

Environmental Learning = One Trail + Many Partners

By Heather Dewar

What does it take to teach the children of hard-pressed immigrant farm workers how to do science and feel at home in wilderness? At Florida Panther National Wildlife Refuge near Naples, FL, it takes a refuge trail and a carefully-crafted set of hands-on lessons in scientific fieldwork, designed in partnership with local teachers, the Florida Department of Environmental Protection (DEP), and the staffs of nearby parks and reserves.

Florida Panther Refuge and another Florida refuge, St. Marks National Wildlife Refuge in the Florida Panhandle, are among the field sites participating in 18 localized versions of the state's Learning In Florida's Environment (LIFE) program. Now in its eighth year, the program seeks to boost middle school students' science achievement and environmental awareness, placing priority on schools where poverty rates are high and scores on state achievement tests are low.

Participating schools work with the state and with educators from various outdoor sites to develop a yearlong environmental science curriculum, anchored by field excursions to several sites where the children collect, record and analyze basic ecological data. The Big Cypress Watershed Project, which includes Florida Panther Refuge as a field station, is one of the LIFE program's busiest sites. In November and December, some 550 seventh-graders from three Collier County middle schools take turns visiting the refuge for a day of field observations and a dollop of educational play.

Students learn how differences in elevation and plant life affect where panthers prefer to hunt.

Though Naples is known as a wealthy enclave, many students in the LIFE program have parents who work in low-paying service industries, or as migrant farm workers. Immokalee Middle School, for example, is in the heart of South Florida's winter vegetable belt, where the local radio station broadcasts in Spanish, Haitian Creole and two Mayan languages, and 40 percent of the population lives on incomes below the federal poverty line.

"Most of the students have parents who work two or three jobs to put food on the table," said Florida Panther Refuge ranger Sandy Mickey. "They can't afford family trips to the beach, so any chance to spend time in nature is a major life experience for them."

Customized Lesson Plans

The LIFE program's constant is hands-on data collection, centered on basics such as air and water temperature, humidity, wind speed, water depth and salinity. Customized lesson plans teach students how to use that data as another way of seeing the landscape, and understanding how plants and animals survive in it. For example, in one field exercise students propose a hypothesis about the role of soil moisture (or another abiotic factor) in determining what plants grow in a particular spot, and then measure soil moisture to test their hypotheses. In South Florida, where a few inches' change in elevation spells the difference between a pine-forested upland, a sawgrass prairie and a watery cypress slough, there are lots of possibilities.

As the only environmental educator on a refuge that is mostly closed to the public, Mickey recruits helpers from the refuge staff, the LIFE program, other environmental learning centers, and participating schools. "Even the school bus drivers get involved," she said.

Classes are split into two groups. Half gather data in habitats that support dozens of varieties of native orchids, bromeliads and other epiphytes. Many have never seen plants growing anywhere other than a field, and are astonished by the refuge's wild abundance of epiphytes, which in some places cover virtually every limb of every tree.

The others collect data in three different habitats – a wet prairie, a tropical hardwood hammock, and a pine flatwood. They learn how elevation determines the plant community; how plants create a microclimate; and how those factors combine to determine where panthers prefer to hunt for white-tailed deer and where they hide out with their cubs.

"We see panther tracks pretty often," Mickey said, and the children respond with "complete enthusiasm and awe... The really cool part of the program is getting them out on the trail and watching their eyes light up" when the data come alive.

After a morning of data gathering and lunch, the students set aside their data sheets "to blow off steam before they get back on the bus," Mickey said. For the afternoon's more rambunctious learning sessions, Mickey has tweaked the classic game of tag.

Role Playing

In one version half the children play the role of Florida panthers traveling through their home range, while the other kids play obstacles the children encounter on the way, such as highways, mercury contamination, prey shortages, or other cats defending their home ranges. By game's end the children have learned about threats facing the endangered panthers and the importance of wildlife corridors.

In the other activity, half the children play the part of fire, while the other half don red shirts to play wildland firefighters, who try to keep the "fire" confined in a marked-off square. The students experiment with various fire control measures to even out the game – moving pylons to simulate bulldozed fire lines or calling in an imaginary aerial water drop, carried out by a student who swoops across the field wearing a helicopter pilot's helmet. By the game's end, the children have learned about the principles of prescribed burning, Mickey said.

The games "have been really effective at getting the students to run around and burn off some energy but also to learn while they're playing," said David Graff, coordinator for the LIFE Big Cypress Watershed Project.

The LIFE program is flexible enough to accommodate sites as different as St. Marks Refuge, an environmental education powerhouse that offers programs to thousands of people each year, and Florida Panther Refuge, which has

limited public access and – aside from a few special events each year – offers fewer programs and recreational activities.

Each program shares common elements, said Misty Alderman, an environmental education specialist who coordinates the LIFE program for the Florida Department of Environmental Protection. Among them are:

- ✦ Multiple visits to outdoor sites, each with its own set of unique field labs;
- ✦ Localized content, collaboratively designed to mesh with teachers' curricula;
- ✦ Lesson plans that incorporate the fieldwork into science, math, social studies and even language classes;
- ✦ Pre- and post-visit testing to confirm that students have learned the key concepts; and
- ✦ Teacher training to implement the lesson plans and follow up on student outcomes.

Participating teachers spend two full days going over the field activities in detail, Graff said. At the start of the program, teachers walk through the field activities, either in a classroom or, if possible, at one of the sites their students will visit. The teachers collect the data, test the sampling equipment and note any changes in the lesson plans. When the semester ends the teachers



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Florida Panther National Wildlife Refuge participates in Florida's LIFE (Learning In Florida's Environment) program, in which students collect, record and analyze basic ecological data on the refuge.

go over the students' data sheets in detail, assessing which ones succeeded in their teaching objectives and which ones need to be modified.

What Does It Cost?

Start-up costs for LIFE programs vary, but a bare-bones price tag to establish the program in three middle schools is around \$5,000, not including the state LIFE program staffers' time. It costs about \$2,000 per year to sustain a LIFE program serving 150 students, with most of that money going to provide bus transportation, Alderman said.

In these days of lean school budgets, the state does not pick up the tab. The DEP's LIFE staff helps school districts obtain grants from various state and federal sources. NOAA's Bay Watershed Education and Training (B-WET) program has funded the LIFE program at Florida Panther Refuge for three years. Some sites receive one-year state grants.

The Florida DEP points to students' higher math and science scores in internal tests and, for some schools, on statewide achievement tests as well.

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Lesson plans incorporate science, math, social studies, language – and sometimes a canoe ride – into field trips to Florida Panther National Wildlife Refuge.

For example, in 2010, the year after the first group of Immokalee Middle School seventh-graders completed the program, about one-fourth of the school’s eighth-graders passed the state-mandated science achievement test. That might be considered a sad result, but it’s a 92 percent improvement over the school’s passing rate the year before.

There’s no proof of cause and effect, but Florida DEP surveys found that in 2010, 95 percent of the teachers participating in the LIFE program felt it boosted their students’ achievement test scores.

Students also give the program a thumbs-up. In 2010, 61 percent said the program made them more comfortable outdoors; 79 percent said the field work was fun; 80 percent said the field activities helped them understand their

science lessons better; and 81 percent agreed that “the outdoor field activities have made me more aware of how my actions affect the environment.” When asked for details, the students replied with specifics like, “turn off lights when I’m not using them,” “clean up dog poop even if it’s not my dog poop,” “plant some local flowers around my house,” and “respect Earth.”

Environmental educators at refuges and elsewhere can use the program’s free field lab outlines, which are site-specific, but can be adapted to other locations. To see the field labs, go to the LIFE program web page – www.dep.state.fl.us/secretary/ed/lifeprogram.htm – find the list of participating sites, and click each site’s links to see its unique content.