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# Hanford Site Bald Eagle Monitoring Report for Fiscal 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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Release Approval

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## Contents

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<b>1.0</b>	<b>INTRODUCTION .....</b>	<b>1</b>
<b>2.0</b>	<b>METHODS.....</b>	<b>3</b>
<b>3.0</b>	<b>RESULTS .....</b>	<b>5</b>
<b>4.0</b>	<b>DISCUSSION.....</b>	<b>7</b>
<b>5.0</b>	<b>REFERENCES .....</b>	<b>14</b>

## Figures

---

Figure 1.1.	Protected Bald Eagle Night Roosts for FY2013 .....	2
Figure 2.1.	Locations Monitored for Bald Eagle Night Roosting during FY2013.....	4
Figure 3.1.	Boat Survey Results for FY2013 .....	6
Figure 4.1.	Buffers Generated from the Combined FY2012/FY2013 Surveys.....	9
Figure 4.2.	Pair of Adult Bald Eagles in Nest Near Wooded Island .....	10

## Tables

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Table 3.1.	Night Roost Monitoring Data for FY2013.....	5
Table 4.1.	Linear Interpolation of Night Roost Monitoring Data for FY2013 .....	8

## 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 Richland Operations Office (DOE) has the *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* ([DOE 2009](#)) that 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 nests on the Hanford Site are usually abandoned by mid-March, as the eagles begin to migrate toward summer feeding areas or nesting territories. In other portions of Washington State, nesting may begin as early as December and young may fledge as late as August ([DOE 2009](#)).

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 2009](#)) 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.

Ten bald eagle night roost locations on the Hanford Site were protected from disturbance during 2013 with 400-meter buffers (Figure 1). These exclusion buffers are enforced from November 15 through March 15. The purpose of the FY2013 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.

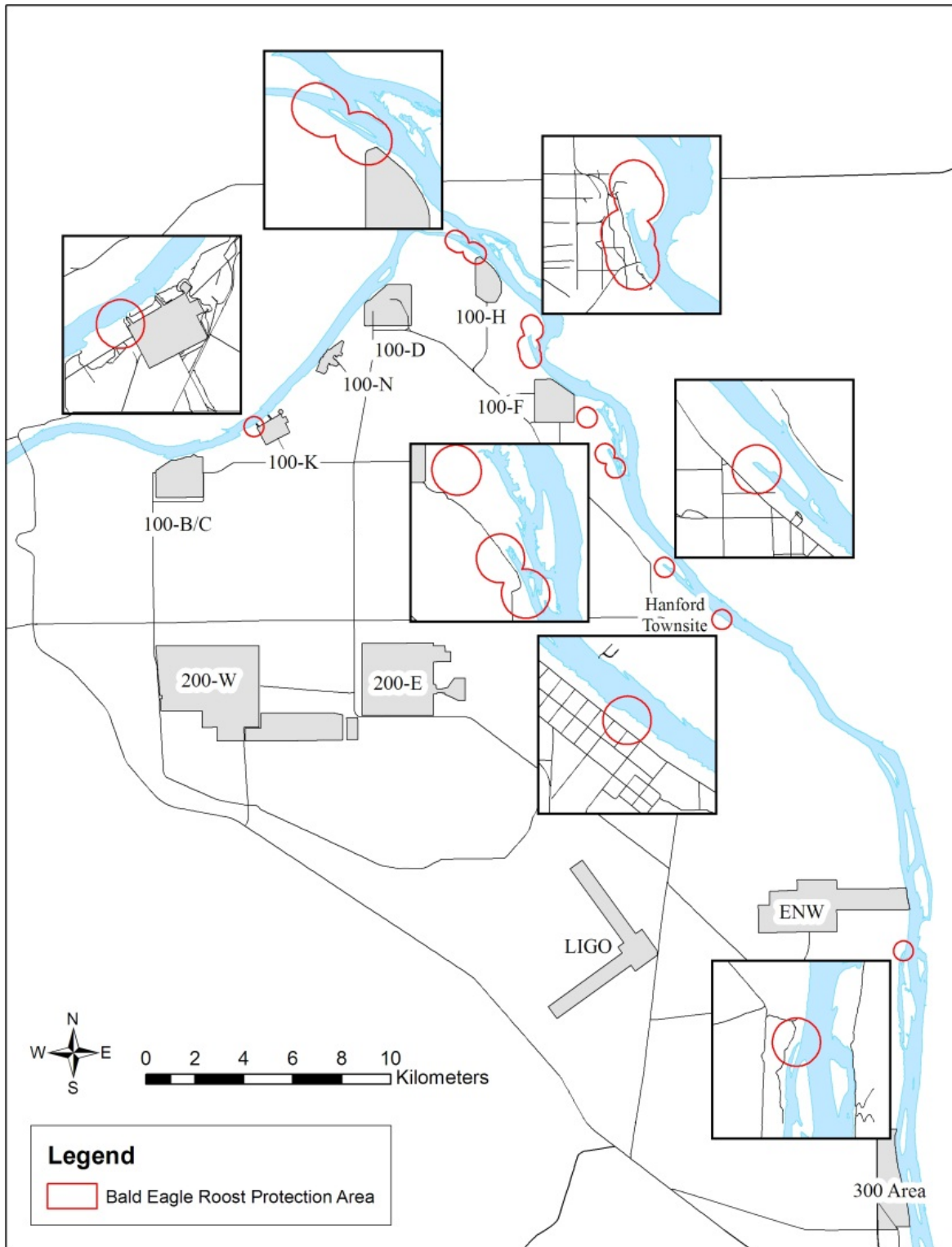


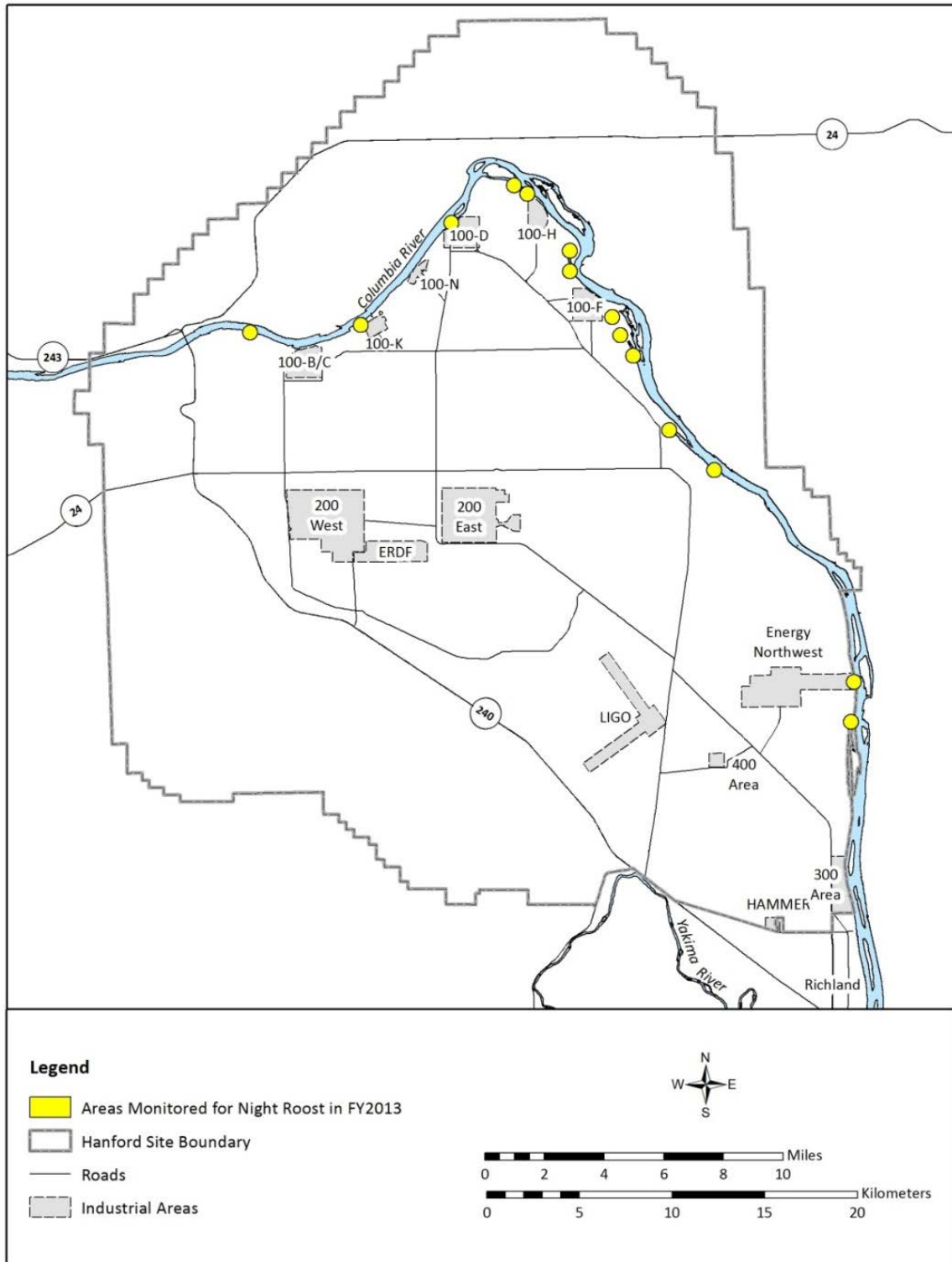
Figure 1.1. Protected Bald Eagle Night Roosts for FY2013

## 2.0 Methods

Night roost surveys were performed at the ten currently protected night roost locations and four additional locations identified as “potential roosts” (Figure 2). Surveys were conducted at dusk, from one-half hour 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.

Nest surveys were performed at three potential nest locations: 100-H, White Bluffs peninsula, and Upstream of Wooded Island. Nest surveys typically consist 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.).

Boat surveys were also 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 is 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.



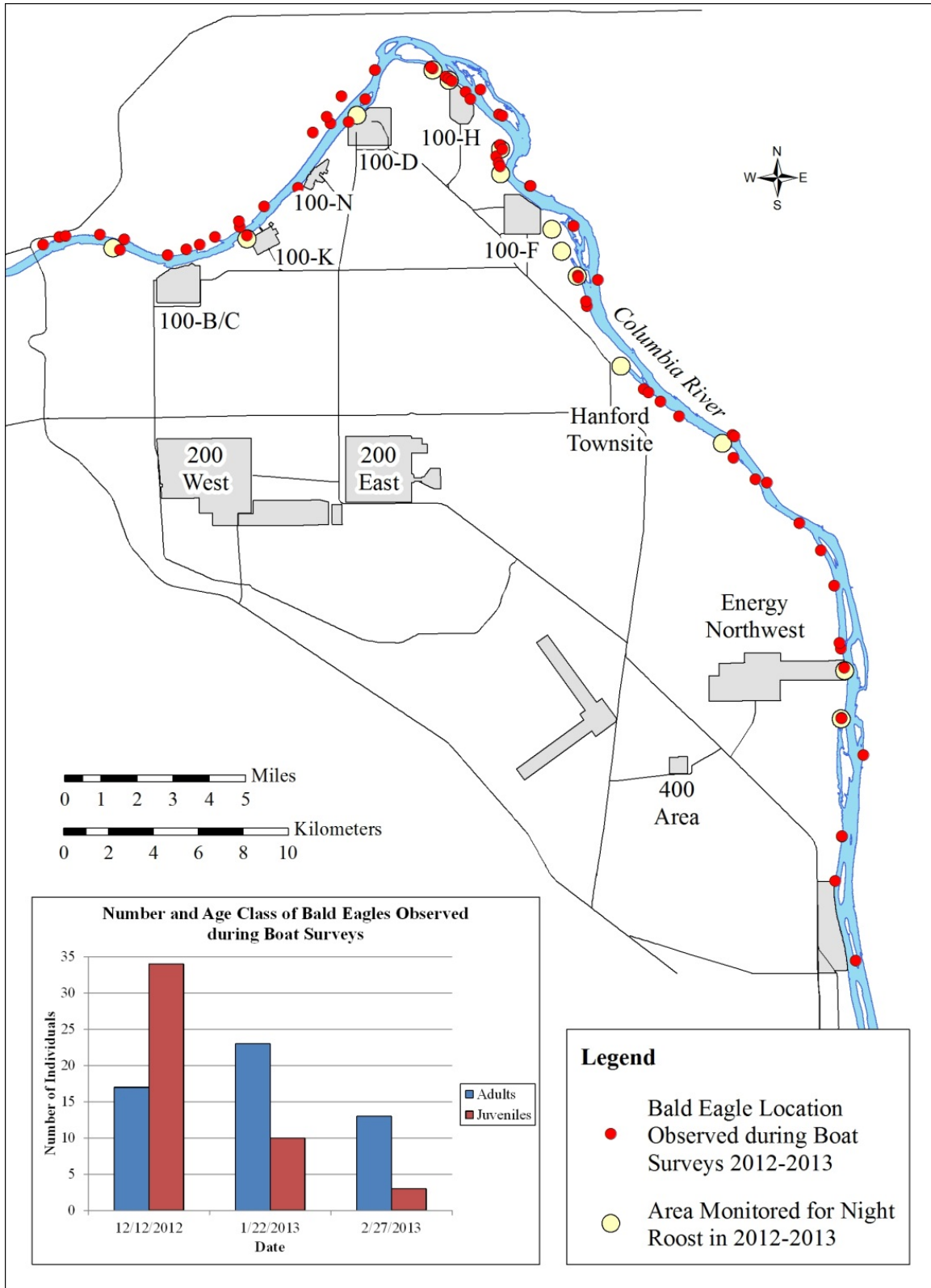
**Figure 2.1. Locations Monitored for Bald Eagle Night Roosting during FY2013**

### 3.0 Results

Two-hundred and eight night roost surveys and three boat surveys were completed during the FY2013 monitoring season. The first night roost survey was conducted on November 26, and the final survey was completed on February 27. The roosting period from November 15 through March 15 contained 121 nights. Night roost locations were surveyed between 14 and 15 nights, covering approximately 12% of the available nights. Surveys were conducted approximately once per week at each location. The night roost survey results are summarized in Table 1. Boat surveys were performed on December 12, January 22, and February 27. Total counts and location information for the boat surveys are shown in Figure 3. All spatial data collected during the surveys were transferred from hard copy maps into a geographic information system for analysis. Nest surveys began on January 25 and were ongoing at the completion of this report. A pair of eagles was observed constructing a nest at the Upstream of Wooded Island night roost location for the first time on January 25 by surveyors conducting a boat survey. Nest surveys continued at the location regularly, and the pair was still tending the nest as of the completion of this report (May 23). A large nest and a pair of adult eagles were observed on May 20, 2013 at the historical nest location on White Bluffs peninsula. However, one of the adult birds appears young with dark flecking on the head and a dark terminal tail band. Nest surveys were also continuing at this location as of the completion of this report, but the nest was not yet considered active. A single eagle was observed moving sticks in a partially constructed nest during a night roost survey conducted on February 4 at the 100-H Area. No nesting activity was observed during the two subsequent nest surveys performed at this location.

**Table 3.1. Night Roost Monitoring Data for FY2013**

Night Roost Location	Total Roost Surveys	≥3 Eagles	1 or 2 Eagles	% with Eagles
100-B/C*	15	0	3	20%
100-K	15	0	2	13%
100-D*	15	0	0	0%
100-H Upstream	15	6	3	60%
100-H Downstream	15	1	6	47%
Upstream Whitebluffs	15	12	3	100%
Downstream Whitebluffs	15	2	6	53%
100-F Island Upstream	15	1	6	47%
100-F Island Downstream*	15	0	2	13%
100-F Slough	15	1	5	40%
Upstream Hanford Townsite	15	0	2	13%
Downstream Hanford Townsite	15	0	4	27%
ENW Outfall*	14	0	1	7%
Upstream of Wooded Island	14	1	9	71%
*Potential Roost for 2013				



**Figure 3.1. Boat Survey Results for FY2013**

## 4.0 Discussion

Bald eagle use was documented at 13 of the 14 locations monitored during FY2013. Varying degrees of usage were observed at the roost locations as the season progressed. The majority of the eagles present during the early season (November-December) were juveniles, who grouped in large numbers in areas where spawned out fall Chinook 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 is likely due to juvenile eagles taking advantage of the fall Chinook food resource, but then leaving after the carcasses are no longer available. Adult eagles continue to use the Reach, likely feeding on waterfowl.

Based on direct observations, and on the definition of a night roost being three or more eagles on two or more nights during two or more years, the previously identified “Upstream White Bluffs” and “100-H Upstream” locations and “Downstream White Bluffs” roosts qualified during the FY2013 survey. The remainder of the sites failed to qualify based on this raw data analysis. The direct observations are based on approximately 12 percent of the available nights during the roosting timeframe. Thus, some method of extrapolation is necessary to estimate the number of nights eagles were present at each location for the entire season. For example, three or more eagles were observed at the “100 F Slough” location one time, however it is likely that three or more eagles were present at that roost location on at least one un-surveyed night, which would result in this location qualifying as a night roost. Linear interpolation was used to estimate the number of qualifying roosting events at the identified roost locations. The formula used is as follows:

$$y = y_1 + (x-x_1) \frac{y_2-y_1}{x_2-x_1}$$

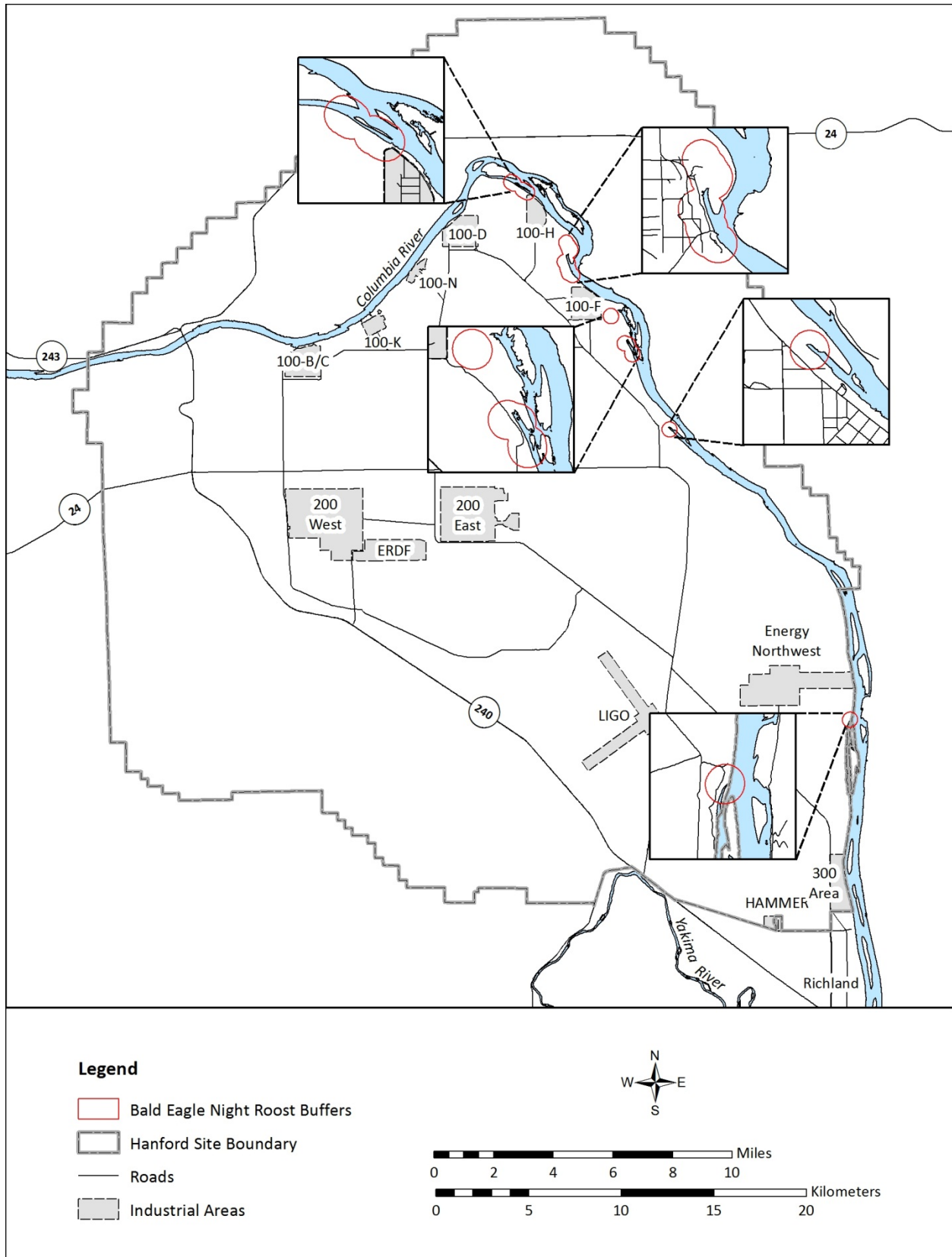
In the linear interpolation equation above,  $y_1$  is the first observed number of eagles,  $y_2$  is the second observed number of eagles, and  $x_1$  and  $x_2$  are the corresponding dates. The resulting data were used to estimate the number of qualifying nights at each location, with a qualifying night being  $\geq 3$  eagles present (Table 2).

**Table 4.1. Linear Interpolation of Night Roost Monitoring Data for FY2013**

Night Roost Location	Qualifying Nights	Nights with Eagles Present	% of Nights with Eagles Present	Total Nights**
100-B/C*	0	10	9%	115
100-K	0	2	2%	115
100-D*	0	0	0%	115
100-H Upstream	43	72	63%	115
100-H Downstream	8	42	37%	115
Upstream Whitebluffs	92	115	100%	115
Downstream Whitebluffs	8	54	47%	115
100-F Island Upstream	1	37	32%	115
100-F Island Downstream*	0	2	2%	115
100-F Slough	11	42	37%	115
Upstream Hanford Townsite	0	2	2%	115
Downstream Hanford Townsite	0	4	3%	115
ENW Outfall*	0	1	1%	116
Upstream of Wooded Island	1	73	63%	116
*Potential Roost for FY2013				
**Number of nights between first and last survey				
Qualified night roost during 2013				

Thus, based on the interpolated results, previously identified roosts that qualified during FY2013 were the 100-H Upstream, 100-H Downstream, Upstream White Bluffs, Downstream White Bluffs, and 100-F Slough. Previously identified roosts that did not qualify during FY2012 were 100-K, 100-F Island Upstream, Upstream Hanford town site, Downstream Hanford town site and Wooded Island. Potential roosts for FY2013 that did not qualify were 100-B/C, 100-D, 100-F Island Downstream, and ENW Outfall.

The buffer areas shown in the *Bald Eagle Management Plan for the Hanford Site* (DOE 2009) are based on points located at the center of the roost locations. However, some roosts include several trees that occur over a large area, resulting in eagles roosting close to the edges of the previous buffers. Thus, the previous buffers did not keep vehicular traffic or project activities from coming within 400 meters of night roosting eagles. The buffer areas distributed to Hanford Site personnel for 2013, based on the monitoring data from FY2012 (Lindsey et al. 2012), represents 400 meter buffers from the actual roosting locations of individuals observed. This is used to ensure that disturbance to roosting eagles is minimized. At the completion of the FY2013 monitoring season, the roosting observations for both FY2012 and FY2013 were combined to accurately represent eagle usage at each roost over multiple years. The point-locations of eagles roosting within each identified roost area, minus any extreme outliers, were mapped in ArcGIS, and a 400-meter buffer was placed around those points to more accurately buffer the actual extents of the roosts (Figure 4). In addition, based on the combined monitoring data from FY2012 and FY2013 it was determined that two previously protected night roost locations (100-K and Downstream Hanford town site) should no longer be protected. These sites, like most trees that occur along the Hanford Reach, are occasionally used by eagles, but do not meet the qualifications of a protected night roost.



**Figure 4.1. Buffers Generated from the Combined FY2012/FY2013 Surveys**

The nest at Wooded Island may be the first successful nesting attempt to occur on the Hanford Site (Figure 5). Eagles have been documented constructing nests and defending territories annually on the Hanford Site. However, these nesting attempts typically end in mid-March when the birds depart for their true nest sites. The continued presence of the pair of adult eagles at Wooded Island in the middle of May is far later in the season than previously observed. During a nest survey conducted on April 11, both adults were present at the nest and one was sitting in the nest for the majority of the survey, potentially indicating egg incubation or laying. This would fall inside the egg laying date range for eagles in Washington State, which ranges from March 1 to May 10 ([Burke Museum 2013](#)). Continued weekly monitoring will show whether the birds continue to occupy the location, and whether any young are successfully fledged.



**Figure 4.2. Pair of Adult Bald Eagles in Nest Near Wooded Island**

Specific details and observations for each roost location are described below. Each roost has been classified into one of five categories, to better describe eagle use at each location. 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-B/C (low density-low frequency)**

This roost location was not important to eagles during the FY2013 surveys. However, it was noted that eagles were present on the north shore of the river in trees directly across from the 100-B/C potential roost during many surveys, and that location may function as a night roost. All of the trees in this stand have relatively closed canopies, which appear to be less suitable for eagle roosting than trees with more open structure or canopies ([Eisner 1991](#)). Eagles were observed in more open structured trees on the north side of the river.

- **100-K (low density-low frequency)**

This location was not used regularly by eagles during FY2013, and only 1 or 2 birds were ever present. This may be due to the high level of remediation and demolition activity occurring within 400 meters of the roost location.

- **100-D (no use)**

Although eagles were observed on the 100-D Island, no eagles were observed at the 100-D roost during FY2013. The 100-D Area was highly active with remediation activity by the Washington Closure Hanford contractor during FY2013, so eagle use could increase when activity levels decrease in the future. The canopy in this stand is relatively closed and may not be ideal for eagle roosting.

- **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 FY2013, with up to 19 eagles present during a single night.

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

This location qualified during the FY2013 survey but was not used as extensively as the 100-H Upstream location. The 100-H area had active remediation and groundwater activities occurring which may affect the level of use. Although a single eagle was observed constructing a nest, no pair ever occupied or defended the location.

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

This location was an extremely important communal night roost during FY2013. Multiple eagles were observed during every night roost survey performed at this location, and there were  $\geq 10$  eagles present during six of the 15 surveys conducted.

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

This location was used less extensively during FY2013 than it was during FY2012. The roost still qualified in FY2013, and eagles were present about 50 percent of the time.

- **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  $\geq 3$  eagles present only once. The site did have eagles present during over 30% of surveys conducted.

- **100-F Island Downstream (low density-low frequency)**

This location continued to be unimportant to eagles for FY2013. Single eagles were observed at the location on only two occasions.

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

Eagles continued to use this location during FY2013, especially very early in the season. During the first survey, conducted on November 12, one adult and six juveniles were present at the roost.

- **Upstream Hanford town site (low density-low frequency)**

This location was used infrequently during FY2013. Due to the closed canopy present at many of the trees inshore, some roosting locations on the river side may be obscured from view at this location. The site was used more often during the FY2012 season, with birds present 46% of the time.

- **Downstream Hanford town site (low density-low frequency)**

This location was used infrequently during FY2012 and FY2013. Although previously identified as a night roost, the site no longer appears to be important to eagles.

- **ENW Outfall (low density-low frequency)**

Only a single eagle was observed at this location during FY2013, and none were present during FY2012 surveys. The single adult was perched 470 meters downstream, thus not even present near the center of the potential roost that was identified.

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

It is not exactly clear when the pair of adults began defending this location as a nesting territory, but this could have been the reason for the low density use at this location during FY2013. Juveniles were observed roosting in the trees 700 meters upstream of the typical roosting location, possibly due to territorial defense of the nest area.

Future eagle monitoring plans include continuing annual boat surveys along the entire Hanford Reach to determine the total number of eagles present at regular intervals throughout the winter-roosting season. Monitoring of historical and potential new nest sites will be conducted, and some winter night roost monitoring will be conducted to determine whether eagles continue to use current roosts and whether new night roost locations are established.

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