

# Economics Of Aquatic Weed Control In The Central And Southern Florida Flood Control District

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## INTRODUCTION

Recurring floods and droughts have been natural phenomena in central and southern Florida since prehistoric times. With the advent of man and his cities and farms, water control became a vital necessity. Today a \$396,000,000 system of canals, pumping stations, water reservoirs, dams and spillways is now more than half completed for the Central and Southern Florida Flood Control District. This system is designed to control flooding and mitigate drought. Benefits are now estimated at \$82 million per year. But these benefits would be almost totally negated if aquatic weeds were left uncontrolled. Costs of weed control are high—running into seven figures annually within the FCD. However, these costs are small compared to the damages that would occur if weeds were permitted to choke our waterways.

## WATER MANAGEMENT

In a state of Nature, seven out of every 10 acres in central and southern Florida were flooded virtually every year. Periodically 19 out of every 20 acres were inundated. The land is unusually flat, particularly in the area from Lake Okeechobee southward. There is a tropical rainfall pattern, with two-thirds of the annual total of about 55 inches occurring in the summer "rainy season," from June to September. Concentrated rainfall on flat terrain has caused widespread sheet flooding. The water does not flow off quickly, because slopes are so slight. The drop in ground elevation averages only a little over one inch per mile from Lake Okeechobee to the southern tip of the peninsula. Drainage programs were launched in the early decades of the 20th century, but they were largely under-financed. Floods recurred. Droughts were worsened by overdrainage. Hurricane driven wind tides in 1926 and 1928 claimed a total of about 2,500 lives near Lake Okeechobee. The feast and famine water cycles plagued Florida in the 1930's and 1940's. Then in 1947 a gigantic flood inundated more than 5,000,000 acres, and damage ran to \$60,000,000.

It was clear that a large scale water management program was needed, if Florida were to grow and prosper. Accordingly, in 1948, the Congress authorized such a program (1). The objectives were and are: flood control, water conservation, water supply, preservation of desirable levels of fresh water in the ground, prevention of salt water intrusion from the ocean, preservation and enhancement of fish and wildlife, navigation, and public recreation.

In 1949, the State Legislature created the Central and Southern Florida Flood Control District to represent all local interests in the building and subsequent operation of the system.

But the overall Project, now slightly more than 50% complete, is a *primary* system for water control. There

must also be *secondary* and *tertiary* works, to take advantage of the primary facilities. Individuals, cities, farmers, drainage districts, and counties can use the primary canals to remove flood waters in rainy seasons, and to obtain needed water supplies in dry times. However, they must construct their own ditches, dikes, and pumping stations.

The basic concept of the FCD is flood control by conservation, rather than by diversion. A network of lakes and reservoirs, interconnected by waterways and canals, is utilized to store excess water when there is too much, and to make this excess available for all water needs whenever needed. The needs include farmers, wildlife, cities, industries, and the Everglades National Park.

## COSTS OF AQUATIC WEED CONTROL

The Flood Control District uses both chemical and mechanical means of aquatic weed control. Floating aquatic vegetation, such as water hyacinths, are killed with chemical sprays, usually applied from small boats. Submersed weeds are uprooted with steel A-frames, dragged along canal bottoms by towboats, amphibious "Ducks" and other equipment. The submersed weeds, which are uprooted, float to barriers and are removed by draglines, but the job has to be done over and over again. Every year it grows more costly.

In the latter 1950's, the annual cost of weed control climbed above \$100,000 for the Flood Control District. In fiscal year 1963 it exceeded \$160,000. In 1964 it was \$189,000; in 1965 and 1966, \$230,000 each year (2). In the past fiscal year, which ended June 30, 1967, the FCD expended \$337,740 on weed control. A breakdown of expense for the past year indicates \$230,000 for chemical weed control and \$107,000 for mechanical weed control. From 1949 through June 30, 1967, the Flood Control District spent a total of \$2,179,000 on aquatic weed control.

It is predicted that ultimately, when the primary water management system is finished, the FCD will have to spend more than \$600,000 per year to keep water weeds in check. This is a straight-line projection, assuming continued use of present techniques of eradication (3).

Within the boundaries of the 18-county Flood Control District, many different weed control programs are being conducted by other organizations. In the Everglades farming areas south of Lake Okeechobee, local drainage districts collect assessments which usually run about \$5 to \$5.25 per acre per year. This money is used for local pumping operations, for administration, and for maintenance of canals. Part of the local administration costs and most of the canal maintenance expense go for aquatic weed control. It is conservatively estimated that drainage districts are spending at least \$2 an acre for aquatic weed programs. Since there are now about 360,000 acres in agricultural production between Lake Okeechobee and the Conservation

Areas, it will be seen that cost of weed control in secondary canals and ditches exceeds \$700,000 per year.

Local counties, like Dade, Broward, Palm Beach, and Lee are heavily committed in aquatic weed control. The U.S. Fish and Wildlife Service, the Lake Worth Drainage District, in southeastern Palm Beach County, and many others are also spending considerable sums to check aquatic growth. The Army Corps of Engineers, within the boundaries of the FCD, is currently involved in a weed control project (in cooperation with the State of Florida) that will approach \$166,000 this year. It is probable that all aquatic weed control efforts within the Flood Control District now are near a \$2,000,000 annual level.

### BENEFITS OF AQUATIC WEED CONTROL

With the warm sunshine and year-round growing season typical of Florida, aquatic weeds would soon clog all primary and secondary canals, reservoirs, and most waterways if left uncontrolled. The Flood Control District would be unable to remove flood waters, which would inundate vast acreages. Large pumping stations, operated by the District, would not be able to pump very long before weeds were sucked into intake gratings so thickly that a head of water would be created, with a drawdown of the water level enough to stall the pumps.

In testimony prepared for Congress, it is now reported that average annual benefits from the Flood Control District total \$82,169,600 per year. This is broken down as follows: Flood damages prevented - \$30,467,300; Increased land use - \$49,498,100; Recreation - \$1,794,100; Fish and wildlife - \$359,100; Navigation - \$51,000. It is also reported that the water control Project has a benefit-cost ratio of 4.9 to 1 (4). This means that \$4.90 in benefits are being realized (in the above categories) in return for every \$1.00 of initial cost. This is probably one of the most generous benefit-cost ratios for any large public works project in America (5).

Without aquatic weed control programs, the entire Flood Control District would cease to be functional. In rainy seasons, waters would again rampage across farmlands, and cities would be flooded. In addition to actual flood damages, land values would be decreased.

Thus, it can be reasonably predicted that aquatic weed control as an integral part of water management makes possible benefits approaching \$82 million per year in the District.

Other benefits of the existing Project include municipal water supply and prevention of salt water intrusion. These are very real, but have never been evaluated in dollars. It is certain, however, that municipal supplies—as well as irrigation supplies for farms—would be seriously affected if the waterways were filled with aquatic weeds. Cities like West Palm Beach tap FCD water supplies via surface canals. In dry seasons, the West Palm Beach pumping station would soon experience difficulty in drawing water supplies from the District's Canal L-8, if that canal were choked with vegetation. In fact, the city's Canal M, which brings fresh water directly into the 12,000 acre city water catchment area could become blocked to flow of water.

Navigation could be brought to a halt almost everywhere. Waterways used by fresh water fishermen could be blocked. Irrigation supplies for farmers could be drastically cut down, if not cut off. Lack of aquatic weed control would

spell a nightmare of economic chaos for central and southern Florida. It is doubtful if an accurate estimate of all damages could be made. But taking into consideration all the benefits of water control—those that have been evaluated in dollars plus those that are known to be large and significant but are unevaluated—it can be seen that values far in excess of \$100,000,000 per year are at stake. With weed control as a part of water management, these are benefits. Without control, the benefits would become damages.

### SOME NEW HORIZONS

Experiments in biological control in recent years could result in some breakthrough in weed control which would change the cost picture. The Plantation Field Laboratory has been conducting experiments with Marisa snails. Florida Atlantic University conducted a three-year study of manatees (sea cows) and their usefulness in eating aquatic weeds. This latter project, funded by the Flood Control District, still leaves some major questions unanswered, especially concerning manatees' breeding and reproduction, and their susceptibility to fatal respiratory infections in time of unusually cold weather.

The Governor's Aquatic Research and Development Committee, headed by Lyman Rogers, an Ocala businessman, has brought together numerous agency representatives, plus private enterprise. Experiments with water hyacinths used as a supplement for cattle feed, conducted by Lykes Brothers, under the Committee's aegis, hold promise of new economic horizons. Rogers has reported that a value of \$30 a ton for hyacinths has been suggested, for use in cattle feeds. A new study of elodea (hydrilla) suggests the plant has a protein content of 26%. The Governor's Committee is hopeful that a market can be found for some of the more troublesome weeds in Florida. Plans are being discussed which may lead to the creation of a statewide aquatic weed control authority, perhaps headed by a board or commission. The Commission hopes to see a bill introduced in the 1969 legislature which would create such a statewide organization. Expanded research programs, and mass purchases of chemicals and equipment for statewide use could effect economies, making possible more and better weed control.

The search for new and better methods of control goes on, but for the time being Floridians must fight the weed control battle with the existing weapons. Water control is the lifeblood of the economy of central and southern Florida; and weed control is absolutely vital to all of this.

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