Collection of Food Habits Data of Bald Eagles to be Released on the Northern Channel Islands

A Report to the Science Review Panel for the Northern Channel Islands Bald Eagle Feasibility Study

Stanley N. Wiemeyer
U.S. Fish and Wildlife Service
Nevada Fish and Wildlife Office
1340 Financial Blvd., Ste. 234
Reno, Nevada 89502-7147

Introduction

The reintroduction of bald eagles to the Northern Channel Islands off of the coast of southern California has been proposed. Past reintroduction efforts on Santa Catalina Island to the south of this area have had only limited success because reproductive attempts have been unsuccessful, leading to intensive human intervention to maintain the small population (Garcelon 1994). The lack of reproductive success has been due to highly elevated concentrations of DDE in bald eagle eggs, with abnormal eggshells. Modeling of DDE exposure to bald eagles on Santa Catalina Island indicated that the majority of the contaminant dose originated from consumption of marine mammals, principally sea lions (Valoppi et al. 2000). Lesser levels of exposure were from consumption of seabirds, whereas DDE from fish was considered to be only a minor and insignificant component of the overall exposure. However, a diet of only fish might result in DDE residues in eggs that could approach a concentration associated with limited reproductive impairment. Similar foods with similar DDE concentrations as found at Santa Catalina are expected to be consumed by bald eagles that are proposed to be reintroduced to the Northern Channel Islands. The risk assessment for the reintroduction of bald eagles to the Northern Channel Islands indicated that the effort will not likely establish a sustainable population without human intervention due to the elevated levels of exposure to DDE in their projected diet (Valoppi et al. 2000). Recommendations are provided here for food habits studies on bald eagles to be released on the Northern Channel Islands and for methods that may be used to obtain that information.

Radio Telemetry

Radio telemetry has proved to be a useful method for the tracking of bald eagles in other studies. Conventional radio telemetry was used to track bald eagles on Santa Catalina Island (Sharpe and Garcelon 2000). Radio tracking data can be used to determine movement patterns and thereby may provide information on locations commonly used by individual bald eagles. Information on repeated use of sites (e.g., during early morning and late afternoon/evening when the majority of feeding may occur) in some cases may indicate preferred feeding locations. Emphasis on field observations at such sites then may yield valuable information on feeding

activities and types and relative biomass of foods consumed.

Advantages and disadvantages are present for different types of radio telemetry. For example, although conventional radio telemetry may yield valuable information on bald eagle activities, including feeding sites, it is labor intensive and birds are found only when and where one is looking for them. Conventional telemetry may yield highly variable results regarding precision in locating birds, with the best results being obtained with the sighting of the individual. Conventional transmitters may last up to 2 years. Solar satellite telemetry, on the other hand, may provide information over the entire range of the bird throughout a 24 hour period and for extended periods (i.e., transmitters reasonably expected to last 5 years). Precision of location data from satellite transmitters may vary, with the best data providing locations within 150 meters of the actual location of the bird. Solar satellite packs are more expensive than conventional packs and costs are incurred for obtaining the continuous data. Overall, telemetry would assist in obtaining information on feeding areas and would enable closer and more frequent observation of feeding activities. Data on movements and behavior of individual bald eagles might also be useful in trapping attempts for the collection of blood and feathers for contaminant and isotope analysis.

It is recommended that both conventional and solar satellite telemetry packs be placed on all bald eagles released on the Northern Channel Islands. Data from solar satellite packs should be used to obtain data on overall movements. Follow up information should then be obtained using conventional telemetry to follow birds during times and in areas of interest for better defining feeding locations.

Observational Data

Observations of feeding bald eagles at Santa Catalina Island have been used to determine food types, including species, consumed (Garcelon 2000; Sharpe and Garcelon 2000). Similar data should be obtained for bald eagles that are to be released at the Northern Channel Islands. Information from radio telemetry should be used to determine areas frequently used, especially during periods of the day when bald eagles commonly forage. Blinds should then be placed at locations of interest (e.g., where bald eagles go frequently to feed) for detailed observations of foraging and consumption of foods. Information obtained should include, to the extent possible, food type (i.e., fish, bird, mammal), species, and estimates as to the size of the food item or quantity consumed. Information on food habits, ideally, should be collected over an extended period (i.e., 3 to 5 years) because food preferences may shift with the age of the bird. For example, adult bald eagles are apt to capture more live prey than juveniles (Todd et al. 1982; Harmata 1984). Data collected should also provide information on potential seasonal changes in the diet.

Past data has demonstrated the importance of marine mammals in the overall risk from exposure to DDE (Valoppi et al. 2000). Use of this food source by bald eagles may be a relatively rare event in relation to consumption of other food sources. Because of the

importance of this food source in the risk assessment, surveys of beaches on the islands where bald eagles are released should be conducted to determine the availability of beached marine mammals, especially sea lions, that may be consumed by bald eagles. Surveys should collect data on location, species, and number of beached (i.e., dead) marine mammals. Surveys should be conducted at least quarterly and as frequently as monthly, if possible. The determination of the location of such items would also enable the collection of tissue samples for residue analysis. When beached marine mammals occur in areas of frequent use by bald eagles, remote video cameras should be used to monitor the sites, an approach that has been used in other bald eagle studies (Howald et al. 1999). Reviews of the video tapes should be conducted to estimate the frequency of use and quantity of tissue consumed by bald eagles. Information on the locations of beached marine mammals could also be used in carcass removal operations if use by bald eagles is deemed excessive and is contributing to excessive risk of DDE exposure.

Supplemental Data

Bald eagles may repeatedly use the same perch or roost site. These sites should be visited during periods when bald eagles are absent and searched for food remains. Food remains, including castings, should be collected for identification of the type and species of food item consumed. Fresh remains may also be suitable for stable isotope and contaminant analyses. These data, especially for perch sites that may be under observation, may yield species-specific data that cannot be easily obtained from observations alone.

Summary and Conclusions

Information on food habits of bald eagles that are released on the Northern Channel Islands is important in predicting risks from DDE exposure and the prediction of future reproductive outcomes. Information on bald eagle movements and behavior from both solar satellite and conventional radio telemetry should be used to provide information on preferred feeding areas. Follow up observational data should provide critically needed information on feeding habits with regard to the relative use of major food types in the diet (i.e., fish, birds, marine mammals). This information should be supplemented with the collection and identification of food remains at perches and roost sites. These data should be used to determine those food types and species that should be collected for residue analysis. Efforts should be made to determine the relative biomass of each food type for proper weighting of the contribution of the group in the risk assessment. Plans for these studies should not be rigid, but rather be adaptable in response to early experiences and study findings, as well as to ongoing data needs.

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