

Some possible biological controls show promise, but the effect of these animals on native population must be studied.

Outdoor recreation is a number one industry in Florida. The importance of aquatic weed control to this industry cannot be over-emphasized, neither can the dangers from misuse of chemicals be forgotten.

We all have a stake in the development of our outdoor recreation industry. It is through organizations like the Hyacinth Control Society working together that our maximum potential can be enjoyed.

Aquatic Plant Control

By

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Most of you here today are concerned with either field operations and administration or scientific research for aquatic plant control. There are others of you who maintain, for personal or other reasons, a strong interest in hyacinths and other obnoxious aquatic plants. In fact, because of the nature of this Society, I can say with assurance that we are all mutually concerned in the control and progressive eradication of water hyacinth.

In our enthusiasm for controlling the hyacinth and in seeking new methods we tend to forget the basic reasons why control is needed. I would like to refresh your memories as to why we are trying to control and progressively eradicate these obnoxious aquatic plants, particularly why the Corps of Engineers is concerned and the present status of Corps control operations.

As you know, the hyacinth is believed to have been introduced into the United States at the Cotton Exposition of 1884 in New Orleans, Louisiana, from which it spread through the southeast. It was reported that hyacinth was first introduced in Florida in the St. Johns River about 1890 at Edgewater, about four miles above the city of Palatka. Considered as the beautiful flowering plant that it is, it was of no particular concern until 1894, at which time it was reported that the hyacinth had become so abundant that it began to attract the attention of steamboatmen and fishermen, although at that time the amount was not sufficient to cause trouble.

The first notice that the plants were objectionable and were creating obstructions to navigation was contained in a letter dated 9 February 1895 from Mr. E. S. Crill of Palatka to his congressman requesting aid. A description of the hazards to navigation is contained in a Department of Agriculture report of 1897, which stated:

"That the water hyacinth is becoming a serious menace to navigation in the St. Johns River is unquestionably true. Small boats with screw propellers find it impossible to penetrate a very large mass of the plants, as they lack the necessary power, and the plants soon become entangled in the screw and prevent it from revolving. Parting the plant with boat hooks, etc., is very slow and tedious. Paddle-wheel steamers

are able to penetrate the extensive masses of the plants much better, but are generally hindered and frequently entirely blocked. When a large steamer going at full speed strikes a bank of the hyacinths, it comes almost to a standstill. In side wheel steamers the plants collect between the wheel and bulkheads, packing in so solidly that it is often almost impossible to reverse the engine. This necessitates caution in approaching the landings. Steamers with low-pressure engines are troubled by the clogging of the injection pipes so that sufficient water can not be secured for the condensers. In the case of some boats the obstruction is occasionally removed by blowing steam through the injection pipe. This process, however, is rather dangerous, as the injection pipes and condensers are not constructed with a view to having heavy pressure applied from within. Floating logs frequently lie concealed in the masses of the plants and form a serious danger to navigation. Several boats have already been injured to some extent by striking such obstructions."

"In large lakes, like Lake George, and in wide portions of rivers, there is some danger of steamers being caught between floating masses of the plants, carried out of the channel, and stranded. "The City of Jacksonville," the largest and most powerful steamer plying on the St. Johns, at one time in the fall of 1896 had great difficulty in avoiding this. Small launches, rowboats, sailboats, etc., have in several instances been caught between masses of the floating plants and have found it impossible to get out without aid. In many places it has become dangerous to use small boats."

A vivid description of one such incident, printed in the *Palatka Advertiser* during the summer of 1896, read as follows:

"Three men in two rowboats attempted to cross the St. Johns River at Palatka before day, Wednesday morning and were caught in the water hyacinths. The steam tug "Frank" made two unsuccessful attempts to get to them. A rescuing party from the schooner "Russell" went out Wednesday afternoon about 3:00 o'clock with boards and, throwing them on top of the hyacinths, succeeded in rescuing two of the men who were thoroughly chilled and wet through. At 4:00 o'clock the other man was still in his boat in about the center of the river calling loudly for help and working hard to reach the trestlework of the drawbridge as all efforts to reach him had proved futile."

I was unable to find anything further regarding his rescue; however, I believe that the ending should have read, "And as the dying sun sets in the west, we leave the stranded stranger still crying for help."

These difficulties were not limited to the St. Johns River in Florida, but were also encountered in Louisiana, as evidenced by a petition to Congress from citizens interested in navigation of the Tickfaw River in Louisiana during the latter part of 1896.

Congress authorized the checking and removal of such obstacles to navigation by the Corps of Engineers in the River and Harbor Act approved March 3, 1899. At that time it was reported that the western streams of Florida which flow into the Gulf of Mexico did not appear to be affected and that inquiries which were made of engineering officers-in-charge of improvements of rivers and harbors in western Florida, Georgia, and Alabama indicated that the plant did not exist in any of the rivers in their districts. In Louisiana the plant was reported in nearly all the streams, lakes, bays, and bayous in the southern part of the state, about south of the latitude of Baton Rouge, which either by themselves or through their connections with other streams,

empty into the Gulf.

The program for removal or destruction of the water hyacinth obstruction was quite a novel one and had never before been the subject of discussion from an engineering standpoint. As you know, many types of heavy, cumbersome, and costly mechanical devices were developed and used by the Corps on the waterways of the navigation system in the southern states. Chemical control using sodium arsenate was tried; however, this chemical being extremely hazardous, its use was discontinued.

The hyacinth's rapid spread to Texas, Mississippi, and Alabama created similar problem areas and these states were subsequently included in the program. In 1945, Congress, recognizing the impact which the newly discovered chemical herbicide 2,4-D might have as a potential weapon in the aquatic plant control program, requested that the Corps of Engineers determine whether any expansion of the scope of operations or methods of control were advisable at that time, and to determine the nature and extent of the various public benefits that would accrue from "extermination and removal." The report prepared at that time was comprehensive in that it represented a cooperative approach to the problem since water hyacinth obstructions affected agriculture, health, recreation, fish and wildlife interests.

The problems created by water hyacinths become very real when we consider damaging effects on flood control, drainage and irrigation. The carrying and discharge capacities of natural water courses are greatly reduced and retarded when blocked or congested with hyacinth. Numerous small channels and shallow waterways are necessary for efficient drainage of flat, low-lying areas, such as found in our coastal areas from North Carolina to Texas. When these are choked with obnoxious aquatic plants they are subject to more frequent, more extensive and more prolonged flooding with subsequent damage to adjacent farmlands and other properties.

The increasing uses of water for irrigation purposes in our southern states are not without associated problems, for these same obnoxious aquatic plants are considerable nuisances. A large part of the water used for irrigation is pumped out of canals such as those in the Everglades and from lakes in the citrus groves of central Florida. In many instances the hyacinths become so thick, they impede the flow of water to such an extent that pumps become inoperable because of exposed or blocked intakes.

The State of Florida is increasing in population at a rapid rate and is draining areas to make more useable lands available. This growth in useable lands has resulted in the construction of miles of drainage canals to provide more land for housing and agriculture. It has been reported that many, if not all, of these canals and drains are becoming infested with obnoxious aquatic plants as soon as they are completed. Just keeping up with the locations of these new channels has been a problem of those responsible for aquatic plant control operations.

Studies made by the U. S. Fish and Wildlife Service have shown that water hyacinth and other obnoxious aquatic plants are a serious detriment to fish and wildlife resources. Many areas are rendered unuseable for fish habitat, particularly where heavy masses of floating plants cover small waterways and ponds. This cover uses up the dissolved oxygen in the water; it occludes sunlight which is so necessary for maintaining the basic food production organisms vital to the fishery resource; and makes shallow water spawning areas unuseable. With regard to wildlife, drifting mats of weeds

tear up beds of submerged plants, defoliate floating leaved aquatics and have overwhelmed marginal food plants which are desirable foods for waterfowl. In addition to the direct losses due to the actual infestation, these same aquatic plants may so block a waterway that uninfested open areas beyond such a blockage cannot be reached by hunters and fishermen for long periods each year. The fish and wildlife resources are thereby not available for harvesting or beneficial public use. Some fishermen have been led into believing that a fringe depth of hyacinth along the banks of streams and lakes make fishing conditions ideal. This is a misconception. What actually occurs is that the hyacinth infestation has in reality moved the shoreline outward from the bank restricting the amount of water surface suitable for fishing. Clearing away this hyacinth infestation from the shallow water area is most valuable to the production of the basic food organisms needed in those areas for sustaining the fish population in these and nearby areas for successful sport fishing.

Evidence of greater hunting success was reported by the Louisiana Game and Fish authorities as a direct result of hyacinth and alligatorweed control operations. For several years the Department, acceding to the wishes and complaints of residents within one particular area, treated it at about the time requested. The fact that the requests came about the same time each year was noted and it was soon learned that the spray treatment preceded the deer season by only a few days. Needless to say the salty taste of 2,4-D increased the harvest of deer in this area each year until the discovery of the true reason for the spray requests.

The presence of obnoxious aquatic plants in recreational waters spoils the scenic attractiveness usually associated with such areas. Of course, the nuisance to recreationists from the mosquito production normally found in such water areas can become a large problem. Because of infestation with aquatic plants, such waters are not desired nor generally used for boating, bathing and swimming, skiing and the other water oriented activities.

Drainage canals infested with loose, uncompacted mats of scattered hyacinth or other aquatic plants furnish optimum conditions for breeding of malaria, encephalitis, and pest mosquitoes. These canals, if located in or near municipalities require mosquito control operations.

Municipal water supply systems which use surface waters for their source of supply have found that where aquatic plants are present, there is a tendency for the plants to clog and obstruct the flow through the intakes. The labor required for the physical removal of these obstructions add to the ever increasing costs of waterworks operations. The most serious effects of water hyacinth and alligatorweed on the quality of surface waters are that the continuing growth and decay of the plants in a waterway imposes an organic pollutional load on the streams and rivers. The biological and chemical effects of such pollution are similar to sewage or industrial wastes. This action lowers the natural capacity of the waters to absorb organic pollution and creates septic and odor conditions when the plants cause the total oxygen to be depleted. Such ultimate conditions destroy the values of these waters. The increased importance of and interest in water pollution control to conserve the waters for public water supplies, for propagation of fish and aquatic organisms, for wildlife, for recreational purposes, and for industrial and other acceptable uses of water makes this one of the more important aspects.

The values of desirable water-front properties have been lowered in areas where large infestations of hyacinth and

other obnoxious aquatic plants are present. Restricted waterways and obstructions to piers and beaches have rendered many such properties unusable.

The joint report the Chief of Engineers furnished the Eighty-Fifth Congress in 1958 was published as House Document No. 37 of that session and it contained an evaluation of the problem as it existed in 1948. The Congress, in reviewing the magnitude of the problem, instructed the Corps of Engineers to proceed with a comprehensive program for the control and progressive eradication of water hyacinths, alligatorweed, and other obnoxious aquatic plant growths in the combined interest of navigation, flood control, drainage, agriculture, fish and wildlife conservation, public health, recreation and related purposes. Congress also recognizing the value of scientific research included in the authorizing act a requirement for continuing research and development of the most effective and economic control measures. This project, known as the Expanded Project for Aquatic Plant Control, was separate from the previous Act for Removal of Water Hyacinth Obstructions to Navigation.

This expanded project has been underway for several years. Progressive control operations have been conducted in North Carolina, the Santee-Cooper area in South Carolina, the Lake Blackshear area in Georgia, and in most of Florida and Louisiana, with the greatest part of the work being accomplished in Florida and in Louisiana, where the problems are more acute. In the States of North Carolina and South Carolina, the most obnoxious aquatic plant is alligatorweed. Water hyacinths have not been reported in these states. Work in these states has been somewhat limited in scope for lack of a satisfactory herbicide.

Research conducted under the project has been primarily directed against alligatorweed. The research work is being done by means of a cooperative research program with three other federal agencies concerned in the program. These are the U. S. Fish and Wildlife Service, the U. S. Public Health Service, and the Agricultural Research Service. These agencies are also represented on the Research Advisory Committee for this project. This committee is composed of one representative from each of three Engineer Divisions concerned and one representative from each of the research agencies. This committee is unique in government agency cooperation. Being small in number, it can and does function as a working group to review existing and proposed cooperative research programs of each of the agencies and contract research work with qualified universities to perform research in the field of aquatic plant control. It also furnishes professional evaluations of the research performed with suggestions for continuation to the Corps for guiding its administration of the research program.

The 1948 report stated:

"In the present state of knowledge, no practical means of combatting the alligatorweed is known to this committee." This statement is as true today as it was when it was written in 1948. However, we do know infinitely more now about alligatorweed. We have several interesting and promising leads which are under investigation. Large scale field tests using Silvex on alligatorweed are underway in North Carolina and Florida. The use of a 2,4-D and diglycolic acid mixture is being investigated in large scale field tests in Louisiana. Other promising herbicides are being investigated in greenhouses, growth pools and in smaller field tests. Biological investigations for the control of alligatorweed have been underway in the U. S. and South America for about four years. These studies by the Agricultural Research Service

were made as part of the research program administered by the Corps and have resulted in the introduction into the United States of the most promising insect found to feed on alligatorweed. This insect, a flea beetle of the genus *Agasicles*, is host specific to alligatorweed.

The expanded project is programmed for two more years of operational work. It is expected that Congress will again recognize the many benefits derived from this program for the control and progressive eradication of water hyacinth, alligatorweed and other obnoxious aquatic plants. At a time when every effort is being made to conserve and utilize our natural resources for their highest and best use, the losses incurred as a result of having obnoxious aquatic plants on our waterways, streams and tributaries are of great importance and become more so when we consider that water resources are not depleted or used up but can be used over and over again by the public.

In conclusion it appears that the Expanded Project for Aquatic Plant Control is in keeping with the objectives of this Society contained in Article II of the Certificate of Incorporation which reads:

"The general nature of the objects of this Society shall be to assist in promoting control of water hyacinths and other noxious aquatic weeds, to provide for the scientific advancement of members of the Society, to encourage scientific research, to promote university scholarships, and to extend and develop public interest in the movement."

Water Hyacinth Control In Louisiana

by

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There is an old saying, "A thing of beauty is a joy forever," which is simply untrue in the case of the water hyacinth. Because it is a beautiful and unusual plant, it was brought to the Exposition in New Orleans in 1884. Many people asked for samples of the water hyacinth to transplant into the ponds and streams on their country places to beautify the scenery. Others had visions of increasing the cattle fodder in the area and carried plants home for this purpose.

This was the start of the hyacinth problem in the State of Louisiana. Visitors to the Exposition took samples of the plant home to other states. Florida inherited the problem from this source when a well-meaning citizen presented numerous plants to the authorities for beautification of the St. Johns River according to legend.

Within ten years after its introduction into Louisiana, it had become a menace in the streams of St. Tammany Parish, the Plaquemine Waterway and in the Mermentau River. It continued to spread until the navigation in these areas was seriously threatened and the Congress was finally asked to do something to provide relief. In 1900, the Corps of Engineers was assigned the mission of clearing the navigable waters of Louisiana in the interest of navigation and the battle was on. It has continued without interruption to the present date.

The menace has continued to spread into other areas largely through the action of man. Dozens of tourists gather the blooming plants each year to take home to other states.