

**ANNUAL REPORT ON VITAL SIGNS MONITORING OF DISTRIBUTION AND
ABUNDANCE OF BALD EAGLES IN WRANGELL-ST. ELIAS NATIONAL
PARK & PRESERVE**

Judy Putera

**Wrangell-St. Elias National Park
And Preserve
P.O. Box 439
Copper Center, AK 99573**

2008

CENTRAL ALASKA NETWORK

Executive Summary

Key Words: *Wrangell-St. Elias National Park and Preserve, Bald Eagle, Haliaeetus leucocephalus, Population dynamics, monitoring*

Introduction

The CAKN has adopted a holistic view of network ecosystems and will track the major physical drivers of ecosystem change and responses of the two major components of the biota: plants and animals. Thus, the CAKN has identified Fauna Distribution and Abundance as one of its top three Vital Signs. In general, the CAKN wants to know where fauna are distributed across the landscape and to track changes in both their distribution and abundance. The Fauna Distribution and Abundance Vital Sign comprises monitoring efforts for a suite of vertebrate species spanning the significant elevation gradient found in CAKN parks, and also including species of specific interest within each park. The Copper River in WRST contains a high density of nesting Bald Eagles in interior Alaska; accordingly, the CAKN technical committee identified Bald Eagles as a focal fauna species to monitor in Wrangell-St. Elias National Park and Preserve (WRST). Bald Eagles in WRST are a high profile species that are dependent upon many resources along the Copper River and are ecologically interesting because they nest at the northern edge of the species range. Bald Eagles are top-trophic level predators and they often respond quickly to changes in their environment by changing their breeding activities. Further, Bald Eagles nesting along the Copper River in WRST may face increasing disturbance due to forestry activities and increased human visitation.

Bald eagles (*Haliaeetus leucocephalus*) are common breeders in Wrangell-St Elias National Park and Preserve (WRST). Most nests are concentrated along the Copper River and its major tributaries. Potential threats to nesting eagles include habitat loss, human disturbance, and exposure to environmental contaminants that may affect reproduction or survival. Specific threats include highway construction from Chitina to Cordova, development and timber harvest on private lands along rivers, lakes, and coastal areas, potential increases in commercial and recreational fishing on the Copper River and its tributaries, camping or other recreational or subsistence access/use activities (including use of ATVs and jet boats) in sensitive breeding areas, and environmental contamination from local and global sources. Pollution is of special concern in the wake of the Exxon-Valdez oil spill that occurred near Valdez in March of 1989. The TransAlaska Pipeline crosses three tributaries of the Copper River—the Gulkana, Tazlina, and Klutina rivers. These rivers are also crossed by the Richardson Highway, which is heavily used by tanker trucks carrying petroleum products to and from the Valdez terminal. These are all important reasons to document long-term trends on population density and reproductive rates for bald eagles.

Objectives

The objectives of the monitoring efforts are to:

- a) Document the annual changes in occupancy of bald eagles,
- b) Document the annual changes in productivity of bald eagle nests, and
- c) Document any changes in distribution of bald eagle nests.

Methods and Materials

Study Area:

Five survey areas were defined along major riverways, and are described in Kozie (1996) (Figure 1). The Upper Copper River (UCR, 80km) extends from Copper and Tanada lakes to the confluence of the Chistochina River. White spruce (*Picea glauca*) is the predominant tree species, with balsam poplar (*Populus balsamifera*) common on the lower stretches. The Middle Copper River (MCR, 179km) extends from the Chistochina River south to the confluence of the Chitina River. The MCR contains a mixture of both white spruce and balsam poplar, with poplar being slightly more common. The Copper River begins to braid along the MCR.

The LCR (188km) extends from the Chitina River south to Miles Lake. The LCR is dominated by cottonwood along the river. The vegetation also begins to exhibit coastal influences, adding several coastal species including black cottonwood (*Populus trichocarpa*), Sitka spruce (*Picea sitchensis*), and mountain hemlock (*Tsuga mertensiana*). The Copper River becomes wider and more braided with steep canyons on either side. Nesting begins consistently later along the LCR and is probably influenced by the numerous glaciers in the area which delay snow melt and maintain the area in a winter like state several weeks after green up has begun to occur to the north.

The Bremner River (45km) is surveyed from its confluence with the Copper River to the forks by Threemile Canyon, and has similar characteristics as the LCR.

The Chitina River (116km) is surveyed from the confluence of the Copper River to where the river becomes braided above the Tana River. White spruce is the major tree species, with cottonwood becoming scarce in the upper reaches.

A total of 609 km of riverways are surveyed annually, amounting to over 1200km of surveys.

Surveys:

Two aerial surveys were conducted—one to document territorial occupancy, and one to document productivity. Surveys were flown using a small airplane (Aviat Husky or Piper Super Cub) flying at low level (<100m AGL) and low speed (<100 kph), with one experienced observer. The same observer was present on all flights except for the August 1 productivity flight of the Lower Copper River. The same pilot conducted all surveys.

Flight paths followed the river's edge, with the opposite side covered on the return trip. In most cases, the relatively narrow riparian corridor allowed adequate coverage with a single pass on each side of the river. Where the corridor widened, multiple passes were made to adequately evaluate the available habitat.

For all nests located, the following information was collected: a) location (waypoint number associated with lat/long via handheld Global Positioning System (GPS) receiver—Garmin Map 76S), b) count of adult birds, c) behavior of adults (incubating, perched), d) number of eggs observed, e) number of nestlings, f) species of nest tree (*Populus* spp., *Picea* spp.), g) whether tree was alive or dead, and h) nest status (good, poor, remnant, gone). All information except lat/long (recorded via GPS) was recorded on field forms. During the second productivity survey, all nest locations collected during prior surveys were uploaded into the GPS, and each nest was checked for productivity.

Territorial occupancy was defined based on a bird in the nest in incubating posture or two adult birds at a nest (Postupalsky 1974). For the productivity survey, all nests observed with an incubating bird or two adult birds at a nest during the occupancy survey were checked to determine nest outcome. Multiple passes were commonly needed to count chicks, particularly in the Lower Copper area where cottonwoods are more common, and leaves make counting chicks difficult. Although a small helicopter (e.g. R-44) would be particularly useful, nests could be adequately assessed with the fixed-wing with additional passes, and the added expense of a helicopter (chartered from Fairbanks, 2.5 hours away) is not currently necessary. Only on the Lower Copper, where the cottonwoods are larger, would a helicopter provide significant increased effectiveness.

Results

Occupancy surveys were conducted on the Upper and Middle, and Chitina River segments on 21-23 May (Figure 1). Because of high snow conditions along the Lower Copper River, and historically later phenology of the Lower Copper and Bremner segments, these areas were surveyed on 28 May and 2 June. Productivity surveys on the Upper and Middle Copper, and Chitina River were conducted on 24-25 July. The Lower Copper and Bremner segments were flown on 1 August.

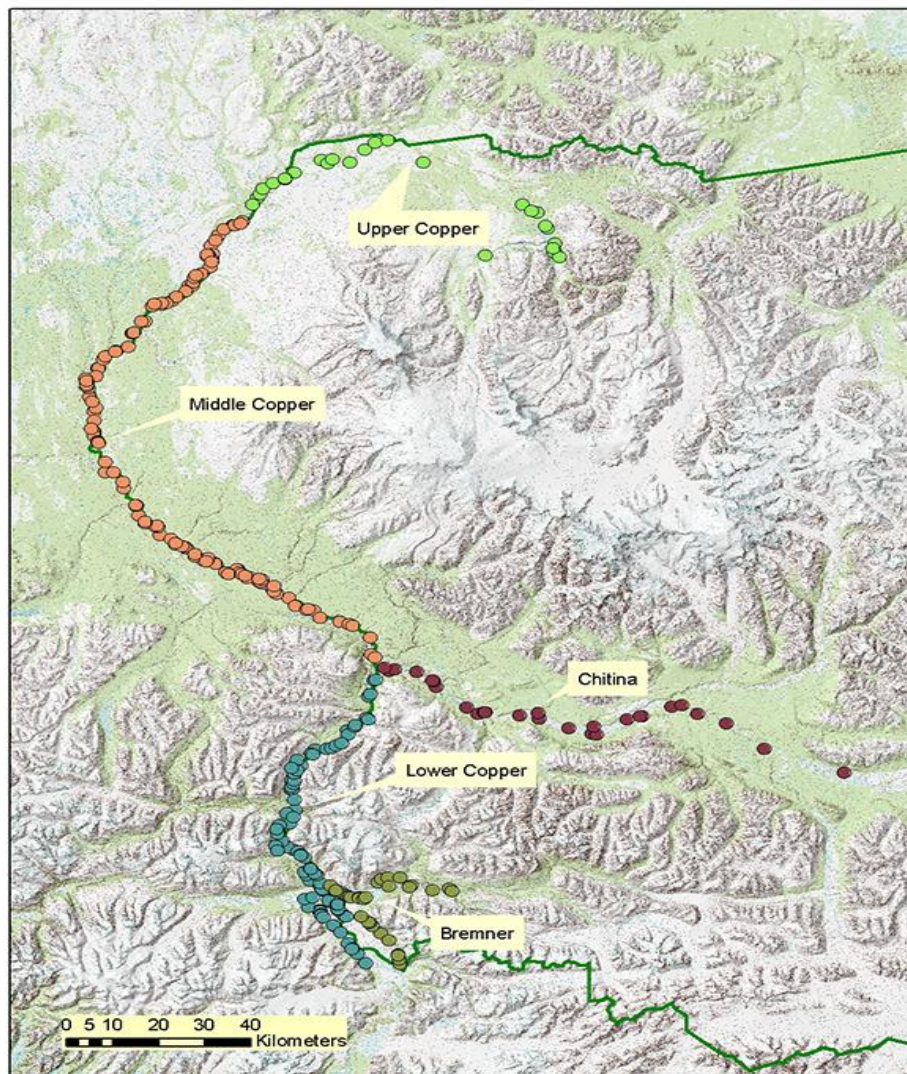


Figure 1. Bald eagle nest sites along the Copper River and selected tributaries, Wrangell- St. Elias National Park and Preserve. River segments are described in the text.

A total of 316 nests were located during occupancy surveys (Table 1). Ninety-nine nests were occupied, having either an incubating adult or 2 adults at the nest tree. Overall known nest success was 47.7%, producing 65 young to fledging age. Productivity, defined as the number of young per occupied nest, was calculated at 0.74. Nest success and productivity ranged from 33.3% and 0.44 on the Chitina River segment to 60.0% and 0.93 on the Upper Copper River segment.

Table 1. Results of occupancy and productivity surveys along the Copper River and two tributaries, the Bremner and Chitina rivers, Wrangell-St. Elias National Park and Preserve, 2008.

	Lower	Bremner	Middle	Upper	Chitina	TOTAL
Nests Located	95	41	123	30	27	316
Occupied ¹	26	9	40	15	9	99
Unknown Productivity ²	5	4	2	-	-	11
Successful	8	2	20	9	3	42
Young Fledged	12	3	32	14	4	65
% Nest Success	38.1	40.0	52.6	60.0	33.3	47.7
Young/Occupied Nest	0.57	0.60	0.84	0.93	0.44	0.74
Young/Successful Nest	1.5	1.5	1.6	1.6	1.3	1.6

¹Occupancy was defined by the presence of an incubating bird or 2 adult birds at the nest.

² Occupied nests not found or checked during productivity surveys.

Overall nest success and productivity improved from 2006 and 2007, years in which all 5 river segments have been surveyed (Table 2).

Table 2. Bald Eagle nest productivity on the Copper, Chitina, and Bremner River segments, Wrangell-St. Elias National Park and Preserve, 2006-2008.

Year	Occupied Nests	Successful Nests	% Nest Success	No. of Young	Young/Occupied Nest	Young/Success Nest
2006 ¹	101	29	30	39	0.41	1.35
2007 ¹	110	40	39	54	0.52	1.35
2008 ²	99	42	48	65	0.74	1.56

¹Occupancy was defined by the presence of an incubating bird at the nest.

² Occupancy was defined by the presence of an incubating bird or 2 adult birds at the nest.

Although lower than the previous 2 years, nest success was still highest among river segments along the Upper Copper River (Table 3). The Chitina River continued to have the lowest nest success. Success improved along the Lower and Middle Copper River segments, but decreased along the Bremner River.

Table 3. Bald eagle percent nest success/productivity by river segment, Wrangell-St. Elias National Park & Preserve, 2006-2008.

Year	Lower	Bremner	Middle	Upper	Chitina	TOTAL
2006	25 / 0.36	50 / 0.50	26 / 0.39	70 / 1.12	14 / 0.14	30 / 0.41
2007	35 / 0.52	70 / 0.60	22 / 0.24	79 / 1.07	17 / 0.25	39 / 0.52
2008	38 / 0.57	40 / 0.60	53 / 0.84	60 / 0.93	33 / 0.44	48 / 0.74

The Middle Copper River segment has been surveyed nearly every year beginning in 1989 (Table 4). Nest success has been consistently low along this section of the river with greater than 50% nest success occurring only in 1989 and 2008.

Table 4. Bald eagle nest productivity of the Middle Copper River segment, Wrangell-St. Elias National Park and Preserve, 1989-2008.

Year	Occupied Nests	Successful Nests	% Nest Success	No. of Young	Young/Occupied Nest	Young/Success Nest
1989	11	6	55	7	0.64	1.17
1990	30	4	13	6	0.20	1.50
1991	35	8	23	11	0.31	1.38
1992	32	13	41	18	0.56	1.38
1993	29	14	48	21	0.72	1.50
1994	30	8	27	11	0.37	1.38
1995	30	11	37	13	0.43	1.18
1996	35	9	26	14	0.40	1.56
1997	29	12	41	14	0.48	1.17
2004	23	4	17	5	0.22	1.25
2005	32	11	39	17	0.53	1.55
2006	38	10	26	15	0.39	1.50
2007	45	10	22	14	0.31	1.40
2008	40	20	53	32	0.84	1.60

Discussion

Nest success and productivity were quite variable among the survey segments, probably reflecting the availability of prey (salmon). The Middle Copper and Chitina River segments are fast-flowing, deep, and silt laden, probably reducing the availability of salmon. The highest productivity is found in the Upper Copper River segment, which is a clear, shallow stream, providing lots of opportunity to catch salmon. Nest trees are limited along this segment, which exceeds 900m in elevation. The majority of nest trees are small white spruce, and Copper and Tanada lakes are near treeline.

The Lower Copper and Bremner segments contain a considerable coastal influence, with abundant and larger nest trees, and large quantities of salmon so soon after they leave the ocean.

Sprunt et al. (1973) found that nesting territory success greater than 50% and minimum productivity of 0.70 young per occupied nest was required to maintain stable bald eagle populations. Overall nest success during 2008 in WRST was just below the minimum

level of 50%, while productivity was above the minimum required to maintain a stable population.

Annual bald eagle surveys have been conducted in the upper Tanana Valley, Game Management Unit (GMU) 12, by Tetlin National Wildlife Refuge personnel since 1991. This survey area borders the northeast boundary of WRST. Bald eagle nest success and productivity was 53.7% and 0.73 in 2006 and 36.1% and 0.42 in 2007, respectively. Results in 2006 were similar to those observed in WRST. Mean ($\pm$ SD) nest success and productivity was 51.8 ± 1.3 and 0.65 ± 0.19 , respectively, in the upper Tanana Valley from 1991 to 2007. Results are not yet available for 2008 and 2009. Bald eagle nest surveys are also conducted by the Bureau of Land Management along the Gulkana River, a tributary to the Copper River near the upper end of the Middle Copper River segment. Nest success and productivity for 17 nests was 71% and 0.82 during 2006.

In southwest Alaska, mean bald eagle nest success and productivity was 53% and 0.83 for the years 1992, 1997, 2002 and 2007 on Kodiak National Wildlife Refuge lands. Lake Clark National Park and Preserve reported average nest success and productivity of 54% and 0.78 for interior nests and 51% and 0.70 for coastal nests from 1992 to 2008.

Acknowledgements

Tom Betts and Jerry Lee provided effective and safe piloting and great company. Al Smith and Scott Miller were central to the development of an improved database.

Literature Cited

- Kozie K .D. 1991. Bald eagle inventory and monitoring plan: Wrangell-St. Elias National Park and Preserve, Copper Center, Alaska.
- Kozie, K. D. 1996. Bald eagle productivity for Wrangell-St. Elias National Park and Preserve, 1993-1996. Wrangell-St. Elias National Park and Preserve, Copper Center, Alaska.
- McIntyre, C. 2005. Summary of inventory and monitoring projects for nesting diurnal raptors in Alaska, 2005. Unpublished report, Denali National Park and Preserve, Alaska.
- Postupalsky, S. 1974. Raptor reproductive success: some problems with methods, criteria, and terminology. Raptor Research Report N. 2, pp 21-31.
- Sprunt, I. V. A., W. B. Robertson Jr., S. Postupalsky, R. J. Hensel, C.E. Knoder, and F. J. Ligas. 1973. Comparative productivity of six bald eagle populations. Transactions of the North American Wildlife and Natural Resource Conference 38:96-106.
- Steidl, R .J., K. D. Kozie, and R. G. Anthony. 1997. Reproductive success of bald eagles in interior Alaska. Journal of Wildlife Management 61:1313-1321.