The Rocky Glades: An Endangered Landscape and its Fishes

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The Rocky Glades is the remnant of a large, short-hydroperiod karst wetland that lies between Shark River and Taylor sloughs. It remains structurally intact and expansive only within Everglades National Park (ENP). Pre-drainage accounts indicated that this region was wetter and likely provided better habitat for aquatic species. Drainage has reduced wet- and dry-season water levels, and today, hydroperiods rarely exceed six months. To persist in this landscape, aquatic animals must disperse, find refuge, or perish. Few data had been collected to describe aquatic-animal community composition and successional patterns on the wetland surface until our study began in 2000. We developed a new trapping method, using drift fences with minnow traps, to document the relative abundance and catch per unit effort (CPUE) of animals during the wet season. Our objectives were to address several questions: how rapidly do different species appear in the traps; how does composition, size-structure, and recruitment of aquatic animals change during the flooding period; and what are the sources of colonizing fishes in the wet season? When the wetland surface dried in autumn, we began to sample solution holes, which are numerous karst cavities of varying areas and depths, in which access to groundwater offered a chance for survival to aquatic animals during the dry season. Historically, groundwater levels apparently were higher than under current management. We wished to learn if the holes were refuges for fishes under today's hydrological conditions.

On the wetland surface, we documented a rich community of 38 fish species, comprised mainly by small-bodied livebearers, killifishes, and sunfishes. With the advent of flooding, fishes and Everglades crayfish were collected with one or two days of wetland flooding. Each year, adults appeared first in the traps, followed by juveniles within one month. Juveniles of larger-bodied species were collected later in the wet seasons. Peak catches occurred within one to two weeks of re-flooding, and again as the sites dried. We documented the colonization and expansion of three newly introduced cichlid and catfish species, and two native species that are moving in from the north. There is evidence that these expansions are the result of recent water-delivery changes.

The numerous karst solution holes in this region once may have been effective dry-season refuges. However, our data demonstrated that nearly all fishes that entered the holes died as the waters receded simply because most holes dried. Most fishes that survived to the beginning of the wet season were introduced species, and were not the species that first colonized surface habitats. This suggests that initial wet-season colonists disperse into the Rocky Glades from elsewhere. The region appears to be a "sink" habitat for aquatic fauna under today's hydrologic conditions, dependent on connections to other landscape units for the replenishment of its fauna each wet season. We are investigating methods to determine the sources of those colonists.

We hypothesize that restoration of higher water levels in both the wet and dry seasons will lead to the enhancement of the biotic characteristics of the Rocky Glades by providing more persistent connections to other landscapes, causing longer flooding of the wetlands to allow animals to build up populations, and allowing better animal survival in the dry season as solution holes remain flooded and animals are confined within them for shorter periods.