Florida Atlantic University: an Island of Environmental Changes

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Florida Atlantic University's (FAU) Boca Raton campus is an upland island at the eastern edge of the Everglades. The island began about 15,000 years ago when falling world sea levels piled sand into ridges along Florida's coasts. Those ridges trapped water to form the Everglades. Periodically, water overflowed the Everglades, breached the ridges, and eroded the landscape into our island.

During World War II, the American military discovered this island surrounded by Everglades wetlands. Since the land was high and dry, they established a 1940 military base in western Boca Raton. The airport on that base became the FAU campus in 1961.

Environmental changes on the Boca Raton campus have been studied since its beginning. Recent efforts are focused at formally allowing our students to participate in those changes at FAU and elsewhere through a series of environmental programs.

The Campus Environment

The FAU campus was designated a "Burrowing Owl Sanctuary" by the Florida Audubon Society in 1971, when it contained the largest owl population in Palm Beach County. As enrollment at FAU has grown, so has the demand for parking space and buildings. At present, the buildings are concentrated in a central area, but that will change in the future if predicted enrollments become reality. So, each time a new facility is added, the endangered burrowing owls (*Athene cunicularia*) lose more land.

The owl population has been monitored for years by Dr. Sheila Mahoney. She has found a steady decline in the suitable land available to the animals and a corresponding loss in their numbers. The tiny colony on the Davie Campus was recently extirpated by a parking lot. Spraying of insecticides for mole crickets (*Gryllotalpha hexadactyla*) on both campuses has taken an added toll because these insects are an important food for the owls. Adding insult to injury, feral house cats have further decimated the owls and other native animals.

There were an estimated 100 owl pairs in 1971. Over the past two years there have been no more than 14 active owl territories on campus; of those, about half produced chicks. Dr. Mahoney, students, and volunteers are analyzing a decade of data (1998-1999). She will report the changes in the owl breeding population when finished. Additionally, graduate student James Erskine has done an analysis of food remains collected over the years, and is preparing those data for publication.

In 1973, a joint effort between the biology faculty and the dean of the college created a 91.6 acre ecological preserve on campus (Austin 1990) to provide habitat for plants and animals, especially for burrowing owls and gopher tortoises (*Gopherus polyphemus*). Due to the combined efforts of biology, engineering, nursing, philosophy, and other faculty, the master plan for the university, completed in September of 1995, expanded that preserve. An additional 10-11 acres was added along its eastern side. There are also two separate parcels. These islands of wild land on campus serve as corridors for wildlife between FAU and nearby environmentally sensitive lands owned by the city of Boca Raton. Apart from serving wildlife, these wild lands are critical for teaching and research in the environmental programs.

Now the gopher tortoises, formerly probably the densest population in the state, are threatened (Stewart et al. 1993, Hicklin 1994). The tortoise population has been thinned by habitat loss to natural succession, invasive alien plants, and the introduction of a respiratory disease that is often fatal. Those factors have caused a decline in the population since 1992. In addition, an exotic pest moth (*Cactoblastis cactorum*) was found in March of 1992 on the prickly pear cacti (*Opuntia* spp.) that serve as an important food for the gopher tortoises. The cactus plants have been almost eliminated from the preserve, further stressing the tortoises (Pierce 1995).

Working with the administration in the early 1990s, campus environmentalists initiated a collaborative program in which native plants were given preference for landscaping. Species on the Exotic Pest Plant Council (EPPC) invasive alien plant list were excluded from new plantings on campus, and many older plants were removed. A change in personnel and an influx from a Miami-Dade County nursery have modified that arrangement. While the nursery provided many desirable native species, such as Royal Palms (*Roystonea regia*), it also brought in listed invasive plants like Strawberry Guava (*Psidium cattleianum*). Accidentally introduced with the nursery stock were many pest weeds, including Oersted's spurge (*Euphorbia oerstediana*), Possum Grape (*Cissus sicyoides*), Taro (*Colocasia esculentum*), and Santa Maria (*Parthenium hysterophorus*).

For many years, the Department of Biological Sciences has been a leader in environmental activities at FAU. The Environmental Sciences Programs currently is housed within biology, and biologists represent one view of how such topics may be approached. Undergraduate student Debra Hooks and others in the Biology Club began a planting project in 1992. These students, working with the biology faculty, modified the interior of the "Growth Complex" north of the Biological Sciences building. Students planted, and now maintain, this botanical mini-garden. Specimens donated by Richard Moyroud (Mesozoic Landscape Nursery) and Mike Jameson (Native Green Cay Nursery) form the nucleus of the collection. Care was taken to

include plant species that were not found elsewhere on the Boca Raton campus, but that were essential to teaching. The plants provide more materials for classes than are available on the combined remaining campus lands. Indeed, this facility is the most diverse botanical resource within many miles of campus. Included are endangered species like Beach Jacquemontia (*Jacquemontia reclinata*), Beach Lantana (*Lantana tampense*), Four-petal Pawpaw (*Asimina tetramera*), and groupings by habitats (e.g., hammock, scrub).

Environmental Programs

In 1991, FAU began an environmental initiative with generous funding from the Donnell-Kay Foundation. While many of the things promised by the initiative did not materialize, several were successes. First, individuals in departments across campus who were concerned with environmental issues learned that they had allies elsewhere. That realization created a network of faculty and students that provides psychological and political support for environmental discussions. The second outcome was the establishment of environmental programs. The first undergraduate route was an Environmental Certificate Program available to all who earn a Bachelors degree. After taking selected courses, the students are awarded a certificate of environmental awareness.

A second undergraduate program was established with the Jupiter Community High School Environmental Research and Field Studies Academy. These high school students can take a special curriculum to earn college credits. Courses focus on a variety of environmental topics, including biological sciences, geography, geology, history, and philosophy.

The first M.S. in Environmental Sciences in South Florida follows a similar interdisciplinary approach. The first term, the Fall of 1998, included 12 new graduate students admitted to FAU. This route allows all students in sciences to receive this Masters degree, regardless of the department where their major professors are housed.

Federal and state grants totaling over $300,000 (Drs. J. C. Volin & D. F. Austin, principal investigators) have allowed the Environmental Sciences Programs to support four of the 12 entering graduate students. These grants came from the Big Cypress National Preserve, the Big Cypress Seminole Reservation, the Florida Department of Agriculture & Consumer Services Division of Forestry, and the South Florida Water Management District. Graduate students are now doing thesis research in the Big Cypress National Preserve (Collier County), the Big Cypress Seminole Reservation (Hendry County), and the Hillsboro Pineland (a parcel of Environmentally Sensitive Land in Broward County).

Additional support for students comes from the Charles E. Schmidt College of Science. Negotiations are under way for even more student aid from the Center for Environmental Studies (see below) and Broward County governmental agencies.

An offshoot of the *Environmental Initiative* at FAU was the Center for Environmental Studies (CES) created through the efforts of Dr. Leonard Berry. This Type I Environmental Center (in North Palm Beach) serves the entire State University System. CES has linked with the South Florida Water Management District, and unites a network of environmental groups throughout the state. One of CES's newest projects is the Riverwoods Field Laboratory, headed by Dr. Carlos de la Rosa. This environmental facility is available to all students in the state who wish to become involved in some aspect of the Kissimmee River Valley Restoration Project.

Now there is also an environmental graduate program in the College of Education, and others are being planned in the College of Business and the Schmidt College of Arts & Letters. Each of these emphases differs in its approach to environmental education because of different world-views. The College of Education emphasis is based on teaching at elementary levels, and is centered at Pine Jog Environmental Sciences Center (Director, Pat Welch). That center has coordinated indoor and outdoor activities that allow students to experience non-urbanized landscapes, often for the first time. Associated with FAU is the Gumbo Limbo Environmental Complex that provides the Palm Beach County School Board and others with experience on coastal sites.

The College of Business will focus on environmental businesses. Even the A. D. Henderson Laboratory School on the Boca Raton campus incorporates environmental activities into landscaping with native plants, especially species that are attractive to butterflies.

The Future

Past conservation efforts at FAU have been a battle to retain native biodiversity. That struggle will continue as growing human populations in southeastern Florida make the green space on the campus a more isolated island. Many things have been learned during the interactions between development and conservation proponents. We learned that even a victory, such as the creation of the ecological preserve, may turn into a new learning experience because of the difficulties in managing the fragment as a "wild" area. However, with these conflicts, the campus will remain a prime locality for the education of students in the things to do (and not to do) in trying to maintain some balance between urbanized landscapes and remnants of wildness.

Resources

A. D. Henderson Laboratory School, cf. http://www.fau.edu/divdept/coe1/adhus/adhus.htm

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Center for Environmental Studies (CES), cf. http://www.ces.fau.edu/

Exotic Pest Plant Council (EPPC), cf. http://www.fleppc.org

FAU Environmental Sciences Programs, cf. http://www.fau.edu/envsci/

Gumbo Limbo Environmental Complex, cf. http://www.fau.edu/gumbo/

Hicklin, Judith. 1994. *The effects of Brazilian pepper (Schinus terebinthifolius) on gopher tortoise (Gopherus polyphemus) habitat utilization*. M.S. Thesis, Florida Atlantic University, Boca Raton.

Pierce, R. L. 1995. *Infestation of Opuntia by the phycitid moths Melitara prodenialis and Cactoblastis cactorum*. M.S. Thesis, Florida Atlantic University, Boca Raton.

Pine Jog Environmental Sciences Center, cf. http://www.fau.edu/divdept/coe/specfac/pinejog.htm

Riverwoods Field Laboratory, cf. http://riverwoods.ces.fau.edu/

Stewart, M. C., D. F. Austin, G. R. Bourne. 1993. "Habitat structure and the dispersion of Gopher Tortoises on a nature preserve," *Florida Scientist* 56(2):70-81.

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