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Hanford Roadside Bird Surveys Report for Calendar Year 2012



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

Contractor for the U.S. Department of Energy
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P.O. Box 650
Richland, Washington 99352

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Prepared by

J.W. Wilde, M.S. Filan, S. J. Johnson

Prepared for the U.S. Department of Energy

Assistant Secretary for Environmental Management



P.O. Box 650

Richland, Washington 99352

APPROVED

By Julia Raymer at 10:26 am, Jul 30, 2013

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1.0 Introduction

The U.S. Department of Energy's Hanford Site is unique in that public access is restricted, there is no industrial development unrelated to the cleanup efforts, and agriculture 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 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 endemic birds 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. Ultimately, human activities associated with the development of the Hanford Site, in addition to large fires that have occurred in the last 30 years, have caused the populations of a number of shrub-steppe birds to decrease, and some, such as the Greater Sage Grouse (*Centrocercus urophasianus*) have been locally extirpated. Federal laws including the Migratory Bird Treaty Act of 1918 still provide protection of these species. Thus, monitoring is essential to not only maintain current biological information on 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 Sage Sparrow (*Amphispiza belli*), 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 in addition to numerous state monitored species ([WDFW 2012](#)) that benefit from the large expanses of habitat. This list includes birds such as the Ferruginous Hawk (*Buteo regalis*), a state "threatened" species, the American White Pelican (*Pelecanus erythrorhynchos*), a state "endangered" species, and the Bald Eagle (*Haliaeetus leucocephalus*), a state "sensitive" species ([WDFW 2012](#)).

As owner of the Hanford Site, the Department of Energy Richland Operations office (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 2012 provides continued data for documenting species occurrence and distribution on the Hanford Site, and is comparable 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](#)). As of 2011, Mission Support Alliance LLC (MSA), assumed responsibility for wildlife monitoring on the Hanford Site.

This report is not intended to be an inclusive inventory of all birds that inhabited any portion of the Hanford Site in 2012, but rather documents the status of birds identified through a transect survey method used to detect trends and for evaluating potential disturbance effects in valued habitats. 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).

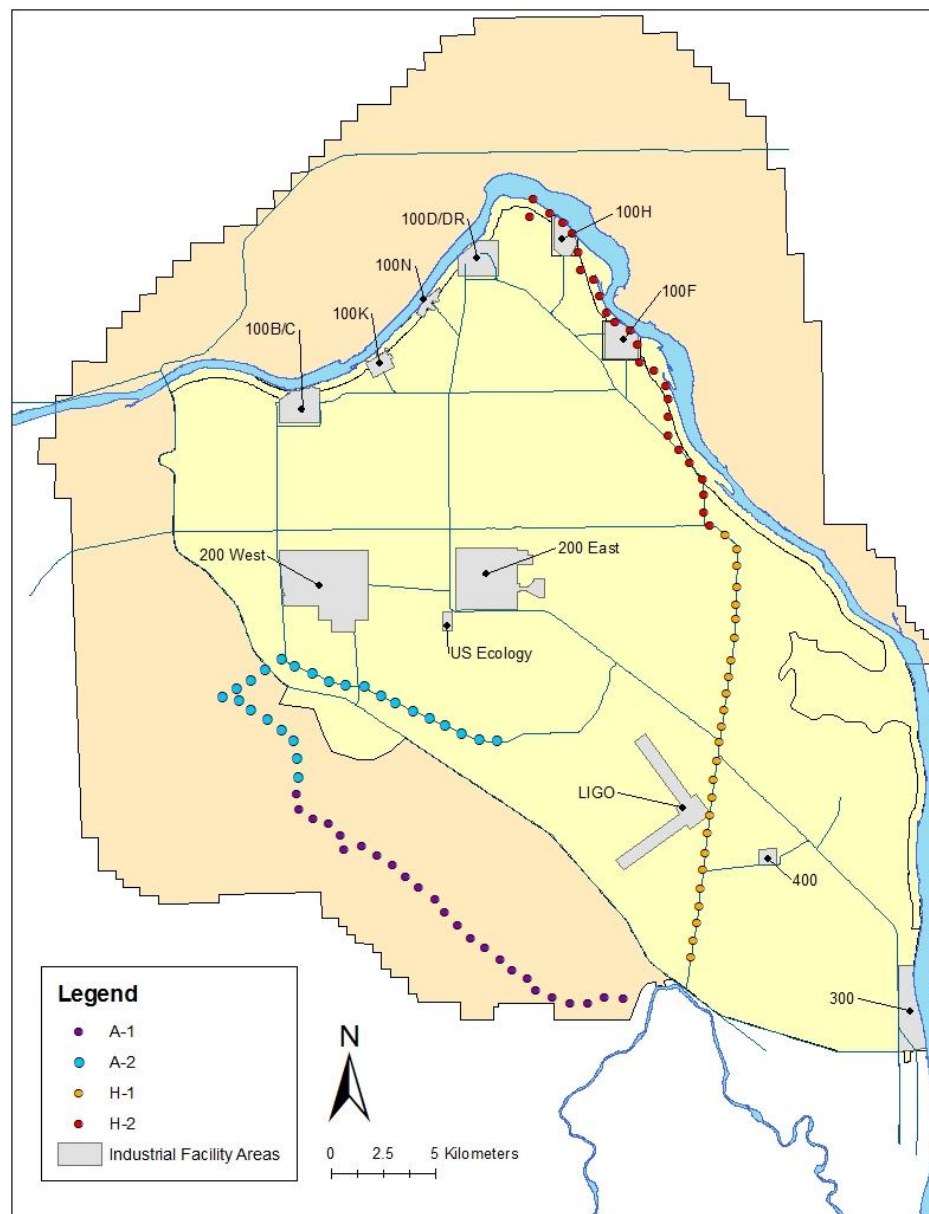


Figure 1. Roadside Bird Survey Routes during 1988-2001

2.0 Methods

In 1988, Pacific Northwest National Laboratory (PNNL) established four roadside survey routes (Figure 1). Route A1 was designed to monitor the native bunchgrass communities at mid-elevations of the Fitzner-Eberhardt Arid Lands Ecology (FEALE). Route A2 was designed to monitor sagebrush communities at lower elevations on FEALE and central Hanford. Route H1 was designed to monitor recovering shrub steppe and bitterbrush areas on central Hanford. Route H2 was intended to monitor former townsites, abandoned agricultural areas, and riparian areas along the Columbia River. These

The routes were modified in 2002 due to both the transfer of management responsibility of the FEALE to the U.S. Fish and Wildlife Service (USFWS), and because a large fire in 2000 modified the habitat through which route A2 passed. In 2002, surveys along route A1 and the FEALE portion of A2 were discontinued. Route H3 was established to monitor mature sagebrush communities on the north side of Gable



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switched to the other side of the road; the route was subsequently referenced as H-1rev. All four of these routes were surveyed at monthly intervals from 2002 through 2005. In 2006, 2008, and 2009, surveys were conducted once in the spring, and not all routes were surveyed every year. No surveys were performed in 2007, 2010, or 2011. Description-based route names were added in 2006: "Horn Rapids-Townsite" refers to H-1rev, "Old Fields" refers to H-2rev, "Gable Mtn" refers to H-3 and "Army Loop Rd" refers to H-4.

In 2012, the PSRP program resumed using the original H2 survey points for the Old Fields route rather than the revised H2rev points (Figure 3). The original survey points better capture the riparian area along the river and monitors a greater variety of habitats.

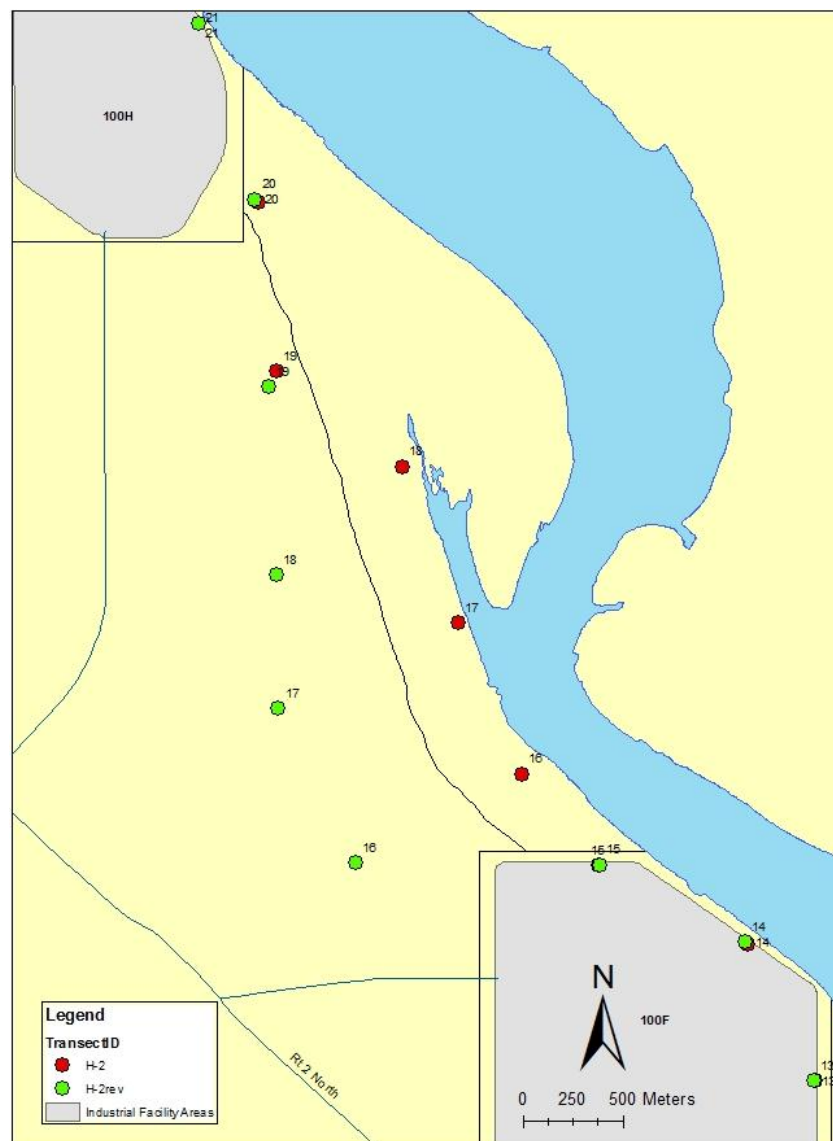


Figure 3. Relocation of Survey Point Locations to Modify H-2 to H-2rev (used 2002 through 2009)

Survey protocol follows the procedures used for the North American Breeding Bird Survey (BBS) performed by the United States Geological Service (USGS) annually around North America (Bysrack 1981; Sauer 2010), with the main difference change being the Hanford routes are 20 kilometers (km) (12.43 miles) long instead of the 40-km (24.85 miles) routes used in the BBS. Each survey route is 20-km long, marked at 0.8-km (0.5 miles) intervals with steel fence posts, rebar posts or flags; thus, there are 25 survey points per route. Birds within 400 meters (m) (0.25 miles) on either side of each survey point were identified by sight or sound during a three minute stop 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 the 400-m area on either side of each transect were also noted. The shorter routes equate to less time commitment of staff per survey, compared to the 40-km BBS routes, and allow more point-counts to be covered during morning hours while not encroaching on mid-day hours when avian activity may be reduced. Attempts were made to start all surveys in the early morning hours, within 30 minutes before or after sunrise. Surveys were halted if adverse weather conditions such as high winds, heavy rain, or snowfall developed during the route survey.

3.0 Results

A total of 13 route surveys were attempted during 2012 (Table 1). Three surveys were performed in conjunction with the USGS BBS the week of June 16, 2012. Two surveys were only partially completed: one Horn Rapids-Townsite survey which was terminated due to heavy rains, and one Army Loop Road survey was partially performed due to the BBS route entering Army Loop Road at point #12. Spring/summer surveys were conducted in March through June and fall/winter surveys were conducted October through December. Fifty-nine bird species were identified and recorded during the 2012 surveys (Table 2). Overall, 52 different species were identified along the Old Fields (H-2) route, 26 were identified along the Army Loop Rd (H-4) route, 13 were identified along the Horn Rapids-Townsite (H-1rev) route, and 12 were found along the Gable Mtn (H-3) route.

Table 1. 2012 Survey Date and Location

Route Name	Transect	Date
Army Loop Rd	H-4	June 14, 2012
Army Loop Rd	H-4	March 8, 2012
Army Loop Rd	H-4	May 15, 2012
Army Loop Rd	H-4	November 14, 2012
Gable Mtn	H-3	March 27, 2012
Gable Mtn	H-3	October 31, 2012
Horn Rapids-Townsite	H-1rev	April 15, 2012
Horn Rapids-Townsite	H-1rev	December 6, 2012
Horn Rapids-Townsite	H-1rev	June 15, 2012
Old Fields	H-2	April 4, 2012
Old Fields	H-2	June 15, 2012
Old Fields	H-2	October 7, 2012
Old Fields	H-2	May 17, 2012

During the 2012 monitoring season, surveys were conducted over 240 kilometers (149.1 miles) of transects. These surveys documented birds at over 300 point counts during seven different months (Table 1). As a result of the bird surveys, 3,565 individuals were identified and recorded (Table 2). The most abundant species was Horned Lark (*Eremophila alpestris*) (875 counted), followed by Western Meadowlark (*Sturnella neglecta*) (851), European Starling (*Sturnus vulgaris*) (293), Canada Goose (*Branta canadensis*) (285), and Bank Swallow (*Riparia riparia*) (157). Seven species, including the American Coot (*Fulica americana*), American Crow (*Corvus brachyrhynchos*), Black-throated Sparrow (*Amphispiza bilineata*), Caspian Tern (*Sterna caspia*), Cassin's Finch (*Haemorhous cassinii*), Sage Thrasher (*Oreoscoptes montanus*), and Yellow-headed Blackbird (*Xanthocephalus xanthocephalus*) were observed only once. The Old Fields survey route had the highest average species richness, followed by Army Loop Rd route, then Gable Mtn route, and Horn Rapids-Townsite having the lowest average species richness in 2012 (Table 3).

Table 2. Alphabetical List of Species and Abundance Identified During 2012 Transect Surveys

Bird Species		Army Loop Rd	Gable Mtn	Horn Rapids-Townsite	Old Fields	Grand Total
American Coot	<i>Fulica americana</i>				1	1
American Crow	<i>Corvus brachyrhynchos</i>				1	1
American Goldfinch	<i>Spinus tristis</i>				20	20
American Kestrel	<i>Falco sparverius</i>	2			4	6
American Robin	<i>Turdus migratorius</i>				13	13
American White Pelican	<i>Pelecanus erythrorhynchos</i>				49	49
Bald Eagle	<i>Haliaeetus leucocephalus</i>				7	7
Bank Swallow	<i>Riparia riparia</i>	1			156	157
Barn Swallow	<i>Hirundo rustica</i>	2				2
Black-throated Sparrow	<i>Amphispiza bilineata</i>			1		1
Black-billed Magpie	<i>Pica hudsonia</i>		6	1	23	30
Brewer's Blackbird	<i>Euphagus cyanocephalus</i>				51	51
Brown-headed Cowbird	<i>Molothrus ater</i>				16	16
Bullock's Oriole	<i>Icterus bullockii</i>	2			12	14
California Gull	<i>Larus californicus</i>				2	2
California Quail	<i>Callipepla californica</i>	2			32	34
Canada Goose	<i>Branta canadensis</i>		25		260	285
Caspian Tern	<i>Hydroprogne caspia</i>				1	1

Bird Species		Army Loop Rd	Gable Mtn	Horn Rapids-Townsite	Old Fields	Grand Total
Cassin's Finch	<i>Haemorhous cassinii</i>	1				1
Chukar	<i>Alectoris chukar</i>		2			2
Cliff Swallow	<i>Petrochelidon pyrrhonota</i>				136	136
Common Loon	<i>Gavia immer</i>				12	12
Common Nighthawk	<i>Chordeiles minor</i>	2			15	17
Common Raven	<i>Corvus corax</i>	16	10	38	62	126
Dark-eyed Junco	<i>Junco hyemalis</i>				4	4
Double-crested Cormorant	<i>Phalacrocorax auritus</i>				24	24
Eastern Kingbird	<i>Tyrannus tyrannus</i>				7	7
European Starling	<i>Sturnus vulgaris</i>	11	62		220	293
Ferruginous Hawk	<i>Buteo regalis</i>			2		2
Gadwall	<i>Anas strepera</i>				4	4
Grasshopper Sparrow	<i>Ammodramus savannarum</i>	5			7	12
Great blue heron	<i>Ardea herodias</i>				32	32
Great egret	<i>Ardea alba</i>				11	11
Horned Lark	<i>Eremophila alpestris</i>	313	100	151	311	875
House Finch	<i>Haemorhous mexicanus</i>	30		1	1	32
Killdeer	<i>Charadrius vociferus</i>				7	7
Lark Sparrow	<i>Chondestes grammacus</i>	18		9	2	29
Loggerhead Shrike	<i>Lanius ludovicianus</i>	3	1		2	6
Long-billed Curlew	<i>Numenius americanus</i>	6	2		9	17
Mallard	<i>Anas platyrhynchos</i>				64	64
Mourning Dove	<i>Zenaida macroura</i>	2		2	2	6
Northern Flicker	<i>Colaptes auratus</i>	1			2	3
Northern Harrier	<i>Circus cyaneus</i>	2	2		1	5
Northern Rough-Winged Swallow	<i>Stelgidopteryx serripennis</i>				5	5
Osprey	<i>Pandion haliaetus</i>				6	6
Prairie Falcon	<i>Falco mexicanus</i>	2			1	3
Red-tailed Hawk	<i>Buteo jamaicensis</i>	4			10	14
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	1			117	118
Ring-billed Gull	<i>Larus delawarensis</i>				13	13
Ring-necked Pheasant	<i>Phasianus colchicus</i>		1		3	4

Bird Species		Army Loop Rd	Gable Mtn	Horn Rapids-Townsite	Old Fields	Grand Total
Sage Sparrow	<i>Artemisiospiza belli</i>	1	6	8		15
Sage Thrasher	<i>Oreoscoptes montanus</i>			1		1
Spotted Towhee	<i>Pipilo maculatus</i>				2	2
Swainson's Hawk	<i>Buteo swainsoni</i>	9		2	3	14
Western Kingbird	<i>Tyrannus verticalis</i>	6		2	17	25
Western Meadowlark	<i>Sturnella neglecta</i>	227	186	168	270	851
western Wood-pewee	<i>Contopus sordidulus</i>				2	2
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	1			9	10
Yellow-headed Blackbird	<i>Xanthocephalus xanthocephalus</i>				1	1
duck species*					4	4
gull species*					53	53
unknown*		1	2		4	7
Individual Counts Grand Total		671	405	386	2103	3565

*Further identification not made based on distance to bird, difficulty of visual inspection due to light or vegetation, or audio difficult to isolate and describe.

Table 3. Number of Species Identified During Each Survey in 2012

Route Name				
Date Surveyed	Army Loop Rd	Gable Mtn	Horn Rapids-Townsite	Old Fields
March 8, 2012	8			
March 27, 2012		8		
April 4, 2012				24
April 15, 2012			3	
May 15, 2012	16			
May 17, 2012				33
June 14, 2012	14			
June 15, 2012			12	36
October 31, 2012		7		
November 7, 2012				19
November 14, 2012	12			
December 6, 2012			3	
Avg. Species Richness	12.5	7.5	6	28

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. The roadside bird surveys performed on the Hanford Site are not a complete inventory or an accurate population census. As designed, the surveys are intended to be an indicator of abundance, species distribution, and potential habitat quality. As currently implemented, the avian monitoring program is a cost effective method of collecting species data, over large portions of the Hanford Site, 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 4 shows the four survey routes and associated vegetation cover.

The 'Gable Mtn' survey route was performed only twice, had the lowest species diversity (12 species), and the second lowest total count (405 individuals) of the four routes. Fewer surveys performed on this route contributed to the lower count of individuals and species diversity. Lower number of overall species is also 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 i.e. 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 could be potential habitat for bird species such as Rock Wren (*Salpinctes obsoletus*) or Canyon Wren (*Catherpes mexicanus*), but distance from survey points make identification of these small birds challenging during surveys using this method if the birds are not actively singing. As expected, sagebrush dependent species, such as the sage sparrow, inhabit this area due to the presence of mature, intact shrub-steppe. These species are highly sensitive to habitat removal and disturbance but also present an opportunity for mitigation ([PNL-6493](#)).

The Horn Rapids to Townsite also had low overall diversity (13 species) and the lowest overall count (386 individuals) of the four routes. This route presents some unique challenges. Only three surveys were performed, impacting the overall count. The entire route follows a main road used by employees to access large portions of the Hanford Site. The highest number of vehicle passing occurrences is recorded when performing surveys on this route. The route passes through three main types of vegetation cover: intermediate shrubs, grasses, and climax shrubs (Figure 4). Areas within climax shrubs include some heavy sands to dune areas. Metal power line towers provide perching and nesting habitat for species such as Common Ravens, Ferruginous Hawks, and other raptors. Uncommon birds recorded along this route included a Sage Thrasher, and a Black-throated Sparrow, the first ever recorded for this dataset.

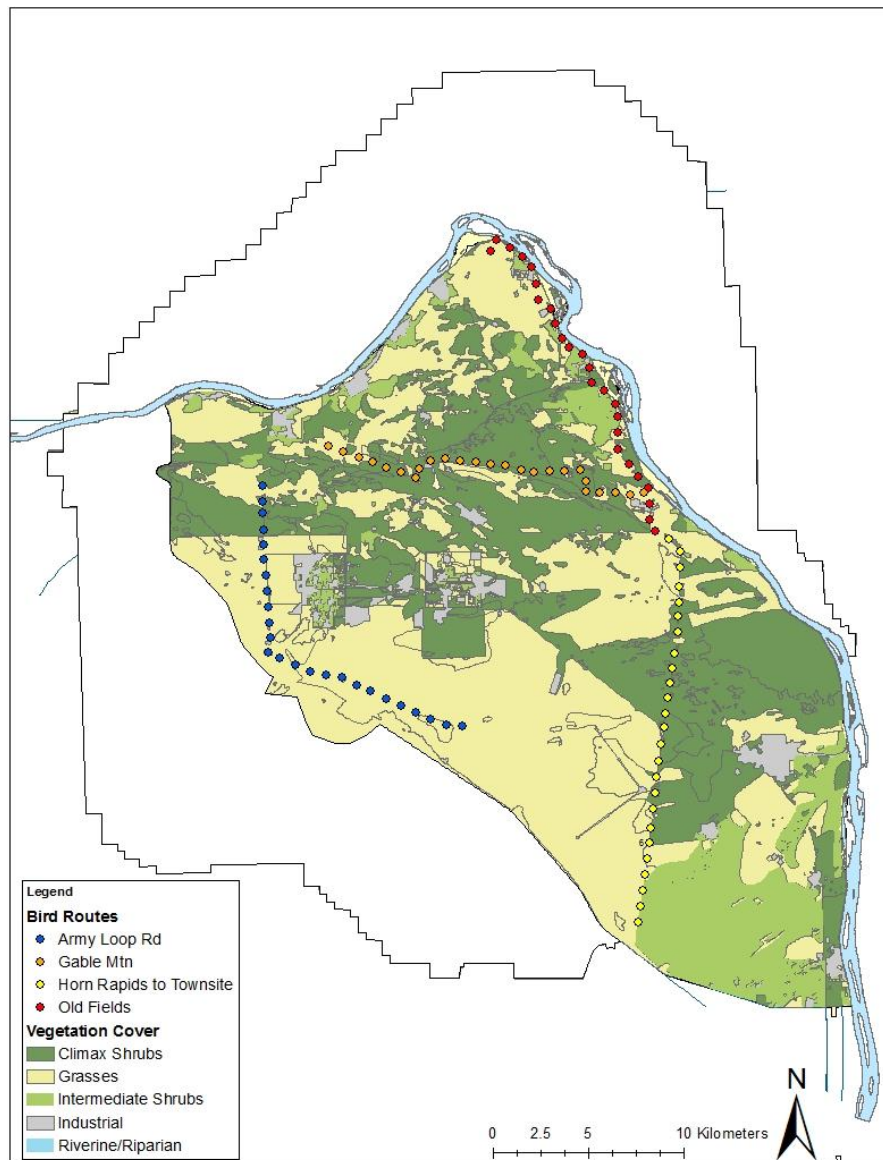


Figure 4. Hanford Bird Survey Routes Compared to Vegetation Cover

Although most of the Army Loop Rd survey route passes through native grasslands and cheatgrass meadows, both the species diversity (26 species) and total count (671 birds) were the second highest among the four routes. The first four observation points along the Army Loop Rd route are located within an area with dense sagebrush, which explains the presence of shrub-dependent species such as the sage 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, power 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 that can exceed 100 individuals. The power

lines along this route provide nesting structure for Common Raven, Swainson's Hawk, Red-tailed Hawk, and even some passerine species.

The Old Fields survey route had the richest species diversity (52 species), doubling the number of recorded species of even the second highest route, and had by far the greatest number of individuals present (2103 total). The primary attribute contributing to the species diversity is the number of points that are located along riparian and riverine areas. Various species of waterfowl and fish-eating birds including American White pelican, Double-crested Cormorant and Caspian Terns 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 which, in conjunction with the riparian areas, provide a rich, albeit unnatural, habitat for many species to inhabit. Some of the large trees along the river act 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 and, while not documented during roadside surveys, Burrowing Owls (*Athene cunicularia*) (HNF-54294). 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 were documented along this route, including the Bald Eagle, American White Pelican, Common Loon, 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 those listings include (in order of least to greatest concern) State Candidate, State Sensitive, State Threatened, and State Endangered. Washington also maintains a list of State Monitor species, a group of birds that are not considered "species of concern" but 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) identify 18 state-listed species that either reside on or migrate through the Hanford Site, in addition to approximately 23 State Monitor species. The 2012 surveys found more listed or monitor species compared to recent years in which more than one survey was performed (Figure 5).

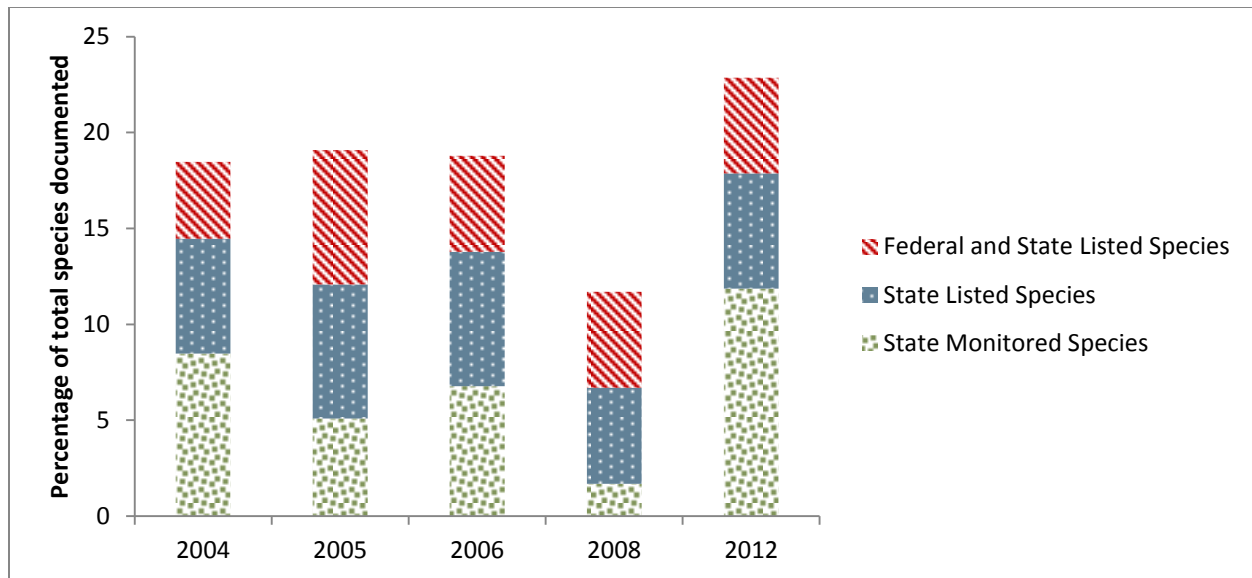


Figure 5. Number of Bird Species of Concern Documented During 2012 Roadside Surveys

The continued use of the Hanford Site by state and federal species of concern provides the need for continuing protection of the valuable habitat on site, and the routine monitoring of the avifauna. Seven listed species were detected during roadside surveys during 2012. The listed species included American White Pelican, Bald Eagle, Common Loon, Ferruginous Hawk, Loggerhead Shrike, Sage Sparrow and Sage Thrasher. These species are discussed in more detail below. Figure 6 shows the distribution of the seven state listed species recorded during 2012 roadside surveys. Roadside surveys are a valuable tool in collecting avifauna data over large areas and varied habitats on the Hanford Site. A minimum of quarterly surveys will provide data on potential changes to species trends, document listed species, and capture the annual variation of bird use. More focused surveys, such as walking routes and point counts, may be added in the future. These additional surveys can include the reproduction of avian census and surveys performed by agencies other than Department of Energy (DOE) and its contractors on the Hanford Site (Greager 1997, LaFramboise et al. 1997, 1998, Stephniewski 1994, 1995). The additional survey work can fill potential gaps in species census, document migrant traps for species using unique habitats, and record birds not readily documented from roadsides. Avifauna monitoring performed for the Department of Energy supports Hanford's Site mission of cleanup by ensuring compliance with the Migratory Bird Treaty Act of 1918 and that Hanford activities are not impacting species on Site. With increased development in the surrounding Tri-Cities area, many of the arid lands obligate species reliance on areas such as the Hanford site will continue to be of importance.

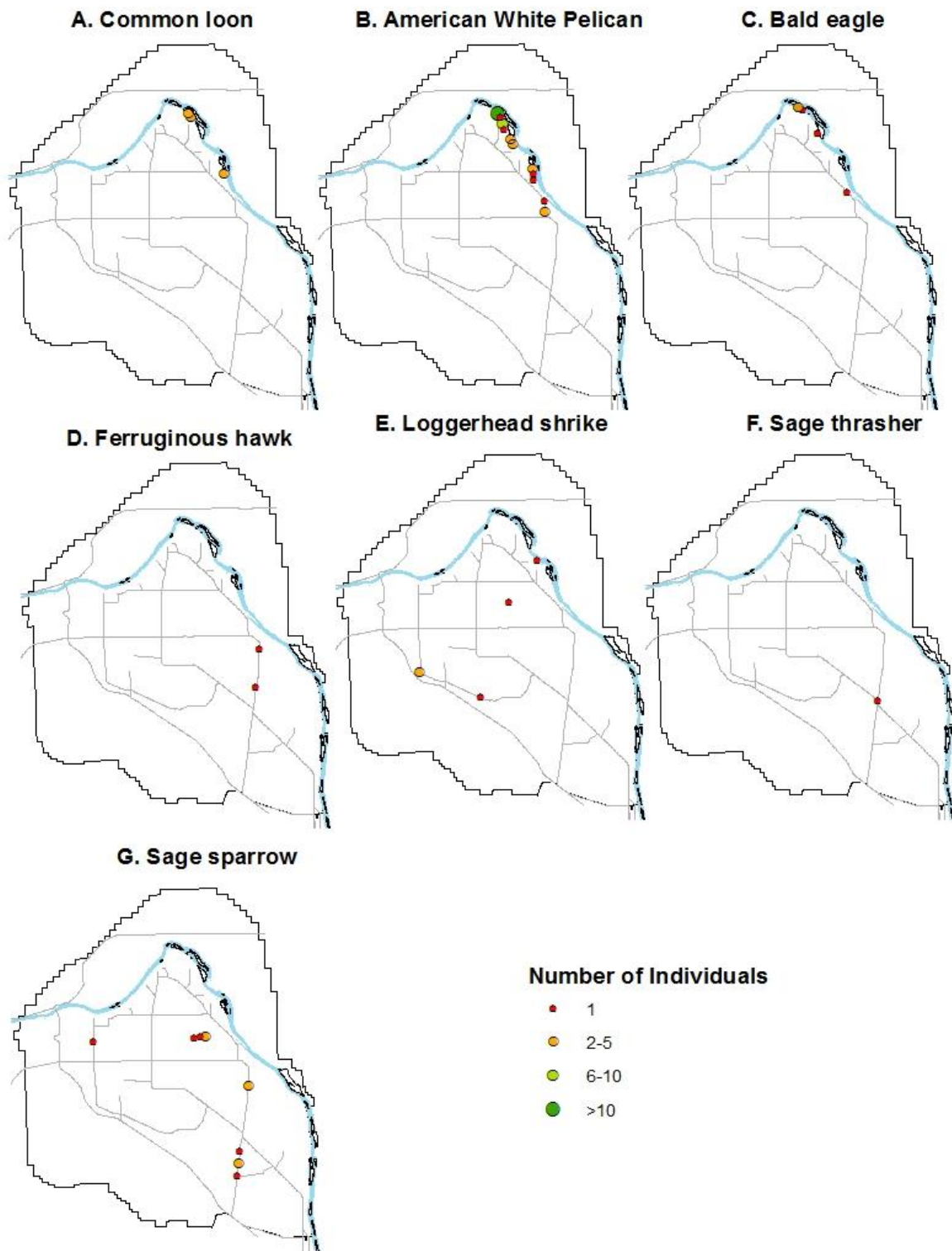


Figure 6. Locations on the Hanford Site and the Number of Individuals of the Seven State Listed Species Detected During Roadside Surveys in 2012

Common Loon (COLO)- The Common Loon is a State Sensitive species. A total of 12 Common Loons were recorded over two survey dates, 4/4/12 and 6/15/12. The common loon is considered a regular visitor to the Columbia River, although 10 individuals counted during two adjacent stops on 4/4/12 was deemed higher than average.

American White Pelican (AWPE)- Common to the Hanford Reach, this State Endangered species is often sitting on the points of islands or floating through the sloughs. A total of 49 American White Pelicans were counted over 4 surveys, all on the Old Fields survey route.

Bald Eagle (BAEA)- 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, but no successful nests have been recorded. Bald Eagles were recorded on 3 separate survey dates with a total of 7 individuals counted, all along the Old Fields survey route. Additional winter roost monitoring has shown the number of eagles in the area can exceed 50 individuals ([HNF-52464](#))

Ferruginous Hawk (FEHA)- The Ferruginous Hawk is a State Threatened species and Federal Species of Concern. PRSP staff located and identified two known nests in 2012 ([HNF-53073](#)). Two Individuals were recorded at 2 separate points during the 6/15/2012 survey on the Horn Rapids to Townsite survey routes.

Loggerhead Shrike (LOSH)- Loggerhead Shrikes are a resident and successful breeder on the Hanford Site. This Federal Species of Concern and State Candidate can often be seen year round. A total of 6 individuals were counted on five different survey dates covering three survey routes.

Sage Thrasher (SATH)- The Sage Thrasher is listed as a State Candidate and has had few recent sightings on the Hanford Site. A single individual was heard singing at point 13 on the Horn Rapids to Townsite route on 6/15/2012. With the sun rising behind the bird, which was east of the surveyors, it was difficult to provide visual confirmation of the account. Additional time was spent at the point listening and verifying the audio in the field by comparing the songs to recordings of Sage Thrashers in possession of the surveyors.

Sage Sparrow (SAGS)- Sage Sparrows are a common resident to the Hanford Site and its remaining areas of dense sagebrush habitat. Sage sparrows are a State Candidate species. Sage sparrows can be difficult to detect using roadside surveys because the road and its buffer create a void in dense shrub cover from which the bird sings. Fifteen individuals were recorded on 3 separate dates and along all routes except the Old Fields.

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