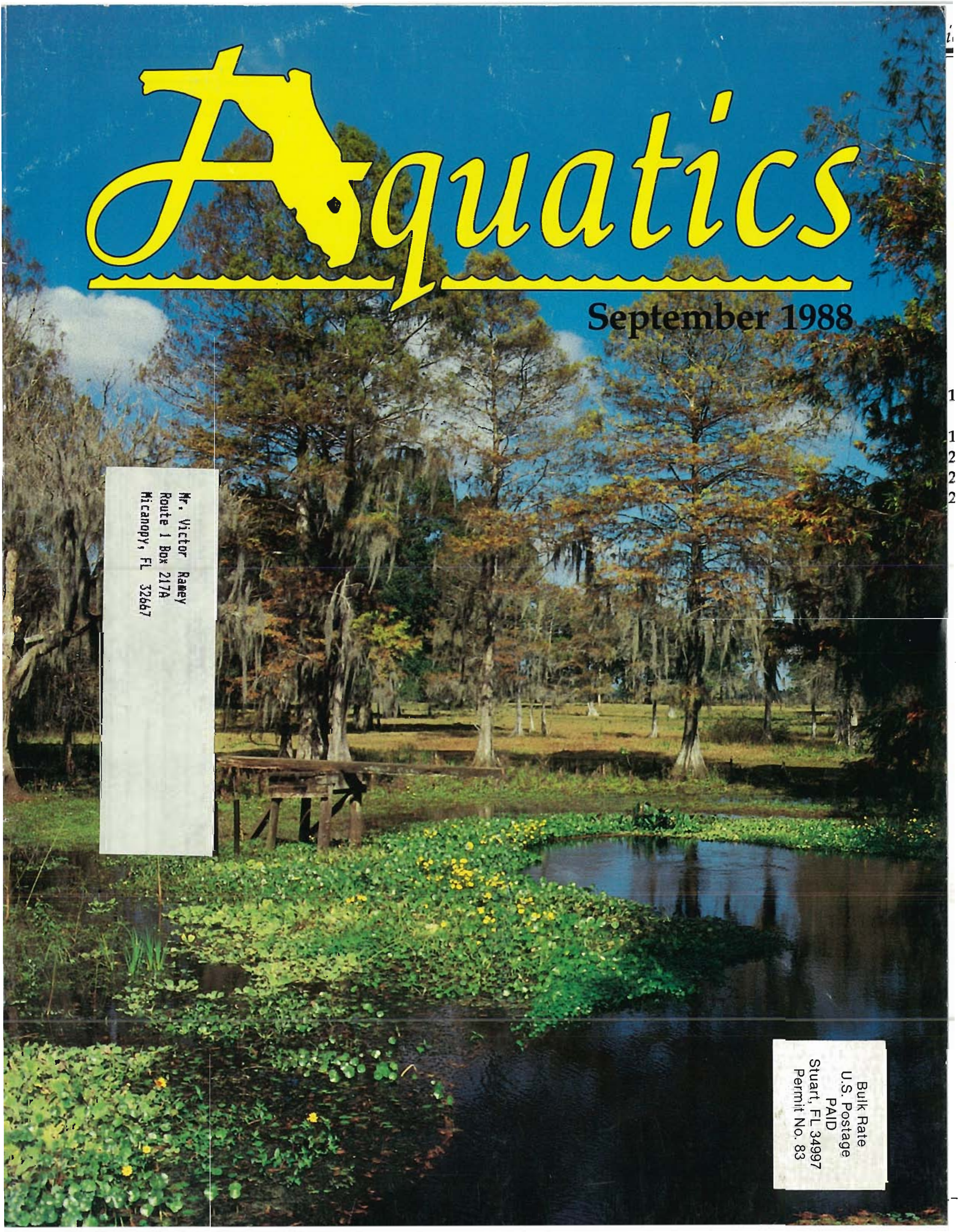
Aquatics

September 1988



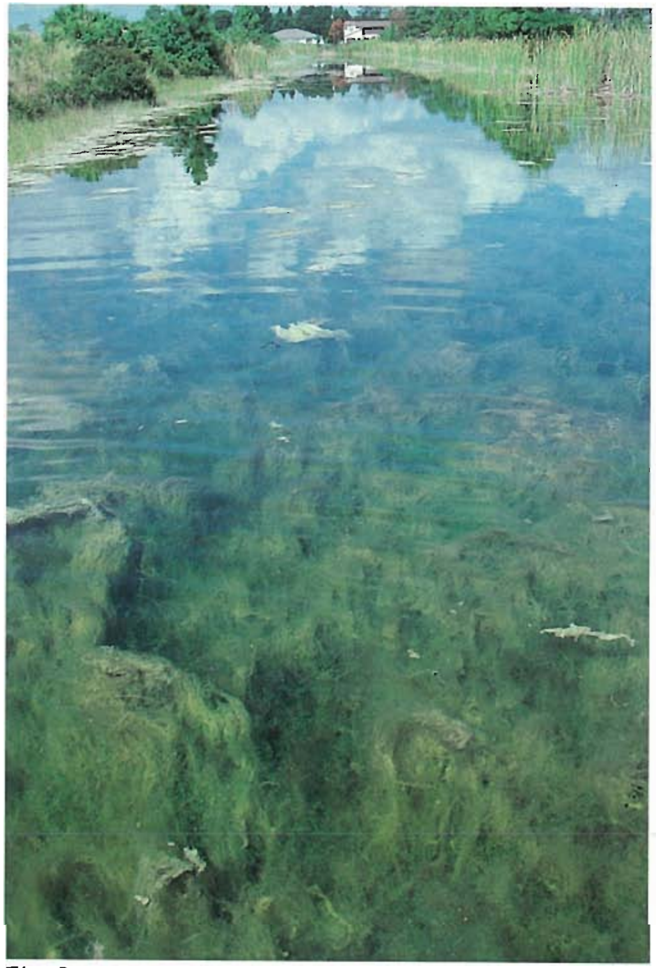


Fig. 2

occurring with these species. Grass carp should be stocked during the winter months in Florida when U. *biflora* is the primary target and the plant is at its lowest density.

The statewide occurrence of *U. biflora* in Florida has remained at about 60 - 70 sites during the last four years, primarily in lakes and canals comprising 700 -1,000 surface acres[3,4]. The acreage estimate for canals in South Florida is probably significantly underestimated since several hundred acres of *U. bilfora* occur in the freshwater canal system in Lee County alone.

biflora it takes to foul the prop on our 25 HP outboard.

Heavy summer rains are sometimes very effective at dissipating floating mats and probably act as a natural control to keep this species from major weed status in some situations. This effect of heavy rain on dissipating the plant at the surface may be anticipated and utilized before scheduling herbicide treatments.

My observations of *U. biflora* in canals in Lee County indicate that it may be more sensitive to winter conditions of lower water temperature and shorter day length than associated *Chara* or *Najas* species. Between late November and March, when water temperatures average below 23°C in this area, *U. biflora* is rarely a problem and demonstrates a marked decline in biomass after October.

Schardt and Nall[5] report that *U. biflora* has little wildlife value and I have found that grass carp prefer it less than *Najas* or *Chara* when

Another possible reason for its underestimation as a weed is that it is probably misidentified as a filamentous alga which is a mistake easily made unless it is examined closely. The emergent yellow flowers, often occurring quite densely during mid and late summer, are the best indication that the disgusting looking mat is something other than a filamentous alga. However, filamentous algae are occasionally found growing associated with *U. biflora*, and in mixed mats, the whole thing is sometimes written off understandably as just algae.

In summary, *U. biflora* has apparently adapted well to a variety of aquatic habitats over a broad geographic range. During its peak growth season of late summer in South Florida, it often outcompetes other native vegetation and requires management especially when it is highly visible in mat form at the surface.

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4. Schardt, J.D. 1985. *1985 Florida aquatic plant survey.* Fla. Dept. Nat. Res.
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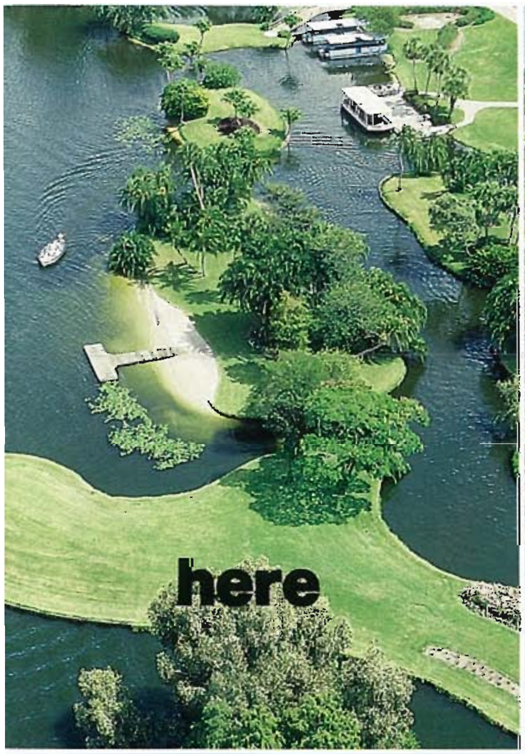

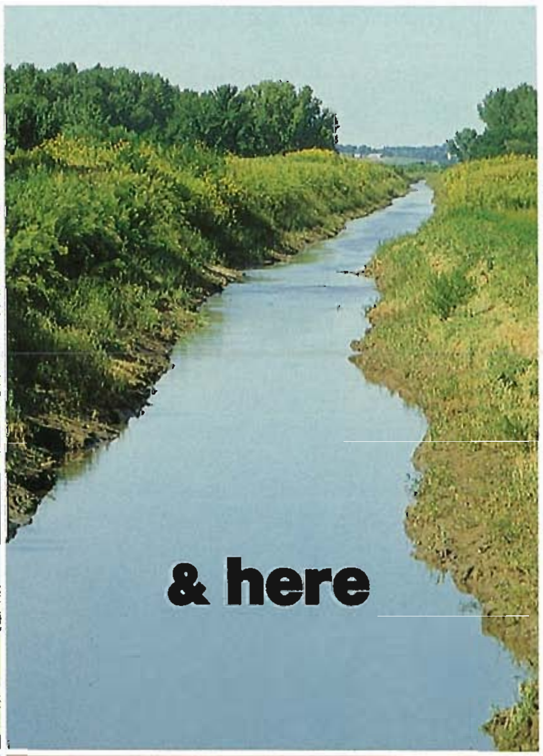

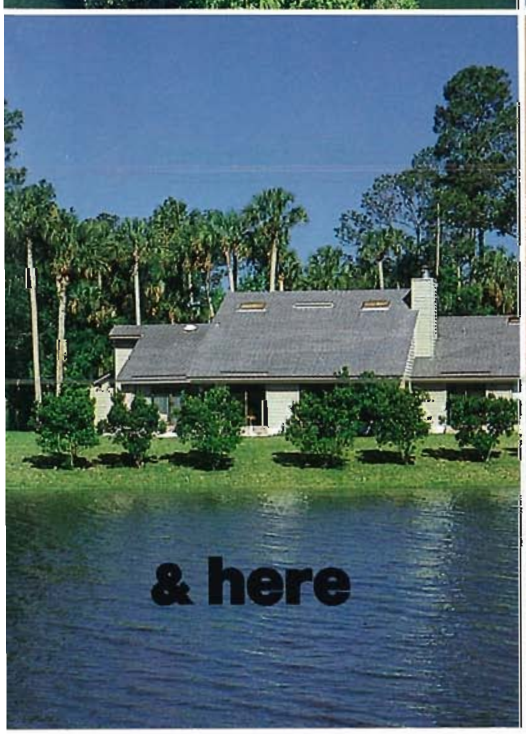

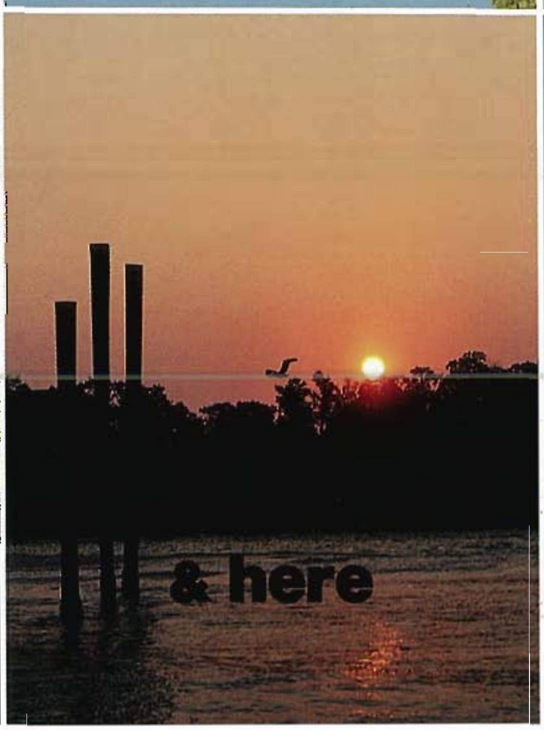

sponsors and cooperators provided $496,102 of the total dollars spent. The State of Florida's share was $916,347.

State Funding Program

The DNR disburses funds through the State Funding for Aquatic Plant Control Program to local governments charged with the responsibility of managing aquatic plants. Participants in the 1987 program included eighteen cities, seventeen counties and thirty-five water control and other special districts. Waters eligible for funding are permanent bodies of water which local governments are financially responsible to maintain. The majority of waters managed under this program are ditches, canals and small man-made lakes.

Ths State Program was revised in 1986, through revisions to Section 16C-50, F.A.C.. The major change was the establishment of nine priority levels for the allocation of funds. The priority levels were based on two major factors: 1) the waters treated; sovereign lands (natural lakes and rivers) versus man-made canals and ditches whose ownership is claimed by local government entities, and 2) the plants controlled; exotic species versus native vegetation. Funding priority was given to the management of state owned waters and control of exotic species such as hydrilla and water hyacinth.

Prior to the establishment of the

TABLE 2. Herbicides utilized under the Cooperative Aquatic Plant Control Program.

Herbicide	YEAR 1984	1985	1986	1987
2,4-D	19,174	12,805	13,658	9,441
2,4-D Granular*	54,000	65,000	67,198	3,600
Aquathol K	23,940	22,349	34,541	23,646
Aquathol Granular*	50,621	56,330	14,804	63,359
Copper Chelate	6,195	7,538	11,816	4,494
Diquat	7,003	8,755	9,970	11,229
Hydrothol 191	62	0	317	20
Hydrothol 191*	120	2,480	0	0
Hydout*	211	450	0	0
Rodeo	307	440	586	256
Sonar A.S.	589	315	459	1,371
Sonar 5P/SRP*	16,147	16,158	29,500	75,966

* Indicates pounds, all other amounts are gallons.

TABLE 3. Summary of control costs by plant type and control method for the Cooperative Aquatic Plant Control Program during 1987.

Control Method	Plant	Acres Controlled	Dollars Spent	Cost Per Acre
Herbicide	Floating*	33,668	$2,145,782	$ 64
	Hydrilla	7,995	$3,305,972	$414
	Other	1,292	$ 210,421	$163
	Total	42,955	$5,662,175	$132
Mechanical	Floating*	3	$ 2,798	$ 933
	Hydrilla	163	$100,709	$ 618
	Other	91	$114,225	$1,255
	Total	257	$217,732	$ 847
Total	Floating*	33,671	$2,148,580	$ 64
	Hydrilla	8,158	$3,406,681	$416
	Other	1,383	$ 324,626	$235
	Total	43,212	$5,879,887	$136

* Water hyacinth and water lettuce

TABLE 4. Acreage of plants controlled under the State Aquatic Plant Control Funding Program.

	YEAR			
PLANT	1984	1985	1986	1987
Grasses	15,928	15,937	14,143	12,057
Algae*	6,721	8,013	5,149	741
Hydrilla	4,570	6,046	9,390	8,381
Ditchbank Brush	5,932	4,517	0	0
Water Hyacinth	1,649	1,306	2,033	2,221
Water Lettuce	1,648	1,345	2,017	2,852
Cattail	1,992	1,958	1,815	684
Alligatorweed	903	1,121	1,338	1,281
Chara	722	721	1,231	567
Bladderwort	755	559	744	422
Duckweed	349	353	2,430	128
Spikerush	346	392	678	153
Naiad	402	494	611	67
Spatterdock	555	390	387	140
Pennywort	0	127	250	78
Hygrophila	121	99	164	404
Salvinia	18	142	3	179
Phragmites	0	124	269	90
Other Plants	1,102	540	615	288
TOTAL	43,763	44,184	43,267	30,733

* 1984 and 1985 totals include planktonic algae, 1986 and 1987 do not.

TABLE 5. Herbicides utilized under the State Aquatic Plant Control Funding Program.**

	YEAR		
HERBICIDE	1985	1986	1987
Aquathol Granular*	14,192	28,950	44,022
Aquathol K	15,059	18,355	13,981
Aquazine	0	56	0
Aquazine W.P.*	0	80	0
Banvel 720	2,175	996	564
Casaron*	1,200	1,300	0
Chelated Copper	24,836	37,181	14,421
Chelated Copper*	2,025	2,680	0
Copper Sulfate*	21,528	18,228	4,652
Dalapon*	9,333	4,233	0
Diquat	7,836	9,654	6,066
Hydrothol 191	1,248	1,414	1,233
Hydrothol 191 Granular*	3,060	6,560	11,200
Hydout*	0	1,000	110
Rodeo	11,201	12,589	11,492
Scout	21	0	0
Sonar A.S.	10	20	147
Sonar 5P/SRP*	480	7,920	16,524
2, 4-D	1,454	1,962	1,112
2, 4-D Granular*	68,550	8,820	15,400

* Indicates pounds, all other amounts are gallons.
** Ditchbank herbicides utilized under the program in 1985 are not listed.

priority system, available funds were allocated to grantees on an equal percentage basis for reasonably estimated aquatic plant management expenses. In 1985, the DNR provided 18 percent reimbursement. With the establishment of the priority funding system the DNR begins with the first priority level and allocates 50 percent of the approved control costs. Each subsequent priority level, in descending order, is funded at 50 percent until the available funds are insufficient to provide 50 percent reimbursement. At this level, reimbursement is at the highest percentage possible. Work in the remaining levels is not eligible for reimbursement.

During 1986, the two lowest priority levels, ditchbank plants (level 8) and planktonic algae (level 9), were not funded. In 1987, native plants in flood control waters (level 7) were added to the non-funded levels. Only four of the nine priority levels are being funded in 1988. These levels include all work in sovereign waters and the control of hydrilla, water hyacinth and water lettuce in non-sovereign waters.

Summaries of the plants controlled and herbicides utilized under the State Program from 1984 to 1987 appear in Table 4 and 5. Mechanical control operations were also conducted utilizing harvesters, draglines, towboats pulling A-frames, and backhoes. Slope mowers were used prior to 1986 when ditchbank mowing was reimbursed. Note that Tables 4 through 7, include only operations which were eligible for reimbursement. For example, the acreage of ditchbank plants controlled dropped from 4517 acres in 1985 to zero in 1986 and 1987. This occurred because the DNR no longer reimbursed for ditchbank control, not because ditchbank control was no longer conducted. In 1987, the decline in acreage of native plants controlled, especially filamentous algae, occurred for the same reason.

The total acreage controlled, dollars allocated and spent, and cost per acre for herbicide, mech-

TABLE 6. Summary of acres controlled, dollars spent and cost per acre for the State Aquatic Plant Control Funding Program.

Control Method	1984	1985	1986	1987
	YEAR			
Acres Controlled				
Herbicide	38,007	37,726	39,689	27,480
Mechanical	5,756	6,458	3,578	3,253
Biological	0	N/A*	5**	0
TOTAL	43,763	44,184	43,272	30,733
Dollars Spent				
Herbicide	$4,744,395	$5,120,327	$5,476,788	$4,357,291
Mechanical	2,251,799	2,471,529	1,730,584	1,381,561
Biolgical	0	500	3,942	0
TOTAL	$6,996,194	$7,592,356	$7,211,314	$5,738,852
Cost Per Acre				
Herbicide	$125	$136	$138	$159
Mechanical	$391	$383	$484	$429
Biological	N/A	N/A	$888	N/A
Combined	$160	$172	$167	$187
Funds Allocated	$2,001,004	$1,711,513	$4,185,600	$3,472,926
Reimburse-ment	22%	18%	25% or 50%	34% or 50%

* Stocking of triploid grass carp not completed until 1986.
** Estimated control achieved as of 2/87.

TABLE 7. Public funds spent under the Cooperative and State Aquatic Plant Control Programs.

Program	Plant	1984	1985	1986	1987
		YEAR			
Cooperative	Floating*	$2,524,100	$2,326,800	$2,079,300	$2,148,580
State	Floating*	431,675	360,114	590,040	843,597
	SUBTOTAL	$2,955,775	$2,686,914	$2,669,340	$2,992,177
Cooperative	Hydrilla	$2,280,400	$2,346,700	$2,752,600	$3,406,681
State	Hydrilla	843,900	1,206,094	2,158,052	2,029,179
	SUBTOTAL	$3,124,300	$3,552,794	$4,910,652	$5,435,860
Cooperative	Other Plants	$ 238,750	$ 589,910	$ 443,147	$ 324,626
State	Other Plants	5,722,684	6,026,198	4,463,222	2,866,076
	SUBTOTAL	$5,961,434	$6,616,108	$4,906,369	$3,190,702
	TOTAL	$12,041,509	$12,855,816	$12,486,361	$11,618,739

* Water hyacinth and water lettuce.

anical and biological control methods for Fiscal Year 1984-1987 appear in Table 6. The majority (88 percent) of plants were controlled using herbicides. All control costs include salaries, benefits, equipment rental, herbicides, contractural work and indirect administrative costs. Of the $5, 738,852 spent in 1987, approximately 92 percent was spent to control exotic species.

The combined amount of public funds spent under the Cooperative and State Programs for each plant category appears in Table 7. During 1987, State Program participants also controlled an estimated ten to twelve thousand acres of plants in the non-funded priority levels. This work is not included in the above tables since it was not eligible for reimbursement. Based on the average cost per acre for the State Program ($187.00), this work would increase the amount spent by State Program participants by at least two million dollars.

These acreage and cost figures represent only operations conducted under the Cooperative and State Funding Programs in public waters. Work conducted by private individuals, commercial applicators, or governmental agencies under the non-funded permitting program (Chapter 16C-20, F.A.C.) would make the acreage and cost estimates for aquatic plant management in Florida considerably higher.

Coming up in the Next Issue of *Aquatics*

- Developing a Plan to Manage Lake Vegetation, by Sandy Engel, Stanley Nichols, and Tom McNabb
- Medicinal Uses of Aquatic Plants Common to Florida, by Sue Newman
- A Review of the Final Recommendations of the American Assembly Conference on Management and Control of Aquatic Weeds in Florida, by Joe Joyce
- Haller's Historical Highlights
- Much, Much More. . .

Florida's Water Management: A Humid History

By
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West Palm Beach, Florida 33416

Modern Florida is a place which has undergone a lot of remodeling, and I don't mean simply my Aunt Sophie's Boca condo, although she's still unhappy with the wallpaper. Southern Florida, especially, has seen vast projects constructed across its face to achieve water drainage and land reclamation.

With average annual rainfall of 55 inches the natural Florida was a very watery place. Because of the state's unique southern hydrogeology the shallow, miles-wide Everglades arose. Very flat land contours and porous, near-surface bedrock further contributed to the creation of a land where water retention time was very long.

South Florida's aboriginal Indians inhabited the area continuously for ten to twenty thousand years. Peninsular inhabitants were the Calusas in the southwest, including Lake Okeechobee, and Tequestas on the Keys and southeast coast. The peninsular Indian cultures were markedly different from those in north Florida and the American Southeast. Sub-tropical coastal resources allowed nearly complete sustenance from hunting and gathering methods without extensive migration or agriculture. Only in the Pacific Northwest of North America was a comparable food resource available.

Due to the natural abundance, little environmental modification was performed or necessary for the peninsular people to flourish. Evidence of some canals and agriculture does remain, however. At their peaks, the Calusas may have numbered 20,000 and the Tequestas 5,000 people. That they flourished in spite of the onslaught of the region's incredible hordes of mosquitoes and biting flies remains a marvel to me.

Spain ruled Florida for 300 years, establishing coastal settlements and forts. In 1821, the U.S. acquired the new territory of Florida for $5 million. Statehood followed in 1845. The federal Swamp Lands Act of 1850 conferred all ownership of swamp and overflow lands to the states. The young state of Florida was plagued by financial woes. To generate capital, vast areas were given, or sold at bargain prices, to those pledging to drain land, build railroads or otherwise contribute to making more land arable and accessible. Yet the State's debt continued to mount as its real estate was handed over to private hands. The land grants and cut-rate sales to developers met with a lot of criticism especially when commitments to reclaim land and attract new residents were not accomplished. Mainly, the new land owners cut virgin timber stands and performed little in the way of capital improvements.

The first effective drainage operation was initiated in 1881 by Hamilton Disston of the Philadelphia tool manufacturing family. Disston purchased 4,000,000 acres at twenty-five cents an acre and brought dredges to Kissimmee. Here lakes (Kissimmee, Hatchineha, Tohopekaliga and others) forming the headwaters of the Kissimmee River, and ultimately Lake Okeechobee and the Everglades, were connected by canals and the Kissimmee River was deepened and somewhat straightened. Also, the waterfall of the Caloosahatchee River was blasted out and three lakes (Hicpochee, Bonnet, and Lettuce) southwest of Lake Okeechobee connected. These lakes had been the Caloosahatchee's headwaters yet they ultimately were directly connected to Lake Okeechobee.

In addition to increased water flow, this drainage system allowed steamboat traffic between Kissimmee and Okeechobee and on from there to the Gulf of Mexico. Commerce and immigration possibilities were enhanced. Disston received title to 1,652,711 acres or half of the land he claimed to have drained. Later surveys held that the project permanently drained no more than 50,000 acres yet a lot was learned during the work.

Besides showing that the drained lands could be farmed, Disston's projects illustrated the extreme difficulties and expense such undertakings entailed. Disston continued to develop his land holdings and encouraged agricultural research and railroad construction. However, he died in 1894, after which his family sold all his Florida holdings at a fraction of their potential value. From his undertakings, though, it was realized that regional, public-funded projects would be required to accomplish major drainage projects.

Initial state drainage legislation came in 1905 with the creation of the Board of Drainage Commissioners who were empowered to construct a drainage system. Governor Napoleon Bonaparte Broward proposed that a 200 foot-wide canal be cut from Lake Okeechobee east to the Saint Lucie River at a cost of $250,000. Financing was to come from taxes levied by the Drainage Board upon the 4,300,000 acres lying

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within its newly-created Everglades Drainage District. The taxation rate was a nickel per acre. Their first project actually begun, however, was in 1906 as the New River Canal between Fort Lauderdale and Lake Okeechobee was dug through state-owned lands. Broward faced stiff opposition in continuing the project, yet its activity spurred new land sales and decreased opposition to the taxation. He underestimated the cost and difficulty of the work, though. By 1909, only fifteen miles of the New River Canal had been constructed at a cost of $377,642. At this point, Broward's successor, Gov. Gilchrist began looking for private contractors to take on the canal projects.

Despite the stuttering drainage efforts, people were coming to Florida. Land sales companies made claims (often false) as to the vast drained areas available for productive farming. The public uproar surrounding false sales claims instigated federal Congressional hearings in 1912 which led to markedly decreased sales and drainage funding. Florida issued drainage bonds to reinforce confidence in land sales but WWI intervened and little progress was made in the '20s. The Palm Beach Canal was completed between Lake Okeechobee and West Palm Beach in 1917. In 1924, a William J. Conners invested in 16,000 acres in what was to become the Everglades Agricultural Area and was given authority to construct a toll road along the new Palm Beach Canal.

During the same period, Flagler's original railroad company, the Florida East Coast, constructed lines to the emerging towns around the lake. The boat traffic which had predominated in supplying the area was displaced. In 1926, the Florida land boom collapsed entirely and credit of the Everglades Drainage District was exhausted. Yet the area population had risen to 48,000 and the occurrence of droughts, floods and deadly hurricanes in the '20s prompted $20,000,000 in new bond issues to complete the drainage project. The Depression intervened, however, and the debt-load of the Drainage Commission was so great that all employees were released and efforts to re-pay creditors began in 1932.

Drainage project construction fell to the Army Corps of Engineers which built a levee system, as part of the new Okeechobee Drainage District project, around much of Lake Okeechobee between 1930 and 1937. Many other projects weren't resumed until the '40s when the need to proceed was shown by alarming muck soil subsidence in the Everglades basin, saltwater-intrusion along the coast, and concern for the newly-created (1947) Everglades National Park. Also, in 1947, almost twice normal rainfall occurred in south Florida flooding as many as 5,000,000 acres of 18 counties six inches to ten feet deep for a month. Much of the existing drainage infrastructure was obviously not working.

The Army Corps of Engineers

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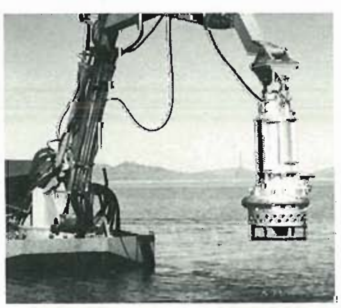

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drew up plans and submitted them to Congress in 1948. The state created the Central and Southern Florida Flood Control District in 1949 to maintain many of the Corps constructions. Numerous projects continued well into the 1970s. The southern water conservation areas were created within a levee and canal system, the Lake Okeechobee dike was continued and heightened, the Kissimmee River was channelized and the canals between the Osceola County lakes Disston had originally connected were modified in the interest of retaining water in them year-round. Historically, many of these lakes had drained almost completely during the winter dry seasons.

In the upper St. John's River Basin, west of Vero Beach, drainage work had been planned, but not begun during times of low land prices. Plans were scaled down in the late '60s when canal construction to aid navigation and drainage was begun. A series of weirs between Melbourne and Sanford allow several lakes (Washington, Hell'n'Blazes, Sawgrass) to function as reservoirs in the river system.

In 1960, the Southwest Florida Water Management District, or "SWIFTMUD," was created. As a result of the Water Resources Act of 1972, Suwanee River, Northwest Florida and St. John's River Water Management Districts were created and Central and Southern Flood Control District was renamed South Florida WMD. These Districts, along with the previously mentioned SWFWMD, partitioned the state into five regional water management districts.

The northern water management districts were, and continue to be, managers of more natural systems in which there are fewer man-made constructions. Of course, to begin with, natural drainage was greater in many of these areas. Many parts of north Florida are even blessed with hills; rare unknowns in south Florida, (by way of explanation to Dade County residents, these constitute land which rises and falls, in the Florida panhandle to the nose-bleeding altitude of 345 feet). While central and north Florida's wetlands comprise major land areas (including North America's reputed largest wetland area: the Green Swamp), arable lands also were available without extensive drainage. Projects in the St. John's River District, for example, have included land acquisition for agricultural water retention, not drainage.

All the Districts continue to try to be all things to all their residents. Agriculture needs water to irrigate with when conditions are dry, but water removal when too much arrives. Urban dwellers need high quality water for recreational and domestic purposes. In order to survive, wildlife need areas to remain without excessive human manipulation or intrusion. All water-use demands are continuing to increase with the population. Local, state and federal agencies, elected officials and the people must continue to make integrative decisions in order to achieve an aquatic equilibrium with equal dampness to all.

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Successful Biocontrol of Water Hyacinth: A Documented Example

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Introduction

Reports on a decline in water hyacinth infestations have become more frequent in recent years. Yet there always remains the problem of documentation (Center 1982). It is rare to have a situation in which one person has been in an area long enough to notice a gradual weed decline. Even if this is so, data are seldom collected until the process is nearly complete and baseline data for comparison are by that time unavailable. Moreover, if declines are rapid at sites that are only infrequently observed, the changes may go unnoticed altogether. Economic realities are such that research funding is scarcely ever made available for monitoring of released biocontrol agents in the field. Yet from the standpoint of researchers and aquatic plant managers alike, data are essential in evaluating change and determining the primary causative factors.

In January 1986, we began a two-year study of the population dynamics and life history patterns of water hyacinth weevils at several field sites in north and south Florida. Our goal was to find relationships among climatic conditions, water quality, plant nutritional quality and weevil abundance and ecology. We tried to select field sites at which the water hyacinth were not damaged in any way, so that we could exclude impacts from herbicidal or mechanical weed control on the insect-host plant system. We also wanted water hyacinth sites that we were sure would persist for the full two years so that we could collect a complete data set.

One of the sites we chose was an abandoned phosphate pit in north central Florida. This pond was approximately 22 feet (7m) deep with a surface area of approximately 10 acres (4 ha). The pond water was nutrient-rich, and remained so throughout the study, with nitrogen concentrations as high as 2.1 ppm and phosphorous concentrations often up to 0.8 ppm. In November 1985 this pond was completely covered with a dense stand of large water hyacinth plants. The plants were large and robust so we felt certain we could have a viable field site for the duration of the study. Adult water hyacinth weevils were present at the site, averaging 1 weevil per plant.

Methods

We began collecting data on a monthly basis at this site in February 1986. Water samples were collected monthly and analyzed for nutrients (N and P) and other compounds. Information was collected on air temperature, water temperature, sunlight, wind speed and relative humidity, using a continuously-recording remote weather station. We collected replicated quantitative water hyacinth samples to determine plant density, size, biomass, and tissue quality (chemical composition), as well as weevil density and distribution of life history stages (larvae, pupae, adults). We also took qualitative insect samples to determine when weevils produced eggs and when they possessed the flight muscles that allow them to periodically disperse in the field.

Results and Discussion

The data are presented in Table 1, and show the decline in the water hyacinth population at Miner's Lodge Pond during a 2-year period. Early in 1986 the pond was completely covered with frost damaged water hyacinth, with only a very small area of open water (5%). Plants began sending out new leaves in March as they recovered from winter damage (height 3rd leaf 25 cm). The biomass of live plant tissue averaged 408g DW/m^2. Shoot density of these tall (36 cm), robust plants doubled over the next 3 months and biomass increased 2½ times (1030 g/m^2) as early summer plant growth occurred. Weevil populations declined slightly prior to and during this period of rapid plant growth. Water hyacinth biomass fell through the late summer as plant growth slowed in the higher summer temperatures. Leaf height was greatest at this time (41 cm), and weevil density increased to further evidence that if a water hyacinth infestation contains water hyacinth weevils and is allowed to remain free of manipulations which might impinge on the insect population, the insects may successfully control the plant (Center and Durden 1981).

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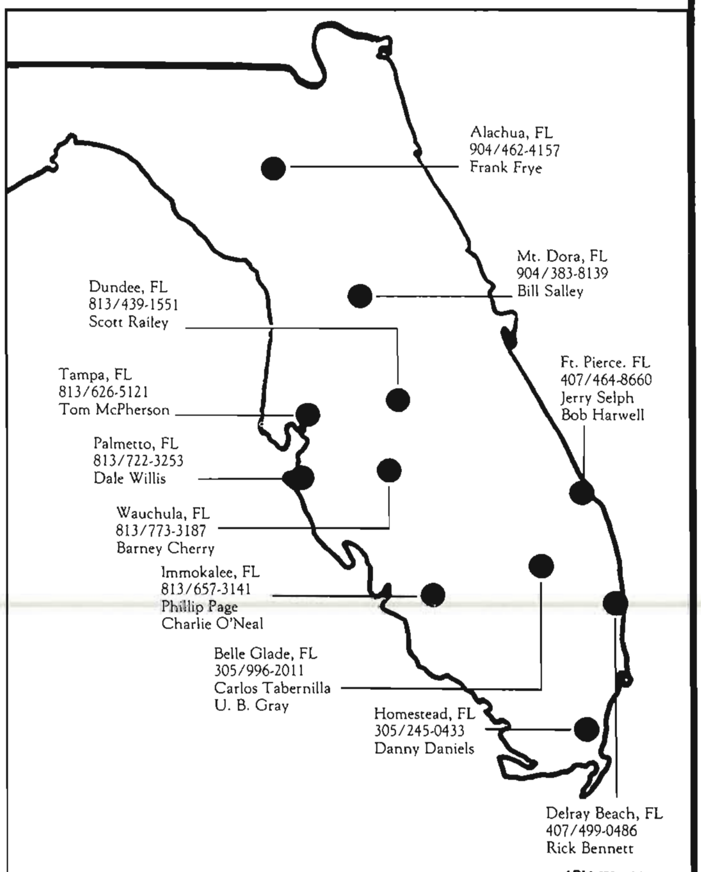


HALLER'S HISTORICAL HIGHLIGHTS

Where Did It Go?

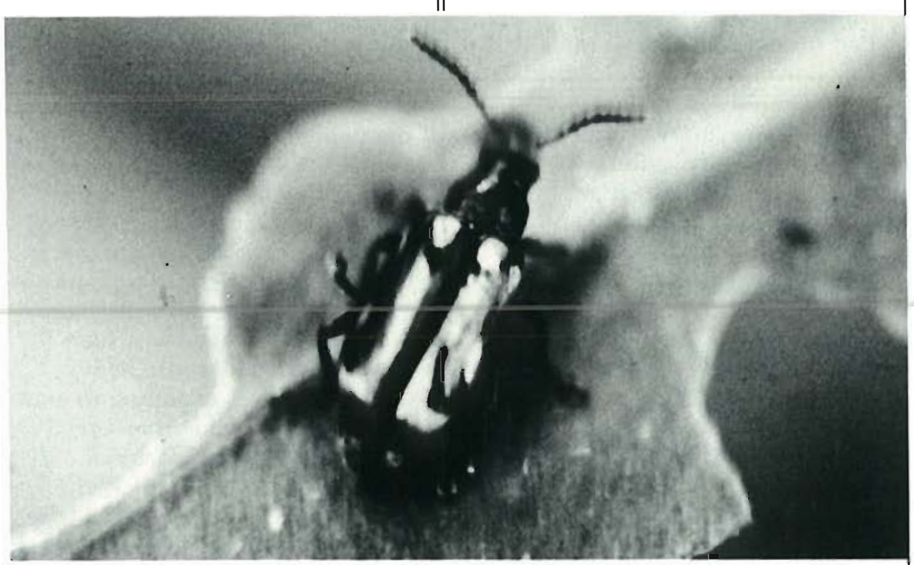
Time passes quickly they say. Recent surveys show us that the majority of people active in aquatic weed control today have been in the profession less than 10 years. Thus, let's go back to 1960 and visualize if you can, rivers, streams, lake shores and canals totally covered with an aggressive, exotic, aquatic weed. You say, "well, I see that all the time"! But, not like it was in 1960, believe me. The major plant causing the problem in 1960 was introduced into the United States, probably in the late 1800s, possibly through the dumping of ballast from sailing ships. It was an emergent/floating plant having hollow stems as big as your thumb. The lush green vegetation often grew to 3 feet high and as an old timer said, "it's like running your boat into a sea of binder twine." The thick, intertwined mats of vegetation could support the weight of a man and provided excellent habitat for swamp rabbits. Floating mats completely clogged major tributaries of the St. Johns River, the Withlachoochee and many others. Santee-Cupper backwaters in South Carolina and shallow bayous of Louisiana provided favorable habitat to many thousands of acres of this plant. It was considered more of a problem than water hyacinth, primarily because few herbicides effectively controlled it. Certainly, esters of 2,4-D, silvex, 2,4,5-T and other materials of the day slowed its growth, but this plant was public enemy number one back in 1960.

Alligatorweed was growing rampant throughout the southeast from Texas to North Carolina when the U.S. Army Corps of Engineers asked for assistance and provided funds to the U.S. Department of Agriculture's Entomology Research Division of the Agricultural Research Service. Research literature of the 60s and 70s clearly documents the methodical search for the native range of alligatorweed in South America. Alligatorweed was found along most of the eastern coast of South America, but never growing to the extent that it was causing problems as in the southeastern U.S. Many insects were found to be feeding on alligatorweed in South America, but the alligatorweed flea beetle seemed to cause the most damage to this plant. After extensive food preference and reproductive studies it was determined that the alligatorweed flea beetle fed and reproduced exclusively on alligatorweed. It was also documented that the alligatorweed flea beetle was not present in the United States. Thus, in April, 1965, 260 adult alligatorweed flea beetles were introduced into the Ortega River alligatorweed mats and everyone involved in the project was sitting on their hands to see what would happen next.

By the following year literally thousands of alligatorweed flea beetles had decimated the alligatorweed in the Ortega River, and scientists collected these insects for movement to other areas of the southeast. Within 2 years, the alligatorweed flea beetle was in contact with all the major alligatorweed population in Florida, and the rest is history.

Alligatorweed still is controlled in some areas in Florida today, primarily in ornamental ponds where people can't wait for the flea beetle to do its work, and in agricultural areas of south Florida where populations of the insect don't build up to high enough populations to be effective. Also, alligatorweed flea beetles can't tolerate cold weather along the northern range of alligatorweed growth and it is not effective against terrestrial alligatorweed. But by and large, alligatorweed problems are non-existent in Florida compared to 1960. Next time you see one of the yellow-black striped adults, show some respect as it's great, great, etc. grandparents were likely one of the initial 260 history making alligatorweed flea beetles introduced into the Ortega River.

■ **Bill Haller**



Alligatorweed flea beetle (Agaskles). *Photo by Greg Jubinsky.*

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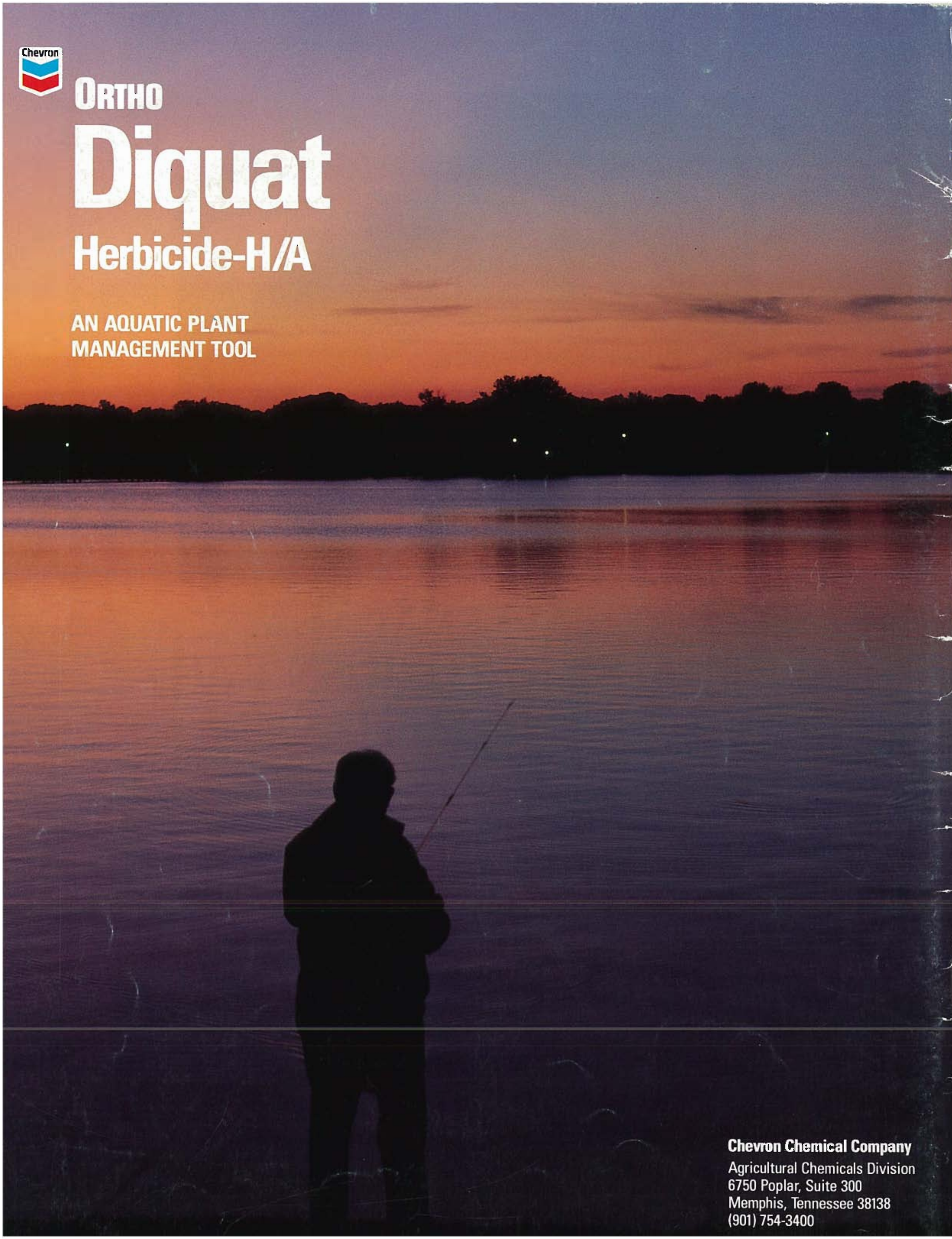

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