Florida LAKEWATCH

Dedicated to Sharing Information About Water Management and the Florida LAKEWATCH Program Volume 57 (2012)

Jerry Entel

A dock out of water on Lake Clay in Highlands County.

Long-Term Weather Patterns, Drought and Lake Levels

Many Florida LAKEWATCH volunteers have been forced to stop sampling their lakes because there is not enough water to get a boat out on the lakes to sample. This is not the case for all of Florida but as the following newspaper articles and recent pictures of Orange Lake and Lake Newnan Alachua/Marion Counties can attest to, it is certainly true for much of central Florida:

· **Low water in area lakes**
Shrinking lakes, ponds, creeks and rivers throughout Marion County, have caused officials to warn of potential problems at area boat ramps. Published April 18, 2012 http://www.gainesville.com/article/20120418/ARTICLES/120419543

· **[Thousands of fish killed on Newnans Lake](http://www.gainesville.com/article/20120322/ARTICLES/120329833)**
Low water levels and heat have resulted in the deaths of thousands of fish on Newnans Lake east of Gainesville. Published March 22, 2012
http://www.gainesville.com/article/20120322/ARTICLES/120329833

· **[Water district mulls options for parched Keystone area lakes](http://www.gainesville.com/article/20120312/ARTICLES/120319892)**
The plummeting water levels of lakes Geneva and Brooklyn have been a concern for years as the extended drought. Published March 12, 2012
http://www.gainesville.com/article/20120312/ARTICLES/120319892

Many lakes suffering from drought conditions are in direct contact with the local ground water generally referred to as an aquifer. Florida has several fresh-water aquifer systems. The major three are the Floridan aquifer system (FAS), the intermediate aquifer system (IAS) and the surficial aquifer system (SAS). The FAS is the most important aquifer in Florida and it is the source of drinking water for over 90% of Floridians. Additionally, most of the ground water discharging from our springs originates from the FAS. The IAS does not exist in all parts of Florida and, therefore, is only locally important. The SAS exists over most of Florida, and in portions of Florida the SAS is an important source of water supply and the system most important to lake water levels.

Anything that brings water levels down in the aquifers, especially the surficial, can cause lower lake levels. Therefore, excessive pumping of ground water can at times bring local shallow lake levels down. Good examples of this can be found in a few lakes in Hillsborough and Pasco Counties that are located around well fields supplying potable water for the counties. Some of these lakes are actually augmented with well water to maintain the aquatic flora and fauna of the area. However, the major factor driving the water levels of most aquifer systems and surface water flows into lakes, thus lake levels, is the amount of recharge from rainfall. The current lake level situation mentioned above is primarily caused by the large cumulative deficit in rainfall that central Florida has been experiencing for the last several years. The plot on page 3 shows the cumulative rainfall record measured in Gainesville Florida for the last 110 years. Cumulative rainfall is calculated by consecutively adding the annual amount of rainfall above or below normal. Since the 1970s Gainesville has

Mark Hoyer

Newnans Lake in Alachua County in April 2012.


Leon Couch

Lake Higgenbotham County in May 2012.

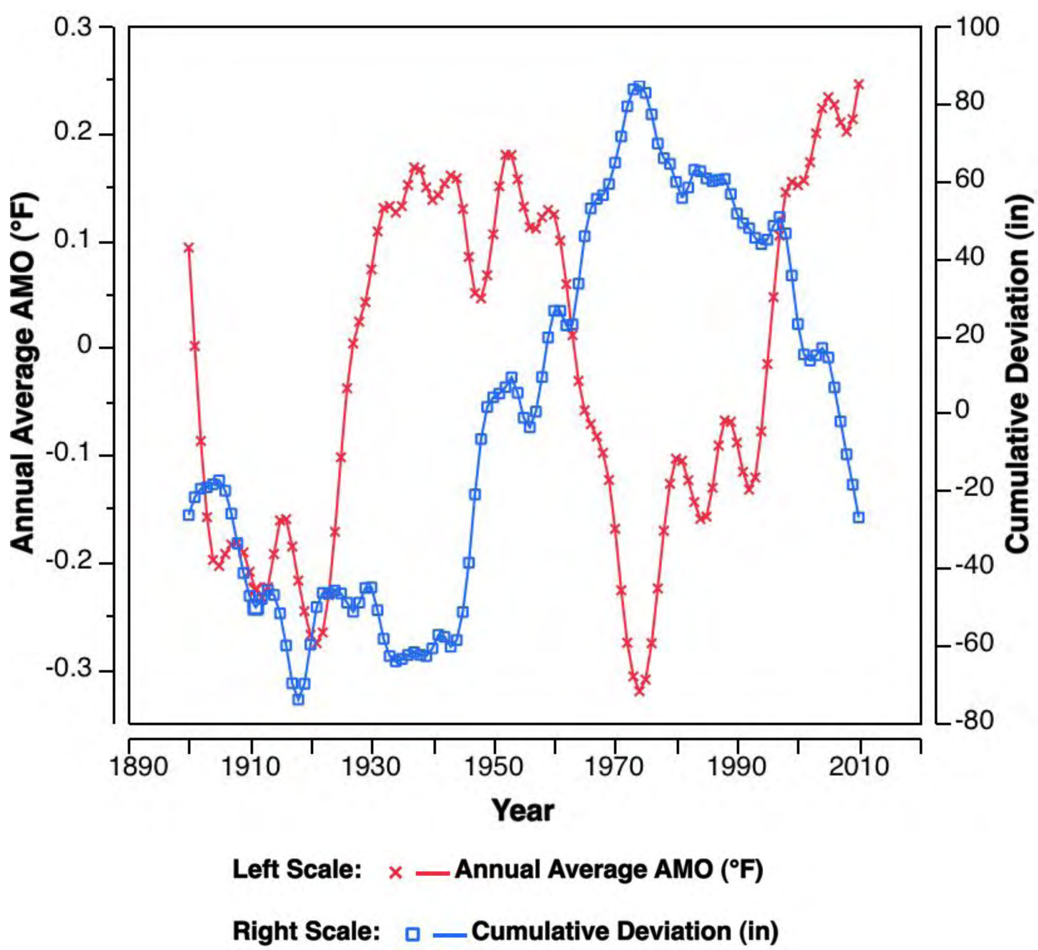
been experiencing a continual rainfall deficit causing less aquifer recharge and lower lake levels. The long–term record shows that these extreme dry conditions have happened before (1910-1940) and that there appears to be a multidecadal pattern.

Most interestingly is the apparent inverse relation between Gainesville's cumulative rainfall record and the Atlantic Multidecadal Oscillation (AMO) in water temperature. The AMO is an ongoing series of long-duration changes in the sea surface temperature of the North Atlantic Ocean, with cool and warm phases that may last for 20-40 years at a time and a difference of about 1°F between extremes. These changes are natural and have been occurring for at least the last 1,000 years. The good news is that we appear to be reaching the historically recorded bottom of the rainfall deficit and the peak of the AMO. Therefore, if history is a good guide the AMO should start falling and an annual surplus of rain should start happening and our lakes will begin to rebound and fill up. Until then be an optimist, pray for rain and sample when you can!

Because of the water level issues mentioned above and the interest shown by many volunteers, LAKEWATCH is currently researching the possibility of getting volunteers involved in measuring water levels in Florida's aquifers. We are currently working out the details with a newly formed organization called AquiferWatch.

AquiferWatch

Good Water for Life



More information will be coming your way in the near future so keep reading you newsletters.

It's time for the Secchi Dip-in Again

This is an invitation to participate in this year's Secchi Dip-In, which runs from June 23, 2012 to July 15. This is the 19th year of the Dip-In, and the three week event in June and July is beginning to see the fruits of the volunteers' efforts.

Mega-Expansion of the Database

Questions of status and change of our waterbodies has increasingly become a focus of concern among citizens, scientists, and governments. The demand for environmental data has begun to outweigh the demonstration that volunteers can collect meaningful data. That volunteers can collect quality data has been well-established since we began in 1994.

We are entering a new phase of the Dip-In, where dissemination of data to the Public will become an important component of our mission. The Dip-In database is an ideal spot to produce a user-friendly site where any volunteer or agency can enter data, edit past data, and personalize the site with photos of the site or of the volunteer activity.

To accomplish the task of producing a comprehensive volunteer database, we are combining our data with that gathered by Dr. Dan Canfield and his group at the University of Florida. Dan has been soliciting data from volunteer programs and governmental agencies throughout the United States. His efforts have produced a database with over 975,000 records on over 13,000 waterbodies.

The next task facing us is the incorporation of this massive dataset into the on-line Dip-In dataset. This will be no easy task because there are numerous duplicate records in the databases and each waterbody has to be checked to verify its name and location. There is no funding for this task, which doesn't make the job impossible, just lengthy.

The result will be a database where anyone can find data on many lakes and other waterbodies and where volunteers, coordinators, and agency officials can have add or edit their data. Where it will go from there is dependent only on the imagination and needs of coordinators and volunteers.

Volunteer Perceptions

The expanded database does not lessen the importance of the annual collection of transparency readings by volunteers during the Dip-In. It has been a central theme of the Dip-In that, when possible, the data be collected and submitted by the volunteers themselves. The reason for this is that we ask questions of the volunteer's perception of water quality and quality problems. These data have produced some interesting findings on the relationship between Secchi depth and volunteer perceptions.

Trends in Transparency:

Thanks to contributions from Dip-In volunteers and the additional Canfield data we now have 5 years or more data on more than 4,500 waterbodies. Our latest analysis, which you can view at our Dip-In website (http://www.secchidipin.org) suggests that about 17% of the monitored lakes are changing at significant rates. Ongoing transparency contributions can only add to the number of lakes examined and the number of years included in the trends.

Presence on Facebook:

Have you "liked" the Secchi Dip-In site on Facebook? We have posted a number of photos of volunteers, Secchi disks, turbidity tubes and even data graphs on the site. You are welcome to post additional photos as well as announcements of your own program's activities. We would be happy to provide links to your program.

Your Contribution is Needed:

Would you please consider participating this year? Probably never in recent history have our environmental efforts been more under greater attack by special interests. The Dip-In won't solve our environmental crisis, but its data has and will continue to be a chance for volunteers to contribute to any large scale consideration of status and trends of water quality in North America. You can make a difference, both for your local efforts and for the world.

For more information, please contact

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Mobile: (330) 221-3746

Dip-In Site:
http://www.secchidipin.org

Facebook Site:
http://www.facebook.com/secchidipin

2012 Secchi Dip-In

June 23 - July 15, 2012

Hydrilla Management in Florida Lakes

Stacia A. Hetrick and Ken A. Langeland

Hydrilla (*Hydrilla verticillata*) is the most aggressive invasive plant in Florida waters. It can provide some benefits to fish and wildlife at low levels of coverage, but it also can have major detrimental impacts to water uses, causing substantial economic and environmental hardships.

History and Habitat

Native to southeastern Asia, hydrilla was introduced to Florida in the 1950s through the aquarium trade. It has since spread throughout Florida and continues to spread in many parts of the United States. Hydrilla has become a serious weed and is found in freshwater lakes, rivers, reservoirs, ponds, canals, and ditches.

Figure 1. Hydrilla (*Hydrilla verticillata*) plant with flowers.

Identification

Hydrilla grows submersed in water and is rooted to the lake bottom, although sometimes fragments break loose and survive in a free-floating state. Erect stems can grow longer than 10.6 m (35 ft) when the plant grows in deep water (Figure 1). Branching is usually sparse, but when it grows near the water surface branching becomes profuse. Hydrilla's small leaves (2–4 mm [.08–.15 in] wide, 6–20 mm [.24–.79 in] long) are strap-like and pointed. They grow in whorls of four to eight (rarely three) around the stem. Leaf margins are coarsely saw-toothed, and one or more sharp teeth may be present along the length of the midrib on the underside of the leaf (Figure 2). Often a small bump appears where the tooth has aborted. Common waterweed (Brazilian elodea, *Egeria densa*) can be misidentified as hydrilla but is uncommon in Florida. When in doubt, an expert should be consulted for identification.

Figure 2. Underside of hydrilla leaf.

Reproduction and Distribution

Only the female dioecious biotype of hydrilla (male and female flowers on different plants) occurs in Florida. Therefore, hydrilla does not reproduce from seed in Florida. Female flowers are borne on thread-like stalks and float on the water's surface (Figure 1). The flowers are solitary and have whitish petals and sepals, each about 4 mm (.15 in) long.

Hydrilla produces compact dormant buds called turions (Figure 3) in leaf axils. It also produces tubers (Figure 4) on the end of rhizomes (underground stems) and stolons (horizontal stems). Plant fragments and stems laden with mature turions can drift throughout a water body producing new plants. Turions are 5–8 mm (.2–.31 in) long, dark green, and appear to be spiny.

Figure 3. Hydrilla turion.

Tubers can be found throughout sediments up to 30 cm deep. They are 5–10 mm (.2–.39 in) long and are off-white to yellow unless they take on darker colors from organic sediments. Hydrilla can produce tubers in the millions per acre from September through March. Tubers can remain dormant for several years; they are not impacted by most management activities; and a low percentage of the tubers continue to sprout throughout the year. These attributes make hydrilla difficult if not impossible to manage and/or eradicate.

Figure 4. Hydrilla tuber.

Impacts and Benefits

Hydrilla causes serious environmental and economic impacts in Florida. It produces dense canopies that can cover the entire surface of a water body and have the potential to reduce plant diversity by shading out native submersed plants. The canopies also provide ideal breeding environments for mosquitoes; reduce aquatic life by lowering dissolved oxygen concentrations; and cause wide fluctuations in pH and surface water temperatures. Dense infestations can greatly impact water uses by restricting navigation and recreational activities such as boating, swimming, and fishing (Figure 5). Tourism, property values, native plant communities, water quality, fisheries, and flood control also can be impacted by hydrilla infestations.

In the absence of other structure, hydrilla presence can provide habitat and food resources for fish and wildlife and has been associated with quality largemouth bass populations. Hydrilla also provides quality nursery habitat for juvenile fish. However, high hydrilla coverage can reduce fishing efforts because it can pose difficulties for angler access, may cause fish growth rates to decline, and represents a risk to fish populations because of low oxygen and potential fish kills.

Credits: Stacia Hetrick, UF/IFAS Osceola County

Figure 5. Hydrilla infestation on an 8–10 foot deep Lake Tohopekaliga in Central Florida.

Some aquatic birds and waterfowl use hydrilla as a food resource. Some migratory ducks and coots feed on hydrilla while over-wintering in Florida, and many duck hunters target areas where hydrilla occurs. Alternatively, some bird species that swim through the water to forage, such as anhinga and double-crested cormorants, tend to be less abundant in areas with large amounts of hydrilla.
While hydrilla may have some recognized benefits to fish and wildlife, maintaining low to intermediate coverage that does not impact other uses of the water body has proven to be difficult in most aquatic systems.

Management Responsibility

The Florida Fish and Wildlife Conservation Commission (FWC) is designated by the Florida Legislature as the lead agency responsible for coordinating and funding invasive plant management programs on public waterways in Florida. This authority is carried out under the FWC's Invasive Plant Management Section (IPMS) through the Aquatic Plant Management Program. The IPMS contracts with public agencies and private companies to manage plants in public water bodies, but other government authorities or property owners are responsible for plant management in canals, private waters, and sovereign waters that do not have public access.

Purpose

Management of hydrilla is conducted for various reasons, depending on the desired uses of the water body. History suggests that hydrilla rarely remains static and often expands and interferes with many lake uses if not managed. Hydrilla is managed on public lakes to maintain navigation and flood control and to enhance native emergent and submersed plants (such as pondweed and eelgrass).

Planning

In 2011, the FWC published the agency position on hydrilla management, which states that the FWC will determine the level of hydrilla management on each public water body using a risk-based analysis that considers human safety issues, economic concerns, budgetary constraints, fish and wildlife values, and recreational use, with input from resource management partners and local stakeholders.

Hydrilla management programs are developed each year for public water bodies. Government contractors and FWC biologists draft management strategies that are reviewed by local, state, and federal agency personnel and other stakeholders who have expressed interest in invasive plant management in public waters. Reviewers then meet to establish management plans, priorities, and budgets for the ensuing year.

For aquatic plant management on the Kissimmee Chain of Lakes, a small interagency group was formed in the 1980s to aid communications between the Florida Fish and Wildlife Conservation Commission (formerly Florida Game and Freshwater Fish Commission), the Florida Department of Environmental Protection (formerly Florida Department of Natural Resources), the South Florida Water Management District, and the U.S. Army Corps of Engineers. More than 25 years later, this group still exists – although the membership roster has increased to nearly 100 individuals from city, county, state, and federal agencies in addition to hunting and angling organizations, state universities, and a variety of citizen groups. Even though FWC is the lead entity for aquatic plant management, the creation of a Kissimmee Chain of Lakes aquatic plant management plan involves input from all of these stakeholder groups.

Herbicide Stewardship

Throughout the 1980s and 1990s, the herbicide fluridone was used to selectively manage hydrilla on a large-scale in Florida waters. In 2000, researchers at several institutions, including the University of Florida, verified what aquatic plant managers had suspected for several years: Hydrilla was developing a resistance to fluridone in waters that had received repeated applications of this herbicide active ingredient. Research revealed that several populations of hydrilla, particularly in large Central Florida lakes, are resistant to low fluridone concentrations. High doses of fluridone will still control resistant hydrilla, but these higher concentrations impact non-target aquatic plants and significantly increase the cost of control. Further, hydrilla on a few lakes in Central Florida is showing resistance to endothall-containing herbicide products, another mainstay in Florida hydrilla management. Researchers agree that the best strategy for resistance management is the development of multiple tools that can be used in rotation. This approach has been used successfully in agricultural weed management throughout the world.

Herbicides

Herbicides are a type of pesticide made specifically to kill or inhibit the growth of plants. All pesticides must be registered for their specific use by the U.S. Environmental Protection Agency (EPA), and they must be approved by the Florida Department of Agricultural and Consumer Services (FDACS) before they are used in Florida. Aquatic herbicides are a type of pesticide that has been approved by EPA to manage plant growth in aquatic systems. The label associated with each product is a legal document that describes the approved target plants, sites of application, application rates, and any restrictions on the use of water following treatment. Herbicide application techniques include helicopter, fixed-wing aircraft, boat, truck, or backpack sprayer, and they are selected based on various factors including the size of the target treatment (Figure 6).

Herbicide products used to manage hydrilla in Florida lakes contain the active ingredients endothall, diquat, copper, fluridone, penoxsulam, imazamox, bispyribac-sodium or flumioxazin.

Endothall-containing products are now the most widely used herbicides for large-scale hydrilla management in Florida. Endothall is a contact herbicide and requires only 12–72 hours exposure time (depending on concentration of the herbicide in the water) to be effective. Traditional use patterns of endothall included small-scale applications for access, navigation, and treatment of new hydrilla infestations. As fluridone-resistant hydrilla became more prevalent, the switch to large-scale endothall applications was evaluated. Researchers have determined that the most effective time of year to implement large-scale hydrilla control with endothall is in late fall to early spring when water temperatures are cooler and the microbes (bacteria) that break down endothall are less active. When treating cool water, endothall breaks down at a slower rate, resulting in increased exposure of the target plants. The cooler water holds more dissolved oxygen compared to the summer and early fall months, and the slower recovery rate of the plants allows for more effective control. Additionally, hydrilla produces tubers in the fall, so stressing the plants with herbicide during this time has the potential to decrease the amount of tuber production.

Figure 6. An application of aquatic herbicide using an airboat with trailing hoses for treating hydrilla. Note: Filamentous algae is on the water's surface and hydrilla is below.

Credits: UF/IFAS Center for Aquatic & Invasive Plants

Since the late 1980s, fluridone has been the most widely used herbicide for large-scale hydrilla management in Florida public waters. It is usually applied as a whole-lake treatment. Fluridone is a slow-acting herbicide and can provide control of hydrilla with little or no damage to other plants in the treatment area (selective). For fluridone to be effective, hydrilla must be exposed to it for long periods compared to endothall. Depending on environmental variables, especially concentration of the herbicide in lake water, hydrilla must be exposed to lake water for a minimum of 60 days. As a result, sequential fluridone treatments — often called "bumps" — are usually applied over a period of time to ensure that a lethal concentration of the herbicide is maintained in the water column. Fluridone is still used for managing hydrilla in lakes that contain susceptible hydrilla populations.

Penoxsulam was recently registered

in 2007, and it is also used to manage hydrilla in lakes with fluridone-resistant hydrilla. Research in Osceola County lakes suggests that it is beneficial to use penoxsulam in combination with another herbicide (e.g., endothall). Like fluridone, it is a slow-acting, systemic herbicide that requires a long exposure time (90–120 days) to hydrilla for optimum performance and additional bump treatments may be necessary.

The active ingredient copper can be used to control hydrilla, but because of concerns over accumulation of this element in lake sediments the FWC permits the use of copper herbicides in public waters only when no alternative management options are available. Diquat is a contact herbicide that can be used alone but is typically used in combination with other herbicides to manage hydrilla.
Since 2007, four new herbicides have been registered for hydrilla control. They include the active ingredients bispy- ribac-sodium, flumioxazin, penoxsulam, and imazamox.

These active ingredients are being incorporated into FWC's management programs, and results from trial treatments will determine their use patterns in the future.

Biological Control

Biological control refers to the purposeful introduction of natural enemies (i.e., insects, fish, or diseases) by scientists and environmental managers as a means to weaken and suppress invading plants. The introduction of foreign biological control agents is strictly monitored by the U.S. Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) and the Technical Advisory Group for Biological Control Agents of Weeds (TAG) and reviewed by the Department of Interior.
To date, the grass carp is the only effective biological control agent used to manage submersed aquatic vegetation like hydrilla (Figure 7). In Florida, a permit is required by law for use and possession of grass carp, and only sterile, triploid grass carp can be used. Hydrilla control with grass carp is cost-effective, but this technique offers limited plant selectivity. The results of grass carp stocking are unpredictable, and there can be a risk of complete removal of all submersed habitat that is important to fisheries. Grass carp often are used in ponds and small lakes where they can be contained but are typically not used for open systems such as Florida's large (>~ 1000 acres) public lakes. The life span of grass carp can exceed 15 years, and once they are introduced it is difficult if not impossible to physically decrease their densities to where they no longer control aquatic plants. There are many examples where grass carp have been used to successfully control hydrilla in lakes, but few if any of these have been able to maintain any level of submersed native plants.

Biological control with host-specific insects has produced little success to date. Since 1987, four insect biological control agents have been intentionally released in the United States to control hydrilla. Of these insects, only the Asian hydrilla leaf mining fly is widely established and is commonly associated with hydrilla. The larvae of these insects are capable of destroying the leaves of the plant and reducing photosynthesis, but this insect has not had a significant impact on hydrilla populations. Thus, the presence of the fly has little bearing on hydrilla management.

Mechanical Control

Mechanical control refers to the use of machinery designed to cut, shear, shred, crush, press, lift, convey, transport, and remove aquatic plants and associated organic material from water bodies. Specially designed machines called mechanical harvesters or aquatic plant harvesters are used to physically remove hydrilla. These machines cut the stems of the plants, convey them to a holding area on the harvester, and then transport the plant material to additional equipment on the shore for disposal (Figure 8). Mechanical removal is mainly used for hydrilla management when hydrilla is close to domestic water supply intakes, in rapidly flowing water, or if immediate removal is necessary. Using mechanical control of hydrilla on large lakes without the use of herbicides or other control methods has not been feasible because of the high cost, its short-term effects, logistical constraints, and other considerations.

Credits: UF/IFAS Center for Aquatic & Invasive Plants

Figure 7. Grass carp (*Ctenopharyngodon idella* Val.).

Credits: UF/IFAS Center for Aquatic & Invasive Plants

Figure 8. Mechanical harvester in the process of harvesting hydrilla.

Research

The FWC Invasive Plant Management Section (IPMS), the Environmental Protection Agency

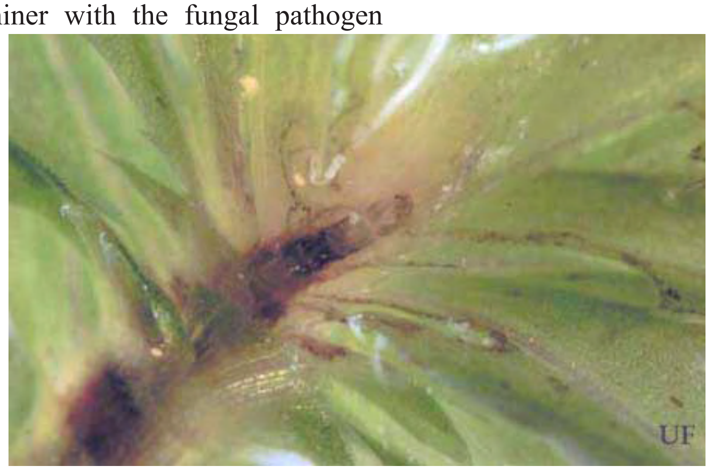
(EPA) the U.S. Army Engineer Research and Development Center (ERDC), and the U.S. Department of Agriculture (USDA) are examples of agencies that are currently funding research relating to hydrilla. Much of the research focuses on chemical and biological control, but some also focuses on mechanical control, habitat quality, and hydrilla growth. Because hydrilla has shown the ability to develop herbicide-resistant plant populations, much research is focusing on evaluating new and existing herbicides and combinations of herbicides for controlling hydrilla.

Researchers from the University of Florida and the U.S. Army ERDC are evaluating new and currently registered herbicides, along with new technology processes or practices for the control of hydrilla. Specific research projects are focusing on 1) evaluating new herbicides for activity against hydrilla; 2) evaluating large-scale hydrilla management projects; 3) evaluating fish habitat in dense hydrilla managed with different herbicide approaches; 4) investigating the dynamics of granular herbicide release and plant uptake; 5) evaluating flumioxazin and bispyribac-sodium combinations for controlling hydrilla; and 6) improving understanding of factors that influence expansions and declines of hydrilla.

Researchers continue to seek possible biological control agents such as insects and pathogens in hydrilla's native range. Current research also is focusing on evaluating a naturalized midge known as the hydrilla miner, *Cricotopus lebetis* (Figure 9). Larvae of the hydrilla miner develop in the growing tips of hydrilla, which causes branching of the plants and stunts the growth of hydrilla (Figure 10). Studies are being conducted to investigate temperature tolerances and host range of the insect. Researchers are evaluating the compatibility of the hydrilla miner with the fungal pathogen *Mycoleptodiscus terrestris* (Mt) and the herbicide imazamox. Studies also are focusing on the feasibility of incorporating mechanical harvesting into large-scale management operations by further examining the potential issues related to mechanical harvesting, such as cost-effectiveness, use patterns, efficiency, and fish by-catch.

Credits: Jerry Butler, UF/IFAS Entomology & Nematology

Figure 9. Adult male hydrilla miner, *Cricotopus lebetis.*



Credits: Jerry Butler, UF/IFAS Entomology & Nematology

Figure 10. Damage to hydrilla tip from the larva of the hydrilla miner.

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Volunteer Bulletin Board

We would like to acknowledge and thank all of the volunteers who made the Florida Department of Environmental Protection (FDEP)/LAKEWATCH comparison study possible. Each of these volunteers gave extra time and effort to coordinate meet and collect water samples with FDEP biologist. Thanks to their hard work the study was extremely successful in demonstrating to FDEP that volunteer data is reliable, accurate and comparable to the data taken by FDEP biologist.

County	Lake	Volunteer
Alachua	Santa Fe	Tom & Peggy Prevost
Flagler	Disston	Reed Laney
Highlands	Lynn	John Goodwin
Highlands	Pearl	Wes Tanner
Hillsborough	Josephine	Joanne Spurlino
Jackson	Silver	Den Leathem
Lake	Bay	Patricia Mann
Lake	Clear	Alfred Zweidler
Lake	Florence	Jim Peacock
Lake	Jem	Gerre Jaillet
Lake	Joanna	Merrell & Nancy Beebe
Lake	Palatlakaha	John McGuire
Lake	Sawmill	Marvin Jacobson
Lake	Yale	Joe Giles
Orange	Bessie	Alan Courney
Orange	Butler	Gene & CE Spears
Orange	Georgia	Petra McCord
Orange	Ola	Gerre Jaillet
Orange	Tibet	Chester Winsor
Osceola	Coon	Curt Lixie
Osceola	Gentry	David Andrix
Osceola	Tohopekaliga-Middle	Todd Schefstad
Polk	Eloise	R Joe Tremblay
Polk	Parker	Arthur Burt
Putnam	Redwater	Robert David
Seminole	Adelaide	Ron Brock
Seminole	Bear	Nancy Dunn
Seminole	Brantley	Fred Streetman
Seminole	Orienta East	Richard Tobin
Seminole	Rock	Julie & Bob Becvar

Outstanding LAKEWATCH Volunteer

Caringbridge.org

Katie with her husband Brian and their lovely daughters Zoe (on the right) and Eva.

In Memory of Kathryn Kulbaba

July 30, 1980 – May 16, 2012

Katie had a passion for the environment and she believed that education and awareness played an essential role in environmental issues. This passion led her to the City of Orlando's Division of Streets and Stormwater as their Public Awareness Specialist. While working as Public Awareness Specialist she became instrumental in the success of Florida LAKEWATCH in Orlando. Katie recruited volunteers for the program, trained volunteers in the City of Orlando, monitored the water collection center at her office and sampled Lake Eola as a LAKEWATCH volunteer.

Katie was born in Harrisburg Pennsylvania on July 30, 1980. She is a graduate of Pennsylvania State University (PSU) in the field of environmental studies. While attending PSU she meet Brian. They where married on January 19, 2002 and two lovely daughters followed: Zoe (2009) and Eva (2010).

Katie volunteered for groups such as Keep Orlando Beautiful and Save the Manatee Club because she believed in promoting awareness on environmental issues. She was a member of the Stormwater Education Task Force. Katie promoted neighborhood lake projects that helped organize volunteers to collect litter and debris from lakes such as Mann, Lorna Doone, Park and Dot to name a few. She created programs that brought in experts to help education students, community groups and businesses. Katie's enthusiasm for her job and the environment was remarkable.

She enjoyed the outdoors, traveling, bike riding and spending time with her friends and family.

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Florida
LAKEWATCH

This newsletter is [illegible] by the Florida LAKEWATCH program, within UF/IFAS. Support for the LAKEWATCH program is provided by the Florida Legislature, grants and donations. For more information about LAKEWATCH, to inquire about volunteer training sessions, or to submit materials for inclusion in this publication, write to:

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http://lakewatch.ifas.ufl.edu/

All unsolicited articles, photographs, artwork or other written material must include contributor's name, address and phone number. Opinions expressed are solely those of the individual contributor and do not necessarily reflect the opinion or policy of the Florida LAKEWATCH program.

Katie passed away May 16, 2012. Her husband Brian and her daughters Zoe and Eva survive Katie. Everyone who knew her loved and appreciated her. She was a devoted wife and loving mother that will be missed by all. We want to acknowledge all Katie achieved for her career, community, and family.

Deb Charles

Katie was a loving wife and devoted mother who will be missed by all.