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Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2018



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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Hanford Site Bald Eagle Monitoring Report for Fiscal Year 2018

J. E. Grzyb and J.W. Wilde
Mission Support Alliance

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**P.O. Box 650
Richland, Washington 99352**

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1.0 INTRODUCTION

A national symbol of the United States, the Bald Eagle (*Haliaeetus leucocephalus*) plays an important role in the riverine ecosystem at the Hanford Site. Most Bald Eagles found on the Hanford Site occupy the site annually during winter and early spring. Monitoring Bald Eagles during this period is conducted 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 section provides an overview of Bald Eagle activity on the Hanford Site along with Bald Eagle management guidelines and monitoring objectives.

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 spawning Chinook salmon (*Oncorhynchus tshawytscha*) 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 Bald 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 along the Columbia River perching and roosting in trees and on cliffs.

Nest building has been a common occurrence on the Hanford Site but typically the attempts are abandoned by mid-March as the eagles begin to migrate toward summer feeding areas or other nesting territories. Beginning in 2013, and subsequently since, Bald Eagles successfully produced fledged young from a nest located upstream of Wooded Island. In other portions of Washington State, nesting may begin as early as December and young may fledge as late as August (HNF-60744).

1.2 BALD EAGLE PROTECTION AND MANAGEMENT ON THE HANFORD SITE

Bald Eagles are a success story for species protection under the *Endangered Species Act of 1973* (ESA). In 2007, 40 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. Despite the significant recovery of Bald Eagle populations, federal laws (including the *Bald and Golden Eagle Protection Act of 1940* and the *Migratory Bird Treaty Act of 1918*) still provide protection for Bald Eagles, their nest trees, and communal night roosts. In addition, following delisting, the USFWS developed the National Bald Eagle Management Guidelines (USFWS 2007), which provide monitoring and management guidance for Bald Eagles.

At the Hanford Site, the U.S. Department of Energy (DOE) has developed DOE/RL-94-150, *Bald Eagle Management Plan for the Hanford Site*. 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. Actions addressed are protective measures for roost sites and nests (Table 1), which are based on federal and state guidelines.

The *Bald Eagle Management Plan for the Hanford Site* (DOE/RL-94-150) relies on a roost-site definition developed by the Washington Department of Fish and Wildlife under its former management policies: a roost site is defined as a tree or a group of trees in which at least three Bald Eagles roost for at least 2 nights during a year. These roosting locations provide shelter from winter weather and serve a social function. Administrative protection in the form of roost site buffers is initiated at a new roost site if monitoring determines the presence of three or more Bald Eagles on at least 2 nights during a year, or if continued monitoring over 2 or more years determines that the site is occupied at night by one or more Bald Eagles at least 30% of the time during wintering season. These protections are discontinued if the requirements are not met (DOE/RL-94-150). Currently, there are eight Bald Eagle night roost locations on the Hanford Site that are protected annually from disturbance between November 15 and March 15 with 200-m (660-ft) buffers (Figure 1).

Eagle nesting activity is documented and potential nest sites are monitored to determine if new nest protection areas are necessary. A nest is considered occupied if a pair of Bald Eagles continue to use the nest after May 10, which is the latest first-egg date recorded for Bald Eagles in Washington State (Burke Museum 2013). When a new nest is identified, nesting exclusion buffers of 200 m (660 ft) are enforced until the nest is abandoned or the young Bald Eagles have fledged (DOE/RL-94-150). The USFWS generally recognizes that a Bald Eagle nest is considered active for 5 years following occupation by a pair of Bald Eagles during the breeding season. Therefore, nest-site buffers are maintained throughout the roosting (starting November 15) and nesting seasons (or until abandoned) for 5 years following occupation (DOE/RL-94-150).

Table 1. Bald Eagle Management Plan for the Hanford Site Administrative Buffers.

Bald Eagle Use Area	Buffer Zone	Access Restrictions
Communal night roost (Terrestrial and Aircraft)	200 m (660 ft)	Restricted access from November 15 to March 15. Work-related access granted between 9 a.m. and 3 p.m. after notification of Hanford Site ecological compliance staff.
Perch	No restrictions	No restrictions.
Forage	No restrictions	No restrictions unless major foraging areas are identified.
Nest (Terrestrial Primary Zone)	200 m (660 ft.)	Restricted access from November 15 until nest is abandoned or young fledge, leaving the nest unoccupied.
Nest (Terrestrial with additional Conditioned Zone protection)	200 m (660 ft)+ any determined conditioned zone(s)	Restricted access from November 15 until nest is abandoned or young fledge, leaving the nest unoccupied. The conditioned zone buffers will be active until the protected resource is no longer necessary to the success of the nest (e.g., an Eagle feeding zone would only be buffered during active salmon spawning periods and when carcasses are present).
Nest (Aircraft)	305 m (1,000 ft) slant distance	With helicopters and fixed winged aircraft, except for authorized biologists trained in survey techniques, avoid operating aircraft within the buffer zone.

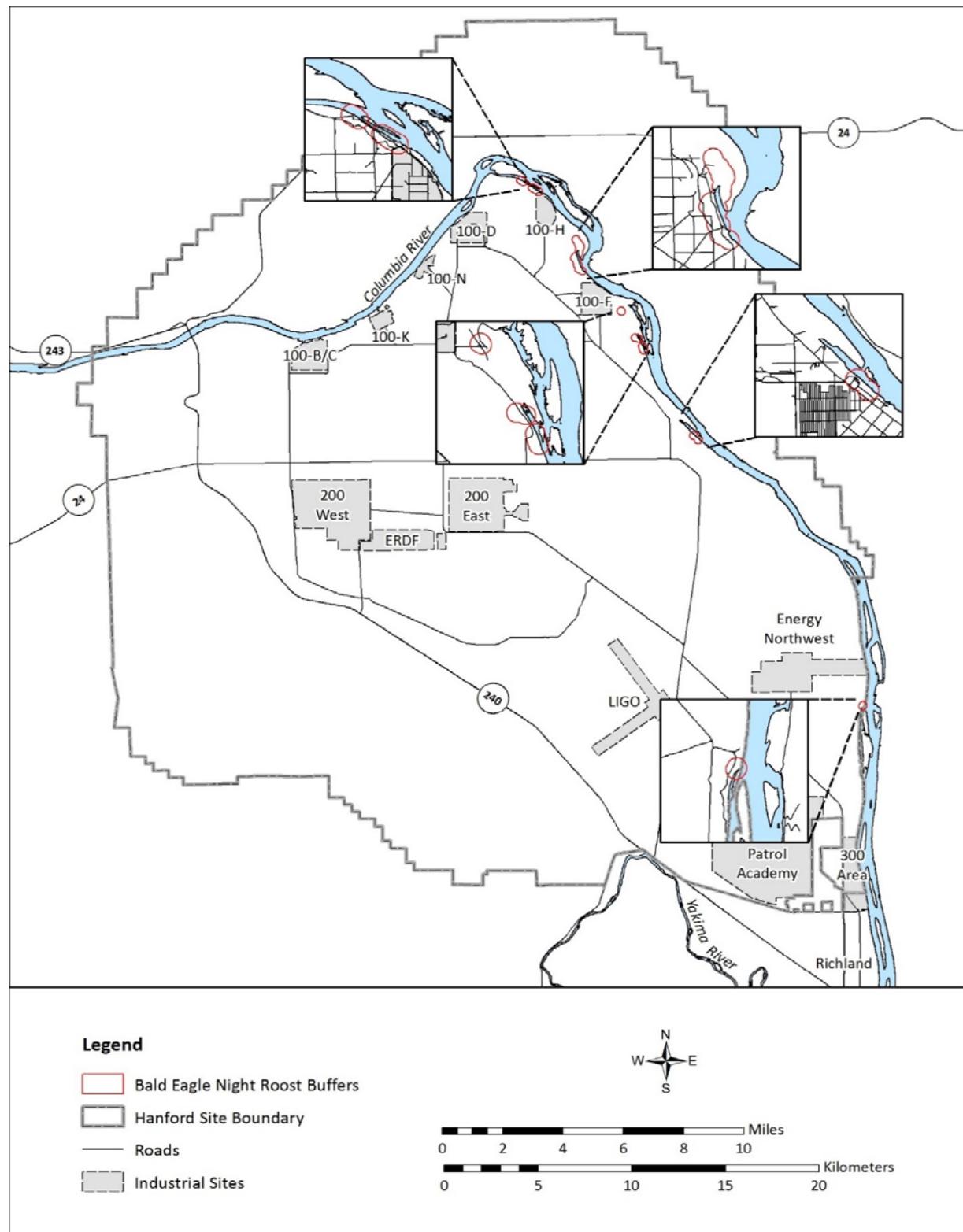


Figure 1. Locations of Protected Bald Eagle Night Roosts

1.3 HANFORD SITE BALD EAGLE MONITORING

Beginning in 2013, two levels of effort were established for annual Hanford Bald Eagle monitoring: limited and comprehensive. Limited monitoring occurs during the comprehensive gap years; comprehensive monitoring is performed every 3 to 5 years. During limited monitoring, night roost surveys are performed bi-monthly (typically twice a month, December to February) to document the continued usage of the currently protected communal night roosts. Boat surveys are performed during the season to document the abundance, age class, distribution, and activities of Bald Eagles using the Hanford Reach of the Columbia River during both types of monitoring. A night roost survey is performed on the same day as each boat survey in order to compare diurnal and nocturnal abundance and distribution during the winter roosting season. This information is used to help determine the need to search for new roost sites. A final boat survey looks for new nests and observes known nests from viewpoints potentially obscured by foliage from land-based viewpoints. During comprehensive monitoring, 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 if they need to be established at new roost sites. This report includes data from limited frequency Bald Eagle monitoring activities that occurred between November 2017 and June 2018.

1.4 OBJECTIVES

The objectives of the fiscal year (FY) 2018 monitoring effort were to undertake the limited frequency monitoring with the goal of documenting Bald Eagle use-areas on the Hanford Site in accordance with DOE/RL-94-150. Annual surveys of Bald Eagle night roosts and nest sites provide the information required to maintain and/or update administrative buffers that minimize disturbances to Bald Eagles and their habitats. Long-term distribution and abundance trends of Bald Eagle allow for the assessment of potential impacts from Hanford Site operations and evaluation of the effectiveness of Bald Eagle management on the Hanford Site.

2.0 METHODS

Fiscal year 2018 Bald Eagle monitoring that occurred between November 2017 and June 2018 followed the limited level of effort as described in Section 1.3. Monitoring methods consisted of night roost, boat, and nest surveys and were performed at various times throughout the monitoring season. Each of these survey methods is described in the sections below.

2.1 NIGHT ROOST SURVEYS

Night roost surveys were conducted at the eight protected night roost sites (Figure 2). These areas were monitored by three teams concurrently in a single evening. Using three teams allowed for adequate travel time between roost locations. Surveys were conducted at dusk (15 minutes prior to sunset until there was insufficient light to see individual birds). Surveyors approached each location in a vehicle and remained outside of the designated 200 m (660 ft) buffer zones active in the FY 2018 monitoring season

(Figure 2) (DOE/RL-94-150). Spotting scopes and binoculars were used to determine the number of Bald Eagles present, age class (adult vs. juvenile), and activity occurring at the roost. Surveyors then marked the specific location where the Bald Eagles were roosting on an aerial photo of the roost location. After staff felt that they had adequately observed the roost status, surveyors proceeded to the next location.

2.2 BOAT SURVEYS

Boat surveys of the entire Hanford Reach were performed two times during the season (mid-December and mid-March). Historically, mid-December has been the documented peak population season for new and returning Bald Eagles on the Hanford Site. On December 11, 2017, a boat survey was performed to determine the age class (i.e., adult or juvenile), distribution, and number of Bald 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). This boat survey was accompanied with a night roost survey on the same date. The performance of boat and night roost surveys on the same day allows project staff to correlate day and night counts and distributions to identify potential night roost areas, nest sites, and important daytime perching areas. All spatial data collected during the surveys were transferred from hard copy maps into a geographic information system for analysis. A second boat survey was conducted using the same method on March 19, 2018, for the purpose of documenting the end of the roosting season with a focus on identifying new nests.

2.3 NEST SURVEYS

Nest surveys were performed at five potential nest locations in the vicinities of the 100-B/C Area, White Bluffs Peninsula, Hanford Townsite Substation, Hanford Townsite Downstream, and Benton Substation. Three of these nesting areas (White Bluffs Peninsula, Hanford Townsite Substation, and Benton Substation) have been documented as active nesting location in previous survey years. 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 were conducted monthly and consisted of 1-hour maximum observation from a distance of at least 200 m (660 ft) of all five potential nest sites and documenting any signs of nesting activity (e.g., territory defense, nest tending, and pair bonding behaviors). Observations were recorded every 10 minutes through the survey period; any notable observations of importance were recorded between these intervals.

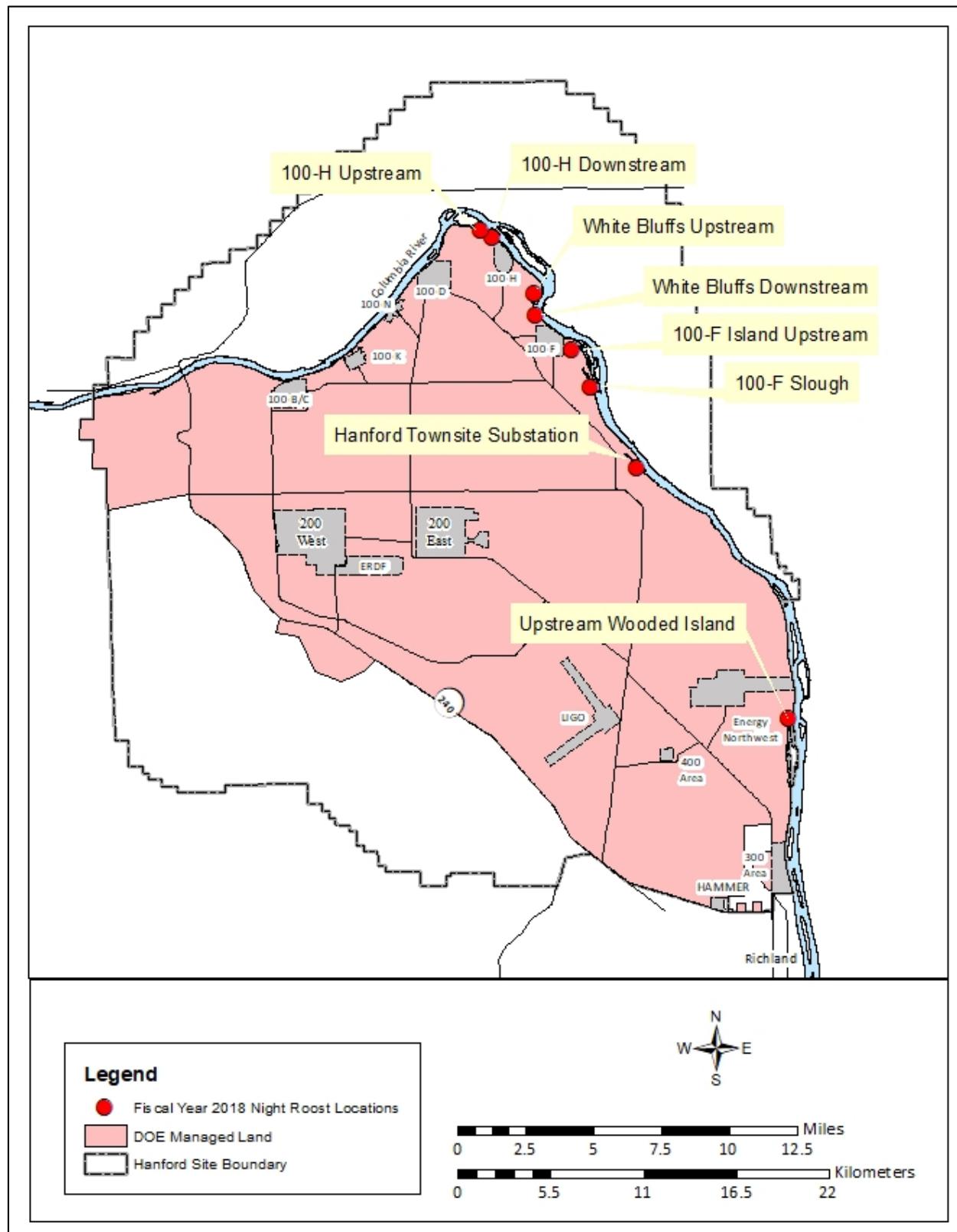


Figure 2. Bald Eagle Night Roosts Monitored in Fiscal Year 2018

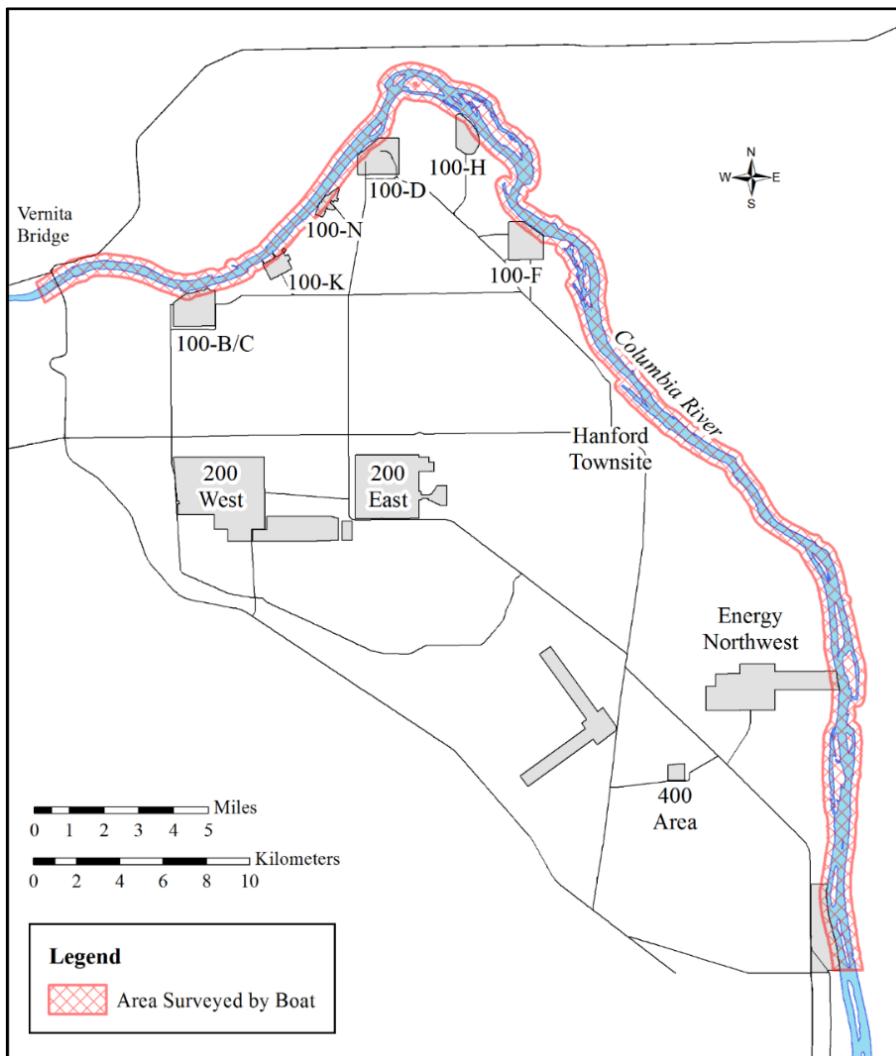


Figure 3. Area Surveyed by Boat in Fiscal Year 2018

3.0 RESULTS

3.1 NIGHT ROOST SURVEYS

Night roost surveys were performed over 8 nights during the FY 2018 season between November 13, 2017, and March 19, 2018. The majority of Bald Eagles present during the early season were juveniles who grouped in large numbers in areas where post-spawned fall Chinook salmon carcasses are known to accumulate. Results for the currently protected roosts are summarized in Table 2 and Figure 4, and observation summaries are described below. FY 2018 observed an increase in observed night roosting Bald Eagles between the first two surveys (November 13 and November 27). Combined totals remained constant through December 11, then decreased by January 2; these combined totals remained fairly constant through the month of January, on average observing 24 individuals and tapering off to five and four individuals during the last two night-roost surveys,

respectively. In total, there were 256 night-roost observations made in FY 2018, 42% of which were at the White Bluffs Upstream roost (107 observations) and 28% at the 100-H Upstream roost (72 observations). Figure 2 shows the locations of the night roosts described below.

3.1.1 Upstream of Wooded Island

Three juvenile Bald Eagles were observed at the roost site during the January 29 survey. A total of eight Bald Eagle observations were documented at the roost during the FY 2018 season. Due to this roost's close proximity to the Benton Substation nest, adult observations may have been individuals from this nesting pair.

3.1.2 Hanford Townsite Substation

During past Bald Eagle monitoring efforts, a nesting attempt was observed at this night roost location, which was later determined to be unsuccessful. Three Bald Eagles were documented during the December 11 survey (two adults and one juvenile) with one adult perched in the nest. A total of 11 individuals were observed at this site during the FY 2018 monitoring.

3.1.3 100-F Slough

The 100-F Slough roost was utilized during the first three night-roost surveys with a total of 10 Bald Eagle observations, 9 of which were juveniles. Previous monitoring of this location has shown a decline in use by mid-December.

3.1.4 100-F Island Upstream

100-F Island Upstream was utilized during two night-roost surveys (December 11 and January 29). The maximum count at this roost site was eight Bald Eagles on December 11, with seven juveniles and one adult. Four Bald Eagles were observed on January 29 (two adults and two juveniles), then the roost was again vacant the rest of the survey season.

3.1.5 White Bluffs Downstream

Bald Eagles were observed at the White Bluffs Downstream night roost during five of the eight surveys. It was vacant during the first survey and then continuously utilized through January 15, with an additional observation on the final March 19 survey. A total of 14 Bald Eagles were observed at this roost, consisting of 6 adults and 8 juveniles.

3.1.6 White Bluffs Upstream

In comparison to past monitoring years, White Bluffs Upstream night roost continued to be the most utilized roost with a total of 107 Bald Eagle observations (83 in FY 2017 [HNF-63012]). Out of all the monitored night roosts in FY 2018, it was the only one to be consistently utilized during each survey. The highest number of observations occurred on November 27 and December 11 with 31 and 36 Bald Eagles, respectively. This roost also yielded the highest number of juvenile observations (65) out of all roosts monitored in FY 2018.

3.1.7 100-H Downstream

Observed total use of this roost increased from the previous survey year from 14 to 22 individuals. This roost had been used very little prior to FY 2016, which may be associated with increased human presence due to remediation activities. With these remediation activities completed, Bald Eagles may continue to use this site with more regularity. Despite having a lower total count than the FY 2016 season (48), this roost continues to be occupied by more Bald Eagles than historically observed.

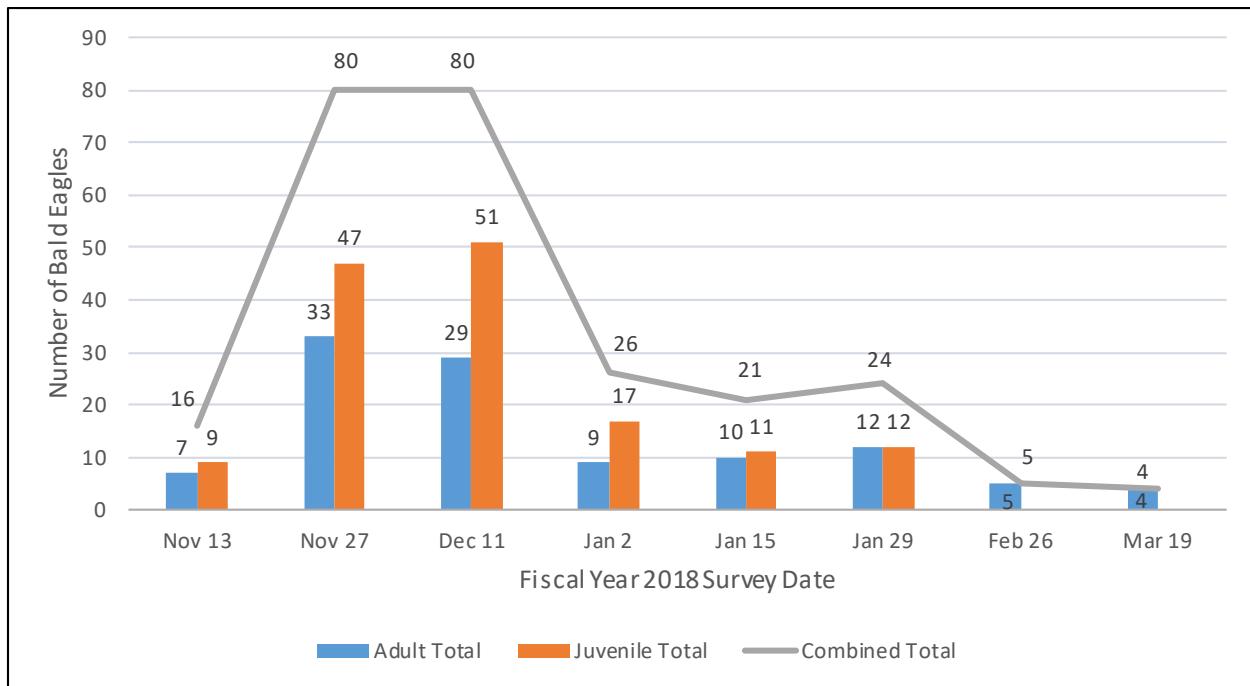
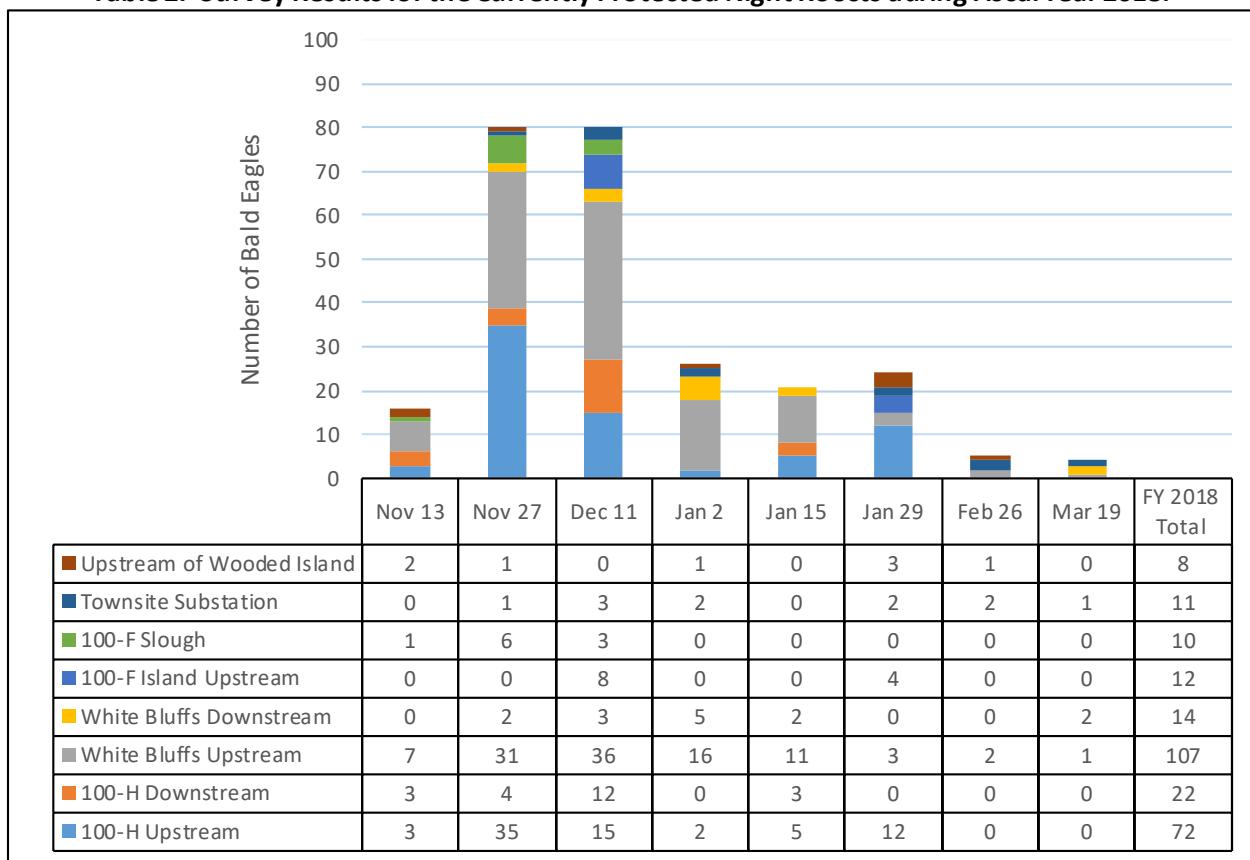
3.1.8 100-H Upstream

In comparison to past monitoring years, 100-H Upstream night roost continued to be the second most heavily used roost on the Hanford Site. During the FY 2018 season, a total of 72 Bald Eagle observations were documented. The highest count observed occurred on November 27, with 13 adults and 22 juveniles present. The roost was continuously utilized during the first six surveys before going vacant in the last two surveys.

3.2 BOAT SURVEYS

Boat surveys were performed on December 11, 2017, and March 19, 2018. The maximum number of Bald Eagles observed during a boat survey was 105 Bald Eagles (49 adults and 56 juveniles) recorded on December 11, 2017. This is more than double the FY 2017 boat survey high count of 50 individuals recorded on December 7, 2016. In comparison, the FY 2018 boat survey is 74% of the all-time high count of 141 Bald Eagles recorded on December 9, 2014 (Figure 5) (HNF-59488). This demonstrates that the population can fluctuate year-to-year, but overall remain much higher than the average maximum count of 25 between FY 1962 and FY 2013. The second boat survey conducted on March 19, 2018, observed 10 Bald Eagles (8 adults and 2 juveniles). It should be noted that the second boat survey was conducted to document the end of the roosting season and to identify new nesting locations, not for the purpose of counting wintering Bald Eagles. The locations of the Bald Eagles counted on the Hanford Reach during the boat surveys for FY 2018 are shown in Figure 6.

Comparing corresponding boat and night roost surveys (performed on December 11, 2017) shows that the night roost survey observed 24% less Bald Eagles than the daytime boat survey. This difference provides a beneficial understanding of the actual number of Bald Eagles that forage on the Hanford Reach of the Columbia River that may be night roosting elsewhere.

Table 2. Survey Results for the Currently Protected Night Roosts during Fiscal Year 2018.**Figure 4. Fiscal Year 2018 Night Roost Survey Totals**

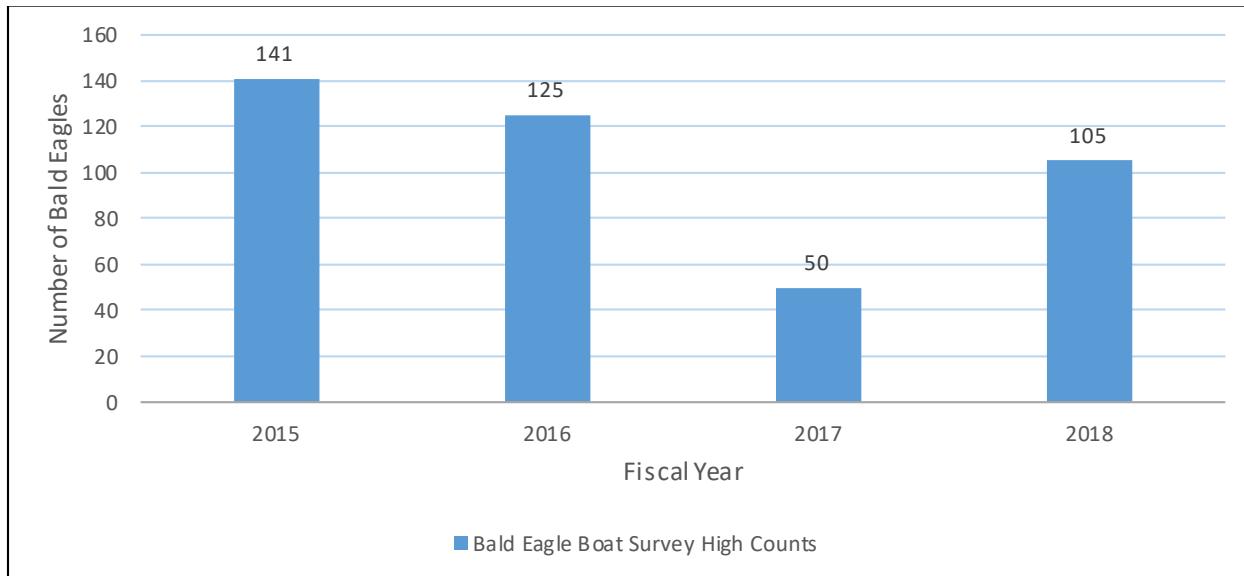


Figure 5 A Comparison of the Last 4 Years of Bald Eagle Boat Survey High Counts

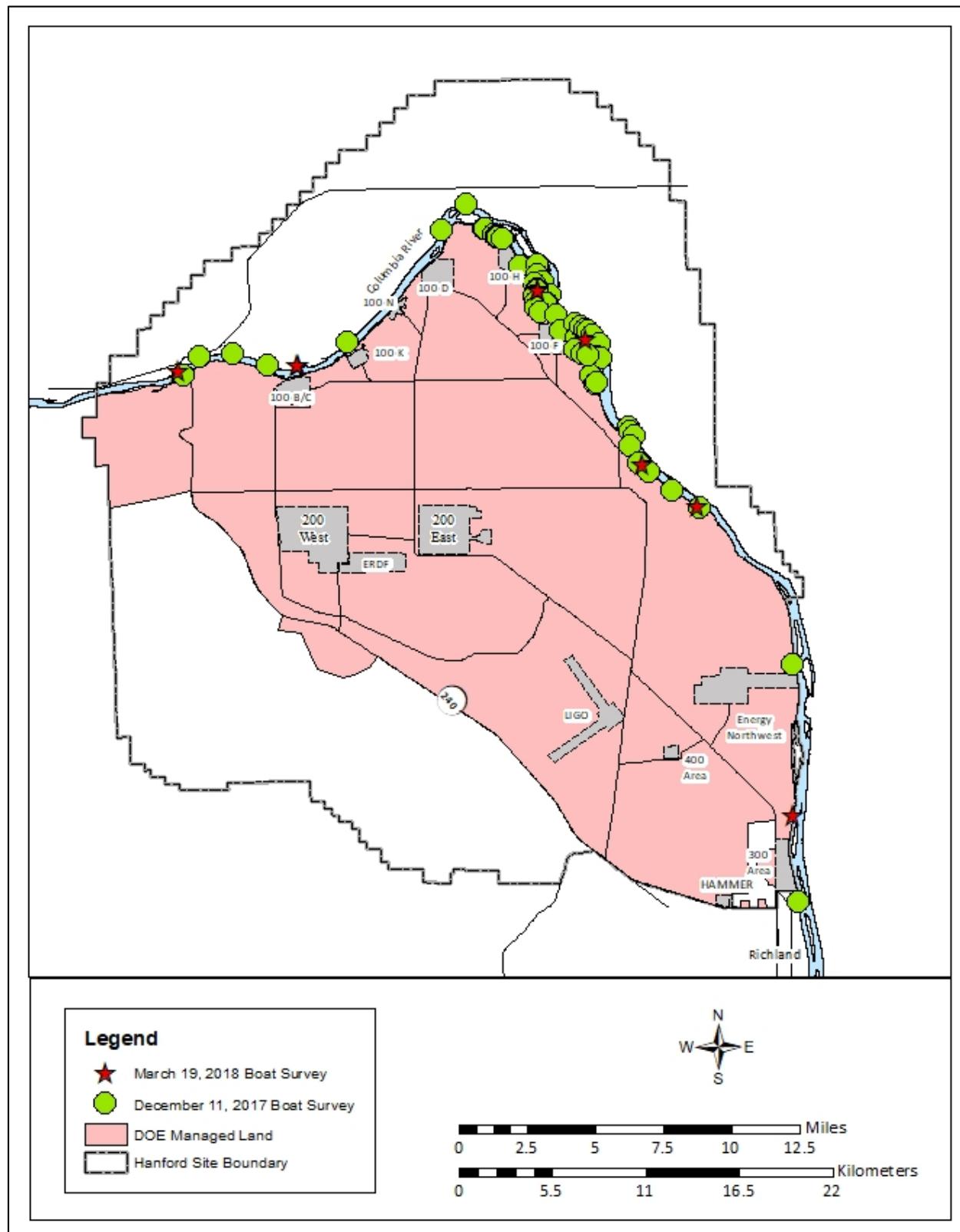


Figure 6 Bald Eagles Locations Observed during the Fiscal Year 2018 Boat Surveys

3.3 NEST SURVEYS

Beginning in FY 2013 and again in FY 2014, monitoring staff documented a successful nest upstream of Wooded Island that produced a pair of fledglings each year. In FY 2015, the nest was occupied for a third consecutive year with three fledglings observed near the nest in late spring. During FY 2016, monitoring staff were performing other monitoring work in the area and noted that a large stick nest was being constructed on a tower near the Bonneville Power Administration's Benton substation; approximately 1,100 m (0.68 mi) northwest of the Upstream Wooded Island nest site. Monitoring staff later confirmed that the nest was active and the Wooded Island nest was nearly gone, presumably from the Bald Eagles using the old nest materials to build the new nest. On April 27, 2016, monitoring staff confirmed that the nest was occupied with two Bald Eagle chicks in the nest. A pair of adult Bald Eagles were observed utilizing the nest during each night roost survey conducted in FY 2017; once again the nest was found to be occupied with two chicks seen in the nest the following spring (HNF-63012). This nest was observed to be active again in FY 2018, with a pair of adults in and around the nest observed on multiple night roost surveys. After a nest survey on May 10, 2018, it was confirmed that this nest again produced young with one chick observed.

The nest, located on the White Bluffs Peninsula, was occupied throughout the FY 2015 nesting season; however, because its location was obscured by foliage later in the nesting season, monitoring staff could not confirm presence of young in the nest. 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, actual success could not be determined. During a nest survey on May 15, 2017, one chick was observed in the nest along with one adult (HNF-63012). In FY 2018, staff performing a nest survey on May 10, 2018, observed one young chick (down feather covered) in the nest.

Staff identified a potential nest across from the 100-B/C Area during the March 21, 2017, boat survey. One adult Bald Eagle was observed in the nest while a second perched nearby. The nest continued to be occupied on April 6, 2017, but was determined to be abandoned after no Bald Eagles were observed in or around the nest during all remaining nest surveys (HNF-63012). In FY 2018, a pair of adults was observed in and around the nest on April 9, 2018, but subsequent nest surveys determined it to be abandoned.

A pair of Bald Eagles appeared to be attempting to nest in a previously constructed rookery nest at the Hanford Townsite Substation night roost in FY 2017. The location was named the Hanford Townsite Substation nest. During night roost surveys, the pair was observed both in and around the nest. As the nesting season continued, nest monitoring proved the nest to be abandoned and the pair absent from the area (HNF-63012). A pair was again observed to be utilizing the nest in FY 2018 during the night roost surveys. While conducting a nest survey on May 10, 2018, two chicks with mature feathers were observed in the nest, while one adult perched nearby. During the final nest survey on June 14, 2018, the two chicks were observed exercising their wings and conducting short hover flights in the nest. No adults were observed in the area.

A possible new nest was observed inland and downstream from the Hanford Townsite High School during the March 19, 2018, boat survey. The location was surveyed and determined to be active on April 9, 2018, with two adults in and around the nest. The location was named the Hanford Townsite

Downstream Nest. Subsequent surveys determined the nest to be abandoned. All nesting activities for FY 2018 are illustrated in Figure 7.

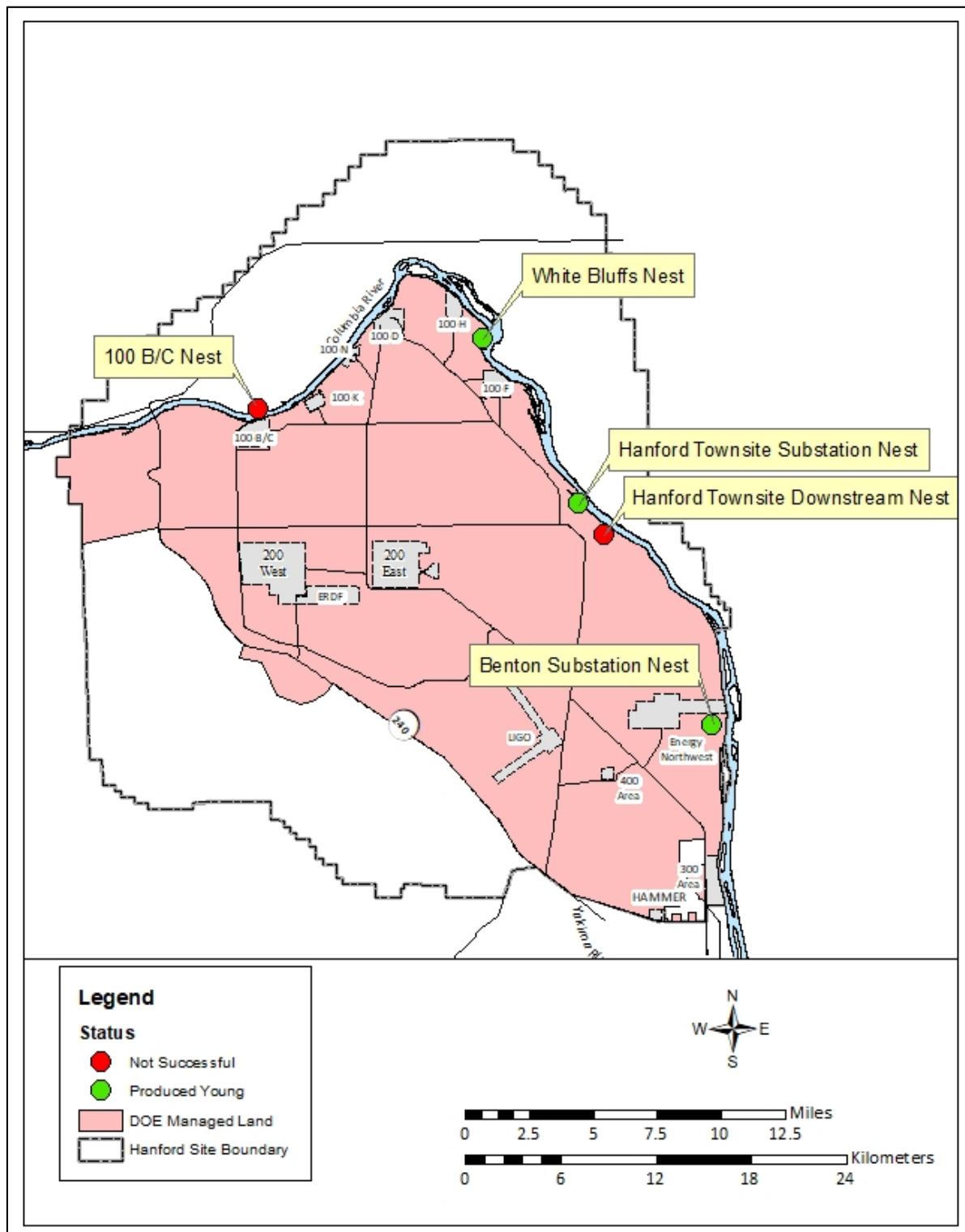


Figure 7. Nesting Attempt Locations in Fiscal Year 2018

4.0 DISCUSSION

Long-term monitoring of the status and trends of Bald Eagle populations show that national, state, and regional protections have been successful in reestablishing higher numbers of this species along the Hanford Reach. Although the Bald Eagle was removed from the federal endangered and threatened species list, the species is still protected under the *Bald and Golden Eagle Protection Act of 1940* and the *Migratory Bird Treaty Act of 1918*. Understanding how Bald Eagles utilize the Hanford Reach is essential to ensure continued compliance with these laws (HNF-63012). The management decisions followed in the *Bald Eagle Management Plan for the Hanford Site* (DOE/RL-94-150) appear to be benefiting the protection of the species on site, demonstrated by the upward trend of nesting activity.

Night roost surveys in FY 2018 documented a combined total of 109 adult and 147 juvenile Bald Eagle observations. There were two consecutive roost surveys (November 27 and December 11) where a total of 80 individuals were observed during a single survey. These were the FY 2018 night roost high counts with a slight difference between the age group numbers (Figure 5). The age group high counts between these two surveys documented 33 adults (November 27) and 51 juveniles (December 11). Comparing these numbers to the December 11 boat survey, where 49 adults (29 adults observed during same day night roost survey) and 56 juveniles were observed, the juveniles present on the Hanford Reach of the Columbia River possibly prefer the protected night roosting locations, while a much larger proportion of adults are roosting in other locations. A possible explanation for these roosting differences is that returning adults are familiar with this stretch of river while the juveniles congregate when in less familiar territory. This explanation reinforces the importance in protecting these night roosts, encouraging new generations to winter along the Hanford Reach of the Columbia River. The initial sharp decrease in juvenile Bald Eagle numbers was likely due to the depletion of their food source, fall Chinook salmon carcasses. Adult Bald Eagles continued to use the Hanford Reach, likely feeding on waterfowl and carrion as they are more experienced hunters. Based on the results of the FY 2018 night-roost surveys, all eight of the currently protected night roosts qualified for continued protection under the communal night roost definition stated in Section 1.2. While six of the night roosts (100-H Upstream, 100-H Downstream, White Bluffs Upstream, White Bluffs Downstream, 100-F Island Upstream, and 100-F Slough) all had three or more Bald Eagles on the roost during at least two surveys, two night roosts (Hanford Townsite Substation and Upstream of Wooded Island) were occupied by at least one Bald Eagle more than 30% of the time in recent consecutive years.

Nest sites are typically identified during boat surveys and night roost monitoring with the occasional incidental discovery. 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 a specified protection buffer zone. Over the last 6 years there has been an upward trend of nesting attempts on the Hanford Site, three of which produced young in FY 2018. If this trend continues, viewpoints of new nesting attempts may become limited due to breeding pairs of Bald Eagles spacing themselves apart into locations difficult to observe. Nest monitoring becomes more difficult as foliage begins to obscure the direct lines-of-sight to the nest. During the March 19, 2018, boat survey, there were not any new nests observed along the river that could not be accurately surveyed from the land. If future nests are observed along the river that cannot be surveyed from land to assess productivity and success, it would be beneficial to conduct a mid-nesting season boat survey. This survey

may also aid in observing nests from an alternate viewpoint when land-based viewpoints are obscured by foliage.

A possible factor influencing the annual abundance of Bald Eagles at the Hanford Site is the varying population size of fall Chinook salmon. Fall Chinook salmon redds, or nest areas, are counted annually in the Hanford Reach and are representative of the fall Chinook salmon population size in the area. A comparison of annual maximum counts of Bald Eagles and fall Chinook salmon redds for the Hanford Reach dating back to FY 1962 can be seen in Figure 8. Fitzner and Hanson (1979) compared 12 years of Bald Eagle survey data on the Hanford Reach with fall Chinook salmon redd and waterfowl densities and found that Bald Eagle numbers varied somewhat independently with the salmon redd numbers but not with changing waterfowl numbers. Their study focused on winter Bald Eagle survey numbers collected between FY 1962 and FY 1978. The subsequent long-term Bald Eagle data collected on the Hanford Reach appears to adhere to their findings with increased response in Bald Eagle population to prey availability (HNF-63012). There is a strong correlation between the maximum combined number of Bald Eagles (juveniles and adults) observed and the annual maximum Chinook redd count ($R^2=0.7107$; $r=0.8430$). The difference between the two FY 2018 boat surveys (90% decrease) is largely due to the depletion of salmon carcasses available as a reliable food source. For more information regarding Chinook salmon management on the Hanford Site, see DOE/RL-2000-27, *Threatened and Endangered Species Management Plan: Salmon, Steelhead, and Bull Trout*.

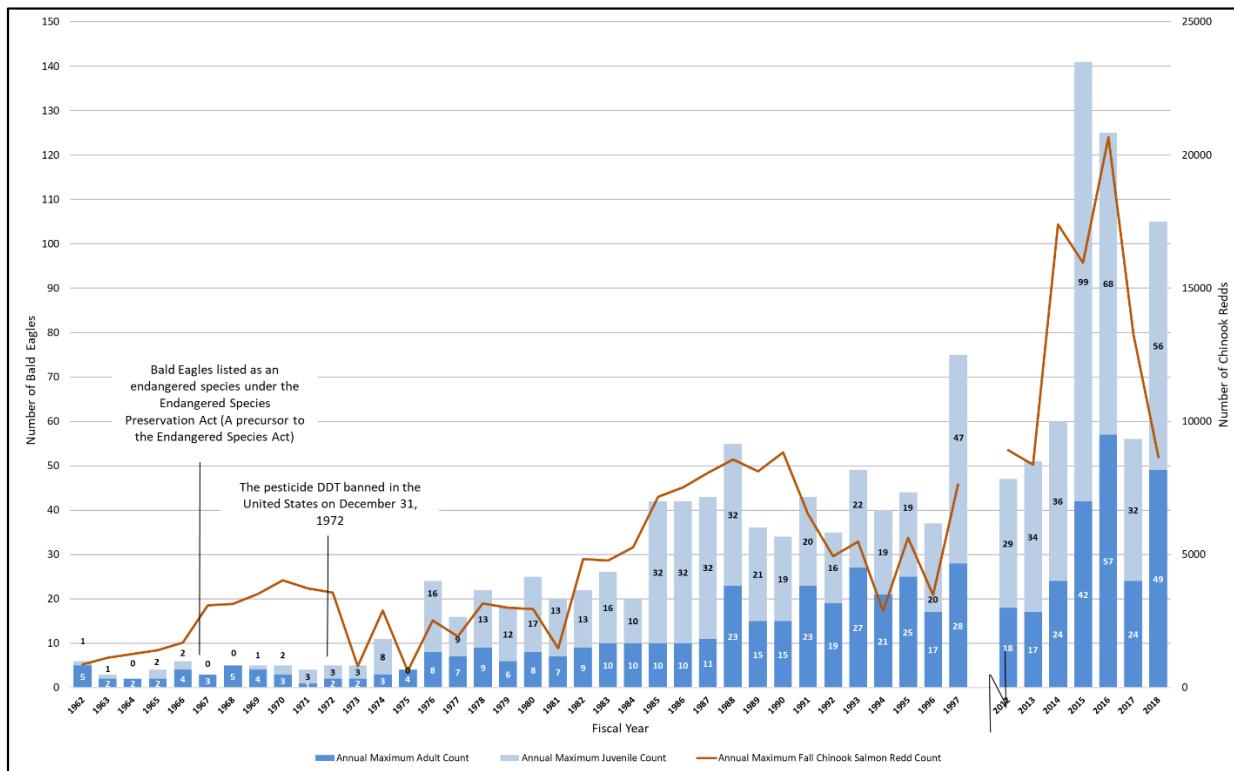


Figure 8. Annual Maximum Count of Bald Eagles and Fall Chinook Redds from Fiscal Years 1962-2018

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