

## Birds, Reptiles, and Amphibians: The Long-term Biomonitoring Study at Bosque del Apache

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In recent years, much emphasis has been placed on the management of ecosystems and the biological diversity that inhabits them. This is especially true on National Trust lands, such as Bosque del Apache National Wildlife Refuge that is dedicated to protecting national game and non-game natural resources. Bosque del Apache (BDA) offers an opportunity to really understand the complex riparian ecosystems of the Rio Grande floodplain valley, where it still exists as a mosaic of microhabitats. Where the Rio historically meandered and flooded in and out of its present-day channel, it left behind distinct vegetation community types across its broad floodplain. Of particular importance to the BDA is the management and restoration of this natural habitat and wildlife species diversity into conditions similar to what was historically found in the landscape.

A long-term biomonitoring study is in effect at the refuge, which I am currently working on, to monitor avian, reptile, and amphibian populations in the various riparian community types, as well as document key vegetational characteristics which may influence wildlife use. Data we gather from this study is expected to provide base-line information to help evolve management plans to protect and improve the biological diversity that occurs in the refuge floodplain during the summer breeding season. This diversity includes plant assemblages; resident, short-distance migrant and neotropical migrant bird species; and reptile and amphibian species that reproduce and disperse throughout the summer and monsoon seasons. The riparian habitats included in the study are 1) mature cottonwood (*Populus fremontii*) forest, with a willow (*Salix sp.*) and salt cedar (*Tamarix chinensis*) understory; 2) brush dominated by

screwbean mesquite (*Prosopis pubescens*), salt cedar, willow, and Russian Olive (*Elaeagnus angustifloia*); 3) alkali sacaton (*Sporobolus airoides*) grassland, interspersed with screwbean mesquite, four-wing saltbush (*Atriplex canescens*), and wolfberry (*Lycium berlandieri*); 4) a restored riparian cottonwood and willow forest; and 5) a monoculture, salt cedar forest.

In each of the habitats, permanent avian point count transects and reptile/amphibian trap arrays are established. Each point count transect is surveyed six times each summer. All bird species and number of individuals seen or heard within a five-minute period are recorded. Reptile trap arrays, which consist of both pitfall and funnel traps, are opened for 10-nights each month, for four months. The captured individuals are identified to species, measured, and released. Vertebrate surveys have been conducted so far in the summers of 1995, 1996, and 1997. In 1997, we also measured the key vegetational and structural characteristics of each community type, which are considered important in determining habitat quality, such as live and dead plant material "patchiness" and canopy structural diversity.

The preliminary results that I've found show that each vegetation community type makes important contributions to the overall diversity of the floodplain valley. Of the 90 bird species that we recorded, 23 % of them were detected in only a single habitat type. These species may be considered specialist to certain habitat type. The brush and restored riparian forest contained the highest avian species richness, including the highest number of neotropical migrant bird species. The salt cedar and meadow transects yielded the lowest species richness. For the reptiles and amphibian, the restored riparian forest and meadow habitats

displayed the highest species richness and number of captures, while salt cedar had the lowest number of species. While all the habitats, including salt cedar and meadow, contributed unique species assemblages to the overall floodplain diversity, this data shows that the restored riparian forest seems to be an especially important habitat. It has some of the highest bird, reptile, amphibian, and plant species diversities, which coincide with the most complex horizontal and vertical canopy and ground litter structures.

The high wildlife species diversity detected during the summer months on the refuge are due to landscape diversity patterns.

They are also another good reason to visit Bosque del Apache NWR during the summer months. You can especially experience the species diversity we've encountered by hiking the Rio Viejo Trail, which takes you on a loop through the restored riparian forest. But don't forget the mosquito repellent!

Table 1- Selected components of avian, reptile, amphibian, and vegetation survey results conducted as part of the long-term biomonitoring study at BDANWR, along with the rank of each habitat component.

**Relative Habitat Value Highest→Lowest**

**Avian Results**

|                                    |       |    |    |    |    |
|------------------------------------|-------|----|----|----|----|
| Average Specie Richness            | BR    | RE | ME | CW | SC |
| Total Specie Richness              | BR    | RE | SC | CW | ME |
| No. of Unique Species              | BR/RE | ME | SC | CW |    |
| No. of Neotropical Migrant Species | BR/RE | SC | ME | CW |    |

**Reptiles & Amphibians Results**

|                                      |    |    |    |    |    |
|--------------------------------------|----|----|----|----|----|
| Total Specie Richness                | RE | ME | BR | CW | SC |
| No. of Captures per array, per night | RE | ME | BR | SC | CW |

**Vegetation Sampling Results**

|                                |    |    |    |    |    |
|--------------------------------|----|----|----|----|----|
| Canopy horizontal "patchiness" | SC | RE | BR | BC | ME |
| Canopy vertical structure      | RE | CW | SC | BR | ME |
| Tree Specie Diversity          | RE | CW | ME | BR | SC |

BR = Brush RE = Restored Forest CW = Cottonwood ME = Meadows SC = Salt Cedar