# Bald Eagle Survey Methods

## Importance

All three Southwest Alaska Network (SWAN) park units support large populations of bald eagles. Bald eagles were once listed as an endangered species in the contiguous 48 states due to human-caused declines. Populations have since recovered, and bald eagles were delisted in 2007. As top predators, bald eagles can serve as indicators of the overall health of local ecosystems. Their breeding success is influenced by food availability and spring weather conditions. Understanding the status and trends of local populations can assist managers in addressing future questions on the impacts of visitor access or other human caused disturbances, such as oil spills.

**NPS photo/K. Chritz**

## Findings

Bald eagle nest monitoring continues to improve at SWAN parks. In 2014, ecologists discovered a key weakness of the bald eagle monitoring protocol that could lead to biased estimates of bald eagle nest occupancy in parks. The bias arises when the true status of a nest (initiated or empty) is ambiguous during observational nest surveys. For example, in a single survey, it is impossible to know if an empty nest is truly empty, or if the eagles are not in the nest during the survey. Two surveys can be used to correct any bias from this ambiguous status.

This bias is shown for the 2014 surveys in Lake Clark National Park and Preserve (see figure). Bald eagle populations are considered to be stable if nest initiation rates are greater than 0.5. The results from one survey is shown by the green circle. The curved line demonstrates what the bias-corrected results look like when two nest surveys are completed. From this figure, it is clear that one nest survey does not result in the most accurate information on eagle nests.

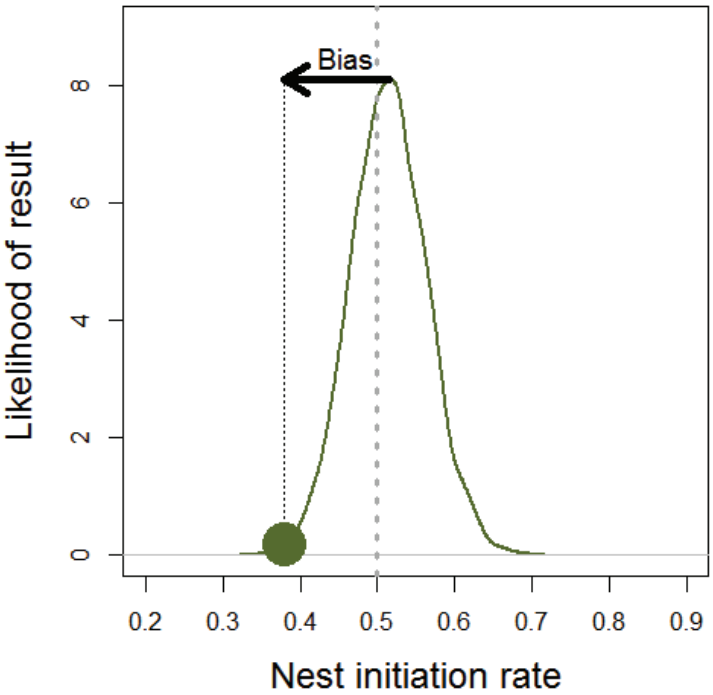


**Figure of the bias-corrected (curve) and apparent (green circle) bald eagle nest initiation rates at Lake Clark National Park and Preserve.**

Results of our recent analyses confirm that a negative bias in nest initiation rates is present in most cases. Biased estimates can be problematic for wildlife managers because they could lead to incorrect management actions. To correct for bias in nest monitoring, it is recommended that parks conduct two occupancy surveys during the nest initiation period in May.

## Status

Bald eagle nest productivity in Katmai National Park and Preserve (NPP), Kenai Fjords National Park (NP), and Lake Clark National Park and Preserve (NPP) are shown in the table below. SWAN's new double occupancy survey model improves how productivity data are analyzed.

| Park | Year | Productivity | Lower 95% confidence interval | Upper 95% confidence interval |
|---|---|---|---|---|
| **Katmai NPP** | **2015** | **1.04** | **0.68** | **1.46** |
| **Kenai Fjords NP** | **2014** | **0.90** | **0.64** | **1.23** |
| **Kenai Fjords NP** | **2015** | **0.77** | **0.53** | **1.05** |
| **Lake Clark NPP** | **2013** | **0.67** | **0.46** | **0.88** |
| Lake Clark NPP | 2014 | 0.92 | 0.69 | 1.19 |

**NPS photo/P. Calamari**

## Discussion

Ecologists at SWAN and SWAN parks are finalizing the official monitoring plan and standard operating procedures. These protocols feature important advancements in data collection and analysis. Look for it on IRMA prior to the onset of field sampling in May.

Bald eagles often have more than one nest in their territories. A recent study by Watts (2015) analyzed the value of protecting alternate nests from both a biological and economic perspective. The study found that alternate nests have a 70% chance of surviving to the next year, compared to 90% of primary nests. Further, the probability that a nest or nest tree would be reused or rebuilt (if lost) by the resident pair declined with the amount of time since the last nest was used. This decline in probability of nest reuse meant that the cost-to-benefit ratio of protecting alternate nests does not extend beyond three years post-abandonment.

Watts, B.D. 2015. Estimating the residual value of alternate bald eagle nests: implications for nest protection standards. The Journal of Wildlife Management 79:776-784.

**For more information:**

Contact Tammy Wilson, tammy_wilson@nps.gov

Wildlife web site at http://science.nature.nps.gov/im/units/swan/monitor/wildlife.cfm

**March 2016**

Brief created by: Erin Kunisch
www.nps.gov/rlc/oceanalaska/index.htm