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Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2015



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

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P.O. Box 650
Richland, Washington 99352

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Prepared by
K.J. Cranna, J.J. Nugent, J.W. Wilde, and J.E. Grzyb

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



P.O. Box 650
Richland, Washington 99352

APPROVED

By Ashley R Jenkins at 7:22 am, Nov 03, 2015

Release Approval

Date

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Acronyms and Abbreviations

DOE	U. S. Department of Energy
ESA	Endangered Species Act
FY	Fiscal Year
GIS	Geographic Information System
WDFW	Washington State department of Fish and Wildlife
USFWS	U. S. Fish and Wildlife Service

1.0 Introduction

A national symbol of the United States, the Bald Eagle (*Haliaeetus leucocephalus*) plays an important predatory role in the riverine ecosystem at U. S. Department of Energy (DOE) Hanford Site. Bald eagles occupy the site annually during winter and early spring. Monitoring eagles during this period 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. This monitoring report provides an overview of Bald Eagle activity on the Hanford Site between November 2014 and July of 2015.

1.1 Bald Eagles on the Hanford Site

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. Wintering eagles use different habitats for various activities such as perching, foraging, and roosting. Although bald eagles may be observed far from water, they typically occupy habitats within 0.25 miles (400 meters) of the Columbia River and use trees growing along the shoreline for perching and roosting.

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. Beginning in 2013, Bald Eagles have occupied and successfully produced fledged young from a nest located upstream of Wooded Island for three consecutive years. In other portions of Washington State, nesting may begin as early as December and young may fledge as late as August ([DOE 2013](#)).

1.2 Bald Eagle Protection and Management at Hanford

Bald eagles are a success story for species protection under the *Endangered Species Act of 1975 (ESA)*. In 2007, forty years after the Bald Eagle was listed as endangered and given protection under the ESA, the U.S. Fish and Wildlife Service (USFWS) determined that the population of bald eagles in the lower 48 States had recovered sufficiently to be removed from the ESA endangered and threatened species list. The State of Washington also down-listed Bald Eagles from threatened to sensitive. Despite the significant recovery of bald eagle populations, however, 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. In addition, following delisting, the USFWS developed the [*National Bald Eagle Management Guidelines*](#), which provides monitoring and management guidance for Bald Eagles ([USFWS 2007](#)).

At Hanford, DOE has developed the *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* ([DOE 2013](#)), This document provides an overview of bald eagle distribution, behavior, and ecology important to understanding the issues related to management and protection of this species on the Hanford Site, and uses this information to define the actions that constitute the DOE policy regarding

Bald Eagle protection and management on the Hanford Site. Key among these actions are protective measures for roost sites and nests, which are based on federal and state guidelines.

Roosting locations provide shelter from winter weather and serve a social function. The *Bald Eagle Management Plan for the Hanford Site, South-Central Washington* ([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. Administrative protection is initiated at a new roost site if monitoring determines the presence of three or more eagles on at least two nights during a year, or if continued monitoring over two or more years determines that the site is occupied at night by one or more eagles at least 30 percent of the time ([DOE 2013](#)). Administrative protections and access restrictions are discontinued at sites where monitoring over two or more years indicates night roost occupancy by one or more eagles is less than 30 percent of the time and there is little or no indication of use by more than two eagles ([DOE 2013](#)). Bald eagle night roost locations on the Hanford Site are protected from disturbance from November 15 through March 15 with 400-meter buffers (Figure 1)

Eagle nesting activity is documented, and potential nest sites are monitored to determine if new nest protection areas are necessary. When a new nest is identified, nesting exclusion buffers of 400-meters are enforced until the nest is abandoned or the young eagles have fledged.

1.3 Hanford Site Bald Eagle Monitoring

Beginning in 2013, two levels of effort were established for annual Hanford Bald Eagle monitoring: comprehensive and limited. Comprehensive monitoring is performed triennially and limited monitoring occurs all other years. Boat surveys are performed monthly (December to February) to document the abundance, age class, distribution, and activities of Bald Eagles using the Hanford Reach during both levels of monitoring. Night roost surveys are performed monthly (December to February) to solely document the continued usage of the currently protected communal night roosts during limited surveys. The night roost monitoring frequency is increased to weekly or bi-weekly throughout the season to determine if administrative protections are justified at existing locations or need to be established at new roost sites during comprehensive monitoring. Boat surveys are performed on the same dates as night roost surveys to compare diurnal and nocturnal abundance and distribution. This information is used during comprehensive monitoring to help determine whether or not there is a justification to search for new roost sites. Nest surveys are performed in the same manner regardless of night roost monitoring effort level. The level of effort for any given year may be modified based on budget constraints, federal or state agency information requests, and/or Hanford Site remediation projects occurring near or within Bald Eagle nest or night roost protection buffers.

Hanford Site Bald Eagle monitoring for Fiscal Year (FY) 2015 was based on the limited approach and included monthly boat and night roost surveys throughout the Bald Eagle wintering season as well as nest monitoring that continued into the spring. The next triennial comprehensive monitoring event is scheduled for FY 2016 (Table 1).

Table 1. Hanford Site Bald Eagle Monitoring Schedule Summary

Annual Bald Eagle Monitoring Event Type	Schedule (From 2013 to 2019)	Surveys Performed	Survey Frequency during Season (Dec. through Feb.)	Survey Purpose
Comprehensive	Triennial: FY 2013 FY 2016 FY 2019	Boat	Once per month	Document age class, distribution, and abundance
		Night Roost	Weekly or bi-weekly (depending on budget allocation)	Determine if administrative protections are justified at existing locations or need to be established at new roost sites
		Nest	Once per month (continues into spring/summer as needed)	Establish nest protection areas and monitor for nest success or abandonment
Limited	All other years: FY 2014 FY 2015 FY 2017 FY 2018	Boat	Once per month	Document age class, distribution, and abundance to determine if new roosts should be monitored during future comprehensive events.
		Night Roost	Once per month	Document continued usage of currently protected night roosts
		Nest	Once per month (continues into spring/summer as needed)	Establish nest protection areas and monitor for nest success or abandonment

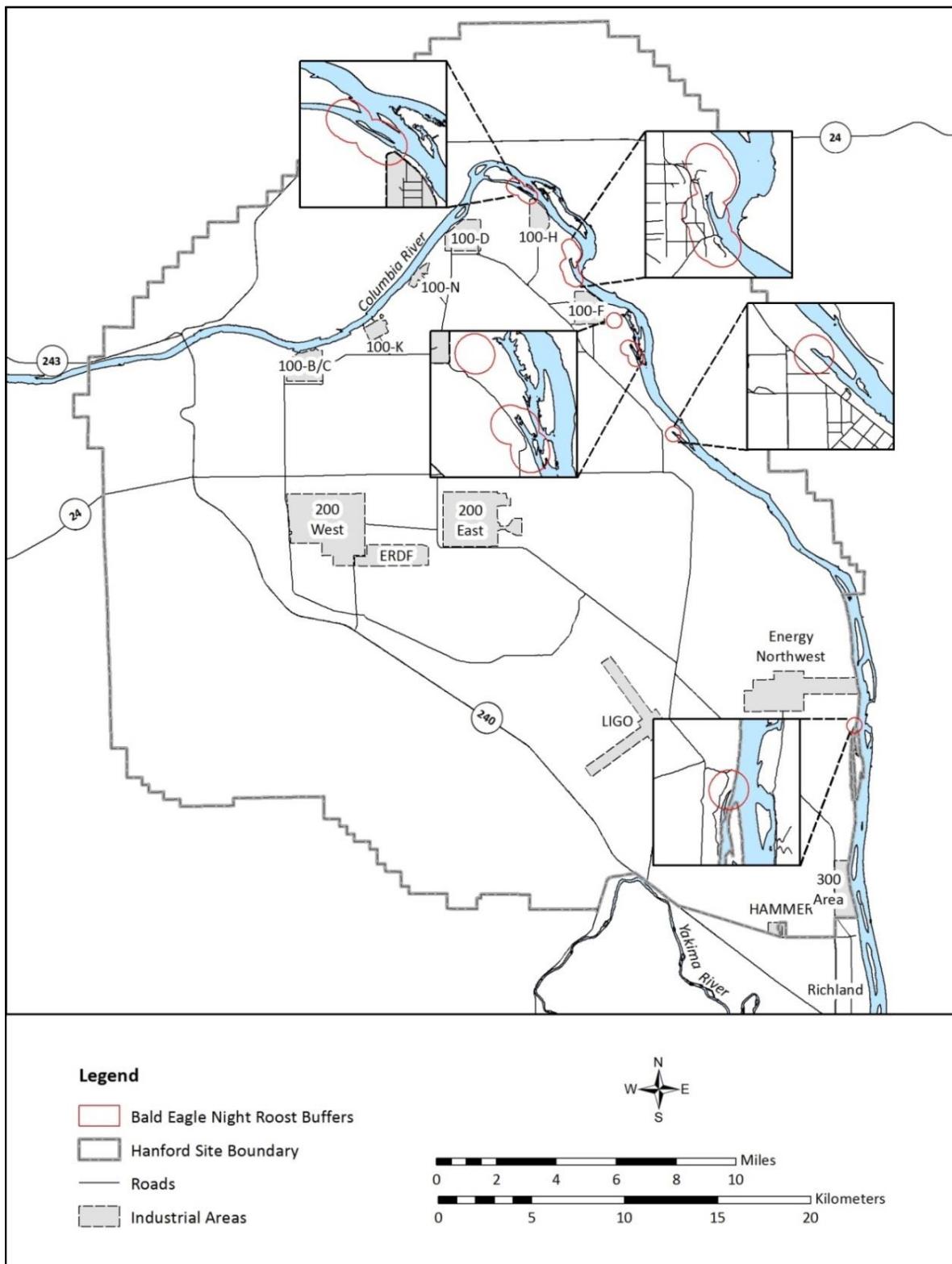


Figure 1. Protected Bald Eagle Night Roosts for FY2015

2.0 Methods

FY 2015 Bald Eagle monitoring followed the limited level of effort defined in Section 1.3 and consisted of night roost surveys, boat surveys, and nest surveys. Each of these survey methods is described in the sections below.

2.1 Night Roost Surveys

The currently protected night roosts were divided into eight monitoring areas that could each be observed from a single survey location (Figure 2). These areas were monitored by three teams in order to perform coinciding surveys on all eight night roost areas in a single evening. Surveys were conducted at dusk, from ten minutes prior to sunset until there was insufficient light to see individual birds. 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 or activities occurring at the roost. Surveyors then marked the specific location where 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.

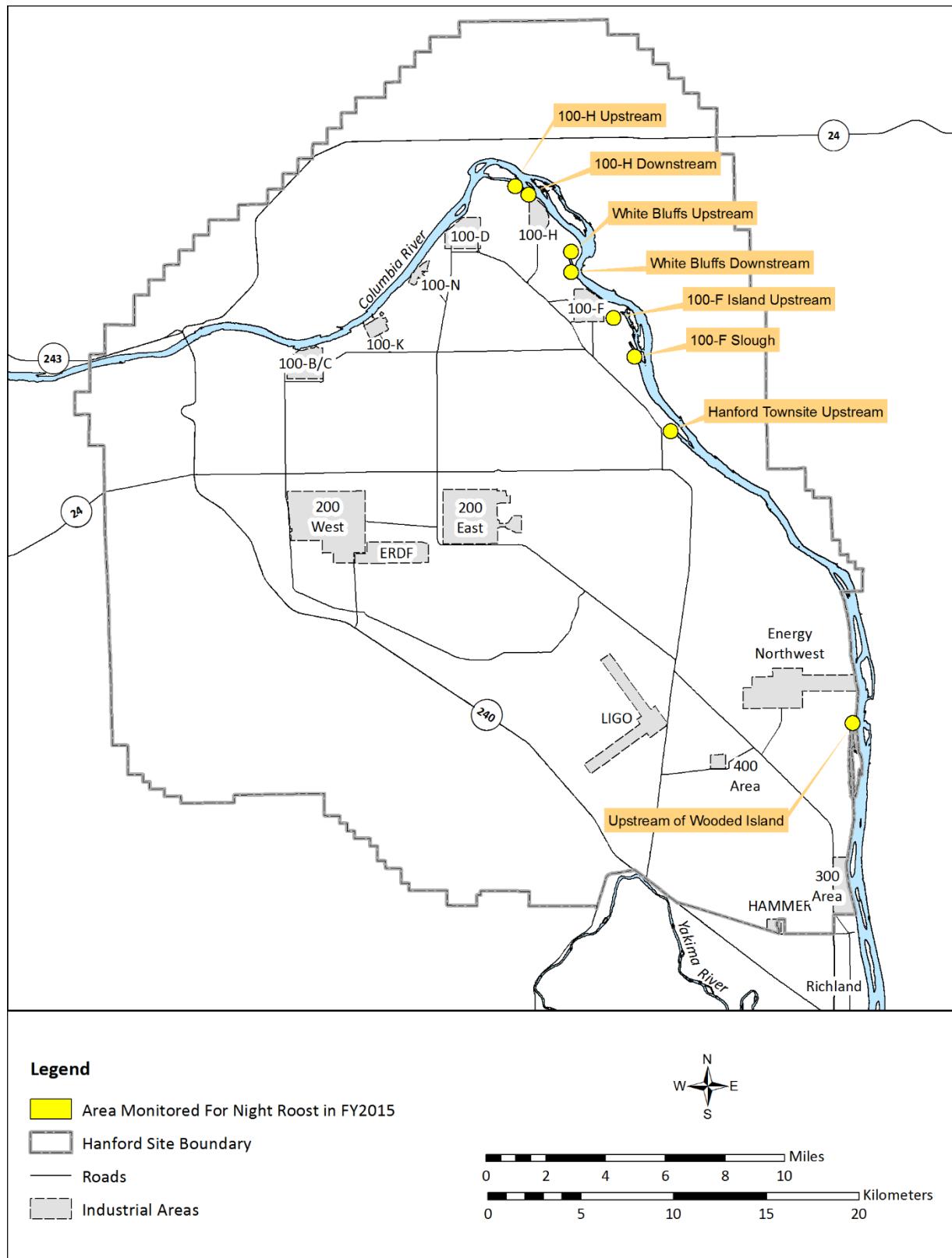


Figure 2. Locations Monitored for Bald Eagle Night Roosting during FY2015

2.2 Boat Surveys

Boat surveys were performed to determine the age class, distribution, and number of eagles on the Hanford Reach. Both shorelines of the Columbia River along the Hanford Site were surveyed, beginning immediately upstream of Vernita Bridge and ending at the 300 Area (Figure 3). All boat surveys were performed on the same dates as night roost surveys. By performing the two surveys in succession, correlations of day and night counts and distributions can be used to determine additional potential night roost areas and nest sites for future comprehensive bald eagle monitoring efforts (currently scheduled for FY 2016). All spatial data collected during the surveys were transferred from hard copy maps into a geographic information system (GIS) for analysis.

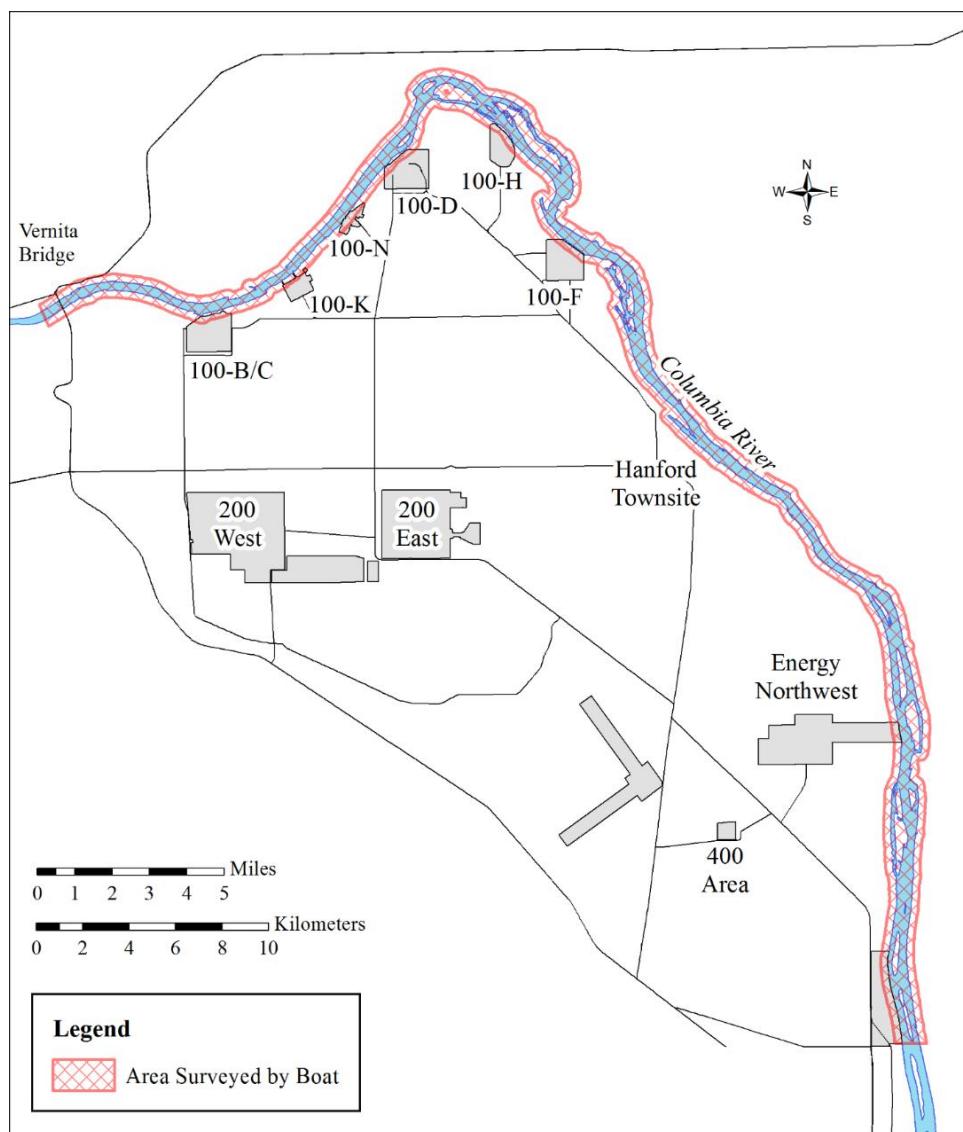


Figure 3. Area Surveyed by Boat

2.3 Nest Surveys

Nest surveys were performed at two potential nest locations: White Bluffs peninsula and Upstream of Wooded Island (Figure 4). Nesting behaviors were documented at both of these sites during night roost monitoring (December through February). The lack of foliage on trees during this time period allows surveyors to identify potential nest sites before they are obscured by leaves in late spring. 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.). On April 8, 2015, additional nest surveys were performed at both potential nest locations during a test of Energy Northwest's emergency management sirens located along the river corridor to document any potential effects on the nesting eagles.

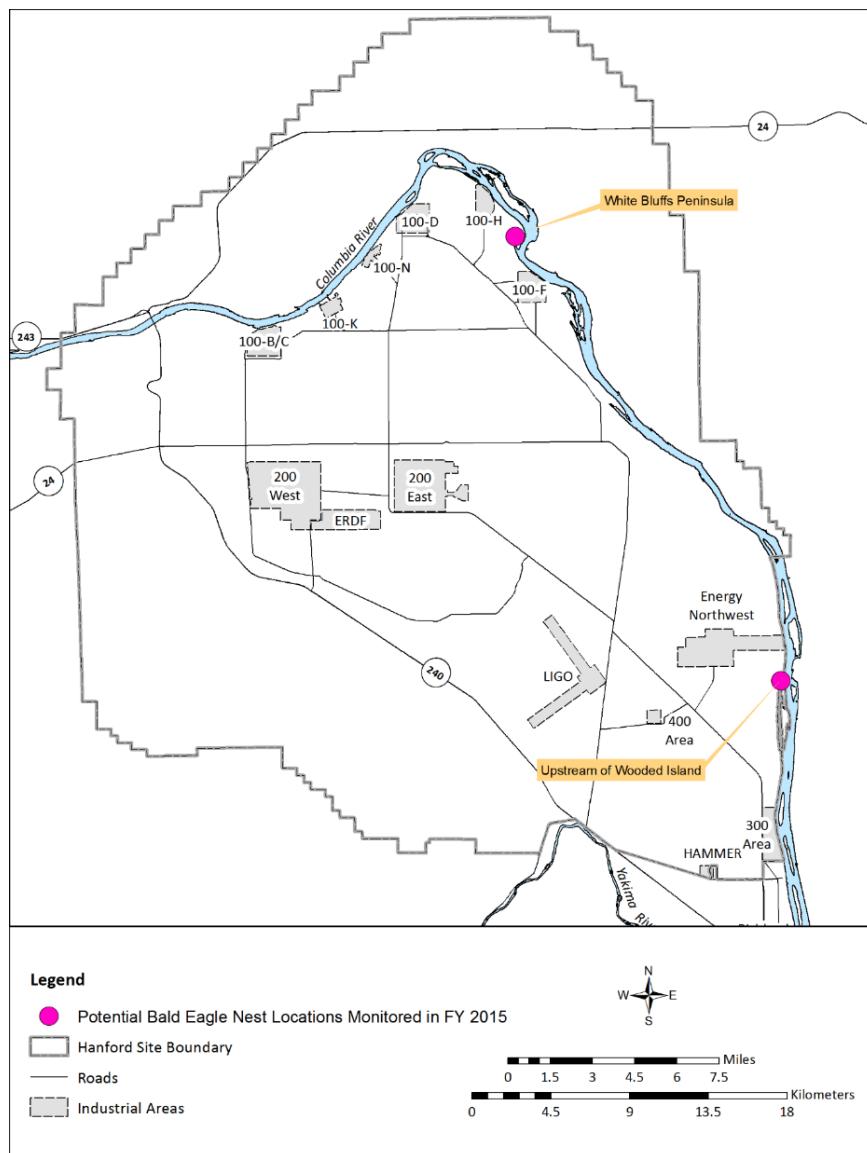


Figure 4. Bald Eagle Nest Locations Monitored in FY 2015

3.0 Results and Discussion

3.1 Night Roost Surveys

Three night roost surveys at the eight currently protected night roost monitoring locations were completed during the FY2015 season. The first night roost survey was conducted on December 9, the second on January 14, and the final survey was completed on February 25. All three night roost surveys were performed in concurrence with the three boat surveys. The night roost survey results are summarized in Table 2.

Table 2. Bald Eagle Night Roost Monitoring Data for FY2015

Night Roost Location	Number of Eagles Present		
	12/9/2014	1/14/2015	2/25/2015
100-H Upstream	43	10	5
100-H Downstream	0	0	0
Upstream White Bluffs	38	21	6
Downstream White Bluffs	0	3	0
100-F Island Upstream	15	13	1
100-F Slough	1	0	0
Upstream Hanford Townsite	1	2	1
Upstream of Wooded Island	3	2	1

Bald eagle use was documented at all but one (100-H Downstream) of the night roost locations monitored during FY2015. The absence of Bald Eagles at the 100-H Downstream night roost is likely due to the frequent remediation activities occurring at the nearby 100-H Area in recent years. Varying degrees of usage were observed at the remaining 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 declined less rapidly (Figure 5). This was likely due to juvenile eagles taking advantage of the fall Chinook salmon (*Oncorhynchus tshawytscha*) food resource then leaving after the carcasses were no longer available, while adult eagles continued to use the Hanford Reach, likely feeding on waterfowl and carrion.

3.2 Boat Surveys

Boat surveys were performed on December 9, 2014, January 14, 2015, and February 25, 2015. Total counts and location information for the boat surveys are shown in Figure 5. The maximum count of 141 bald eagles documented during the December 9, 2014 boat survey was nearly double the previous record maximum count on the Hanford Site of 75 eagles in 1996. This is most likely due to the record numbers of adult fall Chinook salmon spawning in the Hanford Reach during both 2013 and 2014. A comparison of

annual maximum counts of bald eagles and fall Chinook salmon redds for the Hanford Reach dating back to 1961 can be seen in Figure 6. Fitzner and Hanson (1979) compared twelve years of eagle survey data on the Hanford Reach with salmon redd and waterfowl densities and found that eagle numbers varied somewhat independently with the salmon redd numbers but not with changing waterfowl numbers. Their study focused on winter eagle survey numbers collected between 1961 and 1977. During this timeframe eagle populations throughout the United States were at their lowest point due to habitat loss, declining prey availability, the widespread use of DDT, and persecution from ranchers and fishermen. Since that time, a nationwide recovery of bald eagle populations has resulted in the delisting of bald eagles as an endangered species. The subsequent long-term bald eagle data collected on the Hanford Reach appears to adhere to their findings with a much increased response in eagle population to prey availability.

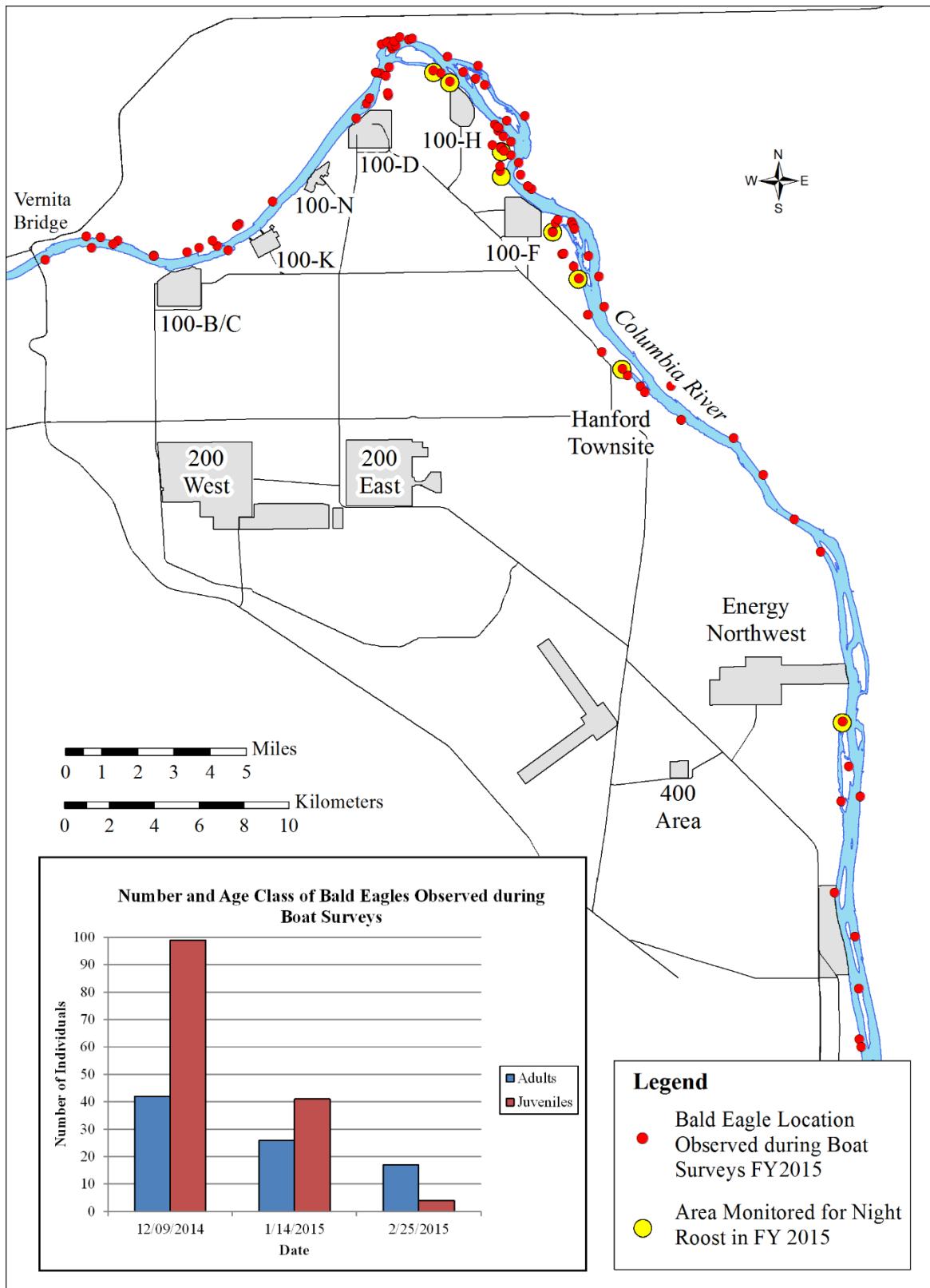


Figure 5. Boat Survey Results for FY2015

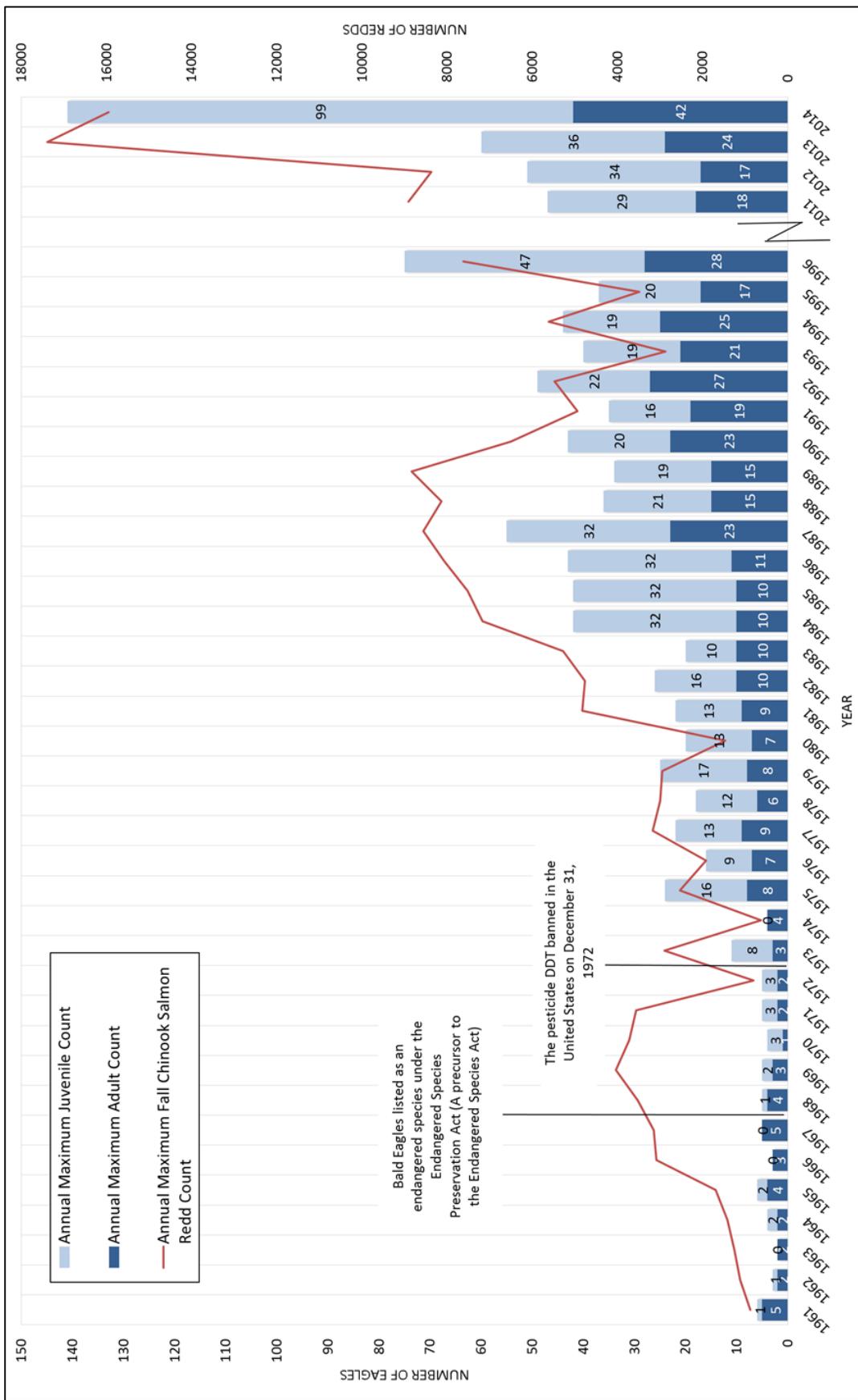


Figure 6. Annual Maximum Count Bald Eagles and Fall Chinook Redds from 1961 to Present

3.3 Analysis of Night Roost and Boat Survey Data

Boat and Night Roost survey data collected during the two most recent limited monitoring events (FY 2014 and FY 2015) were analyzed to determine whether or not there is a justification to perform field reconnaissance surveys for new roost sites during comprehensive monitoring events and, if so, to help identify potential areas to perform these surveys. A comparison of total counts from both events revealed that an average of 60% of the number of eagles observed during the boat surveys were observed during the night roost surveys (Figure 7). While it is likely that a portion of the remaining eagles were either roosting on the Grant/Franklin County side of the river or roosting at a monitored roost but out of view of the observers, it is also likely that some of these eagles were roosting in other locations along the Hanford shoreline. GIS analysis of the results from the FY 2015 boat surveys revealed that 60% of the eagles observed were within 2 km of the currently protected night roosts. To determine potential locations for new roost sites, a 2 km buffer was placed around the remaining eagle observations and all significant groups of trees on the Hanford shoreline that fell within these buffers were identified (Figure 8). The potential roost sites identified through this method correspond to sites that were surveyed during the FY 2012 and FY 2013 comprehensive monitoring events that failed to qualify as communal night roosts. However, the significant increase in the maximum count of individuals observed during FY 2015 (141) compared to recent years (47 in FY 2012, 51 in FY 2013, and 60 in FY 2014), along with record fall Chinook salmon redd numbers in recent years, makes it more likely that these sites could be utilized during the FY 2016 season.

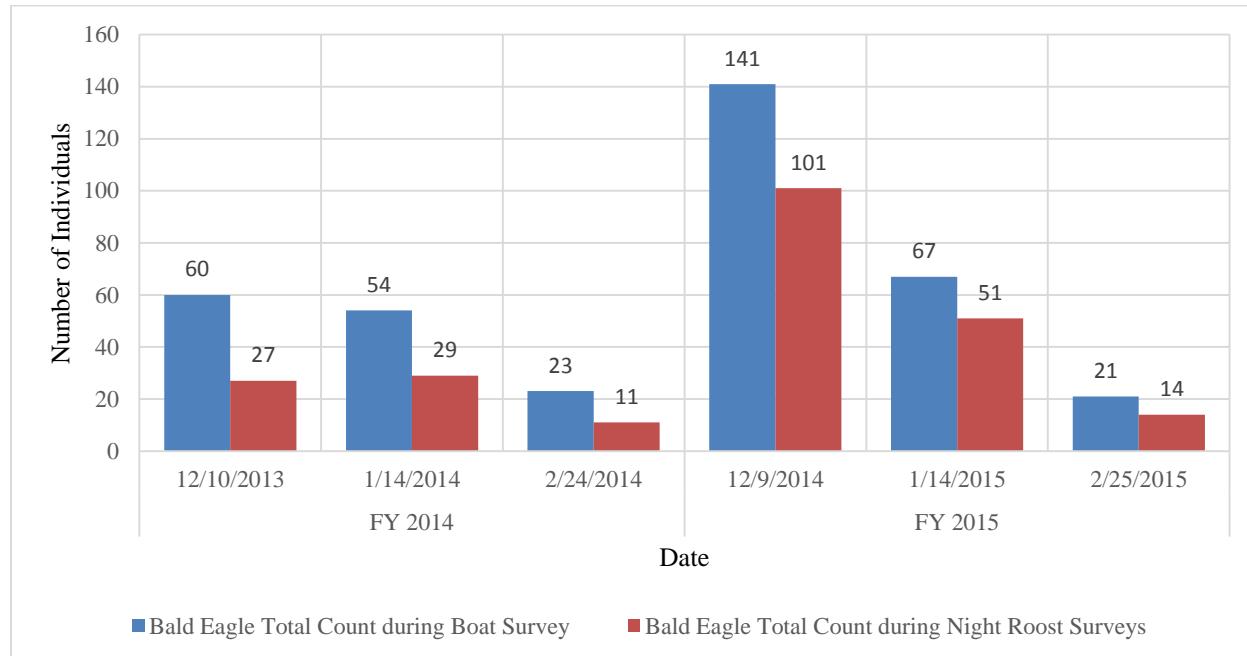


Figure 7. Bald Eagles Observed during Boat and Night Roost Surveys in FY 2014 and FY 2015

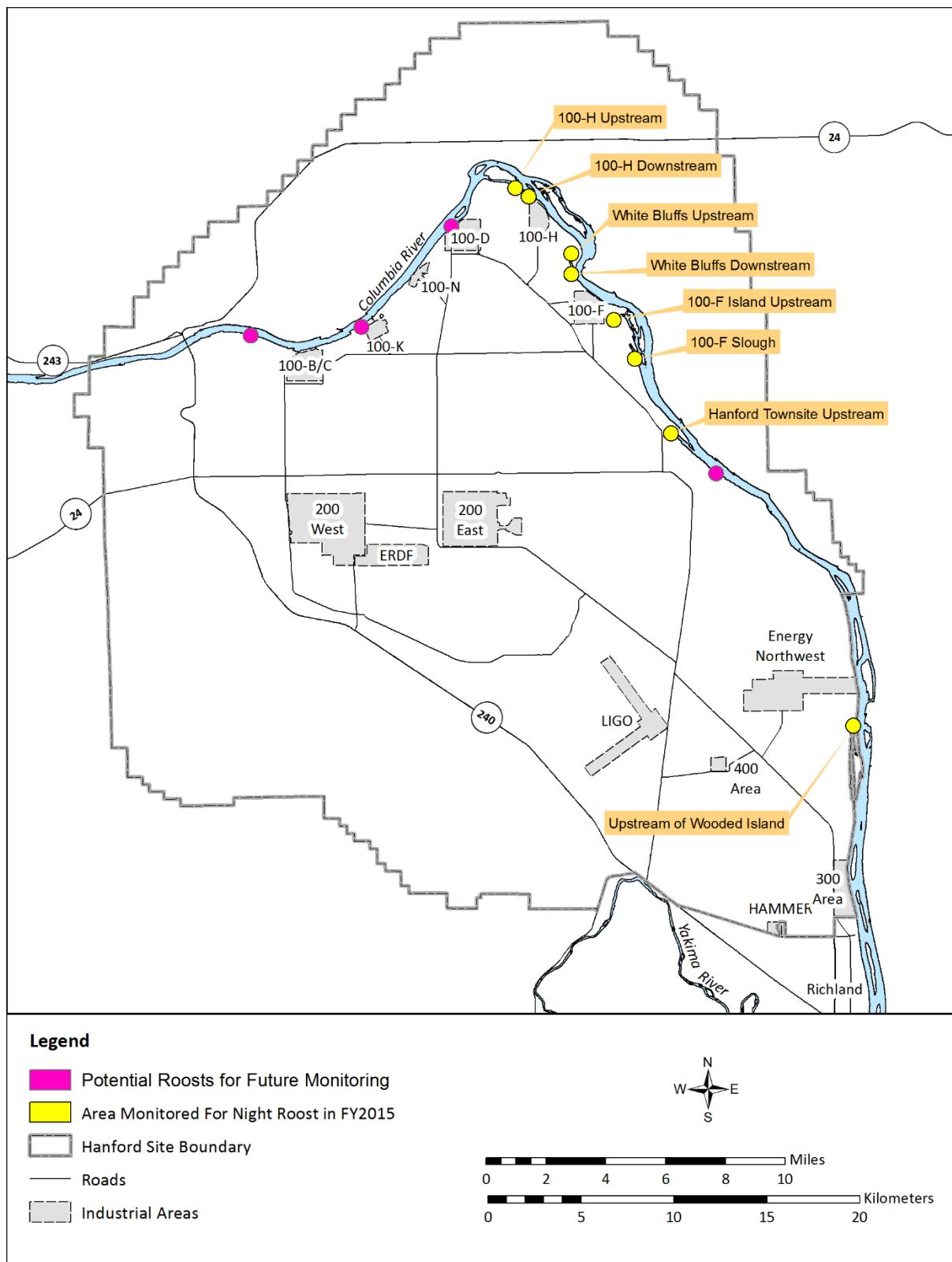


Figure 8. Locations of Potential Roosts for Future Night Roost Monitoring

3.4 Nest Surveys

Nest surveys were performed at the White Bluffs peninsula on March 2, March 4, March 25, April 1, and April 8 of 2015. The nest upstream of Wooded Island was surveyed on March 10, March 17, March 31, and April 8 of 2015. A summary of observations for the FY 2015 nest surveys is shown in Table 3.

Bald Eagle nesting attempts have been documented on the Hanford Site dating back to the 1960s and until recently, these nests were typically abandoned by late spring. Beginning in FY 2013, monitoring staff documented a successful nest upstream of Wooded Island that produced a pair of fledglings. Again in FY 2014, the same nest was occupied by a pair of adults throughout the nesting season and produced another pair of fledglings. In FY 2015, the nest was successful for a third consecutive year with three fledglings observed near the nest in late spring. The nest located on the White Bluffs peninsula was occupied throughout the FY 2015 nesting season, but because its location was obscured by foliage later in the nesting season, monitoring staff could not confirm that this nest was successful. On June 5, 2015, surveyors performing a roadside breeding bird survey documented a juvenile Bald Eagle perched in the tree containing the nest, which could indicate a successful nest attempt, however, the success of the nesting attempt remains inconclusive.

On April 8, 2015, nest surveys were performed at both nest locations during a test of Energy Northwest's emergency management sirens located along the river corridor to document any potential effects on the nesting eagles. No significant changes in behavior were documented.

Table 3. Nest Survey Summary for FY 2015

Nest Location	Date	Time	# of	# of	Observations
			Adults	Juv	
White Bluffs Peninsula	3/2/2015	1545	0	0	No Birds
		1555	0	0	No BAEA, 1 CORA, 2 EUST
		1605	1	1	2 BAEA Flew in, 1 Adult, 1 Juv, Juv took new course. Adult landed on tree ~300m N of Nest. Juv returned flushing adult who landed on nest. Juv perched next to adult
		1615	1	1	2 BAEA, Adult and Juv remained unmoved. No nest defense. Some adult vocalizations
		1625	1	1	Juv flew and briefly returned to tree before departing
		1635	1	0	1 adult BAEA on nest, no other birds
		1645	1	0	No change
White Bluffs Peninsula	3/4/2015	1105	1	0	1 adult BAEA starting 300m upstream perched flew shortly after and began soaring
		1115	0	0	No birds seen
		1125	0	0	No birds seen
		1135	0	0	No birds seen
		1145	0	0	No birds seen
		1155	1	0	One adult on nest
		1205	2	0	Two birds in the nest
		1215	2	0	BAEA pair in nest, One appears to be eating, The other tending nest
Wooded Island	3/10/2015	1405	1	0	One adult in nest
		1415	1	0	One adult in nest
		1425	1	0	One adult in nest
		1435	1	0	One adult in nest
		1445	1	0	One adult in nest
		1455	1	0	One adult in nest
		1505	1	0	One adult in nest
White Bluffs Peninsula	3/17/2015	1245	2	0	One adult in nest, one perched on the branch above and to the right of nest
		1255	2	0	One adult in nest, other switched to the branch above and to the left of nest
		1305	2	0	One adult in nest, other perched on the branch above and to the left of nest
		1315	2	0	One adult in nest, other perched on the branch above and to the left of nest
		1325	2	0	One adult in nest, other perched on the branch above and to the left of nest
		1335	2	0	One adult in nest, other perched on the branch above and to the left of nest
		1345	2	0	One adult in nest, other perched on the branch above and to the left of nest
White Bluffs Peninsula	3/25/2015	1125	1	0	One adult in nest, nest getting harder to observe due to foliage
		1135	1	0	One adult in nest
		1145	1	0	One adult in nest
		1155	2	0	One adult landed in the high branch above the nest on the left side. One adult still in nest
		1205	2	0	One adult on the high branch above the nest on the left side. One adult still in nest
		1215	2	0	One adult on the high branch above the nest on the left side. One adult still in nest
		1225	2	0	One adult on the high branch above the nest on the left side. One adult still in nest
Wooded Island	3/31/2015	1435	1	0	One adult on nest
		1445	1	0	One adult on nest
		1455	1	0	One adult on nest
		1505	1	0	One adult on nest
		1515	1	0	One adult on nest
		1525	1	0	One adult on nest
		1535	1	0	One adult on nest
White Bluffs Peninsula	4/1/2015	1150	2	0	One adult on nest, one adult on branch away from nest
		1200	2	0	One adult on nest, one adult on branch away from nest
		1210	2	0	One adult on nest, one adult on branch away from nest

Table 3. Nest Survey Summary for FY 2015

Nest Location	Date	Time	# of	# of	Observations
			Adults	Juv	
Wooded Island	4/8/2015	1220	2	0	One adult on nest, one adult on branch away from nest
		1230	2	0	One adult on nest, one adult on branch away from nest
		1240	2	0	One adult on nest, one adult on branch away from nest
		1250	2	0	One adult on nest, one adult on branch away from nest
		955	2	0	One adult sitting in nest, one adult sitting in tree
		1003	2	0	1st siren - adult in nest shifted around in nest but stayed in place
		1005	2	0	One adult sitting in nest, one adult sitting in tree
		1011	2	0	2nd siren - adult in nest shifted around again but stayed in place, other adult flew away
		1015	1	0	One adult sitting in nest
		1025	1	0	One adult sitting in nest
White Bluffs Peninsula	4/8/2015	1030	2	0	One adult sitting on nest and other adult returned and landed at nest, may have brought food then sat in tree
		1032	2	0	3rd siren - no eagle response, siren was more distant
		1035	2	0	One adult sitting in nest, one adult sitting in tree
		1042	2	0	4th siren - one adult remained on nest and other adult flew away then returned and landed on nest
		1045	2	0	both adults on nest maybe eating
		1055	2	0	both adults on nest maybe eating
		950	1	0	One adult on nest
		1000	1	0	alarm sounded, no effect on bird in nest
		1010	1	0	alarm sounded, no effect on bird in nest
		1020	2	0	One adult in nest, one in tree, alarm sounded, with no effect on either bird
		1030	2	0	One adult in nest, one in tree
		1040	2	0	One adult in nest, one in tree
		1050	2	0	One adult in nest, one in tree

4.0 Conclusions

4.1 Bald Eagle Foraging, Perching, and Roosting on the Hanford Reach

Long term monitoring of the status and trends of Bald Eagle populations clearly show that national, state and regional protections were successful in reestablishing this species on the Hanford Reach. Although the Bald Eagle was removed from the federal endangered and threatened species list, the species is still protected under federal law. Understanding how Bald Eagles utilize the Hanford Reach is essential to ensure continued compliance with these laws.

FY 2015 monitoring efforts documented a record number of Bald Eagles using the Hanford Reach for foraging and daytime perching. However, throughout the two most recent limited monitoring events (FY 2014 and FY 2015) only 60% of the total number of individuals observed during the day were observed during night roost monitoring. A better understanding of where the remaining eagles are roosting in the future could help ensure continued protection for this species. Monitoring planned for FY 2016 includes an increased frequency in night roost monitoring as well as the addition of four potential roost sites.

4.2 Bald Eagle Nesting on the Hanford Site

Eagles are sensitive to disturbance throughout all nest stages, but are especially sensitive to human disturbance during the earlier stages of the nesting cycle. Disturbance during courtship, nest building, egg laying, and incubation can lead to abandonment of the nest. Continued protection of nest sites from human disturbance is necessary to minimize the impacts of ongoing Hanford operations.

Nest sites are currently identified during boat surveys and night roost monitoring. The seasonal timing of these surveys allows monitoring staff to more easily detect nest building and nesting behavior. As the season progresses, nest monitoring is performed only on land and outside of the 400-meter protection buffer zone. Nest monitoring becomes much more difficult as foliage begins to obscure the direct lines-of-sight to the nest. With successful nests documented on the Hanford Site for three consecutive years, future monitoring efforts could benefit from the addition of one or more boat surveys later in the season with a focus on nest location identification as well as nest monitoring.

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