

HABITAT ASSOCIATIONS OF BIRDS AND HERPETOFAUNA IN SOUTHEASTERN ARIZONA

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Introduction

The mountains of southeastern Arizona support a large diversity of vegetative plant communities ranging from grassland and desert scrub to spruce-fir forests. These vegetation types provide appropriate conditions for a number of species of vertebrates. Although vertebrates have been the subject of numerous studies in this region, most studies were restricted to one species, one mountain range, or one season. This limited scale of observation precludes generalizations of habitat associations between species and their environments.

In 1991, we initiated a research project to evaluate habitat associations of birds and herpetofauna on the insular mountains of southeastern Arizona. This project is scheduled to continue through 1995. Our overall goal is to inventory three classes of vertebrates and their habitats, and to establish a sampling system to be used as a template for a long-term monitoring program to assess the effects of natural and anthropogenic impacts on vertebrate populations.

Specific objectives of the research are to: (1) determine distributions and abundances of birds; (2) evaluate macro- and microhabitat associations of birds; (3) determine patterns of resource use by a subset of neotropical migrant birds; (4) determine distributions and abundances of reptiles and amphibians inhabiting riparian environments; and (5) describe microhabitats of reptiles and amphibians in riparian areas.

We are using the point-count method to sample bird abundances; 250 counting stations have been established among the mountain ranges. Additional stations will be established in 1992. Counting stations sample oak (*Quercus* spp.), oak-juniper (*Juniperus* spp.), pine (*Pinus* spp.)-juniper, and pine-oak woodlands, and mixed-conifer forests. Observers record all birds detected within a fixed 5-min period at each station. Points are sampled three times each season to account for temporal variations in bird detectabilities.

Physiognomic and vegetative variables are measured within four 0.1-ha circular plots to characterize the habitat. Bird numbers will be correlated to these habitat variables to assess detailed habitat associations.

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We are collecting data pertaining to foraging and nest sites of warblers and tanagers to assess aspects of resource use on a finer scale. These data will detail species, size, shape, and vigor of specific trees and substrates used for foraging and nesting.

Time-constraint sampling is being used to assess the distribution and abundance of reptile and amphibian populations. All sampling is being done in riparian habitats and along drainages. This method entails two people searching on, under, and in all possible substrates where an amphibian or reptile might be found for a fixed period of 4 person-hours. Once an animal is located, search time is temporarily suspended while the animal is captured, measured, and released, and information is recorded pertaining to the habitat within a 2.5-m radius of where the animal was found.

Our results are preliminary, representing data from the first year of a study that is scheduled to last five years. We feel that five years is the minimum duration needed to incorporate temporal variations in abundances, distributions, and habitat use. Failure to account for such environmental variations may result in incomplete or misleading information.

Conclusions and further research

Observers detected 117 avian species during point counts. Of these species, 78 were detected on the Chiricahuas, 69 on the Huachucas, 52 on the Pinalenos, 71 on the Santa Catalinas, and 76 on the Santa Ritas. Counting stations on the Pinalenos were restricted to one vegetation type (oak-juniper woodland), which accounts for the relatively low number of species detected there; multiple vegetation types were sampled on the other mountain ranges. We will enlarge our sampling efforts to include more vegetation types on the Pinalenos in 1992.

The species detected across all mountain ranges included 59 resident species that occur year-round and 58 species of neotropical migrant birds, most of which breed in these mountains but winter in tropical environments of Mexico and Central and South America. Neotropical migrant birds are of particular concern because of recent evidence that suggests precipitous population declines of some species throughout North America.

Observers conducted a total of 48 time-constraint searches on the Chiricahua, Huachuca, Santa Rita, and Santa Catalina mountains during July, August, and September 1991. They captured 444 individuals representing 23 species of herpetofauna, with 10 to 13 species represented on each mountain range. Lizards were captured more frequently than any other taxon, with *Sceloporus jarrovi* being captured most frequently. Other lizards sampled

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included: *S. clarkii*, *S. scalaris*, *S. virgatus*, *S. undulatus*, *Holbrookia maculata*, *Urosaurus ornatus*, *Elgaria kingii*, *Phrynosoma douglassi*, *Cnemidophorus sonora*, and *C. exsanguis*. Seven species of snakes were sampled: *Lampropeltis pyromelana*, *Masticophis lateralis*, *Thamnophis cyrtopsis*, *Crotalus lepidus*, *C. molossus*, *C. viridis*, and *C. willardii*. Five amphibians were captured: *Ambystoma tigrinum*, *Bufo punctatus*, *Hyla arenicolor*, *H. eximia*, and *Rana castibellana*.

These results provide only a cursory example of the types of information we are collecting. Presently, it is premature to expand upon these data or to present specific habitat, foraging, and nest data until the study is completed. When completed, however, this study should provide important information for the management of wildlife in southeastern Arizona.

In a general sense, the data will help to define the biodiversity of the sky islands. Specifically, we will provide information on habitat associations of the birds and herpetofauna that we are studying. Habitat descriptions will range from general associations of these vertebrates with general vegetation types, to detailed descriptions of the habitat components for some species. Data from these detailed descriptions will be used in the development of predictive, quantitative habitat models. These models will be particularly important for assessments of habitat suitability and for predicting the effects of habitat change on these species. Further, our bird counts will provide bird abundance data for five years, and a firm basis for long-term population monitoring.