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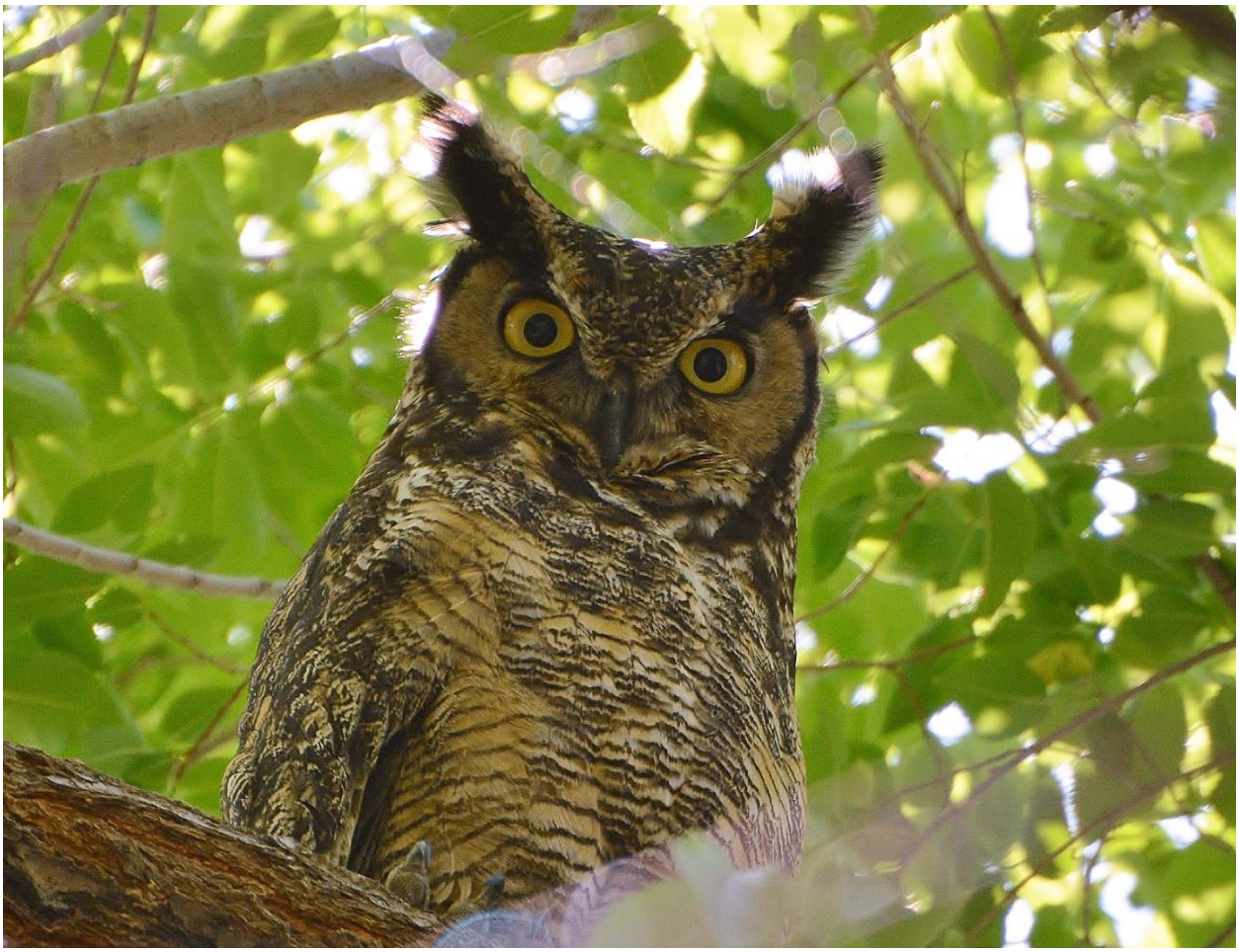
HNF-59755
Revision 0

# Hanford Site Raptor Nest Monitoring Report for Calendar Year 2015



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Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy
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The cover photo is of a Great Horned Owl, taken by Kevin Cranna.

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Mission Support Alliance

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# Contents



# Figures



# Tables

# 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 habitats under DOE-RL stewardship at Hanford 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, USDOE 1999), which is the Environmental Impact Statement that evaluates the potential environmental impacts associated with implementing a comprehensive land-use plan for the Hanford Site for at least the next 50 years, ensures that DOE-RL, its contractors, and other entities conduct activities on the Hanford Site in compliance with NEPA.

The vision for the DOE-RL managed portion of the Hanford Site focuses not only on the clean-up of nuclear facilities and waste sites, but on the protection of groundwater and the Columbia River and the restoration of Hanford lands for access and use. To reach these goals Hanford is working closely with partners, such as the U. S. Fish and Wildlife Service (USFWS) and National Park Service (NPS), to enable use of the Hanford land consistent with the CLUP. As the Hanford Site moves toward accomplishing this vision, understanding of the ecological resources present and the need for conservation and/or protection of those resources will be critical for making informed decisions for responsible site stewardship.

The *Hanford Site Biological Resources Management Plan* (BRMP, USDOE 2013a) is identified by the CLUP as the primary implementation document for managing and protecting natural resources on the Hanford Site. 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; or that are rare and/or declining (federally or state listed endangered, threatened, or sensitive species); or are of significant interest to federal, state, or tribal governments or the public. The BRMP ranks wildlife species and habitats (Levels 0–5) based on the level of concern for each resource. A Washington State threatened species, the Ferruginous Hawk (*Buteo regalis*) is ranked as a Level 4 resource in the BRMP, along with the Bald Eagle (*Haliaeetus leucocephalus*), a Washington state-listed sensitive species and a federal species of concern. Level 4 resources are considered essential to the biological diversity of the Hanford Site and the Columbia Basin Ecoregion. The management goal of Level 4 resources is preservation, with a high level of status monitoring.

Nesting raptor surveys fulfill the obligations described in the Memorandum of Understanding between DOE and USFWS *Regarding the Implementation of Executive Order 13186*, "*Responsibilities of Federal Agencies to Protect Migratory Birds*" (USDOE and USFWS 2013) 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.

## 1.1 Background

Raptors are apex predators that can significantly change the dynamics of an ecosystem by controlling prey species' populations. As top-level predators, raptors are also much more susceptible to negative environmental stressors such as toxins, habitat loss or degradation, and human disturbance. The number and diversity of nesting raptors in an area can be an indicator of environment health.

The Hanford Site supports a large and diverse community of raptorial birds (Fitzner et al. 1981), with 26 species of raptors observed on the Hanford Site. Thirteen raptor species have been recorded nesting on the Hanford Site, including eight species of diurnal raptors and five species of owls (Table 1). Several of these species are on state and federal threatened and endangered species lists (WDFW 2016). The Ferruginous Hawk is a Washington state-listed threatened species, and the Bald Eagle is a Washington state sensitive species and a federal species of concern. The Burrowing Owl (*Athene cunicularia*) is a Washington state candidate species, and the Swainson's Hawk (*Buteo swainsoni*), Prairie Falcon (*Falco mexicanus*), and Osprey (*Pandion haliaetus*) are Washington state monitored species. Raptor species on the Hanford Site are also afforded protection under the Migratory Bird Treaty Act (MBTA). Because of the status of these species and their protection under the MBTA, DOE-RL documents and protects nest locations to avoid disturbance during the nesting season and tracks populations over time to determine potential impacts of Hanford operations on these species.

**Table 1. Status of Nesting Raptors of the Hanford Site**

| Species | | Species Status | |
|---|---|---|---|
| **Common Name** | **Scientific Name** | **Washington State** | **Federal** |
| Ferruginous Hawk | *Buteo regalis* | Threatened | None |
| Swainson's Hawk | *Buteo swainsoni* | Monitored | None |
| Red-tailed Hawk | *Buteo jamaicenais* | None | None |
| Prairie Falcon | *Falco mexicanus* | Monitored | None |
| American Kestrel | *Falco sparverius* | None | None |
| Northern Harrier | *Circus cyaneus* | None | None |
| Bald Eagle | *Haliaeetus leucocephalus* | Sensitive | Species of Concern |
| Osprey | *Pandion haliaetus* | Monitored | None |
| Great Horned Owl | *Bubo virginianus* | None | None |
| Long-eared Owl | *Asio otus* | None | None |
| Short-eared Owl | *Asio flammeus* | None | None |
| Burrowing Owl | *Athene cunicularia* | Candidate | None |
| Barn Owl | *Tyto alba* | None | None |

The creation of the Hanford Site has likely benefited many raptor species from restrictions on public access, livestock grazing, and agriculture for the past 72 years. Prior to European settlement, trees

occurred only sporadically on the Hanford Site, along riparian zones. Species such as the American Kestrel (*Falco sparverius*), Great Horned Owl (*Bubo virginianus*), Long-eared Owl (*Asio otus*), Red-tailed Hawk (*Buteo jamaicenais*), Swainson's Hawk, Ferruginous Hawk, and Bald Eagle have benefited from the trees that people planted near now-abandoned homesteads, townsites, and previous army encampment sites. Human-made structures on the Hanford Site have also provided nesting habitat for a variety of raptors: Barn Owls (*Tyto alba*) in abandoned structures; Red-tailed Hawks on the outside of decommissioned reactor buildings; and Red-tailed, Swainson's, and Ferruginous Hawks on transmission towers and wooden utility poles. Recent additions to the list of nesting raptors on the Hanford Site (first year 2000), ospreys have benefited from nest platforms built for their use (Poston et al. 2001).

Some species of raptors nest on the Hanford Site in low numbers due to the natural lack of suitable nesting habitats, food sources, or nesting substrates. For instance, Prairie Falcons nest primarily on cliffs, which on the Hanford Site are limited to Rattlesnake and Gable mountains, Gable Butte, and Yakima and Umtanum ridges. Northern Harriers (*Circus cyaneus*) nest primarily on the ground in wetland areas, which are also limited on the Hanford Site. Ospreys subsist on live fish and consequently are restricted to areas along the Columbia River.

Short-eared Owls (*Asio flammeus*) are common winter visitors to the Hanford Site but rarely nest on site. This species nests on the ground in marshes, grasslands, and tundra areas supporting dense cyclic populations of small mammals (Wiggins et al. 2006). Short-eared Owls have also been found nesting around Benson Ranch on the Fitzner/Eberhardt Arid Lands Ecology Reserve (Fitzner et al. 1981) but no other areas on site.

Bald Eagles appear on the Hanford Site primarily during the winter months when they congregate to feed on post-spawned fall Chinook salmon (*Oncorhynchus tshawytscha*) carcasses that wash up along the shores of the Columbia River and waterfowl that winter in the area. Prior to 2013, some pairs of Bald Eagles attempted to nest on the Hanford Site, but most left the area in the spring when their food sources diminished without successfully raising young (USDOE 2013b). In 2013, the first successful Bald Eagle nest was documented on the Hanford Site; this nest was again successful in 2014 and 2015 (Cranna et al. 2015a; Cranna et al. 2015b).

Since 1973, nesting raptor surveys have been conducted on the Hanford Site by DOE-RL and the Washington Department of Fish and Wildlife (WDFW; Olendorff 1973; Fitzner et al. 1977; Fitzner 1978, 1980a, 1980b; Fitzner et al. 1981; Poole et al. 1988; Fitzner and Newell 1989; Nugent 1995; Leary 1996; Dirkes and Hanf 1998; Leary et al. 1998; Dirkes et al. 1999; Poston et al. 2000, 2001; Clayton 2005). However, these surveys were not conducted systematically and were not consistent in the area chosen for monitoring: depending on the year, surveys included either the entire area or a small section (i.e., only the DOE-RL managed portion) of the Hanford Site, or only known nest locations. The previous surveys were not conducted every year, and the species documented during those surveys included different subsets of raptors. A consistent approach for long-term monitoring of nesting raptors was finally initiated in 2012 for the portions of the Hanford Site managed by DOE-RL and has been reproduced annually since that time (Nugent et al. 2013; Nugent et al. 2014; Nugent et al. 2015).

## 1.2 Objectives

The focus of this annual report is to document the distribution and abundance of nesting raptors on the DOE-RL managed portions of the Hanford Site. Annual surveys provide land managers with specific locations of nest sites so that the nests can be avoided and disturbances minimized during the nesting season. Long-term trends in nesting raptor populations also allow for the assessment of potential impacts from Hanford Site operations.

## 1.3 Scope

The scope of this work is to document the distribution and abundance of as many nesting raptors species as possible on the DOE-RL managed portions of the Hanford Site using the survey methods described in Section 2.0. These methods are likely to detect the majority of species of nesting raptors on the Hanford Site but with varying degrees of success (Table 2) and with some highlights summarized below.

**Table 2. Nest Site Selection of Raptors on the Hanford Site and Likelihood of Detecting Nests During Annual Surveys**

| Species | Nest Site Selection | Likely to Detect Nests if Present? | Likely to Detect Most Nests? |
|---|---|---|---|
| Ferruginous Hawk | Trees, Cliffs/Rock Outcrops, Utility Structures | Yes | Yes |
| Swainson's Hawk | Primarily Trees, but also Utility Structures | Yes | Yes |
| Red-tailed Hawk | Trees, Cliffs/Rock Outcrops, Utility Structures | Yes | Yes |
| Prairie Falcon | Primarily Cliffs | Yes | Yes |
| American Kestrel | Primarily Secondary Cavities in Tree | Yes | No |
| Northern Harrier | Primarily on Ground in Wetland Vegetation but also Dry Grasslands | No | No |
| Bald Eagle | Large Trees, Nest Platforms, Cliffs | Yes | Yes |
| Osprey | Large Trees, Nest Platforms, Cliffs | Yes | Yes |
| Great Horned Owl | Primarily in Trees in Nests Built by Other Species | Yes | Yes |
| Long-eared Owl | Primarily in Trees in Nests Built by Other Species | Yes | Yes |
| Short-eared Owl | Primarily on Ground in Dry Sites | No | No |
| Burrowing Owl | Primarily in Burrows Dug by Other Animals but also Human-made Structures (e.g., Culverts, Artificial Burrows) | Yes | No |
| Barn Owl | Existing Cavities in Trees, Cliffs/Rock Outcrops, Caves, Buildings | Yes | Yes |

The survey methods are likely to detect a majority of individual nest sites for Red-tailed, Swainson's, and Ferruginous Hawks; Prairie Falcons; Bald Eagles; Ospreys; and Great Horned and Long-eared Owls.

- The species noted below nest in less conspicuous areas, and a high proportion of individual nest sites for these species are not likely to be detected using the described methods.
    - Burrowing Owls nest in burrows in the ground, and the survey methods described are not optimal for documentation of this species' nest sites. A separate monitoring effort was instituted for Burrowing Owls in 2015 (Wilde et al. 2016), but data are also provided in this report.

  - Northern Harriers and Short-eared Owls are ground-nesting birds with difficult to detect nests and are thus not likely to be assessed accurately using the defined survey methodology. Short-eared Owls may not nest within the current survey area.

  - American Kestrels are secondary cavity nesters and most nest sites are not detected using these survey methods.

- The most conspicuous raptors nesting on the Hanford Site are the three species of *Buteo* Hawks: Red-tailed, Swainson's, and Ferruginous. These species build large stick nests on trees, cliffs, rock outcrops, utility poles and transmission towers. The largest number of raptor nest sites detected with these methods belong to *Buteo* Hawks.

- Common Ravens (*Corvus corax*) also build large stick nests that are difficult to distinguish from *Buteo* Hawk nests without the presence of the birds. Although Common Ravens are not considered raptors, they perform a similar ecological role and are protected under the MBTA. The majority of Common Raven nests are detected with the prescribed survey methods and are included in this report.

Raptor nesting season on the Hanford Site extends over 6 months, generally from March through August. Fitzner et al. (1981) found that Great Horned Owls were the earliest in season nesters on the Hanford Site with an average egg laying date of March 15. In 2015, Great Horned Owls were discovered tending a nest with one egg on the 105KE Reactor on January 14; however, this nest was observed depredated on January 22. Fitzner et al. (1981) also found that American Kestrels were the latest in season nesters with an average laying date of May 25. First-egg dates for raptor species known to nest on the Hanford Site are provided in Table 3. Although these data are limited and dated, survey timing can be inferred. To detect the greatest number of raptor nests, surveys were conducted in late May and early June, during which time all species occupy their respective nesting territories.

**Table 3. First-egg Dates for Raptor Species Known to Nest on the Hanford Site**

| Species | Hanford Site* | | | Statewide† | | |
|---|---|---|---|---|---|---|
| | Number of Records | Earliest First-egg Date | Latest First-egg Date | Number of Records | Earliest First-egg Date | Latest First-egg Date |
| Ferruginous Hawk | - | - | - | 23 | Mar 28 | Apr 30 |
| Swainson's Hawk | 39 | Apr 28 | May 20 | 28 | Apr 28 | May 31 |
| Red-tailed Hawk | 19 | Mar 30 | Apr 20 | 46 | Feb 23 | May 09 |
| Prairie Falcon | 3 | Apr 15 | May 24 | 126 | Mar 09 | May 18 |
| American Kestrel | 4 | May 08 | Jun 18 | 30 | Mar 26 | Jun 20 |
| Northern Harrier | 2 | Apr 07 | Apr 25 | 14 | Mar 26 | May 24 |
| Bald Eagle | - | - | - | 26 | Mar 01 | May 10 |
| Osprey | - | - | - | 26 | Apr 16 | Jun 21 |
| Great Horned Owl | 5 | Mar 05‡ | Apr 27 | 28 | Feb 11 | Apr 28 |
| Long-eared Owl | 7 | Mar 20 | May 21 | 41 | Mar 06 | Jun 03 |
| Short-eared Owl | - | - | - | 7 | Mar 18 | May 30 |
| Burrowing Owl | 6 | Apr 08 | - | 12 | Mar 23 | Jun 08 |
| Barn Owl | - | - | - | 6 | Mar 04 | May 14 |

* Fitzner et al. 1981
† The Burke Museum, University of Washington
‡ In 2015, great horned owls were observed tending a nest with one egg on January 14; however, the egg was found depredated on January 22.

# 2.0 Methods

Nests were located using foot and vehicular surveys. Surveys were conducted on the DOE-RL managed lands of the Hanford Site, excluding portions of the 200 Area (Figure 1). DOE-RL managed lands include the central Hanford, McGee Ranch, Riverland, and dunes areas and the southern shoreline of the Columbia River. All elevated substrates in the surveyed areas were searched for nests. Suitable nesting structures included trees, cliffs and rock outcrops, utility pole and transmission towers, abandoned buildings, and nest platforms. The distribution of nesting substrates on DOE-RL managed portions of the Hanford Site is provided in Figure 2.

Nest searches occurred in late May and early June, during which time all species occupy their respective nesting territories. Some nest sites were also recorded during other unrelated ecological surveys. A nest was considered occupied if adult birds were tending a recently built nest or eggs, or young were present. A Trimble Global Positioning System (GPS) with sub-meter accuracy was used to record nest site coordinates. Areas in which nest sites were not easily accessible in the field such as high cliffs were later adjusted on maps in a Geographic Information System (GIS). Field personnel spent as little time as possible at each nest site to avoid disturbing the birds. During cold or wet weather, field personnel avoided flushing incubating adult birds. Flushing adult birds at these times may cause nest failures. Nest searches were not conducted during inclement weather.

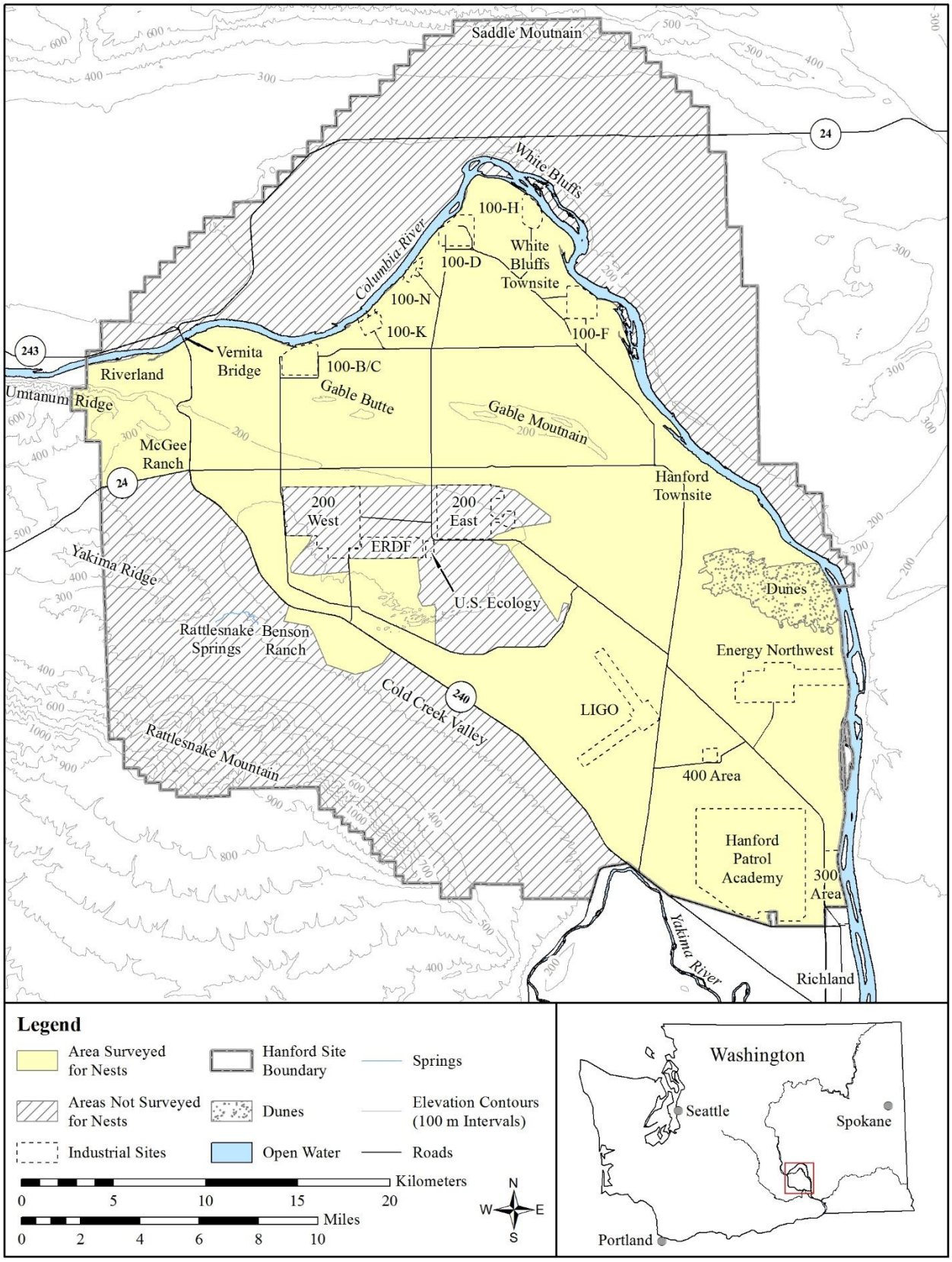


**Figure 1. Area Surveyed for Raptor and Raven Nests on DOE-RL Managed Lands of the Hanford Site in 2015**

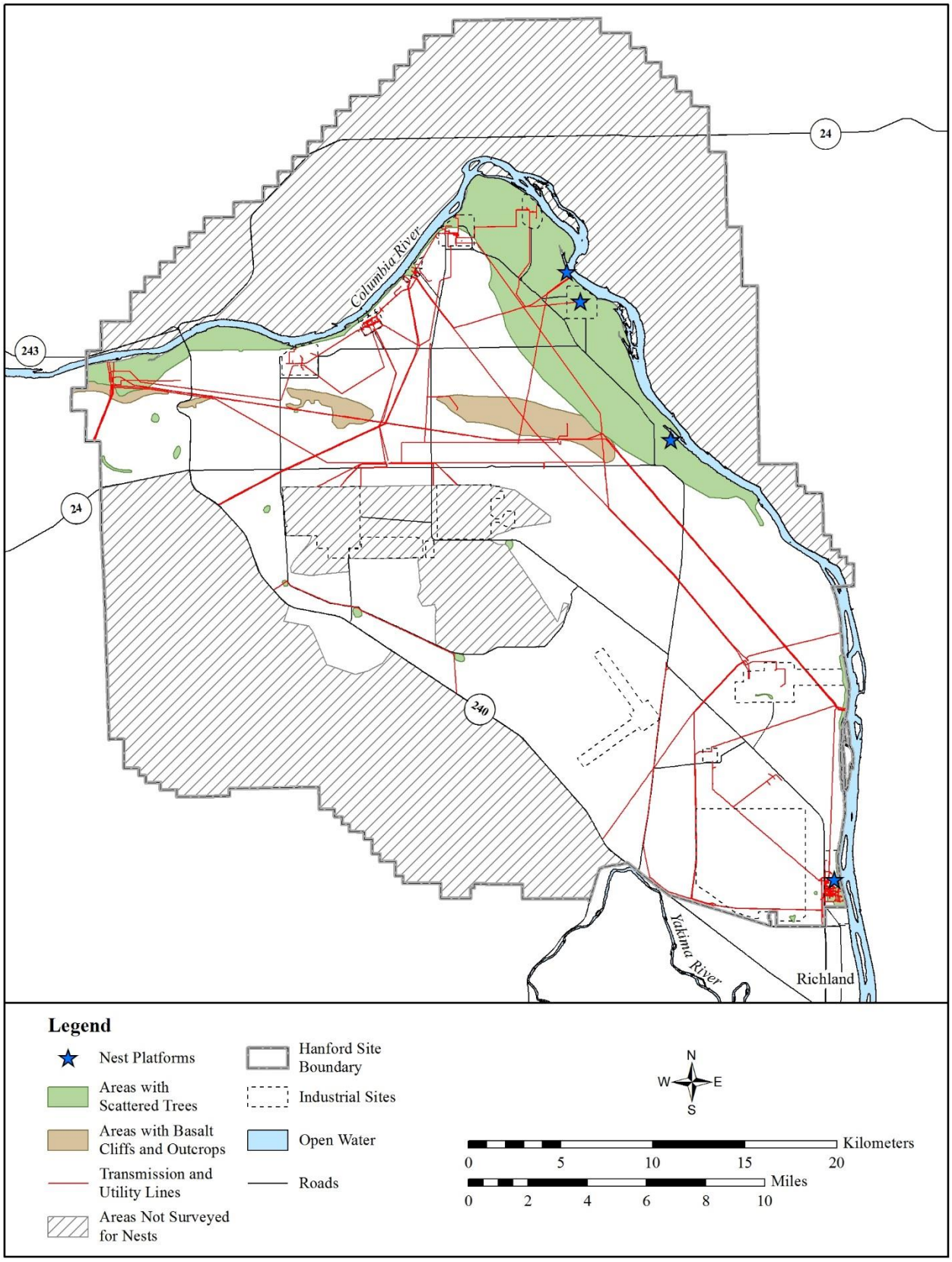


**Figure 2. Distribution of Nesting Substrates on DOE-RL Managed Lands of the Hanford Site**

# 3.0 Results

Nest surveys were conducted on 12 days from May 14 through June 8, 2015 (specifically, May 14, May 18–21, May 27, May 28, June 1–4, and June 8). Nests observed during other ecological monitoring efforts are also presented here. A total of 122 nest sites were recorded in 2015 (Table 3). A second Bald Eagle nest was built on the White Bluffs peninsula, but its continued occupancy and success could not be determined. Of the 11 Burrowing Owl nests observed, 10 of these were found during a separate Burrowing Owl monitoring effort (Wilde et al. 2016), and one nest site was detected during a vegetation mapping survey. From the 62 Common Raven nests observed, two of these were removed from utility poles by Integrated Biological Control because they were deemed fire hazards. Nest substrates used by raptors and ravens on DOE-RL managed lands are shown in Table 4. Approximately 11% of the raptor and raven nests located in 2015 were on naturally occurring substrates such as cliffs, mammal burrows, and naturally established trees along the Columbia River. All raptor nest sites located in 2015 are displayed in Figure 3, and Common Raven nest sites found in 2015 are shown in Figure 4.

**Table 4. Nest Substrates Used by Raptors and Ravens on DOE-RL Managed Lands of the Hanford Site in 2015**

| Species | Tree | Cliff | Transmission Tower | Utility Pole | Electrical Substation | Nest Platform | Communications Tower | Building | Irrigation Pipe | Mammal Burrow | Artificial Burrow | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Ferruginous Hawk | | | 4 | | | | | | | | | 4 |
| Swainson's Hawk | 19 | | 1 | | | | | | | | | 20 |
| Red-tailed Hawk | 3 | | 3 | | | | | 1 | | | | 7 |
| Prairie Falcon | | 3 | | | | | | | | | | 3 |
| American Kestrel | 4 | | | | | | | | | | | 4 |
| Bald Eagle | 1 | | | | | | | | | | | 1 |
| Osprey | | | | | | 3 | | | | | | 3 |
| Great Horned Owl | 3 | | | | | | | 2 | | | | 5 |
| Long-eared Owl | 2 | | | | | | | | | | | 2 |
| Burowing Owl* | | | | | | | | | 3 | 3 | 5 | 11 |
| Common Raven† | 14 | 1 | 37 | 7 | 1 | | 1 | 1 | | | | 62 |
| **Total** | **46** | **4** | **45** | **7** | **1** | **3** | **1** | **4** | **3** | **3** | **5** | **122** |

* Burrowing Owls were recorded in separate monitoring effort (Wilde et al. 2016).
† Common Ravens are technically not raptors but occupy a similar ecological niche and are protected under the MBTA.

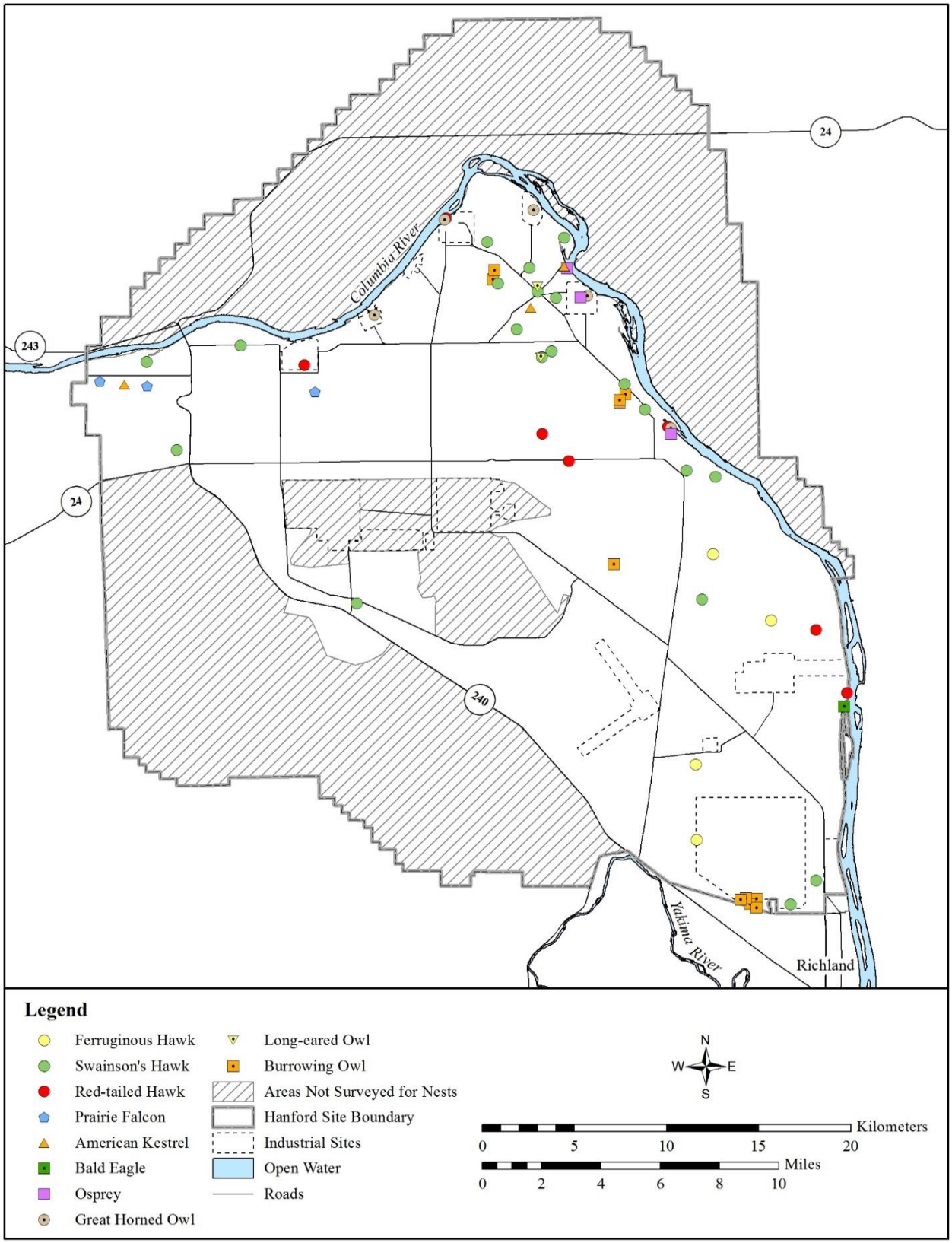


**Figure 3. Raptor Nests Located on DOE-RL Managed Lands of the Hanford Site in 2015**

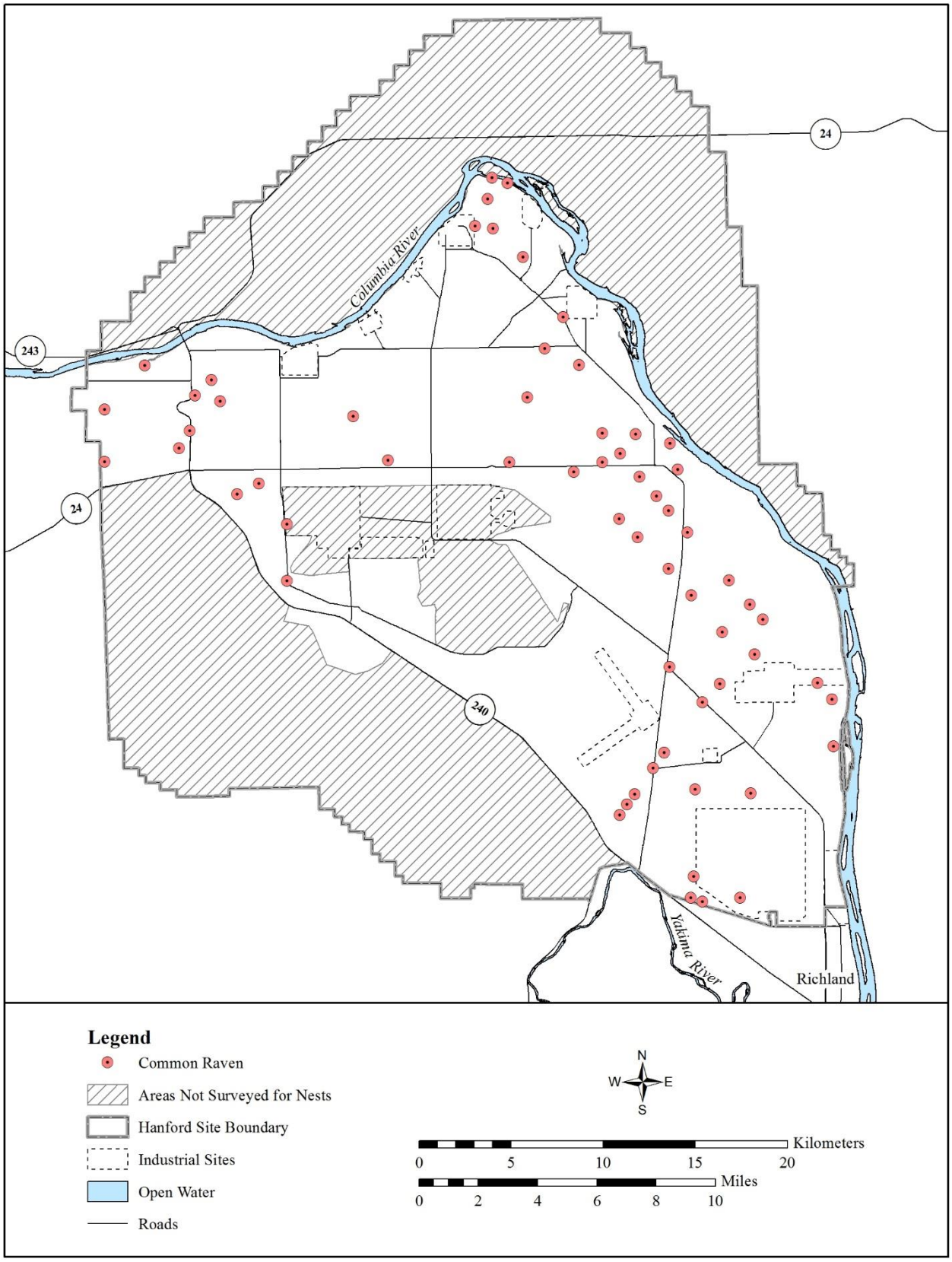


**Figure 4. Common Raven Nests Located on DOE-RL Managed Lands of the Hanford Site in 2015**

# 4.0 Discussion

Survey methods used in 2015 were consistent with the methods used in 2012 through 2014 (Nugent et al. 2013; Nugent et al. 2014; Nugent et al. 2015). Nests of 10 raptor species (Ferruginous, Swainson's, and Red-tailed Hawks; Prairie Falcons; American Kestrel; Bald Eagles; Ospreys; and Great Horned, Long-eared, and Burrowing Owls) as well as Common Ravens were located in 2015. It is likely that all or most of the nests on the DOE-RL managed portions of the Hanford Site for the majority of these species, with the exception of American Kestrels and Burrowing Owls, were detected during the 2015 survey. A comparison of the number of raptor and raven nest sites located in 2012 through 2015 is presented in Figure 5, and a summary of the number of raptor and raven nest sites reported on the Hanford Site from the years 1973 through 2015 is provided in Table 5.

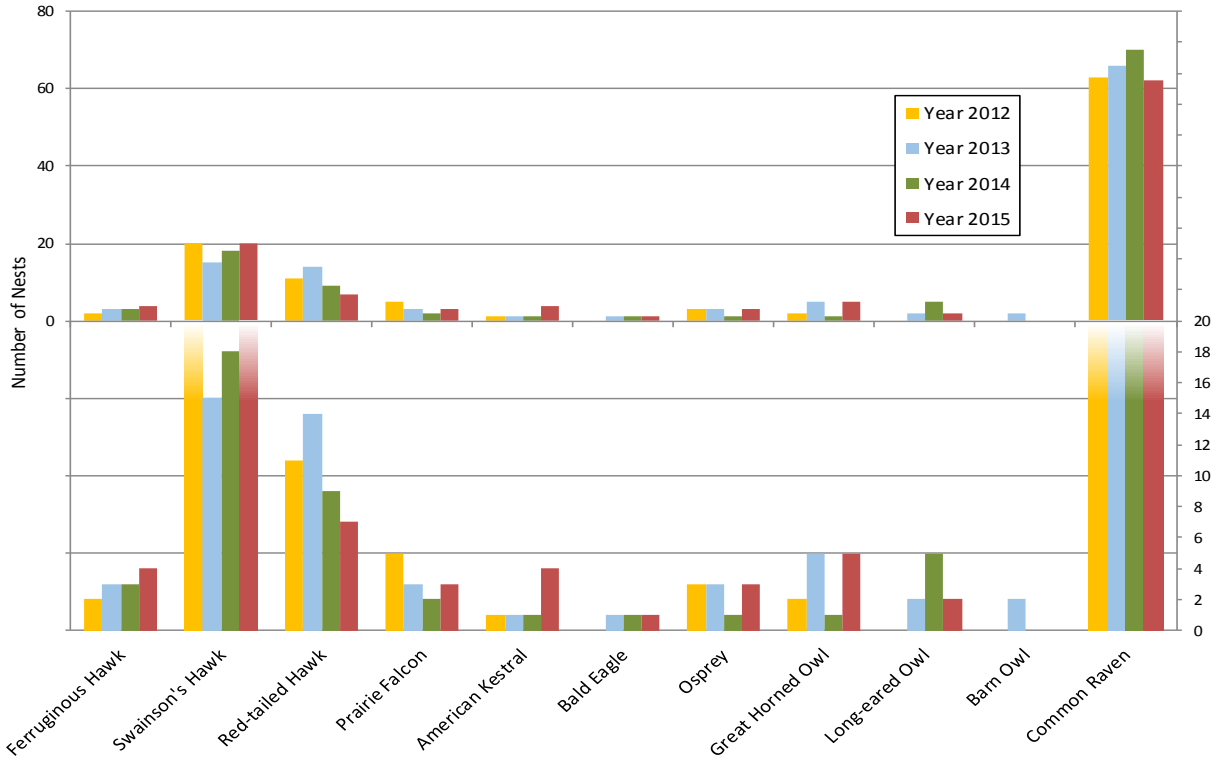


**Figure 5. Number of Raptor and Raven Nest Sites Located on DOE-RL Managed Lands of the Hanford Site in 2012 through 2015**

**Table 5. Number of Raptor and Raven Nest Sites reported on the Hanford Site from the Years 1973 through 2015**

| Survey Years | Source | Species | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Ferruginous Hawk | Swainson's Hawk | Red-tailed Hawk | Prairie Falcon | American Kestrel | Northern Harrier | Bald Eagle | Osprey | Great Horned Owl | Long-eared Owl | Short-eared Owl | Burrowing Owl | Barn Owl | Common Raven |
| 1973 | Olendroff (1973) | | 10 [10] | 9 [12] | 2 [2] | | | | | 7 [7] | 1 [1] | | | | |
| 1975 to 1978 | Fitzner (1980b) and Fitzner et al. (1981) | [1] | 14 to 16 | 7 to 19 | [4] | [10]* | [5]* | | | 2 to 4 [3 to 5] | 2 to 6 [3 to 8] | [1 to 2]* | 13 to 22* [20 to 26]* | 1 to 2 [2] | [9 to 11] |
| 1981 and 1982 | Thompson-Hanson (1984) | | | | | | [15]* 4 to 6* | | | | | | | | |
| 1987 | Poole et al. (1988) | | 23 [36] | | | | | | | | | | | | |
| 1987 and 1988 | Fitzner and Newell (1989) | 4 to 7 | | | | | | | | | | | | | |
| 1991 to 1993 | Nugent (1995) | 8 to 10 [11] | 14 [22 to 25] | 13 [20 to 25] | | | | | | | | | | | |
| 2000 | Poston et al. (2001) | | | | | | | | 1 | | | | | | |
| 2005 | Clayton (2005) | 4 | 9 | 14 | | | | | | | | | | | 45 |
| 2007 and 2008 | Larson (2009) | | | | | | | | | | | | [16 to 17]* | | |
| 2010 | WDFW (2012) | 2 | | | | | | | | | | | | | |
| 2010 | Wilde (2010) | | | | | | | | | | | | 27† | | |
| 2012 | Nugent et al. (2013) | 2 | 20 | 11 | 5 | 1* | | | 3 | 2 | | | | | 63 |
| 2012 | Wilde et al. (2013a) | | | | | | | | | | | | 39† | | |
| 2013 | Nugent et al. (2014) | 3 | 15 | 14 | 3 | 1* | | 1 | 3 | 5 | 2 | | | 2 | 66 |
| 2013 | Wilde et al. (2013b) | | | | | | | | | | | | 50† | | |
| 2014 | Nugent et al. (2015) | 3 | 18 | 9 | 2 | 1* | | 1 | 1 | 1 | 5 | | 11* | | 70 |
| 2015 | This Report | 4 | 20 | 7 | 3 | 4* | | 1 | 3 | 5 | 2 | | 11* | | 62 |

Number in brackets is the number of nests found in those years on the entire Hanford Site. Number not in brackets is the number of nests found in those years in the area of our survey which includes the DOE-RL managed lands of the Hanford Site excluding portions of the 200 Area (Figure 1).

* Nests of American Kestrels, Northern Harriers, Short-eared Owls, and Burrowing Owls are difficult to find; therefore, nest numbers likely represent minimums.

† Number of active burrows, including nest and satellite burrows.

The first known successful Bald Eagle nest was documented on the Hanford Site upstream of Wooded Island in 2013; the nest site was successful again in 2014 and 2015 (Cranna et al. 2015a; Cranna et al. 2015b). A second Bald Eagle nest was constructed on the White Bluffs peninsula in 2015, but its continued occupancy and success could not be determined due to its location being obscured by foliage later in the season. On June 5, surveyors performing a roadside breeding bird survey observed a juvenile Bald Eagle in the nest tree; however, it was unclear whether this was a young bird from the nest (Cranna et al. 2015b).

Ferruginous Hawks occupied four nest sites on the Hanford Site in 2015, up slightly from two to three nests observed in 2012 through 2014. All four nest sites were located on 230 kV transmission towers and were all previously active (known WDFW nest territories). Nesting Ferruginous Hawks were uncommon on the Hanford Site prior to 1987, with only one or two pairs nesting each year on basalt outcroppings on the side hills of Rattlesnake Mountain (Fitzner and Newell 1989). In 1987, four pairs of Ferruginous Hawks were observed nesting on the relatively new 230 kV transmission towers associated with the Washington Public Power Supply System reactors (now known as Energy Northwest). Construction of the transmission towers began in 1976, and lines were energized between December 1976 and July 1981. In 1988, seven Ferruginous Hawk nests were observed on 230 kV transmission towers, and one in a tree. In 1991, 1992, and 1993, 11 active Ferruginous Hawk nests were reported on the entire Hanford Site (8 to 10 active nests in the survey area) each year (Fitzner et al. 1994; Nugent 1995). The majority of these nests were located on transmission towers. A decrease in the number of nesting Ferruginous Hawks on the Hanford Site has occurred since the 1990s. Clayton (2005) reported four nesting pairs on transmission towers in 2005 and Washington Department of Fish and Wildlife (Livingston, pers. comm. 2012) documented only two nesting pairs on transmission towers in 2010.

Ferruginous Hawks are especially sensitive to human disturbance and incursion into their nesting areas. On the Hanford Site, nesting Ferruginous Hawks are protected using WDFW guidelines (WDFW 2004). Buffer zones of 1000 meters (m) [3281 feet (ft)] are established around active nests. Road closure signs are placed in the roads where they intersect with the 1000 m (3281 ft) buffers. Nest areas are protected from all human disturbance within 250 m (820 ft) between March 1 and May 31, and within 1000 m (3281 ft) for prolonged (>0.5 hour) activities during the entire nesting and fledging season (March 1 to August 15). The data collected during this survey allow for the identification and protection of nesting Ferruginous Hawks.

Twenty Swainson's Hawk nests were found in 2015, which was similar to the past 3 years (20 in 2012, 15 in 2013, and 18 in 2014). These numbers were within the range (9 to 23 nests) found in the survey area in the last 42 years. The number of Red-tailed Hawk nests located in 2015 (7) was fewer than observed in the past 3 years (11 in 2012, 14 in 2013, and 9 in 2014) and is at the lower end of the range found in the survey area during the past 42 years (7 to 19 nests).

Three Prairie Falcon nests were found in 2015, which was similar to the past 3 years (five in 2012, three in 2013, and two in 2014). Nests were found on the basalt cliffs on Gable Butte and Umtanum Ridge. The number and location of Prairie Falcon nests on the Hanford Site has remained relatively constant over the

years. Olendroff (1973) observed seven (two in the survey area) Prairie Falcon nests along the stretch of cliffs from Gable Butte to the Yakima-Benton County Line in 1973, while Fitzner et al. (1981) found no more than four pairs nesting in any one year (1975 through 1978) on the entire Hanford Site.

American Kestrel nest site numbers are expected to be much greater than the four nests located during this survey. As secondary cavity nesters, American Kestrels have many opportunities (holes and crevices on trees, cliffs, buildings, and other structures) for nesting on the Hanford Site but are difficult to detect during a survey of this type.

Three Osprey nests were located on the Hanford Site in 2015; all nests were situated on nest platforms. These numbers were similar to the past 3 years (three in 2012, three in 2013, and one in 2014).

Five Great Horned Owl nests were found on the Hanford Site in 2015; three nests were placed in trees, one nest was found on the decommissioned 105KE Reactor, and another nest was located on the decommissioned 105H Reactor. The nest discovered on the 105KE Reactor contained one egg on January 14 but was found to be depredated on January 22. The number of Great Horned Owl nests has ranged from one to seven a year in the survey area in the past 42 years.

Two Long-eared Owl nests were located in 2015, both nests were found in trees. A range of one to six Long-eared Owl nests in a year have been observed in the survey area in the last 42 years.

Barn Owl nest numbers have always been infrequent on the Hanford Site. No Barn Owl nests were detected in 2015 although a single Barn Owl was seen in the Hanford Townsite on May 27. No Barn Owl nests were observed in 2012, two nests were found in 2013, and none were located in 2014. Fitzner et al (1981) documented one or two Barn Owl nests each year in the survey area from 1975 to 1978. No Short-eared Owl nests were detected in the years 2012 through 2015. Short-eared Owls rarely nest on the Hanford Site.

A separate monitoring effort for Burrowing Owls was conducted in 2015 (Wilde et al. 2016). The scope of the Burrowing Owl monitoring effort in 2015 was to document the status of known active burrows. Eighteen active burrows were located constituting 11 active Burrowing Owl nest sites. Eleven Burrowing Owl nest sites were also found in 2014 though neither year likely represents a complete number for the Hanford Site.

Sixty-two Common Raven nest sites were detected on the Hanford Site in 2015. This number was a decrease from a high of 70 nest sites in 2014. Until 2015, nesting Common Ravens had been increasing steadily on the Hanford Site with 70 nests in 2014, 66 in 2013, and 63 in 2012 compared to 45 nests located by Clayton (2005) in 2005 and 9 to 11 nests located on the entire Hanford Site each year by Fitzner (1980b) from 1975 to 1978. Ravens often flourish as a result of human alterations to the environment. The majority of raven nests found on the Hanford Site are on transmission towers or utility poles. Increased numbers of nesting ravens can have detrimental impacts to sensitive species in the area, in particular, ravens prey on eggs and nestlings of other birds nesting on the Hanford Site.

# 5.0 References

Burke Museum. 2015. *Washington Birds Breeding Phenology Project*. University of Washington. Accessed October 5 at: http://www.burkemuseum.org/ornithology/phenology.

CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601-9675. (P.L. 96-510).

Clayton, K. M. 2005. *Breeding Population Status and Nest Site Characterization of Hawks* (Buteo spp.) *and Common Ravens* (Corvus corax) *on the Hanford Site, Southcentral Washington*. PNNL-SA-46396. Pacific Northwest National Laboratory, Richland, Washington.

Cranna, K., C. Lindsey, J. Nugent, and J. Wilde. 2015a. *Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2014*. HNF-58547, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-58547_-_Rev_00.pdf.

Cranna, K., C. Lindsey, J. Nugent, and J. Wilde. 2015b. *Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2015*. HNF-59488, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-59488_-_Rev_00.pdf.

Dirkes R. L. and R. W. Hanf. 1998. *Hanford Site Environmental Report for Calendar Year 1997. PNNL-11795*. Pacific Northwest National Laboratory, Richland, Washington. Online at: http://msa.hanford.gov/files.cfm/PNNL-11795_1997.pdf.

Dirkes R. L., R. W. Hanf, J. R., and T. M. Poston. 1999. *Hanford Site Environmental Report for Calendar Year 1998*. PNNL-12088. Pacific Northwest National Laboratory, Richland, Washington. Online at: http://msa.hanford.gov/files.cfm/PNNL-12088_1998.pdf.

Executive Order 13186. *Responsibilities of Federal Agencies to Protect Migratory Birds*. Online at: http://energy.gov/nepa/downloads/executive-order-13186-responsibilities-federal-agencies-protect-migratory-birds.

Fitzner, R. E., D. Berry, L. L. Boyd, and C. A. Rieck. 1977. "Nesting of Ferruginous Hawks (Buteo regalis) in Washington 1974-75." *The Condor* 79:245-249.

Fitzner, R. E. 1978. *The Ecology and Behavior of Swainson's Hawk in Southcentral Washington*. PhD thesis. Washington State University. Pullman, Washington.

Fitzner, R. E. 1980a. *Behavioral Ecology of the Swainson's Hawk in Southeastern Washington*. PNL-2754. Pacific Northwest Laboratory, Richland, Washington.

Fitzner, R. E. 1980b. Impacts of a Nuclear Energy Facility on Raptorial Birds. In *A Workshop on Raptors and Energy Development*, ed. R. P Howard and J. F. Gore. Bonneville Power Administration, U. S. Fish and Wildlife Service, Idaho Power Company, and the Idaho Chapter of the Wildlife Society. Boise, Idaho. January 25-26, 1980.

Fitzner, R. E., W. H. Rickard, L. L. Cadwell, and L. E. Rogers. 1981. *Raptors of the Hanford Site and Nearby Areas of Southcentral Washington*. PNL-3212. Pacific Northwest National Laboratory, Richland, Washington.

Fitzner, R. E., and R. L. Newell. 1989. Ferruginous hawk nesting on the U.S. DOE Hanford Site: case history of a recent invasion caused by transmission lines. In *Proceedings IV: Issues and technology in the management of impacted wildlife*. Pp. 125-132. Thorne Ecological Institute, Boulder, Colorado.

Fitzner, R. E., S. G. Weiss, and J. A. Stegen. 1994. *Threatened and Endangered Wildlife Species of the Hanford Site Related to CERCLA Characterization Activities*. WHC-EP-0513. Westinghouse Hanford Company, Richland, Washington.

Larson, K. B. 2009. *Nest Habitat Selection of Burrowing Owls in Relation to Soils, Burrow Availability, and Burrow Temperature*. MS Thesis. Washington State University, Pullman, Washington.

Leary, A. W. 1996. *Home Ranges, Core Use Areas, and Dietary Habits of Ferruginous Hawks in Southcentral Washington*. MS Thesis. Boise State University, Boise, Idaho.

Leary, A. W., R. Mazaika, and M. J. Bechard. 1998. "Factors Affecting the Size of Ferruginous Hawk Home Ranges." *Wilson Bulletin* 110(2):198-205.

Livingston, M. 2012. Personal communication with this WDFW staff member.

MBTA – Migratory Bird Treaty Act of 1918, 16 U.S.C. 703, et seq.

NEPA – National Environmental Policy Act of 1969, 42 U.S.C. 4321, et seq. (P.L. 91-190).

Nugent, J. J. 1995. *Nest-Site and Habitat Selection of Buteo Species in Southeastern Washington and the Use of Geographic Information Systems to Model Nest Habitat Quality*. MS Thesis. University of Montana, Missoula, Montana.

Nugent, J., C. Lindsey, and G. Malin. 2013. *Raptor Nest Monitoring Report for Calendar Year 2012*. HNF-53073, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-53073_-_rev_00_No_Coversheets.pdf.

Nugent, J., C. Lindsey, and J. Wilde. 2014. *Hanford Site Raptor Nest Monitoring Report for Calendar Year 2013*. HNF-56769, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-56769_-_Rev_00.pdf.

Nugent, J., K. Cranna, C. Lindsey, and J. Wilde. 2015. *Hanford Site Raptor Nest Monitoring Report for Calendar Year 2014*. HNF-58717, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-58717_-_Rev_00.pdf.

Olendorff, R. R. 1973. *Raptorial Birds of the U.S.A.E.C. Hanford Reservation, South-Central Washington*. BNWL-1790. Battelle Pacific Northwest Laboratories, Richland Washington.

Poole, L. D., N. V. Marr, and S. M. McCorquodale. 1988. *Productivity, Mortality, and Response to Disturbance of Nesting Swainson's Hawks on the Hanford Site*. PNL-6496. Pacific Northwest National Laboratory, Richland, Washington.

Poston T. M., R. W. Hanf, and R. L. Dirkes. 2000. *Hanford Site Environmental Report for Calendar Year 1999*. PNNL-13230. Pacific Northwest National Laboratory, Richland, Washington. Online at: http://msa.hanford.gov/files.cfm/PNNL-13230_1999.pdf.

Poston T. M., R. W. Hanf, R. L. Dirkes, and L. F. Morasch. 2001. *Hanford Site Environmental Report for Calendar Year 2000*. PNNL-13487. Pacific Northwest National Laboratory, Richland, Washington. Online at: http://msa.hanford.gov/files.cfm/PNNL-13487_2000.pdf.

Thompson-Hanson, P. A. *Nesting Ecology of Northern Harriers on the Hanford Site, South-central Washington*. MS Thesis. Washington State University, Pullman, Washington.

USDOE – U. S. Department of Energy. 1999. *Final Hanford Comprehensive Land-Use Plan Environmental Impact Statement*. DOE/EIS-0222-F. U.S. Department of Energy, Washington, D.C. Online at: http://energy.gov/nepa/downloads/eis-0222-final-environmental-impact-statement-0.

USDOE – U. S. Department of Energy. 2013a. *Hanford Site Biological Resources Management Plan*. DOE/RL-96-32, Rev. 1. U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/DOE-RL-96-32-01.pdf.

USDOE – U. S. Department of Energy. 2013b. *Bald Eagle Management Plan for the Hanford Site, South-Central Washington*. DOE/RL-94-150, Rev. 2. U.S. Department of Energy, Richland Operations Office, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/Hanford%20Bald%20Eagle%20Management%20Plan%20Rev.%202%20-%20FINAL.PDF.

USDOE – U.S. Department of Energy and USFWS – U.S. Fish and Wildlife Service. 2013. *Memorandum of Understanding between the United States Department of Energy and the United States Fish and Wildlife Service: Regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds."* September 12. Online at: http://energy.gov/sites/prod/files/2013/10/f3/Final%20DOE-FWS%20Migratory%20Bird%20MOU.pdf.

WDFW – Washington Department of Fish and Wildlife. 2004. *Management Recommendations for Washington's Priority Species – Volume IV: Birds*. Washington Department of Fish and Wildlife, Olympia, WA. Online at: http://wdfw.wa.gov/publications/00026/wdfw00026.pdf.

WDFW – Washington Department of Fish and Wildlife. 2016. *Species of Concern in Washington. Washington Department of Fish and Wildlife*. Online at: http://wdfw.wa.gov/conservation/endangered/.

Wiggins, D. A., D. W. Holt and S. M. Leasure. 2006. "Short-eared Owl (*Asio flammeus*)." The Birds of North America Online, Ed. A. Poole. Ithaca: Cornell Lab of Ornithology. Retrieved from the Birds of North America Online at: http://bna.birds.cornell.edu/bna/species/062/.

Wilde, J. 2010. *Active Burrowing Owl Burrows on the Hanford Site in 2010*. Unpublished Raw Data.

Wilde, J. W., K. J. Cranna, and J. J. Nugent. 2016. *Hanford Site Burrowing Owl Monitoring Report for Calendar Year 2015*. HNF-59375, Rev. 0. Mission Support Alliance, Richland, Washington. Report in Preparation.

Wilde, J. W., C. T. Lindsey, and J. J. Nugent. 2013a. *Burrowing Owl Monitoring Report for Calendar Year 2012*. HNF-54294, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-54294_-_Rev_00_Cleared_Public.pdf.

Wilde, J. W., C. T. Lindsey, J. J. Nugent, and M. S. Filan. 2013b. *Hanford Site Burrowing Owl Monitoring Report for Calendar Year 2013*. HNF-56531, Rev. 0. Mission Support Alliance, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/HNF-56531_-_Rev_00.pdf.