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## Bald Eagle Perch-sites in Eastern Washington

### Abstract

We monitored Bald Eagle (*Haliaeetus leucocephalus*) use and relative abundance of perch types along major water bodies in eastern Washington during the winters of 1982-83 and 1983-84. Eagles perched in ponderosa pines (*Pinus ponderosa*), snags, cottonwoods (*Populus* spp.), man-made structures, the ground, ice, and other sites. Use of perches varied with their availability along each water body. Ponderosa pines, snags, and cottonwoods received high proportions of use where they were available. Bald Eagle perches should be considered in the management of riparian areas.

### Introduction

Wintering Bald Eagles (*Haliaeetus leucocephalus*) spend much of each day perching (Servheen 1975). The availability of suitable perches may influence the local distribution of wintering Bald Eagles (Erickson *et al.* 1976, Stalmaster and Newman 1979, Fielder and Starkey 1980, Steenhof *et al.* 1980).

More than 200 Bald Eagles annually winter along the major water bodies in eastern Washington. Shorelines along eastern Washington water bodies offer a variety of perch types. However, these shorelines are also subject to extensive human modification (*e.g.*, logging, firewood cutting, livestock grazing, and hydroelectric, agricultural, residential, recreational, and highway development and expansion). Steenhof *et al.* (1980) found that 58 percent of the Bald Eagles wintering in South Dakota perched within 5 m of the water. Therefore shoreline modifications may affect wintering Bald Eagles. Wildlife managers should consider the availability and importance of those perches to bald eagles when evaluating shoreline modifications. To facilitate this consideration, and supplement Bald Eagle perch site information for western Washington (Stalmaster and Newman 1979), we present information of 1336 observations of Bald Eagles perched or flying along the water bodies in eastern Washington.

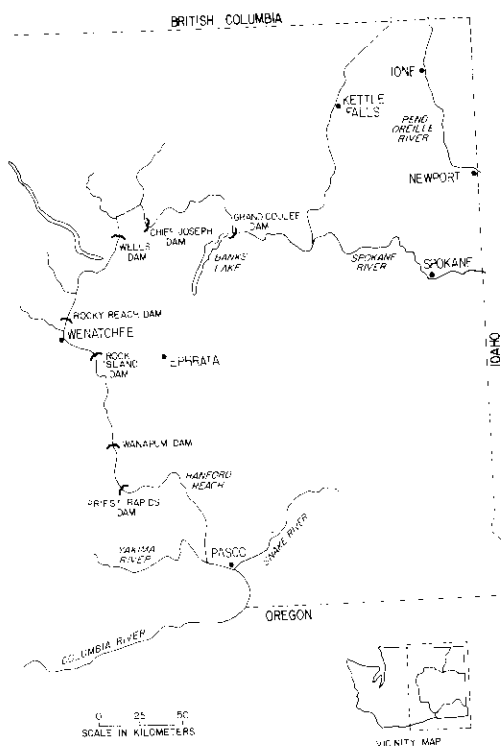


Figure 1. Eastern Washington Bald Eagle survey area.

### Study Area

The study area (Figure 1) included the Columbia River (from Pasco to about 10 km above Kettle Falls), Banks Lake, the Spokane River (from

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its mouth to Spokane), and the Pend Oreille River (from Newport to Ione), a total of 1775 km of shoreline. We divided the study area into segments because of their management by a variety of hydroelectric agencies. We addressed the Columbia River according to the reservoirs lying behind the hydroelectric dams (Priest Rapids, Wanapum, Rock Island, Rocky Reach, Wells, and Chief Joseph). The Hanford Reach included the Columbia River between Pasco and Priest Rapids Dam. FDR Reservoir, lying behind Grand Coulee Dam, was divided into south FDR Reservoir (the Columbia River between the dam and the mouth of the Spokane River) and north FDR Reservoir (the portion between the Spokane River mouth and 10 km upstream from Kettle Falls). The Spokane and Pend Oreille rivers were each treated as separate segments.

The study area included 5 vegetation associations or zones described by Franklin and Dyrness (1973): the *Artemisia tridentata*-*Agropyron spicatum* and *Artemisia tripartita*-*Festuca idahoensis* vegetation associations and the *Pinus ponderosa*, *Tsuga heterophylla* and *Pseudotsuga menziesii* zones. The physical character of the study area shorelines also varied greatly (e.g., arid lands, gravel bars, mud flats, steep basalt cliffs, and forests).

Vegetation or shoreline characteristics along several segments merit discussion. The Hanford Reach has many large cobble islands and several stands of black locust (*Robinia pseudoacacia*) and Chinese elm (*Elmus* sp.) trees. Very tall basalt cliffs border most of the southern 2/3 of Wanapum Reservoir. Man-made raptor perches, designed for Bald Eagles, have been erected along Wanapum, Rock Island, Wells, and Chief Joseph reservoirs. Except for 4 tripods with crossarms along Rock Island Reservoir, all man-made perches along these reservoirs are single poles with crossarms. A large number of river pilings occur in the Pend Oreille River and these power poles, and towers were also classified as man-made perches. Much of Banks Lake is bordered by steep basalt cliffs. Banks Lake, large portions of the Spokane River, and large embayments along the Pend Oreille River freeze over each winter. Most of the remainder of the study area remains relatively ice-free.

## Methods

Observations of Bald Eagles, and their perches were recorded monthly from November 1982-February 1983 and November 1983-March 1984, except the Spokane and Pend Oreille rivers were not surveyed during the winter of 1982-83.

Surveys were conducted in a high-wing Cessna aircraft, flown at speeds of 130-145 km/h, 30-60 m above ground level, using an observer/pilot and at least one additional observer. The same direction was flown each month within five days of the 15th of each month, except when weather reduced visibility. Where river or reservoir width exceeded 0.8 km, each shoreline was flown separately because eagle sightings were more easily made within a distance of 0.4 km from the aircraft. Where water body widths were 0.8 km or less, the route was flown along the center axis of the water, allowing both shores to be observed simultaneously.

In recording perches, the use of dead portions of a tree was included with snag use. Ground perches included cliffs, shoreline rocks, mud flats, and gravel bars. We included counts of flying birds as part of Table 1 for comparative purposes.

We used rank correlation (Chapman and Schaefele 1970) to analyze availability and use of perch types along each water body. Subjective ranking of the relative availability of perch types allowed comparison of numbers of trees, lengths of cliffs, and areas of gravel bars and ice.

## Results and Discussion

Bald Eagles used perch sites in eastern Washington primarily according to their varying availability along the water bodies surveyed. Of the 1336 Bald Eagle sightings tallied during nine surveys (four of which did not include the Spokane and Pend Oreille rivers), 14 percent were of eagles in flight which had not been flushed by our approach. They were either soaring or in transit. Along the mainstem Columbia (two winters of surveys) Bald Eagles perched in ponderosa pines, snags, on the ground and in cottonwoods 34 percent, 26 percent, 15 percent, and 12 percent of the time, respectively (Table 1). Along the Spokane and Pend Oreille rivers, (one winter of surveys) eagles perched in ponderosa pine, cottonwoods and snags 32 percent, 27 percent and 24 percent of the time, respectively.

TABLE 1. Utilization of bald eagles perch sites along major water bodies in eastern Washington (number of sightings is followed by percent of sightings in parentheses).

Body of water <sup>1</sup>	Ponderosa pine	Snag	Cotton-wood	Man-made structure	Other <sup>2</sup>	Ground <sup>3</sup>	Ice	Total	No. Flying
Hanford Reach	0(0)	3(3)	6(5)	4(3)	Rp 78(67)	G 26(22)	0(0)	117	12
Priest Rapids Res.	0(0)	1(8)	5(38)	0(0)	Jo 1(8)	G 6(46)	0(0)	13	5
Wanapum Res.	0(0)	0(0)	0(0)	0(0)	Rp 1(3)	C 31(97)	0(0)	32	13
Rock Island Res.	0(0)	1(20)	3(60)	1(20)	0(0)	C 0(0)	0(0)	5	1
Rocky Reach Res.	15(32)	15(32)	11(23)	0(0)	Pm 3(6)	C 3(6)	0(0)	47	9
Wells Res.	13(17)	18(24)	32(43)	3(4)	Pm 6(8)	G 3(4)	0(0)	75	0
Chief Joseph Res.	46(47)	43(44)	2(2)	1(1)	Pm 3(3)	C 2(2)	0(0)	97	3
Banks Lake	18(10)	27(16)	65(38)	0(0)	Pm 1(1)	C 57(33)	4(2)	172	58
South FDR Res.	34(40)	26(30)	1(1)	0(0)	Pm 12(14)	C 13(15)	0(0)	86	12
North FDR Res.	226(57)	136(34)	4(1)	0(0)	Pm 13(3)	G 17(4)	0(0)	396	57
	352(34)	270(26)	129(12)	9(1)	118(11)	158(15)	4(<1)	1040	170
Spokane R.	32(48)	20(30)	0(0)	0(0)	Pm 6(9)	C 4(6)	4(6)	66	6
Pend Oreille R.	4(9)	7(15)	30(65)	4(9)	Pm 0(0)	G 0(0)	1(2)	46	8
	36(32)	27(24)	30(27)	4(4)	6(5)	4(4)	5(4)	112	14

<sup>1</sup>Spokane and Pend Oreille rivers were surveyed 5 times, other water bodies were surveyed 9 times.

<sup>2</sup>Other perch types identified as: Jo—*Juniperus occidentalis*, Pm—*Pseudotsuga menziesii*, Rp—*Robina pseudoacacia*.

<sup>3</sup>Gravel bars (G) and cliffs (C) were the most used ground perches. G or C designates the perch type most abundant.

TABLE 2. Rankings (highest ranking = 1) of relative abundance of perch types and their use (abundance/use) and the coefficient of rank correlation ( $r_k$ ) of those rankings for each water body (highest rankings indicated by 1).

Body of water	Ponderosa pine	Snag	Cotton-wood	Man-made structures	Other	Ground <sup>1</sup> G/C	Ice	$r_k$
Hanford Reach	7/6.5	3/5	4/3	5/4	1/1	G 2/2	6/6.5	.88
Priest Rapids Res.	6/6	4/3.5	2/2	7/6	3/3.5	G 1/1	5/6	.96
Wanapum Res.	6/5	6/5	4/5	3/5	2/3	C 1/1	6/5	.89
Rock Island Res.	5/5.5	2/2.5	1/1	3/2.5	6.5/5.5	C 4/5.5	6.5/5.5	.91
Rocky Reach Res.	2/1.5	4/1.5	1/3	6.5/6.5	3/4.5	C 5/4.5	6.5/6.5	.77
Wells Res.	1/3	4/2	2/1	5/5.5	3/4	G 7/5.5	6/7	.76
Chief Joseph Res.	1/1	2/2	6/4.5	4/6	3/3	C 5/4.5	7/7	.88
Banks Lake	3/4	5/3	4/1	7/7	6/6	C 1/2	2/5	.57
South FDR Res.	1/1	2/2	5/5	6.5/6.5	3/4	C 4/3	6.5/6.5	.96
North FDR Res.	1/1	3/2	5/5	7/6.5	2/4	G 4/3	6/6.5	.88
Spokane R.	1/1	3/2	5/6.5	7/6.5	2/3	C 6/4.5	4/4.5	.88
Pend Oreille	2/3.5	4/2	1/1	3/3.5	5/6.5	G 7/6.5	6/5	.82
Mean	3.0/3.3	3.5/2.7	3.3/3.2	5.3/5.5	3.3/4.0	3.9/3.6	5.6/5.9	
Mean ranking	1/3	4/1	3/2	6/6	2/5	5/4	7/7	

<sup>1</sup>Either gravel bars (G) or cliffs (C), whichever were most abundant (as indicated) were used to rank ground perches.

Several aspects of Bald Eagle perch sites in eastern Washington merit discussion because the perches are either locally valuable to Bald Eagles or subject to impact from human activities, or both. Cliffs provide elevated perches. Lift provided by winds near cliffs allow eagles to fly or soar with a minimal energy expenditure (Stalmaster 1983). Where cliffs were common or abundant a high proportion of eagles were either seen flying or on "ground" perches, primarily cliffs (e.g.; Wanapum Reservoir 69 percent on ground perches, 29 percent flying; Banks Lake 25 percent on ground perches, 25 percent flying, Table 1). Few of man's present activities in eastern Washington affect cliffs used by eagles.

Stalmaster and Newman (1979) found that Bald Eagles preferred perches with an open limb structure allowing good visibility and unobstructed flight. Our eastern Washington studies further support those findings. Ponderosa pine was the most available perch type in eastern Washington, ranking 1 or 2 in abundance along 7 of the 12 water bodies (Table 2). Thirty-four percent of the perched eagles seen during our surveys were in ponderosa pines. Large, old ponderosa pines often have bare limbs and an open limb structure. Snags and many cottonwoods also offer an open limb structure suitable for Bald Eagle perch sites. Cottonwoods and snags were ranked 3 and 4 in mean abundance and accounted for 14 percent and 26 percent of the perched eagle sightings, respectively. Snags seem to be preferred perch sites. Although snags had a mean ranking of 4 in abundance along eastern Washington waters, they had a mean ranking of 1 in use (ranking 3 or higher along 9 of the 12 waters). With the exception of snags, eagle use of perch types correlated ( $r_k$ ) well with perch abundance along each particular water body (Table 2).

Snags, cottonwoods, and ponderosa pines, and other trees along water bodies in eastern Washington are threatened by many forms of human development (e.g., livestock grazing, logging, firewood cutting, and agricultural, hydroelectric, highway, and residential development). Overgrazing by livestock, often concentrated in riparian areas, can affect recruitment of saplings which would become future perch sites. Logging and firewood cutting removes many large trees and snags which may serve as Bald Eagle perch sites. Clearing shoreline trees

for any type of development eliminates potential perches close to the water, the perches which Bald Eagles use most often (Steenhof *et al.* 1980). Vegetation to be inundated by hydroelectric projects in the northwest has usually been cleared as a standard procedure. However, the U.S. Army Corps of Engineers left shoreline vegetation standing as a fish and wildlife mitigation measure when they raised the Chief Joseph Dam and reservoir (U.S. Army 1980). When the water rose, many ponderosa pines drowned and now provide Bald Eagle perch sites as snags. Bald Eagles would benefit should future hydroelectric projects adopt a similar "non-clearing" policy.

Much public land borders the water bodies surveyed in this study. Public agencies should protect present Bald Eagle perch sites and provide for future perches by taking efforts to preserve and perpetuate old growth or large trees along shorelines which they manage. Trees attain larger size than most man-made perches and offer other values (e.g., thermal, visual, wind protection).

Table 1 indicates only slight use of man-made perch sites. However, aerial surveys during previous years, and random sightings indicate frequent use of these structures by Bald Eagles.

Man-made perches, if placed close to water, may increase Bald Eagle use along treeless shorelines. Additional man-made perches would probably be effective along Priest Rapids Reservoir, the lower half of Banks Lake, the lower half of Wanapum Reservoir, and the upper and lower portions of the Hanford Reach because these waters presently lack shoreline perches.

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