

Final Report

Impacts of off-road vehicle use on wildlife in the prairie ecosystems of Big
Cypress National Preserve

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Progress to Date

Up to this point most of the work that has been conducted on this project has focused on amphibians. Amphibians are thought to be important indicator species for determining the status of ecosystems (Alford and Richards 1999), and they are abundant and readily captured for study in south Florida. We have completed a landscape-scale survey of amphibians across the entire Big Cypress National Preserve. This survey documented the site occupancy of all amphibian species by habitat using the site occupancy estimation technique of (MacKenzie et al. 2002, MacKenzie et al. 2003). This method produces an estimate of site occupancy given that species are detected imperfectly (i.e. a species may not be detected at a site, even if it is present). Using this technique in the program PRESENCE we will be able to determine which environmental variables most affect detection probability and site occupancy of each species.

We are currently working on building an index of ORV use for each of our sites to use as a covariable in the site occupancy model. We will use the ORV trail map layer produced by the University of Georgia (Madden et al. 1999) to calculate a total density of trails within a 1 km diameter circle of each sampling point. This density of trails will serve as an index for comparison, and by comparing models (Burnham and Anderson 1998) with and without this index we should be able to determine whether ORV use is affecting the distribution of amphibians on a regional scale. We are also collecting data on the hydroperiod of each site to include hydrology in the model. This will allow us to improve our site occupancy estimate and to make a distinction between hydrology and habitat, allowing us to better understand the effect hydrology has on species distributions without habitat as a confounding factor.

The use of PVC pipes to capture treefrogs will continue to be an important aspect of this project. This will allow us to investigate the influence of ORV use on a much more local scale. This population-level study provides information on the natural fluctuations of treefrogs during an annual cycle, and it also will help us to determine the effects of ORV use on these populations through our experimental design. We have a total of six sites, two in each of three levels of ORV use. Monitoring of these sites will continue through the onset of the next wet season.

At a single-species scale we are examining the ecology of the greater siren (*Siren lacertina*). This species may reach very high abundances locally, and is an important predator in the aquatic environment (Bancroft et al. 1983). We have captured 15 of these animals and currently experimenting with radio-transmitter attachment methods. We will have 20 animals radio tagged by the onset of the wet season. We will use radio telemetry

to better understand the ecology of this poorly known species and to examine the effect of ORV use on individual amphibians. By following the movements of individuals we will be able to apply the principles of spatial ecology to determine how *Siren* uses the environment around it (e.g. does it favor open habitats or forested habitats). This will provide valuable information about how ORV use might influence the movement patterns of *Siren*.

The small mammal work began in July. Small mammals are good indicators of disturbance due to their small home ranges and abundance. This study will potentially run for one year to monitor populations over time and to determine if abundance and species richness of rodents varies in relation to varying levels of ORV use. A total of four permanent sites have been set up, two ORV influenced and two non-ORV influenced. Random sites will be established to help increase the number of individuals to help test possible influence of ORV activities.

Future Work

In addition to a continuation of the projects described above, we will also begin working on a matrix population model (Caswell 2001) for treefrog species in Big Cypress National Preserve. This will be a largely mathematical exercise using data gathered during the PVC experiment ongoing. With this model we hope to make predictions about the long-term population growth rate of treefrogs in the park under different hydrologic and human recreation management (ORV) scenarios.

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