Aquatic Weed History

Century Old Problem

By JULIAN J. RAYNES
Assistant Chief
Civil Land Planning Section
Environmental Engineering Branch
Engineering Division, U.S. Army
Engineer Division, South Atlantic

THE words "obnoxious aquatic plants" conjures up visions of waterways, rivers, streams, and their tributaries, all choked with water hyacinth, alligatorweed, Hydrilla, Eurasian watermilfoil and many, many other species of undesirable aquatic plants.

The vision would not be complete if we did not include the many boats and barges stuck in the vegetation and moving with vegetation as directed by the wind; or the flood waters which are being retained on land areas because floodways are choked with aquatic vegetation; or the agricultural crops suffering extensive damages because of the lengthy periods of flooding resulting from clogged drains choked with aquatics; or the untold losses to wildlife and fisheries as a result of coverage of open waters and blanketing of marshlands by obnoxious plants; or the reduced flows of life giving water in choked irrigation ditches. We must not forget these visions because they can become reality again in short order if neglected.

We are a nation subject to cause and effect. The history of aquatic plants or weeds in the Southeast is the result of cause and effect. In 1896, the large masses of water hyacinths in the St. Johns River in Florida and some of the main rivers in Louisiana created serious navigation problems and the Congress was made aware of the problem. It was reported that small boats with screw propellers found it impossible to penetrate large masses of hyacinths. Large steamers going at full speed would come to almost a standstill after striking a bank of hyacinths. Condensers used for cooling water were often times clogged by aquatic plants. The danger of steamers being caught between floating masses of the plants and being carried out of the channel was evidenced in 1896 by the "City of Jacksonville", the largest and most powerful steamer in the St. Johns River, when it reported extreme difficulty in avoiding entrapment.

Most are familiar with the story that visitors to the New Orleans Centennial Exposition in 1884 carried the beautiful hyacinth to their homes where it flourished. One document relating to Florida states that as nearly as can be learned, water hyacinths were first introduced into the St. Johns River about 1890 at Edgewater about four miles above Palatka. Within six years, the problem became so acute that the War Department was asked to investigate the situation.

In accordance with Congressional authority, a Board of Officers was appointed in 1897 for the purpose of investigating the extent of obstructions to navigable waters of Florida, Louisiana, and other states by water hyacinths and performing such experimental work as necessary to determine a feasible plan for removing such obstructions. The records of that Board state that one of the members, when in charge of certain river and harbor work in Louisiana some 20 years previously, had observed the plant and its peculiarities and that it was then believed to be flourishing in the Atchafalaya Basin. This would place water hyacinth as flourishing in Louisiana about 1877 which is six years before the New Orleans Centennial Exposition!

Engineers of the U. S. Army Engineer District Office, then located in St. Augustine, Florida, recommended the construction of a mechanical crusher boat. The Board of Officers adopted this recommendation and further advised the use of log booms as an adjunct and suggested utilizing nature by drifting the plants out to sea.

The Board also conducted the earliest known chemical tests for control using muriatic, sulfuric and even carbolic acids. Kersosene and hot water were also tested. Nothing effective was found except a prohibitively expensive solution of salt and quicklime which destroyed both roots and tops in 48 hours. This cost was estimated to be $100 per acre.

Subsequently, the Chief of the Corps of Engineers recommended that two crusher boats be built, one for Florida and the other for Louisiana at a cost of $25,000 each and that log booms be used as an adjunct. The recommendation was adopted by Congress in the River and Harbor Act approved March 3, 1899.

Shortly after the adoption of the original project, a mechanical crusher boat was constructed; however, in 1902 the crusher boat was abandoned because of its inability to cope with the rapid rate of spread of the plant and the demonstrated need for destruction of far greater capacity. In the meantime, the value of sodium arsenite for killing these plants had been demonstrated and since it appeared to offer the extra capacity needed it was adopted for use.

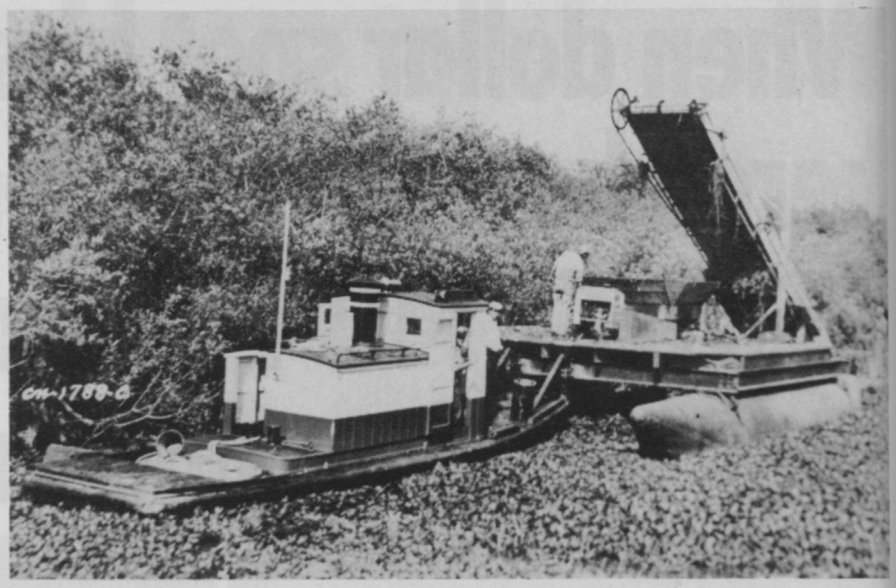
Sodium arsenite was used for hyacinth control even though it was known to be toxic to man and animals. As a result of protests by cattlemen in Florida, the River and Harbor Act approved March 3, 1905, in appropriating funds for "the removal of the water hyacinths from the navigable waters of the State of Florida, so far as it is or may become an obstruction to navigation", imposed the restriction "that no chemical process injurious to cattle which may feed upon the water hyacinth shall be used." The prohibition was not extended to other states.

The un-retouched photos on the next page give a good idea of how aquatic weeds plagued our southern waterways during the early part of this century.

Records indicate that 23 chemicals were tested in 1906 in the search for chemical control. These included:

1. London purple
2. Arsenite of lime

(continued on page 22)



Operating in a sea of hyacinths, this conveyor and dipper are making a trial run in a small canal. Photo was taken in the 1930's.

AQUATIC WEED HISTORY *(from page 12)*

3. Fowler's solution
4. Arsenite of soda
5. Copper sulfate
6. Potassium bichromate
7. Potassium ferrocyanide
8. Crude carbolic acid
9. Potassium hydrate
10. Sulfocarbolic acid
11. Chlorinated lime
12. Bichloride of mercury
13. Monochloride of mercury
14. Lugal's solution of iodine
15. Terpene
16. Oil of tar
17. Tannic acid
18. Aqua regia
19. Kerosene emlusion
20. Whale-oil-soap solution
21. Formaldehyde, 40%
22. Creolin and chloronaphtholeum
23. Sulfurous acid

The first six of these were found to be effective. All of these were also toxic to cattle. Experiments were then conducted to find a repellent which would prevent cattle from eating sprayed plants. Only one effective repellent was found, but the cost was prohibitive.

Sodium arsenite was utilized in Louisiana until 1937. It was abandoned because of cost considerations favoring destruction by machines, defects in effectiveness of the chemical treatment and the demonstrated dangers of this chemical.

Needless to say, the most elementary method of removing hyacinths is to drag or throw them onto the bank. One successful method used was "the elevator", a barge-mounted piece of equipment in which hyacinths are pulled or pushed onto an endless-belt conveyor which lifts them from the water and deposits them on the bank. Barge-mounted equipment with a boom and forked grapple has also been used to deposit the plants on shore. In small canals, draglines with grapples or rakes have also been used.

In 1937, the hyacinth destroyer, "Kenny", a 135 ton, self-propelled, diesel electric, crusher boat was put in operation in the New Orleans District. Vegetation was lifted from the water as the vessel advanced and deposited in a hopper from which it was fed between two rollers operated under 40,000 pounds pressure. The refuse was then returned to the water where it would sink to the bottom. This method resulted in almost complete kill of the plants that passed through it, but its effective use was limited to water deep enough to float the equipment and to areas where hyacinths were massed over a considerable area to feed the machine continuously and in large amounts.

About the same time, the most effective mechanical destroyer in Florida was the "sawboat." This was a specially built boat consisting of three sets or banks of cotton-gin circular saws spaced five-eighths of an inch apart, one bank about six feet in width mounted at the front and one bank on each side about three feet in width. These banks could be raised or lowered. The saws were spun at high speeds and were used to propel the boat. Areas were usually cut about four times to

thoroughly macerate the material.

In Louisiana, barges were utilized to perform the same type operation.

Needless to say, the advent of 2,4-D, with its effectiveness, safety, ease of application, and value for control of water hyacinth and other obnoxious aquatic plants was recognized by the Congress when it authorized a separate Expanded Project for Aquatic Plant Control covering the eight Gulf and South Atlantic States, PL 85-500, 85th Congress, approved July 3, 1958.

That law authorized a comprehensive program to provide for control and progressive eradication of the water hyacinth, alligatorweed and other obnoxious aquatic plant from the navigable waters, tributary streams, connecting channels, and other allied waters in the combined interest of navigation, flood control, drainage, agriculture, fish and wildlife conservation, public health and related purposes including continued research for development of the most effective and economic control measures.

Subsequent amendments, Section 104 of the River and Harbor Act of 1962 and (76 Stat. 1173, 1180) and Section 302 of the River and Harbor Act, Approved 27 October 1965 (79 Stat. 1092) authorized Federal funds for research and extended the program from the Gulf and South Atlantic States to the United States.

In retrospect, the history of obnoxious aquatic plants in the Southeast over thepast 70 years has been related to operation programs of the Corps of Engineers. Much of the research, both chemical and biological, that has been accomplished to date was actually initiated in 1960 under the Expanded Program for Aquatic Plant Control.

Since that time, private industries, State and local agencies have also conducted a large part of the research activities in the field of aquatic plant control.

It is our hope that through the combined efforts of all concerned, the means for control operations can be found that will ultimately lead to the progressive eradication of obnoxious aquatic plants and at the same time provide for the protection of man's environment.

References

1. H. D. No. 27, 85th Congress, 1st Session, "Water Hyacinth Obstructions in the Waters of The Gulf and South Atlantic States," 1958.

2. Bulletin No. 18, Division of Botany, April 5, 1897, U.S. Department of Agriculture.

3. H. D. No. 251, 89th Congress, 1st Session, "Expanded Project for Aquatic Plant Control," 1965.