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HNF-58608
Revision 0

Hanford Site Roadside Bird Surveys Report for Calendar Year 2014

Prepared for the U.S. Department of Energy
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
under Contract DE-AC06-09RL14728

P.O. Box 650
Richland, Washington 99352

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Mission Support Alliance

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Release Approval | Date

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1.0 Introduction

The U.S. Department of Energy, Richland Operations Office (DOE-RL) conducts ecological monitoring on the Hanford Site to collect and track data needed to ensure compliance with an array of environmental laws, regulations, and policies governing DOE activities. Ecological monitoring data provide baseline information about the plants, animals, and habitat under DOE-RL stewardship at Hanford that is required for decision-making under the *National Environmental Policy Act* (NEPA) and *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA). The *Hanford Site Comprehensive Land Use Plan* (CLUP, DOE/EIS-0222-F), which is the Environmental Impact Statement for Hanford Site activities, helps ensure that DOE-RL, its contractors, and other entities conducting activities on the Hanford Site are in compliance with NEPA.

The *Hanford Site Biological Resources Management Plan* (BRMP, DOE/RL 96-32 Rev 1) is identified by the CLUP as the primary implementation control for managing and protecting natural resources on the Hanford Site. According to the CLUP, the BRMP

> "*provides a mechanism for ensuring compliance with laws protecting biological resources; provides a framework for ensuring that appropriate biological resource goals, objectives, and tools are in place to make DOE an effective steward of the Hanford biological resources; and implements an ecosystem management approach for biological resources on the Site. The BRMP provides a comprehensive direction that specifies DOE biological resource policies, goals, and objectives.*"

DOE-RL places priority on monitoring those plant and animal species or habitats with specific regulatory protections or requirements, that are rare and/or declining (federal or state listed endangered, threatened, or sensitive species), or are of significant interest to federal, state, tribal governments, or the public. The BRMP ranks wildlife species and habitats from Level 5 (highest priority) to Level 0 (lowest priority), providing a graded approach to monitoring biological resources based on the level of concern for each resource. Current monitoring of bird species and habitats on the Hanford Site span a range of BRMP resource levels from maintaining protective buffers around Ferruginous Hawk (*Buteo regalis*) nest sites (Level 4), Bald Eagle (*Haliaeetus leucocephalus*) nest and night roost sites (Level 4), and burrowing owl nest sites (Level 3) to safeguarding migratory bird nest locations in Level 0 habitat. The roadside bird surveys support the obligations described in the Memorandum of Understanding between the U.S. Department of Energy's (DOE) and the United States Fish and Wildlife Service (USFWS) *Regarding the Implementation of Executive Order 13186,* "*Responsibilities of Federal Agencies to Protect Migratory Birds*" by conducting research and other activities for the preservation and enhancement of habitat for migratory birds, maintenance of bird populations, and minimization of human impacts on native species.

The Hanford Site lies within the semi-arid Pasco Basin of the Columbia Plateau in southeastern Washington State. The site occupies an area of approximately 1,517 square kilometers (586 square miles) north of the city of Richland (DOE/EIS-0222-F). The DOE Hanford Site is unique in that public access is restricted, there is little ongoing industrial development, and agricultural activities do not occur within its

boundaries. The Hanford Site contains a variety of bird habitats that include: basalt outcrops, riparian zones along streams and springs, shrub-steppe on slopes and on plains, sand dunes and blowouts, and abandoned fields or disturbed areas (PNL-8942). The Hanford Site provides large expanses of habitat for shrub-steppe birds and other landbirds that depend on either mature stands of sagebrush or areas with at least some component of native grasses in the understory (The Nature Conservancy 1999). In some portions of the Hanford Site, human activities such as farming, urbanization, and industrial development have greatly decreased the amount of natural habitat that native landbirds require for survival. In turn, the riparian areas of the Hanford Site may have been improved by planting larger trees near homesteads and towns. These trees provide nesting locations, feeding areas, and roosting spots for many species.

The amount and quality of shrub-steppe habitat in the Columbia Plateau has been greatly reduced from historical levels due to urban development, agricultural conversion, wildfires, and fragmentation. These changes place additional stressors on shrub-steppe obligate species and some, such as the Greater Sage Grouse (*Centrocercus urophasianus*), have been locally extirpated. Federal laws, including the Migratory Bird Treaty Act of 1918, provide protection for these species. Monitoring is essential to not only maintain current biological information on the abundance and distribution of these species on the Hanford Site, but also to ensure compliance with protection regulations and to inform future protection and management efforts.

Several sagebrush-steppe dependent species, such as the Sagebrush Sparrow (*Artemisiospiza nevadensis)*, Sage Thrasher (*Oreoscoptes montanus*), and Loggerhead Shrike (*Lanius ludovicianus*), are currently listed by the Washington State Department of Fish and Wildlife (WDFW) as "candidate species" and have the potential to be listed as threatened or endangered in the future (WDFW 2013). In addition, the Hanford Site and surrounding area provides refuge to potentially 17 state-listed species as well as numerous state-monitored species (WDFW 2013) that benefit from the large expanses of habitat. This list includes birds such as the Ferruginous Hawk, a state "threatened" species, the American White Pelican, a state "endangered" species, and the Bald Eagle, a state "sensitive" species (WDFW 2013).

As managers of the Hanford Site, DOE-RL is responsible for conservation of wildlife and wildlife habitats (DOE/RL 96-32). Avifauna have been documented and monitored on the Hanford site for over 60 years (WHC-EP-0402), including over 20 years of roadside survey monitoring (PNNL 2011). The monitoring performed in 2014 provides continued data for documenting species occurrence and distribution on the Hanford Site, and can be compared with the long-term trend data collected on the Hanford Site over multiple decades. The monitoring of birds that occur on the Hanford site is a valuable tool for developing baseline information on the presence and distribution of biological resources across the Hanford Site, identifying trends in species or populations, and compiling biological information necessary to implement adaptive management (DOE/RL 96-32).

Three independent efforts were performed by MSA in 2014 to monitor and protect migratory bird species on the Hanford Site:

- Bald Eagle roost and nest monitoring (Cranna et al. 2015),
- Raptor nest monitoring (Nugent et al. 2015), and
- Roadside bird surveys.

The purpose of the Fiscal Year 2014 eagle roost monitoring was to document that eagles are continuing to use the currently protected roost locations. Protective buffers were established for eight bald eagle night roost locations on the Hanford Site during Fiscal Year 2014. These exclusion buffers were enforced from November 15 through March 15. Eagle nesting activity was also documented and potential nest sites were monitored to determine nest protection areas (Cranna et al. 2015).

Nesting raptors were monitored to document their distribution and abundance on the DOE-RL managed portions of the Hanford Site. Annual raptor nesting surveys provide land managers with specific locations of nest sites so nests can be avoided and disturbances minimized during the nesting season. Long-term trends in nesting raptor populations are summarized to allow assessment of the possible impacts due to Hanford Site operations (Nugent et al. 2015).

Migratory bird and breeding bird surveys, which are the focus of this report, were performed on four historical survey routes in 2014. In 1988, Pacific Northwest National Laboratory (PNNL) established four roadside bird survey routes (Figure 1). These routes were monitored in the spring months from 1988 through 1991, and winter counts were added in 1992 and 1993. Each transect was monitored monthly between 1994 and 2001 (Rickard).

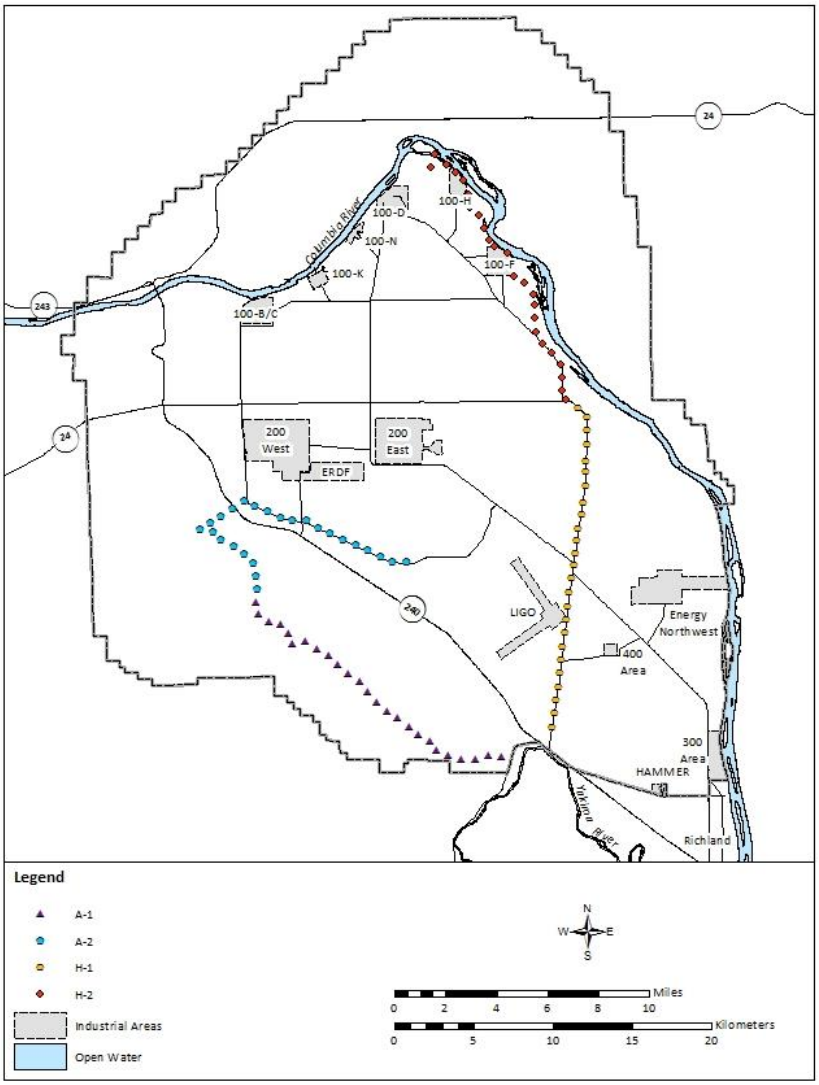

Figure 1. Roadside bird survey routes performed on the Hanford Site from 1988-2001

Bird Survey routes were modified in 2002 due to both the transfer of management responsibility of the Fitzner-Eberhardt Arid Lands Ecology Reserve (ALE) from the DOE to the U.S. Fish and Wildlife Service (USFWS), and a large fire in 2000, which modified the habitat along the routes. In 2002, surveys along ALE were discontinued as part of the routine program, and a new route was established to monitor mature sagebrush communities on the north side of Gable Mountain and Gable Butte, previously burned areas, and successional grassland communities (Wilde et al. 2013). The four modified roadside bird survey routes that have been used from 2002 to present are shown in Figure 2.

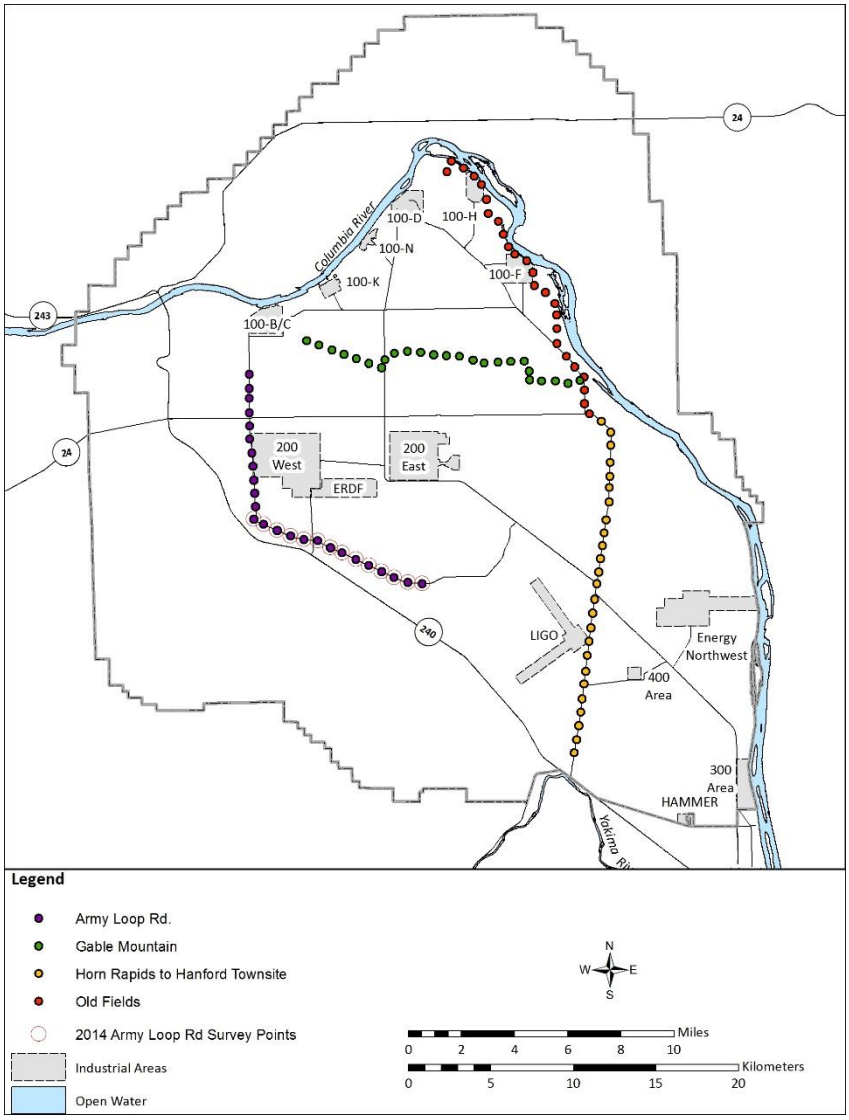

Figure 2. Roadside bird survey routes and point locations used on the Hanford Site since 2002

In 2005, Hanford became part of the North American Breeding Bird Surveys (BBS). The BBS is a unique collaborative counting effort designed to increase the understanding of North American bird populations and is now used as the primary data source for estimation of population change and modeling of the possible consequences of change in land use, climate, and many other possible stressors on bird populations (Sauer 2010). Jointly developed and coordinated by the United States Geological Survey (USGS), USFWS, and the Canadian Wildlife Service, the BBS incorporates counting efforts across the Unites States and Canada. Comprehensive summaries of population change have been calculated for >400 species of birds across North America (Sauer et al 2003). In 2005, two of the current routes, "Horn Rapids to Hanford Townsite" and "Old Fields", were surveyed in combination as the annual "Horn Rapids" North American Breeding Bird Survey (BBS) route. The "Richland" BBS route was created in 2006 from the previously discontinued ALE routes, including half of the current Army Loop Rd Route, and surveys were performed by Hanford Site staff. Figure 3 shows the two USGS BBS survey routes performed at Hanford.

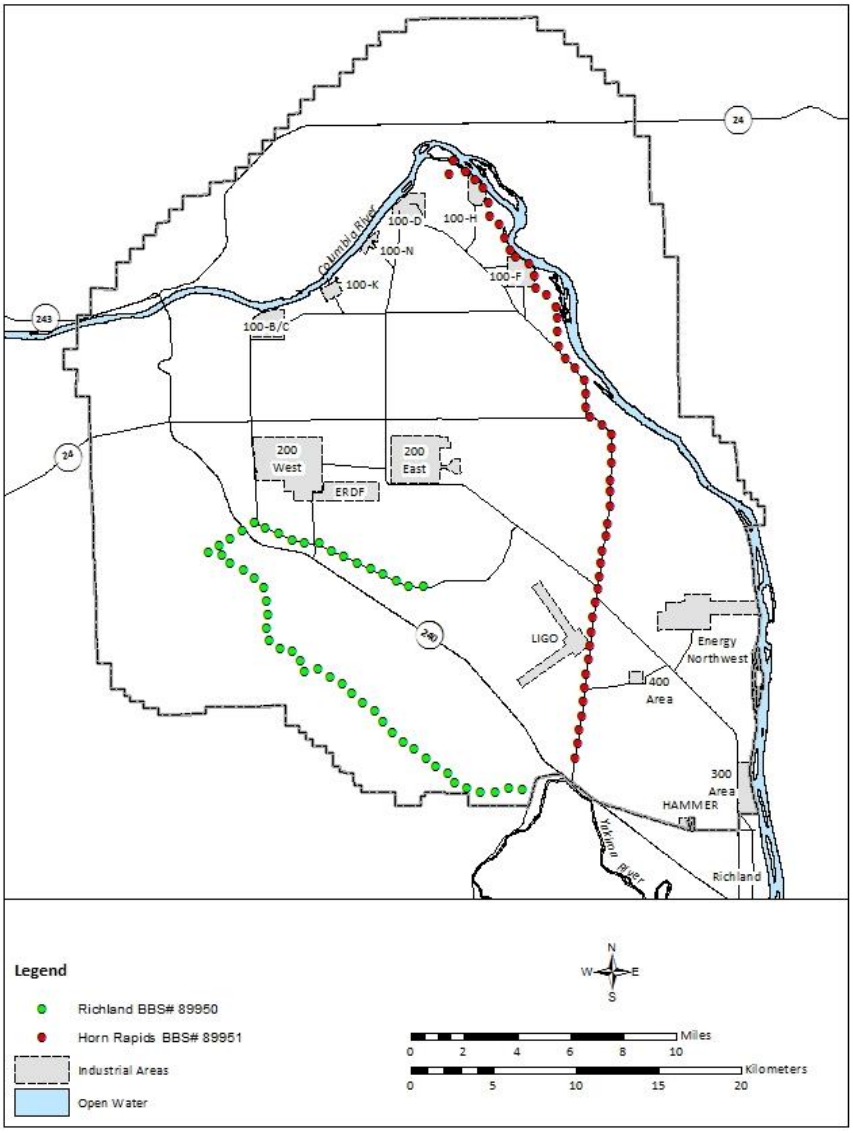

Figure 3. The U.S. Geological Survey Breeding Bird Survey routes performed annually on the Hanford Site

Survey of the two Hanford BBS routes covers two of the established Hanford routine roadside bird survey routes and surveys a half of a third route. To maintain consistency and allow the official BBS data to fit within the annual program results, MSA follows the methods of the BBS described in Section 2.0 when performing counts along survey routes.

This report does not provide an inventory of all birds that inhabited any portion of the Hanford Site in 2014, but rather documents the status of birds identified through a transect survey method, which is used to detect trends and evaluate potential disturbance effects. Road surveys are a practical way to monitor changes in species richness, the number of species represented in the community, and relative

abundance, how common or rare a species is relative to other species in the community, of shrub-steppe birds over time and in response to various types of land-use changes.

2.0 Methods

Roadside survey counts follow the protocols used for the BBS coordinated by the USGS annually throughout North America (Bysrack 1981; Sauer 2010). Four survey routes (Figure 2) or portions of routes were surveyed a single time during the 2014 breeding season in coordination with BBS (June).

Hanford routine roadside routes are 20 kilometers (km) (12.43 miles) compared to the 40-km (24.85 miles) routes used in the BBS (Figure 2, Figure 3), with the "Horn Rapids 89951" BBS route surveying both the Horn Rapids to Townsite and Old Fields routine Hanford survey routes. All roadside routes contain point counts at 0.8-km (0.5 miles) intervals marked with steel fence posts, rebar posts, pin flags, or by GPS coordinates only. There are 25 survey points per Hanford route and 50 survey points per BBS route. Birds within 400 meters (m) (0.25 miles) of each survey point were identified by sight or sound during a three-minute observation at each marker post. Surveyors drove to each survey location and observed the area for three minutes, recording their observations, then continuing to the next location. The number of vehicles passing by during the survey time was recorded on the field sheet for each point. Observers remained at a survey point for more than the three minutes only if additional time was needed to confirm identification or count for birds that were noted during the three-minute observation period. Observations of any nesting activities within 400-m of the survey point were also noted. It is acknowledged that a roadside monitoring program is not without bias; however, the benefits are considered to outweigh most disadvantages (USDA 1993).

Attempts were made to start all Hanford surveys in the early morning hours, within a 30 minute timeframe before or after sunrise. The BBS survey routes were started as near as possible to 0438 hours, a request provided by the USGS in their informational packet. Surveys were halted if adverse weather conditions such as high winds, heavy rain, or snowfall developed during the route survey.

3.0 Results

Roadside surveys were performed on 3 dates. Three complete routes and a partial route from the 4 Hanford annual routes were surveyed in 2014 (Table 1). The "Horn Rapids" BBS route surveys both the Horn Rapids to Townsite and Old Fields route in a single run. Only the second half of the Army Loop Rd route (points 12-25) were surveyed in 2014 as part of the "Richland" BBS route completion. A total of 1332 individual birds were documented during the 2014 surveys, similar to the 1264 individuals counted during June surveys in 2013. Fifty-one bird species were documented in 2014, which was higher than the 47 species recorded in June 2013.

The Horned Lark (*Eremophila alpestris*) was the most abundant species documented. Surveys documented 334 Horned Lark individuals, 25.08% of all individuals counted. The second most abundant

species was the Western Meadowlark (*Sturnella neglecta*) with 249 individuals, 18.69% of surveyed individuals (Table 2). The Horned Lark was counted on 75 survey points (86.21 %), while the Western Meadowlark was documented on 74 survey points (85.06%). These two species were clearly the most documented species in 2014; they were counted at nearly three times as many survey points as any other species documented.

Table 1. 2014 Survey date and location.

Route Name	Survey Date
Army Loop Rd	6/10/2014[a]
Gable Mountain	6/9/2014
Horn Rapids to Townsite	6/12/2014[b]
Old Fields	6/12/2014[b]

[a] Surveyed during Richland BBS
[b] Surveyed during Horn Rapids BBS

The "Old Fields" route had the highest species diversity and the highest abundance of individuals (Table 3). The "Old Fields" route has historically been the route with the highest species richness and abundance. The route runs along the northeastern edge of the central Hanford Site, often directly adjacent to the Columbia River providing the largest variety of habitat of any route.

Table 2. Species, Sorted by Abundance, Over the 3 Surveys Performed on the Central Hanford Site in 2014.

Common Name	Scientific Name	Routes[a]	Individuals	% Counts	Stops[b]	% Stops
Horned Lark	*Eremophila alpestris*	4	334	25.08	75	86.21
Western Meadowlark	*Sturnella neglecta*	4	249	18.69	74	85.06
Cliff Swallow	*Petrochelidon pyrrhonota*	1	160	12.01	7	8.05
European Starling	*Sturnus vulgaris*	3	101	7.58	12	13.79
Brewer's Blackbird	*Euphagus cyanocephalus*	2	51	3.83	9	10.34
Lark Sparrow	*Chondestes grammacus*	3	45	3.38	22	25.29
Bank Swallow	*Riparia riparia*	1	41	3.08	6	6.90
Red-winged Blackbird	*Agelaius phoeniceus*	1	33	2.48	7	8.05
Canada Goose	*Branta canadensis*	1	32	2.40	1	1.15
Great Egret	*Ardea alba*	1	26	1.95	4	4.60
Common Nighthawk	*Chordeiles minor*	3	26	1.95	12	13.79
Common Raven	*Corvus corax*	4	26	1.95	18	20.69
Ring-billed Gull	*Larus delawarensis*	1	23	1.73	5	5.75
Sagebrush Sparrow	*Artemisiospiza nevadensis*	2	23	1.73	11	12.64
Western Kingbird	*Tyrannus verticalis*	3	16	1.20	10	11.49
California Quail	*Callipepla californica*	2	11	0.83	6	6.90
Bullock'S Oriole	*Icterus bullockii*	1	11	0.83	5	5.75

Common Name	Scientific Name	Routes[a]	Individuals	% Counts	Stops[b]	% Stops
Mallard	*Anas platyrhynchos*	1	10	0.75	2	2.30
Rock Wren	*Salpinctes obsoletus*	1	9	0.68	6	6.90
Eastern Kingbird	*Tyrannus tyrannus*	1	9	0.68	4	4.60
Long-billed Curlew	*Numenius americanus*	2	9	0.68	6	6.90
Great Blue Heron	*Ardea herodias*	1	7	0.53	3	3.45
Swainson'S Hawk	*Buteo swainsoni*	2	6	0.45	5	5.75
N. Rough-winged Swallow	*Stelgidopteryx serripennis*	1	6	0.45	1	1.15
Black-billed Magpie	*Pica hudsonia*	1	5	0.38	3	3.45
Mourning Dove	*Zenaida macroura*	2	5	0.38	4	4.60
Grasshopper Sparrow	*Ammodramus savannarum*	3	4	0.30	3	3.45
Barn Swallow	*Hirundo rustica*	1	4	0.30	2	2.30
Brown-Headed Cowbird	*Molothrus ater*	1	4	0.30	2	2.30
American Robin	*Turdus migratorius*	1	4	0.30	2	2.30
Loggerhead Shrike	*Lanius ludovicianus*	2	3	0.23	3	3.45
Sage Thrasher	*Oreoscoptes montanus*	2	3	0.23	3	3.45
Common Merganser	*Mergus merganser*	1	3	0.23	3	3.45
Tree Swallow	*Tachycineta bicolor*	1	3	0.23	1	1.15
Northern Harrier	*Circus cyaneus*	1	3	0.23	3	3.45
Vesper Sparrow	*Pooecetes gramineus*	1	3	0.23	2	2.30
American White Pelican	*Pelecanus erythrorhynchos*	1	3	0.23	2	2.30
Killdeer	*Charadrius vociferus*	1	2	0.15	1	1.15
Forster's Tern	*Sterna forsteri*	1	2	0.15	1	1.15
Red-Tailed Hawk	*Buteo jamaicensis*	2	2	0.15	2	2.30
Savannah Sparrow	*Passerculus sandwichensis*	1	2	0.15	1	1.15
American Kestrel	*Falco sparverius*	1	2	0.15	1	1.15
Song Sparrow	*Melospiza melodia*	1	2	0.15	2	2.30
Osprey	*Pandion haliaetus*	1	2	0.15	2	2.30
Say's Phoebe	*Sayornis saya*	1	1	0.08	1	1.15
Double-crested Cormorant	*Phalacrocorax auritus*	1	1	0.08	1	1.15
Ring-necked Pheasant	*Phasianus colchicus*	1	1	0.08	1	1.15
Western Wood-pewee	*Contopus sordidulus*	1	1	0.08	1	1.15
American Crow	*Corvus brachyrhynchos*	1	1	0.08	1	1.15
Bald Eagle	*Haliaeetus leucocephalus*	1	1	0.08	1	1.15
Ferruginous Hawk	*Buteo regalis*	1	1	0.08	1	1.15

[a] Count of how many of the 4 unique Hanford Roadside routes was species identified (4 Max)
[b] Number of survey points the species was identified

Table 3. Species Richness and Abundance Counted During 2014 Roadside Bird Survey Routes on the Hanford Site Sorted by Route.

Route Name	Performed	Species	Abundance
Army Loop Rd	.5	8	116
Gable Mountain	1	13	214
Horn Rapids to Townsite	1	17	283
Old fields	1	41	719
Total	**3.5**	**51[a]**	**1332**

[a] Unique species identified

4.0 Discussion

For 26 years, the roadside bird survey monitoring program has provided the Hanford Site with valuable avian community data needed for population and habitat evaluation. As designed, the surveys are intended to be an indicator of abundance, species distribution, and potential habitat quality. Performing surveys using BBS methods is an efficient way of collecting species data over large portions of the Hanford Site and provide data that are comparable with the historical data set.

As anticipated, species diversity varied over the four routes, which differ in vegetation type and cover. Figure 4 shows the four survey routes and associated vegetation cover.

Roadside bird survey route 'Army Loop Rd' starts in disrupted sagebrush habitats and continues through fire-recovering native grasslands and cheatgrass meadows. This route was performed as part of the 2014 BBS "Richland" Route, which enters the Hanford 'Army Loop Rd' route at point 12. Species richness (8 species) and abundance (116 birds) on this route were the lowest of the four Hanford routes. This is to be expected with only half the route surveyed in 2014 (Figure 2); however annually this route has historically been on the lower end of these two indices. The 14 observation points surveyed in 2014 are located within native, replanted, or invasive grass cover types. Along this route there are many fence lines, utility lines, and a few historical army installations where planted trees persist. These artificial habitats allow a greater number of species to inhabit the area than what would be expected based on the ground cover type. Horned Larks are prevalent on this route year round. The utility lines along this route provide nesting structures for Common Ravens (*Corvus corax*), Swainson's Hawks (*Buteo swainsoni*), Red-tailed Hawks (*Buteo jamaicensis*) and some passerine species.

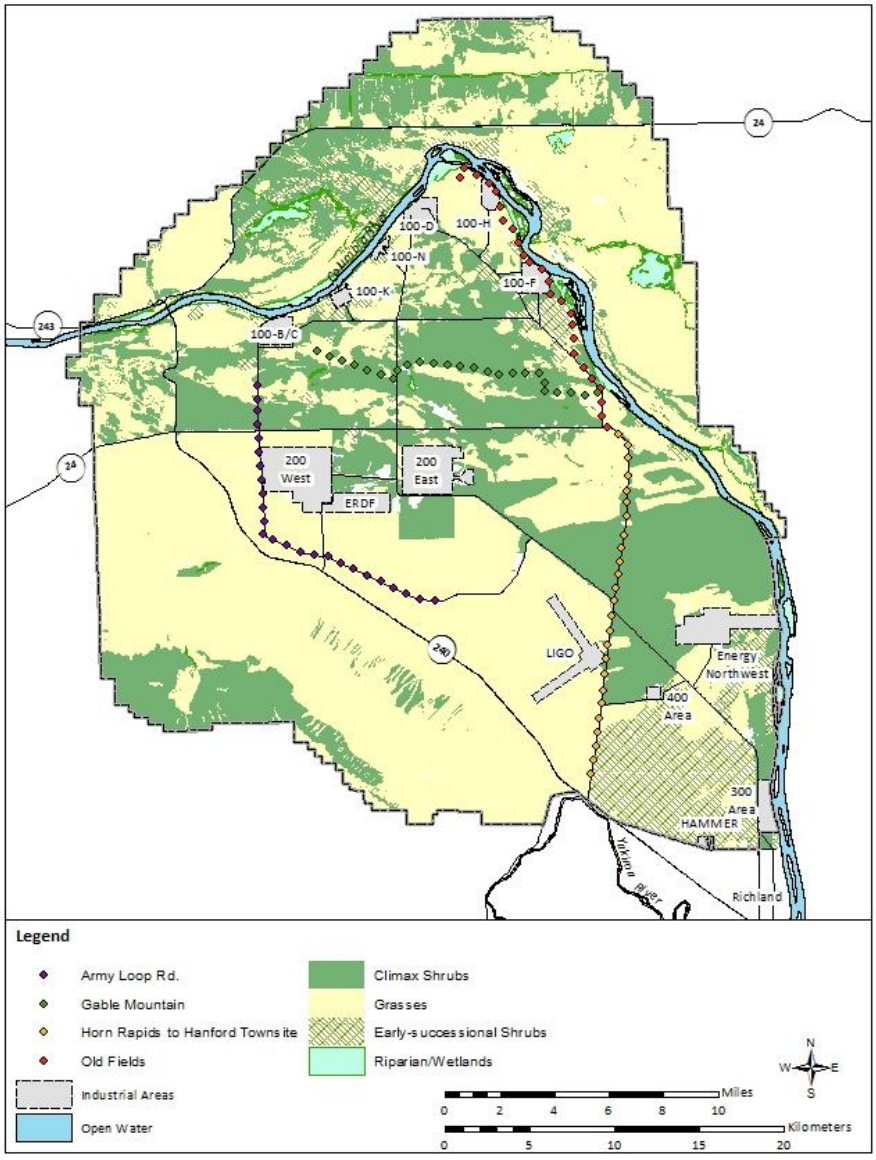

Figure 4. Hanford Site roadside bird survey routes and the vegetation communities that they intersect

The 'Gable Mountain' survey route produced 13 species, slightly more than 'Army Loop Rd' and the second lowest abundance (214 individuals) of the four routes. This survey follows a route that consists primarily of varied densities of climax shrubs including sagebrush (*Artemisia spp*.), bitterbrush (*Purshia tridentata*), and spiny hopsage (*Grayia spinosa*). Additionally, this route surveys sections of land dominated by cheatgrass (*Bromus tectorum*) and small, assorted bunchgrasses. Gable Mountain contains many basalt outcroppings and talus slopes, which are potential habitat for bird species such as Rock Wren (*Salpinctes obsoletus*) or Canyon Wren (*Catherpes mexicanus*), but distance from survey points often make identification of these small birds challenging during surveys unless the birds are actively singing. Nine Rock Wrens were identified during the 2014 survey of the 'Gable Mountain' route. As expected,

sagebrush-dependent species, such as the Sagebrush Sparrow, inhabit this area due to the presence of mature, intact shrub-steppe. These species are highly sensitive to habitat removal and disturbance, but could benefit from habitat restoration (PNL-6493).

The route of 'Horn Rapids to Townsite' had the second highest diversity (17 species) and the second highest abundance (283 individuals) of the four routes. The higher abundance can be partially attributed to the high frequency of Western Meadowlark and Horned lark, which accounted for 211 (74%) of the individuals detected during surveys of this route. This route presents some unique challenges. The entire route follows a main road used by employees to access large portions of the Hanford Site. The number of vehicles passing presents a disturbance to the survey. The route passes through three main types of vegetation cover: intermediate shrubs, grasses, and climax shrubs (Figure 4). Areas within climax shrubs include some sand and dune areas. Metal transmission towers provide perching and nesting habitat for species such as Common Ravens, Ferruginous Hawks, and other raptors. While challenges exist on this route, some uncommon birds have been recorded along this route historically and include a Sage Thrasher, which was recorded twice in 2014, and a Black-throated Sparrow (*Amphispiza bilineata*), recorded in 2012, the first ever for this dataset (Wilde et al. 2013).

The Old Fields survey route had the richest species diversity (41 species), more than double the number of recorded species of any other route, and had by far the greatest number of individuals present (719 total). The high species diversity is due to the number of points that are located adjacent to riparian and riverine areas. Various species of waterfowl and fish-eating birds including Great Egret (*Ardea alba*), Great-blue Heron (*Ardea herodias*), American White Pelican, and Double-crested Cormorant (*Phalacrocorax auritus*) were documented along this route. The Old Fields route passes through some of the Hanford Site's historic settlements, starting near the old Hanford Townsite and passing through the White Bluffs Townsite, ferry landing, and many pre-Hanford operations farm fields. There are many planted trees in and around these towns and historic farms that, in conjunction with the riparian areas, provide rich, albeit non-native, habitat for many species to inhabit. Some large trees along the river are used as Bald Eagle night roosts during the winter, and may continue as perches late into the spring and or early summer. The old farming areas, which are now dominated by cheatgrass, provide a haven for bird species like the Horned Lark, Ring-necked Pheasant (*Phasianus colchicus*), Long-billed Curlews (*Numenius americanus*) and, while not documented during roadside surveys in 2014, Burrowing Owls (Wilde et al. 2012, Wilde et al. 2014). While riparian and riverine areas are not representative of shrub-steppe habitat, these areas contribute greatly to the overall avian diversity of the Hanford Site.

The MSA roadside monitoring program documents the presence, abundance, and distribution of species of concern on the Hanford Site. Both the USFWS and the WDFW maintain lists of species that are of management concern because populations or habitat availability are limited. In the State of Washington, these listings include (in order of least to greatest concern) State Candidate, State Sensitive, State Threatened, and State Endangered species. Washington also maintains a list of State Monitor species, a group of birds that are not considered "species of concern", but for which status and distribution data is maintained by the WDFW. There are currently no species listed as federally threatened or endangered

on the Hanford Site, although several are considered “species of concern” in Eastern Washington; all of these species also have state listings. Previous inventories on the Hanford Site (i.e. Landeen et al 1991, Fitzner and Gray 1991, TNC 1999) identified 17 state-listed species that either reside on or migrate through the Hanford Site, in addition to approximately 23 State Monitor species.

The continued use of the Hanford Site by state and federal species of concern warrants continued protection of the valuable habitat on site and the routine monitoring of the avifauna. Six listed species were detected during roadside surveys in 2014. The listed species included American White Pelican, Bald Eagle, Ferruginous Hawk, Loggerhead Shrike, Sagebrush Sparrow, and Sage Thrasher. These species are discussed in more detail below. Figure 5 shows the distribution of the six state listed species recorded during 2014 roadside surveys.

Review of historical surveys performed by agencies other than Department of Energy (DOE) and its contractors (Greager 1997; LaFramboise et al. 1997, 1998; Stephniewski 1994, 1995) may help identify off-road or additional roadside count locations. Continued surveys using BBS protocols in combination with additional routes around facility areas is a method employed by other DOE sites, including the Idaho National Laboratory bird monitoring program (GSS-ESER-169). Other DOE facilities use more labor intensive mist netting to monitoring migratory bird populations (Hathcock et al. 2013).

The monitoring of migratory and breeding bird populations and habitat on the Hanford Site is useful for identifying the need for and effectiveness of conservation efforts. While some monitoring programs focus exclusively on the breeding season, this method may fail to capture the significance of Hanford Site habitat to species outside of the breeding season. Landbird monitoring in shrub-steppe (including shrub-steppe ridges), grasslands, old farmlands, riparian zones and the industrial areas on site during three seasonal periods (breeding, fall migration, and winter) may broaden Hanford bird use knowledge. This includes year-round residents, both short and long distance migrants, vagrants, and winter residents.

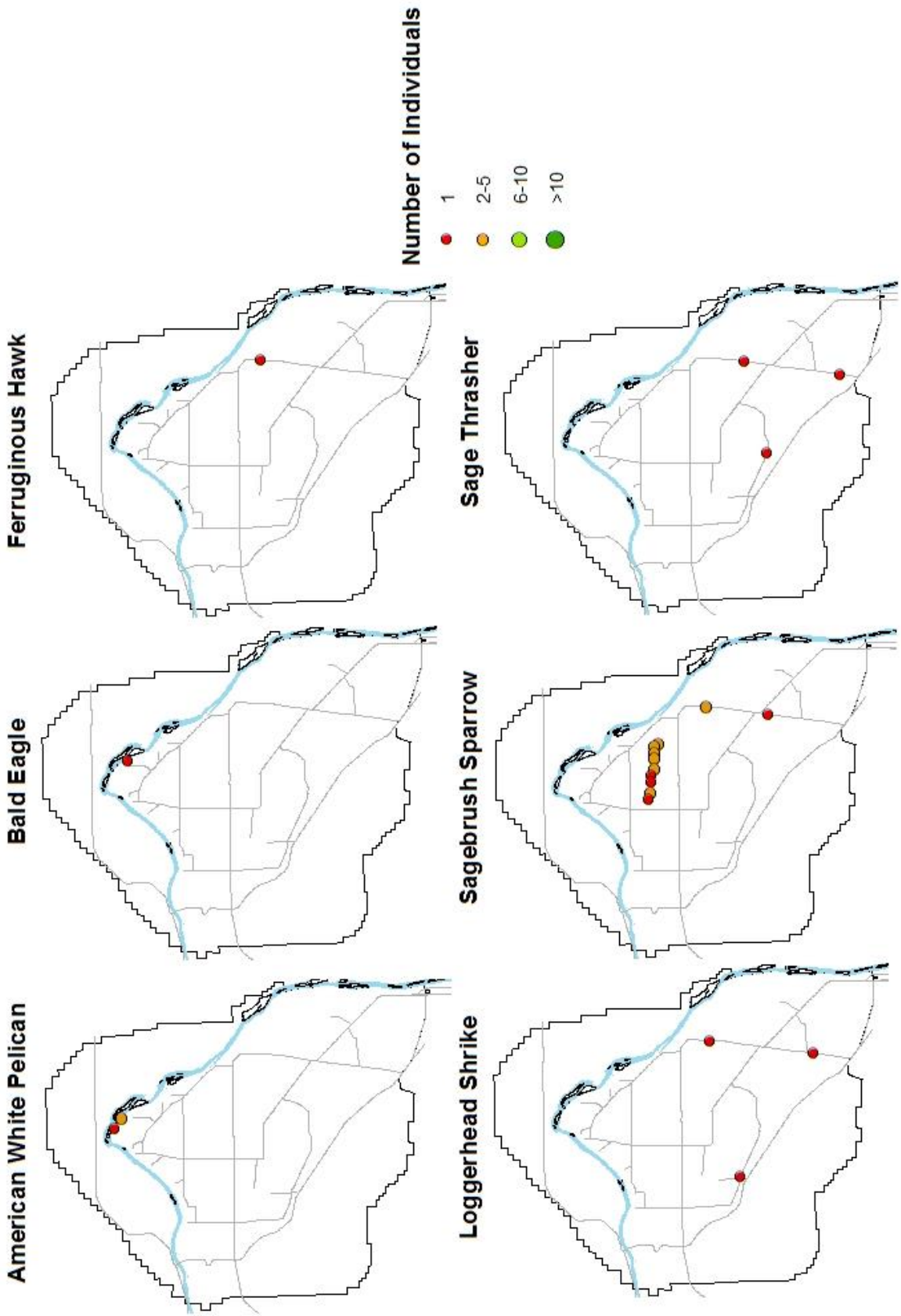

Figure 5. Locations on the Hanford Site and the number of individuals of the six state listed species detected during roadside surveys in 2014

American White Pelican - Common to the Hanford Reach, this State Endangered species is often seen on the ends of islands or floating through backwater sloughs. Three American White Pelicans were counted during three surveys, all on the Old Fields survey route. This is comparable to the June surveys of 2013 when 2 pelicans were identified.

Bald Eagle - A State Sensitive and Federal Species of Concern, the Bald Eagle is an annual winter resident along the riparian and riverine areas of the Hanford Site. Occasional nest building has occurred; however, 2013 was the first successful nesting attempt to be documented on the Hanford Site. The eagles produced two offspring that successfully fledged in both 2013 and 2014 (Cranna et al. 2015). A single Bald Eagle was recorded on the Old Fields survey route. This sighting was recorded while strictly using the BBS protocol along the designed routes; additional winter roost monitoring has shown the number of eagles in the area can exceed 60 individuals (Cranna et al. 2015).

Ferruginous Hawk - The Ferruginous Hawk is a State Threatened species and a Federal Species of Concern. Separate raptor nest monitoring located and identified known Ferruginous Hawk nests in 2014 (Nugent et al. 2015). One Individual was recorded during the June 12, 2014 survey on the Horn Rapids to Townsite survey route, in close proximity to the same nest location that was active in 2013.

Loggerhead Shrike - Loggerhead Shrikes are residents and successful breeders on the Hanford Site. This Federal Species of Concern and State Candidate species can often be seen year round. A total of 3 individuals were counted on seven different survey dates covering three survey routes. This number is down from the 7 individuals identified during the June surveys of 2013.

Sagebrush Sparrow - Sagebrush Sparrows are common to the Hanford Site in remaining areas of dense sagebrush habitat. Sagebrush sparrows are a State Candidate species. Sagebrush Sparrows can be difficult to detect using roadside surveys because paved roads and road shoulders exclude mature shrubs that are used by singing male Sagebrush Sparrows. A total of 23 individuals were recorded on the Gable Mountain and Horn Rapids-Townsite routes. This number was an increase from the 15 individuals identified during the June surveys in 2013. The Gable Mountain route accounted for 20 individuals in 2014.

Sage Thrasher - The Sage Thrasher is listed as a State Candidate species in Washington State. Three individuals were counted, one on the Army Loop Rd route point 24 and two on the Horn Rapids-Townsite route at points 2 and 17. There were no Sage Thrashers recorded in 2013, but a single individual was counted on the Horn Rapids-Townsite route in 2012.

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