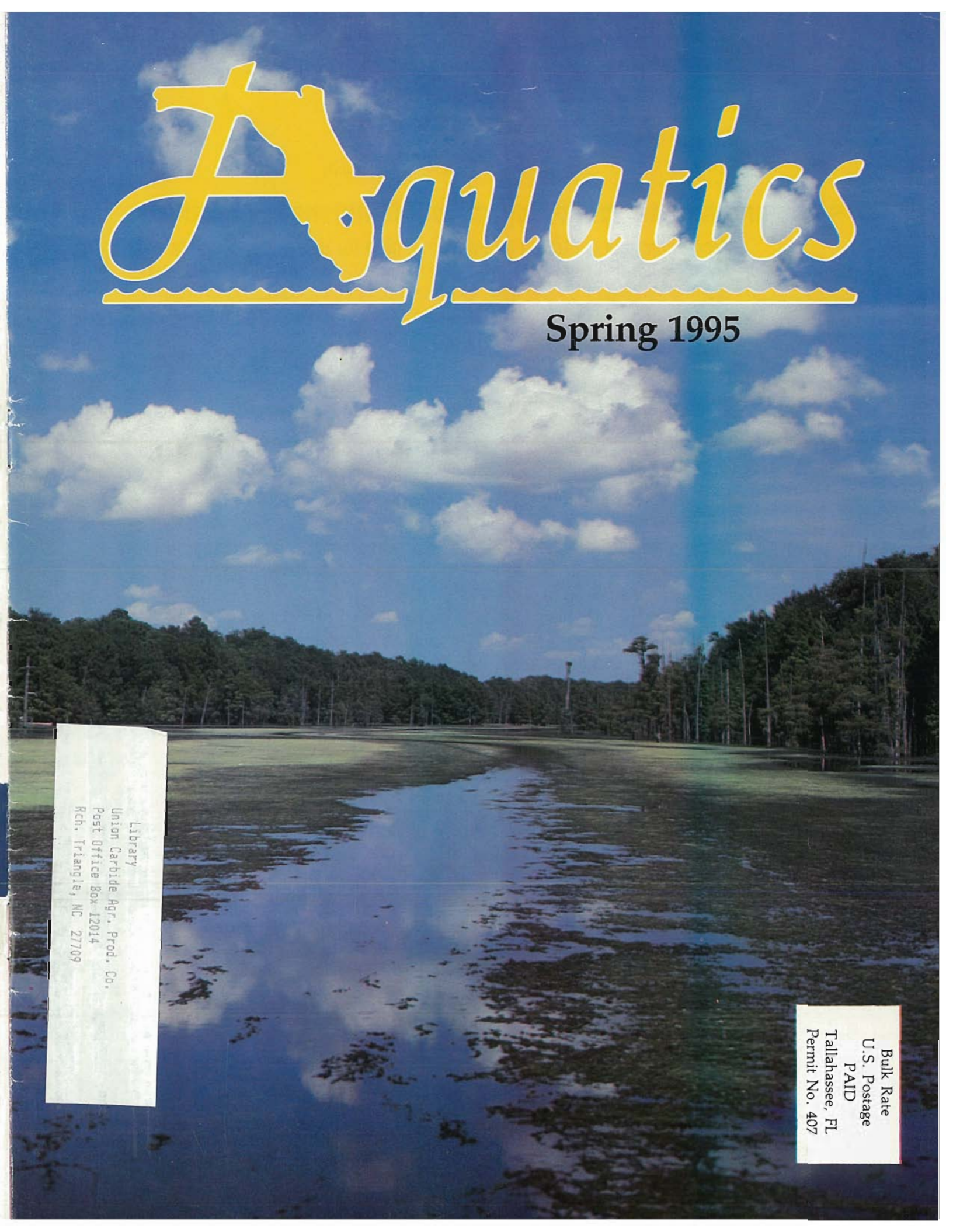


Spring 1995

Bulk Rate
U.S. Postage
PAID
Tallahassee, FL
Permit No. 407

QUALITY PRODUCTS FOR WATER QUALITY

Algae and Aquatic Weed Control and Maintenance Products

AQUASHADE® AQUATIC PLANT GROWTH CONTROL

A patented, concentrated liquid formulation for use in contained lakes and ponds. EPA registered for aquatic plant growth control. Contains a blend of blue and yellow dyes to block out specific light rays critical to photosynthesis. No restrictions on swimming, fishing, irrigation or stock watering. Leaves water a pleasing blue color.

CUTRINE-PLUS LIQUID ALGAECIDE / HERBICIDE

A patented, concentrated liquid algaecide with a wide range of labeled use sites. Contains chelated copper which stays in solution to continue controlling a broad range of algae well after application. No water use restrictions following treatment.

CUTRINE-PLUS GRANULAR ALGAECIDE

A granular chelated copper algaecide ideally suited for treatment of bottom growing algae and spot treatments along docks, beaches, boat launches and fishing areas. Controls growth before it reaches the surface.

WEEDTRINE-D AQUATIC HERBICIDE

A liquid aquatic herbicide that effectively controls a broad range of underwater, floating and emergent aquatic weeds. Kills quickly on contact. Ideal for small area treatments.

Navigate

A granular aquatic herbicide which selectively controls some of the most troublesome aquatic plants such as water milfoil, coontail, and spatterdock. Gradual release and systemic action ensures complete kill of the entire plant.

STOCK TRINE II ALGAECIDE

A liquid chelated copper algaecide formula in a concentration suitable for dosing stock water tanks, troughs and small ponds. Treated water can be used immediately for stock watering.

AQUATRINE ALGAECIDE

The exact formulation of Cutrine-Plus Liquid, but labeled specifically for use in fish and shrimp aquaculture facilities. Provides use instructions for ponds, tanks and raceway systems.

AQUASHADE OA

A dilute Aquashade formulation in 2 oz. and 8 oz. packaging for ornamental applications in garden ponds, fountains and aquariums. Provides algae control at a drop per gallon or one ounce per 1,000 gal.

FOAMTRINE FOAMING CONTROL

A silicone defoamer to suppress, eliminate and prevent foaming within a wide variety of systems. Use in pesticide spray mixtures, industrial ponds, fountains and even water park rides.

Available From Quality Distributors Throughout the United States and Worldwide

applied biochemists inc
SURFACE WATER / SPECIALTY PRODUCTS

YOUR ONE SOURCE MANUFACTURER FOR AQUATIC PLANT CONTROL

People and products dedicated to algae control and aquatic weed problems

6120 W. Douglas Ave. • Milwaukee, WI 53218 • 1-800-558-5106

LETTER TO THE EDITOR

Throughout the 12 years I have been a member of the Florida Aquatic Plant Management Society (Society), I have seen this Society grow and become the most positive association for aquatic plant managers in the field today. Our diversity of Local, State and Federal Agencies, University Systems and Private Applicators is matched by no other. The Society's most impressive feature is the continued involvement by the applicators themselves. Agency and University Society members are important; but, the **APPLICATORS** are the backbone and the reason the Society exists today.

Over the past 18 years of the Society's existence, concepts on how to manage our State's aquatic plant problems have been studied, discussed, argued, agreed upon, and at times have almost divided our Society. With this in mind, it is important to note that we are probably at one of the most critical times for protecting Florida's natural resources due to the immense expansion of the exotic plant hydrilla (*Hydrilla verticillata*). State and federal funding allocations have not kept pace with the rapid increase in hydrilla. If additional funding is not allocated soon, our systems will no longer function as mother nature intended. **HYDRILLA IS THE MOST TOXIC PROBLEM OUR AQUATIC PLANT MANAGERS ARE FACING TODAY!**

There is a solution, and it will take hundreds of dedicated people to help solve the problem. **THE SOLUTION IS TO UNITE!** To do so everyone **must** put all past feelings and disagreements behind them and focus on the main issue, "Saving Florida's Natural Resources". If every one of us can come to the right understanding and commit to solving the most important issue this Society has faced to date, then we can get it done. This will not be an easy task, and it will take time; however, we should all make time if we really care. All agency people need to make the proper contacts within their work place and make everyone aware of the problem and what steps must be taken to resolve hydrilla's exponential expansion. University researchers need to continue to seek funding for improving hydrilla management technologies. Lastly, and most importantly, each applicator needs to write his local representative and ask for additional support in acquiring proper funds for hydrilla control throughout the state and volunteer to help whenever possible.

We as a Society of 529 members can have a dramatic impact on our legislature both at

Continued on page 12

Merrits Mill Pond in Jackson Co. FL, home of the world's record shellcracker, is now another victim of the hydrilla invasion. Photo by Nancy Allen

Aquatics

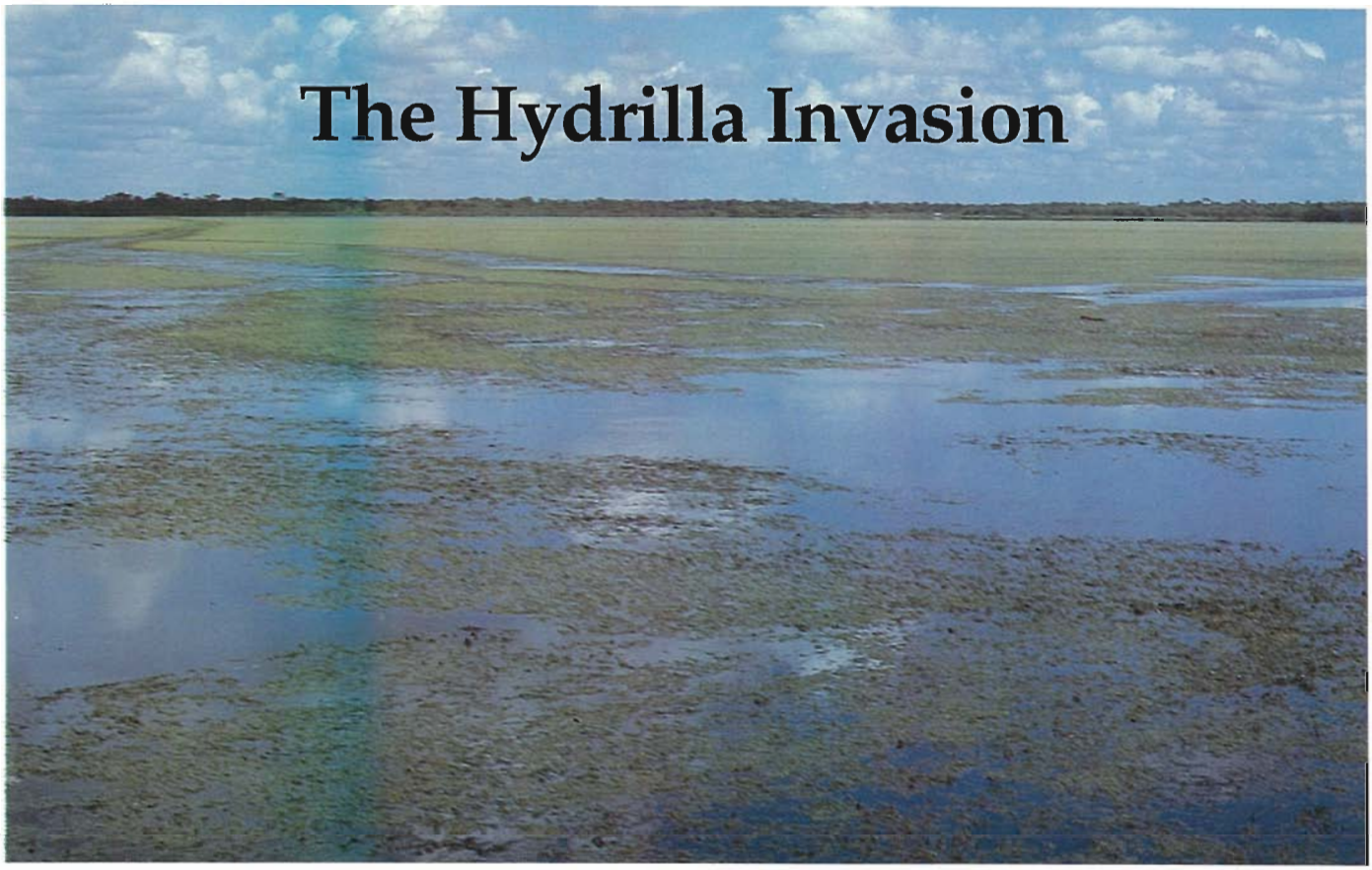
Spring 1995/Vol. 17, No. 1

CONTENTS

AQUATICS: Published quarterly as the official publication of the Florida Aquatic Plant Management Society Registration No. 1,579,647. This publication is intended to keep all interested parties informed on matters as they relate to aquatic plant management particularly in Florida. To become a member of FAPMS and receive the Society newsletter and Aquatics magazine, send $20.00 plus your mailing address to the Treasurer.

EDITORIAL: Address all correspondence regarding editorial matter to Ken Langeland *Aquatics* Magazine.

The Hydrilla Invasion



Increased funding is desperately needed to free lakes, such as this, from hydrilla's choking grip.

by
Ken Langeland
University of Florida
IFAS Agronomy Department
Center for Aquatic Plants

It can begin with a single bud in the leaf axil of a plant fragment no bigger than a mosquito. This fragment may be brought to the lake purposely or inadvertently on a boat trailer, in a bait bucket, or by a bird. Out-of-sight, on the lake-bottom, the bud sprouts a root to absorb nutrients from the sediment and a shoot heads for the lake-surface and the sun. Elongating up to an inch a day, it's not long before the shoot nears the surface. Once to the surface, additional axillary buds now sprout to form branches and additional buds. Meanwhile, lower on the stem, runners are being formed by other axillary buds, which in turn are sending up their own shoots. In a short time now, a clump of hydrilla will be observed on the water surface.

This clumped stage of the hydrilla invasion may be the most dangerous time. Structure provided by the new plants may attract anglers who have fishing success and associate their success with the hydrilla. Thinking that this will improve fishing in other lakes, unwary anglers may transport transplants to other lakes and thereby aid in dispersal. As many homeowners, fish camp operators, and anglers alike know, this is a grave mistake because hydrilla will soon have severe detrimental impacts on any lake.

Once hydrilla is apparent in a lake, the invasion process is usually irreversible. By this time, a "blue-zillion" buds are present so that any fragmentation of the plant by boaters, birds or wave action can spread the plant to other areas of the lake. Specialized reproductive structures, called turions, which are enlarged axillary buds, can form on broken off plants and aid long distance spread. Tubers are then formed, hundreds per square foot, in the lake sediment, which can remain viable for several years.

When the hydrilla invasion is complete, matted out hydrilla becomes so thick in the top three feet of water that sunlight is blocked out, native plant communities are eliminated, operation of outboard motors is impossible, fish populations become unbalanced, masses of hydrilla sink to the bottom and drift up on beaches, causing large amounts of muck,property values decline, and revenues are lost.

Hydrilla does not go away by itself, and now the difficult and expensive process of hydrilla management must begin to free the lake from hydrilla's choking grip and regain use of the lake. Lack of available public funds is usually the limiting factor for proper hydrilla management in large open waters. This issue of Aquatics is devoted to providing information regarding hydrilla and it's management to make known the desperate need for increased public funding for protecting our water resources from the hydrilla invasion.

Algae control we can all live with...thanks to HYDROTHOL 191.

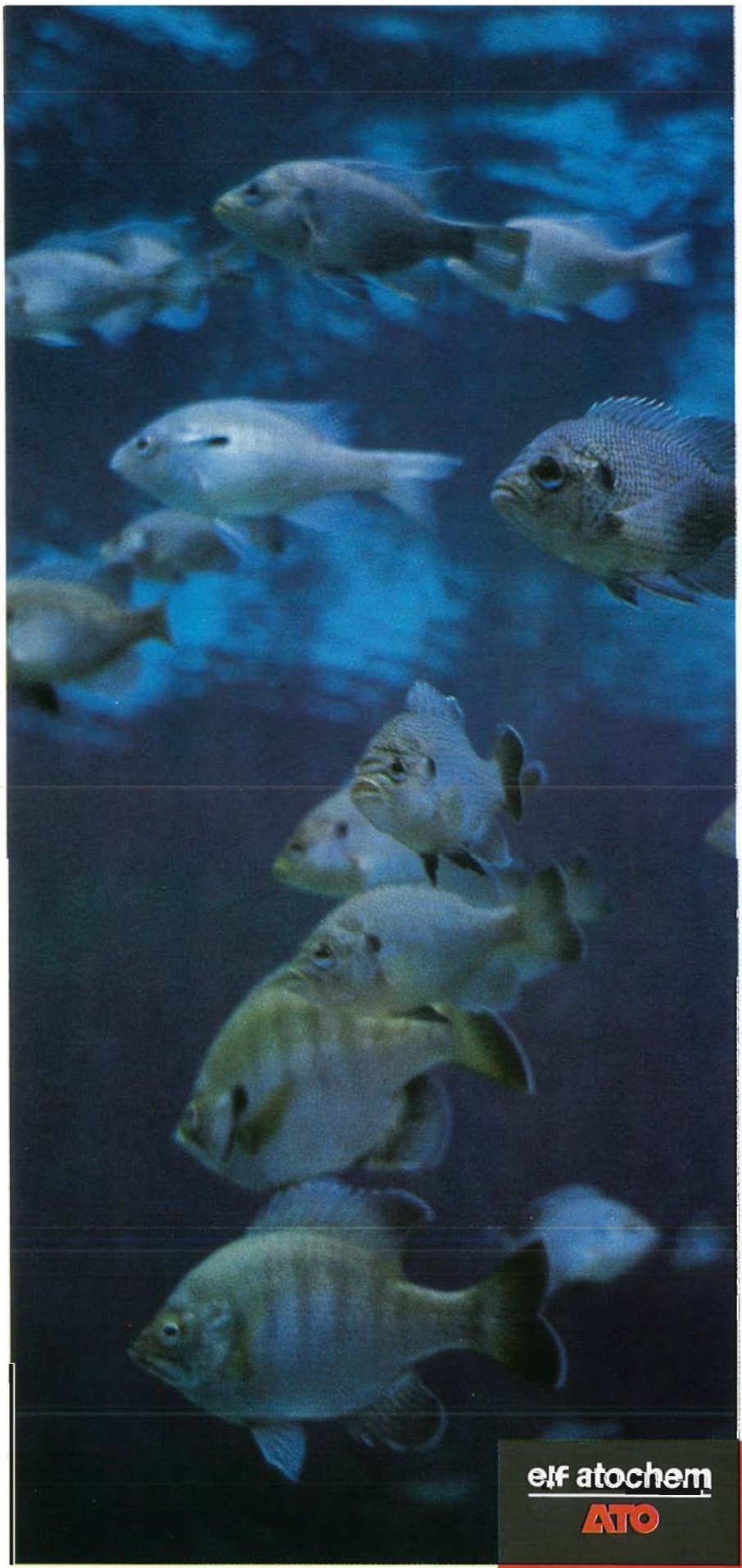
When you need to control algae in your lake, pond or canal, you want an algicide that's effective without being hazardous to fish or other aquatic life forms. That's why you should rely on HYDROTHOL® 191 Aquatic Algicide and Herbicide.

HYDROTHOL 191 works quickly on contact against Cladophora, Pithophora, Spirogyra and Chara. In both still and moving water. And, when applied at the recommended 0.2 ppm, HYDROTHOL 191 won't kill fish.

HYDROTHOL 191 is broken down by microorganisms into naturally occurring by-products based on the elements carbon, hydrogen and oxygen. It won't leave residues, accumulate in the hydrosoil or the food chain, or discolor your water.

As with any chemical product, you should read and follow label instructions carefully. Application by a certified applicator is recommended. We've taken great care to provide the information needed to help you enjoy algae free water in an environmentally compatible way. Talk to your distributor or Elf Atochem Representative today about HYDROTHOL 191.

Elf Atochem North America, Inc. Three Parkway, Philadelphia, PA 19102. 215-587-7219.



elf atochem
ATO

Hydrilla Control - Past, Present and Future

by
Bill Haller
IFAS Agronomy Department, Center for Aquatic Plants

The largest infestation of hydrilla in Florida in 1974-78 occurred in the once 3rd ranked bass fishing lakes in the nation, Orange and Lochloosa Lakes in southern Alachua County. Control of this 10-12,000 acre infestation then was well beyond the capabilities of state funding and the feasible control options were few. The diploid grass carp was absolutely prohibited, no other even potential biocontrol agents were available short of the manatee. Herbicide options were limited to the contact herbicides endothall, diquat and copper with treatments costing approximately $150/acre with up to 2 applications required per year. The U.S. Army Corps of Engineers Waterways Experiment Station and Jacksonville District evaluated mechanical harvesting, and in fact designed and built a more efficient harvester. Nevertheless, costs remained prohibitive and one harvester could only maintain 250-300 acres weed free during the growing season. The final option considered was to do nothing, but subsequent economic studies showed that these lakes, when hydrilla was controlled, were an economic asset to the region of over $10,000,000/year.

Fortunately, high water levels in the late 1970s reduced the hydrilla infestation in these lakes and research continued on developing more cost effective herbicides and biological control methods. Now, 20 years later, hydrilla has moved into even larger (30,000 acres +), open flowing systems such as Lakes Kissimmee, Istokpoga, West Lake and others. Hydrilla infestations of this magnitude have once again surpassed the ability of state and federal agencies to fund adequate hydrilla control programs. The options for control have changed somewhat, but everyone would be much happier making recommendations in a 10,000 acre landlocked lake! The present alternatives for control in such large open systems are still limited.

Fisheries biologists have perfected a reliable means of producing sterile triploid grass carp which are now allowed in the state under the auspices of the Florida Game and Fresh Water Fish Commission. However, the results from a recent grass carp symposium (March 1994) indicatethat grass carp migrate great distances in open systems, they are not specific to hydrilla, and wildlife ecologists are very concerned over the potential of these fish to destroy all submersed aquatic plants.

Meantime, entomologists have introduced into Florida four insects of two genera that are specific herbivores of hydrilla. To date, these insects have not wiped out large hydrilla infestations and research continues on these insects as well as locating additional candidates for introduction.

The most widely used means of controlling large hydrilla infestations has been the registration and development of the systemic herbicide fluridone. The contact herbicides mentioned remain as options, but with insufficient funds, cost per acre per year is of utmost importance. In the past several years we have conducted research with fluridone to understand its movement in water systems, minimum dose and contact time required for hydrilla control, rate of microbial and photolytic degradation, effects on non-target plants, etc. Pending further research, it appears that concentrations of 10-15 parts per billion (ppb) in contact with hydrilla for 40-50 days is required for hydrilla control. Usually, this control lasts for approximately one year. In our studies on the lakes of the Withlachoochee and upper St. Johns River, when water flows permitted, we obtained hydrilla control at costs of $70-90/acre/year. Partial lake treatment with fluridone as described by Ernie Feller in a separate article in this issue has been possible in shallow (<6 ft deep) water for less than $60/acre/year. Research has reduced costs on a per acre basis by about 1/3, but the area of infestation has tripled. Essentially we are back to the same proportional situation between funds and costs as we were in 1974-78 on Orange and Lochloosa Lakes. Currently, the options for hydrilla control are mechanical harvesting, herbicides and grass carp. The decision of which method or methods to use is made on the basis of cost and environmental impact, just like 20 years ago, but with two new options to consider (fluridone and grass carp).

Everyone wants something for nothing. Are we locked into paying $75/acre/year for hydrilla control with herbicides forever? I

The Beauty Of Sonar Is Measured By What It Doesn't Do.

A beautiful lake can turn ugly once exotic weeds like hydrilla or Eurasian watermilfoil take over. But before you do anything drastic, like introduce non-selective grass carp or launch a mechanical harvester, consider what Sonar* aquatic herbicide doesn't do. • Sonar doesn't eliminate desirable vegetation. Selective treatments remove hydrilla and Eurasian watermilfoil. After treatment, native, desirable species can become more abundant, creating a more diverse habitat. • Sonar doesn't harm fish or waterfowl or keep you out of the water when used according to label directions. In fact, Sonar has been used successfully by wildlife management groups to restore aquatic habitats. • And with Sonar, your lake may need treatments less frequently than with other aquatic herbicides. That's because results can last for more than just a season. • The one thing Sonar does do is return the use of your lake to you, in all its natural beauty. Ask your lake management consultant for more information.

For product information and availability please call: 1-800-419-7779

SePRO

*Trademark of SePRO Corp.

can foresee no economic forces working to reduce herbicide costs. We have reduced dosages and timing to about as low as possible. EPA registration costs, and the safety and environmental data we insist upon for aquatic herbicides (probably > $40 million) is not going to decrease.

Fortunately, we can now control hydrilla at a more reasonable cost than 20 years ago, but "what's in the future?"

A 1986 review of mechanical harvesting by Thayer and Ramey indicated that hydrilla harvesting varied from $200-600+ per acre with maybe two harvests a year required in Central Florida. An acre of hydrilla hasn't changed much in weight (10-12 tons/acre) or area (43,560 ft^2) since 1986 and harvesting remains quite expensive. Costs might be reduced by using "bigger machines" to harvest more acres/day but I doubt costs could be reduced by more than 25-30%.

As indicated, the cost of herbicides will, if anything, increase with inflation and in response to any additional regulation/registration requirements. It's very unlikely that a super herbicide will be developed soon that will control hydrilla for longer than a year or two because of hydrilla reproductive capabilities. So reduced cost per acre will have to come about with improved timing of application, formulation or other means, such as tuber depletion or interference with hydrilla reproduction with a plant growth regulator. Research into these subject areas is currently in progress.

Advances in biocontrol are still needed. Control of hydrilla with grass carp is very economical (in the area of $5/acre/year) but we need to be able to fence them into an area to prevent movement from the target site and be able to remove them as needed to manage their populations. Additional foreign search and evaluation of potential biocontrol insects needs to be conducted to ascertain whether or not the most likely successful insects have been introduced. There has not been extensive research on nematodes, viruses or other potential biocontrol agents although there is not a lot of precedent in the biocontrol arena outside of insects and pathogens.

So currently we will have to spend money to conduct hydrilla control. We have more options and more economical means of control now than 20 years ago and more options will be available 20 years from now. Meantime, it makes economic sense to spend $1 for aquatic weed control to derive $20 in economic benefits as has been the long term average on Orange and Lochloosa Lakes.

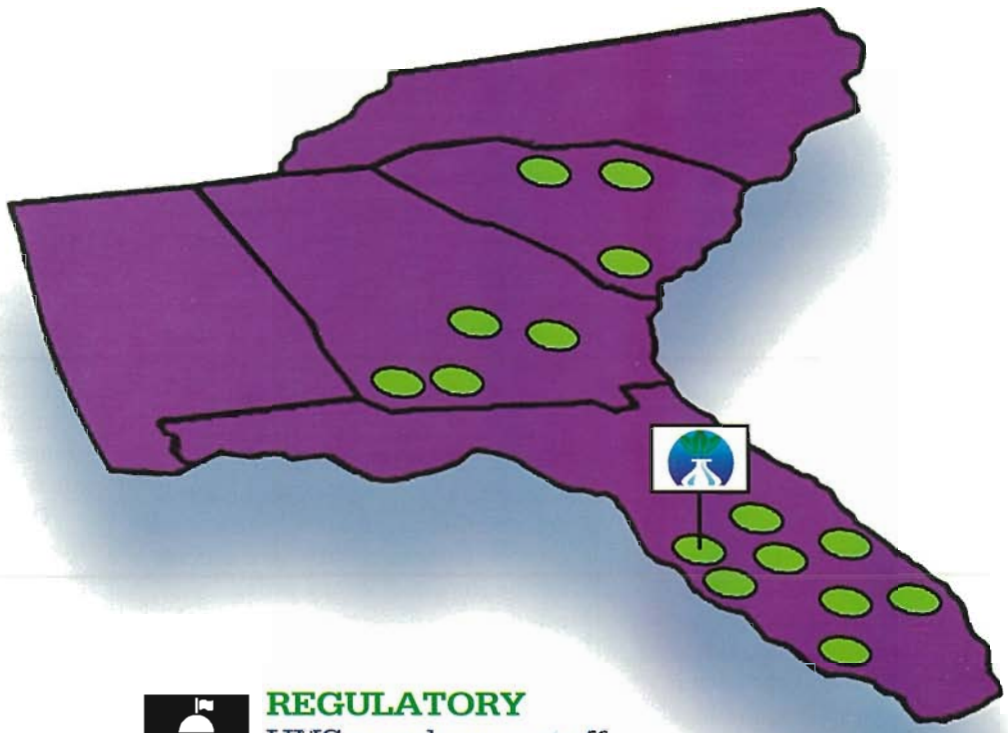
Providing Aquatic Weed Control Products and Services to the Aquatic Industry

FEATURING

REWARD
AQUATHOL K
AQUA-KLEEN
RODEO
K-TEA
KOMEEN
HYDROTHOL
AMINE 4

NALCOTROL
NALCOTROL II
NALQUATIC
UNFOAMER
X-77
LI-700
SILWET
BOND

Plus a complete line of herbicides and adjuvants to serve your needs



REGULATORY
UHS employs a staff who specialize in state and federal regulations, EPA mandates and environmental and transportation issues.

CONTAINER RECYCLING
Participate in our container recycling program. UHS will recycle all plastic chemical containers at your business location.

DISTRIBUTION
Take advantage of our many convenient locations for pickup or delivery of quality UHS products.

United Horticultural Supply
GULF STATES DIVISION

For additional information call:

Toll free: (800) 457-0415
Fax: (813) 664-0371

3632 Queen Palm Drive ▪ Suite 306
Tampa, Florida 33619

Hydrilla Reaches Crisis Levels in Florida Waters

By Jeff Schardt
Department of Environmental Protection

The Bureau of Aquatic Plant Management's 1994 survey of aquatic plants in 450 Florida public lakes and rivers, covering 1.25 million acres of water is complete. As in the previous six years, the exotic species waterhyacinth and waterlettuce were again considered to be under maintenance control. These plants collectively covered 3,500 acres, the third lowest total since the bureau began surveying waters in 1982.

In direct contrast to the excellent maintenance control of floating plants is the crisis which now exists in Florida's public waters due to hydrilla's growth and expansion. The technology exists to manage hydrilla in most situations, and eradication may even be possible in Florida's largest waters. However, insufficient funding stands between this deepening crisis and maintenance control of hydrilla.

Hydrilla expansion in Florida is a classic example of an invasive exotic organism filling empty niches and displacing native species. Hydrilla has the biological traits of an invasive plant pest including rapid growth, ability to thrive in a broad range of environmental conditions, prolific reproduction, and high potential for dispersal. But hydrilla has not colonized and overwhelmed Florida waters without help. Human behavior has played a significant role in this epidemic. As with most invasive plants, hydrilla became broadly established before it was recognized as a threat to natural ecosystems. Although hydrilla was introduced into Florida in the early 1950's, it was incorrectly identified as a less aggressive species of *Elodea* until the late 1960's, well after it became entrenched throughout peninsular Florida. Forty years after its introduction, most Floridians still do not know or care what hydrilla is. Neither do they understand the extent of the problem it is causing.

Even after the invasive potential of an exotic species is recognized, establishment is often aided by special interest groups which seek to exploit the benefits derived early after introduction. Entrenchment is enhanced through those who naively or arrogantly think invasive species can be removed if they prove offensive. An example is the stocking of common carp (*Cyprinus carpio*) into the United States during the late 1800's by the United States Fish Commission, the predecessor of the United States Fish and Wildlife Service. There were several attempts to establish common carp in United States waters during the early 1800's to provide an additional food and sportfish for the developing nation. The program proceeded until common carp were finally established. By thetime people realized that common carp were destructive to habitats and fisheries, eradication was not possible. Expensive removal (maintenance) programs are now required in waters when common carp reach high levels.

Hydrilla too, has its myopic allies in those who see its potential to improve water clarity, enhance fisheries and attract waterfowl. Warning signals were raised in the early 1970's as hydrilla entered and covered Orange Lake and Lake Trafford in a period of only a few years. It was evident that the problems caused in South Florida canals and Crystal River in the 1960's were not isolated occurrences. By the middle 1970's research had unveiled hydrilla's benevolent facade and exposed this alien as one of the most adaptable and fastest growing plants on earth. Reports documented hydrilla's ability to displace native vegetation, stunt sport fisheries and resist control measures. Yet, science and management plans which pointed toward swift action to contain hydrilla met with vocal and often angry opposition.

The debate over whether to manage hydrilla at the lowest possible level in Florida public waters or allow it to expand for fish and water fowl use, raged through the 1970's into the early 1990's. Through this period, bureau policy maintained that any early reward generated from hydrilla introductions did not justify the long term environmental damage and inevitable high management costs. Even most hydrilla supporters recognize that hydrilla eventually requires maintenance. But many fall into the same trap as the U.S. Fish Commission did 100 years earlier by relying on future managers to provide expertise and funding when hydrilla becomes a problem.

The confusion generated by the open conflict between opposing management schools leads to an indecisive public. Without public support, legislative funding increases are not easily acquired. The bureau has petitioned the Florida Legislature for additional hydrilla management funds since 1986. However the only substantial increase, in 1992, fell far short of the amount needed. Consequently, hydrilla more than doubled in Florida public waters in little more than a decade; from 40,000 acres in

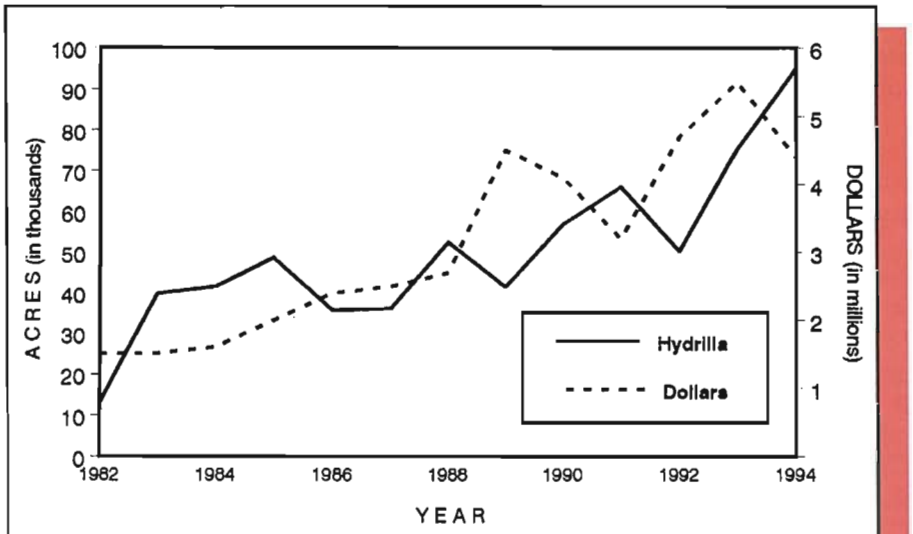


Figure 1: Acres of Hydrilla in Florida Public Lakes and Rivers and Funds Spent managing Hydrilla from 1982-1994

1983 to 97,000 acres in 1994. Almost 50,000 new acres of hydrilla were reported since 1992. Hydrilla has covered some of Florida's largest and most important recreational waters, such as Lakes Hatchineha, Istokpoga, Walk-in-Water, Pierce and Marion. During this hydrilla explosion in the early 1990's, there was a concurrent drop in the once sometimes fanatical support for this plant. Now homeowner groups and fishing clubs call for action to bring this pest under control.

The entry and dispersal phases are complete. Hydrilla is now poised to take over numerous Florida waters if funding is not quickly and substantially increased. Hydrilla is already the most abundant aquatic plant found in Florida public lakes and rivers, covering approximately three times more area than cattail which is the second most common species. Hydrilla was present in 194 (43 %) of the 450 public waters that the bureau surveyed in 1994.

Despite the problems which now exist, the hydrilla crisis is solvable. Waters in which hydrilla once dominated, but was brought under control, include: Lakes Jackson, Lochloosa, Poinsett, Samson, and Trafford, and the Withlacoochee River. Ten thousand acres of hydrilla in Lake Istokpoga have been successfully controlled twice during the past six years. Funding now plays a much greater role than technology in sustaining this control. Without a consistent source of sufficient funding, control is usually lost within two

years after treatment.

There is an indirect relationship between funding and hydrilla coverage (Figure 1). When sufficient funds are available, hydrilla coverage can be reduced. When funds are inadequate, hydrilla expands. When hydrilla expands more funding is required for the following year. Control costs have increased by 70% during the past decade, but available funding for all aquatic plant management supervised by the bureau has declined from a high of $12 million in 1985 to $7 million in 1991 and 1994.

There is also an economy of scale in hydrilla management. After floating exotic plant control is funded in the Cooperative Aquatic Plant Management Program, about $4.5 million will be available for hydrilla control in fiscal year 1994-1995. Small infestations and pioneer hydrilla populations are scheduled for management in 150 waters during fiscal year 1994-1995 at a cost of about $300,000 or $2,000 each. Twenty-six large scale hydrilla control operations (greater than $50,000) are required at a cost of approximately $9.3 million or about $360,000 each. This is nearly 200 times the cost of controlling hydrilla when small populations exist. Cooperative Program policy therefore requires funding the control of small hydrilla populations first to keep small control costs from becoming large fiscal problems.

Ongoing large scale hydrilla management programs are the next funding priority to avoid sacrificing control efforts which were required to reach maintenance control. Remaining funds, if available, are applied to waters with large scale hydrilla problems based on such factors as regional use, cost effective control feasibility, and availability of nearby waters that do not have hydrilla problems. In fiscal year 1994-1995, control is affordable in 17 of the 26 waters where large scale management is needed, totalling $4.2 million. The other waters will continue to fester and serve as foci to further hydrilla spread until funding is increased.

To begin the process of regaining control of Florida's waters from hydrilla, the bureau drafted legislation to increase hydrilla management funding by $9.0 million. The Department of Environmental Protection suggested that the Gasoline Tax Collection Trust Fund is a logical source for this funding. Two recent studies, one conducted by the Division of Economic and Demographic Research of the Joint Legislative Management Committee and the other by the United States Coast Guard, demonstrate that motor boats generate more in gas tax revenues than is needed to fund aquatic plant management. The department is seeking to increase the aquatic plant management share of these revenues from $6.3 million to approximately $19.3 million and will work appropriately with the Executive and Legislative branches of Florida's government to acquire these funds. However, strong support is needed by the aquatic plant management contingent as well as the public to achieve this goal.

Letter *Continued from page 3*

the federal and state levels if we will just become involved. If we all would unite for this one cause we will DEFINITELY be able to preserve Florida's natural resources for all of our children, and for generations to come.

I have asked Dr. Langeland, Aquatics Editor, to include in this issue of Aquatics as much information as possible to help you the reader support our goal for saving our resources. This magazine has numerous articles on hydrilla and information that will allow you to find the addresses of all of your state and federal representatives. I sincerely hope you will take the time to write a short note and send it to each representative from your area. Addresses for your legislators in your district can be found in front of you local telephone book; and key committee chairs are listed in this issue. The articles in this issue should assist you in gaining a better understanding about the hydrilla problems we are facing in Florida today and with no increased hydrilla control the problems we may be facing tomorrow.

For more information on how you can best help in this years FAPMS legislative initiative, contact the Legislative Committee Chairman, Brian Nelson, Aquatic Plant Manager, South West Florida Water Management District Brooksville, Florida 34609904-796-7211.

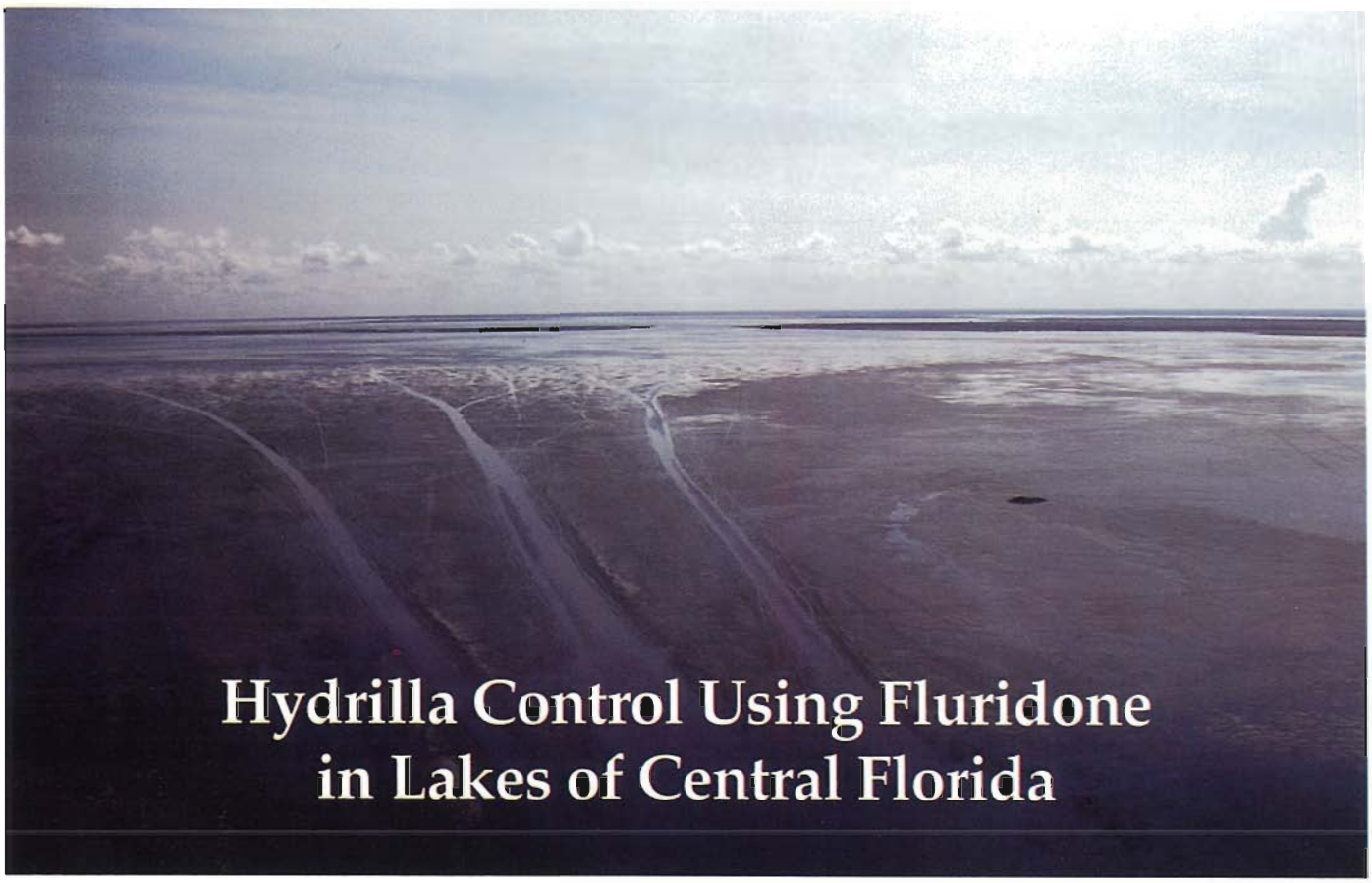
Thank you,
Mike Hulon
President, FAPMS

We're Here To Help.

We've got the products you want—when and where you want them. Choose from a complete line-up of name-brand herbicides, algaecides, adjuvants and much, much more. They're in stock and ready for immediate delivery. Plus, we back each and every one of the products we handle with top-quality service and expert technical support. Let us help you. Contact your nearest location or one of the following aquatics specialists:

- **Alec Sheffer**
  Regional Sales Manager
  Plant City
  (800) 207-1440
- **Tammy Kovar**
  South Florida
  Boynton Beach
  (800) 207-1408
- **Vera Gasparini**
  North & Central Florida
  Plymouth
  (407) 257-8704
- **Tracy Henderson**
  Plant City
  (813) 752-1177
  Ext. 245

Terra®
ASGROW
FLORIDA



Hydrilla Control Using Fluridone in Lakes of Central Florida

Hydrilla in 14, 148 ha - Lake Kissimmee restricts navigation to boat trails

by
Ernie Feller and Mike Bodle
South Florida Water Management District

Introduction

The exotic, submersed plant hydrilla (Hydrilla verticillata (L.f.) Royle.) has become such an extensive pest in Florida that several million dollars are spent annually in trying to alleviate the resulting navigation, fishing, flood control and water supply problems. For example in 1992, $5.2 millon was spent managing hydrilla throughout Florida. The South Florida Water Management District, which covers 46,500 km² south of Orlando, is directed to manage water for the benefit of the public, and provide flood control and environmental protection. The Kissimmee field station is responsible for most of the lakes within the District and, since 1982, hydrilla has been a major problem in six of the lakes in the headwaters of the Kissimmee River in Central Florida. Fluridone has been used in these lakes in increasing amounts since 1986, with 3,791 ha of hydrilla treated at a cost of $5,150,073.

Boat channels and fishing holes have been opened in dense hydrilla stands using mechanical harvesters and contact herbicides, but for large-scale control the District has turned extensively to the aquatic herbicide, fluridone (Tradename - SONAR). Fluridone inhibits carotenoid pigment synthesis, resulting in chlorophyll photodegradation, chlorosis, and slow plant death. Hydrilla is particularly susceptible to this herbicide and is often controlled at fluridone concentrations lower than those needed to control other plants. Thus, it has been possible during the eight years since fluridone was registered, to modify and improve application techniques and maximize the number of hectares of hydrilla controlled for each hectare that is actually treated. Different waterbodies require different application strategies for effective hydrilla management using fluridone. This article describes some of the strategies used in the lakes of the headwaters of the Kissimmee River for achieving the most cost-effective hydrilla control feasible.

Whole-Lake Treatment Plus Grass Carp

Of the 22 lakes in the headwaters of the Kissimmee River, Fish Lake (91 ha) is unique because it is an almost enclosed system with only one outflow, which has a triploid grass carp-retaining barrier. In 1983, 8 ha were treated under an experimental use permit with 2.2 kg ha^{-1} of fluridone and with a chelated copper herbicide. This treatment was effective for four years, after which 70% of the lake became reinfested with hydrilla.

Thus, in 1988, 13 ha were

treated with 2.2 kg ha^{-1} of fluridone alone ($11,000) but this was followed by the addition of 640 triploid grass carp. This maintained sufficient control for four years. Hydrilla subsequently regrew because the grass carp population declined. In 1993 a further 8 ha were treated with the same rate of fluridone, followed by a stocking of 650 grass carp. This has again provided 100% hydrilla control. Thus, in Fish Lake such integration of herbicide and biocontrol methods has reduced herbicide applications to once in five years. Annual average costs have been only $2,200 for herbicide and about $1,000 for fish.

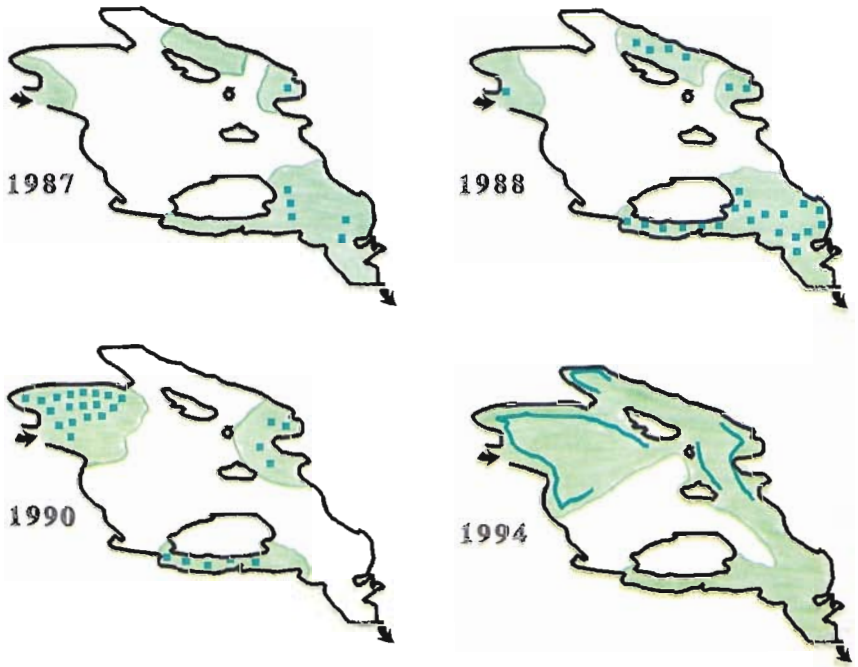
Whole-lake Split Treatment

Where sufficient funding is available, whole lake treatments are the most efficient method of using fluridone in waterbodies with extensive hydrilla infestations. Hydrilla has covered more than 90% of Lake Hatchineha (2,700 ha) but, because of its high water turnover rate, single fluridone applications have not provided sufficient herbicide contact time to be effective. However, the hydrilla has been controlled lakewide by applying fluridone at 2.2 kg ha^{-1} to 404 ha, if this total application is evenly split over four weeks. Such treatments cost approximately $550,000 and can reduce hydrilla coverage for at least a year.

Longer term control of hydrilla might be achieved if funding allowed annual whole lake treatments for four or five consecutive years. Since hydrilla propagules only remain viable in the sediments for four to five years, annual treatments which control the plants germinating each spring and prevent reproduction in the fall would eventuallydiminish the propagule supply in the sediments.

Partial Lake Treatments Adapted To Flow

A whole lake fluridone treatment of Lake Kissimmee (14,148 ha) would cost over $2,000,000; more than 60% of Florida's 1994/95 hydrilla control budget. Consequently only partial lake treatments have been possible despite infestations covering 57% of this waterbody. Each year's treatments have been applied to the areas of the lake with the greatest hydrilla infestations, and these locations vary annually (e.g., compare treatment



Maps of Lake Kissimmee showing fluridone treatment plots (blue squares and lines) and hydrilla infestations (green shading). Arrows indicate main inflow from Lake Hatchineha and outflow to the Kissimmee River

site maps for 1988 and 1990). Before 1994 these treatments were split over 4 weeks. However, in some years (e.g., 1987) applications were halted prior to completion due to significant discharges of water into the Kissimmee River, thereby reducing herbicide exposure time in the plots.

In 1994, rather than treating discrete 10 ha plots over 4 weeks, applications were split over 7 weeks and were made in strips around the shoreline of each bay that was treated (see 1994 map). Under this strategy hydrilla was controlled in each bay by a method approximating a whole lake treatment. It also allowed applications to continue when water discharges to the Kissimmee River were greater than would have been tolerated previously.

Despite these improvements in the efficiency of partial lake treatments, it is likely that the total area of hydrilla infestation in Lake Kissimmee will continue to increase.

Partial Lake Treatments For Fisheries Habitat

Like Lake Kissimmee, Lake Toho-pekaliga (Toho) is too big (7,612 ha) to consider for whole lake treatments under current funding levels, despite hydrilla infestations that have covered 43% of the lake. In 1987/88 water levels were lowered in this lake so that organic sediments in the littoral zones could be mechanically removed in an effort to restore sport-fish spawning habitat. After re-flooding, these areas were rapidly colonized by monospecific stands of hydrilla. Such sites have become one of the primary target areas for hydrilla control in Lake Toho, in an attempt to continue the fisheries habitat restoration and to provide access for anglers.

In 1993, 20 ha in one restored area were treated with 2.2 kg ha^{-1} of fluridone, split over 8 weeks and applied in 2 km long strips along the shoreline. In this site, which was subject to noticeable water movement parallel to the shore, these treatments were estimated to expose the hydrilla to 15 ppb fluridone for at least 8 weeks. This treatment selectively controlled hydrilla in 120 ha for over a year, while causing minimal impacts to native plants, an important consideration in such habitats. As a consequence of the success of this treatment, shoreline strip applications (split over several weeks) have been adopted as the primary fluridone treatment technique in all lakes of the Kissimmee River headwaters.

Other fisheries habitat restoration projects have included smaller waterbodies such as Lake Jackson (413 ha). Aided by a relatively low water turnover rate, recent fluridone treatments have successfully provided open water where hydrilla had completely filled the lake.

Conclusions

Based on growing experience and collaborative research, strategies for applying fluridone are constantly being modified in an effort to control as much hydrilla as possible with the limited funds available. In heavily-infested, large lakes the prospect is bleak for consistent whole lake management unless:

- funding is increased,
- large-scale use of grass carp is shown to be acceptable and manageable, or
- effective insect biocontrols become available.

Efficient management of smaller lakes, or priority areas of large lakes, does appear to be feasible, and the District continues to cooperate in research projects addressing these issues. But even progress in these situations can be threatened in years of particularly low funding. Under these conditions, funding priorities focus on lakes with new hydrilla infestations, striving to prevent them from developing the crisis problems found in waterbodies like Lake Kissimmee. For example, preventative hydrilla treatments in East Lake Tohopekaliga (4,845 ha) aim to keep small hydrilla stands from overtaking the lake. Treatments of small infestations within large lakes are not easy. However, such "maintenance" control efforts are essential, since partial treatments may be the only affordable hydrilla management method for the foreseeable future.

Kissimmee crews apply Sonar® pellets from an airboat

Looking for a better solution to aquatic weed and algae control?

It seems as if you've tried it all. You've sprayed. You've scooped. You've pulled them out by hand. Now take a whack at these nuisances with Komeen® aquatic herbicide and K-Tea™ algaecide.

Both Komeen and K-Tea now have new, expanded labels to include more weeds and algae. Komeen controls weeds such as Hydrilla, Water Hyacinth, Pondweed, Coontail, and Southern and Northern Naiads. K-Tea controls both planktonic and filamentous algae. And both are highly effective in virtually any type of water, even if it's hard or alkaline.

And not only do Komeen and K-Tea mow down aquatic weeds and algae, they require no re-entry or set-back restrictions, buffer zones or holding periods. After treatment you can use your water immediately for fishing, swimming, watering livestock and drinking.

See for yourself why Komeen and K-Tea are a cut above the rest.
Contact Griffin Corporation, Rocky Ford Road,
Valdosta, GA 31601, (912) 242-8635.

Griffin

Hydrilla in Florida's Public Waters

By Jeff Schardt
Department of Environmental Protection

Ecology

- Hydrilla is an invasive, submersed, exotic aquatic plant introduced into the United States through Florida by the aquarium plant industry in the early 1950's.
- This submersed plant grows up to one inch per day.
- Hydrilla branches profusely when stems reach the water surface, forming impenetrable mats.
- Dense hydrilla mats impede navigation and flood control, reduce native plant diversity, stunt sport fish populations, cause fish kills and accelerate the filling in of water bodies.
- Reproduction is through fragmentation, budding, and subterranean propagules called tubers.

Hydrilla Impacts in Florida Waters

- A 1985 US Fish and Wildlife Service report valued Florida freshwaters at $1.5 billion per year from recreational fishing alone.
- A 1992 study for the US Coast Guard estimated that 300,000 motor boats are trailered into Florida each year. Hydrilla could impact this interstate commerce. These boat trailers and propellers could serve as vectors to transport hydrilla into other states.
- The Florida Game and Freshwater Fish Commission estimates that 1.3 million anglers utilize Florida waters; 250,000 from out of state
- Hydrilla is present in 194 (43%) of Florida's public lakes and rivers which cover 1.25 million acres of fresh water.
- Hydrilla is projected to reach crisis levels in 50 public waters in FY 95-96 requiring large scale control (>$50,000 each) totaling $13.7 million. 144 small scale projects are estimated to cost $900,000 to prevent crisis levels from developing.
- Hydrilla has expanded by 50,000 acres during the past two years to cover nearly 100,000 acres of Florida public waters.
- The most urgent hydrilla-related problems, including; extensive fish kills, flooding, and loss of habitat, recreation and navigation, are in eastern Polk County and in the Kissimmee Chain of Lakes which is also part of a Federal Navigation Project.

Funding Structure and Requirements

- An estimated $10.0 million is necessary in FY 1994-1995 to manage hydrilla in Florida public waters. Only $4.5 million are available. Consequently, as much as $14.5 million may be necessary in FY 1995-1996 as hydrilla continues to expand.
- The Florida Department of Environmental Protection administers the Cooperative Aquatic Plant Management program under a Cooperative Agreement with the Corps of Engineers
  - State funds are derived from the Gas Tax Collection Trust Fund and motorboat registration.
  - The Corps provides 100 % funding for Federal Navigation Projects (RAG Program).
  - The Corps and the Department cost share in other public waters (APC Program).
    - The Corps' APC Program Share decreased from 70% to a maximum of 50% in 1987.
    - The Corps' APC Program share was 25% for the past two years.
- Federal Navigation Projects funded through the Cooperative Program require $6.8 million for appropriate hydrilla and waterhyacinth control in FY 1994-1995. Only $1.0 million in federal funding is projected to be available (as of 2-1-95).
- Monitoring, management, compliance and administrative contracts are in place.
- All funding increases would be applied directly to aquatic plant management.

CHAIRS OF KEY 1995 FLORIDA LEGISLATIVE COMMITTEES

TRANSPORTATION COMMITTEE

Senate: Malcolm E. Beard, Chair
P.O. Box 3565
Plant City, FL 33564
813-757-9106 Fax:813-757-9105

James Hargrett, Vice Chair
P.O. Box 11025
Tampa, FL 33680
813-272-2990 Fax:813-272-2577

House: Kelly Smith, Chair
222 N. Third Street
Palatka, FL 32177
904-325-8384 Fax:904-329-3779

James Fuller, Vice Chair
2602 University Blvd. West
Jacksonville, FL 32217
904-488-4770 Fax:904-488-4773

WAYS AND MEANS (SENATE) / APPROPRIATIONS (HOUSE)

Senate: Mario Diaz-Balart, Chair
8890 Coral Way, Suite 215
Miami, FL 33165
305-227-7690 Fax:305-226-3272

Ken Jenne, Vice Chair
612 SE 5th Avenue, Suite 3
Fort Lauderdale, FL 33301
305-467-4332 Fax:305-467-4392

House: Buzz Ritchie, Chair
507 East Fairfield Drive
Pensacola, FL 32503
904-444-8686 Fax:904-444-8689

Lori Edwards, Vice Chair
201 S. Main Street
Auburndale, FL 33823
813-965-5510 Fax:813-965-5517

NATURAL RESOURCES

Senate: Ginny Brown-Waite, Chair
20 N. Main Street, Room 200
Brooksville, FL 34601
904-544-2344 Fax:904-544-2346

Rick Dantzler, Vice Chair
P.O. Box 9225
Winter Haven, FL 33883
813-294-2876 Fax:813-291-5288

House: Everett Kelly, Chair
111 N. Sinclair Ave., Suite B
Tavares, FL 32778
904-742-6116 Fax:904-742-6118

Charles Sembler, Vice Chair
P.O. Box 2380
Vero Beach, FL 32961
407-778-5077 Fax:407-778-7210

Cypress Shores Subdivision Fights the "Hydrilla Invasion"

by
Robert J. Yuskaitis, Treasurer
Cypress Shores Property Owners Association, Inc.

Cypress Shores is a small subdivision located on the N.E. shore of West Lake Tohopekaliga on the outskirts of Kissimmee, Florida. The subdivision, consisting of 42 individual 1.4 acre to 1.2 acre lots, was created in 1955. It was constructed around a 2.2 acre man made "T" shaped boat basin with a 250 foot sea-walled foot channel into Lake Toho. Beyond the sea-walled channel there is a 500 ft unprotected channel to Toho's waters. West Lake Toho has average water levels from 55 ft above sea level down to 51 1/2 feet.

By late 1980 the growth of hydrilla had reached the North End of Lake Toho and started to move into our outgoing boat channel. During 1991 and 1992 it invaded our boat basin. Late in 1992/93 the growth of hydrilla along with the growth of algae on top of it became extensive. The boat basin topped out 100% by February of 1993 and was no longer useable for boating or fishing. The Coots could no longer swim, they just had to walk across the water on the hydrilla and algae, it was solid with the "Hydrilla Invasion."

In April of 1993 I asked Ernie Feller, a Supervisor of the South Florida Water Management District to draw up a plan of attack on the "Hydrilla Invasion" of Cypress Shores, and this he did. Ernie suggested that we use three different herbicides, Sonar®, Aquathol® and Rodeo®, for our aquatic weed management project. He also recommended that we should first install a floatation containment

dam at the opening of our 2.2 acre boat basin between our seawalls where it led into the lake. By doing this we would prevent the "gold plated" Sonar® from escaping and diluting into the main body of West Lake.

In December 1992 our homeowners association had voted in a 1993 aquatic weed control budget of $2,000 for herbicides for the weed control project. We also had to take $476 from our reserve fund in order to purchase the 43 foot long, 7 feet high floating containment dam. Next came the purchase of Sonar®, 5 quarts with tax - $1,447.

The recommended application rate of Sonar® for a 6 foot averagewater depth of the treatment site is 2 quarts per acre, where there is a dense aquatic weed mass. Thus, for our combined boat basin and channel of 2.2 acres, we calculated that 5 quarts (160 ounces) would do the job. Ernie Feller concurred and suggested that we do the application in 7 split treatments, one each week for 7 consecutive weeks. We divided the 160 ounces by 7 and the result was 22.86 ounces per each application.

We used a borrowed air boat for the application of Sonar®. The dense mass of hydrilla along with algae, *Pithophora* spp. and *Spirogyra* spp. would not permit the use of even a 150 HP outboard. We used a 4 gallon back pack sprayer with it's spray nozzle removed to inject the Sonar® under the surface, as we made a number of passes throughout the length of the boat basin. We made 2 consecutive applications of 4 gallons each of final mix for each of the 7 treatments. Each mix contained 11 1/2 ounces of Sonar® and water to make 4 gallons. The water level of West Lake was 52.2 ft above sea level at the start. At this level some of our shore line in the boat basin was out of the water, thus many hydrilla tubers were not exposed to the Sonar®.

We had started the 1st application on May 22nd of 1993 and completed the 7th application on July 7th. It took several long weeks before we noticed the symptoms of the slow acting, systematic Sonar®, tips of the hydrilla turning white. It was a very slow process.

To open the outgoing channel to the lake that was outside of the dam, we purchased four containers, 40 pounds each, of Aquathol® at a cost of $254. Aquathol® was used for the outside channel because Sonar® would have been diluted by wave action.

We were very fortunate that the South Florida Water Management District loaned us the use of their Granblo® Spreader Unit that we mounted on our air boat to apply the Aquathol® granules. This unit has a hopper that holds 60 pounds of granules. The granules fall thru a check gate into a tube thru which a high velocity jet of air is blowing. The air blower is powered by a small gasoline motor, and the blower is aimed like a mortar to disperse the granules. It worked like a charm.

The third herbicide to be used was Rodeo®, 2 1/2 gallons at the cost of $250. To apply the Rodeo®, we rigged up a 15 gallon tank with a small gasoline operated pump and a 10 foot wand with a spray head. We also had a stainless steel filter before the wand. The mix that we used was 2 ounces of Rodeo® to a gallon of water. We also mixed in Kinetic®, a wetter/spreader. We applied the Rodeo® to all of the shoreline weeds of the basin that were in and out of the water and also those of inner and outer channels.

In mid August I noticed that the color of the water on the boat basin side of the dam was a green-blue color. The outside water was a dirty brown-blue. I at first had concern that something had gone wrong, so I had Jim Sweatman of Florida's Game and Fish Commission check the oxygen content. It was 6 parts, all o.k. We did not experience any fish kill, not a single fish. We removed the containment dam on August 20, 1993, 6 weeks after the last application of Sonar®. The total time of the containment of Sonar® was 13 weeks. Within 24 hours of the dams removal the color of the water in the boat basin was the same as that of the lake - wind surge and lake currents in action. I also knew that we had Sonar® escaping past our containment dam, this is why we had such an excellent weed kill in the lake side channel.

The total cost of the control project was $2,428. The cost per acre was $1,056 including the cost of the dam and the three herbicides. The containment dam is reusable. I calculated that over 150 man hours were put in by three volunteers for FREE.

The hydrilla that started to reoccur around the perimeter of the basin after 12 months was from the tubers that were on the banks of the basin that were above water at the time of Sonar® application, and from what blew in from Lake Toho. We applied Aquathol® to the new growths on September 20, 1994 and will do so again this year, 1995. Sonar® liquid or pellets will also be used when available this year.

Ernie Feller's plan for us to use split treatments worked better than 100%. It is now almost two years since we applied Sonar® and there is not evidence of regrowth of hydrilla on the basin's bottom. The outgoing channel does have some growth as does 30% of the shoreline. The project (the operation) was a "Great Success." *But West Lake Toho (the patient) is DYING.*

We will continue to be in trouble for this year and probably many in the future. Our Governor stated this month, January 1995 that only 3 million dollars will be available for exotic water weed control, for fiscal year 95/96, etc. Our West Lake Toho is now covered with 15,000 acres of hydrilla out of its water surface of 18,000 acres. At the cost of $600 per acre, the cost to control/manage hydrilla this year would be over $9,000,000, yes 9 million dollars, for just Toho.

AQUAVINE

SePRO Announces Promotion and New Positions

William H. Culpepper, President and CEO of SePRO Corporation, announced the promotion of David Tarver to National Sales Manager for SePRO's aquatic business. Sam Pittman and Bo Burns have joined the company as aquatic specialists, who will be responsible for Sonar® sales and development. Sam is based in central Mississippi, and will cover Alabama, Arizona, Arkansas, Lousiana, Mississippi, New Mexico, Oklahoma, Tennessee, and Texas. Bo will be moving to SePRO headquarters in Carmel, Indiana, and will be responsible for the northern half of the U. S., from Washington state to New York. SePRO has also announced EPA approval of Sonar® for Eurasian watermilfoil control at 10 to 20 ppb with no potable water restrictions. For more information contact one of the representatives named above or call SePRO at 800/419-7779.

Close Call

Randy Snyder, senior applicator for the St. Johns River WMD in Melbourne, contracted viral encephalitis this past December 3. He lapsed into a coma and was transported to Shands Hospital on the UF campus where he was successfully treated. Randy is back in Melbourne undergoing physical therapy. The Nurses have nicknamed him the "Miracle Man" because of his rapid progress. Randy is expected to go home on March 7 and continue rehab. We all wish him a speedy recovery. Anyone wishing to contact Randy, can reach him by mail @ SJRWMD, 2133 North Wickham Road, Melbourne, FL 32935.

Meetings

Aquatic Plant Management Society, 35th Annual Meeting, Hyatt Regency Bellevue, Seattle, Washington, July 9-12, 1995. Contact Steve de Kozlowski, President 803/737-0800.

Florida Aquatic Plant Management Society Annual Meeting, St. Petersburg Hilton, October 16-18, 1995, Contact Mike Hulon, President 407/846-5304.

Florida Lake Management Society, Sixth Annual Florida Lakes Conference, Clearwater Beach Hilton, May 3-5, 1995, Contact Nancy Page 813/464-4798.

North American Lake Management Society: 4th Annual Southeastern Lakes Management

Conference, March 29-April 1, 1995, Radisson Plaza Hotel, Charlotte, North Carolina. Contact Barbara Wiggins 704/336-5500.

New Pubs

"Handbook of Common Freshwater Fish in Florida Lakes" by M. V. Hoyer, and D. E. Canfield, Fisheries and Aquatic Sciences, IFAS, University of Florida. 1994. 177pp.: Each of 39 most common fish of Florida lakes is presentedwith a line drawing, a color photo, description, and information on distribution, biology, and biologists' comments. Statistics are presented for lake morphology, water chemistry, aquatic plants, population estimates, size, and weight associated with fish collections. An identification key for the 39 fish species is presented. Order IFAS # SP-160 from IFAS Publications, IFAS Bldg. 664, Gainesville, FL, 32611-0001, 904/392-1764.

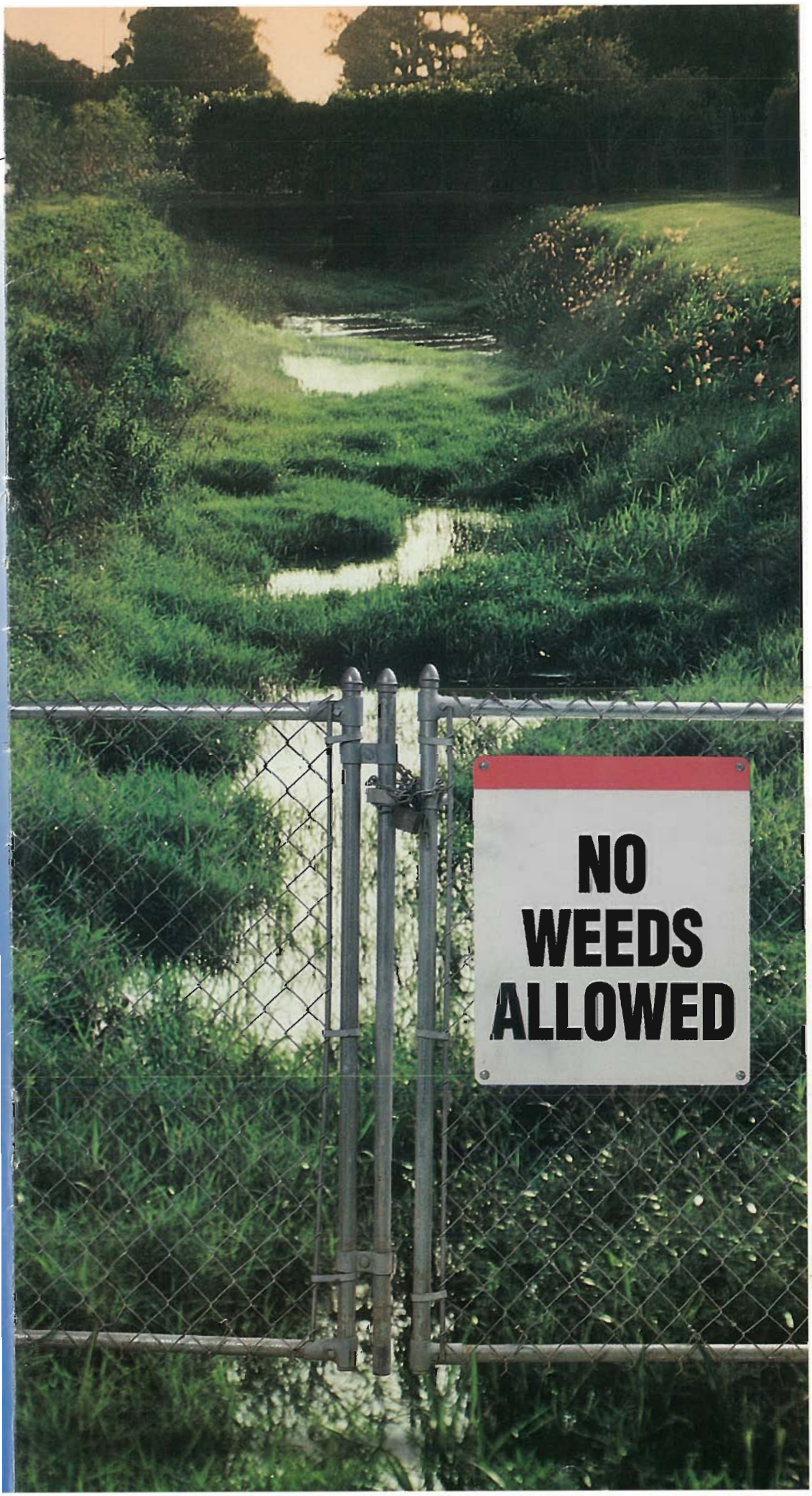
"Triploid Grass Carp" - This four page brochure is designed to help the public evaluate potential use of triploid grass carp for aquatic plant management. For additional information contact Arnold Lingle 904/357-6631.

"From Wastewater to Water Gardens" - 10-min video, produced by the IFAS Center for Aquatic Plants, Information Office. This program follows the path of wastewater from the City of Gainesville as it is treated by the Gainesville Regional Utilities Kanapaha Water Reclamation Facility and then used to irrigate Gainieville's popular, 62-acre Kanapaha Botanical Gardens and to feed the new Kanapaha Water Garden. From Wastewater to Water Gardens is suitable for students or for interested general audiences. The program may be borrowed by contacting the IFAS/CAP Information Office (904/392-1799). The program may be purchased for $15.00 (plus tax for Florida residents) by sending a check or purchase order payable to the University of Florida, IFAS Publications, Building 664, Gainesville, FL 32611-0001.

ERRATA

I can't beleive it, but we made a few mistakes. In Catherine Robbin's article "Synopsis of the 1994 Grass Carp Symposium," *Aquatics* 16:11-14, the following corrections should be noted:

Pg. ll: Lake Conroe is 8,000 ha. Pg. 12: Lake Conway was stocked with 17 fish per ha. Lake Yale is 1636 ha and was stocked between 1987 and 1990. --- 90% of the stomachs had hydrilla, which made up 30% of the vegetative cover. Sonar treatments were made in 1992 and 1993, with hydrilla coverage at 80% of the lake. In 1994 the grass carp in Lake Yale averaged 35 pounds each. It is estimated that 8,000 grass carp are left in Lake Yale. Deerpoint lake had a milfoil problem, not hydrilla. Pg. 14: FMB pellets were tested on Lake Whipoorwill, a 325 acre lake, and Live Oak Lake, a 375 acre lake, both near St. Cloud, FLorida.



Next time, use Rodeo®.

You can try mowing weeds. Or pulling them out by hand. You can even put up fences and barbed wire. But you won't keep weeds from coming back — unless you use Rodeo® herbicide.

Rodeo controls more than 170 species of emerged grasses, broadleaf weeds and brush. It works by moving throughout plant tissues... roots and all. So you'll get complete control, and long-lasting results.

And because Rodeo is fully labeled for aquatic areas, you can use it almost anywhere. Including lakes, rivers, ponds, estuaries, reservoirs, and, of course, ditchbanks. In fact, conservationists around the world count on Rodeo to control invasive weeds in sensitive wildlife habitats.

For more info on the link between Rodeo and better vegetation management, and a FREE subscription to our *Road Talk* newsletter, call: **1-800-332-3111.**

RODEO®
EMERGED AQUATIC WEED AND BRUSH HERBICIDE
BY Monsanto

ALWAYS READ AND FOLLOW LABEL DIRECTIONS FOR RODEO HERBICIDE.

ROD-56980 2/95

REWARD® for aquatic weed control is the one herbicide that doesn't make you wait.

Once applied, REWARD spreads quickly through the water, making fast contact with all unwanted vegetation. Absorbed by plants within minutes, REWARD controls unsightly emerged weeds within 10 days and submersed weeds in about 30. Unlike other aquatic herbicides REWARD controls both floating and submersed weeds. All without worry about toxicity to fish or other wildlife.

REWARD herbicide. For broad-spectrum aquatic weed control without the wait — and without the worry.

NO WAIT. NO WORRY.

For more information, contact your distributor or call Zeneca at 1-800-759-2500.

ZENECA
Professional Products