

# Hanford Site Roadside Bird Surveys Report for Calendar Year 2013



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



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**Richland, Washington 99352**

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**APPROVED**

*By GE Bratton at 11:01 am, Oct 15, 2014*

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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 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 in 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 of 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 2012](#)). In addition, the Hanford Site and surrounding area provides refuge to potentially 18 state-listed species as well as numerous state-monitored species ([WDFW 2012](#)) 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 2012](#)).

As owner 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 2013 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](#)).

Four independent monitoring efforts were performed by MSA in 2013 to monitor and protect migratory bird species on the Hanford Site:

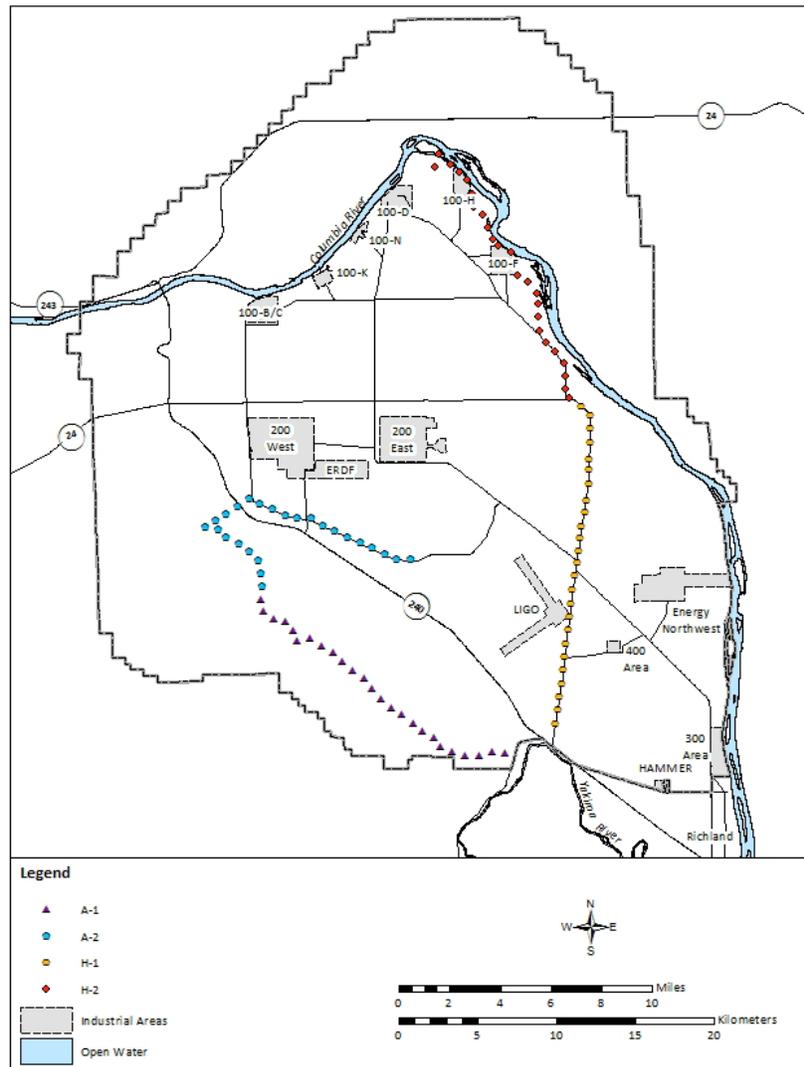
- Bald Eagle roost and nest monitoring ([HNF-55187](#)),
- Raptor nest monitoring ([HNF-56769](#)),
- Burrowing Owl (*Athene cunicularia*) monitoring ([HNF-56531](#)), and
- Roadside bird surveys.

Ten bald eagle night roost locations on the Hanford Site were protected from disturbance during 2013 with buffers. These exclusion buffers were enforced from November 15 through March 15. The purpose of the Fiscal Year 2013 monitoring was to determine whether eagles are continuing to use the currently protected roost locations, and whether any additional roosts exist along the Hanford shoreline of the Columbia River. Eagle nesting activity was also documented and potential nest sites were monitored to determine if new nest protection areas were necessary ([HNF-55187](#)).

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 of Hanford Site operations ([HNF-56769](#)).

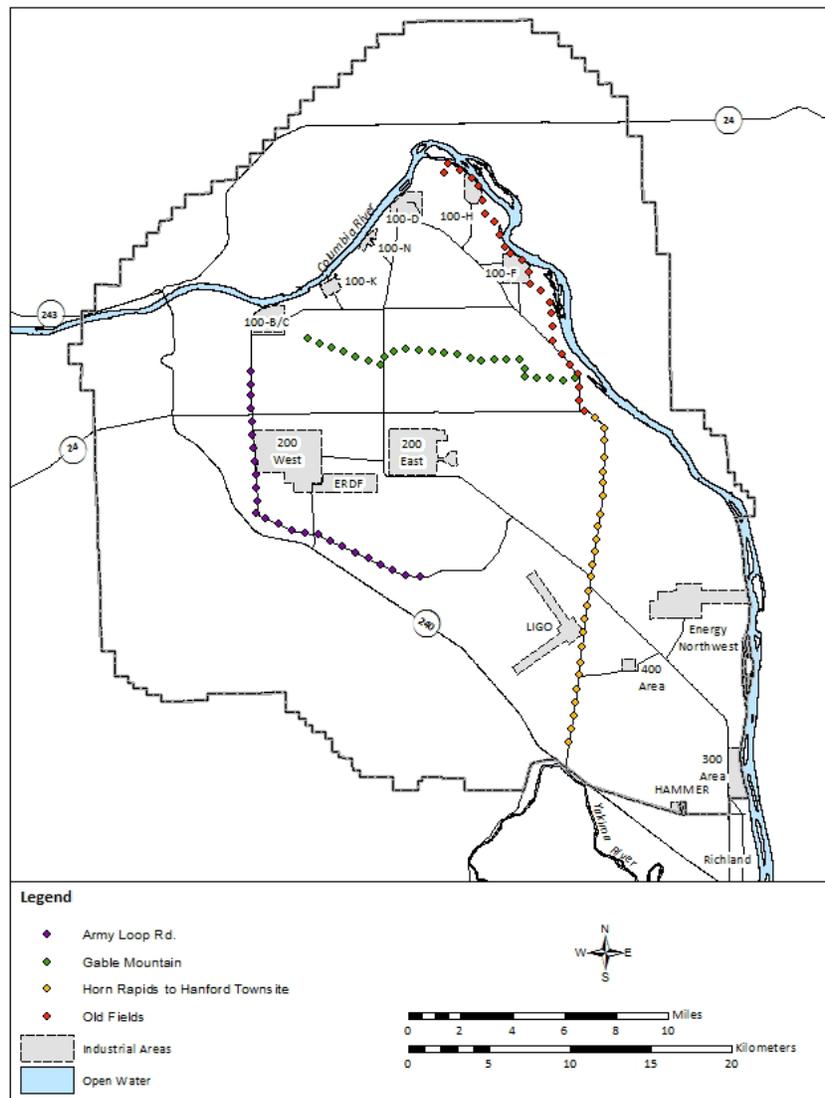
Monitoring of the Hanford Site Burrowing Owl populations was initiated in 2012 ([HNF-54294](#)) and continued into 2013 ([HNF-56531](#)). Efforts in 2013 focused on maintaining existing artificial burrows, determining the status of previously known burrows, and surveying for new burrows. Without documentation of current owl burrow locations, it can be difficult to provide effective guidance for their protection. Continued monitoring and protection of this state candidate species will help to assure the continued presence of Burrowing Owls on the Hanford Site ([HNF-56531](#)).

Migratory bird and breeding bird surveys, which are the focus of this report, were performed on four historical survey routes in 2013. 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).



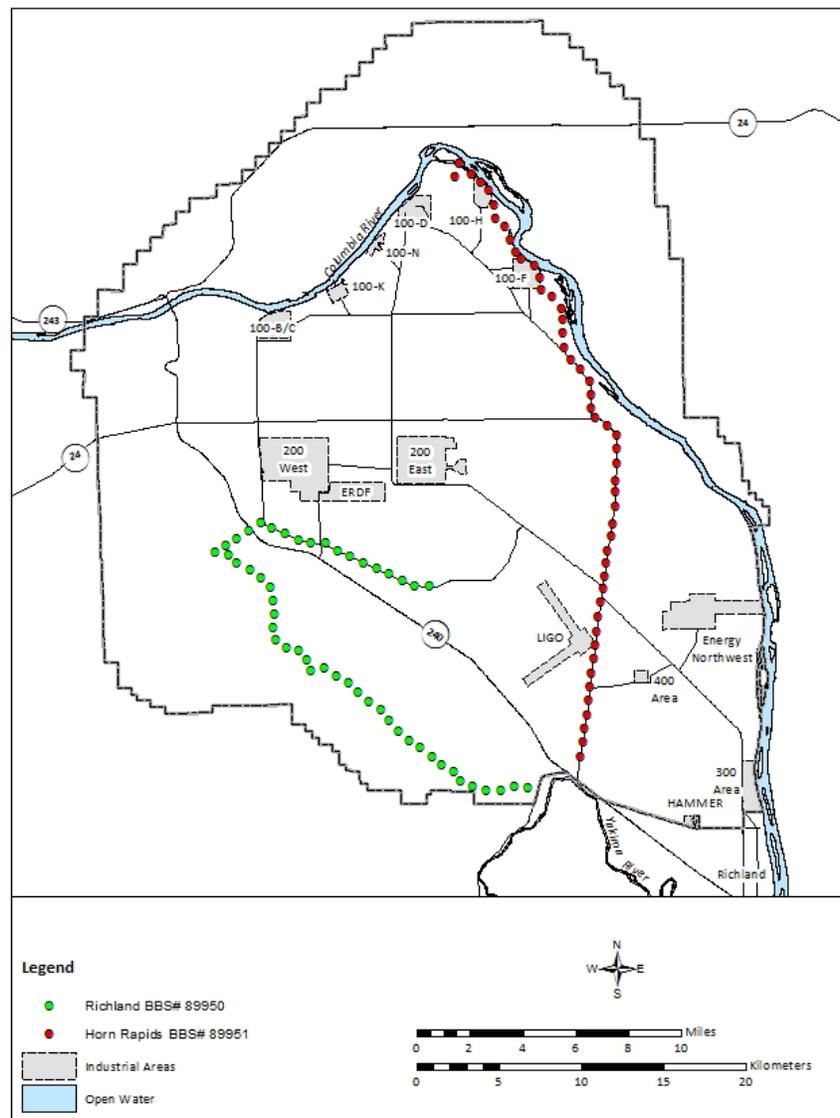
**Figure 1. Roadside bird survey routes performed on the Hanford Site from 1988-2001**

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 ([HNF-55491](#)). The four modified roadside bird survey routes that were 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, two of the current routes, “Horn Rapids to Townsite” and “Old Fields”, were combined and designated as the annual “Horn Rapids” North American Breeding Bird Survey (BBS) route. In 2006 the “Richland” BBS route was created from the previously discontinued routes, and surveys were performed by Hanford Site staff. Figure 3 shows the two United States Geological Survey (USGS) BBS survey routes performed at Hanford. 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 USGS, USFWS, and the Canadian Wildlife Service, the BBS incorporates counting efforts across the United States and Canada. Comprehensive summaries of population change have been calculated for >400 species of birds across North America (Sauer et al 2003).



**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.

In addition to the BBS surveys, non-traditional location counts were performed following the fall migration BBS surveys. These counts were located at potential migration hot spots, usually isolated patches of trees. The goal of the extra effort was to expand the value of restricted roadside counts and allow more focused searches.

This report does not provide an inventory of all birds that inhabited any portion of the Hanford Site in 2013, 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 and relative abundance of shrub-steppe birds over time and in response to various types of land-use changes ([PNNL 2011](#)).

## 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). A total of 11 roadside surveys were performed on the Hanford Site in 2013, surveying nearly 300 points over approximately 80 kilometers (50 miles). Four survey routes (Figure 2) were surveyed three times during the 2013 season. Routes were surveyed once in pre-breeding season (March), once during breeding season in coordination with BBS (June), and once during fall migration (September).

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). All roadside routes are marked with count points at 0.8-km (0.5 miles) intervals with steel fence posts, rebar posts, or flags. 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 marker post and observed the area for three minutes, recorded their observations, and continued to the next marker post. 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.

Attempts were made to start all Hanford surveys in the early morning hours, within 30 minutes 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.

It is acknowledged that an on-road monitoring program is not without bias; however, the benefits are considered to outweigh most disadvantages and can be partly offset by off-road point counts ([USDA 1993](#)). In 2011 and 2012, the PSRP migratory bird monitoring program has did not include any off-road or non-traditional point or transect surveys outside of the species specific monitoring mentioned above. In 2013, six locations were selected to perform non-traditional point counts and/or walking surveys (Figure 4). The locations were selected based on the potential for documenting species richness during the fall migration when the surveys were performed. Non-traditional survey counts were classified as either a point or walking survey count, with three of each. These non-traditional surveys were performed following completion of BBS or Hanford routes on September 9 and September 10. Transects were done by foot survey, visiting any habitat or structure considered to be of value for bird

species along the route. The point counts were surveyed by remaining relatively stationary from a view point of the desired habitat or structure for a period of 20 minutes. Only unique species were documented on the non-traditional surveys and not number of individuals. The purpose of the non-traditional surveys was to understand if the Hanford roadside surveys were leaving significant gaps in species data.



### 3.0 Results

A total of 11 roadside surveys, covering each of the four Hanford roadside routes three times (a single BBS survey covered two Hanford Routes), were completed in 2013 (Table 1). A total of 3421 birds were documented during the 2013 surveys, similar to the 3565 individuals counted in 2012. Seventy-three different bird species were documented in 2013 (excluding the non-traditional routes), up from the 53 species documented in 2012.

The Western Meadowlark (*Sturnella neglecta*) was the most abundant species documented. Surveys documented 712 meadowlark individuals, approximately 20.81% of all individuals counted. The second most abundant species was the Horned Lark (*Eremophila alpestris*) with 708 individuals, 20.70% of surveyed individuals (Table 2). The Western Meadowlark was counted on 239 survey points (79.67%), while the Horned Lark was documented on 221 survey points (73.67%). These two species were clearly the most counted species in 2013; they were counted at nearly three times as many survey points and included almost twice as many individuals as any other species documented.

**Table 1. 2013 Survey date and location.**

Route Name	Pre-Breeding Survey	Breeding Survey	Fall Migration Survey
Army Loop Rd	3/13/2013	6/17/2013 <sup>a</sup>	9/12/2013
Gable Mountain	3/12/2013	6/11/2013	9/18/2013
Horn Rapids to Townsite	3/29/2013	6/24/2013 <sup>b</sup>	9/17/2013
Old Fields	3/27/2013	6/24/2013 <sup>b</sup>	9/10/2013

<sup>a</sup> Surveyed during Richland BBS

<sup>b</sup> 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 11 surveys performed on the Central Hanford Site in 2013.**

Common Name	Scientific Name	Routes <sup>a</sup>	Individuals <sup>b</sup>	%	Stops <sup>c</sup>	% <sup>d</sup>
Western Meadowlark	<i>Sturnella neglecta</i>	12	712	21.00	239	79.67
Horned Lark	<i>Eremophila alpestris</i>	12	708	20.88	221	73.67
European Starling	<i>Sturnus vulgaris</i>	8	364	10.73	42	14.00
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>	1	182	5.37	3	1.00
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	7	173	5.10	32	10.67
Common Raven	<i>Corvus corax</i>	12	135	3.98	76	25.33
Bank Swallow	<i>Riparia riparia</i>	1	124	3.66	7	2.33
Canada Goose	<i>Branta canadensis</i>	3	86	2.54	11	3.67
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	3	82	2.42	13	4.33
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>	2	66	1.95	7	2.33
Barn Swallow	<i>Hirundo rustica</i>	5	57	1.68	10	3.33
California Quail	<i>Callipepla californica</i>	3	49	1.45	29	9.67
Black-billed Magpie	<i>Pica hudsonia</i>	9	49	1.45	11	3.67
Yellow-rumped Warbler	<i>Setophaga coronata</i>	2	43	1.27	8	2.67
Sagebrush Sparrow	<i>Artemisiospiza nevadensis</i>	8	41	1.21	27	9.00
House Finch	<i>Haemorhous mexicanus</i>	9	37	1.09	15	5.00
Great Blue Heron	<i>Ardea herodias</i>	3	36	1.06	7	2.33
American Crow	<i>Corvus brachyrhynchos</i>	6	31	0.91	6	2.00
Lark Sparrow	<i>Chondestes grammacus</i>	5	29	0.86	17	5.67
Tree Swallow	<i>Tachycineta bicolor</i>	3	26	0.77	4	1.33
Western Kingbird	<i>Tyrannus verticalis</i>	3	23	0.68	9	3.00
Great Egret	<i>Ardea alba</i>	2	21	0.62	9	3.00
Killdeer	<i>Charadrius vociferus</i>	4	21	0.62	10	3.33
American Kestrel	<i>Falco sparverius</i>	6	19	0.56	13	4.33
Mallard	<i>Anas platyrhynchos</i>	2	18	0.53	4	1.33
Red-tailed Hawk	<i>Buteo jamaicensis</i>	9	17	0.50	14	4.67
Loggerhead Shrike	<i>Lanius ludovicianus</i>	7	17	0.50	15	5.00
Common Nighthawk	<i>Chordeiles minor</i>	3	15	0.44	11	3.67
Common Merganser	<i>Mergus merganser</i>	3	14	0.41	5	1.67
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	2	13	0.38	3	1.00
Mourning Dove	<i>Zenaida macroura</i>	6	13	0.38	11	3.67
American Robin	<i>Turdus migratorius</i>	3	12	0.35	7	2.33
American Wigeon	<i>Anas americana</i>	1	12	0.35	1	0.33
American White Pelican	<i>Pelecanus erythrorhynchos</i>	3	11	0.32	4	1.33
Song Sparrow	<i>Melospiza melodia</i>	1	11	0.32	3	1.00
Long-billed Curlew	<i>Numenius americanus</i>	3	10	0.29	5	1.67
N. Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	1	10	0.29	2	0.67
Bullock's Oriole	<i>Icterus bullockii</i>	1	9	0.27	5	1.67
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	2	8	0.24	7	2.33
Rock Wren	<i>Salpinctes obsoletus</i>	2	8	0.24	6	2.00
Ring-necked Pheasant	<i>Phasianus colchicus</i>	4	7	0.21	6	2.00
Northern Harrier	<i>Circus cyaneus</i>	5	6	0.18	6	2.00
Rock Pigeon	<i>Columba livia</i>	1	6	0.18	1	0.33
Eastern Kingbird	<i>Tyrannus tyrannus</i>	1	5	0.15	1	0.33
Chukar	<i>Alectoris chukar</i>	1	5	0.15	3	1.00
Swainson's Hawk	<i>Buteo swainsoni</i>	2	4	0.12	1	0.33
Northern Flicker	<i>Colaptes auratus</i>	2	4	0.12	2	0.67

Common Name	Scientific Name	Routes <sup>a</sup>	Individuals <sup>b</sup>	%	Stops <sup>c</sup>	% <sup>d</sup>
Green-winged Teal	<i>Anas crecca</i>	1	4	0.12	4	1.33
Bald Eagle	<i>Haliaeetus leucocephalus</i>	2	4	0.12	3	1.00
Savannah Sparrow	<i>Passerculus sandwichensis</i>	1	4	0.12	4	1.33
Ring-billed Gull	<i>Larus delawarensis</i>	2	3	0.09	1	0.33
Bufflehead	<i>Bucephala albeola</i>	1	3	0.09	2	0.67
Belted Kingfisher	<i>Megaceryle alcyon</i>	1	2	0.06	2	0.67
Western Grebe	<i>Aechmophorus occidentalis</i>	1	2	0.06	1	0.33
Merlin	<i>Falco columbarius</i>	2	2	0.06	2	0.67
Willow Flycatcher	<i>Empidonax traillii</i>	1	1	0.03	1	0.33
American Goldfinch	<i>Spinus tristis</i>	1	1	0.03	1	0.33
American Pipit	<i>Anthus rubescens</i>	1	1	0.03	1	0.33
Common Loon	<i>Gavia immer</i>	1	1	0.03	1	0.33
Cooper's Hawk	<i>Accipiter cooperii</i>	1	1	0.03	1	0.33
Osprey	<i>Pandion haliaetus</i>	1	1	0.03	1	0.33
Townsend's Warbler	<i>Setophaga townsendi</i>	1	1	0.03	1	0.33
Say's Phoebe	<i>Sayornis saya</i>	1	1	0.03	1	0.33
Vesper Sparrow	<i>Pooecetes gramineus</i>	1	1	0.03	1	0.33
Pied-billed Grebe	<i>Podilymbus podiceps</i>	1	1	0.03	1	0.33
Rough-legged Hawk	<i>Buteo lagopus</i>	1	1	0.03	1	0.33
Prairie Falcon	<i>Falco mexicanus</i>	1	1	0.03	1	0.33
Ferruginous Hawk	<i>Buteo regalis</i>	1	1	0.03	1	0.33
Northern Shrike	<i>Lanius excubitor</i>	1	1	0.03	1	0.33
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>	1	1	0.03	1	0.33
Thayer's Gull	<i>Larus thayeri</i>	1	1	0.03	1	0.33
Greater Yellowlegs	<i>Tringa melanoleuca</i>	1	1	0.03	1	0.33
Orange-crowned Warbler	<i>Oreothlypis celata</i>	1	1	0.03	1	0.33

<sup>a</sup> Count of how many Hanford Roadside routes was species identified over all surveys (4 routes 3 surveys each max 12)

<sup>b</sup> Does not include 30 unidentified individuals of gulls (*Larus* sp.) due to distance

<sup>c</sup> Number of survey points the species was identified

<sup>d</sup> percentage of the 300 total stops surveyed

**Table 3. Species richness and abundance counted during 2013 roadside bird survey routes on the Hanford Site sorted by route.**

Route Name	Performed	Species	Abundance
Army Loop Rd	3	21	479
Gable Mountain	3	22	459
Horn Rapids to Townsite	3	21	574
Old fields	3	64	1909
<b>Total</b>	<b>12</b>	<b>73<sup>a</sup></b>	<b>3421</b>

<sup>a</sup> Unique Species identified

Non-traditional survey route bird counts were completed during fall migration season in an attempt to document if roadside counts left gaps in documenting readily available species through various habitats on the Hanford Site. Six locations were surveyed, three point counts and three as a variation of a walking transect. The quantity of species from the non-traditional Hanford surveys is shown in Table 4. All non-traditional surveys were performed on September 9, 2013. The additional routes yielded nine species of birds that had not been documented during the roadside route surveys during 2013. This is a 12.3% addition to the number of species obtained during surveys. The species documented during non-traditional surveys, including the highlight of species uniques to non-traditional surveys, can be located in Table 5.

**Table 4. Non-traditional counts species quantification with comparison of species unique to those surveys vs Hanford Roadside surveys and BBS only surveys**

Location	Date	# Species	# Species Unique of Hanford Routes	# Species Unique of BBS Surveys
<b>Transects</b>				
WB Boat Launch	9/9/2013	25	4	13
100H Trees	9/9/2013	12	0	3
Weather Station	9/9/2013	5	2	3
<b>Point Counts</b>				
600 Fire Trees	9/9/2013	6	2	4
WB Slough	9/9/2013	8	0	5
200 Fire Trees	9/9/2013	11	3	6
<b>Total Species Richness</b>		<b>40</b>	<b>9</b>	<b>20</b>

**Table 5. Species observed during 2013 non-traditional surveys sorted by species count frequency**

Common Name <sup>a</sup>	Scientific Name	WB Boat Launch	100H Trees	Weather Station	600 Fire Trees	WB Slough	200 Fire Trees	Locations
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	X	X	X	X	X	X	6
California Quail	<i>Callipepla californica</i>	X	X	X			X	4
Yellow-rumped Warbler	<i>Setophaga coronata</i>	X	X			X	X	4
American Robin	<i>Turdus migratorius</i>	X			X		X	3
<b>Dark-eyed Junco</b>	<b><i>Junco hyemalis</i></b>	<b>X</b>		<b>X</b>			<b>X</b>	<b>3</b>
Mourning Dove	<i>Zenaidura macroura</i>	X	X		X			3
Black-billed Magpie	<i>Pica hudsonia</i>	X	X					2
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>		X	X				2
Great Blue Heron	<i>Ardea herodias</i>	X	X					2
Great Egret	<i>Ardea alba</i>	X	X					2
Killdeer	<i>Charadrius vociferus</i>	X					X	2
Northern Flicker	<i>Colaptes auratus</i>	X				X		2
Orange-crowned Warbler	<i>Oreothlypis celata</i>	X			X			2
Red-winged Blackbird	<i>Agelaius phoeniceus</i>		X				X	2
Song Sparrow	<i>Melospiza melodia</i>	X				X		2
<b>Western Wood-pewee</b>	<b><i>Contopus sordidulus</i></b>	<b>X</b>					<b>X</b>	<b>2</b>
American Crow	<i>Corvus brachyrhynchos</i>					X		1
American White Pelican	<i>Pelecanus erythrorhynchos</i>	X						1
Barn Swallow	<i>Hirundo rustica</i>	X						1
<b>Black-chinned Hummingbird</b>	<b><i>Archilochus alexandri</i></b>				X			<b>1</b>
Belted Kingfisher	<i>Megaceryle alcyon</i>	X						1
Common Merganser	<i>Mergus merganser</i>		X					1
Common Raven	<i>Corvus corax</i>	X						1
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	X						1
Eastern Kingbird	<i>Tyrannus tyrannus</i>					X		1
European Starling	<i>Sturnus vulgaris</i>	X						1
<b>Golden-crowned Kinglet</b>	<b><i>Regulus satrapa</i></b>			<b>X</b>				<b>1</b>
<b>Gray Flycatcher</b>	<b><i>Empidonax wrightii</i></b>	<b>X</b>						<b>1</b>
Greater Yellowlegs	<i>Tringa melanoleuca</i>		X					1
<b>Hammond's Flycatcher</b>	<b><i>Empidonax hammondii</i></b>	<b>X</b>						<b>1</b>
House Finch	<i>Haemorhous mexicanus</i>						X	1
<b>House Sparrow</b>	<b><i>Passer domesticus</i></b>						<b>X</b>	<b>1</b>
Mallard	<i>Anas platyrhynchos</i>					X		1
Osprey	<i>Pandion haliaetus</i>		X					1
Say's Phoebe	<i>Sayornis saya</i>						X	1
Savannah Sparrow	<i>Passerculus sandwichensis</i>	X						1
<b>Spotted Towhee</b>	<b><i>Pipilo maculatus</i></b>					<b>X</b>		<b>1</b>
Townsend's Warbler	<i>Setophaga townsendi</i>	X						1
Western Meadowlark	<i>Sturnella neglecta</i>	X						1
<b>Yellow Warbler</b>	<b><i>Setophaga petechia</i></b>				<b>X</b>			<b>1</b>

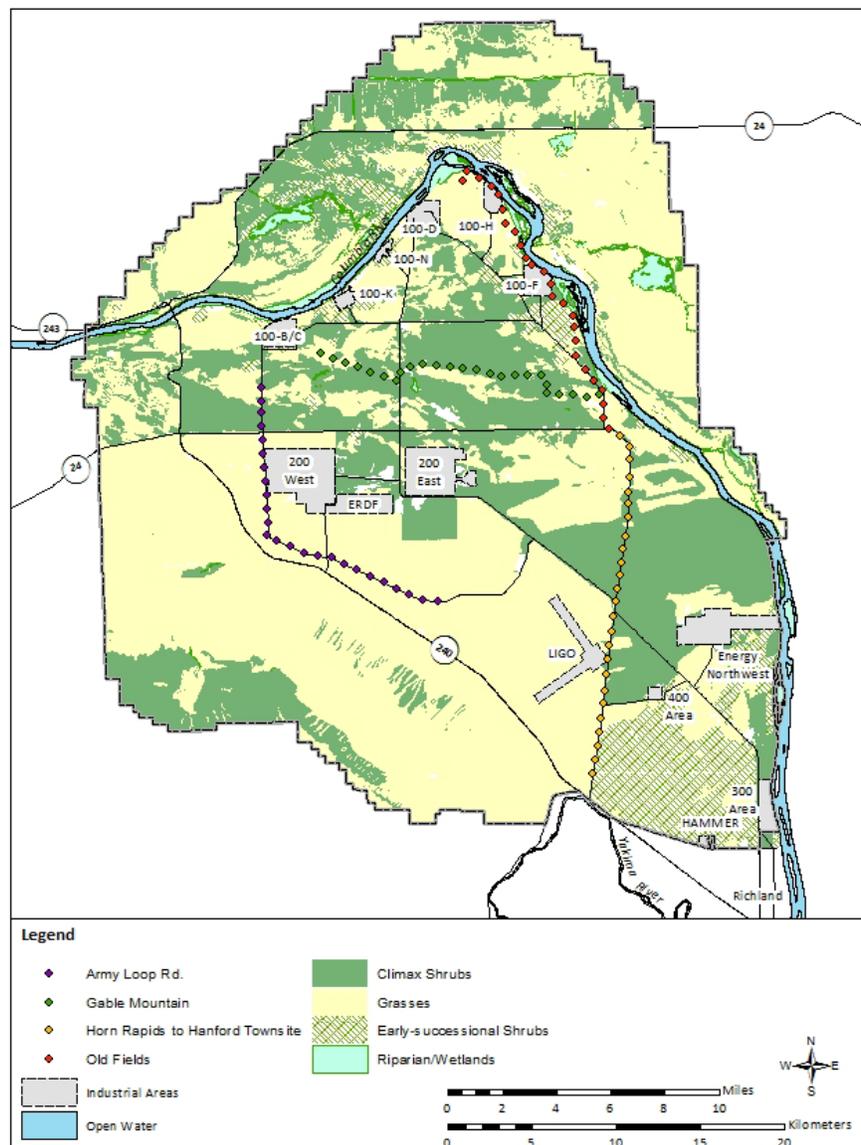
<sup>a</sup> Bold font signifies species not documented during roadside routes

## 4.0 Discussion

For 24 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 a cost effective way of collecting species data over large portions of the Hanford Site and provide data that are comparable with the historical data set collected since 1988.

As anticipated, species diversity varied over the four routes, which differ in vegetation type and cover. Figure 5 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. Species richness (21 species) and abundance (479 birds) were among the lowest of the four Hanford routes. The first four observation points along the Army Loop Rd route are located within an area with dense fragmented sagebrush communities, which accounts for the presence of shrub-dependent species such as the Sagebrush Sparrow and Lark Sparrow. The remaining 21 observation points (all south of Route 11A) are located within 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 expected based on the cover type. Around the end of breeding season, an immense number of horned larks were encountered along this route. Adults with newly-fledged, immature birds often line the roadway in flocks. The utility lines along this route provide nesting structures for Common Raven (*Corvus corax*), Swainson's Hawk (*Buteo swainsoni*), Red-tailed Hawk (*Buteo jamaicensis*) and even some passerine species.



**Figure 5. Hanford Site roadside bird survey routes and the vegetation communities that they intersect**

The ‘Gable Mountain’ survey route had 22 species, slightly more than ‘Army Loop Rd’ and ‘Horn Rapids to Townsite’, and the lowest abundance (459 individuals) of the four routes. The lower overall number of species could be a result of the specialized habitat over large portions of this route. 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*), and accompanying areas of grasses including 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. 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 a low overall diversity (21 species), but had the second highest abundance (574 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 397 (69%) 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, while not currently analyzed, is a disturbance to the survey, and is therefore recorded when performing surveys. The route passes through three main types of vegetation cover: intermediate shrubs, grasses, and climax shrubs (Figure 5). Areas within climax shrubs include some heavy sand and dune areas. Metal power line 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 in 2012 and a Black-throated Sparrow (*Amphispiza bilineata*) the same year, the first ever recorded for this dataset ([HNF-55491](#)).

The Old Fields survey route had the richest species diversity (64 species), nearly tripling the number of recorded species of any other route, and had by far the greatest number of individuals present (1909 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 American White pelican, Double-crested Cormorant (*Phalacrocorax auritus*) and Belted Kingfisher (*Megaceryle alcyon*) 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 and ferry landing, and many pre-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 2013, Burrowing Owls ([HNF-54294](#), [HNF-56531](#)). 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. Many listed species of concern were documented along this route, including the Bald Eagle, American White Pelican, Common Loon (*Gavia immer*), and Loggerhead Shrike.

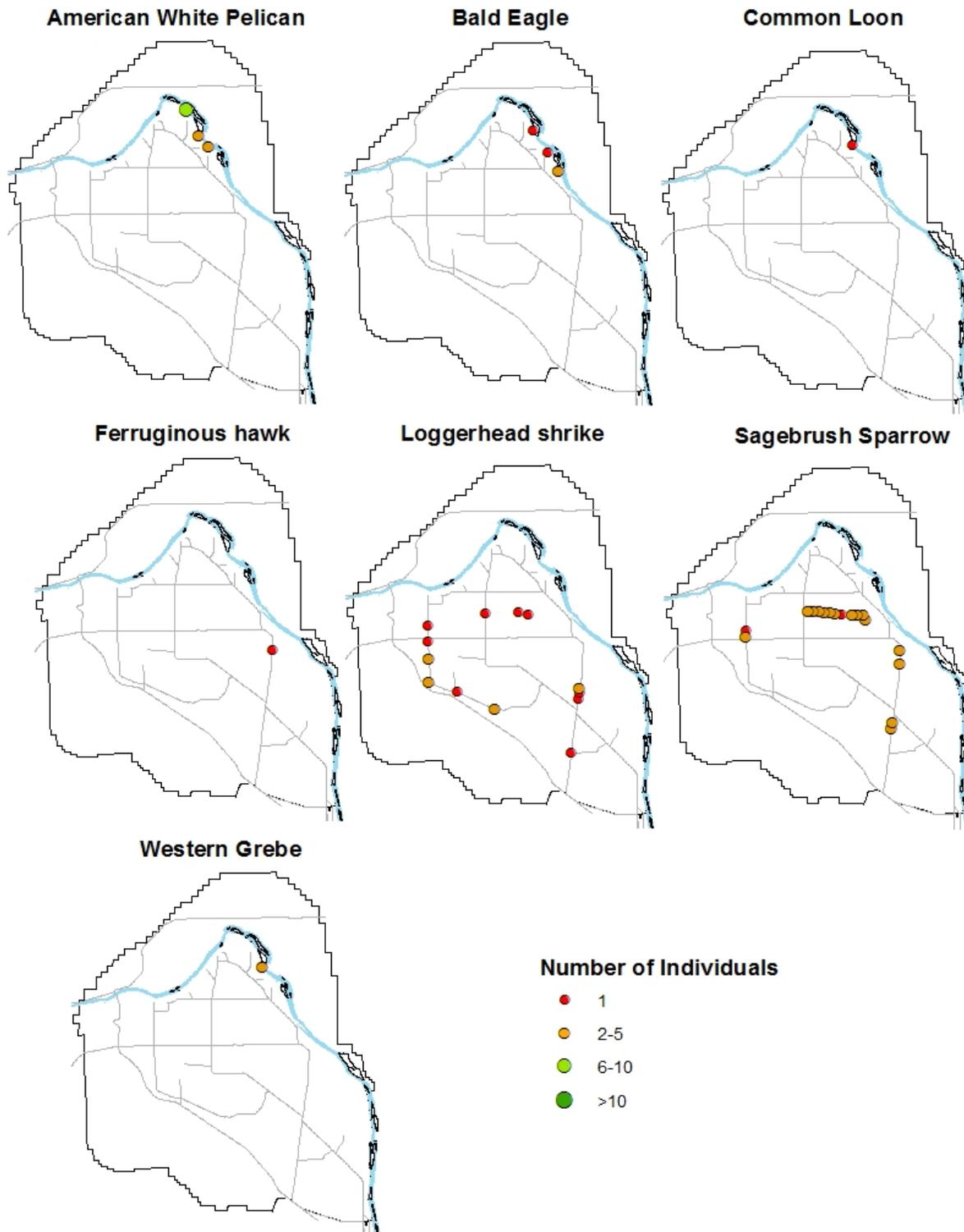
The MSA roadside monitoring program documents the presence, abundance, and distribution of species of concern on the Hanford Site. Both the USFWS and the WDFW maintain lists of species that are of management concern because populations or habitat availability are limited. In the State of Washington, 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 18 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. Seven listed species were detected during roadside surveys in 2013. The listed species included American White Pelican, Bald Eagle, Common Loon, Ferruginous Hawk, Loggerhead Shrike, Sagebrush Sparrow and Western Grebe (*Aechmophorus occidentalis*). These species are discussed in more detail below. Figure 8 shows the distribution of the seven state listed species recorded during 2013 roadside surveys.

Supplementing the roadside survey data with non-traditional counts was performed on a trial basis in 2013, to determine if such counts would better define trending and increase species richness. These counts allowed identification of nine species of birds that had not been recorded over 12 completed roadside survey routes (300 point counts) that ranged through three seasonal timeframes. By focusing some additional survey routes on specific habitat types or points of interest, surveyors captured information that was not easily obtainable during standard roadside survey protocol. The results of this trial suggest that performing the roadside routes in conjunction with the BBS, and developing additional survey routes around facility areas or landscape features will capture greater species richness and provide a more complete story of avian diversity on Hanford. 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 6. Locations on the Hanford Site and the Number of Individuals of the Seven State Listed Species Detected During Roadside Surveys in 2013**

**Common Loon** - The Common Loon is a State Sensitive species. One Common Loon was recorded on survey date 6/24/2013. The common loon is considered a regular visitor to the Columbia River, the number documented in 2013 was down from the 12 that were seen in 2012 over two separate dates.

**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. Eleven American White Pelicans were counted during three surveys, all on the Old Fields survey route. This is a drastic reduction from 2012, when 49 pelicans were seen. Timing and location of the pelicans could explain this reduction. Not all islands are counted during the Old Fields route; pelicans could easily be clustered outside of surveying range. Focused monitoring would be necessary to establish a baseline usage level for American White Pelicans on the Hanford Site.

**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 (see [HNF-56769](#) for details). Bald Eagles were recorded on two separate survey dates with a total of four individuals counted; all individuals were sighted along the Old Fields survey route. These numbers were 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 50 individuals ([HNF-55187](#)).

**Ferruginous Hawk** - The Ferruginous Hawk is a State Threatened species and a Federal Species of Concern. PRSP staff located and identified known nests in 2013 ([HNF-56769](#)). One Individual was recorded during the March 29, 2013 survey on the Horn Rapids to Townsite survey route, in close proximity to a 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 17 individuals were counted on seven different survey dates covering three survey routes. This number is up from six individuals in 2012.

**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 41 individuals were recorded on eight separate dates and along all routes except the Old Fields route. This number increased from the 15 individuals in 2012. The Gable Mountain route, which was surveyed three times in 2013 and two times in 2012, accounted for 26 individuals in 2013.

**Western Grebe** - The Western Grebe is listed as a State Candidate species in Washington State. Two individuals were counted at a single point on June 24, 2013 along the Old Fields survey route. No individuals were counted in 2012.

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