

# Aquatics

Fall 1998

El Niño Issue

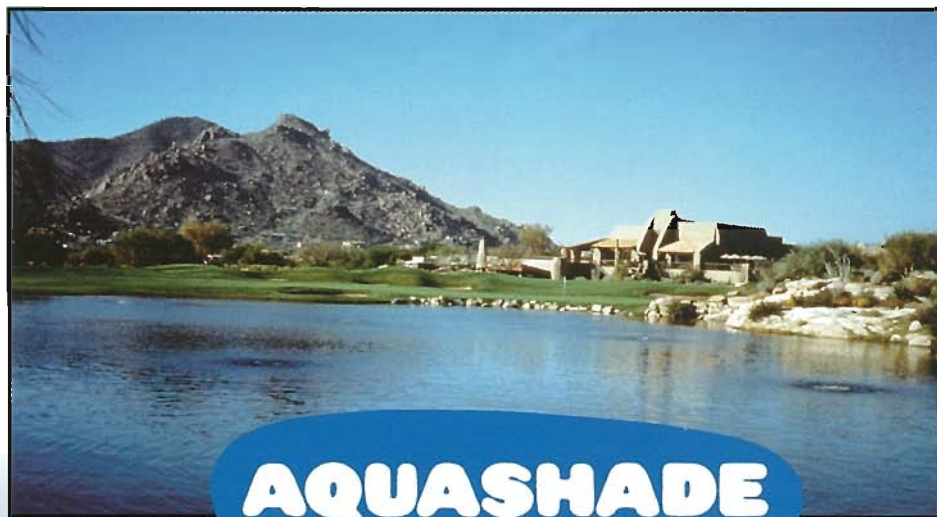
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Editorial

Invasive, exotic aquatic plants have proven to be destructive to Florida's environment and disruptive to its economy. The keys to preventing widespread problems lie in identification of the most invasive species, adequate screening to limit introductions, and frequent monitoring and rapid management responses to control or eradicate new infestations. If invasive plants are allowed to establish, long term maintenance must be routinely applied to prevent further losses.

Florida's aquatic plant managers have demonstrated that when sufficient funds and staffing are available to apply adequate control technologies on a continuous basis, even the most invasive plants can be reduced to minor components of freshwater ecosystems. Water hyacinth and hydrilla each covered more than 100,000 acres of Florida's public waterways. Today, water hyacinth covers fewer than 2,000 acres and maintenance control of hydrilla is likely to be achieved (if current funding continues) before the end of the decade.

Although they are temporarily under control, water hyacinth and hydrilla problems are not yet solved, and other invasive aquatic plants have not even been addressed. About \$15 million now must be spent every year to prevent floating invasive plants (water hyacinth and water lettuce) and submersed hydrilla from once again covering so many of the state's important, natural waterways. All the while, invasive, emergent aquatic plants like wild taro and torpedograss continue to expand because management funding has been insufficient to cope with the two most troublesome species. Wild taro now lines the shaded shorelines of more than half of Florida's public lakes and rivers. Torpedograss is among the 10 most widely dispersed aquatic plants in Florida, and is present in more waters than water hyacinth and hydrilla combined. It is among the three most abundant aquatic plants in more than 25% of the waters in which it is found, and infests more than one-third of the 100,000 acre marsh on Lake

*Continued on page 7*



A common sight during the El Niño rains of 1997-1998

Photo Courtesy of South Florida Water Management District, West Palm Beach

# Aquatics

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EDITORIAL: Address all correspondence regarding editorial matter to Judy Ludlow Aquatics Magazine.

# El Niño or El Scapegoat? What's This Little Boy Really Made Of?

By

**Mike Bodle,  
South Florida Water  
Management District**

Whew!! Some year, huh? Florida (and the rest of world) has been visited by this little South American feller before, but this year he just about wore out his welcome. Before 1998 was even half-gone, Florida endured three life-threatening, presidentially-declared disasters due to this hyperactive little guy. And hurricane season hadn't even kicked in yet!!

Remember the early 1980s when oceanographers and meteorologists were starting to recognize some cyclic marine phenomenon off the coast of Peru? Well, who would've guessed that, within only a decade or so, this once little known subject of geo-climato-oceanographic inquiry would be the subject of thousands of national news items and on hundreds of millions of lips. And how much of what's been written, broadcast, and proclaimed is true, and how much is hype?? Such an array of contradicting confabulations can be assembled that we have to wonder...

## All That Peruvian Hot Water: Hype or Horror?

The masses of oranges and reds in Figure 1 represent warmer-than-normal water extending from Peru to Fiji at the peaks of three different El Niño events, including our most-publicized recent event. The phenomena form when prevailing winds reverse and warm Australian water pushes eastward toward equatorial South America. After that happens, all El Niño breaks loose.

We've all come to easily recognize the images in Figure 1, with all the oranges and reds showing the little shaver in all his glory. We

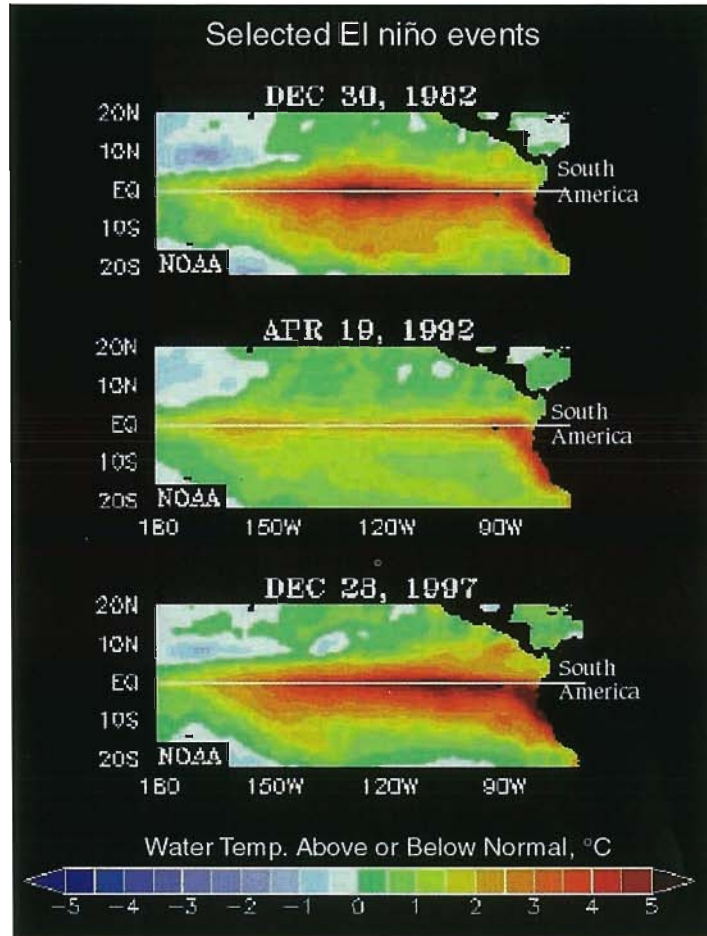


Figure 1

recognize him, only too well, thanks to over-repeated weather reports. The 1997-8 El Niño has been the strongest ever recorded and, even by July '98, some weatherheads were still unwilling to declare it officially over. Perhaps some odd job security fears were at work.

This year's losses to Florida farmers, ranchers and growers are estimated at \$125,000,000. That's not peanuts (although some of it was), but most of this state's crops survived, amounting to a still incredible total value of \$6.1 billion.

This year saw flooding in 54 of Florida's 67 counties, yet the raging waters recharged groundwater stores in areas of Southwest and West-

central Florida that had suffered several years of near-drought conditions. But, flip that coin over again, because these same floodwaters contaminated 5,000 drinking water wells in the state.

Horribly, tornadoes killed 42 in central Florida. El Niño effects strengthened multiple weather fronts that spawned these tragic storms. There's no other side to this grim statistic.

## Naughty with Some Nice?

Nationally, total El Niño-related damages were estimated at \$2 billion, yet \$15 billion in benefits may have accrued. Benefits? Yes, benefits. These included decreased

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hurricane activity last year, lower demand for heating energy during the winter, greater petroleum reserves and lower gasoline prices because of less heating oil use, increased profits for airlines, railroads, and trucking companies thanks to their lower fuel costs. The healthy transportation sector spurred other general economic growth, groundwater levels were recharged in many areas, California reportedly "greened" up with vibrant new plant growth (although, dense plant growth will only increase Californian fuel loads for dry season fires), and winter wheat crops grew exceptionally well during the warmer winter. And read on in this issue, for although the extended Spring 1998 dry periods encouraged Florida's fierce wildfires, they benefited aquatic plant managers by enhancing multi-million dollar hydrilla control efforts state-wide. The more you look, the more sides you find to these things.

## Frogs and Snails and Puppy Dog Tails...and the Kitchen Sink

A new toy animal's voice reportedly declares, "My name is El Niño. You can blame anything on me." Well, it looks like everything already has been.

An "El Niño: Hype Watch 1998" website has amassed more than 700 "El Niño is a very bad boy" items that were floated by media doomsayers this year. Media articles predicting El Niño-induced plagues and pestilence included: bad baseball, bad jokes, bad pizza, bubonic plague, dead crops, dead coral, dead butterflies, dead orangutans, dead penguins, dead people, drought, flood, hangnails, Hanta virus, Lyme disease, Italian clothing, looting in Brazil, meningitis, mold, mosquitoes, out-of-tune pianos, pollen, potholes, snakes, frozen snow, melted snow, mushy snow, spiders, ticks, tough putting greens, weeds, and wet dog smell. And it all happened. I know cuz I read it on the Internet!!!

## We Come Not to Praise El Niño, But to Bury Him

Oh, for the days when the average American didn't even recognize this now achingly over-reported Spanish term. Now that we've survived El Niño's real world effects and withstood endless media El Niño babblings, it's about time we ended all use of this term. The little boy's cool little sister, La Niña, may now be forming out there, attracting all the same dire predictions, although presumably in reverse.

Figure 1 shows the variability in the last four El Niño events. Diligent oceanographers are modeling similar, although much bluer, images of La Niña, in her formative, and not-yet-officially-declared stages. If she forms, she'll look like a blue-toned reverse of her brother, maybe like he's holding his breath while in a skirt. But wait, what about her other sister, who's not quite as cold as her? And their other only sort-of-warm little brother? How many multi-colored siblings will the media want? Will there be señors and señoritas, hijos and hijas, for, let's say, every

quarter-of-a-degree increment between El Niño and La Niña's warm and cool extremes? Whoa, Nellie!! We need to just accept that sea temperatures vary, for lots of reasons, off to the left side of South America. At any time, such masses of water may affect winds, and waves, and clouds, and bugs, and colds, and flu, and Roquefort cheese, and whether or not you'll get that raise and a chance for more gravy. We need to accept it, be prepared, and keep moving on!!

## Sources of information

Thanks to Geoff Shaugnessy and Eric Swartz, SFWMD's crack meteorologists

The Palm Beach Post  
The Miami Herald  
"El Niño Hype Watch 1998"

website: <http://www.primenet.com/~rfwatts.elnino.html>

National Oceanographic and Atmospheric Administration El Niño Southern Oscillation website: [http://www.nic.fb4.noaa.gov:80/products/analysis\\_monitoring/ensostuff/index.html](http://www.nic.fb4.noaa.gov:80/products/analysis_monitoring/ensostuff/index.html)

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**Editorial**

*Continued from page 3*

Okeechobee. The Exotic Pest Plant Council (EPPC) has identified eleven Category I invasive exotic aquatic plants in Florida. These are the plants with the greatest capacity of becoming widespread pests, yet the possession of only six is prohibited in Florida; wild taro is still commercially available in plant nurseries.

Aquatic plant management costs are minor when compared to the value of public lakes and rivers. A 1985 U.S. Fish and Wildlife Services report estimated a \$1.5 billion value from fresh water fishing alone in Florida. A recent study showed a \$50 million annual economic value from just one central Florida lake; 2,000 acre Lake Tarpon in Pinellas County. While it is difficult to add up the environmental losses caused by more than a quarter million acres of water hyacinth and hydrilla, financial costs are easier to calculate. Economic values diminish

sharply when water surfaces are covered by invasive plants. The economic values of Orange and Lochloosa Lakes dropped tenfold when these waters were infested by hydrilla. Nearly \$100 million will be spent in Florida public waters during the 1990s to suppress water hyacinth and water lettuce (\$27 million) and to bring hydrilla under maintenance control (\$72 million).

Government leaders and aquatic plant managers at all levels must remain cognizant that the expansion and maintenance control of water hyacinth and hydrilla came at an enormous environmental and economic price. Austerity measures or indifference toward invasive aquatic plant management during early colonization have the opposite impact in that these policies (or lack of initiatives) lead directly to widespread problems that ultimately cost millions of dollars to contain.

By Jeff Schardt  
Environmental Administrator  
DEP

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The newly released *Guide to Aquaculture Calculations and Conversions* gives fish farmers a handy reference for computing sometimes complex mathematical formulas and conversions. The 44-page resource was written by Andrew Lazur, specialist at the Sam Mitchell Aquaculture Demonstration Facility in Blountstown, Florida.

Subjects include water volume calculations for tanks for various shapes; water volume calculations for earthen ponds; methods for estimating fish weight; and chemical treatment calculations. Each calculation is laid out step-by-step, using examples, and clearly indicating exactly what information is required.

*Guide to Aquaculture Calculations and Conversions* is \$7 a copy, plus \$3 shipping and handling, from the Publications Distribution Center, University of Florida, P. O. Box 110011, Gainesville, FL 32611-0011, (352)392-1764. Checks should be made payable to the University of Florida and must include appropriate county sales tax (6%, 6.5%, or 7%).



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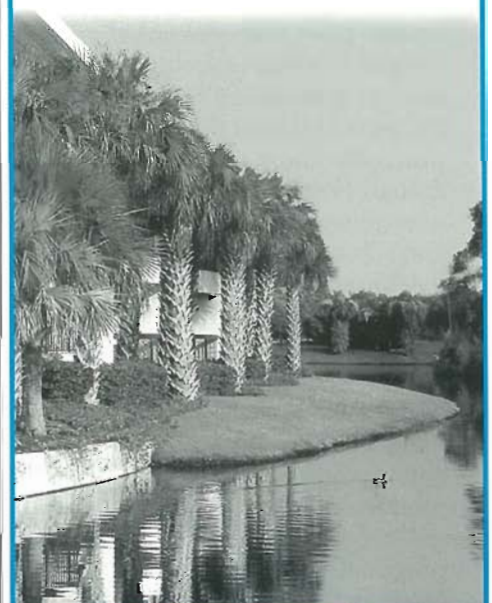
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# Effects of El Niño on Aquatic Plant Management in Florida

## INTRODUCTION

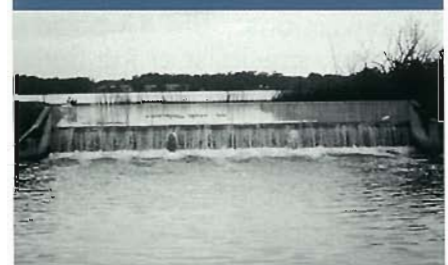
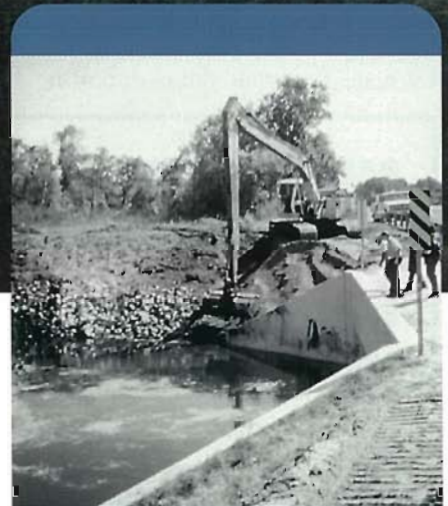
The summaries that follow were provided by managers from various water management districts, and local, state, and federal agencies.

Anticipated to cause a serious setback, the 1997-98 El Niño caused few lasting negative impacts on aquatic plant management in Florida. El Niño's calming effect on tropical systems in 1997 allowed last year's hydrilla treatments to proceed without disruptions. Even though 1998 hydrilla treatments were rain-delayed, the high water, and subsequent treatments during the Spring drought have produced successful results. Tussocks have become a problem in certain areas due to high water levels, but bridges and flood control structures remain clear, and use of public access points has been, or is in the process of being restored. In general, floating plant management programs survived El Niño '98. Many factors contributed to the degree of impact El Niño had on

Florida's aquatic plant management program, but the fact that most programs endured the flooding is yet another example of the environmental and economic benefit of achieving maintenance control.

## CITRUS COUNTY Tom Moldenhauer, Aquatic Plant Manager

Citrus County did not escape the wrath of El Niño. Excessive rainfall and the resultant flooding on the Withlacoochee River caused an increase in tannic acid concentrations. These tannins impart a tea-brown color to the water resulting in lower sunlight penetration and lower submersed plant production. This was especially evident in the Inverness Pool of Lake Tsala Apopka where there had been hydrilla tuber production last year. This year, probably due to the high, dark water, only five hydrilla tubers were found in twenty five samples.



*Top: Flooding of the old Rysco shipyard on the Appalachicola River near, Calhoun County. Photo Courtesy of The County Record, Calhoun County, FL*  
*Top Right: Removing tussocks on Jackson Creek, Highlands County. Photo by Carl Smith*  
*Bottom: Spillway and Grass Carp barrier, Little Lake Jackson, Highlands County. The Grass Carp barrier was ordered to be removed to alleviate residential flooding. Photo by Carl Smith*



Floating plants, however, increased due to flood waters flushing plant populations from once isolated marsh systems.

The west coast did not escape the El Nino effects either. The tannin stained water was evident as far as fifteen miles out into the Gulf of Mexico. The main fresh water springs (Crystal and Homosassa Rivers), were pumping large volumes of water, but it was also discolored. This dark water limited sunlight penetration which reduced plant growth. Lyngbya, however, continued to do well especially in the hot drought that followed the flooding.

**LAKE COUNTY**

**Eric Cotsenmoyer, Director Mosquito and Aquatic Plant Management**

High water levels affected the southern portion of Lake County the most, but no change in aquatic plant management activities occurred. Major changes in littoral zone grasses, however, were observed during and after lake level fluctuations. The density of most species seems to have increased, and they look robust and healthy. A healthier littoral zone is a positive change for most waters in Lake County.

**NORTH WEST FLORIDA REGION - DEP**

**Jess Van Dyke, DEP Biologist**

"Men plan, God laughs." There is no such thing as average rainfall anymore. It has been "flood, drought, flood" in northwest Florida. With the anticipated effects of La Nina, we may have another dry spell this winter, so it will be "flood, drought, flood, DROUGHT!" These deviations from normal rainfall have added a certain twist to aquatic plant management here. Rising water appeared to enhance the efficacy of Sonar on hydrilla in Lake Jackson. On the other hand, the drawdown of Lake Talquin was delayed by heavy rains and the



Formerly dry residential area between Middle Lake & Lake Hancock, Pasco County. The photo was taken from an airboat in 6 inches of water on a road between the two lakes. The water hyacinths are growing over the fenced-in back lawn. Photo by J.D. Wikert

reflood delayed by drought. I find drought exacerbates aquatic plant problems and not simply because shallower water is more productive. Filamentous algae thrives during periods without rain. Without the pounding effects of heavy rainfall, thick mats of "green slime" cover a

number of lakes here and the phone rings off the wall! The good news about the hot, dry spring and early summer is that water hyacinth control was been excellent. There was no downtime for rain and the uptake of 2,4-D was very rapid. You could almost watch them wilt!

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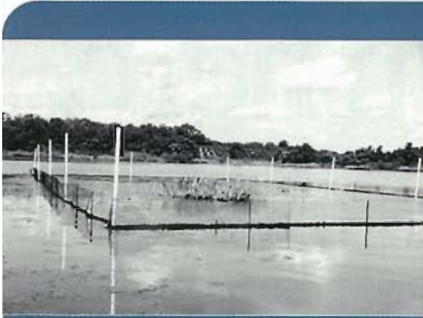


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*Before*



*After*

*Middle Lake, Pasco County, grass carp enclosure. Before: Sept. 97 water depth was 3 feet. After: April 98 the ten foot pvc posts are barely showing above the water surface. Photos by J.D. Wikert*

**PALM BEACH COUNTY**  
**Barry Jennings,**  
**Environmental Program**  
**Supervisor**

According to South Florida Water Management District meteorologists, Palm Beach County was at 280% of normal rainfall for the November through March time period. In addition, to help lower

Lake Okeechobee, SFWMD directed neighboring Lake Worth Drainage District to release water into canals that interconnect with Palm Beach County lakes. As a result, flow rates in Lakes Ida, Osborne, Clark and Pine were too high to conduct the planned hydrilla treatments with Sonar. Aquathol Granular was used later in the spring of 1998 to treat hydrilla.

**POLK COUNTY**  
**Dean Jones, Aquatic Weed**  
**Manager**

El Niño 1998 meant 43.39 inches of rain in Polk County between September and March. Although many lakes were near record levels, the drought that followed quickly brought lake levels back to more normal conditions. Hydrilla treatments that generally start in mid February were delayed until the end of April. Reallocation of DEP aquatic plant management funds from other projects permitted us to boost fluridone concentrations on difficult to manage lakes (Lakes Marion, Pierce, and Weohyakapka). The apparent success of these delayed treatments may result in protocol changes for future treatments; i.e. increasing fluridone concentrations, and delaying treatments until late spring.

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expansion of water hyacinth and water lettuce populations as a result of El Nino were not observed.

Through June, Polk county applicators have treated 665 of the approved 2710 acres of floating plants. All of Polk County's 76 public lakes remain under maintenance control.

**LAKE ROUSSEAU**  
**Terry Sullivan, Biologist, DEP**

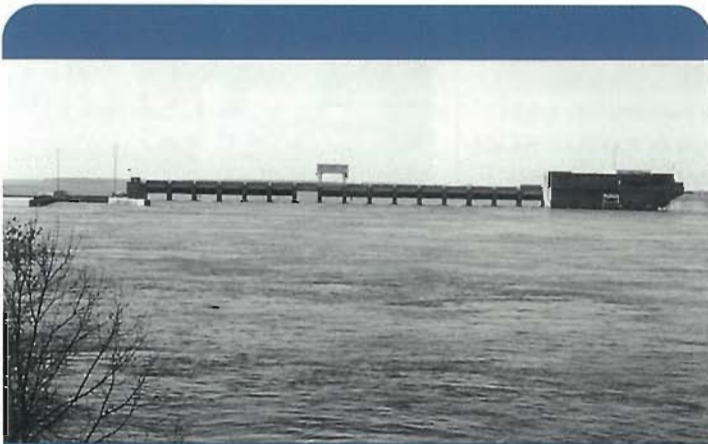
El Nino rains produced flows greater than 7,000 cubic feet per second (cfs) in Lake Rousseau this spring. In the past, hydrilla treatments using Sonar SRP have only been conducted during flows of

1,500 cfs or less in this 4000 acre reservoir. Due to the success of previous treatments, only 70 acres of hydrilla were found in the western end of the lake near the old hydro-electric dam. This area had totally topped out with hydrilla due

to our inability to treat this spring. Finally, by June 1998, flows reduced enough to enable a treatment with Aquathol K. I'm happy to report this treatment was a success.

**SOUTH FLORIDA WATER MANAGEMENT DISTRICT**  
**Mike Bodle, Senior Environmental Scientist**

Meteorologists told the gang of would-be hydrilla wranglers in South Florida and the Kissimmee chain of lakes that El Niño was likely to make Winter 1997-8 wetter and cooler than average. Only moderately cooler, though, as persistent cloudiness was likely to lower overall temperatures, but fewer actual freezes were expected. The group in Kissimmee had hoped to treat hydrilla in January, to minimize native plant effects from the use of fluridone herbicide. But, El Niño rainfall came and the Osceola County region seriously



Looking north on the Appalachianola River, Gadsden County, to Lake Seminole at the Jim Woodruff Lock. Elevation difference between the lake and river is normally 34 feet! Photo courtesy of the County Record, Calhoun County, FL.

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flooded over the Christmas holiday. And, then, the rains just kept coming.

Obviously, aquatic plant treatments were not in the cards this winter. From November 1987 to March 1998, the upper Kissimmee region received 282 percent more rain than normal. (33 inches of rain were received, while 12 would have been normal.) All waterways were overloaded for months on end, and, to further the havoc, tornadoes repeatedly and savagely tore through the region. More southerly jet streams in winter tend to empower strong continental fronts to come as far south as Florida, but this was ridiculous.

As winter turned to spring, jet streams migrated back north, and the rains abated. Strong breezes, dry conditions, few clouds and the sun's return to higher angles in the spring sky all contributed to lots of drying. Before people had picked up the pieces from winter's tumult, many were facing disastrous fires.

But South Florida was spared the serious fire damage suffered in the state's northeastern counties. The region received 5 inches (35 percent of normal) of the normal 14 inches of April through June rains. Finally, this was the time to get the helicopter in the air, and the buckets dumping into the hopper. For several months, as spring turned to summer, no significant water releases were needed from the waterways of the Kissimmee lakes. In eight weeks, a new record was set for the Kissimmee chain-of-lakes chain gang. Treatments costing \$5.5 million were applied to 7,600 acres of hydrilla, principally in Lakes Kissimmee, Hatchineha, Cypress and Tohopekaliga. Hopefully, about 50,000 acres of the weed will succumb to this onslaught.

In-lake sampling confirmed that good levels of fluridone remained dispersed throughout the lakes during, and beyond, the treatment period. Three to seven parts per billion of fluridone were commonly



*Water lettuce backed up against the bridge on highway 27 over the Ichetucknee River.  
Photo by Joe Hinkle*

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found in areas beyond the actual treatment zones. When these levels are maintained for extended periods of weeks, hydrilla control can be expected to result. We're still following the progress of these treatments, and trying to get a recycler to take away one heckuva mountain of empty SONAR buckets. But, everything's looking good. From the point of view of these treatments, El Niño was a good boy, after all.

Control of floating weeds, was another story, however. The winter's extended rainy periods kept aquatic weed managers off the water for days and weeks at a time. There were no serious freezes, and numerous fronts brought lots of wind with the rains. Water hyacinths and water lettuce from Homestead to Pahokee and Okeechobee to Kissimmee kept growing and blowing 'round and 'round. Around Lake Okeechobee, SFWMD crews that normally treat weeds were running pumps and repairing water control structures. Then, the rain stopped, but the winds didn't. Very little floating weed control was performed in March and April anywhere in South Florida. By summer, however, treatments had resumed and floating weed hotspots remained only in sections of Lakes Okeechobee and Kissimmee.

**SOUTHWEST FLORIDA  
WATER MANAGEMENT  
DISTRICT**

**Brian Nelson,  
Administrator, Aquatic  
Plant Management Program**

As a result of heavy rains last fall and winter, the Withlacoochee River reached and exceeded flood stage. The river was closed to all boat traffic by local governments due to extensive residential flooding. This period of high, dark, water came on the heels of a very successful fluridone treatment last spring so hydrilla was not abundant prior to flooding. The absence of significant amounts of hydrilla

coupled with the high flow conditions during the spring diminished both our ability and need to treat this year. The lack of significant rainfall during April, May and June has caused the water to clear and levels to drop resulting in perfect conditions to stimulate hydrilla growth. To date, however, significant regrowth has not occurred and it does not appear that hydrilla will cause significant problems on the Withlacoochee River this summer.

Floating plant control operations were completely suspended on the Withlacoochee River for the six-month period December to May. Floating plant populations were effectively pushed into the woods and the typical flush of spring growth was insignificant. The river has been returned to an effective maintenance control level with only a minor amount of work.

Less than the anticipated number of vegetation jams on bridges required clearing during the flooding conditions. The incidence of fallen trees and associated jams, however, were slightly increased.

The Myakka River and Upper Myakka Lake also exceeded flood stage. Upper Myakka Lake had also been successfully treated with fluridone last spring. Water levels

quickly receded due to the lack of spring rains and a hydrilla treatment was possible this year but was not necessary due to the lack of hydrilla. Hydrilla was present only in the very shallow margins of the lake which were not exposed to fluridone last year. These areas were dry during the treatment which occurred during low water/low flow conditions. This would appear to suggest that while the high flow conditions probably had some affect on hydrilla abundance, last years successful treatment and not high water is the likely reason hydrilla growth is still suppressed on upper Myakka lake.

On this system, which fluctuates considerably on an annual basis, vegetation jams are common on bridges, sharp river turns and other restrictions. A slightly higher number of jams occurred as a result of the flooding conditions contributed to El Nino rains.

**ST. JOHNS RIVER, USACE  
Palatka District  
Nancy Allen, Aquatic Plant  
Control Field Unit Manager**

The storm events associated with El Nino have had both a positive

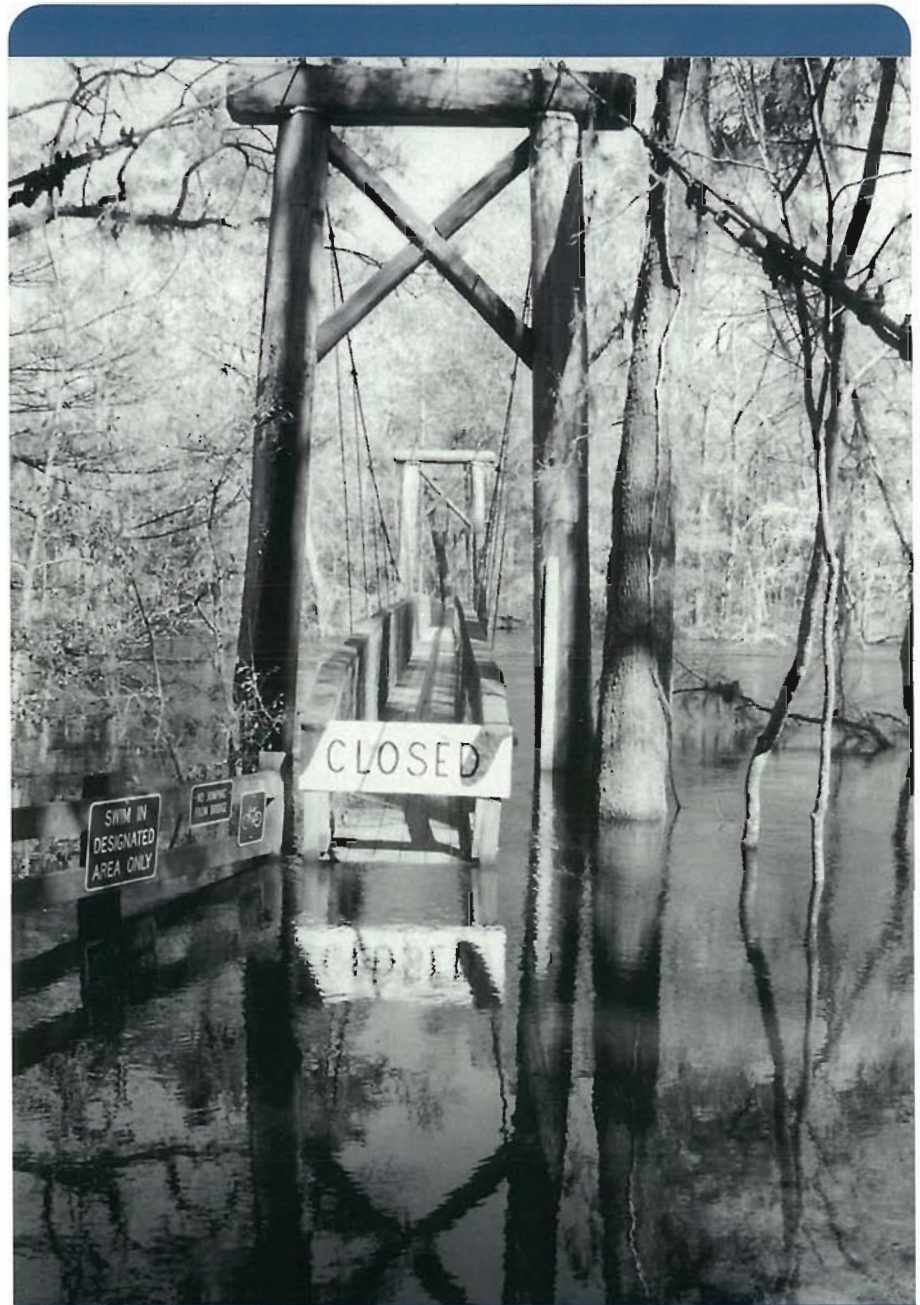


*Tussocks impact homes along the St. Johns River. Photo by Charlie Ashton*

and negative impact on the aquatic plant management program on the St. John's River. High water and high winds increased the amount of snags and debris floating on the St. Johns River and its tributaries. High water levels between highway 46 and highway 520 actually helped us reach and treat numerous pockets of water hyacinths and water lettuce which were normally isolated. The down-side in this area was that numerous mats of mixed vegetation broke free and continuously jammed against the bridges. Extra staff time was required to clear the tussocks off the bridges and ramps. High water from highway 46 north to Lake Monroe, impacted our program when a no-wake zone was implemented due to residential flooding concerns. Areas scheduled to be treated had to be skipped or, if treatment was possible, travel time from the ramp to the work-site increased due to the slow speeds zones.

Lakes Woodruff and Dexter have benefited from the high water in that water hyacinths and water lettuce were flushed through the system. Floating plant populations in both lakes are currently at record low levels. The hydrilla in Lakes Woodruff and Jessup also took a hard hit. Lake Woodruff had approximately 110 acres of hydrilla according to last year's annual inspection. Due to the impact of the high and dark waters, its hydrilla population has crashed. The same is true on Lake Jessup where we have been treating new hydrilla infestations with Sonar and Aquathol.

The high water is now receding and untreated water hyacinths and water lettuce are being stranded on high and dry land. El Nino could have impacted our program much more negatively, but overall I believe that it has benefited our aquatic plant maintenance program.



Foot bridge across the Santa Fe River, Columbia County, Oleno State Park. Photo by Joe Hinkle.

## SUWANNEE RIVER REGION- DEP Joe Hinkle, DEP Biologist

Approximately 950 acres of hydrilla disappeared in Sampson Lake since May 1998. This decline in hydrilla was likely due to the increase in water levels. Suwannee River Water Management District information indicates water levels increased by 4.25 feet and stayed

high for approximately a month. Areas which were solid hydrilla are presently a mixture of *Nitella*, *Sagittaria*, *Bacopa*, coontail, and southern naiad. The hydrilla treatment scheduled for spring in Sampson Lake was canceled. The high water, however, did not seem to have any effect on hydrilla in neighboring Rowell Lake. As a result of the extreme flooding on the Ichetucknee River a large area of water lettuce backed up at the bridge at US 27.



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# AQUAVINE



## DEP Bureau Name Change

The Department of Environmental Protection's Bureau of Aquatic Plant Management has a new name. It is now the *Bureau of Invasive Plant Management*. This change reflects the fact that the bureau is now also coordinating the control of upland invasive plants on public conservation lands. Funding for this program comes from the CARL Trust Fund.

## New Arrivals !

Robbie Lovestrand (DEP) and wife Shannon welcomed the arrival of their second son, Jeremiah, early this spring. Dave Eggeman (FG&FWFC) and wife Diane welcomed the arrival of their first child, Leah Christine, in June.

All are doing fine, and are awaiting their first duck hunts with mom and dad!

## USACE Web-Site

Check it out!! The Aquatic Plant control Operations Support Center Information Exchange Bulletin will be published on USACE's aquatic plant control home page located at, [http://www.saj.usace.army.mil/conops/apc/apc\\_page.html](http://www.saj.usace.army.mil/conops/apc/apc_page.html).

## MEETINGS

10th International Symposium on Aquatic Weeds, "Towards an integrated aquatic plant management", Lisbon, Portugal, September 22-25, 1998.

North American Lake Management Society, 18th International

Symposium, "Cooperative Lake and Watershed Management: Linking Communities, Industry, and Government.", November 11-13, 1998, Banff, Alberta, Canada, Contact Brian G. Kotak 403-525-8431 or Internet, [www.biology.ualberta.ca/alms/1998.htm](http://www.biology.ualberta.ca/alms/1998.htm) for further information.

## 22<sup>nd</sup> ANNUAL MEETING OF THE FLORIDA AQUATIC PLANT MANAGEMENT SOCIETY

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Hopefully to be considered as light humor by most, this column is written for all the hardworking and caring professionals who dedicate their work afield to excellence in aquatic plant management. David Tarver*

# Funny how some traditions just feel natural.



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Source: Van Thai, K., et al, *Weed Science*. 1987. Volume 35: 247-252.

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