

Terrestrial Animals

Protocol: Bald Eagle

Parks Where Protocol Will Be Implemented: ALAG, ANIA, KATM, KEFJ, LACL

Justification/Issues Being Addressed: Bald eagles (*Haliaeetus leucocephalus*) are keystone predators on avian (e.g., seabirds) and fish (e.g., salmon) populations and hence serve an important ecological role in freshwater and marine coastal systems in SWAN parks. Their occurrence and reproductive performance may be influenced by weather conditions, toxic contaminants, food availability, human-related impacts, and climate (Grim and Kallemeyn 1995). Bald eagles may not attempt to nest or their attempt may fail if breeding conditions are unsuitable during a given year. Thus, their nest occupancy and reproductive rates may be useful indicators of both current condition and long-term change (variability) of freshwater and marine coastal systems. KATM, KEFJ, and LACL all contain large breeding populations of bald eagles, and this species is specifically mentioned in enabling legislation for LACL. Bald eagle populations are under continuing threat from human-related impacts such as ecotourism, sport and commercial fishing, timber harvest, potential mining activities adjacent to the parks, and potential oil spills or other accidents along marine coastlines. Further, global climate change will have an unknown effect on their forage base and nesting habitat.

Specific Monitoring Questions and Objectives to be Addressed by the Protocol:

Questions:

- Are bald eagles successfully reproducing in SWAN parks?
- Are nest occupancy rates of bald eagles changing over time in SWAN parks?
- Does nest success differ between bald eagles nesting along interior rivers/lakes and those nesting along marine coastlines in SWAN parks?

Objective:

- Estimate long-term trends in nest occupancy and productivity from a random sample of bald eagles nesting along interior rivers/lakes and marine coastlines of SWAN parks.

Basic Approach: The USFWS currently performs periodic surveys of nesting bald eagles along the Pacific coast of the Alaska Peninsula. Frequency of surveys is dependent on funding. They employ a stratified random sampling design in which the coastline is partitioned into approximately 20.7 km² quadrats, which are stratified into low, medium, and high perceived densities of nesting eagles based on kilometers of shoreline with certain physical characteristics (e.g., exposed shoreline with strong tidal influences; Grier 1977, Grier et al. 1981, Hodges et al. 1984). Three surveyed quadrats occur along the coastline of KATM and 1.5 quadrats fall within ANIA coastline boundaries. An aerial survey using fixed-wing aircraft is performed during maximum nest occupancy in late April-early May. A pilot/observer and second observer search for active nests and record locations and nest contents of detected nests. Steps should be taken to ensure these observations are independent with observers conferring shortly after each nest detection to determine whether either or both detected the nest. When funding is available, a second flight is conducted in July to revisit detected nests to estimate nest productivity. KATM has previously conducted aerial surveys for nesting bald eagles in the Naknek drainage when personnel and funding were available.

LACL conducts a minimum of two aerial surveys every year of bald eagle nests known to be active during the previous 2-3 yr in each of three subareas: (i) marine coastline and shorelines of associated lakes and rivers (“Coast”); (ii) shorelines of Lake Clark and associated rivers (“Lake Clark”); and (iii) shorelines of major lakes and rivers north of Lake Clark (“Interior”). In addition, all potential nesting habitats are intensively searched for new nests in the Coast and Lake Clark subareas in alternate years, with the Interior

subarea intensively searched with one of the other subareas during the third year. Nests are surveyed for initial occupancy during May, and active nests are revisited to estimate productivity during July.

KEFJ has previously conducted boat- and ground-based surveys of nesting bald eagles during spring and summer to estimate occupancy and productivity. Frequency of surveys is dependent on funding.

SWAN will adopt the USFWS protocol to annually survey interior lakes and rivers via fixed-wing aircraft in KATM. Existing surveyed quadrats along ANIA and KATM coastlines will be supplemented with additional randomly chosen quadrats. The USFWS protocol will be implemented in KEFJ except surveys will be helicopter-based to increase nest detections and observer safety. Depending on availability of a trained observer, pilot/observer, and plane, SWAN could supplement existing LACL surveys by conducting intensive nest searches in subareas not intensively searched by LACL staff during a given year.

Principal Investigators and NPS Lead:

- Susan Savage, USFWS-Alaska Peninsula/Becharof NWR
- Judy Putera, NPS-LACL
- Mike Tetreau, NPS-KEFJ
- Bill Thompson, NPS-SWAN (NPS Lead)

Development Schedule, Budget, and Expected Interim Products: USFWS has a well-established protocol for surveying nesting bald eagles. However, availability bias is not addressed under the current protocol. Because of the large effort and expense associated with radiomarking and tracking bald eagles, an evaluation of availability bias of nests in forested habitats would most likely be addressed in partnership with any future research projects studying radiomarked eagles in SWAN parks.

2008 Draft SOPs (\$ to be determined).

2009 Test protocols and augment existing monitoring sites (\$ to be determined).

2010 Implement protocol (\$ to be determined).

Literature Cited:

- Grier, J. W. 1977. Quadrat sampling of a nesting population of bald eagles. *Journal of Wildlife Management* **41**:438-443.
- Grier, J. W., J. M. Gerrard, G. D. Hamilton, and P. A. Gray. 1981. Aerial-visibility bias and survey techniques for nesting bald eagles in northwestern Ontario. *Journal of Wildlife Management* **45**:83-92.
- Grim, L. H., and L. W. Kallemeyn. 1995. Reproduction and distribution of bald eagles in Voyageurs National Park, Minnesota, 1973-1993. U.S. Department of Interior, National Biological Service, Biological Science Report 1, Washington, D.C.
- Hodges, J. I., J. G. King, and R. Davies. 1984. Bald eagle breeding population survey of coastal British Columbia. *Journal of Wildlife Management* **48**:993-998.