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

R. E. Fitzner
Pacific Northwest Laboratory

S. G. Weiss
Westinghouse Hanford Company

Prepared for the U.S. Department of Energy
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Westinghouse Hanford Company
P.O. Box 1970
Richland, Washington 99352

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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 Hanford Site in southcentral 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 below 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 and/or Resource Conservation and Recovery Act investigations and other Hanford activities.

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

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

Bald Eagle Use	Buffer Zone Size	Temporal Restriction
Night Roosting	800 meters	October 15 to April 1
Perching	Evaluated case-by-case	October 15 to April 1
Foraging	Evaluated case-by-case	October 15 to April 1
Nesting	800 meters for secondary area, 400 meters for primary area, to be adjusted on a site-by-site basis	January 1 to July 15, depending on success of the nest

This plan is prepared with the understanding that it is a living document that will need periodic updating. Future research on Hanford, specifically related to human disturbance effects, will enable us to better delineate buffer zones and temporal restrictions for perching, foraging, roosting, and nesting areas.

INTRODUCTION

The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Remedial Investigations of waste sites on the Hanford Site will involve lands containing or adjacent to a bald eagle nest or communal night roost. Because these CERCLA investigations may affect bald eagles, and to meet the intent of WAC 232-12-292, the U.S. Department of Energy (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 Field 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. Yearly review will be a part of this plan.

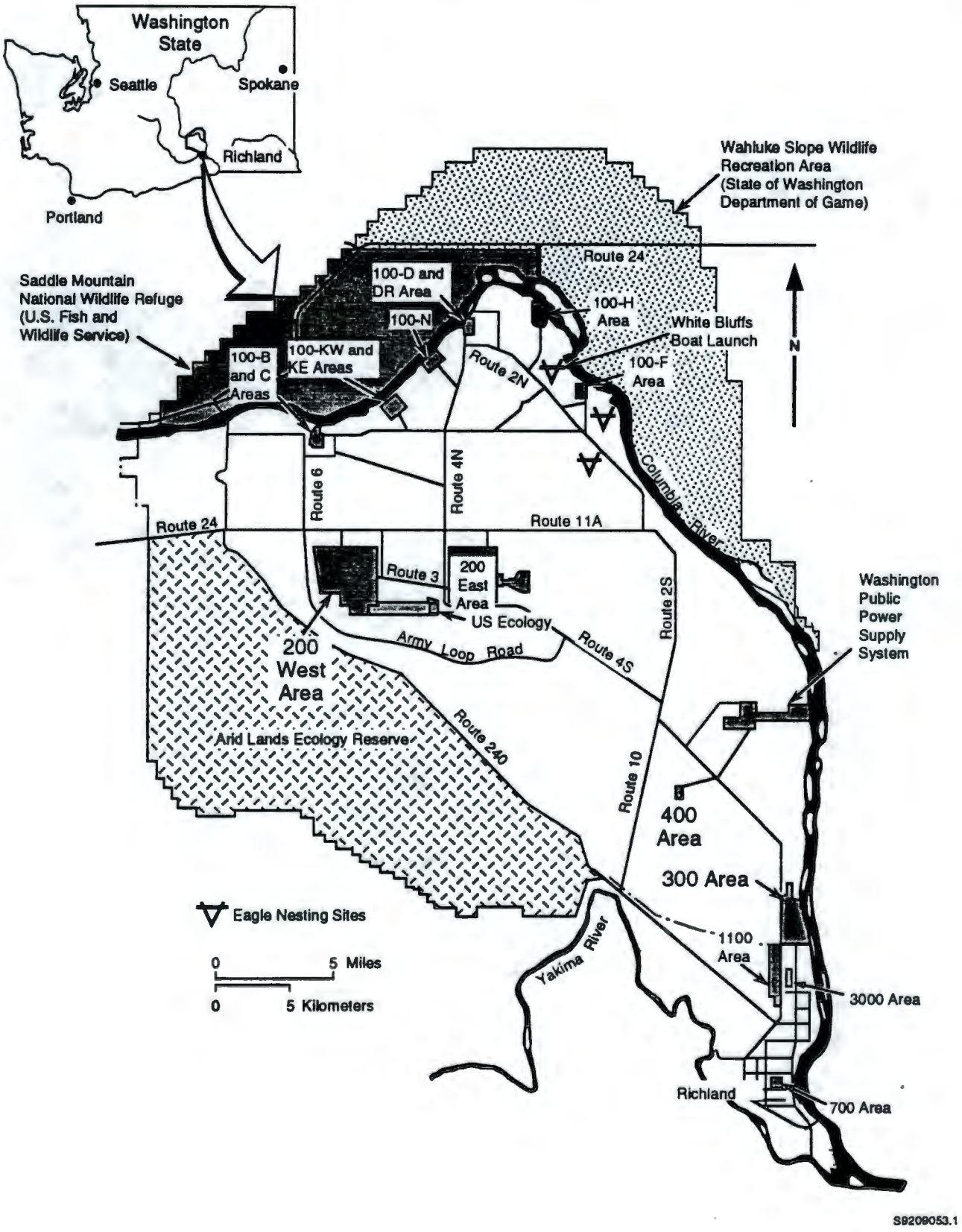
The Hanford Site is located in southcentral Washington and occupies parts of Benton, Franklin, and Grant counties (Figure 1). The Columbia River runs through the Site. The river serves as a major spawning area for fall-spawning chinook salmon (Oncorhynchus tshawytscha) and as a wintering area for waterfowl, 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.

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 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.

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



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 site-specific application 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. Before their adoption, eagle habitat protection in Washington was based primarily on guidelines issued by the U.S. Fish and Wildlife Service. These federal guidelines suggested fixed nest-tree buffers, a primary zone of 330 ft and a secondary zone of 660 ft. Washington's regulations offer a more site-specific, flexible approach (see page 15).

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. This same pattern holds today, but some eagles may arrive earlier and leave later than these general dates. 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 1960s to 25 birds in 1979 (Fitzner et al. 1980). Eagle numbers continued to rise in the 1980s with a maximum count of 55 birds being observed in the winter of 1987-1988 (Gray and Rickard 1989). Table 1 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 Hanford includes perch sites, night roosts, foraging areas, and nesting areas. 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 also utilize inland areas within a few kilometers of the river. The primary perching areas occur from the Hanford townsite upstream to Vernita Bridge. All areas

Table 1. Numbers of Adult and Young Eagles on the Hanford Reach, 1961 to 1990[1]

Year	Total Number	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

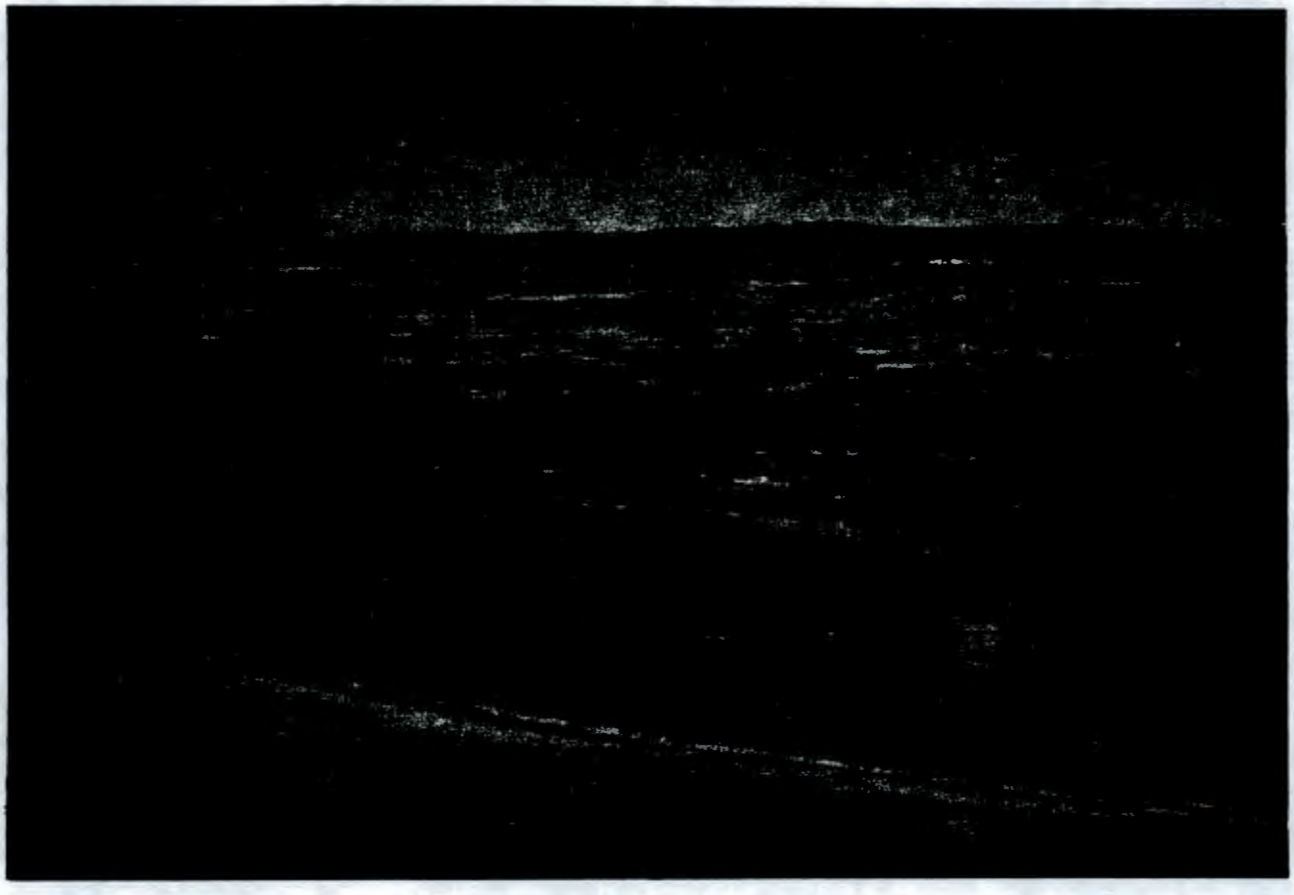
containing trees are used for perching. The White Bluffs opposite the 100-D and 100-H Areas are also used for daytime perching. Some of these perching areas also serve as secondary night roosting areas for small numbers of eagles. Many of the perch sites are old trees planted by early settlers of the Hanford Site. As these trees die, replacements will need to be planted.

NIGHT ROOSTS

Three primary night roosts exist in a few of the larger groves of trees on Hanford, and numerous secondary roosts exist 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

[1] 1990 covers October 1990 through March 1991.

Figure 2. White Bluffs Peninsula Night Roost Site



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.

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 3). These roosting sites are within 500 m of one another, and birds often move back and forth between the roosting sites.

Secondary roosting sites are sometimes used by one, two, or three eagles. One such 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-1980s. 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 types of activities will need to continue in support of the 100-K facility. Figure 4 shows an aerial view of this site. Another roosting site has been noted in another heron nesting colony below the 100-F Area (Figure 1). This roost is in a grove of black locust trees situated on the bank of the river (Figure 5). The location is in Section 10, Township 13N, Range 27E. Up to six birds have been observed using this site for a night roost, a wildfire in spring of 1992 destroyed about half the trees and up to 19 heron nests. A third 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 occasionally been noted here. Other trees and the steep bluffs adjacent to Locke Island are also used by eagles as roosting sites.

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 habitats. The primary spawning grounds of the chinook salmon on Hanford also occur through this area (Dauble and Watson 1990). This area is also closed to hunting and is not heavily used by recreationalists during the winter months. This seclusion from human disturbance is likely a major attractant to the eagles (Fitzner et al. 1980).

NESTING AREAS

Bald eagles have been observed building nests at Hanford for several years, but to date, none have produced young. 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. Another nest was constructed in Section 9, Township 13N, Range 27E. To our knowledge, no eggs were laid. Both 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. We also do not know whether the same birds attempt to nest each year.

The 1991 nests were not reused, however, 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. The herons immediately resumed residency

Figure 3. Night Roost Site Between 100-D and 100-H Areas

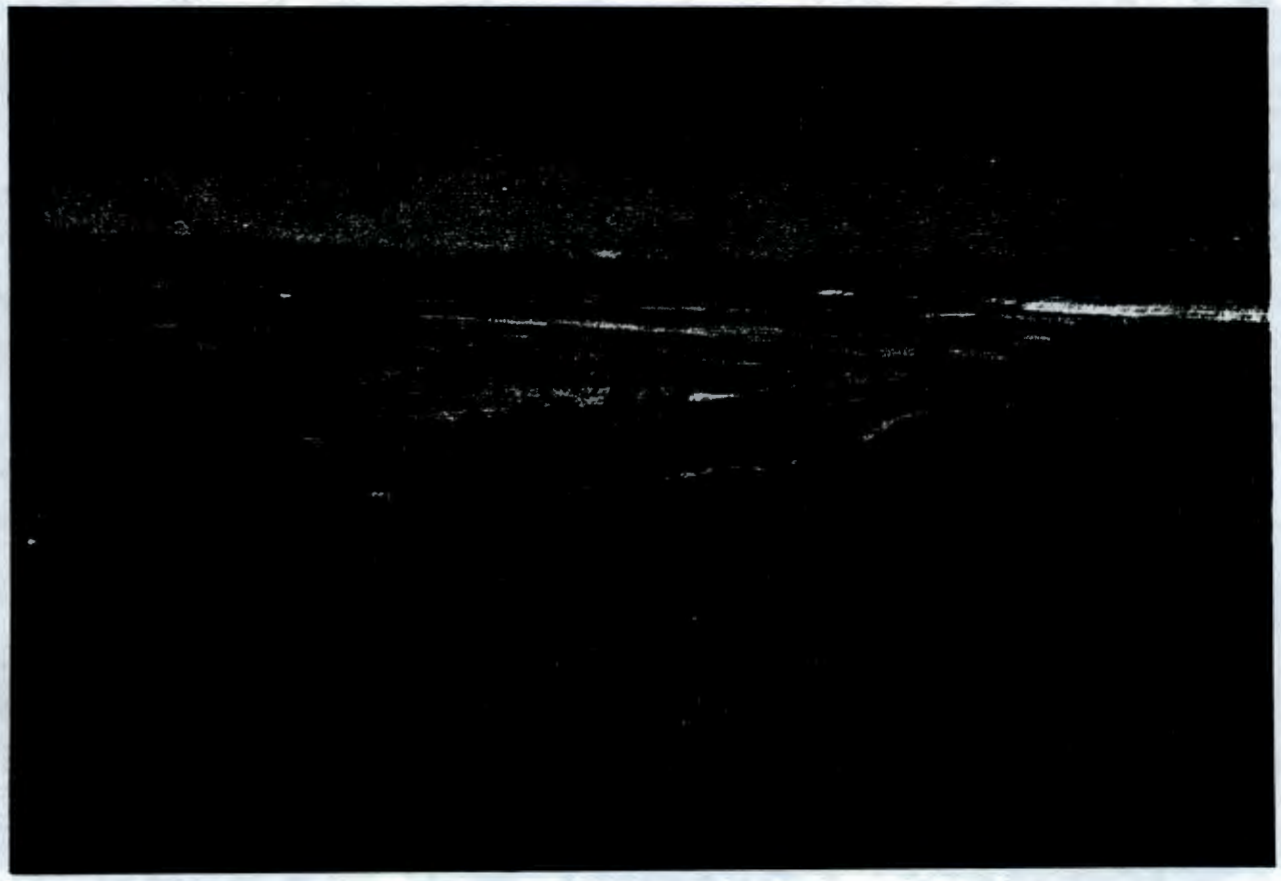


Figure 4. Aerial View of 100-K Area Night Roost Site

Figure 5. 100-F Area Night Roost Site

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.

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

To meet the requirements of the Bald Eagle Habitat Protection Rules, the following activities should be conducted for communal night roosts, perch sites, foraging areas, and nesting sites at Hanford.

It is possible that unresolvable conflicts may arise in the future between the bald eagle and Hanford activities. If such conflicts occur DOE will notify the U.S. Fish and Wildlife Service and Washington Department of Wildlife for resolution.

COMMUNAL NIGHT ROOSTS

The primary night roosts should be placed off-limits to all personnel from October 15 to April 1. Night roosts should be protected during both daylight and nighttime, because eagles also utilize the night roosting areas during the day for resting. Road closures should 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 already exist on roadways leading to the 100-D/100-H Areas roost, alerting people to avoid the roosting area and to not disturb eagles. Similar signs should be placed near other roost sites. The Pacific States Bald Eagle Recovery Plan recommends temporal buffers of 800 m (2600 ft, 0.5 mi) around visible roosts (USFWS 1986). All of the roosts on Hanford are visible roosts and would fall under this recommendation. Therefore, such buffers are recommended between October 15 and April 1. Boat traffic could also disrupt roosting eagles. Boating has not been a problem to date, however, because eagles tend to use Hanford during the off-season for fishing. Hunting is not allowed on the Hanford Site. Recreational boating could become an issue in the future and may need to be dealt with at a later date. Boating has been found to be very disturbing to foraging eagles on the lower Columbia River (McGarigal et al. 1991; Watson et al. 1991)

Special attention should be paid to elimination of helicopter surveillance of river areas near these roosts. Helicopter flights should be kept above 800 m and hovering should not be permitted above roosts. Bald eagles and most wildlife are intolerant to rotary aircraft. Fixed-wing aircraft are acceptable for surveillance activities, and past research on Hanford reveals that wildlife usually adjust well to the constant overflight of a small fixed-wing aircraft.

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 (1000 ft). We recommend that any activities from October 15 to April 1 within 300 m of perch sites and visible from the sites be evaluated for the effect on the eagles. Figure 6 shows the areas commonly used for perching and foraging.

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.

Human activities around nest trees during the nesting season can disturb eagles, causing abandonment or reduced reproductive success. Such activities should be avoided (Anthony and Isaacs 1989; Anthony et al. 1982). Grubb (1976) found that productive nests in Washington were farther from permanent human activity, an average of 120 m (400 ft), than were unproductive nests. Anthony and Isaacs (1989) recommended that habitat alterations not occur within 400 m (1300 ft) of nests and that disturbing activities within 800 m (2600 ft) of nests should be time restricted. In the mid-1970s, the U.S. Fish and Wildlife Service established the buffer zone management concept for the protection of bald eagle nests and communal roosts. For nests, they recommended an unaltered primary buffer zone of 100 m (330 ft) and a secondary zone of 200 m (660 ft) with activity-timing restrictions and only minor alterations allowed. The unaltered primary buffer zone restrictions relate to activities that would render nesting habitat undesirable, such as tree cutting, construction, or frequent human intrusion. Human intrusion would be restricted during the nesting season. The Pacific States Bald Eagle Recovery Plan advised that these U.S. Fish and Wildlife Service guidelines be viewed as minimum protective measures and recommended that disturbing activities such as or comparable to camping, blasting, fireworks, and timber harvesting be restricted to 800 m (2600 ft) for visible nests (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, do reflect the 400-m/800-m temporal restrictions. We also recommend the 400-m/800-m buffer zones for Hanford until research indicates otherwise.

Because no nesting attempts have been successful on the Hanford Site, every effort should be taken to allow bald eagles the opportunity to nest undisturbed. Food resources appear not to be limiting; thus, some other factor is most likely responsible for causing the desertion of nests built on Hanford. 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. Confronted sightseers have indicated that they enjoy the opportunity to get close to (right up to) the eagles. Most Hanford Site workers do not realize that eagles are very sensitive to human presence, particularly during the early stages of nesting (nest building, courtship, and egg laying). Their curiosity and desire to see an eagle close up can be the end to a potentially successful eagle nesting attempt. One confronted sightseer actually admitted that he and others in the office often drove cross country in their 4-wheel-drive vehicle to get directly under the eagle nest because this afforded a particularly good view of the eagles.

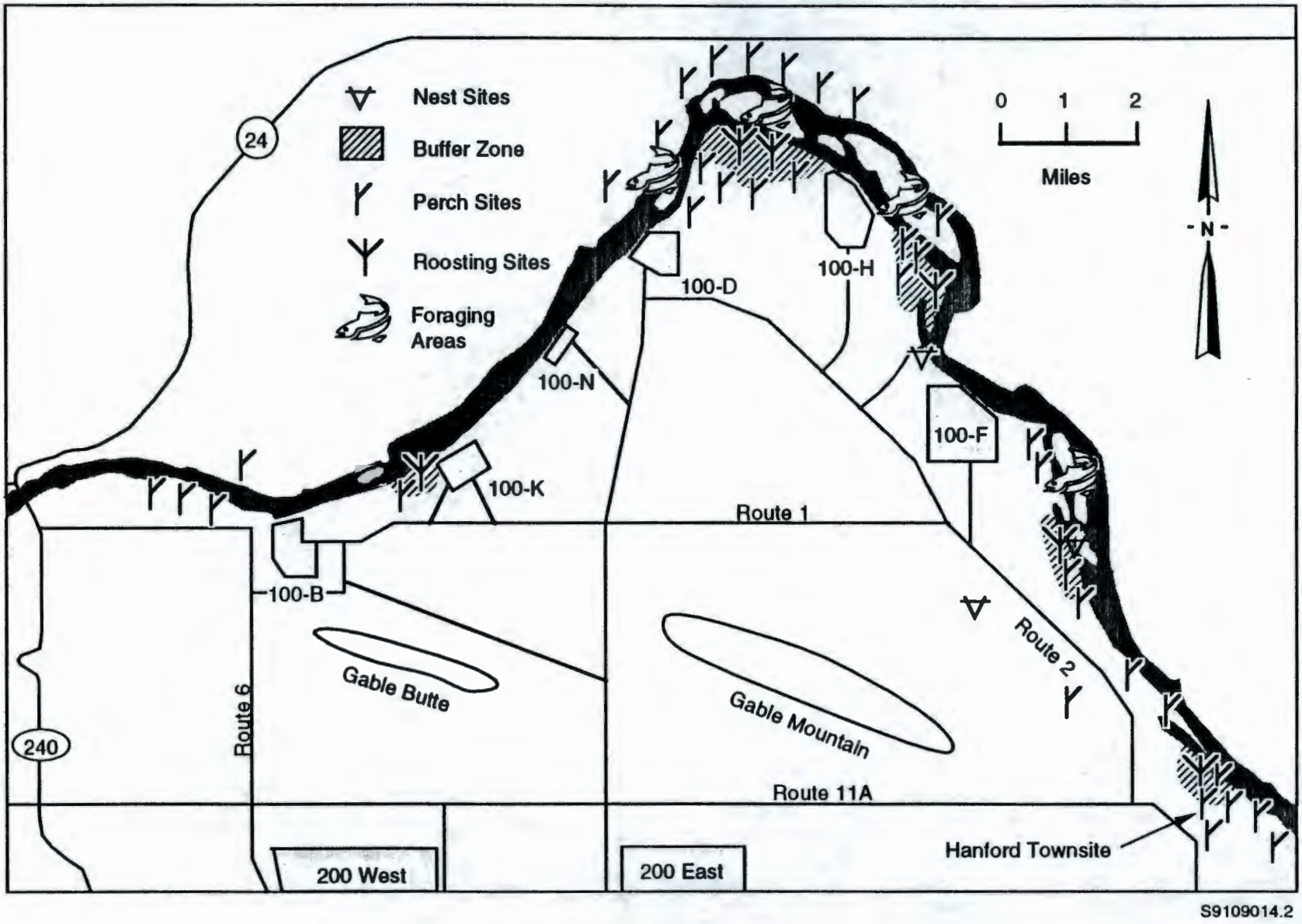


Figure 6. Buffer Zones Recommended for Nesting, Perching, Roosting, and Foraging Sites

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. The nearby boat ramp is the best access to the upper Hanford Reach for Hanford workers requiring access to the river. A new gravel boat ramp exists between 100-B/C and 100-K Areas at the old Hanford Irrigation Project building. Other boat landings exist at 100-N and Vernita Bridge. These ramps could be used during eagle nesting season if eagles choose to nest again at the White Bluffs ramp.

A second nest in 1991, downstream from the 100-F Area, was built in an old Siberian elm tree, about 15 m above ground (Figure 8). This nest was inland, more than 5 km from the river. It was relatively inaccessible, and the only access was via a dirt road. However, this nest had been frequently disturbed by Hanford Site personnel as previously described which may have caused the desertion of the nest or been a contributing factor. No Hanford-specific research has been conducted to determine the effects of human disturbance on wintering or nesting eagles.

The 1992 nest was built in an area not easily accessible by land, and that stretch of the river is not heavily used by boaters in spring. Herons, kept from their nests by the eagles, might have been a source of disturbance to the eagles sufficient to cause desertion. The effect of the fire on 1993 nesting attempts in the rookery is not known. In the absence of data, it is impossible to determine the contributing factors that led to the nest desertions in 1991 or 1992.

The nest sites from the last 2 years may be reused in the future. Also, new nests may be built in other areas of the Hanford Site where tall trees exist. This management plan must be flexible enough to provide for the protection of any new nests that may occur on Hanford in the future. Yearly nesting surveys for eagles should be conducted to determine the location of new nest sites.

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 year-to-year and month-to-month basis.

Human use will depend on the type and duration of activity. The use of the White Bluffs boat ramp, for instance, will need careful coordination by management agencies to ensure that eagles are allowed to nest relatively undisturbed while essential Hanford operations continue. It is essential, 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 May 1. After that period (May 1 to July 15), limited human visitation to White Bluffs could be permitted by DOE. Obviously, if a nest site isn't used in a given year, then restrictions to human trespass can be waived after April 1.

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

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

Note: in the event of a site emergency, the White Bluffs boat launch may need to be utilized. This protection of human lives would supersede any closure of the boat launch for the protection of bald eagles.

The following set of management recommendations is intended for implementation at the sites of the two 1991 nests.

Site 1 (White Bluffs Boat Launch)

This site will likely be the most difficult site to manage. The nest tree in 1991 was situated only 30 m from the boat launch at White Bluffs. Placing an 800-m buffer around the nest would totally eliminate use of the launch and effectively close off the upper Hanford Reach to Hanford Patrol, monitors, and scientists needing access to the river.

Instead, we recommend a temporal restriction in the use of the boat launch for non-emergencies during January, February, and March. If eagles decide to nest in the tree, then the restriction in the use of the ramp would continue until May 1; from May 1 to July 15 some limited use would be allowed. If the eagles do not nest in the tree or desert, then the ramp would be reopened on April 1. 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.

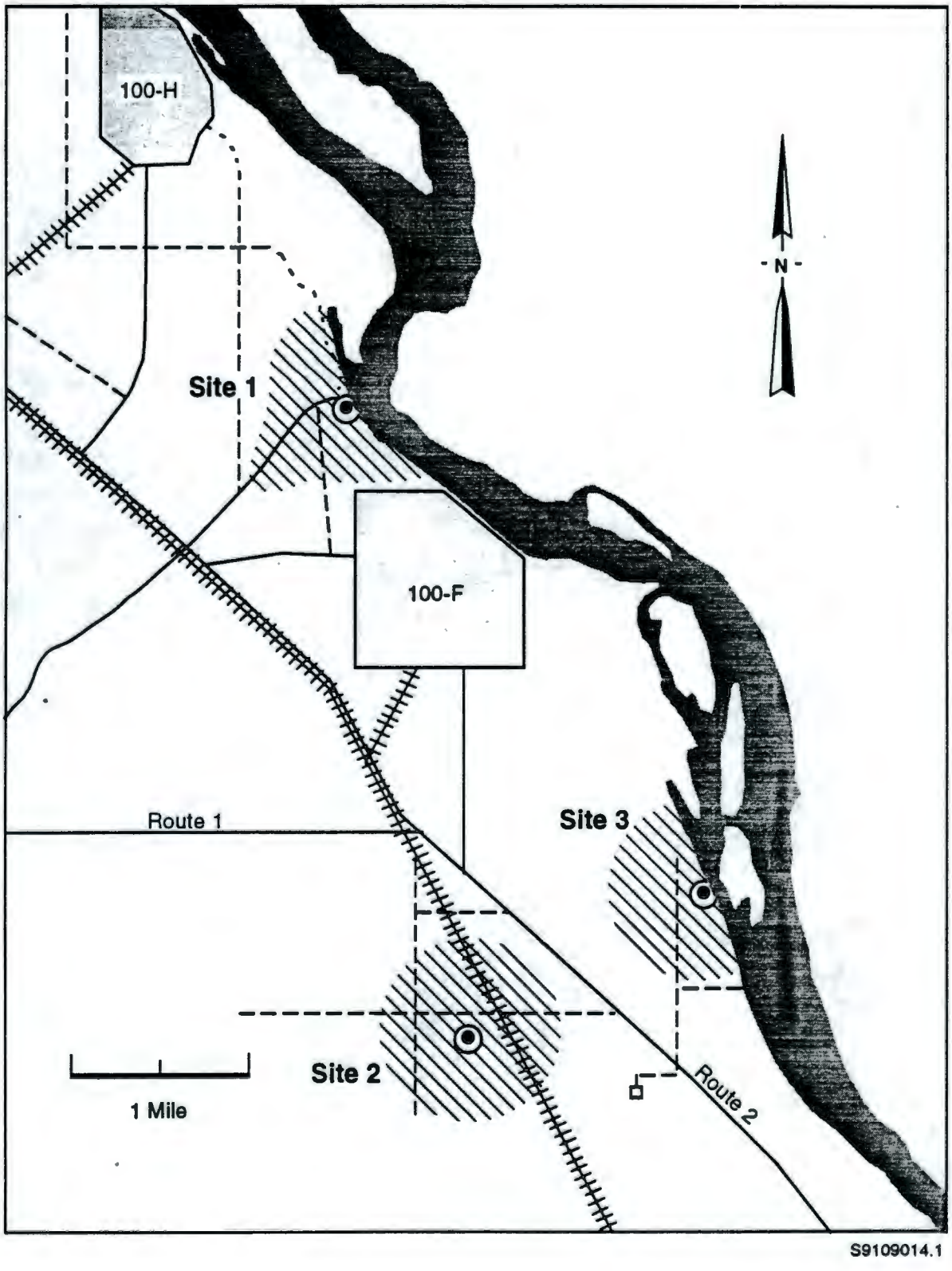
The blacktop roadway leading into White Bluffs should be closed at its entrance (see Figure 1) from January 1 and should not reopen until nesting is completed, or April 1 if nesting is not initiated. Two dirt roads running upriver and downriver from White Bluffs should also be closed during the same period. These roads should be closed at least 800 m from the nest site. The upstream roadway should probably be closed from October 15 through April 1 because it is near a feeding area used by wintering eagles and is also near several perch trees and a major communal night roost. Figure 9 is a map of the White Bluffs and 100-F Area nesting sites showing the buffer zones recommended. The buffer zones are drawn to maximize the use of visual barriers and to reduce all visual contact with humans and their vehicles. No helicopter activity or off-road vehicles would be permitted within the buffer zone during the nesting season.

Site 2 (Inland South of 100-F)

This nest site will be easier to manage. Only two roads lead into this site and both are of poor-condition gravel. Both roads could be closed at their entrances through the use of barricades. Signs stating that the roads would be closed to all personnel from January 1 to July 15 would be placed at the entrance to these roads. If there were no signs of nesting by April 1, the road would be returned to normal use. Figure 9 shows the location of the nest and the recommended buffer areas.

Care should be taken at this site to notify the Hanford Fire Department and Patrol, and other off-road travelers, that the area within the buffer zone is off-limits to all personnel from January 1 to either April 1 or July 15. There would also be no helicopter activity allowed within 800 m of this nest site during the same period. Bald eagles are extremely sensitive to rotary aircraft. Non-stopping railroad usage, however, is expected to have no impact on the eagles.

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



Site 3 (Heron Rookery South of 100-F)

Only one poor-condition dirt road leads to this site, and it could be closed at its entrance through the use of natural barricades and signs. Figure 9 shows the nest location and recommended buffer zone. The notifications listed above for site 2 are also applicable here.

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 need at least a 450-m (1500-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. 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. We recommend any significant activities from October 15 to April 1 within 400 m and visible to important foraging areas be evaluated for their impact to eagles. Helicopter flights should avoid shoreline areas from Vernita to the Hanford townsite from October 15 through April 1. An 800-m buffer and an altitude of 800 m should be maintained by all helicopter traffic. This restriction should still enable Hanford Patrol to see the Columbia River shoreline, but will enable the eagles to feed unmolested. This buffer should be considered for the entire year because of the sensitivity of other wildlife species to helicopter flights. To date, boating recreationalists have not disturbed the eagles. There is no hunting allowed on the Hanford Site 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. Effects of recreational use of the Hanford Reach on bald eagles should be the subject of future research.

RECOMMENDATIONS FOR RESEARCH

To date, the only research conducted on bald eagles at Hanford has been related to their use of communal night roosts. There has been little effort expended to determine daily activity patterns or habitat utilization. These data are needed to determine important foraging and resting areas. A study should also be conducted on the effects of human disturbance on bald eagles along the Hanford Reach. The recommendations for buffers in this report are based on studies conducted elsewhere and are not site-specific to Hanford. A site-specific study would enable us to produce future management recommendations that are finely tuned to Hanford. We also have no data on where the Hanford wintering population comes from or migrates to. Several adults appear to have an affinity for nesting

at Hanford, but many others must nest elsewhere. To determine the factors that may be limiting to the eagles, it is important to know what they are doing the other times of the year when they are not on Hanford. This could be very important to Hanford, because eagles wintering on the Site may be subjected to hazardous chemicals or other life-threatening perturbations when they leave Hanford. These perturbations may reduce our wintering population. Hanford could be unfairly blamed for the reduction, when in fact something offsite was causing the decline. Research to determine offsite movements would provide information about the eagles' biology during other times of the year. The use of satellite radiotelemetry could provide the needed information. Bald eagles occur throughout the entire Hanford Reach and could potentially be affected by Hanford activities other than those for CERCLA or the Resource Conservation and Recovery Act. Thus, research funding for the bald eagle studies should be supported by DOE's overall budget for site-wide resource management.

MANAGEMENT RECOMMENDATIONS

Many of the currently used night roosting sites and perches are trees that were planted by early settlers, before takeover of the Site by the U.S. government. Today, many of these trees are dying, and we are slowly loosing valuable wildlife habitat. Wildfires, such as those that in 1992 destroyed half the heron rookery used earlier by the eagles, only make the need for habitat management more urgent. A natural resource management plan (long-term) for Hanford should be prepared to consider protection and management of wildlife habitat.

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