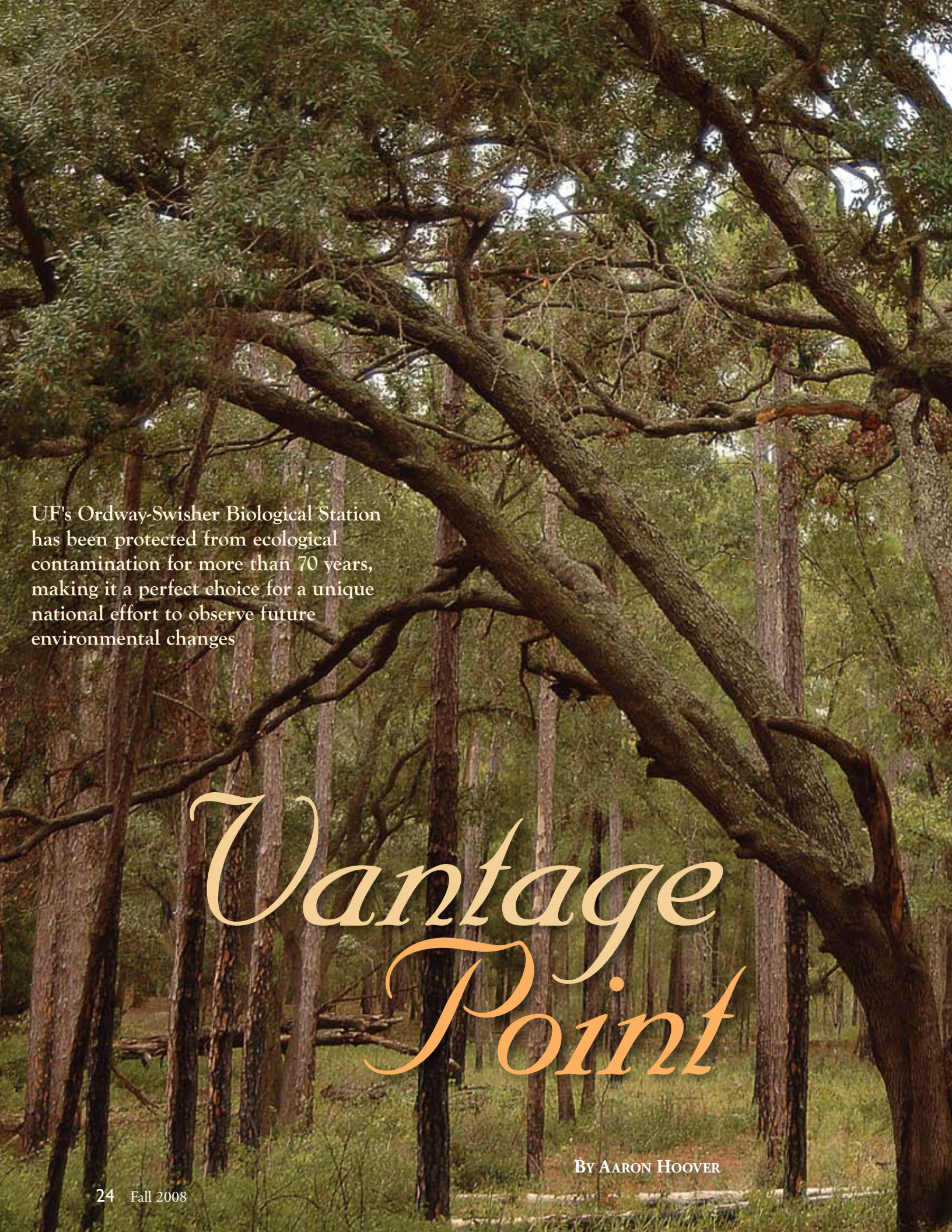


UF's Ordway-Swisher Biological Station has been protected from ecological contamination for more than 70 years, making it a perfect choice for a unique national effort to observe future environmental changes

Vantage Point

By Aaron Hoover

Kristen Bartlett Grace

Hydrilla covers the lakes, and condos cover the land — welcome to Florida circa 2008, population 18 million.

But, just east of the small north Florida town of Melrose a dirt road leads to a different Florida, the one that existed in the early part of the 20th century.

For researchers at the University of Florida's 9,100-acre Ordway-Swisher Biological Station there are …

Kristen Bartlett Grace

> "Fire is very natural and needed here. The disturbance would be if we took fire out of the system."
>
> — Stephen Coates

Prescribed burns mimic the natural fire patterns of a pine forest.

… more than 50 lakes and ponds greened only with paspalum grass, bladderwort and other native plants; old pine forests with trees whose gnarly trunks still bear the "cat face" scars of 1930s-era turpentine gatherers; 140 bird, 35 mammal and 26 fish species, including the pearlescent indigo snake and gopher frog; two Native American burial grounds; and the decaying estate of the cigar magnate who fortuitously amassed the land beginning more than 70 years ago as his private fishing and hunting reserve.

Since 1980, the University of Florida has managed Ordway-Swisher as a field research station to be used by scientists studying the flora, fauna and ecosystems of original Florida.

But Ordway-Swisher is due for a major change. As part of a National Science Foundation-sponsored initiative, it will be one of 20 sites in the National Ecological Observatory Network, or NEON. The goal: To put together what one scientist termed a Hubble Space Telescope for the environment — a continental-scale observatory through which ecologists can observe, from coast to coast and in real time, the impacts of global warming, invading species, land development and so on.

Each of the 20 sites lie in different climates. With Ordway-Swisher's hardwood hammocks, swamps and sand hills, its out-of-the-way setting and lock-down protection, the station was a shoe-in to epitomize the natural Southeast.

"We were looking for locations that are very representative of their areas, and we had always been thinking about Ordway," says Hank Loescher, a staff scientist at NEON's home base in Boulder, Colo.

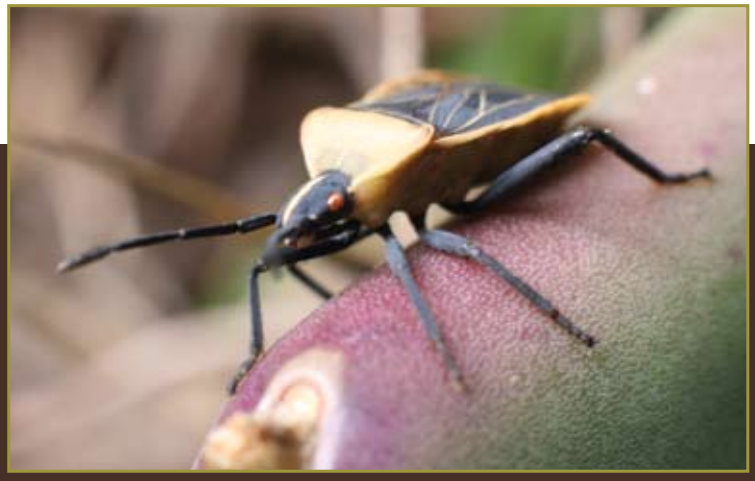
Within the next few years, NEON workers at Ordway-Swisher will build three tall observation towers equipped with a gaggle of sensors and computers. Their purpose: To extend an electronic finger to environmental winds, continuously monitoring thousands of parameters of ecosystem health and quality.

For now, though, Ordway-Swisher remains little changed from when Jacksonville's Carl Swisher, owner of Swisher Cigars, began buying the pieces of land in the 1930s that make up the station.

Swisher, an avid fisherman and outdoorsman, eventually amassed 25,000 acres. He built a weekend home and clay roads to his favorite fishing lakes. Perched in his Cadillac, Swisher wanted to pass through different scenery heading out and returning from an expedition, so he built two roads to many lakes. He employed a full-time caretaker, Truman Perry, whose jobs included rowing Swisher to his favorite fishing hole in each lake. Although he is retired, Perry still works at Ordway-Swisher, just as he has since 1954.

After Carl Swisher died, his family gradually sold off pieces of the land. But in 1979, the family's Swisher Foundation donated 3,000 acres to The Nature Conservancy. A year later, the private Goodhill Foundation gave a grant to UF to buy a second, contiguous 6,000 acres from the Swisher Foundation. That land was preserved in the name of Katherine Ordway, a

Veterinary doctoral candidate LeAnn White is studying gopher tortoise nutrition and health.



Christine W. Miller

Entomologist Christine Miller and her students study the ecology of cactus bugs.

3M Corporation heiress who bequeathed more than $40 million through Goodhill to support efforts to protect biologically diverse landscapes in the United States.

Although scientists and students have had access to both parcels since 1980, the full station only became official in August when The Nature Conservancy formally donated the Carl Swisher Memorial Sanctuary to the university.

Real estate experts place the value of the 3,000-acre Swisher tract at $11 million, but as UF President Bernie Machen said at a ceremony marking the donation, Ordway-Swisher's "natural value is difficult to put a price on."

"The Conservancy's transfer of 3,000 acres to the Ordway-Swisher Biological Station is an important milestone in the ongoing work at this outstanding conservation site," says Jeff Danter, Florida state director of The Nature Conservancy. "Equally important to protecting this site is developing the next generation of conservation scientists and managers who will help make Florida and the world a more sustainable place for us all."

Machen calls the station "a precious rarity that makes it the perfect laboratory for measuring the effects of environmental change."

A ride around the property with Ordway-Swisher research coordinator Stephen Coates in his green Ford pickup makes that clear.

Heading into the station, the single-lane dirt roads passes Ross Lake, one of the property's bigger lakes. Ross' tannin-stained waters typify Ordway-Swisher's surface water-fed, nutrient-rich lakes. Native plants green its shores and shallow zones, and alligators, otters and largemouth bass abound. Ross and Ordway-Swisher's other lakes owe their hydrilla- and water-hyacinth-free waters to one of the station's many rules of self-preservation: Only boats kept there permanently are allowed in Ordway's waters.

From Ross Lake, the road climbs through hills interspersed with longleaf pine from the grass stage to 80- to 100-year-old giants stretching high into the sky. Pale yellow wiregrass carpets the ground beneath them. Such land is prized by developers because it is high, dry and easily drained. As a result, although longleaf pine once blanketed an estimated 90 million acres across the Southeast, fewer than four million acres remain today.

"What you are seeing here," Coates says, "is old Florida. This is what it looked like."

Threatened gopher tortoises and gopher frogs, which make their homes in the tortoises' burrows, live in the longleaf forest. So do impressively large Sherman fox squirrels, uncommonly common at Ordway-Swisher, says Coates. Rafters of notoriously shy wild turkeys stroll fearlessly through the woods and white-tail deer are common sights.

Also common are reminders of the seasonal burns Coates and his colleagues conduct, deliberately setting in motion a natural process that keeps hardwood seedlings from maturing and edging out the pine forest and its wildlife.

"Fire is very natural and needed here," he says. "The disturbance would be if we took fire *out* of the system."

"We want to enable ecological forecasting — where infectious disease will spread, or where invasive species will spread. We also want to project regional water use, carbon balance and what may happen to species with a changing environment across time and space scales."

— Hank Loescher

Kristen Bartlett Grace

The road swings by a declivity where rains create a temporary pond, providing frogs and amphibians key breeding conditions — a wet spot with no fish to eat larvae or tadpoles, Coates says. Eventually his truck finds its way to Lake Barco. Contrasting Ross Lake, the nutrient-poor Barco is gin clear, with no submerged plants or alligators and only the leanest of fish.

Ordway-Swisher contains other typical Southeastern habitat as well. On its western side broods a large, dark cypress swamp. There are hardwood hammocks, sandhill upland lakes and a majestic Florida prairie.

The station's high state of ecological preservation is the main draw for biologists, ecologists and others who spend anywhere from an afternoon to weeks or months on projects there.

This past summer, one scientist studied the population ecology of greater sirens and two-toed amphiumas, both large aquatic salamanders. Another surveyed native bees. A third examined sexual selection in large, colorful, but harmless, golden orb spiders. All told, the station hosts on average 25 projects at any given time.

According to John Hayes, chair of UF's Department of Wildlife Ecology and Conservation, 58 UF graduate projects — 33 master's degree and 25 doctoral degree — have been conducted at the station since 1982. About 220 research publications and reports have been generated from university, state, federal and private research studies at the station. Hayes describes Ordway's lakes as especially valuable for researchers.

"Ordway-Swisher is not pristine. Nothing in Florida is pristine. But it is in very, very good ecological condition," he says. "The lakes are exceptionally pristine and they really provide an ecological baseline for aquatic systems in the state of Florida."

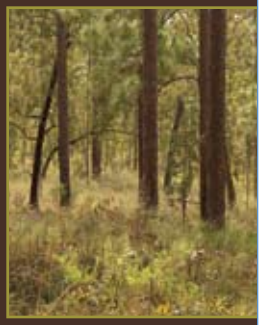
Hayes adds Ordway-Swisher is already on a path to becoming a "globally significant research and education site." NEON will only accelerate that transition.

Like other scientists, ecologists routinely work together, but they have never collaborated on the scale of physicists, with their mammoth particle accelerators; oceanographers, with their ocean research vessels and deep-water submersibles; and astronomers, with their multimillion-dollar telescopes, says Loescher, the NEON staff scientist.

Aware of the gap, a group of ecologists began pursuing the project that became NEON well over a decade ago, Loescher says. The group submitted the most recent formal proposal to the National Science Foundation in 2006. The federal government allocated $25 million this year for planning and development, he says.

Just as physicists turn to particle accelerators to study the nature of matter, so NEON scientists have targets: "Continental scale" research transects where instruments will measure how the environment is responding to climate change, land development, forest management, the growing use of biofuels and invasive species and infectious diseases.

Key to each are the automated observation towers.



NATIONAL ECOLOGICAL OBSERVATORY NETWORK

NEON Climate Domains

The observatory partitions the United States into 20 ecoclimatic domains using a statistical analysis of ecoclimatic state variables and wind vectors.

Each domain will host a core site consisting of a fully instrumented wildland landscape located in a small watershed, and the mobile capacity to record additional data in other parts of the domain.

For more information, visit www.neoninc.org

Loescher, who is in charge of NEON's instrumentation efforts, says each site will likely have three towers equipped with a vast array of sensors and monitors. The sites will also have at least two aquatic arrays — underwater "towers" immersed in lakes or streams — as well as several below-ground soil monitors.

All told, Loescher says, the sensors and monitors will collect terabytes of data from at least 2,000 sources. Some are as mundane as temperature and humidity, others as exotic as real-time stable isotopes, below-ground carbon dioxide and integrated water vapor. NEON will also have portable towers that can be relocated for special projects, such as gauging the environmental effects of hurricanes. Additionally, NEON scientists will have access to airplanes and satellite sweeps.

Coates says Ordway-Swisher already has years of baseline data garnered from throughout the property. Water levels and water quality are checked monthly on all the lakes. An extensive inventory of the flora and fauna has been maintained for years.

The information has been gathered by on-site biologists like Coates and students in countless classes. In September, for example, a mammalogy class spent several nights trapping and recording critters in the forest. They camped at one of the station's two campgrounds, equipped paradoxically with Wi-Fi.

And while that same connectivity will be a conduit for some of the NEON data, project scientists will also rely on "the sneaker net," in Loescher's words. To coordinate, NEON will bring in several new full-time employees, including at least two managers, an education and outreach coordinator and technicians. Loescher says NEON expects to develop a first test site near its Boulder headquarters in the next two years. Starting in 2012, the organization will likely develop two sites annually. None are scheduled yet, but Loescher suggested Ordway-Swisher may well be one of the first.

"Your guys are ready to go. You understand what NEON is," he says.

Whenever it occurs, NEON can hardly come too soon.

Loescher notes that the National Weather System decades ago built a national system of identically calibrated thermometers, barometers and anemometers so that it could more accurately forecast the weather. Today, he says, climate change is a gathering force, but scientists have no uniform metric to compare the northward migration of animals and plants, population die-offs or other changes or to predict what might happen down the road.

"We want to enable ecological forecasting — where infectious disease will spread, or where invasive species will spread," he says. "We also want to project regional water use, carbon balance and what may happen to species with a changing environment across time and space scales."

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