

Monitoring Bald Eagle Nest Occupancy & Productivity Across SWAN Parks



Background

Bald eagles (*Haliaeetus leucocephalus*) are keystone predators of seabirds and fish in marine and freshwater ecosystems of parks in the Southwest Alaska Network (SWAN). Threats include exposure to environmental contaminants, increased human visitation, lead ingestion and incidental trapping take of wintering birds, altered food supply due to harvest of salmon and other fish, and potential climate change effects^{1, 2}.



From left: Large bald eagle chick in a cottonwood nest in Kenai Fjords National Park (Leslie Witter, NPS-SWAN), adult in incubating posture on a spruce nest in Lake Clark National Park & Preserve (Ginger Irvine, NPS-LACL), adult on a ground nest in Kenai Fjords (Laura Phillips, NPS-KEFJ).

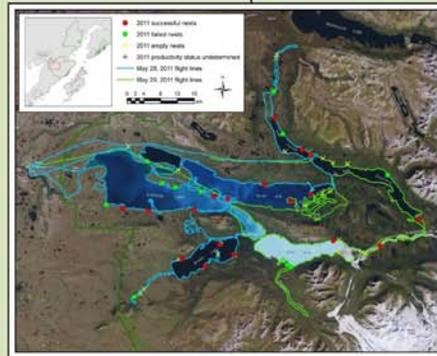
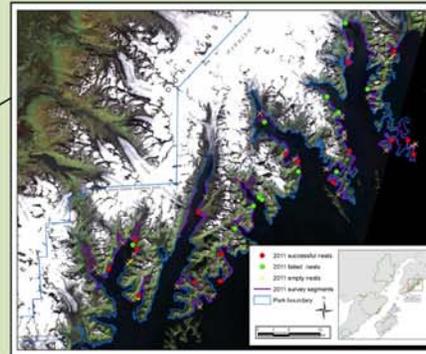
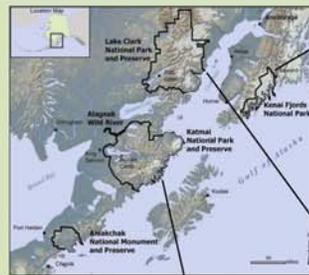
Objective

Bald eagles are indicators of numerous environmental conditions that affect other species, and have been selected as a "vital sign" for monitoring in SWAN. The objective is to develop a survey design for long-term monitoring that will standardize data collection and facilitate comparison of eagle nest occupancy and productivity between Katmai National Park & Preserve (KATM), Kenai Fjords National Park (KEFJ), and Lake Clark National Park & Preserve (LACL).

Progress

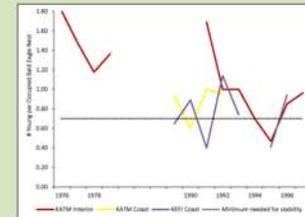
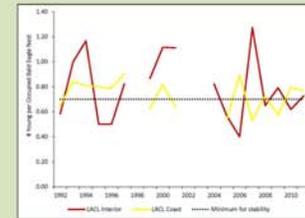
In 2009, KEFJ field tested a protocol based on dual-frame sampling with a double-observer component to correct for biases in nest sightability. An initial survey of all potential nesting habitat was completed. Thereafter, randomly selected segments of coast and shoreline were selected to be surveyed on an annual/semi-annual basis. Nest occupancy and productivity within these segments will be used to extrapolate parkwide trends. After a lapse of 20 yrs, eagle surveys were reinitiated in KATM in spring 2011 based on the KEFJ methods. LACL has monitored eagle productivity for the past 20 yrs; however, current methodology does not provide a systematic sample of eagle habitat or incorporate an estimate of nest sightability. LACL plans to modify survey methodology in 2012 to facilitate comparison with KATM and KEFJ data, while also maintaining continuity with long-term data on known eagle nests.

Study Area & 2011 Nests



Status & Trends

Aerial occupancy and productivity surveys were completed in all 3 parks in 2011. We located 83 nests in LACL; 63% were occupied. Coastal nests had lower success, but higher productivity (42% success; 0.77 ± 0.19 SE chicks per occupied nest) than interior nests (55%; 0.73 ± 0.16). In KEFJ, 47% of the 63 nests monitored were occupied; of these, 60% were successful with 0.83 ± 0.14 SE chicks per occupied nest. In KATM, we found 58 nests in the Naknek drainage; 57% were occupied. Nest success was 62% with 0.90 ± 0.15 SE chicks per occupied nest. Productivity metrics were indicative of stable populations in KATM and KEFJ; numbers in LACL were marginal.



Historic bald eagle productivity data from LACL (top), and KATM and KEFJ (bottom).

Discussion

Indications are that bald eagle populations within SWAN meet minimum productivity metrics required for stability; however, productivity rates exhibit considerable annual variability. Regular surveys of breeding eagles are critical to monitoring the health of this indicator species. Efforts should also be put forth to understand factors affecting variations in productivity so we will be better placed to understand causes if productivity declines in the future. Changes in bald eagle nest success over time may indicate attention needs to be paid to natural or human-caused changes occurring within SWAN ecosystems.



Adult bald eagle in Katmai National Park & Preserve (Bill O'Neill, NPS-SWAN).



Adult bald eagle in Katmai National Park & Preserve (Bill O'Neill, NPS-SWAN).