

HABITAT REQUIREMENTS OF THE MADAGASCAR FISH-EAGLE

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Madagascar fish-eagle (*Haliaeetus vociferoides*) populations have declined dramatically in recent decades as a result of habitat loss and human persecution. Fish-eagle habitat requirements were investigated to help determine what management action should be taken to prevent the eagle's extinction. Characteristics of fish-eagle nesting habitat were examined from May to August 1994 in a 3000 km² area of lakes, rivers, and wetlands in the Antsalova region of Western Madagascar. Habitat variables were measured at sites used by eagles and compared with values measured at random sites within the same area. Comparisons were made at the following levels: nest and perch trees, nest sites, shoreline habitat, and aquatic habitat. Logistic regression was used to identify the variables that best distinguish habitat used by eagles and to develop a predictive model for suitable fish-eagle habitat. The model will be used to locate other areas of suitable fish-eagle habitat and to survey these areas for eagle use. The results of this study will help to determine the extent to which the fish-eagle is limited by habitat availability and whether there are areas of unoccupied habitat where the species could be reintroduced.

ANTICUCKOLDRY BEHAVIOR IN THE WESTERN BURROWING OWL (*SPEOTYTO CUNICULARIA HYPUGAEA*)

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Even though burrowing owls (*Speotyto cunicularia*) are monogamous within a breeding season, their large clutch sizes provide a lengthy fertile period over which extra-pair copulations could take place. Burrowing owls also frequently nest in loose colonies, a situation which makes encounters with conspecifics more likely. If male burrowing owls guarded their mates wherever they went, however, they could risk losing their burrows since burrow takeovers are common. We, thus, expected to observe mate guarding behaviors at burrows prior to clutch initiation. For 8 wk following the spring arrival of females into our study area in 1993 and 1994, we recorded the following behaviors that may be involved in paternity assurance: copulations, allopreening and male primary calls. The duration of time that the male and female spent at the burrow entrance alone and together was also recorded along with nearest neighbor distances. Copulations oc-

curred in all weeks but were most frequent during week five of the observation period. The duration of time that the pair spent together at the burrow entrance was high during weeks 1-5 and declined thereafter. The duration of time that the female was left alone at the burrow entrance was low initially and peaked during weeks 6-8. The frequency of copulations and male primary calls were not significantly correlated with nearest neighbor distance. The frequency of allopreening was low during weeks 1-5 but increased sharply during weeks 6-8, after the peak in copulations. A peak in copulations during week 5 and the amount of time in which the female was left alone suggest anticuckoldry behavior by male burrowing owls. Allopreening and the lack of a correlation between copulations and primary calls with nearest neighbor distance, however, do not. Further observations are necessary in order to further confirm anticuckoldry behavior by male burrowing owls.

FACTORS CONTROLLING BALD EAGLE REPRODUCTION IN THE GREAT LAKES REGION

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The bald eagle (*Haliaeetus leucocephalus*) population, within and adjacent to the Great Lakes Basin, constitutes the greatest single population within the contiguous United States. Bald eagles were largely extirpated from the Great Lakes by the mid-1960s, due to the effects of DDE. Eagles began to repopulate and raise young again along the shores of the Great Lakes, with the exception of Lake Ontario, by the 1980s. Factors limiting bald eagle populations in this region were studied. We compared and contrasted nesting eagles from 10 subpopulations including six interior and four Great Lakes, in a region from northern Minnesota though the north shore of Lake Erie in Ohio for the period 1977-93. Ecological factors investigated included food habits, nest tree use, winter habitat use, and the identification of potential nesting habitat. Bald eagles primarily foraged on fish (suckers, bullheads, northern pike, carp, and freshwater drum). Eagle nests were built primarily in white pines, but in cottonwoods near Lake Erie. Potential nesting habitat exists along the shorelines of all Great Lakes, primarily along Lakes Huron and Superior. Habitat availability, however, may limit the Lake Erie subpopulation, which has little unoccupied habitat and great density of nesting eagles. Toxicological aspects investigated included monitoring concentrations of PCBs and p,p'-DDE in plasma, mercury and selenium in feathers. Concentrations of p,p'-DDE or PCBs, but not mercury or selenium, were significantly, and inversely correlated with regional reproductive productivity and success rates. Reproductive productivity of bald eagles within this population is primarily regulated by concentrations of or-



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