

must also conserve their opportunity to work and earn by the means of their choice, wherever they might live. In my opinion, the discouragement of growth deals its sharpest blow at future generations. Maybe we can live off of each other quite well for the present but I think we will discover, sooner or later, that full production and sound development of our natural resources are at the very heart of a sound economy.

In our earnest attempt to protect animals, fish, and vegetation, I think many people forget that man is animal too. As someone pointed out recently, he is, in a sense, the weakest of all animals. He is born naked and unarmed, without fangs, claws, horns, or instinctual knowledge. Physically, he would fall an easy prey, not only to higher animals but also the lowest bacteria. Man's only weapon—his basic means of survival and advancement in this generation—is his ability to produce. We need not deny fish and fowl a place in the priority of the species, but there is certainly no reason we should give man's needs a secondary position. However, there are those who would do just that. They advocate restriction of growth, development, and even electrical power, without any regard for the consequences. Any serious student of economy knows that we must promise our children and grandchildren more than this. We can flourish and preserve

our environment, if we are willing to pay for it.

The greatest threats to all people, in my opinion, are (1) the coalition of those who would sacrifice future economy in the name of ecology, and (2) those who are unwilling to pay for our past and present problems. Of the two, I think the latter is the most dangerous. The self-satisfied, selfish interests that refuse to recognize and accept the fact that there are aquatic weed problems and a need for their control is quite another problem.

We must go forward in weed control on all fronts, chemical, mechanical, and biological. We must accept the obligation to develop new methods with high environmental standards. Once we have made that decision, the extremists on both sides will move off center stage and get on the periphery where they belong.

It has been a rewarding experience for me to serve as President of your Society this past year. The future of this Society, with its new members and new leadership, will find new growth and security in the years ahead by an ever present humility that we experience working with each other. With this kind of atmosphere your Society will be an inspiration and guide to help carry the heavy load of responsibility. We must retain our identity and purpose, confining our efforts to the control of vegetation problems in the waterways of the world.

## The Florida Department Of Natural Resources And Its Role In Aquatic Plant Research And Control

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The boundaries of the State of Florida encompass approximately 2.4 million surface acres of inland water (5). This acreage includes farm ponds, lakes, rivers, canals, etc., and the vast majority is classified as fresh water. Conservatively, 200,000 to 300,000 acres are infested with noxious aquatic plants, thus rendering many of our water bodies useless.<sup>1</sup> Recreational activities, such as boating and fishing, are hampered; water qualities, resulting from natural death and decay of the aquatics, are threatened; efficiency of potable water reservoirs is declining; and clogged drainage ditches pose potential flooding problems (2, 3, 6).

A wide range of chemical and physical factors (bottom conditions, water flow, pH, hardness, etc.) govern these water bodies; therefore, control measures must vary. Additionally, research must continue to develop safer, more

effective and efficient control systems. The Department of Natural Resources is responsible for coordinating research and control of noxious aquatics in Florida waters. The program of the Bureau of Aquatic Plant Research and Control is threefold: (1) research, (2) matching funds, and (3) control. Research in aquatic plant control has drastically lagged in the past; therefore, a large portion of the budget is allocated to research needs. At present the control efforts entail biological, mechanical, and chemical systems. A brief outline of current research projects sponsored or co-sponsored by the Department of Natural Resources is listed below.

### BIOLOGICAL CONTROL RESEARCH

Utilization of the white amur (*Ctenopharyngodon idella* Val.) as a potential tool is presently underway. According to Swingle (7), the white amur appears to be

<sup>1</sup>Burkhalter, A. 1972. Personal communication.

one of the most promising herbivorous fishes for the control of rooted aquatic plants. Determination of the effectiveness of the white amur as a biological control agent at various stocking rates, observation of the aquatic plant preference of the white amur, influences of the white amur on water quality, and influence of the white amur on other fishes and invertebrate organisms are some of the areas under investigation.

To date, the most effective biological tool has been insect attack (1). Release sites for a weevil (*Neochetina eichhorniae* Warner), host specific on waterhyacinth, (*Eichornia crassipes* (Mart.) Solms), have been established to study subcolonization and establishment of these biological agents. Then the effectiveness and factors which might enhance or reduce their effectiveness will be evaluated.

The submersed aquatics are perhaps the most serious of all aquatic weed problems (4). The major submersed aquatic is hydrilla (*Hydrilla verticillata* Royle). Studies are underway to establish the native home of hydrilla, its world-wide distribution, and pathogens, insects and other arthropods which might show potential as a biological control agent. Travels to the native home of hydrilla will, hopefully, reveal naturally occurring insect or pathogenic enemies. Additionally, surveys are being conducted for naturally occurring organisms associated with hydrilla and *Myriophyllum* sp. in Florida. Once found, these naturally occurring organisms could perhaps be increased to a level where effective biological control is possible.

Attack on noxious aquatics by microbiological organisms poses another potential tool. Such possible attack is under investigation. In addition, surveys for compounds which occur naturally in plants and may retard susceptibility to attack are underway. By reducing these natural compounds, the plants would thus be more susceptible to attack.

#### MECHANICAL CONTROL RESEARCH

The Department of Natural Resources is designing and building a high-capacity mechanical harvester for waterhyacinth to be stationed on the St. Johns River. A crimper-type waterhyacinth harvester is also under investigation. Other research efforts entail the possible utilization of these aquatics once removed from the waterways.

Is the future printing of the Hyacinth Control Society NEWSLETTER on paper made from waterhyacinth beyond the realm of possibility? Can waterhyacinth be used as a soil amendment and as a source of plant nutrients? Waterhyacinth removes nutrients from the water. Are these nutrients retained during the processing of the plants, and if so, are the plants acceptable in the diets of meat-producing animals? We hope to answer these and other questions through research efforts.

#### CHEMICAL CONTROL RESEARCH

The chemical control efforts have been primarily in the area of techniques of application, particularly treat-

ment of submersed aquatics (especially hydrilla). Evaluation of the physiological aspects of herbicides applied through the bivert is underway. In addition, we see possibilities of using growth retardants or perhaps altering the ecological factors to limit the growth of hydrilla. The use of growth retardants, their desired concentration, and the effect of these regulators on water quality and other desirable organisms is under study.

In addition, some 'novel' chemical techniques are being evaluated. These techniques include the possible use of ion exchange agents to deprive hydrilla of certain elements needed for growth. Can we alter basic hydro-soil or water quality factors needed for the growth of hydrilla? Again, these are questions we hope to answer through our research efforts. Those agencies, or institutions, or both, presently conducting research include the U. S. Department of Agriculture, University of South Florida, University of Florida, and Florida Technological University.

#### MATCHING FUNDS

Funds are allocated to aid local aquatic plant control programs. Any public, city, county or district agency which has an approved aquatic plant control program and meets criteria established by the Department of Natural Resources is subject to participation in matching funds. These criteria are outlined in the "Guidelines for Aquatic Weed Control" which are available through the Bureau of Aquatic Plant Research and Control.

#### CONTROL

The Bureau serves an informational function in control programs. Personnel work with the above local agencies in establishing new control programs and educating personnel in new products and techniques of application. The number of state control crews working in the Florida Game and Fresh Water Fish Commission doubled during the Fiscal Year 1971-72. In addition, five regional botanists have been employed to work specifically in aquatic plant control. These botanists are to assist you in your aquatic plant control efforts. In the future, permit requests should be mailed directly to the botanist in the respective region. The aquatic plant control program of the Florida Game and Fresh Water Fish Commission is supported by the Department of Natural Resources.

Of what benefit are our control efforts if avenues for the introduction of yet additional potential noxious aquatics are left open? Regulations concerning the introduction, cultivation, and transportation of noxious aquatics have been implemented.

Noxious aquatic weeds of Florida can only be controlled through the concerted, coordinated efforts of all interested persons. The Department of Natural Resources appreciates your cooperation in these efforts.

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## Current Pesticide Legislation

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To fully appreciate the current pesticide legislation, the history of the Federal Pesticide Legislation should be reviewed.

### INSECTICIDE ACT 1910 (36 STATUTE 331)

This Act was a consumer protection law. It regulated the marketing of insecticides and fungicides by prohibiting the interstate shipment of products that were misbranded or adulterated, as such terms were defined in the statute.

The regulatory scheme consisted of (a) seizure action against a violative product, and (b) criminal action against the shipper of adulterated or misbranded products.

There were certain deficiencies of the Act. One was that the Act limited the classes of economic poisons to insecticides and fungicides; it did not cover such classes as herbicides and rodenticides. The other obvious deficiency was no premarketing clearance requirements.

### Federal Insecticide, Fungicide and Rodenticide Act of 1947 (FIFRA) (61 Statute 163)

The important features of this Act were (a) the premarketing clearance requirement, i.e., registration of products, (b) herbicides and rodenticides were included as economic poisons; and (c) devices were defined and regulated.

In 1959 an amendment covering nematocides, plant regulators, defoliant and desiccants was added to the FIFRA.

In 1964 an amendment that eliminated registration under protest was adopted.

The regulatory scheme of FIFRA calls for (a) the registration of products—the registrant must prove efficacy and safety before the product may be marketed; (b) a registered product may be cancelled whenever it is determined that it no longer complies with all the provisions of the Act. A registered product may be suspended if such action is necessary to prevent an imminent hazard to the public; (c) seizure action against a violative product; and (d) criminal action against the shipper of an adulterated or misbranded product or a product shipped prior to registration.

There are several deficiencies that we now believe to be in the FIFRA.

1. There is no direct control over the actual use of a product.
2. Jurisdictional limitation—no regulatory control over products which are not shipped from one state to another state.
3. Insufficient enforcement provisions, i.e., inadequate criminal penalties and no civil penalties.
4. No regulatory control at the source of the pesticides—the manufacturer.
5. Cumbersome administrative procedure in connection with cancellation or suspension proceedings.
6. A lack of agreement on what is considered an "imminent hazard" to the public.
7. No provisions for regulatory action on pesticides or uses that pose hazards to non-target organisms or adverse effects on environment.

### THE FEDERAL ENVIRONMENTAL PESTICIDE CONTROL ACT (H.R. 10729) (PUBLIC LAW 92-516)

This Act will give direct control over the use of pesticides. Such control is exercised through a new regulatory scheme, which includes:

- a. Classification of pesticides. All pesticides will be classified as for "General Use" or "Restricted Use."
- b. Pesticides classified under "Restricted Use" may be used only by or under the direct supervision of a "certified pesticide applicator" or under certain circumstances, subject to such other restrictions as the Administrator may determine.
- c. Prohibition against, and penalties for, use of any pesticide inconsistent with its labeling.

The classification is defined by the Act as:

- a. General Use—If the Administrator determines that the pesticide, when applied in accordance with its directions for use, warnings and cautions and for the uses for which it is registered, or for one or more if such uses, will not cause substantial adverse effects on the environment, he will classify the pesticide, or the particular use or uses of the pesticide to which the determination applies for general use. (Section 3 (d) (1) (A))
- b. Restricted Use—If the Administrator determines that the pesticide, when applied in accordance with its directions for use, warnings and cautions and for