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Bald Eagle Site Management Plan for the Hanford Site, South-Central Washington

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Dick Fitzner, the lead author, was killed in a plane accident on June 3, 1992, while conducting research on sage grouse. Dick's 20 years of experience, knowledge, and love of wildlife were indispensable in preparing this report. He will be sorely missed by the professional community and his many friends.

SUMMARY

Bald eagles regularly use the U.S. Department of Energy's (DOE) Hanford Site in south-central Washington State during winter months for roosting, perching, and foraging. Each of these activities requires buffer zones to protect eagles from human disturbances. The buffer zones listed in Table 1 have been recommended as a way to protect the eagles. Buffer zones developed in this plan follow recommended guidelines and are intended to be used in planning and carrying out *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) and/or *Resource Conservation and Recovery Act* investigations and other Hanford activities. If Hanford Site activities in the vicinity of identified bald eagle use areas are carried out in accordance with this plan, such actions are not likely to adversely affect the eagles or their habitat. Activities that may be exceptions will involve informal or formal (whichever is appropriate) consultation with the U.S. Fish and Wildlife Service as required by the Endangered Species Act.

Table 1. Temporal and Spatial Restrictions Recommended to Protect Bald Eagles on the Hanford Site.

Bald Eagle Use	Buffer Zone Size	Temporal Restriction
Night Roosting	800 m in the line of sight 400 m out of the line of sight	November 15 to March 15
Perching	Evaluated case-by-case	November 15 to March 15
Foraging	Evaluated case-by-case	November 15 to March 15
Nesting	800 m in the line of sight 400 m out of the line of sight	January 1 to August 15, depending on success of the nest or fledging of birds

Peregrine falcons (a federally listed endangered species) are rare visitors to the Hanford Site; while a sighting can occur anywhere on the Hanford Site, they generally use areas similar to the bald eagle (i.e., the river shore). Thus, Hanford Site activities, undertaken with the precautions in this management plan to protect bald eagles, are also not likely to adversely affect the peregrine falcon.

Two nesting attempts by bald eagles were reported for Hanford in the spring of 1991, and one each in 1992 and 1993. All attempts were unsuccessful. Buffer zones of 800 m, line of sight, are recommended for the existing Hanford nests and any new nests that may be built. However, each nest must be treated on a case-by-case basis and a buffer zone developed in concert with Hanford security, emergency operations, and other essential services.

This plan is prepared with the understanding that it is a living document that will need periodic updating as more is learned about how human disturbance effects relate to buffer zones and temporal restrictions for perching, foraging, roosting, and nesting areas.

INTRODUCTION

The CERCLA remedial investigations of waste sites on the Hanford Site will involve lands containing or adjacent to a bald eagle nest, winter concentration areas, or communal night roost. Because these CERCLA investigations may affect bald eagles, and to meet the intent of Washington Administrative Code (WAC) 232-12-292, the DOE has prepared this Bald Eagle Site Management Plan (BESMP). However, it is intended that this BESMP be used or updated so as to be also applicable to future activities that may affect bald eagles on the Hanford Site.

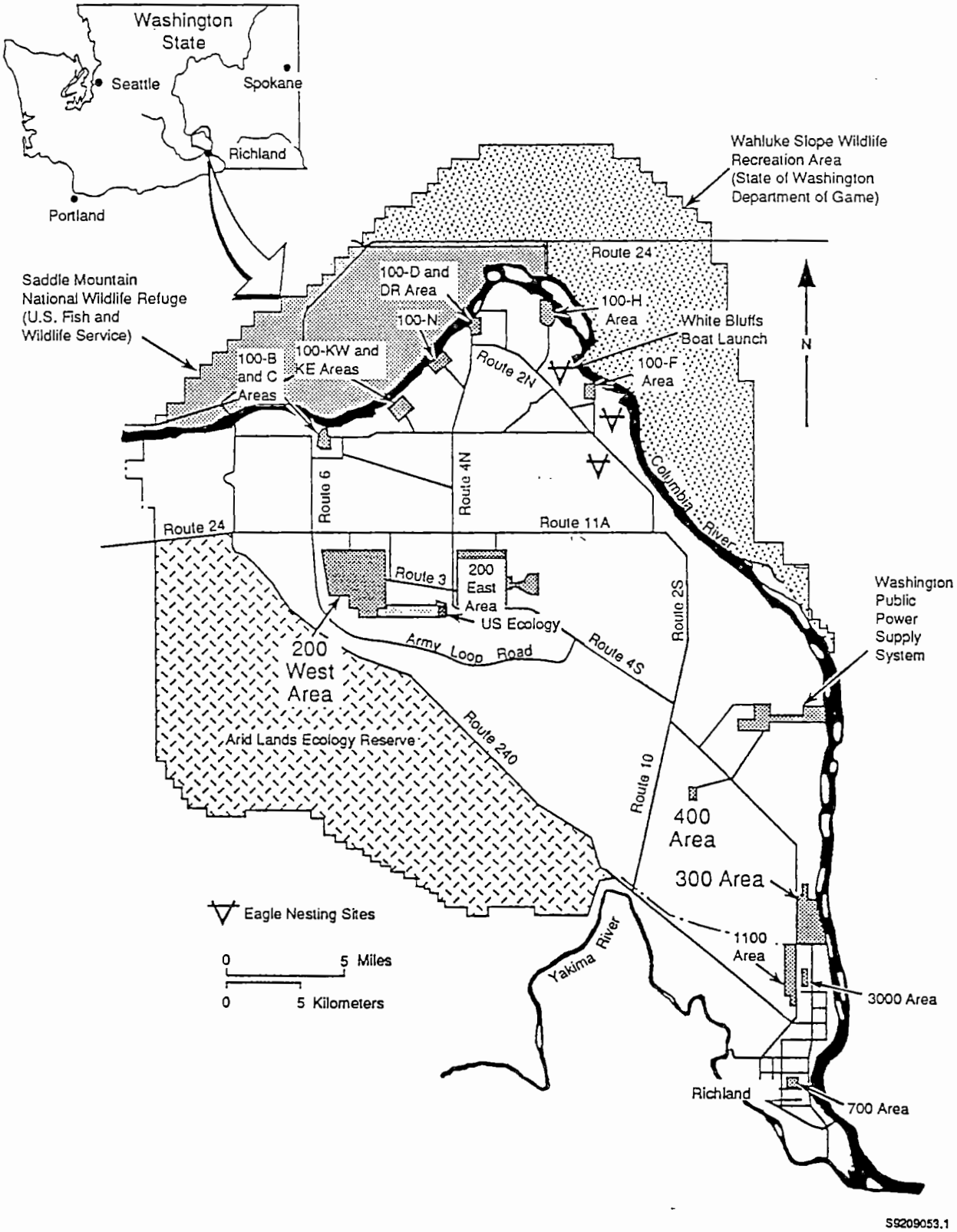
The bald eagle (*Haliaeetus leucocephalus*) has been studied on the DOE's Hanford Site since 1961 and surveyed annually as part of the Environmental Surveillance Program of DOE's Richland Operations Office. The activities outlined in this BESMP are an attempt to protect valuable eagle habitat and encourage propagation of the species. The plan provides background material about eagle use of the Hanford Site, discusses recent regulations by Washington State to protect eagles, describes eagle biology in more detail, and outlines activities to manage eagle use of the Site. This plan will be a living document to reflect the dynamic nature of bald eagles at Hanford.

The Hanford Site is located in south-central Washington and occupies parts of Benton, Franklin, and Grant Counties (Figure 1). In the seven-state Pacific Region, at least 527 pairs of eagles nested in 1985 (USFWS 1986). The goals for regional delisting of the eagle include a minimum nesting population of 800 nesting pairs and a stable or increasing wintering population (USFWS 1986). In Washington, bald eagles are both state and federally classified as threatened. Eagle numbers have increased from a low of 4 to 6 wintering at Hanford in the 1960's to 25 birds in 1979 (Fitzner et al. 1980). The numbers have continued to rise through the 1980's (Gray and Rickard 1989) with a maximum count of 55 birds recorded during 1987 and 1988. However, the number of wintering bald eagles has declined slightly since 1988, with a maximum count in 1992 of 49 birds. In recent years, bald eagles have exhibited nesting behavior but so far have not produced eggs or young.

The Columbia River runs through the Hanford Site. The river serves as a major spawning area for fall-spawning chinook salmon (*Oncorhynchus tshawytscha*) and as a wintering area for waterfowl, primarily mallards (*Anas platyrhynchos*). Both of these species are preyed upon heavily by the bald eagle during winter months (Fitzner and Hanson 1979). The river also contains a large population of suckers (*Catostomus* spp.) and carp (*Cyprinus carpio*). These species of fish could provide a food source for the eagles during the periods when salmon and waterfowl are not abundant enough to serve as prey, mostly late spring and summer.

Riparian vegetation along the Hanford Reach of the Columbia River is poorly developed. Willows (*Salix* spp.) and mulberry (*Morus alba*) occur scattered along the shoreline. Reed canary grass (*Phalaris arundinacea*) is the predominant grass along the shoreline. Cobblestone islands in the Columbia River support scattered stands of lupine (*Lupinus* spp.), buckwheat (*Eriogonum compositum*), absinthe (*Artemisia absinthium*), and ryegrass (*Elymus cinereus*). Shrub cover on the islands is sparse, but includes occasional thickets of willows, mulberry, and currant (*Ribes cereum*). Eagles regularly use the cobblestone islands for loafing and as feeding areas. Spawned-out salmon carcasses tend to wash up and collect around these islands, attracting eagles.

Figure 1. Location of the Hanford Site and Eagle Nesting Sites.



Exotic trees constitute most of the arboreal shoreline vegetation over 3 m in height. The trees, mostly white and lombardy poplars (*Populus alba, P.* spp.), black locust (*Robinia pseudacacia*), and Siberian elm (*Ulmus* spp.), were planted as wind breaks or shade trees before the establishment of the Hanford Site in 1943 and provide perching, roosting, and nesting sites for the bald eagle. Vegetation of the nonriparian surrounding areas is mostly undeveloped shrub-steppe, dominated by sagebrush (*Artemisia tridentata*), rabbit-brush (*Chrysothamnus nauseosus, C. viscidiflorus*), cheatgrass (*Bromus tectorum*), and bluegrass (*Poa* spp.).

The topography of the Hanford Site has helped shield eagles using the river from most human activities. The reactor and associated facilities are in areas on top of steep bluffs above the river. The height of these bluffs ranges from 9.2 m (30 ft) at the 100-B/C Area to about 21 m (70 ft) at the 100-N Area. This height, and the location of most of the facilities back from the edge of the bluff, minimizes the line-of-sight effect human activity might otherwise have on birds. In addition, few trees remain close to the reactor areas, which further limits the potential of line-of-sight effects (the trees immediately upriver of the 100-K Area are an exception, and roosting eagles can be seen in these trees from the west end of the K Area.)

The Hanford Reach of the Columbia River, the area from Priest Rapids Dam to the upriver end of Lake Wallula, was closed to public access from 1943 to 1971. From 1971 to 1978, the public was allowed upstream to the old Hanford powerline, 30 km upstream from Richland, Washington. In 1978, the entire Hanford Reach was opened to public use, with a no-hunting restriction and a seasonal fishing restriction.

Since the inception of the Hanford Site, operation and maintenance activities have been conducted in and outside of the reactor areas. These include well drilling; periodic (usually monthly or quarterly) well sampling; surface radiation surveys and sampling (on the river shore and on the uplands); facility maintenance, decontamination, and demolition; river monitoring; security patrols; tours; and archaeological and ecological surveys and studies.

WASHINGTON STATE REGULATIONS CONCERNING BALD EAGLE PROTECTION

RCW 77.12.650 authorizes bald eagle habitat protection. A group of interested and concerned representatives from the Departments of Wildlife, Ecology, and Natural Resources; San Juan and Thurston Counties; Squaxin Tribe; Washington Association of Realtors; Washington Cattlemen's Association; Washington Dairymen's Federation; Washington Environmental Council; Washington Forest Protection Association; and National Audubon Society developed a combination regulatory/nonregulatory management approach that was mutually satisfactory, in concept, to all participating interests. Bald Eagle Habitat Protection Rules resulted from their efforts. These rules represent a progressive regulatory philosophy that allows for protection of a site to be based on that site's characteristics, and considers the needs of both the bird and the landowner. In 1986, the Bald Eagle Habitat Protection Rules (WAC 232-12-292) were adopted. Also in 1986, the Pacific States Bald Eagle Recovery Plan was finalized; the guidelines in that plan have been used to develop this plan for the Hanford Site.

BIOLOGY OF THE BALD EAGLE ON THE HANFORD SITE

The bald eagle at Hanford has been the subject of much study. Fitzner and Hanson (1979) reported that bald eagles generally arrived at the Hanford Site during mid-November and were abundant from late November through early February with most eagles leaving the Site by early March. Generally, this same pattern holds today, although eagles may arrive earlier or leave later. Fitzner and Hanson (1979) compared bald eagle winter survey data from Hanford (1961 to 1979) with waterfowl numbers and chinook salmon redd counts and provided statistical evidence that eagle numbers in winter varied dependently with salmon redd counts but not with waterfowl numbers. Eagle numbers increased from a low of 4 to 6 eagles wintering at Hanford in the 1960's to 25 birds in 1979 (Fitzner et al. 1980). Eagle numbers continued to rise in the 1980's with a maximum count of 55 birds being observed in the winter of 1987-1988 (Gray and Rickard 1989). Table 2 shows the numbers of adult and young (subadult) eagles observed on the Hanford Reach from 1961 to the present. Since the 1987-1988 high count, eagle numbers have leveled off somewhat, with a wintering population of around 40 birds. The cause of fluctuations in yearly numbers is not known.

The habitat used by the bald eagle on the Hanford Site includes perch sites, night roosts, foraging areas, and nesting areas. The studies at Hanford have revealed that bald eagle use can occur virtually anywhere along the Columbia River. Certain areas, however, receive substantially more use than others; the high-use areas, winter concentration areas, communal night roosts, and the sites used by eagles for nesting attempts have been identified in this plan with buffers to protect the eagles from disturbance as recommended by the Pacific States Bald Eagle Recovery Plan. Other lower use areas are used by eagles on an occasional basis. Continued observation of eagle-use patterns on the Hanford Site will help ensure that the areas identified as nesting sites or primary roosts can be updated, and the level of protection afforded each can be adjusted as warranted. Observations of eagles in these areas are discussed below.

PERCH SITES

During daylight hours, bald eagles perch along the Hanford Reach of the Columbia River and in inland areas within a few kilometers of the river. The primary perching areas occur from the Hanford townsite upstream to Vernita Bridge; all trees, whether single or in groves, may be used for perching. Some of these perching areas also serve as secondary night roosts for small numbers of eagles. Most of the perch sites are old trees planted by early settlers of the Hanford Site.

NIGHT ROOSTS

Six primary night roosts exist in the larger groves of trees at Hanford, and numerous secondary roosts are in smaller groves and single trees. An important communal night roost consisting of a group of decadent black locust and living white poplars occurs on the White Bluffs Peninsula (Figure 2). This grove of trees is also the site of a great blue heron (*Ardea herodias*) nesting colony. In the winter, the herons move away from the nesting colony, and their abandoned nests and nesting trees serve as perches for the night-roosting eagles. Late-evening surveys have revealed that as many as 25 eagles have used this site as a communal night roost.

Table 2. Numbers of Adult and Young Eagles on the Hanford Reach, 1961 to 1992.

Year	Total	Adults	Juveniles
1961	6	5	1
1962	3	2	1
1963	2	2	0
1964	4	2	2
1965	6	4	2
1966	3	3	0
1967	5	5	0
1968	5	4	1
1969	5	3	2
1970	4	1	3
1971	5	2	3
1972	9	2	7
1973	11	3	8
1974	4	4	0
1975	24	8	16
1976	16	7	9
1977	22	9	13
1978	18	6	12
1979	25	8	17
1980	20	7	13
1981	22	9	13
1982	26	10	16
1983	20	10	10
1984	42	10	32
1985	42	10	32
1986	43	11	32
1987	55	23	32
1988	36	15	21
1989	34	15	19
1990	43	23	20
1991	35	19	16
1992	49	27	22

NOTE: Each year given covers October of that year through March of the next year.

Figure 2. White Bluffs Peninsula Night Roost Site.

A second roosting site has been noted in another heron nesting colony below the 100-F Area (see Figure 1). This roost is in a grove of black locust trees situated on the bank of the river (Figure 3). The location is in Section 10, Township 13N, Range 27E. Up to six birds have been observed using this site for a night roost (in 1992 it was also the site of a nesting attempt). A wildfire in the spring of 1992 destroyed about half the trees and up to 19 heron nests. (Current DOE policy for the Hanford Site is to suppress all wildfires; a fire station exists in the 100 Areas near the eagle-use trees.)

Two other major roosting sites exist along the Benton County bank of the Columbia River between the 100-D and 100-H Areas (see Figure 2), in Section 12, Township 14N, Range 26E. These roosting areas are very similar, being in tall, old, black locust trees (Figure 4). These roosting sites are within 500 m of one another, and birds often move back and forth between the roosting sites.

A fifth roosting area is located immediately adjacent to the 100-K Area, on the bank of the Columbia River. Two adult eagles have been seen using this site for roosting since the mid-1980's. The 100-K roost is adjacent (within 100 m) of the 100-K Area perimeter fence. Human activities within the 100-K Area have occurred since 1952 and continue today. These activities, such as building, utilities, and equipment maintenance; fish rearing pond operation; decontamination and decommissioning activities; well and borehole drilling; and radiation surveys, will continue as part of maintenance and operation of the 100-K facility. Figure 5 shows an aerial view of this site. The sixth roosting area is located north of the Hanford townsite. This roost is in a tall Siberian elm situated along the bank of the Columbia River. One or two roosting eagles have been noted here. Other trees and the steep bluffs adjacent to Locke Island are also used by eagles as roost sites.

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Figure 3. 100-F Area Night Roost Site.

Figure 4. Night Roost Site Between 100-D and 100-H Areas.

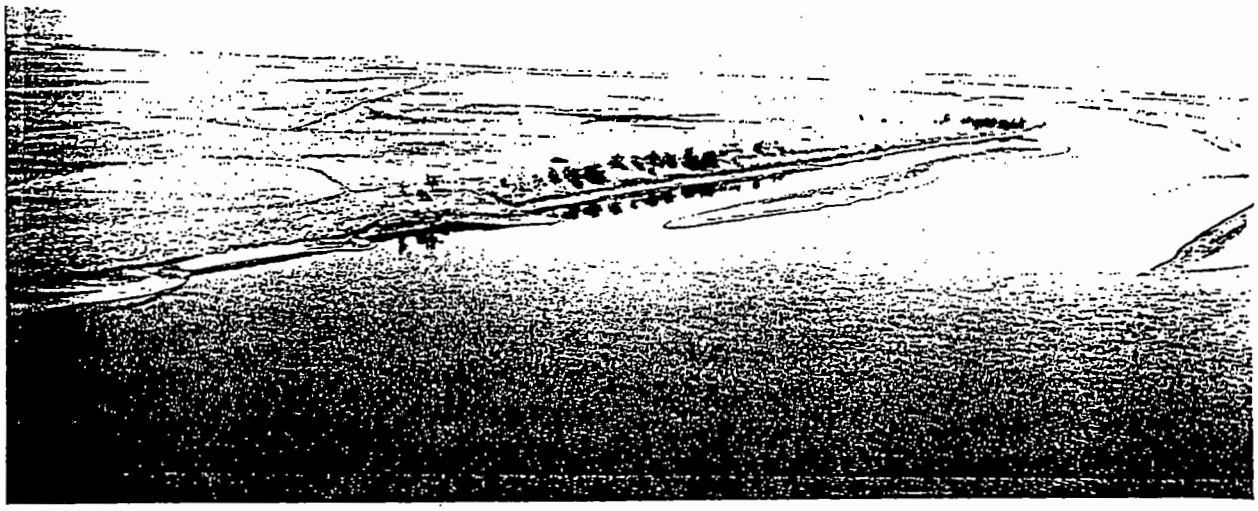
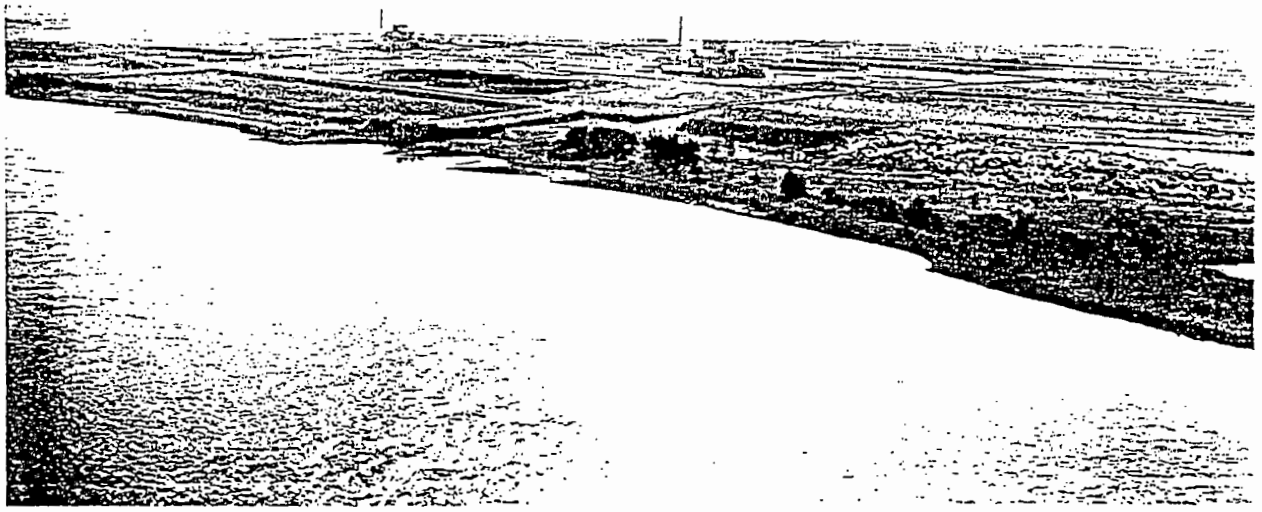


Figure 5. Aerial View of 100-K Area Night Roost Site.



FORAGING AREAS

Bald eagles forage throughout the Hanford Reach, but most of their foraging is done from the Hanford townsite upstream to the abandoned 100-B Reactor. This area contains 10 islands and a variety of shoreline habitat. The primary spawning grounds of the chinook salmon on the Hanford Site also occur through this area (Dauble and Watson 1990). This area is closed to hunting and is not heavily used by recreationists during the winter months. However, some Hanford-related activities have been conducted over the last five decades on and near the river, mostly inside the reactor areas shown in Figure 1. This relative seclusion from human disturbance is likely a major attractant to the eagles (Fitzner et al. 1980). As previously mentioned, much of the foraging area is out of the line of sight of most of the areas with concentrated human activity.

NESTING AREAS

Bald eagles have exhibited nesting behavior at Hanford for several years, but to date, most birds depart the site prior to egg laying. The reasons for nest failure are uncertain but may be related to human disturbance during nest building and/or egg laying, and/or natural phenomena (i.e., prey base, weather). In 1991 a nest was constructed in Section 29, Township 14N, Range 27E, at the White Bluffs boat launch. A second nest was constructed in Section 9, Township 13N, Range 27E. To our knowledge, no eggs were laid. All nests appeared to be fully constructed, and the nest bowls were lined with fine material. We do not know whether the birds that attempt to nest on the Hanford Site are the same ones that winter on the Site, or if the same birds attempt to nest each year.

In 1992 a new nest was constructed in a heron rookery in Section 10, Township 13N, Range 27E. While this nest was also lined with down, the eagles abandoned it in April, possibly from the commotion of herons attempting to return to their rookery. The herons resumed residency after the

eagles left, but a spring fire destroyed about half the nesting trees. No evidence of the eagle nest was found after the fire. Firefighters will be notified that suppression of fires near trees is a priority.

In 1993, bald eagles again exhibited nest building behavior in the same location as in 1991 at the White Bluffs boat launch. The birds exhibited a tenacity for the site between January and March. However, they departed in mid-March, having altered the existing nest only slightly during their residence.

PEREGRINE FALCONS

Peregrine falcons *(Falco peregrinus)*, a federally listed endangered species, are rare on the Hanford Site and generally use habitat similar to bald eagles (i.e., the Columbia River). Peregrines feed on a variety of songbirds, shorebirds, and waterfowl. When they sight their prey, peregrines are able to dive several hundred feet in the air at speeds up to 200 mi/h to capture their prey on the wing. In some portions of their range, birds may forage up to 16 km (10 mi) or more.

Observations of peregrines on the Hanford Site are few. This may be related to the species secretive nature and the lack of any systematic surveying for it. The recorded observations are as follows (the subspecies were not identified).

1. March 3, 1983, a peregrine was observed at the Columbia River shoreline of the 300 Area (Landeen et al. 1991).

2. A peregrine was observed chasing gulls on Island 18, adjacent to the 300 Area, on March 9, 1983 (R. E. Fitzner, personal observation).

3. Two peregrine falcons were observed on Island 19, across from the Tri-Cities Branch Campus of Washington State University on March 4, 1985 (R. E. Fitzner, personal observation).

4. An adult male was observed approximately 0.8 km (0.5 mi) southeast of the Arid Lands Ecology (ALE) headquarters on November 3, 1987 (R. E. Fitzner, personal observation).

5. An immature peregrine was observed chasing rock doves near Coyote Rapids on May 2, 1988 (R. E. Fitzner, personal observation).

6. A peregrine was observed in flight on April 20, 1993, near the Wye Barricade (D. S. Landeen, observer, personal communication).

7. A peregrine was observed on May 3, 1993, near the Columbia River by White Bluffs (A. R. Johnson, observer, personal communication).

BALD EAGLE HABITAT PROTECTION ON THE HANFORD SITE (THE PROPOSED MANAGEMENT PLAN)

To meet the requirements of the Bald Eagle Habitat Protection Rules and the guidelines set forth with Pacific States Bald Eagle Recovery Plan, the following activities should be conducted for communal night roosts, perch sites, foraging areas, and nesting sites at Hanford. Conflicts may arise in the future between the bald eagle and Hanford Site activities. If such conflicts occur, DOE will notify the U.S. Fish and Wildlife Service and Washington Department of Wildlife for resolution. Special attention should be paid to limit helicopter usage of the river near these use areas. Helicopter flights should be kept above 800 m, and hovering should not be permitted above the use areas. Bald eagles and most wildlife are intolerant to rotary aircraft. Fixed-wing aircraft are acceptable for surveillance activities outside of 400 m, and past research on the Hanford Site reveals that wildlife usually adjust well to the constant overflight of a small fixed-wing aircraft.

Because of the rare nature of peregrine falcons on the Hanford Site, and the general similarity in habitat used, the habitat protection described here will also ensure Hanford Site activities are not likely to adversely affect peregrines.

COMMUNAL NIGHT ROOSTS

The six night roosts (Figure 6) will be placed off-limits to all personnel from November 15 to March 15. These data correspond to the historical period of most significant eagle use. Night roosts are to be protected during daylight and nighttime, because eagles also utilize the night roosting areas during the day for resting. Road closures will be implemented on all roads leading to the roosting areas. This closure should be a relatively easy matter for the 100-H/100-D roosts, the White Bluffs Peninsula roost, and the 100-F roost. Signs currently exist on roadways leading to the 100-D/100-H Areas roost, alerting people to stay out of the roosting area and to not disturb eagles. Similar signs will be placed near other primary roost sites. The Pacific States Bald Eagle Recovery Plan recommends temporal buffers of 800 m line of site (2,600 ft, 0.5 mi) or 400 m (1,300 ft) for activities not in the line of sight of roosts (USFWS 1986). All of the roosts at Hanford are visible in many directions, but some have obstructions (such as the hill south of the K Area roost). Therefore, such buffers are recommended, with site-specific adjustments as justified (e.g., by terrain) between November 15 to March 15. Despite continual human activity in the K Area, the roost adjacent to the area has been occupied for many years. This may suggest that there is a higher degree of tolerance by these eagles for human activity. Thus, the buffer does not extend northeast, beyond the fenceline between the roost and the K Area, for operation and maintenance activities visible to the roost or new activities of similar scale to the usual operations and maintenance activities as described previously ~~in the section entitled "Night Roosts."~~ Activities of a larger scale, during the season of eagle use, will need additional consultation. While boat traffic also could disrupt roosting eagles, it has not been a problem to date because eagles tend to use Hanford during the fishing off-season. Recreational boating could become an issue in the future if the Hanford Reach is designated a Wild and Scenic River and may need to be dealt with at a later date if problems arise. However, virtually all use is now in summer and fall, before eagle use of the area begins. Boating has been found to be very disturbing to foraging eagles on the lower Columbia River (McGarigal et al. 1991, Watson et al. 1991). Hunting is not allowed on the Hanford Site south and west of the Columbia River.

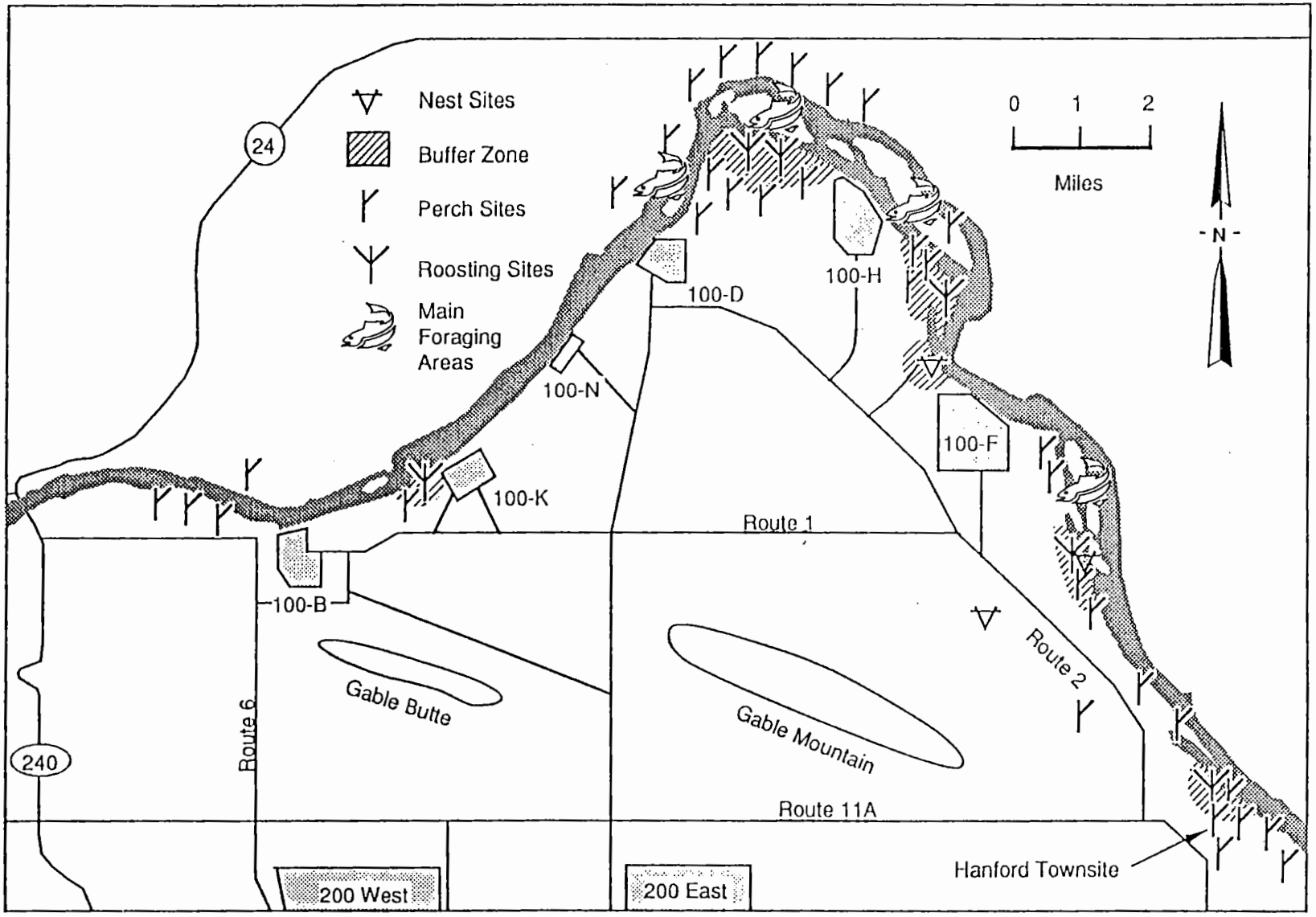


Figure 6. Nesting, Perching, Roosting, and Foraging Sites, and Buffer Zones for Roosting and Nesting Sites.

PERCH SITES

Research dealing with effects of human disturbance on perching eagles was conducted by Stalmaster and Newman (1978). They found that wintering bald eagles along the Nooksack River tolerated people differently, depending on distance. In open areas, eagles flushed 50% of the time when people approached within 150 m (500 ft), and 98% of the bald eagles tolerated human activities at 300 m (1,000 ft). No specific buffers are recommended for perch sites at this time because of the light eagle use over a large area. However, intrusive activities such as well drilling, excavations, and heavy equipment operation from November 15 to March 15 within 300 m of perch sites and visible from the sites will be evaluated by biologists to determine the likelihood of an adverse effect. If there is a likelihood of an adverse effect, formal or informal consultation with the U.S. Fish and Wildlife Service will be initiated. Figure 6 shows the areas commonly used for perching.

NESTING SITES

Much research has been conducted on the effects of human disturbance on bald eagles. Knight and Knight (1984), Stalmaster and Newman (1978), Anthony et al. (1982), Watson et al. (1991), and McGarigal et al. (1991) conducted specific studies that were designed to analyze the effects of humans on bald eagles. The Pacific States Bald Eagle Recovery Plan recommended that disturbing activities comparable to camping, blasting, fireworks, and timber harvesting be restricted to 800 m (2,600 ft) for visible nests and 400 m for nests out of the line of sight (USFWS 1986).

The Washington Department of Wildlife does not recommend standard buffer distances (set circular buffer zones), but works with landowners using a flexible, territory-zoning concept to design site-specific management plans. Their buffer distances, however, reflect the 400-m/800-m temporal restrictions. We also recommend the 400-m/800-m buffer zones for Hanford nests until research indicates otherwise.

No nesting attempts have been successful on the Hanford Site, and no records indicate that eagles had historically attempted nesting. Before the early to mid-1900's, however, there were no suitable trees available for nesting. Effort should be taken to allow bald eagles the opportunity to nest undisturbed to ensure that the lack of success is not a result of Hanford activities or disturbance from workers. Food resources do not appear to be limiting; thus, some other factor is most likely responsible for causing the desertion of nests built on the Hanford Site. Personal observations of R.E. Fitzner have shown that human disturbance could be the primary cause of nest abandonment. On numerous occasions, Hanford Site workers have been observed sightseeing at the eagle nests and also at all of the night roosting areas.

In the spring of 1991, two unsuccessful nesting attempts were made on the Hanford Site. One attempt was made at the White Bluffs boat launch. The nest was situated in a tall cottonwood, about 25 m above ground (Figure 7). The nest was begun in February, and the birds continued to bring sticks through mid-April. The birds apparently abandoned the site sometime in late April. This site was frequently visited by Hanford Site personnel using the nearby boat ramp, which is the best access to the upper Hanford Reach. However, an alternative launch, a gravel boat ramp, between 100-B/C and 100-K Areas at the old Hanford Irrigation Project building, would accommodate operations and maintenance personnel and limit disturbance to any birds attempting nesting in the future. Other boat landings exist at 100-N and Vernita Bridge. These ramps will be used during eagle nesting season if eagles choose to nest again at the White Bluffs ramp. Any use of the White Bluffs boat launch during eagle nesting season will require consultation with the U.S. Fish and Wildlife Service.

Figure 7. 1991 Nesting Site at the White Bluffs Boat Launch.

A second nest, constructed in 1991, at a height of about 15 m above ground, was located downstream from the 100-F Area in a Siberian elm tree (Figure 8). This nest was located unusually far inland, more than 5 km from the river. It was relatively inaccessible, with the only access via a dirt road. The site received frequent disturbance from Hanford Site personnel as previously described. Again, this may have been the reason the birds left the area.

The nest constructed in 1992 was built in an area not easily accessible by land along a stretch of river that is not heavily used by boaters in spring. Herons that used the stand of trees were displaced by the eagles. Persistence of the herons at the eagle nest site might have been a source of disturbance, sufficient to cause desertion. The effect of a fire on the 1993 eagle nesting attempt in the rookery is unknown.

The nest attempt in 1993 at the White Bluffs boat launch was similarly abandoned during mid- to late March. Closure of all roads within 800 m of the nest site was attempted in order to reduce disturbance to nesting/roosting birds. Bi-weekly surveys of the entire Hanford Reach, including the White Bluffs launch, revealed minimal use of the site by birds and only occasional observations of their presence at the nest site (R. Mazaika, pers. comm.).

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Figure 8. 1991 Nesting Site at the 100-F Area.

The White Bluffs nest site from the last several years may be reused in the future. Also, new nests may be built in other areas of the Hanford Site where tall trees exist. The management plan will provide for the protection of any new nests that may occur on the Hanford Site in the future. Yearly surveys for nesting eagles will be included in the current surveys to determine the location of new nest sites. Historic nest sites will be monitored annually to determine site occupancy. If nesting activity is observed at these historic sites, road closures within the 800-m buffer zone will be enforced.

The buffers recommended below will be rearranged as more is learned about the habitat requirements of wintering and nesting eagles on the Hanford Site. Studies are being planned for the near future to assess the affects of Hanford activities on eagles' use of nest, perch, and roost sites. New management guidelines will evolve as they progress.

The establishment of buffers will be coordinated by the DOE with the U.S. Fish and Wildlife Service and Washington Department of Wildlife. Human activities at each nest site will need to be resolved on a yearly and monthly basis.

Permissible human activities will vary based on the type and duration of the activity. Recommendations for the use of the White Bluffs boat ramp, for instance, will require coordination with management agencies to ensure that eagles are allowed to nest relatively undisturbed while essential Hanford operations continue. It is critical, however, that human activities during the periods of eagle nest building, egg laying, and incubation be strictly managed. These times in the nesting cycle are sensitive periods when nest site abandonment is most likely to occur. Therefore, strict policies regarding human disturbance need to be adhered to from January 1 through August 15, or until the young have fledged, ~~through consultation with the U.S. Fish and Wildlife Service.~~ Obviously, if a nest site is not used in a given year or the young have fledged, restrictions to human trespass can be waived after March 15. Signs are posted to the entry points for the nest site at White Bluffs, with text reading "ALL ACCESS PROHIBITED TO PROTECT WILDLIFE. Seasonal Road Closure for Bald Eagle Nest Site Management in Compliance with State and Federal Regulation, including Section 7, Endangered Species Act. Maximum penalty $10,000 for harassment or disturbance of bald eagles. For job-related access, contact: ..."

NOTE: In the event of a site emergency, the White Bluffs boat launch may need to be used. This protection of human lives would supersede any closure of the boat launch for the protection of bald eagles. Such emergencies have not occurred in the past at Hanford and are not expected to occur in the future; however, the contingency must be prepared for.

The following set of management recommendations is intended for implementation at the sites of the nesting attempts.

Site 1 (White Bluffs Boat Launch)

An 800-m buffer and a temporal restriction is proposed in the use of the boat launch for non-emergencies or safety-related activities during January, February, and March. Signs and barricades closing the area will be placed at the entry roads. If eagles decide to nest in the tree, the restriction in the use of the ramp would continue until August 15. If the eagles do not nest in the tree or desert, the ramp would be reopened after desertion or on March 15. Alternate developed boat ramps exist at 100-N (Hanford Patrol) and between 100-B/C and 100-K Areas, and undeveloped gravel ramps exist at the Hanford townsite and Vernita Bridge. These could be used through the eagle nesting period if needed.

The blacktop roadway leading into White Bluffs should be closed at its entrance (see Figure 1) from January 1 and should not reopen until nesting is completed, or on March 15 if nesting is not initiated. Two dirt roads running upriver and downriver from White Bluffs should also be closed during the same period. These roads should be closed at least 800 m from the nest site. The upstream roadway should be closed from November 15 through March 15. The road is near a major communal night roost. Figure 9 is a map of the White Bluffs and 100-F Area nesting sites illustrating the recommended buffer zones. The buffer zones are drawn to maximize the use of visual barriers and to reduce visual contact with humans and their vehicles. Only emergency activity would be permitted in buffer zones during the nesting season; low-impact activities (e.g., well monitoring) on a case-by-case basis may be permitted if out of the line of sight of the nests and between 400 and 800 m.

Site 2 (Inland, South of 100-F) and Site 3 (Heron Rookery, South of 100-F)

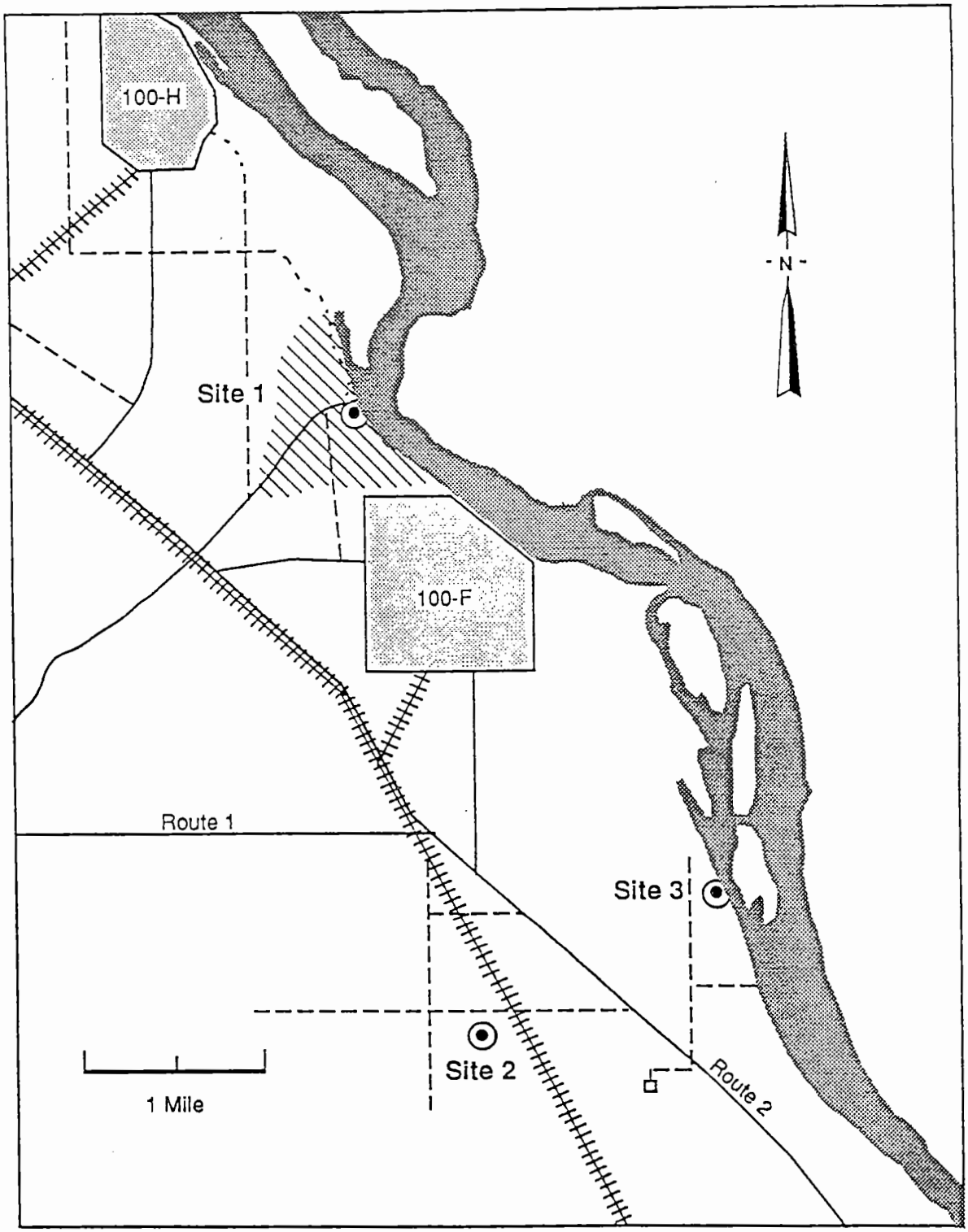
These sites, either because of distance from the river, use by herons, or past fires, do not appear to be likely candidates for future eagle nesting attempts. Consequently, no buffers will be maintained around these sites. However, they will be monitored each winter to verify that nesting eagles are not using them. If nesting behavior is exhibited, buffer zones will be implemented.

FORAGING AREAS

The Washington Department of Wildlife recommends that bald eagles be allowed to feed unmolested, particularly during the morning hours when they are most active. Watson et al. (1991) found that morning and slack low tides were times when human disturbance of foraging bald eagles should be minimized on the Columbia River estuary. Bald eagles often ground-feed in open areas with concentrated food resources and may need at least a 450-m (1,500-ft) buffer distance from human activity and permanent structures. McGarigal et al. (1991) recommend buffer zones of 400 to 800 m wide around high-use foraging areas. Because of Hanford security, the season of eagle use (late fall to winter), historical human activities, and bluffs that block easy visibility of most eagle foraging areas, no buffers for foraging are recommended at this time. If problems develop, timing restrictions may be needed for activities that disturb feeding eagles, such as fishing, boating, and helicopter flights.

The important feeding areas for the bald eagle on the Hanford Reach begin at the Hanford powerline (Hanford townsite) and continue upriver to Vernita Bridge. Eagles congregate near salmon carcass concentrations and areas of high waterfowl use. The vicinity of Locke Island upstream through Island 1 and the 100-F slough (see Figure 6) are extremely important feeding areas that should receive maximum protection from disturbance by humans. River boating activities and shoreline disturbances by Hanford contractors and private individuals should be avoided before 10:00 a.m. and after 5:00 p.m. This would enable the eagles to feed and loaf unmolested. If possible, avoid significant activities from November 15 to March 15 within 400 m and visible to foraging areas that tend to receive high eagle use (Figure 6). Helicopter flights should avoid shoreline areas from Vernita to the Hanford townsite from November 15 through March 15. An 800-m buffer and an altitude of 800 m should be maintained by all helicopter traffic. To date, boating recreationists have not disturbed the eagles. The Hanford Reach is under consideration for designation as a Wild and Scenic River. If it does become a Wild and Scenic River and boating traffic increases, restrictions to protect eagles may be necessary. Currently, however, virtually all boating occurs before the eagle use begins in November. No hunting is allowed on the Hanford Site south and west of the Columbia River or the Hanford Reach of the river from the powerline crossing near the Hanford townsite upstream to Vernita. Fishing on the Reach is a rare occurrence during the winter months. In the future, boating may need to be regulated near roost sites, but at present, boating is not a problem.

Figure 9. Buffer Zones for the White Bluffs Boat Launch and Locations of Past 100-F Area Nesting Sites.



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