



Bald Eagle Nest Dynamics

Bald eagles, though abundant in Southwest Alaska, can still be subjected to various stressors, such as environmental contaminants and human disturbance. Stressors can potentially cause changes in behavior, spatial use patterns, and population status in Bald Eagles. Population trends and changes in species persistence can often be difficult to evaluate since many factors, such as contaminants, disturbance, and density dependence, interact to create trends that are stable, cyclical, or random. Thus, long-term monitoring is an important component of management plans for parks in the Southwest Alaska Inventory & Monitoring Network. Katmai National Park & Preserve, Kenai Fjords National Park, and Lake Clark National Park & Preserve all aim to have effective long-term monitoring programs that can help them to better understand these complex population trends that may occur within the parks.

Understanding Bald Eagle Populations in Lake Clark National Park & Preserve

To better understand the dynamics of nesting Bald Eagles, scientists at the Southwest Alaska Inventory and Monitoring Network and Lake Clark National Park & Preserve examined a 23-year dataset of information collected on Bald Eagle nests in the park. They hoped to shed light on whether variations in the population were due to environmental conditions or food availability, and whether there is a trend in the population status through time. Occupancy of nests and reproductive metrics were analyzed, as well as environmental factors (April minimum temperature and total precipitation in May) and food availability (salmon escapement). Surveys for Bald Eagles are performed twice annually from a small, fixed-wing aircraft. Figure 1 shows the states into which nests are classified. During a May survey, nests are identified as either unoccupied or occupied, based on whether there are eggs or an incubating adult present in the nest. During a July survey, occupied nests are evaluated for success, by identifying one or more live eaglets in the nest.

Weather data were obtained from the National Oceanic and Atmospheric Administration National Climatic Data Center (now National Centers for Environmental Information). Salmon escapement data were obtained through counts from the Kvichak River.

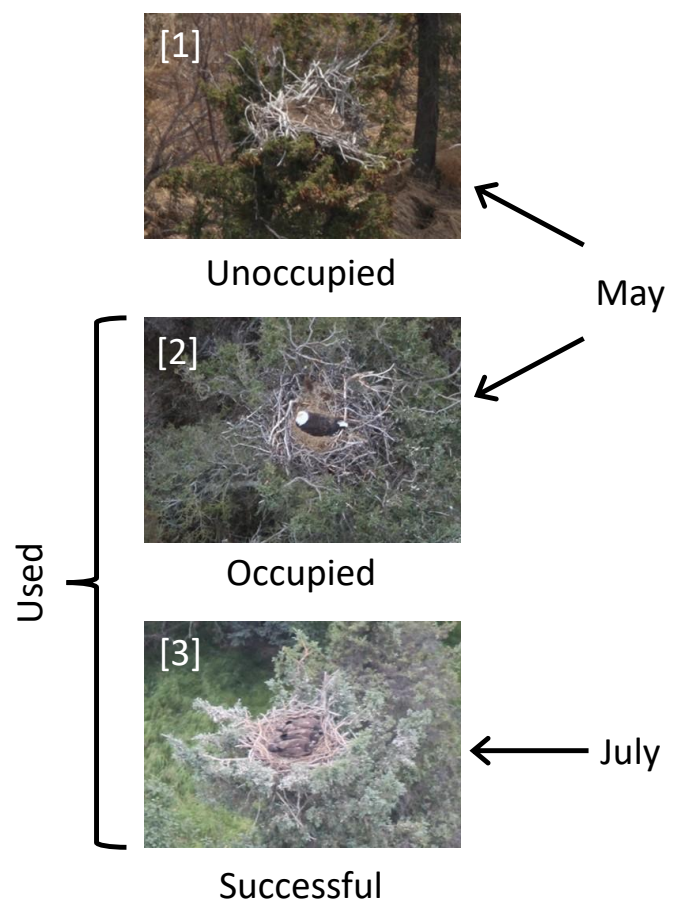


Figure 1. The three possible states for each observed nest. Nests were determined to be occupied or unoccupied during a May survey, by the presence of eggs or incubating adults. In July, nests were classified as successful by the presence of live eaglets.



After analyzing the data, scientists found stability in the Bald Eagle population in Lake Clark National Park & Preserve. Figures 2 and 3 illustrate the stable dynamics of Bald Eagles in the system. Nests are most likely to remain in the same nesting state from year to year, and no trends were detected through time in the proportion of Bald Eagle nests that were considered used. Environmental factors and food availability were not found to affect the probability of nests transitioning between successful and unsuccessful states. Reproduction was shown to be stable throughout the long-term dataset, but warmer minimum temperatures in April were found to correlate with increased chick production.

Implications

The 23 years of data, collected from a relatively undisturbed and stable system, can provide a valuable reference point for other North American Bald Eagle populations, including those in other parks in the Southwest Alaska Inventory & Monitoring Network as well as populations that may experience higher levels of disturbance and are still working toward recovery. Additionally, these findings will be useful as a baseline to assess populations in the case of a large-scale disturbance in Southwest Alaska.

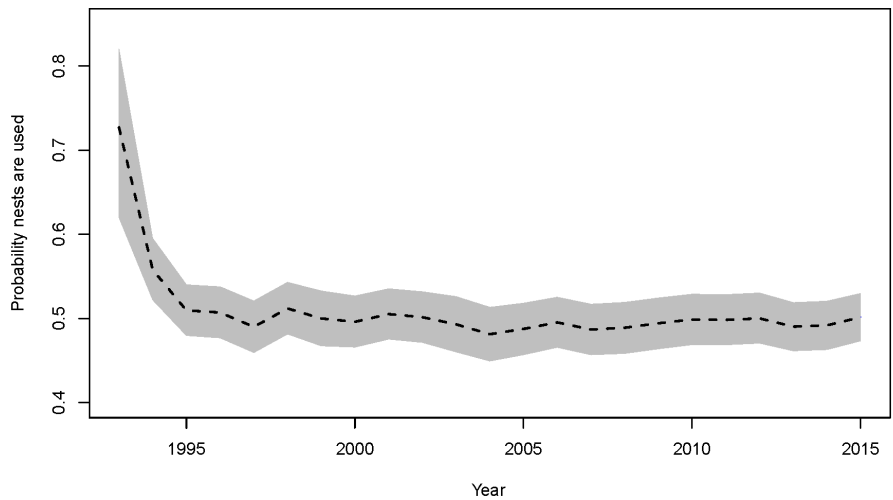


Figure 2. The probability that nests are used (used is defined by the combination of the occupied and successful states) in Lake Clark National Park & Preserve.

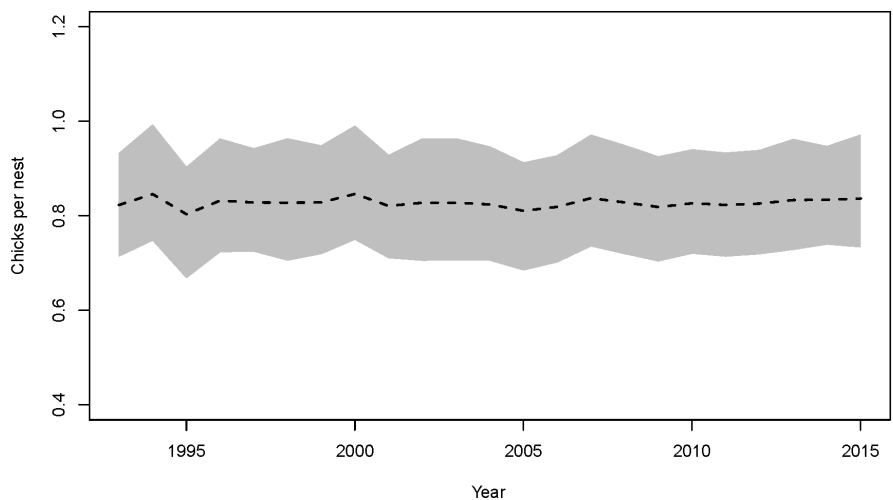


Figure 3. Temperature-adjusted mean and 95% credible intervals of the number of Bald Eagle chicks produced annually, per nest in Lake Clark National Park & Preserve. The mean is represented by the dashed line and the credible intervals are represented by the gray shaded area.

Reference

Wilson, et al. (in press). Nest use dynamics of an undisturbed population of bald eagles in Lake Clark National Park and Preserve, Alaska.

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