used to refine the regional projectile point chronology, as well as advance our understanding of bison procurement on the ESRP during the past 13,000 years.

Decoding the Southern Idaho Cultural Landscape Through Volcanic Glass Source Analysis

To fully characterize the geographic distribution of Southern Idaho obsidian source groups, the INL CRMO has compiled a comprehensive Idaho Obsidian Reference Collection. The current dataset contains over 2,000 samples of geologic obsidian from 155 locations that correspond to 30 geochemically distinct source groups, a few of which have not been previously defined or recognized by archaeologists and produce a technical report categorizing this collection. In FY 2024, DOE will submit the technical report to cooperating agencies in a memorandum of understanding, including the Idaho Falls District BLM, Caribou-Targhee National Forest, SHPO, and Shoshone-Bannock Tribes.

Pewaishe suakiga/Pekwanishu songaha – It Still Breathes, 10BT1449

Site 10BT1449, located near the Radioactive Waste Management Complex, was originally recorded in 1989 by Idaho State University. During a 1993 monitoring visit, the INL CRMO staff encountered Folsom points and possible channel flakes on the ground surface, in addition to the extensive flake scatter documented during the original recording. In early May of 1993, over 2,000 waste flakes, 11 bifaces, 20 channel flakes, and four Folsom points were collected during these efforts. The site was given Shoshone and Bannock names and fully re-recorded in 2022. The site represents a Folsom surface campsite with a complement of tools and debitage, allowing for a rare comparison with widely recognized Folsom technological patterning (INL/PRO-22-65966). Dr. Daron Duke is collaborating with Dr. Suzann Henrikson of the INL CRMO to characterize the Folsom assemblage recovered from *Pewaishe Suakiga* (10BT1449). This research was approved by DOE-ID and HeTO in February 2022. A detailed analysis is currently underway and should be completed in FY 2024. Dr. Duke has confirmed that 10BT1449 represents the only known Folsom manufacturing site in the Desert West. A co-authored manuscript for peer-review will be completed in FY 2024.

Examining the Chronology, Distribution, and Source Attributions of Volcanic Glass Haskett Points in the Pioneer Basin of Idaho

A PhD candidate at the University of Nevada—Reno is including Haskett projectile points from the INL Site in a geospatial analysis of Haskett projectile points across the Far West (INL/PRO-23-71899). DOE-ID and HeTO staff approved this research on July 13, 2023. This project represents a collaboration with INL CRMO staff to examine whether the distribution of this point type reflects a form of land use and mobility distinct from foragers utilizing fluted technology during the same period. The results of the research will be included in a co-authored manuscript for peer-review and incorporated with the dissertation research.



Mobility on the ESRP During the Early Holocene/Middle Holocene Transition: Obsidian Conveyance and Spatial Analysis of Early Holocene and Northern Side-notched Projectile Points

A Utah State University graduate student is performing a geospatial analysis to examine whether Precontact mobility patterns on the ESRP were influenced by climatic events during the Early Holocene/Middle Holocene transition. This project is being completed as a graduate thesis and is utilizing proxy archaeological data from an eight-million-acre study area to test Long's (2007) hypothesis that the ancestral Shoshone and Bannock people remained in highly productive resource patches, such as Lake Terreton and river corridors, during the Terminal Pleistocene and Early Holocene eras. However, Long (2007) argues that, with the disappearance of Lake Terreton roughly 8,000 years ago, foraging return rates within this patch diminished, prompting the utilization of small, productive resource patches spread across the open ESRP landscape. This hypothesis will be tested against the distribution of projectile points spanning the Terminal Pleistocene and Early Holocene eras, along with associated volcanic glass source attribution data. DOE-ID and the HeTO staff approved this research on July 13, 2023, and the student received geospatial INL Site data the following month. Preliminary results of this research will be presented at the "38th Great Basic Anthropological Conference" in Bend, Oregon. The student hopes to complete the thesis in spring 2024. The results of the research will be integrated with the Shoshone and Bannock PCC.

Built Environment Comprehensive Inventory

In 2023, the INL CRMO continued its efforts to update the Built Environment Inventory on the INL Site. Inventory updates for the Advanced Test Reactor (ATR) Complex, CFA, Critical Infrastructure Test Range Complex, EBR-I and Boiling Water Reactor Experiment Facilities, Idaho Nuclear Technology and Engineering Center, and MFC were completed by the Center for Environmental Management of Military Lands, with final revisions made by INL CRMO staff. DOE-ID submitted these inventories to the SHPO on April 30, 2023. Concurrence was received on May 23, 2023.

The following historic properties were recommended individually eligible:

- CF-638: High Explosives Magazine/Dosimetry Calibration Lab, Criterion A
- CF-642/CF-720: Pump House, CFA Well No. 2), Criterion A
- CF-651/CF-719: (Pump House, CFA Well No. 1), Criterion A
- CF-704: Concussion Wall (CF-633), Criterion A
- TRA-670: ATR Reactor Building, Criterion A
- EBR-601: Experimental Breeder Reactor-I (EBR-I), Criterion A
- Chemical Processing Plant (CPP)-659: New Waste Calcining Facility, Criterion A
- MFC-720: Transient Reactor Test (TREAT) Reactor Building, Criterion A
- MFC-724: TREAT Control Building, Criterion A
- MFC-765: Fuel Conditioning Facility, Criteria A and C
- MFC-767: EBR-II Reactor Plant Building, Criterion C
- MFC-768: Power Plant, Criterion A
- MFC-775: ZPPR Vault Work/Equipment Room, Criterion C
- MFC-776: ZPPR, Criterion C
- MFC-785: Hot Fuel Examination Facility (HFEF), Criteria A and B.

Additionally, potential historic districts were evaluated and three were recommended eligible under Criterion A:

- ATR Historic District, contributing properties (TRA-625, TRA-634, TRA-640, TRA-670, TRA-671, TRA-770, and TRA-771)
- TREAT Historic District, contributing properties (MFC-720, MFC-721, MFC-722, MFC-723, and MFC-724)
- ZPPR Historic District, contributing properties (MFC-774, MFC-775, MFC-776, MFC-777, MFC-784, and MFC-792).



INL CRMO architectural historians completed a draft of the Specific Manufacturing Capability and Test Area North Built Environment Inventory Update during 2023. The research design drew upon feedback received from the SHPO during consultation on previous inventories, including a programmatic approach to periods of significance based on active research programs rather than arbitrary cutoff dates. Buildings, structures, linear features, and objects built during or prior to 1986 were identified based on current documentation. Eighteen buildings, three structures, one linear resource, three objects, and three historic districts were recorded and evaluated.

9.5.5 Cultural Resource Monitoring

Field work in 2023 also included a broad, annual program involving routine visits to monitor current conditions at select previously recorded archaeological resources across the INL Site. In 2023, INL CRMO archaeologists, Shoshone-Bannock Tribes HeTO, and DOE-ID staff monitored site conditions at 11 locations on the INL Site. The data acquired during the 2023 monitoring efforts of these sites allowed for a complete evaluation of their current condition as compared to previous recordings. No impact to historic properties were observed during these monitoring visits in 2023.

9.5.6 Site Stabilization, Restoration, Preservation

Birch Creek Soil and Vegetation Restoration

Discussions between DOE-ID, INL (Natural Resources, F&SS, CRMO), HeTO, and BLM staff continued regarding the restoration efforts at the Birch Creek site (10BT0051). In 2023, INL completed soil testing, identification of seed and plant mixes for restoration, and strategies to increase revegetation success, as well as identification of seed and plant mixes for restoration, and strategies to increase revegetation success. The application of phosphate and elemental sulfur was conducted in the spring following the results of soil testing. The site form and report are anticipated for completion in FY 2024.

Naval Ordnance Test Facility Gun Display Project initiation

In order to prepare for the possibility of a future naval gun installation project and rehabilitation of the Naval Ordnance Test Facility site, the following actions have been taken. A working relationship has been established with Naval Surface Warfare Center Dahlgren, which is willing to donate a 16-inch naval gun and mounting components. Preliminary investigative work has been done to determine what components are necessary for such a display and logistical requirements. INL has given the go-ahead for a project cost-study, and subsurface investigations at the Naval Ordnance Test Facility will take place in the spring of 2024 to determine the condition of the original gun mount base and related infrastructure.

9.5.7 Stakeholder, Tribal, Public, and Professional Outreach

In 2023, the CRMO staff continued public outreach, combining virtual opportunities to expand reach and accommodate schedules with in-person meetings and INL Site visits, as well as presentations and activities at the Museum of Idaho, and via special invitation to events. These included “Secrets of the Owl Cave Bone Bed: Revealing an Ancient Bison Drive in Southern Idaho; Night at the Museum; Jeffrey-Goodale Cutoff of the Oregon Trail” (also as guest speaker at the “46th Actinide Separations Conference” banquet, hosted by INL), and the early historic period on the INL Site between 1805 and 1905, including early exploration and fur trapping in eastern Idaho to stage roads, railroads, and homesteading at the future INL Site. In addition, a virtual archaeology tour (in coordination with DOE-ID and the Shoshone-Bannock HeTO staff) was developed and conducted. These tours included a detailed history of the Precontact period on the ESRP and was co-presented by INL CRMO and HeTO staff members with Tribal perspectives interwoven with archaeological information.

Educational exhibits at the EBR-I Visitor's Center (Figure 9-6), a National Historic Landmark, and the Big Lost River Rest Area on U.S. Highway 20/26 within the boundaries of the INL Site are important tools for public outreach. Face-to-face employee “Ask an Architectural Historian” opportunities and public tours at these facilities were conducted in FY 2023, with a total of 12,653 visitors. In addition to in-person tours, visitors could download a free app (TravelStorys) that provided a virtual tour of the EBR-I museum. EBR-I has maintained the infrastructure necessary for self-guided tours of the facility that is available through a free app. Following the success of the virtual tours of the EBR-I Museum, the INL



CRMO developed and conducted two virtual archaeology tours for over 100 INL employees and members of the public. These tours included discussions of DOE-ID's archaeological responsibilities, eastern Idaho Precontact history, and specific examples of historic sites and nuclear history at the INL Site. INL CRMO staff supported a tour for DOE-ID facility representatives, including stops at the CFA Concussion Wall, EBR-I, and the Heat Transfer Reactor Experiment Engines, Powell Stage Station, Goodale's Cutoff, and the B-24 Bomber Crash Site.



Figure 9-6. Experimental Breeder Reactor – I, a National Historic Landmark located on the INL. The CRMO assists DOE with fulfilling their Section 110 commitments to public outreach and education. This is an important element of the INL Cultural Resource Management Plan.

Professional outreach opportunities included archives staff attendance at the “Northwest Archives Conference” in Salem, Oregon, and the “National Association of Government Archives and Record Administration Conference” in Cincinnati, Ohio. In addition, the INL CRMO hosted a symposium at the “Great Basin Anthropological Conference” (October 2023); “From Channel Flakes to Bison Jumps: Current Archaeological Investigations in Southern Idaho.” The symposium included 11 presentations by five members of the Archaeological staff, former staff, and collaborating researchers. Presentations/symposiums included:

- Putting the Owl Cave Mammoth Hunters to Bed: New Dates from Layer
- Farthering Folsom: A Technological Analysis of the “It Still Breathes” Site in Eastern Idaho’s Pioneer Basin
- Protein Residue Analysis in Archaeology: Preliminary Results of a Contamination Experiment
- Late Pleistocene Haskett Toolstone Use in Southern Idaho
- Sourcing the Obsidian Haskett Projectile Points recovered from the Haskett Type Site (10PR37) in Lake Channel, Idaho
- Investigating the Owl Cave Bison Bone Bed Lithic Assemblage



- The Owl Cave Bison Bone Bed: Evidence of an Early Holocene Mass Kill
- Isotopic Studies on Faunal Remains from Owl Cave Shed Light on Bison Predictability on the ESRP
- Mobility on the ESRP: Obsidian Conveyance and Spatial Analysis of Early Holocene and Northern Side-notched Projectile Points
- Reconstructing Ancient Subsistence Practices: The Fauna from Three Prehistoric Sites in Birch Creek Valley, Eastern Idaho
- Buffalo's Little Brother's Hill (10BT2303): A Late Holocene Bison Jump in Eastern Idaho.

On April 19, 2023, the Shoshone-Bannock Tribes held an Earth Day celebration for students from the Shoshone-Bannock Junior-Senior High School at the INL Site. The event was organized by the Shoshone-Bannock HeTO and the INL K-12 Science, Technology, Engineering, and Mathematics Education Program with logistical support from the INL CRMO, F&SS, and Fire Department. Activities included a morning visit to Pioneer and the *Pewaishe Suakiga* sites for tribal students, followed by a ceremony for tribal members and DOE-ID and INL staff at CFA. Over 50 students visited the *Pewaishe Suakiga* site, where a Shoshone-Bannock Tribal Elder offered a prayer and the Shoshone-Bannock Air Quality Co-Lead for the Tribal Long-Term Stewardship Program provided a speech on how the lands and ecology of the INL Site were important to the Shoshone-Bannock Tribes. After the INL Site visits, the group gathered at the INL Site Fire Station and performed dances and invited DOE-ID and INL staff to join in the Friendship or Round dance.

INL CRMO staff continue to support DOE-ID with the Shoshone-Bannock relationship by supporting and facilitating attendance at Language and Cultural Committee Meetings, Cultural Resource Working Group Meetings, and an annual update to the Fort Hall Business Council.

INL Contractor Cultural Resource Community of Practice

INL CRMO staff continued to host monthly meetings of the INL Contractor Cultural Resources Community of Practice. Participating laboratories include INL, Los Alamos National Laboratory, Pacific Northwest National Laboratory, National Renewal Energy Laboratory, Oak Ridge National Laboratory, Brookhaven National Laboratory, and Sandia National Laboratory. In 2023, a total of four successful discussions and workshops on a variety of issues proved fruitful for participants. Topics included PAs, NRHP Historic Districts, creative mitigation strategies, sharing processes and procedures, and discussing strategies for memorandum of agreements.

9.5.8 INL Archives and Special Collections

During 2023, the INL Archives and Special Collections office was staffed by an INL archivist and a retained full-time archives intern. Archives staff assisted INL CRMO architectural historians by scanning 384 items for the Specific Manufacturing Capability built environment inventory update conducted in 2023. During the course of the year, 11 procedures, plans, and forms were approved and implemented.

The purpose and mission of the INL Archives and Special Collection have been highlighted in two articles with input from archives staff; "Idaho National Laboratory and Two ISU Alumni Establish and Archive" (Curtis 2023) and "Archivist Brings the Past Into the Present" (Walker 2023). The Archives and Special Collections office received five external requests and six internal requests for accessions, collections, and reviews. The completed requests have resulted in 204 archival quality scans.

The INL Archives and Special Collection office is involved in INL Site Record Center destruction and permanent monthly transfer meetings. This also allows INL archives staff to scan the material of interest for archives purposes. Archives staff worked with the property organizations and created a tagging system to track and access large objects that are administratively controlled.

During FY 2023, INL archives staff completed 17 accessions, including approximately 23,000 archival photographs, five INL-specific booklets and articles, five maps, 310 slides, and 41 archival objects. Metadata for 111 architectural and engineering drawings was completed in the INL Site Records Center transfer/destruction process with the completion of 355 scans. Repairs were completed for 58 damaged architectural drawings. Of note, these accomplishments were



completed while the archives space was under renovations to become compliant with National Archives and Records Administration standards for six months of 2023.

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Sage-grouse habitat monitoring