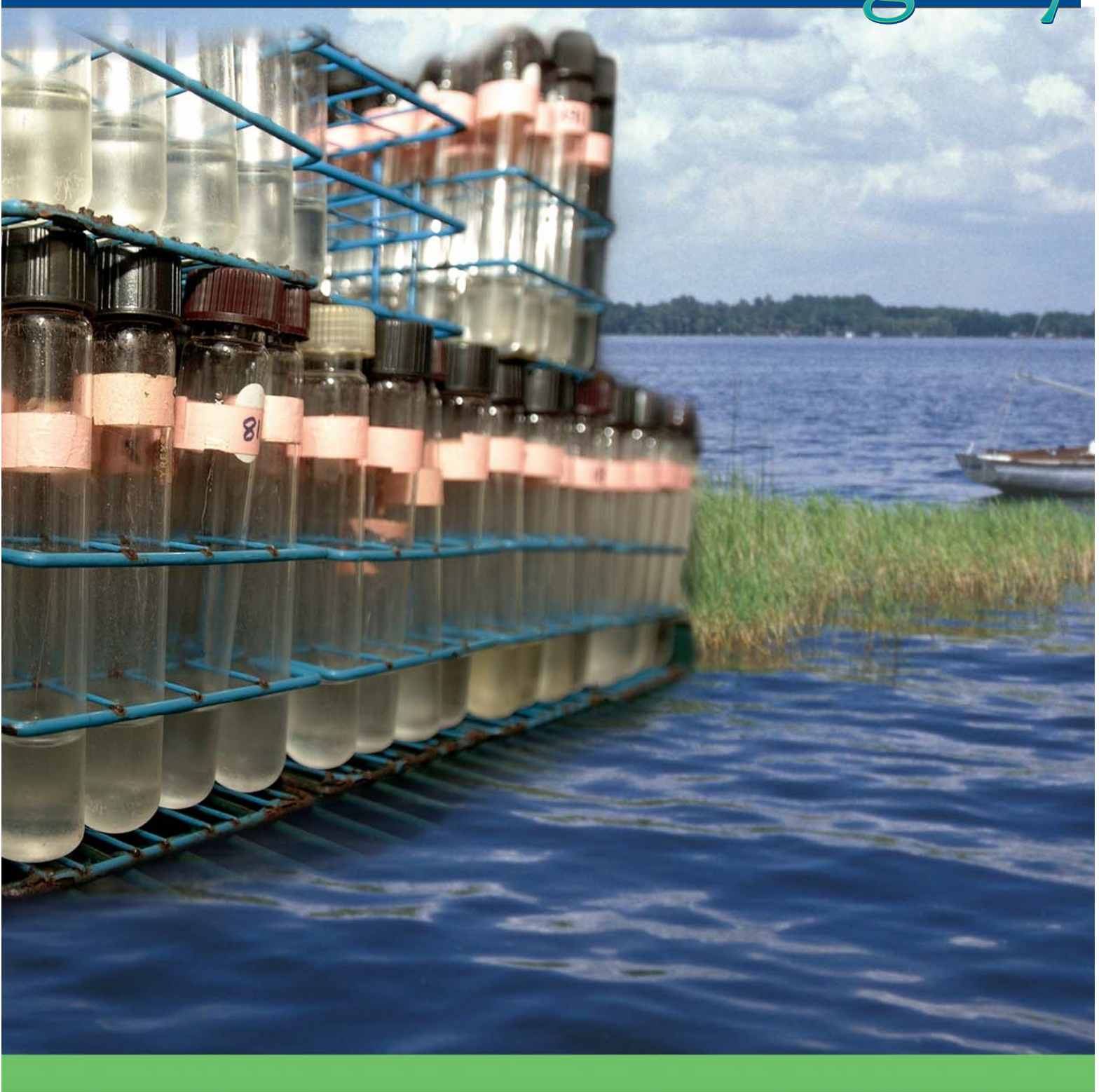


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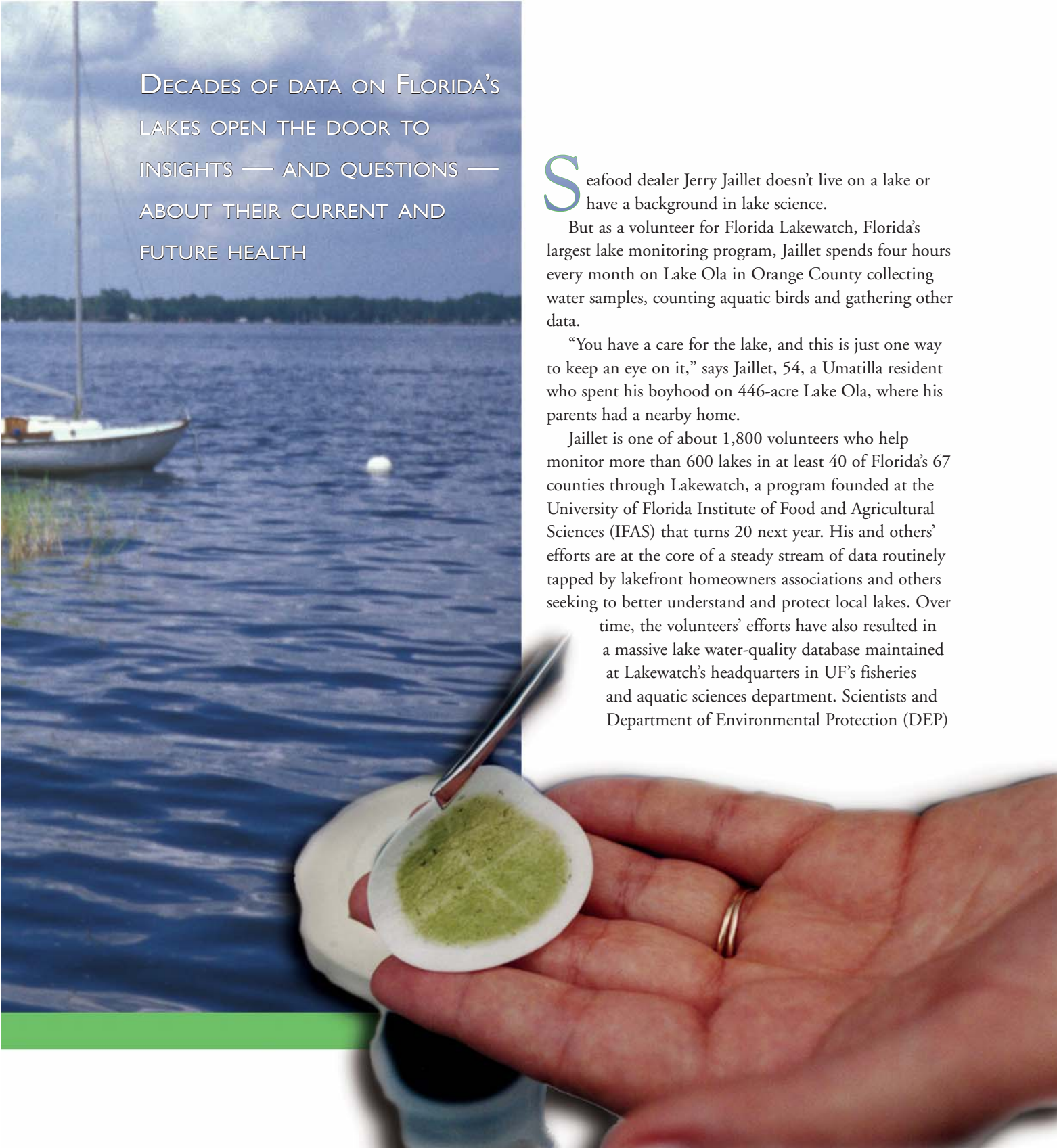
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Lakewatch Legacy



BY AARON HOOVER

A composite image featuring a lake scene with a sailboat on the left and a close-up of a hand holding a petri dish with green algae on the right. The text is overlaid on the lake portion.

DECADES OF DATA ON FLORIDA'S
LAKES OPEN THE DOOR TO
INSIGHTS — AND QUESTIONS —
ABOUT THEIR CURRENT AND
FUTURE HEALTH

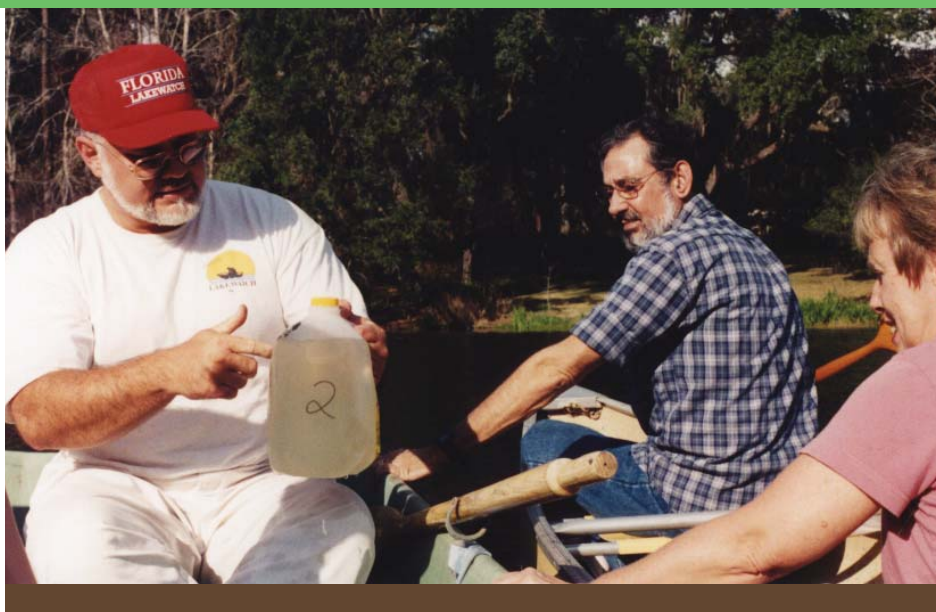
Seafood dealer Jerry Jaillet doesn't live on a lake or have a background in lake science.

But as a volunteer for Florida Lakewatch, Florida's largest lake monitoring program, Jaillet spends four hours every month on Lake Ola in Orange County collecting water samples, counting aquatic birds and gathering other data.

"You have a care for the lake, and this is just one way to keep an eye on it," says Jaillet, 54, a Umatilla resident who spent his boyhood on 446-acre Lake Ola, where his parents had a nearby home.

Jaillet is one of about 1,800 volunteers who help monitor more than 600 lakes in at least 40 of Florida's 67 counties through Lakewatch, a program founded at the University of Florida Institute of Food and Agricultural Sciences (IFAS) that turns 20 next year. His and others' efforts are at the core of a steady stream of data routinely tapped by lakefront homeowners associations and others seeking to better understand and protect local lakes. Over time, the volunteers' efforts have also resulted in a massive lake water-quality database maintained at Lakewatch's headquarters in UF's fisheries and aquatic sciences department. Scientists and Department of Environmental Protection (DEP)

TRAINED BY LAKEWATCH STAFF IN SCIENTIFIC PROCEDURE, VOLUNTEERS COLLECT SAMPLES THAT THE SCIENTISTS USE TO ASSESS ESSENTIAL LAKE INDICATORS. THESE INCLUDE WATER CLARITY, AMOUNT OF ALGAE, CONCENTRATIONS OF PHOSPHORUS AND NITROGEN, AND WATER COLOR AND SALINITY.



managers are among those who tap the database as they make lake-management decisions.

The list of well-publicized threats confronting Florida lakes is long and menacing, but a top concern is nutrient pollution from development tied to Florida's enormous population growth. As solid a resource as it is for scholarship and management, Lakewatch founder and UF fisheries Professor Dan Canfield says the Lakewatch database is also key to his original — and controversial — view of this threat.

“The story that no one wants to hear,” says Canfield, “is that most Florida lakes are in great shape.”

CITIZEN SCIENTISTS

Florida is home to more than 7,700 lakes covering 6 percent of its surface area, ranking it with Alaska and Minnesota among the top five states with the most lakes. Its largest, Okeechobee, spans 690 square miles, but 88 percent of its lakes are a tiny fraction of that size, each covering fewer than 16 acres.

Most Florida lakes are shallow, usually fewer than 16 feet deep, a result of their origins as sinkholes. Most are also rela-

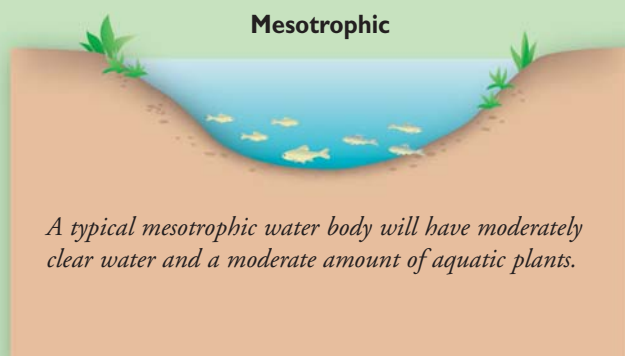
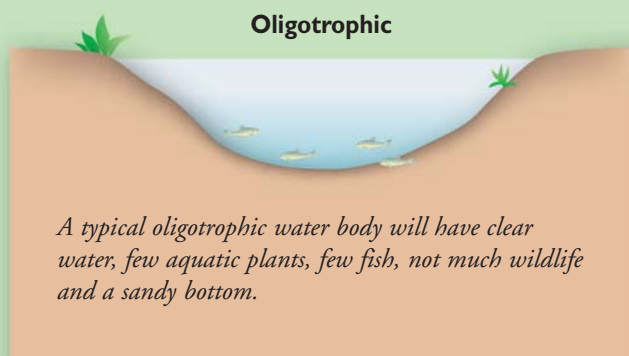
tively young, having first filled 6,000 to 8,000 years ago. A few formed as depressions in an ancient seabed or through the flow of rivers and ocean currents. At least one, Baker County's Ocean Pond, is thought to trace its origin to a meteorite.

UF scientists have sought to keep track of the state's lake conditions since at least the mid-1960s, but work on what was then called the Florida Lakes Database ended in the mid-1980s. Canfield, who earned his doctorate from Iowa State University and began his career at UF in 1979, picked up the slack in 1986, launching Florida Lakewatch after residents around a handful of North Florida lakes queried him about their lakes' conditions.

Trained by Lakewatch staff in scientific procedure, volunteers collect samples that the scientists use to assess essential lake indicators. These include water clarity, “greenness” or amount of the algae-caused pigment chlorophyll, concentrations of the nutrients phosphorus and nitrogen, and in some cases water color and salinity. The volunteers freeze the water they dip from their lakes and drop it off at collection stations, including IFAS extension offices and sheriff's offices. From there, a Lakewatch van carries the

TROPHIC STATES OF FLORIDA LAKES

Trophic state is a measure of a lake's “biological productivity,” or how many plants and animals are in it.



samples to Gainesville for analysis. Over time, the numbers add up to a comprehensive profile of each monitored lake, a profile that gets updated annually.

One result: Homeowners and other interested parties become better interpreters of their lakes' changes, Lakewatch staff members say. That may lessen concern when something seems abnormal, although the reverse also can be true.

"It gives them a cushion of comfort, an understanding of how natural systems fluctuate," says Claude Brown, who oversees Lakewatch's North Florida lakes as one of the program's five regional coordinators. "Over the short term something can look pretty scary, but it may be in the expected dynamics of a dynamic system."

At Lake Ola, for example, Jaillet is leaning on his Lakewatch data and expertise to advise a homeowners association on the best way to address a burgeoning problem with the invasive weed hydrilla. The association could turn to herbicides or plant-eating grass carp but needs to be careful to maintain some plants or algae will replace them, clouding the predominantly clear lake.



Phyllis Brumfield uses a Secchi disk to determine water clarity on Clear Lake. Volunteers lower the disk into the water until they can no longer see it and then record the depth. The more algae in a lake, the faster the Secchi disk disappears.

Although there's certainly no mandate to do so, homeowners have also used Lakewatch data to restrict development and seek environmental protections, perhaps most notably at Lake Disston in Flagler County. There, encouraged by former Lakewatch director Sandy Fisher, homeowners relied on data they began collecting in 1992 to demonstrate the lake's pristine quality, proof that helped them win an Outstanding Florida Waters designation nearly a decade later. Led by lakefront resident Ann Moore, they also tapped the data to convince Flagler County commissioners to rebuff a developer who wanted to build 360 lakeside homes and a golf course on a nearby creek.

Moore says Lakewatch empowers residents to act on their lakes' behalf. Educated as a nurse and a full-time mother at the time she started advocating for Lake Disston, her leadership on the Outstanding Florida Waters designation led to an invitation to become a member of the Board of Governors of the St. Johns Water Management District, a position she occupies today.

"We found out later that no Outstanding Florida Water designation had ever been accomplished by just a few housewives," she says.

Statewide, scientists and the Florida DEP turn to the Lakewatch database for research and management.

"The database is more than simple water chemistry — a lot of times it gives you information about plants, fish and bathymetric maps," says Mark Brenner, a UF associate professor of geology and director of UF's Land Use and Environmental Change Institute. "I think for other limnologists it's a very handy source of information."

Scientists also turn to the Lakewatch numbers in debates about Florida lakes' past and future. Canfield, for his part, maintains that the numbers back up his contention that Florida's nearly 16 million residents haven't had the terribly degrading impact the public imagines.

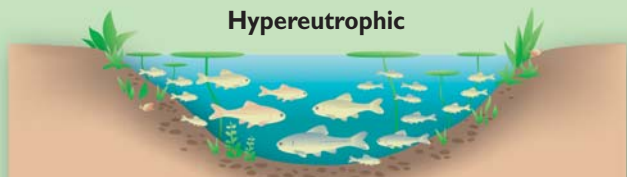
"Florida lakes are not as bad as people have made them out to be," he says.

Eutrophic



A typical eutrophic water body will have either lots of aquatic plants and clear water or few aquatic plants and less clear water. In either case, it has the potential to support lots of fish and wildlife.

Hypereutrophic



A typical hypereutrophic water body will have very low water clarity and the potential for lots of fish and wildlife. It may have an abundance of aquatic plants.

“THE STORY THAT NO ONE WANTS TO HEAR IS THAT MOST FLORIDA LAKES ARE IN GREAT SHAPE.”

— DAN CANFIELD



Lakewatch Director Dan Canfield, standing, and Assistant Director Mark Hoyer in a cooler on campus where thousands of lake water samples are stored.

CONTRARIAN VIEWPOINT

It's not a message often spouted by academics in environmental disciplines, but then Canfield breaks the ivory tower stereotype. A registered Republican, he has a George W. Bush sticker on his pickup and allied with the late George Kirkpatrick, the state senator who infuriated environmentalists with his staunch support of the Rodman dam.

A comprehensive assessment of the Lakewatch and other data, he argues, shows that for at least the past two decades most Florida lakes have held their ground or improved — at least as far as their “trophic status” is concerned. Trophic status is a measure of nutrient enrichment, often seen as an inevitable consequence of the septic tanks, wastewater treatment plants and agriculture that accompanies growth.

The DEP uses chlorophyll levels to determine trophic status: the greener the lake, the more productive it is. By that measure, Canfield says, the Lakewatch data show most lakes have remained stable, and those where increases have occurred are almost inevitably lakes where managers have aggressively attacked aquatic plant growth. That's important, he says, because when aquatic plants die, chlorophyll-carrying algae prosper.

Canfield and Lakewatch Assistant Director Mark Hoyer, who shares his views, are among five authors of a 2000 paper in the journal *Lake and Reservoir Management* that taps Lakewatch and other data for 127 Florida lakes to make their argument.

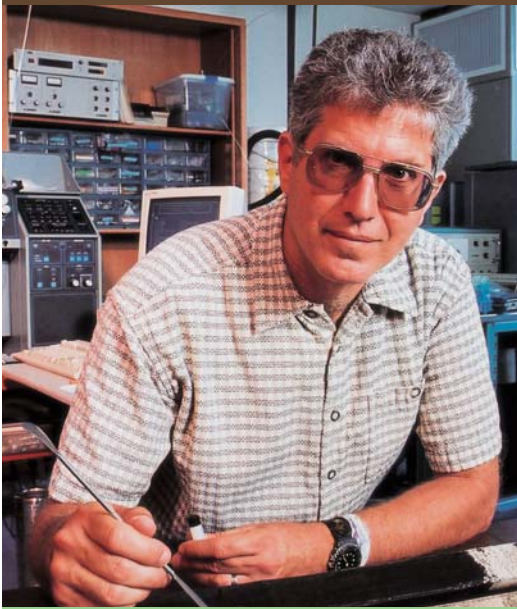
“Although the population of Florida has increased 116 percent over the last 27 years, expected increases in lake concentrations of nutrients were not found,” the paper says. “Increased nutrient concentrations, or decreased water clarity, that is often speculated to occur with population growth and watershed development, have not been documented in this sample of Florida lakes.”

For Canfield and Hoyer, complaints about “pea soup” water and muddy bottoms typically have less to do with science than perception. Thanks in major part to phosphorus-rich soils under parts of the state and other natural conditions, many Florida lakes are naturally both eutrophic and very green, they say. But when newcomers arrive in Florida — especially those from states with deep, clear lakes such as Maine — they inevitably view Florida lakes as polluted, they say.

People “think that every lake should be ‘what I think a lake is’ and whatever they grew up with is what they think about,” Hoyer says. “Down in Polk County, the lakes are green, and that's all they're ever going to be.”

Lake lovers' judgments of lakes as “healthy” and

Josh Wickham



Ray Carson

“BY SAYING THAT THERE HAVE BEEN NO CHANGES, IT’S KIND OF APOLOGIZING FOR THE HUMAN DEVELOPMENT THAT HAS OCCURRED, THE MINING AND THE AGRICULTURE. WHY NOT JUST ACKNOWLEDGE THAT WE DO HAVE A FOOTPRINT ON THE LANDSCAPE AND THE WATERS?”

— MARK BRENNER



Geological sciences Associate Professor Mark Brenner and his colleagues analyze sediment from different strata of meters-long samples cored from lake beds to better understand the lakes’ historic trophic state.

“unhealthy” are also colored by what they want to get out of their lakes, Hoyer and Canfield maintain. Swimmers prefer clear lakes with sandy bottoms, conditions which usually indicate low or moderate nutrient levels. Anglers and bird lovers, by contrast, may prefer greener lakes whose nutrient-enhanced productivity can result in higher bird and sport fish populations.

“Good and bad is in the eye of the beholder,” Canfield says.

Other scientists agree that perception and personal bias is a major, underappreciated issue when it comes to lake management. But many argue that the issue of human-caused nutrient enrichment is far from settled. Brenner, the UF geologist, says the Lakewatch data show little evidence of nutrient spikes because it so recent. A paleolimnologist who studies lake history by analyzing layers of recent and ancient sediment, he says his work on lakes around Lakeland, for example, does indicate a trend of nutrient enrichment.

A century and a half ago, when few if any people lived nearby, Lakes Hollingsworth and Parker were “mesotrophic” or mildly eutrophic, his research shows. Today, they’re highly enriched.

“I feel like there are some changes that are happening,” Brenner says. “By saying that there have been no changes, it’s kind of apologizing for the human development that has occurred, the mining and the agriculture. Why not just acknowledge that we do have a footprint on the landscape and the waters?”

The poster child for human degradation of Florida lakes is Orange County’s Lake Apopka. Renowned early this century for its outstanding bass fishing, Apopka’s extensive aquatic plants began dying off in the late 1940s and were replaced by massive algae blooms. Sport fishing fell off precipitously.

Many blame the lake’s decline and current “hypereutrophic”

status on human causes, including phosphorous runoff from adjacent farms and treated wastewater discharges from shoreline communities through the 1970s. The state, which has embraced these views, now operates a multi-million-dollar Apopka restoration program.

Canfield takes a skeptical view of the efforts, arguing that the initial cause of Apopka’s troubles was hurricane-generated waves that stirred up the lake’s muddy bottom, clouding the water, preventing light from reaching the plants and killing them. He and Roger Bachmann, a visiting professor in UF’s fisheries department, maintain Apopka’s continued eutrophication problems are less related to phosphorous discharge than to a layer of fluid mud on the lake’s bottom that keeps the water turbid and makes it difficult for plants to get established.

Whatever their position on Apopka, everyone acknowledges that nutrient enrichment is not the only concern about Florida lakes. Others include sedimentation, or filling-in of lakes, contamination from mercury and pesticides and the thorny issue of maintaining lake levels against conflicting priorities like flood control and groundwater pumping.

For Canfield, it’s essential to debate the causes and solutions to these and other potential issues.

“Science is an area where we’re supposed to have conflict,” he says. “We’re supposed to have hypotheses and debate them out.” ❌

Related Web sites:

<http://lakewatch.ifas.ufl.edu/>
<http://www.clas.ufl.edu/lueci/home.htm>

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