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Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2014

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

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

P.O. Box 650
Richland, Washington 99352

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1.0 Introduction

The Bald Eagle (*Haliaeetus leucocephalus)* plays an important predatory role in the ecosystem and also serves as a national symbol for the United States of America. In 2007, the U.S. Fish and Wildlife Service (USFWS) determined that the population of bald eagles in the lower 48 States had sufficiently recovered, so the species could be removed from the federal endangered and threatened species list. The State of Washington also down-listed Bald Eagles from threatened to sensitive. Federal laws including the *Bald and Golden Eagle Protection Act of 1940* and the *Migratory Bird Treaty Act of 1918* still provide protection for eagles, their nest trees, and communal night roosts. The *National Bald Eagle Management Guidelines*, produced by the U.S. Fish and Wildlife Service, provides monitoring and management guidance for Bald Eagles (USFWS 2007). The Department of Energy (DOE) Richland Operations Office has the *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* (DOE 2013), which defines appropriate protection measures for nests and roost sites based on federal and state guidelines. Monitoring is essential to maintain current biological information about bald eagle abundance and distribution on the Hanford Site, to ensure compliance with protection regulations, and to inform future protection and management efforts.

Bald eagles primarily use the Hanford Reach of the Columbia River as a wintering area and are attracted to the abundant fish and waterfowl found along the river. Bald eagles arrive on the Hanford site in mid-November to forage and are usually present until mid-March. Nest building has occurred most years, but most nests on the Hanford Site are usually abandoned by mid-March, as the eagles begin to migrate toward summer feeding areas or nesting territories. One successful nest was documented in 2013 and 2014 on the Hanford Site. In other portions of Washington State, nesting may begin as early as December and young may fledge as late as August (DOE 2013).

Wintering eagles use different habitats for various activities such as perching, foraging, and roosting. Roosting locations are important to protect because they provide shelter from winter weather and serve a social function. The Hanford Site bald eagle management plan (DOE 2013) relies on a roost-site definition developed by the Washington Department of Fish and Wildlife (WDFW) under its former management policies; a roost site is defined as a tree or a group of trees in which at least three eagles roost for at least two nights during more than one year.

Eight bald eagle night roost locations on the Hanford Site were protected from disturbance during 2014 with 400-meter buffers (Figure 1). These exclusion buffers were enforced from November 15 through March 15. The purpose of the FY2014 monitoring was to determine whether eagles are continuing to use the currently protected roost locations 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.

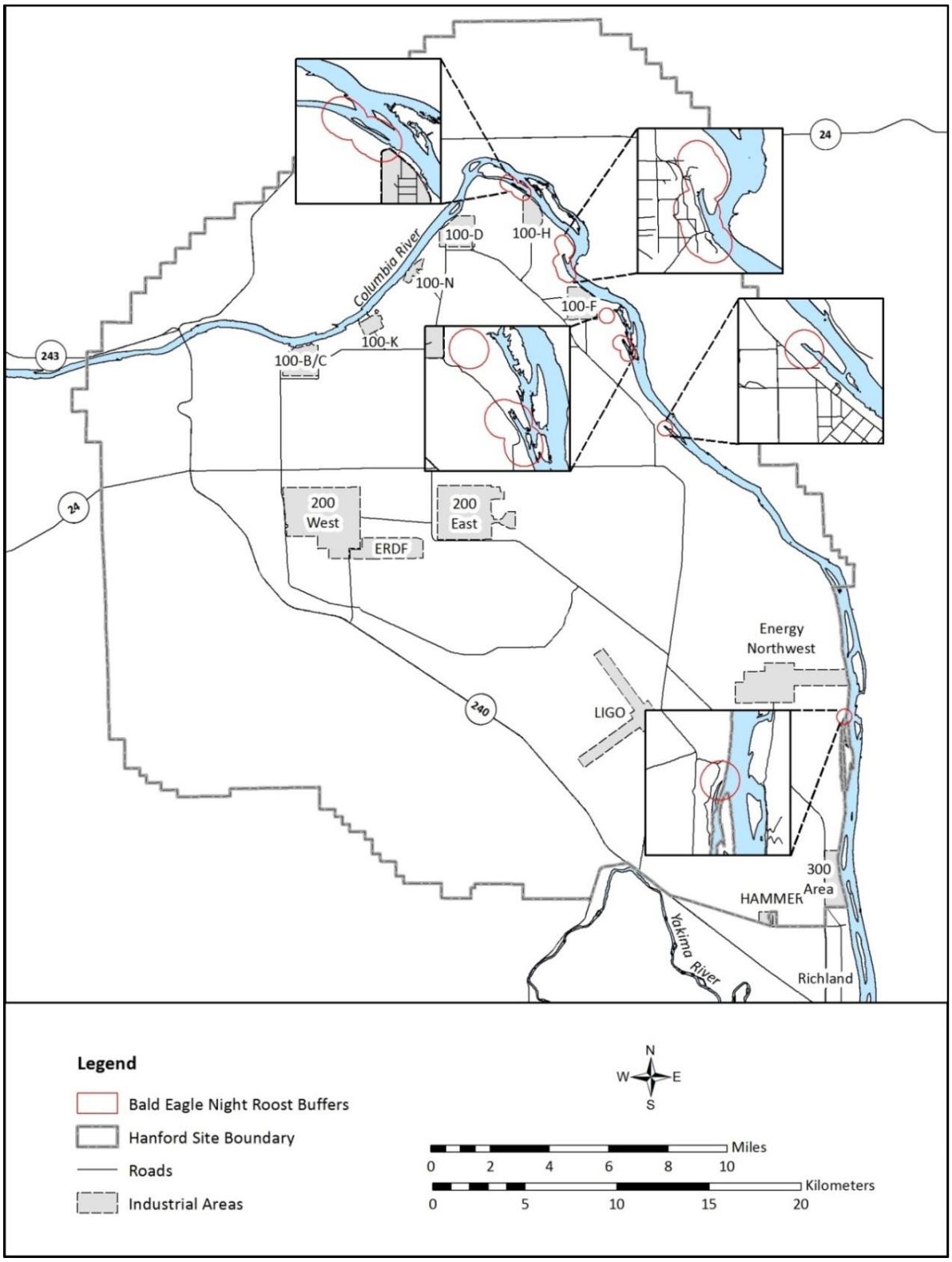

Figure 1. Protected Bald Eagle Night Roosts for FY2014

2.0 Methods

In FY 2014, bald eagle monitoring efforts consisted of night roost surveys, trail camera surveys, boat surveys, and nest surveys. Each of these survey methods are described in the sections below.

2.1 Night Roost Surveys

Night roost surveys (a typical Hanford Site night roost is shown in Figure 2) were performed at the eight currently protected night roost locations (Figure 3). Surveys were conducted at dusk, from ten minutes prior to sunset until dark. Surveyors approached each location in a vehicle, staying outside of the designated 400-meter buffer zones. Spotting scopes and binoculars were used to determine the number of eagles present, age class (adult vs. juvenile), and activity. Surveyors then marked the specific location that the eagles were roosting on an aerial photo of the roost location. After recording the data from a roost location, surveyors quickly proceeded to the next location in order to maximize the number of surveys per night.

Figure 2. A Typical Hanford Site Bald Eagle Night Roost

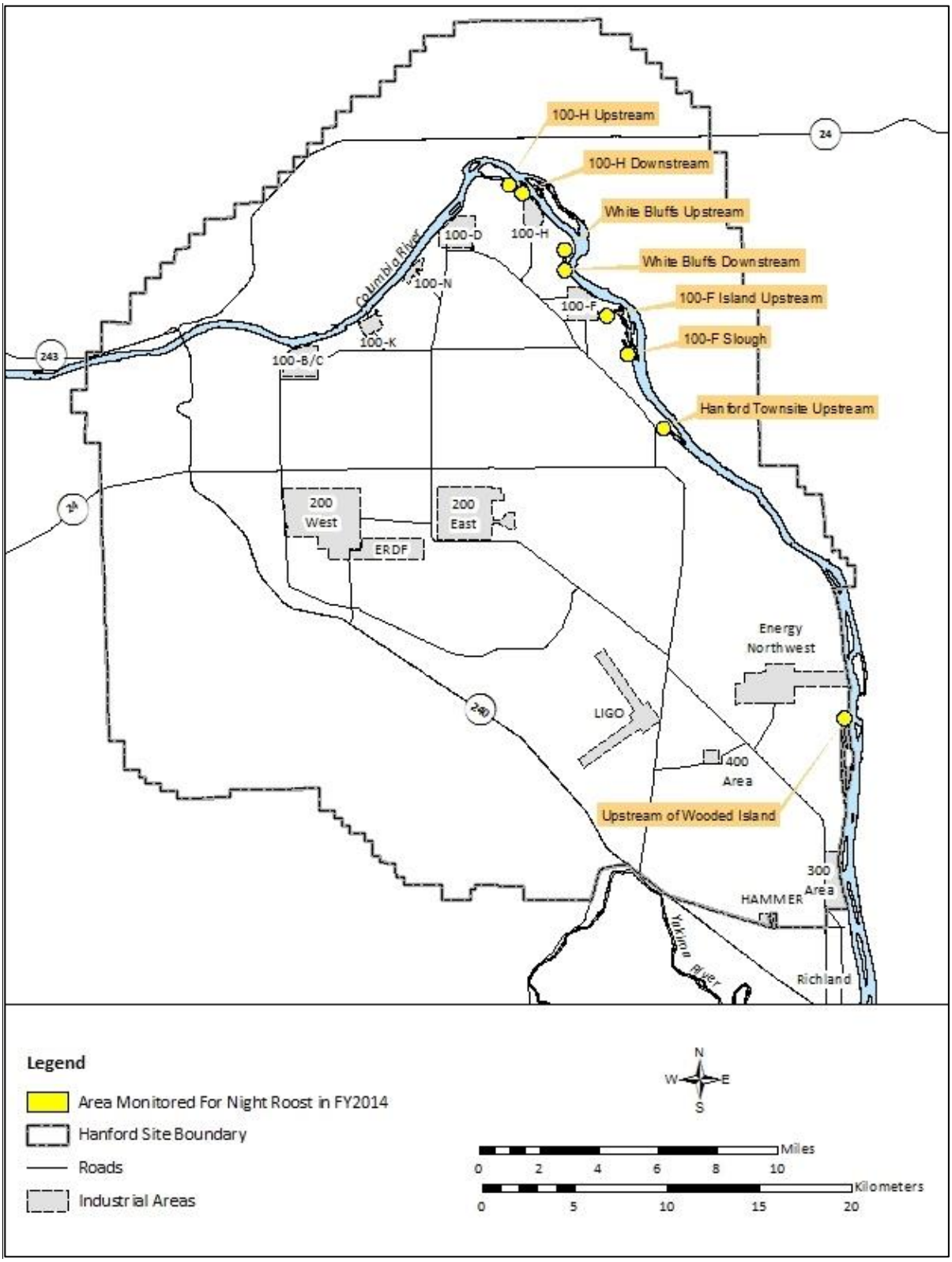

Figure 3. Locations Monitored for Bald Eagle Night Roosting during FY2014

2.2 Trail Camera Surveys

Trail camera surveys were performed at two of the currently protected night roost locations: 100 H Upstream and White Bluffs Upstream. The cameras used for the surveys were Reconyx™ PC900 HyperFire™ professional trail cameras. A camera was placed at each roost location so that the entire roost area was in the field of view. The cameras were programmed to take photographs at 5 minute intervals beginning an hour prior to sunrise/sunset and finishing an hour after sunrise/sunset. The photos were then reviewed for eagle activity. This method was implemented to investigate night roost activity during the standard monitoring time frame (ten minutes prior to sunset until dark) to determine the adequacy of the night roost monitoring methods described in section 2.1.

2.3 Boat Surveys

Boat surveys were performed to determine the age class, distribution, and number of eagles on the Hanford Reach. The entire length of the Columbia River along the Hanford Site was surveyed, beginning immediately upstream of Vernita Bridge and ending at the 300 Area. Boat surveys were also used to identify additional potential night roosts and nest sites.

2.4 Nest Surveys

Nest surveys were performed at two potential nest locations: White Bluffs peninsula and Upstream of Wooded Island. Nest surveys typically consisted of 1-hour observations in the area of interest, documenting any signs of nesting activity (e.g., territory defense, nest tending, pair bonding behaviors, etc.).

3.0 Results

3.1 Night Roost Surveys

Thirty-two night roost surveys were completed during the FY2014 monitoring season. The first night roost survey was conducted on December 2, and the final survey was completed on February 24. One early season night roost survey was conducted on December 2 and the remaining three night roost surveys were performed in concurrence with the boat surveys. The night roost survey results are summarized in Table 1.

Table 1. Bald Eagle Night Roost Monitoring Data for FY2014

Night Roost Location	Total Night Roost Surveys	# of Surveys with ≥3 Eagles Present	# of Surveys with 1 or 2 Eagles Present
100-H Upstream	4	4	0
100-H Downstream	4	0	2
White Bluffs Upstream	4	3	1
White Bluffs Downstream	4	1	0
100-F Island Upstream	4	3	0
100-F Slough	4	0	3
Hanford Townsite Upstream	4	0	1
Upstream of Wooded Island	4	1	3

Specific details and observations for each roost location surveyed during FY 2014 are described below. Each roost has been classified into one of five categories, to better describe eagle use at each location based on cumulative observations from FY 2012 to FY 2014. The categories are “high density-high frequency”, “high density-low frequency”, “low density-high frequency”, “low density-low frequency”, and “no use”. For this purpose, density refers to the number of eagles, and frequency refers to how often eagles occur at a location.

- **100-H Upstream (high density-high frequency)**

  This location was used extensively throughout the roosting season and was one of the most important roosts observed during FY2014, with up to 15 eagles present during a single night.

- **100-H Downstream (low density-high frequency)**

  One eagle was observed occupying the roost during 2 of the 4 surveys. The 100-H area had active remediation and groundwater activities occurring which may affect the level of use.

- **White Bluffs Upstream (high density-high frequency)**

  This location was an extremely important communal night roost during FY2014. Multiple eagles were observed during every night roost survey performed at this location, and there were ≥10 eagles present during 2 of the 4 surveys conducted.

- **White Bluffs Downstream (high density-high frequency)**

  This location was used less extensively during FY2014 than it was during FY2012 and FY2013. Three juvenile bald eagles were observed during 1 of the 4 surveys.

- **100-F Island Upstream (low density-high frequency)**

  This location was identified as a new night roost during FY2012 and was used regularly by 4-9 eagles, especially early in the roosting season. During FY2013 the site saw less frequent use, with ≥3 eagles present only once. This location was an important night roost during FY2014 with ≥3 eagles present during 3 of the 4 surveys.

- **100-F Slough (low density-high frequency)**

  Eagles continued to use this location during FY2014. Eagles were present during 3 of the 4 surveys; however only 2 eagles were present during the first survey and only 1 was present during the second and fourth surveys.

- **Hanford Townsite Upstream (low density-low frequency)**

  Eagles were observed at this location during each of the four surveys; however there was only one survey with ≥3 eagles present. Due to the closed tree canopies present inshore, some roosting activity on the river side may be obscured from view at this location.

- **Upstream of Wooded Island (low density-high frequency)**

  A pair of adults began defending this location as a nesting territory early in the FY2014 season and was present during all 4 surveys. Three juveniles were observed roosting in the trees upstream of the typical roosting location on January 14, possibly due to territorial defense of the nest area.

3.2 Trail Camera Surveys

A total of 3,888 photos were captured during the trail camera surveys (1,944 photos per camera). The cameras were deployed at both locations (100 H Upstream and White Bluffs Upstream) on December 19 and retrieved on January 15. The trail camera night roost survey results are summarized in Table 2.

Table 2. Bald Eagle Night Roost Trail Camera Survey Data for FY2014

Night Roost Location	Total # of Nights Surveyed with Trail Cameras	# of Nights with ≥3 Eagles Observed	# of Nights with 1 or 2 Eagles Observed	% of Nights with Eagles Observed
100-H Upstream	27	23	3	96%
White Bluffs Upstream	27	27	0	100%

A combination of light and weather conditions dictated the time of the last photo that project staff were able to analyze for each night. Conditions were satisfactory during six of the twenty-seven survey nights for analyzing night roost activity during the standard survey time period (ten minutes prior to sunset until dark). Roosting activity observed at the 100-H Upstream location indicated that eagles arrived and departed the roost at varying times throughout the standard survey time period; however, the maximum occupancy observed for all six days occurred near the end of the time period (Figure 4). Results at the White Bluffs Upstream location were similar with the exception of December 23, when the maximum number of eagles observed was at sunset, and January 3, when a single eagle was present at the beginning of the survey period and departed between five and ten minutes prior to sunset (Figure 5).

The photographs that were taken an hour prior-to and after sunrise were generally poor in quality mainly due to fog on the lens. For the photos that were suitable for analysis, there seemed to be little correlation between the number of eagles observed using the roosts at night, and the number observed the following morning.

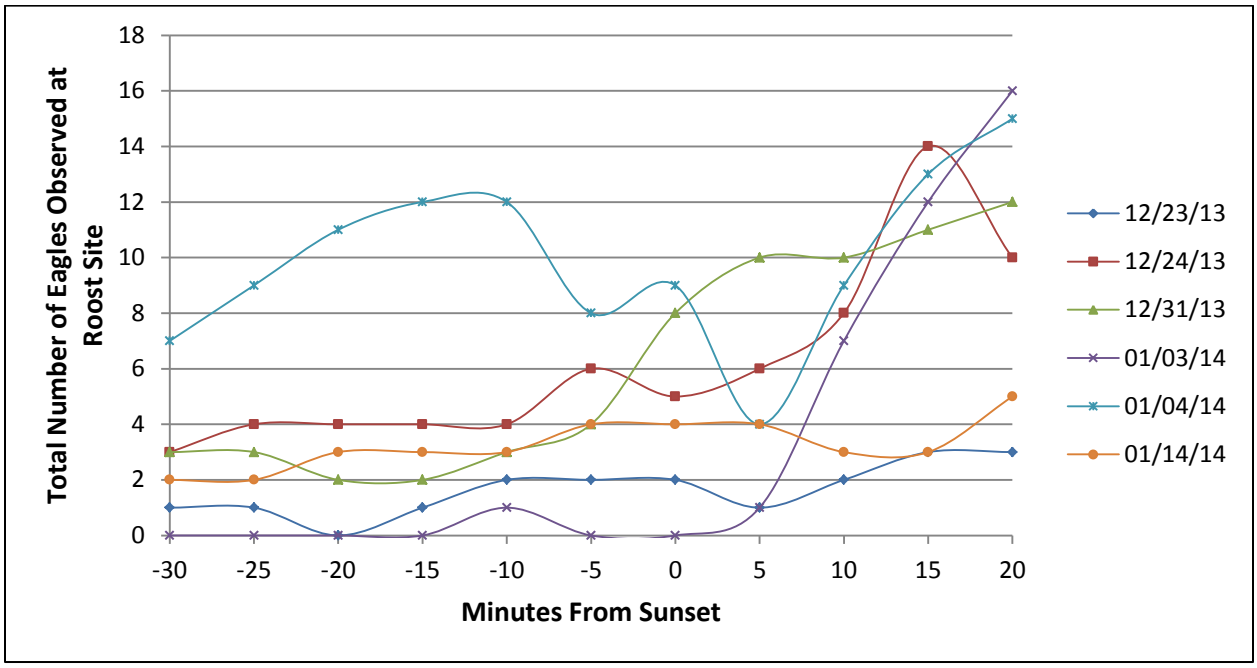

Figure 4. Bald Eagle Roosting Activity Observed with Trail Camera at 100-H Upstream

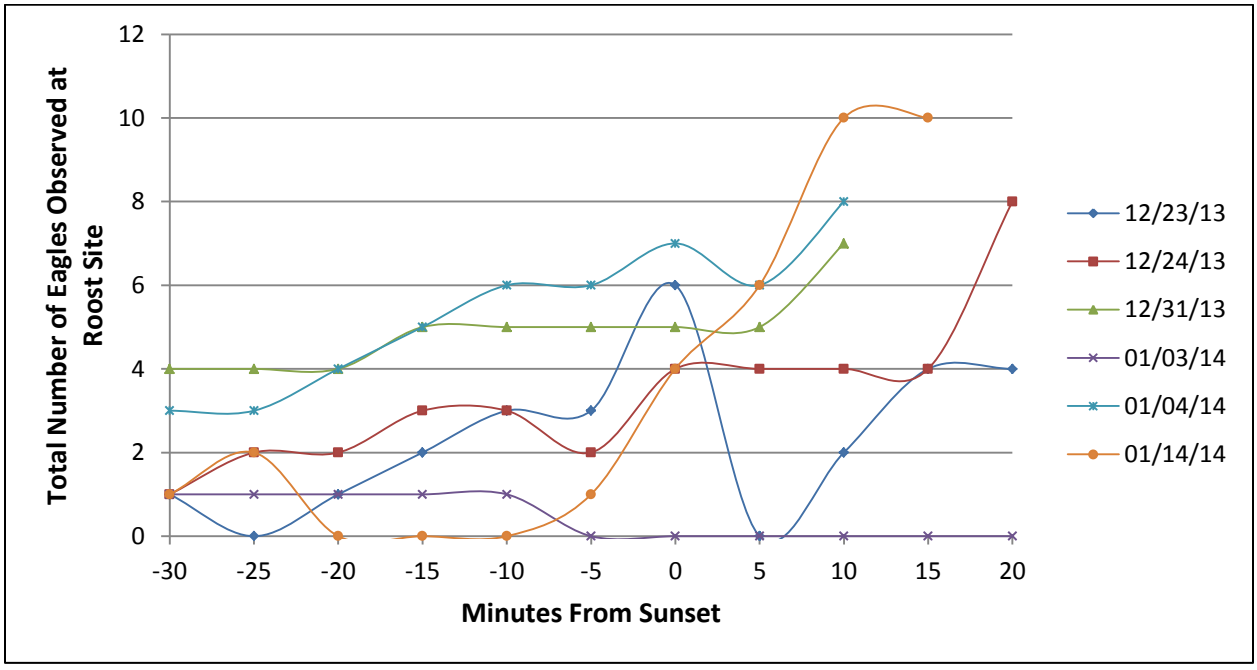

Figure 5 Bald Eagle Roosting Activity Observed with Trail Camera at White Bluffs Upstream

3.3 Boat Surveys

Boat surveys were performed on December 10, 2013, January 14, 2014, and February 24, 2014. Total counts and location information for the boat surveys are shown in Figure 6. All spatial data collected during the surveys were transferred from hard copy maps into a geographic information system for analysis.

3.4 Nest Surveys

Nest surveys were performed at the White Bluffs peninsula on March 5, March 12, March 13, and March 24 of 2014 with no nesting activity observed. Surveyors observed an adult eagle sitting on the historic nest located upstream of Wooded Island on March 5, 2014. A pair of eagle fledglings was observed perched near the Upstream of Wooded Island nest on July 10, 2014 by surveyors conducting sampling activities on the Columbia River.

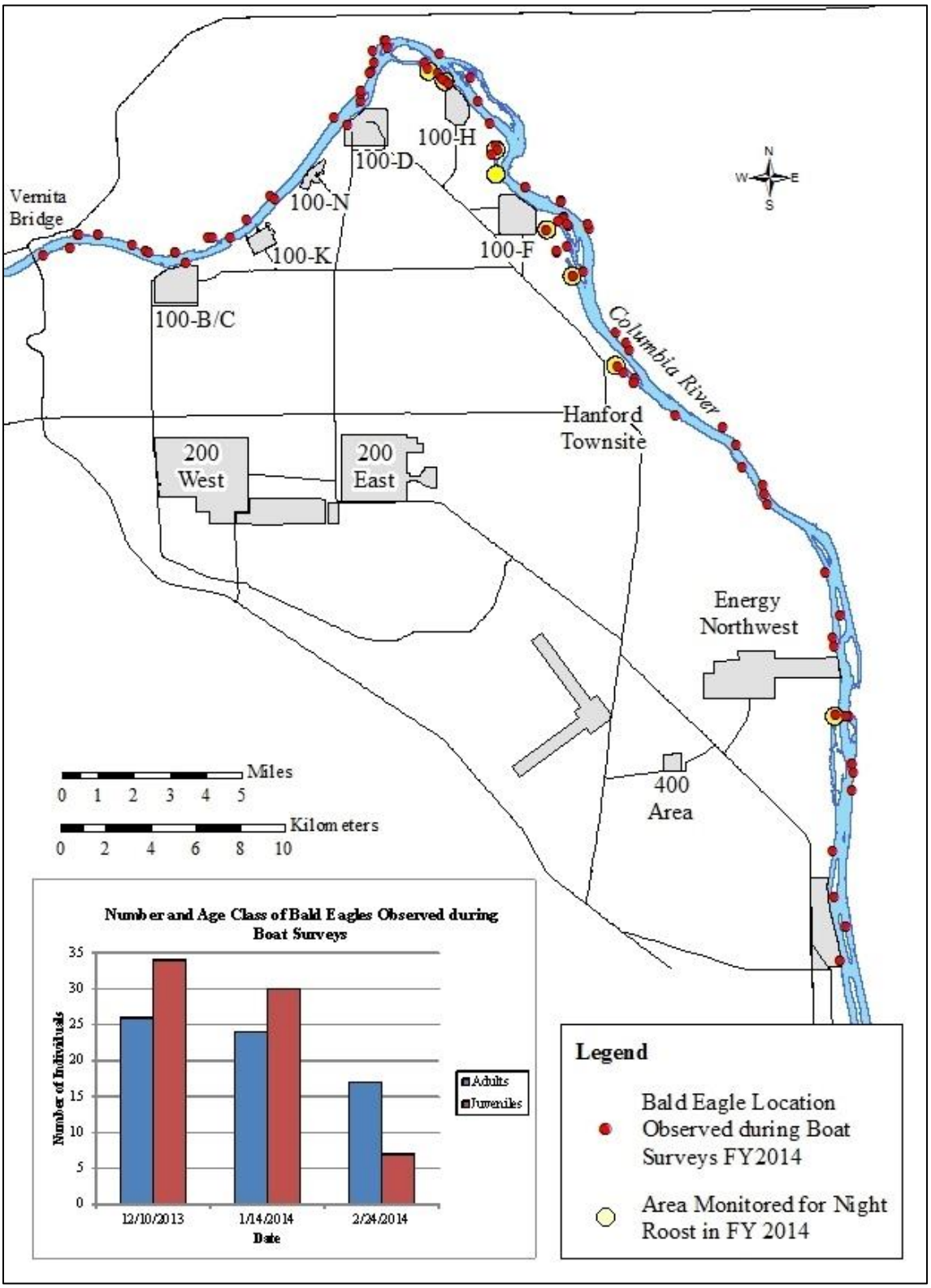

Figure 6. Boat Survey Results for FY2014

4.0 Discussion

Bald eagle use was documented at all of the night roost locations monitored during FY2014. Varying degrees of usage were observed at the roost locations as the season progressed. The majority of the eagles present during the early season were juveniles, who grouped in large numbers in areas where spawned out fall Chinook salmon carcasses are known to accumulate. As the season progressed, the number of juveniles on the Hanford Reach dropped off dramatically while the number of adults remained relatively constant. This was likely due to juvenile eagles taking advantage of the fall Chinook salmon food resource then leaving after the carcasses were no longer available, while adult eagles continued to use the Hanford Reach, likely feeding on waterfowl. In FY 2012 and FY 2013, adults outnumbered juveniles during the January (mid-season) surveys. In FY 2014, however, juvenile numbers were higher than the adults during the same time period (Figure 7). This is most likely a result of the record number of adult fall Chinook salmon spawning to the Hanford Reach during this year.

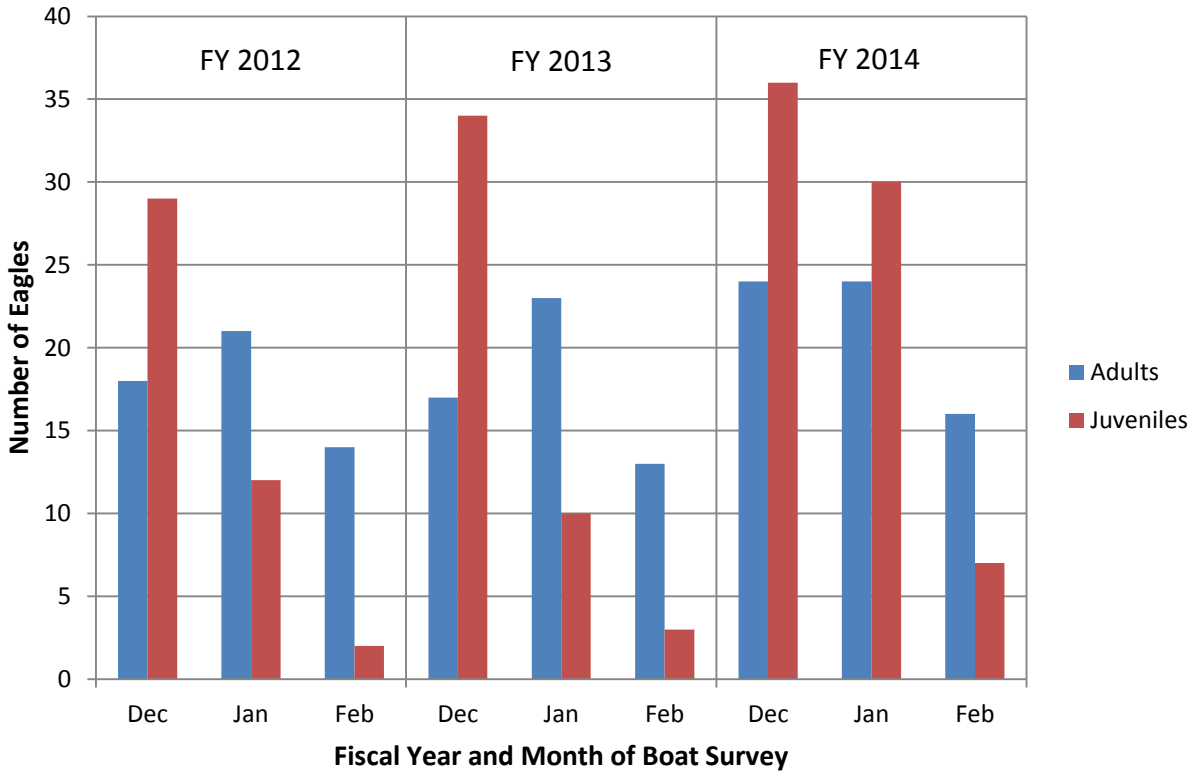

Figure 7. Number and Age Class of Bald Eagles Observed during Boat Surveys from FY 2012 to FY 2014

The direct night roost observations were based on approximately 3 percent of the available nights during the roosting timeframe. The purpose of these surveys was to determine the continued usage of the eight currently protected night roosts during FY 2014. Current planning includes increasing night roost monitoring frequency to weekly or bi-weekly during FY 2016 to determine if administrative protections need to be established at new roost sites, or if they are no longer justified at existing locations.

The trail camera method was effective as a tool for establishing rough estimates of eagle activity at night roosts. The cameras can be placed in the field and left for several days without having to revisit the site, vastly reducing the level of effort. However, observations from the photographs likely represent a minimum number of eagles present, due to the potential for eagles sitting close together to be counted as one, or for eagles sitting low or on the backside of trees to not be visible in the photographs. Also, various combinations of weather and light conditions can result in photographs that are not suitable for analysis, particularly for photographs that are captured during the times of peak roosting activity (sunset to dark). These types of complications are more likely with photography than during visual observations with high powered optics.

Monitoring of the nesting pair of adult eagles upstream of Wooded Island in FY 2013 documented the first known successful bald eagle nest on the Hanford Site (Figure 8). Surveyors monitoring the Wooded Island nest in July 2014 documented a pair of fledged eagle chicks perched near the nest for a second consecutive year. Prior to 2013, eagles have been documented constructing nests and defending territories annually on the Hanford Site. However, these nesting attempts typically end in mid- to late-March when the birds depart for their true nest sites.

Figure 8. Pair of Young Bald Eagles in Nest near Wooded Island in FY2013

5.0 References

Bald and Golden Eagle Protection Act of 1940, 16 U.S.C. 668-668d, 54 Stat. 250. U.S. Fish and Wildlife Service.

Burke Museum. 2013. Washington Birds Breeding Phenology Project. University of Washington. Accessed 5/22/2013: http://www.burkemuseum.org/ornithology/phenology.

Eisner, Sherry A. 1991. *Bald Eagles Wintering Along the Columbia River in South Central Washington: Factors Influencing Distribution and Characteristics of Perch and Roost Trees.* Masters Thesis, University of Montana. Online at http://nerp.pnnl.gov/docs/ecology/thesis/baldeagles_eisner.pdf.

Lindsey, C., J. Nugent, M. Sackschewsky, and J. Wilde, 2012, *Bald Eagle Monitoring Report for Fiscal Year 2012*, HNF-52464, Rev. 0, Prepared by Mission Support Alliance for the U.S. Department of Energy, Richland, Washington. Online at: http://www.hanford.gov/files.cfm/hnf-52464_-_rev_00.pdf.

Migratory Bird Treaty Act of 1918. 16 U.S.C. 703-712; Ch. 128; July 13, 1918; 40 Stat. 755_U.S. Fish and Wildlife Service. Online at http://www.fws.gov/laws/lawsdigest/migtrea.html.

Revised Code of Washington (RCW) 77.15.130. Protected fish or wildlife – Unlawful taking. Online at http://apps.leg.wa.gov/rcw/default.aspx?cite=77.15.130.

U. S. Department of Energy (DOE). 2013. *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, WA. Online at http://www.hanford.gov/page.cfm/ecologicalmonitoring.

U.S. Fish and Wildlife Service (USFWS). 2007. *National Bald Eagle Management Guidelines*. U.S. Fish and Wildlife Service, Midwest Region. Online at http://www.fws.gov/midwest/eagle/guidelines/guidelines.html

Washington Department of Fish and Wildlife (WDFW). 2011. *Bald Eagle Management and Protection in Washington State*. Washington Department of Fish and Wildlife, Olympia, Washington. Online at http://wdfw.wa.gov/conservation/bald_eagle/.