

## THESIS ABSTRACTS

### COMMUNITY STRUCTURE, NICHE OVERLAP AND CONSERVATION ECOLOGY OF TEMPERATE FOREST RAPTORS DURING THE BREEDING SEASON

Previous studies of raptor communities have focused only on a few species or only on a single niche dimension. Thus, only tentative conclusions can be drawn about factors affecting community structure and conservation of forest raptors. I conducted habitat and food studies of raptors during the breeding season in northern New Jersey. I used a systematic survey designed to characterize the whole breeding raptor community within a 16 100 ha intensive study area. Vocalizations of 11 possible species were broadcast during four visits to 81 calling stations. Macrohabitat variables of the calling station were evaluated from aerial photographs and topographic maps. Separate studies of micro- and macrohabitat of three sympatric forest owls and nesting habitat of two species of *Accipiter* hawks were also conducted for comparison.

The broadcast technique resulted in 106 detections of raptors of nine species. Hawks responded more to heterospecific broadcasts than did owls which correlated with the greater species packing of the hawk guild. Owls overlapped more with hawks, and vice versa, thereby seeming to display temporal niche "complementarity." Principal components analysis (PCA) of macrohabitat was used to calculate overlap values and showed the ordination of each species along PCA gradients. Overlap in macrohabitat was not different between synchronous raptors and asynchronous raptors (diurnal vs. nocturnal). Several species were characterized as area-sensitive, and species richness of raptors was positively correlated with wilderness area. Of six major food groups, mammals and birds were the only two groups taken as food by all nine raptors, and combined represented the majority of all diets. Community food overlap (0.357) was considerably lower than community macrohabitat overlap (0.600), but asynchronous raptors had higher overlaps in food suggesting that temporal partitioning does not prevent exploitative competition between hawks and owls. Complementarity of macrohabitat and food overlaps resulted in niche overdispersion for nearly all synchronous raptors, but asynchronous raptors lacked similar uniformity for overlaps. A more detailed study of nesting habitat and food of two sympatric *Accipiter* hawks also revealed niche overdispersion along food (0.470) and habitat (0.538) dimensions. Overall, there were several results which showed evidence of competition in structuring the raptor community. **Thomas Bosakowski. 1990. Ph.D. thesis, Department of Biological Sciences, Rutgers University, Newark, NJ 07102.**

### THE COMMUNAL NIGHT ROOSTING OF WINTERING BALD EAGLES IN WEST-CENTRAL ILLINOIS

The night roosting of Bald Eagles (*Haliaeetus leucocephalus*) was investigated during the winters of 1979-1980 and 1980-1981. The objectives of the study were: 1) to determine Bald Eagle population size, age composition, and eagle use of 2 communal night roosts, 2) to determine the environmental factors that affect the use of night roosts, and 3) to conduct a vegetative analysis of the roost trees.

During the 2 field seasons, there were 1311 sightings of Bald Eagles using the night roosts in the Cedar Glen study area. The Floodplain-Island night roost was used by 67.2% of the eagles while 32.8% used the Cedar Glen night roost. A greater than expected percentage of immature eagles (80.9%) used the Floodplain-Island night roost while a greater than expected percentage of adults (40.5%) roosted in the Cedar Glen night roost. A slight increase in the number of eagles using the Cedar Glen night roost was observed when winds affected the protected value of the Floodplain-Island night roost. No other environmental factors seemed to influence roost use.

Over the 2 study seasons, eagles left the Cedar Glen night roost from 36 minutes before to more than 40 minutes after sunrise. The mean exit time was 11 minutes before sunrise.

The only tree species in the Floodplain-Island night roost that was used was Cottonwood (*Populus deltoides*). No significant difference in mean height was observed between the cottonwood trees used as perches (35.48 m) and the cottonwood trees not used (34.36 m). In the Cedar Glen night roost, no significant differences were found when comparing the mean heights of the trees species used as perches with the mean heights of samples of those same species of trees measured on transect lines. Therefore, something in addition to height must enter into the selection of night roosting perches. This other factor is thought to be the ease with which an eagle is able to fly to and from a particular perch site. Eagles select those perches which are easily accessible, not necessarily those which are the highest.

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