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**Legal and Policy Options to Minimize
Adverse Effects of Mosquito Control
Pesticides on Florida's
Saltwater Fisheries**

John Tucker

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Florida Sea Grant College Program



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**Legal and Policy Options to Minimize Adverse Effects
of Mosquito Control Pesticides on
Florida's Saltwater Fisheries**

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EXECUTIVE SUMMARY

Its reputation as a fishing mecca is one of the most important images that Florida projects. Commercial and recreational fisheries represent a significant component of the state's revenues. Over the period of 1953-1982, total commercial marine landings in Florida ranged from 163 million to 215 million pounds annually. A 1982 study calculated that saltwater sport fishing alone contributes approximately \$2 billion per year to the economy. However, despite continuing increases in the numbers of commercial fishing trips, and the establishment of many fish hatcheries, total harvests of fish and shellfish have been generally declining since the mid-1960s. As a result, the state's well deserved image may be in jeopardy. One factor in this decline has been the loss or degradation of estuarine fishery habitat.

Estuaries play a critical role in the maintenance of fishery populations. Approximately 95% of Florida's commercial fisheries species and most of the recreational species depend on estuaries during one or more life stages. Among other functions, estuaries provide important habitat for the juveniles of many fishery species, as well as for the prey base supporting those species. Studies suggest that shallow seagrass beds, tidal creeks, emergent marsh vegetation, and mangrove prop roots serve as primary juvenile habitat for many species.

Several fishery species, including clams and oysters, spend their entire life cycles within estuarine systems. Others, such as shrimp, migrate as larvae from offshore areas to estuarine nursery habitat, developing into sub-adults before returning to deeper waters to complete their life cycles. Some of Florida's best known estuarine-dependent species include spotted seatrout, striped mullet, striped bass, red drum, snook, mangrove snapper, and tarpon. Spawning occurs offshore for many of these, with larvae or early juveniles moving into estuaries to feed and mature. Tampa Bay alone provides important nursery habitat for approximately twenty major offshore commercial species.

Though there are several factors responsible for the observed declines in Florida's fisheries, some of the most significant involve human impacts on estuaries. Estuarine habitat is being degraded in many ways, including the effects of pollution, bulkheading, construction activity, and dredging and filling. One suspected source of adverse impacts involves the use of pesticides for mosquito control. Mosquito control programs have played an important role in the development of Florida and are responsible for the eradication of malaria, yellow fever, and

dengue from the state. Today, mosquito control programs continue to play an important role by controlling diseases which are transmitted by mosquitoes, and by enhancing the quality of life by eliminating nuisance mosquitoes. Unfortunately, mosquito control pesticides are suspected of adversely affecting certain non-target organisms. The effects of mosquito control pesticides on estuarine and marine organisms are of particular concern, since spraying operations often occur in or near estuarine environments. Although there is disagreement in the scientific community as to the severity of the problem, there is some evidence indicating that these pesticides may harm a variety of estuarine organisms which are important to the survival of popular game fish, including red drum, snook, and spotted sea trout.

This report examines the regulation of mosquito control activities in Florida and makes legal and institutional recommendations to improve protection of non-target estuarine and marine organisms. The primary federal laws affecting the use of pesticides are the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) and the Endangered Species Act (ESA). FIFRA governs the registration, manufacture, distribution, and use of pesticides in the United States and is implemented by the Environmental Protection Agency (EPA). As part of the registration process, EPA conducts cost benefit analyses on pesticide uses, including assessment of environmental risk. FIFRA also provides for reclassification, suspension, or cancellation of existing pesticide registrations through the Special Review process.

FIFRA depends largely on pesticide labels to guide users in environmentally safe use of pesticides. Unfortunately, many mosquito control pesticide labels contain ambiguous language, thereby providing inadequate guidance to pesticide applicators. Although EPA requires elaborate data to be presented during the registration process, there is evidence that the environmental risks of many pesticides have not been adequately assessed. EPA is currently re-registering all pesticides registered before 1984 because the agency has determined its risk assessment was inadequate for these pesticides. Furthermore, scientists indicate that current EPA risk assessment models may severely underestimate risk to non-target species.

The Endangered Species Act prohibits actions which harm endangered or threatened species, and is also implemented by the EPA. The spraying of mosquito control pesticides which causes harm to endangered or threatened species would probably be a violation of the ESA. The ESA contains a citizen's suit provision which could be used to enjoin the use of mosquito control pesticides which harm endangered or threatened species. The Act also establishes a regulatory

program, the Endangered Species Protection Program, to ensure that endangered and threatened species are considered in the registration and use of pesticides.

At the state level, Chapter 388, Florida Statutes, and Rule 10D-54, Florida Administrative Code, establish a variety of regulations which address the consideration and protection of non-target species. State oversight of mosquito control is provided by the Department of Health and Rehabilitative Services. Mosquito control programs are required to conduct pre- and post-spray surveillance of mosquito population levels and are required to assess post-spray non-target effects of aerial adulticides. While there is an elaborate regulatory system in place, effective protection of non-target marine organisms is hindered by a pervasive lack of enforcement at the local, state, and federal level.

Some of the more important recommendations for modification of mosquito control in Florida include: clarification of ambiguous mosquito control pesticide labels; strengthening of surveillance and reporting requirements; strengthening of enforcement efforts and authority; increased use of Integrated Pest Management techniques; development of alternatives to pesticides; increased research to assess the effects of pesticides on non-target organisms; increased funding, particularly for public education, research, and enforcement; utilization of administrative and judicial remedies if warranted; and public education.

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LEGAL AND POLICY OPTIONS TO MINIMIZE ADVERSE EFFECTS OF MOSQUITO CONTROL PESTICIDES ON FLORIDA'S SALTWATER FISHERIES

INTRODUCTION

The importance of estuaries as nursery grounds for saltwater recreational and commercial fisheries is well recognized. Estuaries are one of the most productive ecosystems in the world and provide essential habitat for many game fish and their prey.¹ Many scientists and citizens are concerned that mosquito control practices may be degrading the ecological quality and fisheries value of estuarine waters in Florida.²

Florida has over 1200 miles of coastline, including vast areas of salt marshes and mangrove swamps which are excellent breeding grounds for mosquitoes.³ Early efforts at mosquito control were accomplished by eliminating breeding habitats by draining and filling low lying areas.⁴ Although these early permanent control techniques were often considered

¹ Comp and Seaman, Jr., *Estuarine Habitat and Fishery Resources of Florida*, in FLORIDA AQUATIC HABITAT AND FISHERY RESOURCES 337-340 (W. Seaman, Jr., ed. 1988); E. ODUM, FUNDAMENTALS OF ECOLOGY (3d ed. 1971); J. CLARK, COASTAL ECOSYSTEM MANAGEMENT 11 (1983); Niering, W., and R. Warren, *Salt Marshes*, in COASTAL ECOSYSTEM MANAGEMENT (J. Clark 1983); Maloney, F., and B. Canter, *Stormwater Runoff and the Coastal Zone: Legal Alternatives for Effective Management*, Final Report to Florida Sea Grant, University of Florida 238 (March, 1979).

² See generally, Clark, *Adverse Impacts to Freshwater Aquatic and Marine Organisms*, MOSQUITO CONTROL PESTICIDES: ECOLOGICAL IMPACTS AND MANAGEMENT ALTERNATIVES 33-39 (1991). (Proceedings of a Conference held on January 18, 1991, at the University of Florida, Gainesville, Florida, published by Scientific Publishers, Inc., Gainesville, Florida); Ward, *The Coral Reefs of Florida Are Imperiled*, 178 No. 1 NATIONAL GEOGRAPHIC 128-130 (July, 1990); Taylor, *The Ubiquitous Mosquito*, FLORIDA NATURALIST 11 (Winter 1988); *Pesticide Use Observations, Monroe County, Florida* (Report prepared by the National Enforcement Investigations Center for the U.S. Environmental Protection Agency) (January, 1980).

³ *Integrated Pest Management For Mosquitoes in Florida, A Work Document 2* (Prepared by the Sub-group for Development of IPM for the Governor's Working Group for Mosquito Control, composed of representatives from the Florida Department of Health and Rehabilitative Services, the University of Florida's Institute of Food and Agricultural Sciences, the U.S. Department of Agriculture, the U.S. Navy, and several mosquito control districts in Florida, May, 1982) [hereinafter cited as *IPM*].

⁴ *Id.* at 3.

successful, they were soon replaced by cheaper and seemingly more effective pesticides.⁵ DDT was first used in Florida in 1945 and is credited with the elimination of malaria from the state in 1948.⁶ However, as early as 1947 it was becoming apparent that certain species of mosquitoes were becoming resistant to DDT.⁷ In addition, adverse environmental effects were being noticed as early as 1951.⁸

More recently, mosquitoes have been deemed to be directly related to the economic well being of our state. Specifically, the eradication and control of mosquitoes has been determined to be of such importance to the health and economy of Florida that the state legislature has declared as public policy that levels of arthropods be reduced so as to "foster the quality of life of the people, promote the economic development of the state, and facilitate the enjoyment of its natural attractions...."⁹ To carry out this policy, the legislature authorized the creation of mosquito control districts and established a state regulatory program for mosquito control activities.¹⁰

Today, most efforts to control mosquitoes involve the use of pesticides. In 1988, a total of over 1 million pounds of active ingredient of the three most widely used pesticides (malathion, naled, and fenthion) were applied by mosquito control programs participating in Florida's mosquito control regulatory program.¹¹ This figure does not reflect significant amounts of other pesticides which were applied by mosquito control programs participating in Florida's mosquito control regulatory program, or any of the pesticides applied by several hundred programs which

⁵ *Id.* at 7.

⁶ *Id.* at 3.

⁷ *Id.* at 7.

⁸ *Id.*

⁹ FLA. STAT. § 388.0101 (1989).

¹⁰ *Id.* §§ 388.021, 388.361.

¹¹ Johnson, Newman, Aufmuth, and Whitten, *Handbook of Pesticide Use and Effects on Florida Wildlife* (Document prepared for the Florida Game and Fresh Water Fish Commission, Nongame Wildlife Program) 44 (February, 1991) (in press). This value was derived from the Florida Department of Health and Rehabilitative Services, Entomology Section, 1988 Annual Report.

do not participate in the state mosquito control regulatory program.¹² Appendix B contains a complete listing of pesticides applied from 1987 to 1989 by mosquito control programs participating in Florida's mosquito control regulatory program. Figures 1,2,3, and 4, contained in Appendix A, graphically illustrate relative amounts of adulticides and selected larvicides which were sprayed during this time.¹³ The use of source reduction techniques, such as ditching, diking, and draining, have been severely restricted by wetlands protection laws and changes in management philosophies by state lands managers.¹⁴

While the obvious benefits of mosquito control programs cannot be discounted, reasonable prudence dictates that a closer look be taken at the potential effects of large scale and continuous use of pesticides. The effects of mosquito control pesticides on estuarine and marine organisms are of particular concern, since spraying operations often occur in or near estuarine environments. Although there is disagreement in the scientific community as to the direct and indirect effects of various mosquito control pesticides on fish, some researchers indicate that these pesticides may harm a variety of marine organisms, particularly crustaceans such as copepods (minute freshwater and marine crustaceans) and decapods (shrimps, lobsters, and crabs).¹⁵ These organisms play important roles in the intricate food web that supports a number

¹² Mosquito control programs may choose whether to participate in Florida's mosquito control regulatory program. See the report section entitled Florida Regulatory Framework for an explanation of Florida's mosquito control regulatory program.

¹³ Figures 3 and 4 do not include larvicides applied in the form of briquets, tossits, or granules because of the uncertainty and incompatibility of the measuring units reported by HRS.

¹⁴ *IPM*, at 19.

¹⁵ Some researchers indicate that certain mosquito control pesticides may have adverse effects on marine fish and crustaceans. See Thompson & Tucker, *Toxicity of the Organophosphate Insecticide Fenthion, Alone and with Thermal Fog Carriers, to an Estuarine Copepod and Young Fish*, 43 BULLETIN OF ENVIRONMENTAL CONTAMINATION AND TOXICOLOGY 789 (1989); Tucker, *Dangers of Using Organophosphorus Pesticides and Diesel Oil in Fish Ponds*, AQUACULTURE MAGAZINE (October, 1987); Hester, Olson, & Floore, *Effects of Diflubenzuron on three estuarine decapods, Callinectes sp., Palaemonetes pugio and Uca pugnator*, 57, No.1 FLORIDA ANTI-MOSQUITO ASSOCIATION 8 (1986); Tsen, Wang, & Tucker, *Assimilation of Fenthion in Coastal Water*, in PROCEEDINGS OF THE 8TH INTERNATIONAL OCEAN DISPOSAL SYMPOSIUM, Yugoslavia (October, 1989) (in publication); Clark, *Adverse Impacts to Freshwater Aquatic and Marine Organisms*, MOSQUITO CONTROL PESTICIDES: ECOLOGICAL (continued...)

of popular game fish including red drum, spotted sea trout, and snook. Juvenile forms of fish and other aquatic biota may be particularly vulnerable to the effects of pesticides. Some scientists and citizens are concerned because many of the effects of these pesticides on non-target estuarine and marine organisms are unknown, particularly cumulative and long term effects.¹⁶

The activities and regulation of mosquito control programs as they relate to non-target marine species are the subjects of this report. The first section of the report examines the existing federal regulatory framework; the second section examines the existing state regulatory framework; and the third section presents findings and recommendations to correct problems occurring in Florida's mosquito control regulatory programs.

¹⁵ (...continued)

IMPACTS AND MANAGEMENT ALTERNATIVES 33-39 (1991). (Proceedings of a Conference held on January 18, 1991, at the University of Florida, Gainesville, Florida, published by Scientific Publishers, Inc., Gainesville, Florida).

However, other researchers indicate that certain mosquito control pesticides do not have adverse impacts on non-target species. See Hester, Rathburn, & Boike, *Effects of Methoprene on Non-Target Organisms When Applied as a Mosquito Larvicide*, in Proceedings of the Florida Anti-Mosquito Association 51st Meeting (April 27-30, 1980); Hester, Rathburn, & Rogers, *Small Plot Field Tests of an Oil Formulation Against Mosquito Larvae and Non-Target Organisms*, 39 No. 3 MOSQUITO NEWS (September 1979); Hester, Clements, Dukes, & Swenson, reprinted from Proceedings of the Florida anti-Mosquito Association 49th Meeting (April 2-5, 1978).

¹⁶ Clark, *Adverse Impacts to Freshwater Aquatic and Marine Organisms*, MOSQUITO CONTROL PESTICIDES: ECOLOGICAL IMPACTS AND MANAGEMENT ALTERNATIVES 33-39 (1991). (Proceedings of a Conference held on January 18, 1991, at the University of Florida, Gainesville, Florida, published by Scientific Publishers, Inc., Gainesville, Florida).

FEDERAL REGULATORY FRAMEWORK

I. The Federal Insecticide, Fungicide, and Rodenticide Act

The registration, manufacture, distribution, and use of pesticides in the United States is regulated by the Environmental Protection Agency (EPA) under the authority of the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).¹⁷ Pesticides which are used in Florida for mosquito control are subject to the requirements of FIFRA. An examination of the requirements of FIFRA illustrates the factors EPA considers when deciding whether to approve registration of pesticides. For example, FIFRA requires applicants for pesticide registration to present data regarding the effects of pesticides on non-target species.

EPA must balance adverse effects and benefits of each pesticide when deciding whether to register a pesticide. Registered pesticides must be accompanied by labels that protect users and the environment. FIFRA also contains mechanisms by which EPA can reconsider existing pesticide registrations, such as when new evidence of adverse effects is discovered. In addition, EPA may restrict, suspend, or cancel pesticide registrations which EPA finds are not meeting statutory requirements.

A. General Statutory Scheme

Pesticide regulation under FIFRA is driven by the requirement that all pesticides must be registered with the EPA. The registration process requires that EPA consider the adverse effects and benefits of each pesticide, and determine whether the pesticides meet statutory criteria. FIFRA prohibits anyone from distributing, selling, or receiving any pesticide which is not registered with the administrator of the Federal Environmental Protection Agency (EPA).¹⁸ The term "pesticide" is defined broadly as any substance or mixture of substances used for repelling or destroying a pest.¹⁹ FIFRA requires that a person seeking registration must file information about the pesticide with EPA,²⁰ and then the administrator of EPA must decide if the pesticide

¹⁷ 7 U.S.C.A. §§ 136 - 136y.

¹⁸ *Id.* § 136a(a).

¹⁹ *Id.* § 136(u).

²⁰ *Id.* § 136a(c)(1),(2); 40 C.F.R. Part 158 (July 1, 1991). EPA rules require that applicants submit data pertaining to product chemistry, residue chemistry, environmental fate, toxicology.
(continued...)

meets the statutory requirements with respect to labeling²¹ and will not produce "unreasonable adverse effects on the environment."²² "Unreasonable adverse effects on the environment" are defined as any unreasonable risk to man or the environment, taking into account economic, social, and environmental costs and benefits of the use of a particular pesticide.²³ The term "unreasonable" is not defined by FIFRA.

FIFRA imposes a reporting duty on all registrants to promptly notify EPA of any new information regarding unreasonable adverse effects on the environment caused by a pesticide.²⁴ Failure to report required information relating to the risks and benefits of a registered pesticide constitutes a violation of FIFRA.²⁵ EPA rules detail what information must be submitted, including specific requirements relating to completed toxicological studies, incomplete toxicological studies, epidemiological studies, efficacy studies, studies of dietary or environmental pesticide residues, toxic or adverse effect incident reports, failure of performance incident

²⁰ (...continued)

reentry protection, aerial drift evaluation, wildlife and aquatic organisms, plant protection, nontarget insects, product performance, and biochemical and microbial pesticides. 40 C.F.R. part 158 (July 1, 1991). Additional standards for conducting acceptable tests, guidance on evaluation and reporting of data, further guidance on when data are required, definitions of most terms, and examples of protocols are available in an advisory document referred to as Pesticide Assessment Guidelines through the National Technical Information Service, 5285 Port Royal Road, Springfield, VA 22161.

²¹ Labels are written, printed, or graphic matter accompanying pesticides. 7 U.S.C.A. § 136(p). Labels must include, among other things, directions for use which are adequate to protect health and the environment. *Id.* § 136(q)(1)(F).

²² *Id.* § 136a(c)(5).

²³ *Id.* § 136(bb). EPA may conditionally register or amend a pesticide registration, or suspend the registration of a pesticide, if EPA determines the statutory requirements for such actions are met. *Id.* §§ 136a(c)(7), 136d. As of 1982, EPA had suspended or canceled the registration of over 3,000 pesticides for use in the United States. J.C. JUERGENSMEYER & J.B. WADLEY, *AGRICULTURAL LAW* 53 (1982).

²⁴ 7 U.S.C.A. § 136d(a)(2). The applicant must submit the information to EPA within 15 days of the applicant becoming aware of the information. 40 C.F.R. § 153.64 (July 1, 1991).

²⁵ 40 C.F.R. § 153.66 (July 1, 1991).

reports, dietary or environmental pesticide residue incident reports, and other information which might raise questions about the continued registrability of a registrant's pesticide product.²⁶

Under FIFRA, pesticides are classified either for general or restricted use.²⁷ General use pesticides are those that EPA determines will not generally cause any unreasonable adverse effects on the environment, when used in accordance with the labeling.²⁸ Restricted use pesticides are those that EPA determines "may generally cause, without additional regulatory restrictions, unreasonable adverse effects on the environment," when used in accordance with the labeling.²⁹

General use pesticides may be bought and used by any person. Restricted use pesticides may only be applied by a certified applicator or by someone under the direct supervision of a certified applicator.³⁰ FIFRA directs EPA to issue standards for the certification of applicators of pesticides which insure that an individual is competent with respect to the use and handling of pesticides.³¹ Applicators of restricted use pesticides must be certified by EPA in accordance with FIFRA, or by an EPA approved state certification plan.³²

Mosquito control pesticides being used in Florida at the time of this writing are all considered general use pesticides. However, Florida exceeds federal statutory requirements by

²⁶ *Id.* §§ 153.69-153.78.

²⁷ 7 U.S.C.A. § 136a(d)(1)(A).

²⁸ *Id.* § 136a(d)(1)(B).

²⁹ *Id.* § 136a(d)(1)(C).

³⁰ *Id.*

³¹ *Id.* § 136b(a)(1).

³² *Id.* § 136b. A state may submit a state plan to certify applicators of restricted use pesticides, which EPA may approve if it determines that the state has adequate regulatory structure, legal authority, funds, reporting systems, and standards to implement and conduct a satisfactory certification program. *Id.* § 136b(a)(2). A state certification program must contain provisions to submit required reports to EPA and must have certification standards which conform with the standards promulgated by EPA under FIFRA. *Id.* § 136b(a)(2)(D),(E). In addition, EPA rules and state certification standards must include a provision to provide information concerning integrated pest management techniques to individuals who request such information. *Id.* § 136b(c).

requiring that mosquito control pesticide applicators successfully complete a state certification process.

In addition to regulating the registration of pesticides and the qualifications of pesticide applicators, FIFRA also regulates the use of pesticides. Specifically, it is unlawful for any person to alter any labeling, to use any registered pesticide in a manner inconsistent with its labeling, to violate any cancellation of registration of a pesticide, or to add or take any substance from a pesticide which may defeat the purposes of FIFRA.³³ Of particular significance is the requirement that pesticides may only be used in a manner which is consistent with their labeling. Pesticide application rates specified on labels are designed to be the minimum necessary to effect the desired eradication of the pest.

EPA may issue civil penalties for violations of FIFRA or its rules of not more than \$5000 for each offense by a commercial applicator.³⁴ A commercial applicator is any applicator who uses or supervises the use of any restricted use pesticide for any purpose, or on any property, other than for the purposes of producing any agricultural commodity on property owned or rented by the applicator or the applicator's employer.³⁵ In addition to civil penalties, EPA may issue criminal penalties up to \$25,000, or imprisonment for one year, or both, against commercial applicators who knowingly violate use provisions of FIFRA or its rules.³⁶

Under FIFRA, EPA is authorized to establish procedures and regulations to deal with the disposal or storage of packages and containers of pesticides, and the disposal or storage of pesticides.³⁷ EPA is also authorized to establish requirements and procedures for safe disposal of any pesticide for which the registration has been suspended or canceled.³⁸ EPA is charged with conducting research concerning pesticides and integrated pest management, and must

³³ *Id.* § 136j.

³⁴ *Id.* § 136l(a)(1).

³⁵ *Id.* § 136(e)(2),(3).

³⁶ *Id.* § 136l(b)(1).

³⁷ *Id.* § 136q(a).

³⁸ *Id.* § 136q(a)(b).

develop a national monitoring plan.³⁹ EPA, in cooperation with other federal, state, and local agencies, must monitor air, soil, water, man, plants, and animals for human and environmental pesticide pollution.⁴⁰

States may also regulate the sale or use of any federally registered pesticide in the state, as long as the regulation does not permit any sale or use prohibited by FIFRA.⁴¹ A state plan for regulation of the sale and use of pesticides is subject to approval by EPA and will be suspended if EPA determines that a state is not capable of exercising, or has failed to exercise, adequate control to insure state registration which is in accord with the provisions of FIFRA.⁴² EPA has approved a Florida plan for regulation of the sale and use of pesticides.⁴³

States may also enter into cooperative agreements with EPA which delegate the authority to enforce provisions of FIFRA to the state.⁴⁴ Any state that has entered into a cooperative agreement with EPA for the enforcement of pesticide use restrictions, or is deemed by EPA to have adopted adequate 1) pesticide use laws and regulations, 2) enforcement procedures, and 3) record keeping and recording procedures, shall have primary enforcement responsibility for pesticide use violations within that state.⁴⁵ EPA retains authority to enforce the provisions of

³⁹ *Id.* § 136r(a),(b).

⁴⁰ *Id.* § 136r(c).

⁴¹ *Id.* § 136v(a).

⁴² *Id.* § 136v(c).

⁴³ The Florida Department of Agriculture and Consumer Services (DACS) is the state agency responsible for regulating pesticide sales, labeling, and use in Florida. FLA. STAT. ch. 487 (1989). However, mosquito control programs, while subject to labeling and use requirements imposed by DACS, are primarily regulated by the Florida Department of Health and Rehabilitative Services. *Id.* ch. 388.

⁴⁴ 7 U.S.C.A. § 136u(a).

⁴⁵ *Id.* § 136w-1(a),(b). EPA assumes the enforcement responsibility in states that do not have primary enforcement responsibility, and the provision in FIFRA which allows EPA to inspect records of producers, sellers, or distributors of pesticides is extended to apply to any commercial applicator. *Id.* § 136w-1(c). Section 136f of FIFRA requires producers, sellers, or distributors of pesticides to permit EPA to inspect all records required under FIFRA. *Id.* § 136f.

FIFRA, even when it determines that a state has primary enforcement authority.⁴⁶ Florida has entered into yearly cooperative enforcement agreements with EPA since the late 1980s. The Florida/EPA cooperative enforcement agreement is discussed in Section III of the Florida Regulatory Framework portion of this report.

In the event that EPA receives a complaint indicating a significant violation by a state of the pesticide use provisions of FIFRA, EPA must first refer the matter to the appropriate state officials.⁴⁷ If the state does not take appropriate enforcement action within thirty days, EPA may act upon the complaint.⁴⁸ Similarly, if EPA determines that a state with primary enforcement authority is not carrying out its responsibility, it must notify the state.⁴⁹ The state then has ninety days within which to correct the deficiencies. If inadequacies still exist after 90 days, EPA may rescind, in whole or in part, the state's primary enforcement authority for pesticide use.⁵⁰

In summary, FIFRA establishes a regulatory framework for registration of pesticides, certification of pesticide applicators, and use of pesticides. Although states have the authority to administer the provisions of FIFRA, their discretion is limited to creating regulations which are at least as strict as those in FIFRA.

B. Cost Benefit Analysis Under FIFRA

1. Probable Issues Concerning the Use of Pesticides in Florida for Mosquito Control

FIFRA directs the administrator of EPA to analyze the costs and benefits of a given pesticide use when determining whether to register, re-register, suspend, or cancel that pesticide use. FIFRA data and reporting requirements for registrants illustrate the kinds of information

⁴⁶ *Id.* § 136w-2(c).

⁴⁷ *Id.* § 136w-2(a).

⁴⁸ *Id.*

⁴⁹ *Id.* § 136w-2(b).

⁵⁰ *Id.*

which EPA considers when evaluating pesticide registrations.⁵¹ An important component of cost benefit analyses is the risk assessment of pesticide uses. Unfortunately, there is evidence that the environmental risks of many registered pesticides have not been adequately assessed.⁵² In order to evaluate pesticides used to control mosquitos in Florida, the administrator would probably assess potential issues such as: 1) adverse fish, insect, and wildlife impacts from pesticide applications into and around estuarine systems, 2) adverse water quality impacts from pesticide applications, 3) adverse health effects in humans from continued pesticide applications, 4) adverse health effects from a reduction or termination of pesticide applications, 5) nuisance effects from a reduction or termination of pesticide applications, 6) adverse economic effects from a reduction or termination of pesticide applications, 7) the availability of viable alternatives, and 8) the efficacy of the pesticide. A review of FIFRA statutory provisions, EPA regulations, and administrative decisions regarding cost benefit analysis provides some insight into how the administrator might evaluate the use of a particular pesticide for mosquito control in Florida. Review of cost benefit factors is also useful to identify potential administrative and judicial remedies for pesticides causing adverse impacts to saltwater fisheries.

2. Statutory Guidelines for Cost Benefit Analyses

The administrator of EPA is directed to approve registration of a pesticide if: 1) the pesticide meets the efficacy and labeling requirements of FIFRA, 2) the pesticide "will perform its intended function without adverse effects on the environment," and 3) "when used in accordance with widespread and commonly recognized practice, it [the pesticide] will not generally cause unreasonable adverse effects on the environment."⁵³ Congress defined "unreasonable adverse effects on the environment" to include "any unreasonable risk to man or

⁵¹ FIFRA data requirements are discussed in note 20. FIFRA reporting requirements are discussed in the text accompanying notes 24 - 26.

⁵² See 7 U.S.C.A. § 136a-1, addressing re-registration of registered pesticides. In addition, one scientist has indicated that current EPA models may seriously underestimate risk of pesticides to non-target species. See Tiebout, *Evaluation of Federal Ecological Risk Assessment, MOSQUITO CONTROL PESTICIDES: ECOLOGICAL IMPACTS AND MANAGEMENT ALTERNATIVES 77-83* (1991). (Proceedings of a Conference held on January 18, 1991, at the University of Florida, Gainesville, Florida, published by Scientific Publishers, Inc., Gainesville, Florida.).

⁵³ 7 U.S.C. § 136a(c)(5).

the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide."⁵⁴ Clearly, this definition directs the administrator to consider economic and social, as well as environmental costs and benefits of pesticide uses. After a pesticide is registered, FIFRA places an ongoing duty on registrants to inform EPA of any "additional factual information regarding unreasonable adverse effects on the environment of the pesticide."⁵⁵

Similar language concerning cost and benefit analyses exists in provisions of FIFRA addressing cancellation and suspension of pesticide uses. Specifically, when determining whether to issue notice of intent to cancel registration,⁵⁶ the administrator must take into account "the impact of the action proposed in such notice on production and prices of agricultural commodities, retail food prices, and otherwise on the agricultural economy."⁵⁷ Prior to issuing a final order concerning cancellation or suspension, the administrator must first consider restricting a pesticide's use as an alternative to cancellation, and must fully explain reasons for the restrictions, as well as the impacts on agricultural commodities, retail food prices, and the agricultural economy.⁵⁸

Additional language is contained in the provisions of FIFRA dealing with misbranding. The administrator must review each registration to determine whether the label satisfies the requirements of FIFRA. Among other requirements, a pesticide label is misbranded if the label does not contain directions concerning the use of a pesticide which are "adequate to protect health and the environment."⁵⁹ Similarly, a pesticide is misbranded if the label does not contain a warning or caution statement which is "adequate to protect health and the environment."⁶⁰ The

⁵⁴ *Id.* § 136(bb).

⁵⁵ *Id.* § 136d(a)(2).

⁵⁶ *Id.* § 136d(b).

⁵⁷ *Id.*

⁵⁸ *Id.*

⁵⁹ *Id.* § 136(q)(1)(f).

⁶⁰ *Id.* § 136(q)(1)(g).

sale or distribution of pesticides which are misbranded is unlawful under FIFRA.⁶¹ Clearly, the administrator must evaluate the risks involved with a particular pesticide use in order to ascertain whether the label complies with the requirements of FIFRA.

FIFRA provides some general guidance for the administrator to use in determining whether to grant registration or re-registration, to evaluate labeling, or to issue a notice to cancel or suspend an existing registration. However, the statute provides little guidance as to the relative weights which the administrator should give to the costs and benefits of a pesticide use. Procedures for pesticide evaluation are further elucidated in EPA rules promulgated under FIFRA.

3. Regulatory Guidelines for Cost Benefit Analyses

EPA rules specify the types and minimum amounts of data that a registrant must submit to allow EPA to evaluate the risks and benefits of a pesticide use.⁶² In addition, the rules provide guidance for determining use classifications by listing specific criteria for determinations of unreasonable adverse effects.⁶³ The rules list minimum criteria which must be met in order for a pesticide to be classified for general use for both domestic and non-domestic application.⁶⁴ Pesticide uses which do not meet these tolerances are classified for restricted use unless the label meets certain additional criteria,⁶⁵ or the benefits of unrestricted use outweigh the risks of unrestricted use.⁶⁶

EPA rules addressing Special Review procedures provide additional insight into how EPA evaluates the costs and benefits of pesticide uses. The purpose of a Special Review proceeding is

⁶¹ *Id.* § 136j(a)(1)(E).

⁶² 40 C.F.R. § 158.20(b) (July 1, 1991).

⁶³ *Id.* § 162.11(c).

⁶⁴ *Id.* The criteria include tolerances for acute dermal LD₅₀, inhalation LC₅₀, eye irritation or corneal opacity, skin irritation, and acute oral LD₅₀.

⁶⁵ *Id.* § 162.11(c). Section 162.11(c)(3) lists labeling criteria, which if met, can prevent a pesticide from being classified for restricted use. If these criteria are met the labeling will be considered sufficient to prevent unreasonable adverse effects on the environment.

⁶⁶ *Id.* § 162.11(c).

to help the administrator determine when to initiate procedures to cancel, deny, or reclassify a pesticide registration because uses of that pesticide may cause unreasonable adverse effects on the environment.⁶⁷ The process contains many procedural requirements and is intended to insure that EPA openly evaluates both the risks and benefits of pesticide uses.⁶⁸

Prior to 1985, EPA risk assessment criteria for the evaluation of potential adverse effects focused primarily on toxicity data for the particular pesticide.⁶⁹ EPA was required to initiate Special Review⁷⁰ for any pesticide whose acute toxicity exceeded specific numerical values, or which caused certain chronic effects at any level.⁷¹ In 1985, EPA issued revised risk criteria rules, claiming that the lack of flexibility in the current rules limited EPA's discretion to consider other relevant factors and prevented EPA from addressing the most dangerous pesticides first.⁷²

Under current EPA rules, the administrator may initiate Special Review on his own initiative or at the request of any interested person,⁷³ if the administrator determines that certain risk criteria are met by the pesticide use.⁷⁴ Several of the risk criteria are of particular

⁶⁷ *Id.* § 154.1.

⁶⁸ *Id.*

⁶⁹ 50 Fed. Reg. 49005 (Nov. 27, 1985).

⁷⁰ In the earlier rules Special Review was called Rebuttable Presumption Against Registration (RPAR). The title was changed amid concern that RPAR carried negative connotations that could cause adverse economic consequences for the pesticide industry.

⁷¹ 50 Fed. Reg. 49005 (Nov. 27, 1985).

⁷² *Id.*

⁷³ EPA rejected industry suggestions that restrictions be placed on communications from persons outside EPA, and expressly stated that EPA may initiate a Special Review in response to any communication from a person outside EPA, regardless of the manner or form of the communication. 40 C.F.R. §§ 154.7, 154.10 (July 1, 1991).

⁷⁴ 40 C.F.R. § 154.7 (July 1, 1991). Criteria for initiation of Special Review include a number of factors relating to humans, animals, and the environment. The criteria are as follows:

(a) The administrator may conduct a Special Review of a pesticide use if he determines, based on a validated test or other significant evidence, that the use of

(continued...)

significance to mosquito control activities in Florida. Specifically, the administrator may conduct a Special Review of a pesticide use "if he determines, based on a validated test or other significant evidence,"⁷⁵ that a pesticide use adversely effects non-target organisms, endangered

⁷⁴ (...continued)

the pesticide ...

(1) May pose a risk of serious acute injury to humans or domestic animals.

(2) May pose a risk of inducing in humans an oncogenic, heritable genetic, teratogenic, fetotoxic, reproductive effect, or a chronic or delayed toxic effect, which risk is of concern in terms of either the degree of risk to individual humans or the number of humans at some risk, based upon:

(i) Effects demonstrated in humans or experimental animals.

(ii) Known or predicted level of exposure of various groups of humans.

(iii) The use of appropriate methods of evaluating data and relating such data to human risk.

(3) *May result in residues in the environment of nontarget organisms at levels which equal or exceed concentrations acutely or chronically toxic to such organisms, as determined from tests conducted on representative species or from other appropriate data.*

(4) *May pose a risk to the continued existence of any endangered or threatened species....*

(5) *May result in the destruction or other adverse modification of any habitat designated ... as a critical habitat for any endangered or threatened species.*

(6) *May otherwise pose a risk to humans or to the environment which is of sufficient magnitude to merit a determination whether the use of the pesticide product offers offsetting social, economic, and environmental benefits that justify initial or continued registration.*

(b) In making any determination that a pesticide use satisfies one of the criteria for issuance of a Special Review ... the administrator shall consider available evidence concerning both the adverse effect in question and the magnitude and scope of exposure of humans and nontarget organisms associated with use of the pesticide.

40 C.F.R. § 154.7 (July 1, 1991). (Emphasis added).

⁷⁵ *Id.* § 154.7. A "validated test" is defined as "a test determined by the agency to have been conducted and evaluated in a manner consistent with accepted scientific procedures." *Id.* § 154.1(i). "Other additional evidence" means "factually significant information that relates to the uses of the pesticide and their adverse risk to man or to the environment but does not include evidence based only on misuse of the pesticide unless such misuse is widespread and commonly recognized practice." *Id.* § 154.1(e). EPA intended that these rather broad definitions would assure that risk assessment would have a reasonable scientific basis, yet would not bind EPA from considering pertinent information merely because the information would not satisfy rigid criteria. 50 Fed. Reg. 49006 (Nov. 27, 1985).

or threatened species, or the habitat of endangered or threatened species.⁷⁶ In addition, risks to the environment of "sufficient magnitude" may also justify initiation of Special Review.⁷⁷ Furthermore, there is a catch-all criterion which directs EPA to initiate a Special Review when potential risks arise which are not addressed by any of the specific criteria.⁷⁸ The risk criteria are intended to insure that EPA considers both the "toxic effects associated with the pesticide and the actual or projected exposure of humans and other non-target organisms to the pesticide."⁷⁹ The Special Review proceeding serves as a mechanism for reconsideration of pesticide registrations which appear to cause unreasonable adverse effects on the environment. Special Review may be initiated by EPA or at the request of any interested person. Requests which meet certain risk criteria will trigger a formal Special Review proceeding. Through the procedure, EPA attempts to gain public input and to insure adequate consideration of risks and benefits of pesticide uses.⁸⁰ As part of the evaluation under the risk criteria, the administrator must consider adverse effects and the magnitude and scope of exposure of humans and non-target organisms to the pesticide. The Special Review process can result in cancellation, suspension, or reclassification of a pesticide registration.

4. Administrative Interpretations

FIFRA directs EPA to evaluate the costs and benefits of pesticide uses whenever EPA pursues a cancellation or suspension proceeding. Accordingly, administrative proceedings are the appropriate forum for in-depth analyses of the various cost and benefit issues surrounding

⁷⁶ 40 C.F.R. §§ 154.7(a)(3),(4),(5) (July 1, 1991). EPA received industry comments criticizing the criteria regulating the impact of pesticide uses on endangered species. Specifically, industry representatives suggested that the word "significant" should be put before "risk," and that the language about critical habitats be deleted from the rule. EPA declined to follow these industry suggestions, expressly stating that the Endangered Species Act prohibited the consideration of population size and the taking of even one endangered species. Similarly, pesticide use which impacts the food source or critical habitat of an endangered species is prohibited under the Endangered Species Act. 50 Fed. Reg. 49007 (Nov. 27, 1985).

⁷⁷ 40 C.F.R. § 154.7(a)(6) (July 1, 1991).

⁷⁸ 50 Fed. Reg. 49003-4 (Nov. 27, 1985).

⁷⁹ *Id.* at 49003.

⁸⁰ Special Review procedural requirements are discussed on pages 27 - 29 of this report.

particular pesticide uses. The administrator must consider statutory and regulatory criteria, and, therefore, administrative decisions help illustrate the factors considered in cost benefit analyses and how the various statutory and regulatory criteria have been applied. Ultimately, however, the final decision making power lies with the administrator. Several recent administrative decisions addressing pesticide cancellation procedures are discussed below.

a. Special Review of Diazinon

In 1986, EPA initiated a Special Review of the pesticide diazinon for use on golf courses and sod farms.⁸¹ After initial consideration, EPA issued a Notice of Intent to Cancel because of alleged risks to birds.⁸² EPA examined factors such as diazinon's acute toxicity, estimated doses consumed by birds, diazinon application practices, reported bird kills, problems with reporting bird kills, and effects on endangered species.⁸³ In addition, EPA also examined the effectiveness of alternatives to the use of diazinon and the impact cancellation would have on operating costs.⁸⁴ Ultimately, EPA concluded that the use of diazinon on golf courses and sod farms should be canceled because the risks to birds outweighed the economic benefits of continued use.⁸⁵

As part of its analysis of the use of diazinon, EPA attempted to determine what degree of risk warrants cancellation. Petitioners argued that cancellation is justified only if "continued use of diazinon would adversely affect long-term bird populations or result in widespread mortality."⁸⁶ However, FIFRA directs that cancellation is required if continued use would cause "any" unreasonable risk to the environment.⁸⁷ In holding that there was significant risk to justify cancellation, the administrator cited the legislative history of FIFRA, which stated that

⁸¹ In re Ciba-Geigy Corp., 53 Fed. Reg. 11119 (April 5, 1988).

⁸² *Id.* at 11120.

⁸³ *Id.*

⁸⁴ *Id.*

⁸⁵ *Id.*

⁸⁶ *Id.* at 11122.

⁸⁷ 7 U.S.C. § 136(bb) (1987).

"any adverse effect ought not be tolerated unless there are overriding benefits from the use of a pesticide."⁸⁸ In addition, the administrator stated that there is no statutory or regulatory requirement that a particular threshold level of risk must be reached in order to justify cancellation.⁸⁹

The administrator examined prior cancellation decisions and found that any risk is sufficient to justify cancellation if the risk is unreasonable in relation to the benefits of continued use.⁹⁰ As further evidence that FIFRA does not envision a threshold risk level above which cancellations are warranted, the administrator pointed out that in 1985 EPA specifically deleted a regulatory provision providing that population effects were a separate basis for initiating Special Review.⁹¹

In evaluating the risks of continued use of diazinon, the administrator examined factors such as diazinon's comparative toxicity,⁹² routes of exposure, magnitude of exposure, risk assessment based on toxicity and residue data, reported bird kills, and field studies.⁹³ The administrator determined that diazinon was "very highly toxic" compared to other pesticides⁹⁴ and that diazinon could easily be ingested directly by birds feeding in treated areas, or indirectly by ingestion of seeds or invertebrates.⁹⁵ The magnitude of exposure was evaluated by

⁸⁸ In re Ciba-Geigy Corp., 53 Fed. Reg. 11119, 11122 (April 5, 1988), quoting S.Rep. No. 970, 92d Cong., 2d Sess. 11 (1972).

⁸⁹ *Id.* On appeal, the circuit court expressly affirmed the administrator's rejection of Ciba Geigy's argument that bird kills alone were not sufficient to show unreasonable risk and that the administrator must first determine that the pesticide use will endanger the overall bird population. *Ciba-Geigy Corp. v. U.S. EPA*, 874 F.2d 277, 279 (5th Cir. 1989).

⁹⁰ In re Ciba-Geigy Corp., 53 Fed. Reg. 11119, 11122 (April 5, 1988).

⁹¹ *Id.*

⁹² *Id.* Comparative toxicity is evaluated by reference to a pesticide's median lethal dosage (LD₅₀) which is the single dose that causes mortality in 50 percent of adult birds. *Id.* at 11122.

⁹³ *Id.* at 11122-25.

⁹⁴ *Id.* at 11122.

⁹⁵ *Id.* at 11123.

examining the concentrations of residues which remained from various application techniques. The residues were then factored into a risk assessment model, along with bird feeding habits, in an attempt to predict the time it would take for various bird species feeding in treated areas to reach their median lethal dosage.⁹⁶ The model, which received favorable peer review, indicated that the median lethal dosage would be reached in 15 to 80 minutes, depending on the size of the bird and the concentration of the application.⁹⁷ The administrator determined that these predictions were particularly significant because the waterfowl in question typically feed for a single five to eight hour period.⁹⁸

Petitioners argued that cancellation should never be based only on lab data, exposure information, and bird kills, and that the best evidence is provided from validly conducted field studies.⁹⁹ The administrator, citing previous administrative and judicial decisions,¹⁰⁰ rejected this contention, stating instead that lab data alone may provide a sufficient basis to warrant cancellation or suspension.¹⁰¹ With respect to field studies, the administrator acknowledged that such studies may often be the best evidence of risk, but that petitioner's studies were inadequate and inconclusive.¹⁰² The administrator concluded that although the risk to overall bird populations might be less under the proposed modified label, the risk to individual birds would still be too great.

In evaluating the benefits of continued use of diazinon, the administrator examined the potential economic impacts of cancellation, such as effects on price competition, turf quality,

⁹⁶ *Id.*

⁹⁷ *Id.*

⁹⁸ *Id.* at 11124.

⁹⁹ *Id.*

¹⁰⁰ *Id.* at 11124. See *EDF v. EPA*, 548 F.2d 998, 1005 (D.C. Cir. 1976), quoting *EDF v. EPA*, 489 F.2d 1247, 1254 (D.C. Cir. 1973).

¹⁰¹ *Id.*

¹⁰² *Id.*

minor pests, and pest resistance.¹⁰³ Although the administrator concluded that diazinon was the most economic pesticide for most turf pests, he identified several alternative pesticides. In addition, the administrator pointed out the availability of non-chemical control methods, such as biological controls¹⁰⁴ and cultural controls.¹⁰⁵ Similarly, integrated pest management programs¹⁰⁶ could be used to control turf pests. In summary, the administrator determined that the economic effect of cancellation of diazinon for turf grazes was insignificant because a number of viable alternatives existed.

One of the issues in the decision was whether proposed label amendments were sufficient to meet the requirements for continued use under FIFRA. FIFRA requires EPA to consider label or use changes as an alternative to outright cancellation of a pesticide use.¹⁰⁷ However, the administrator determined that there was no evidence that additional amendments would significantly reduce the risks to acceptable levels.¹⁰⁸ The administrator noted that additional amendments would also reduce the benefits of the pesticide use, which were already outweighed by the risks.¹⁰⁹ Accordingly, the administrator declined to allow continued use subject to additional label restrictions.¹¹⁰

FIFRA directs that EPA may issue a notice of intent to cancel if a pesticide "generally causes unreasonable adverse effects on the environment."¹¹¹ Petitioners asserted that

¹⁰³ *Id.* at 11126.

¹⁰⁴ *Id.* at 11128. An example of biological control is the use of bacteria to eradicate a particular pest.

¹⁰⁵ *Id.* An example of a cultural control is to reduce stress on the turf, thereby increasing the vigor and growth of the turf and making it more resistant to pests.

¹⁰⁶ *Id.* Integrated pest management is the pest control practice of using biological control and other non-chemical methods in conjunction with minimal amounts of pesticides.

¹⁰⁷ 7 U.S.C. § 136d(b) (1987).

¹⁰⁸ *In re Ciba-Geigy Corp.*, 53 Fed. Reg. 11119, 11130 (April 5, 1988).

¹⁰⁹ *Id.*

¹¹⁰ *Id.*

¹¹¹ 7 U.S.C. § 136d(b) (1987).

"generally" means that EPA may only issue a notice of intent to cancel if the pesticide use causes such effects in more than 51 percent of the cases in which it is used.¹¹² EPA rejected this interpretation, stating that FIFRA makes it clear that unreasonable adverse effects on the environment are prohibited regardless of whether such effects are caused most of the time.

Ciba-Geigy subsequently challenged EPA's interpretation of the term "generally" in Ciba-Geigy Corp. v. U.S. EPA.¹¹³ The court of appeals approved of the administrator's interpretation that FIFRA allows the administrator to cancel registrations of pesticides whenever he determines a pesticide commonly causes unreasonable risks, regardless of whether the pesticide use actually causes adverse effects more than 50 percent of the time.¹¹⁴ The court stated that the administrator need only determine that there is a significant probability that adverse effects may occur.¹¹⁵

The court of appeals declined to consider whether EPA's analysis and ultimate determination of the relative costs and benefits of diazinon use were supported by substantial evidence.¹¹⁶ However, the court remanded the case back to the administrator, indicating that the administrator had failed to consider all of the substantive requirements of the term "generally." Specifically, the court stated that "generally" requires that administrator determine whether a particular pesticide application "creates unreasonable risks, though not necessarily actual adverse consequences, with considerable frequency, and thus requires the administrator to consider whether he has defined the application he intends to prohibit sufficiently narrowly."¹¹⁷ In other words, the court felt that the administrator should reevaluate the scope of its ban on the use of diazinon, paying particular attention to the court's elucidation of the statutory requirements of the term "generally."

¹¹² 53 Fed. Reg. 11119, 11122 (April 5, 1988).

¹¹³ 874 F.2d 277 (5th Cir. 1989).

¹¹⁴ *Id.* at 278.

¹¹⁵ *Id.* at 279.

¹¹⁶ *Id.* at 280.

¹¹⁷ *Id.*

Despite its holding remanding the decision back to EPA, the Ciba-Geigy court reaffirmed much of the administrator's reasoning. EPA's interpretation of "generally" indicated that cancellation of certain pesticide uses may be appropriate even though the adverse effects may be limited to a particular geographic area or to the use of a particular application technique. Although the Ciba-Geigy court cautions against imposing too wide a ban on a pesticide use in response to localized adverse effects, the court affirmatively endorses the concept of narrow bans designed to alleviate specific instances of adverse effects.

In addition, EPA and the Ciba-Geigy court make it clear that "generally" does not necessarily mean most of the time. Rather, "generally" may be interpreted as meaning that, in a particular instance, there were unreasonable adverse effects "with regard to the overall picture."¹¹⁸ This interpretation of "generally" could be of particular significance to mosquito control activities in Florida, where application of a pesticide may cause adverse effects in one geographic area but not in another. Similarly, a particular application technique, such as aerial spraying may cause more adverse effects than ground applications.

On remand, EPA upheld its earlier decision to cancel diazinon use on golf courses and sod farms.¹¹⁹ EPA found that diazinon "causes an unreasonable risk to birds commonly and with considerable frequency," and that regulatory alternatives short of cancellation would not reduce risk to acceptable levels.¹²⁰ On remand EPA also reviewed the evidence and reconsidered the merits of Ciba-Geigy's proposed label amendments and found that: 1) there was widespread and continuous risk to a number of bird species; 2) label amendments would not sufficiently lower the risks, and 3) the benefits of continued use would be minimal.¹²¹ Of particular interest is EPA's statement concerning what constitutes an unreasonable risk:

...the Agency's concern for wildlife is not limited to long-term adverse effects on populations. Absent some countervailing benefit of continued use, as a matter of

¹¹⁸ 874 F.2d 277, 279 (5th Cir. 1989), citing 53 Fed. Reg. 11119, 11122 (1988).

¹¹⁹ In re Ciba-Geigy Corporation, et al., 55 Fed. Reg. 31138 (July 31, 1990).

¹²⁰ *Id.* at 31138.

¹²¹ *Id.* at 31140. EPA determined the benefits were minimal because there were other effective and less harmful pesticides available.

policy an unnecessary risk of regularly repeated bird kills will not be tolerated.¹²²

Throughout the case, Ciba-Geigy argued that cancellation of diazinon was warranted only if diazinon posed an unreasonable risk to bird populations. EPA and the court disagreed, stating that diazinon use did not have to "generally cause actual bird kills."¹²³ Instead, cancellation is justifiable if diazinon "generally causes an unreasonable risk of bird kills."¹²⁴ The court of appeals stated that

FIFRA gives the Administrator sufficient discretion to determine that recurring bird kills, even if they do not significantly reduce bird population, are themselves an unreasonable environmental effect.¹²⁵

Accordingly, EPA rejected Ciba-Geigy's argument that bird populations had to be adversely affected, stating that such a position is "inconsistent with this Agency's commitment to eliminate unreasonable risks generally posed to individual birds, regardless of the effect on bird populations."¹²⁶

The diazinon case is significant in several respects. Prior to this decision, successful requests for cancellation of other pesticides had been based, at least partially, on a risk to human health. However, the decision to cancel diazinon use on golf courses was based solely on the fact that diazinon causes adverse impacts to birds. Another distinction between the diazinon case and previous cancellation proceedings is that the arguments for continued use were not based on benefits to public health programs or food programs. Rather, the arguments were based on economics and the benefits of well groomed golf courses.

These distinctions are significant with regard to Florida's mosquito control programs. The diazinon case is strong precedent for cancellation of pesticide uses which adversely effect non-target wildlife and for which there are no public health or food production benefits. Much of Florida's mosquito control spraying is similar in nature. While it is true that some mosquito

¹²² 55 Fed. Reg. 31138, 31144 (July 31, 1990).

¹²³ *Id.* at 31138.

¹²⁴ *Id.*

¹²⁵ 874 F.2d 277, 280 (5th Cir. 1989).

¹²⁶ 55 Fed. Reg. 31138, 31145 (July 31, 1990).

control spraying is conducted for public health concerns, the majority of spraying is conducted to eliminate nuisance biting mosquitoes. In addition, the court of appeals makes it clear that EPA need not tolerate pesticide uses which pose an unreasonable risk to non-target species when the adverse effects outweigh the countervailing benefits. FIFRA gives the administrator of EPA considerable discretion to determine what constitutes an unreasonable risk. The diazinon case indicates that pesticide uses in Florida which adversely impact non-target species and which are conducted solely to control nuisance mosquitoes might be susceptible to a cancellation action, if the adverse effects are determined to outweigh the economic benefits of control of nuisance mosquitos.

b. Special Review of Dicofol

In its decision concerning the use of diazinon on golf courses and sod farms, EPA determined that outright cancellation of those uses was the only acceptable solution. However, as an alternative to outright cancellation of a pesticide use, EPA may consider altering the terms of the registration, including, but not limited to, the pesticide's chemical composition, the label requirements, and application techniques. In 1986, after conducting a Special Review of the pesticide dicofol, EPA determined that certain changes in the existing registration would bring the use of dicofol within an acceptable level of risk.¹²⁷

EPA initiated a Special Review of the miticide dicofol in 1984, amid concern that dicofol and its contaminants (DDTr)¹²⁸ were causing significant adverse effects to non-target wildlife. In assessing the risks of dicofol use, EPA found that DDTr had adverse effects on various fish and birds, and that dicofol may cause adverse effects in birds. EPA consulted with the Office of Endangered Species (OES) and determined that continued use of dicofol would probably jeopardize the existence of a number of endangered species of birds.¹²⁹ EPA and OES

¹²⁷ 51 Fed. Reg. 19508 (1986).

¹²⁸ At the time that the Special Review was initiated, Dicofol products were regularly contaminated with DDT, DDE, and other closely related compounds. These compounds, referred to collectively as DDTr, were thought to be the primary cause of the adverse effects observed in relation to Dicofol use. 51 Fed. Reg. 19508 (1986).

¹²⁹ 51 Fed. Reg. 19508, 19509 (1986). The Office of Endangered Species found that Dicofol use would probably jeopardize the existence of the peregrine falcon, brown pelican, bald
(continued...)

conclusions were derived from both field and laboratory studies. As part of their analysis, EPA and OES evaluated the distribution of sensitive species to determine whether these species were actually present in areas of high dicofol use.¹³⁰ EPA and OES found that there were one or more highly sensitive species and several endangered species present in each of the areas of high dicofol use.¹³¹

EPA found a number of significant benefits to dicofol use. EPA found that dicofol, unlike other miticides, was particularly selective, and consequently was favored for use in Integrated Pest Management programs because it did not kill potentially beneficial non-target insects.¹³² Similarly, because of its high selectivity and common use in Integrated Pest Management programs, dicofol was determined to be a factor in prohibiting mite resistance to pesticides.¹³³ In addition, EPA evaluated both the effectiveness of dicofol as compared to other miticides, and the overall economic impact of removal of dicofol from the market.¹³⁴ EPA found that cancellation of dicofol would probably disrupt Integrated Pest Management programs, accelerate mite resistance to other miticides, and cost producers of agricultural crops between 21 and 39 million dollars per year.

¹²⁹ (...continued)

eagle, Everglade kite, wood stork, and Arctic peregrine falcon. 51 Fed. Reg. 19508, 19509 (1986).

¹³⁰ *Id.* at 19512.

¹³¹ *Id.*

¹³² *Id.* at 19515. Less selective alternative miticides would probably kill non-target beneficial insects which are essential components of many Integrated Pest Management (IPM) programs. Accordingly, the effectiveness of the IPM programs would be reduced and more alternative miticides would have to be applied. *Id.*

¹³³ *Id.* at 19516. Repeated use of a particular class of pesticide can lead to accelerated insect resistance to pesticides within that class. Dicofol was the last chlorinated hydrocarbon available for use as a miticide. Cancellation of dicofol would probably result in increased use of other miticides, thereby increasing the rate by which mites become resistant to the alternative miticides. *Id.*

¹³⁴ *Id.*

After balancing the risks and benefits of dicofol use, EPA determined that the risks of dicofol use as currently formulated and regulated were unacceptable. However, as an alternative to the outright ban of dicofol products, EPA suggested certain modifications to the registration. Generally, EPA determined that continued use of dicofol would be acceptable if registrants reduced the DDT_r contamination in dicofol products to a specified level,¹³⁵ and the label was revised to address disposal and handling concerns.¹³⁶

Several aspects of EPA's balancing of risks and benefits of dicofol use are particularly significant with regard to mosquito control activities in Florida. First, EPA's final assessment of risks was based solely on risks to birds and fish. Although EPA had initially determined that dicofol use might be a potential human carcinogen, this view was rejected as non-verifiable by both EPA and a Scientific Advisory Panel.¹³⁷ Second, despite significant benefits of dicofol use, EPA determined that the risks to wildlife were too great to allow continued use without restrictions. Undoubtedly, the existence of adversely effected endangered species contributed to EPA's decision. Third, rather than imposing an outright ban on any future use of dicofol, EPA attempted to design a creative remedy addressing environmental, agricultural, and economic concerns.

C. Potential Legal Remedies Under FIFRA

1. Administrative Remedies

a. General

FIFRA directs that EPA provide an administrative mechanism for reevaluation of existing pesticide registrations. Section 136d(b) provides that the administrator of EPA may change a pesticide classification or cancel use of a pesticide if a pesticide or its labeling does not comply with FIFRA, or if a pesticide "when used in accordance with widespread and commonly

¹³⁵ *Id.* at 19517. In 1984, when EPA initiated Special Review, DDT_r constituted roughly 10 percent of the composition of dicofol. In 1986, at the time EPA issued its final determination, several manufacturers had amended their registrations to indicate DDT_r constituted no more than 2.5 percent of dicofol. Under EPA's final determination levels of DDT_r would initially have to be equal to or less than 2.5 percent of dicofol's composition, and then equal to or less than 0.1 percent within two years. *Id.* at 19517.

¹³⁶ *Id.* at 19517.

¹³⁷ *Id.* at 19522-23.

recognized practice, generally causes unreasonable adverse effects on the environment."¹³⁸ If the administrator determines that the pesticide poses an "imminent hazard during the time required for cancellation or change of classification proceedings," he may suspend use of the pesticide.¹³⁹ In the case of an emergency, the administrator may suspend use of a pesticide prior to the notification and hearing requirement.¹⁴⁰ EPA orders concerning cancellation, suspension, or some other change in classification are judicially reviewable in federal court.¹⁴¹

b. Petition for Special Review

EPA Special Review procedures provide a mechanism for evaluating pesticide uses which allegedly cause unreasonable adverse effects on the environment.¹⁴² Suspension and cancellation actions are usually initiated through the special review process. The administrator must first make an initial determination of whether to initiate a Special Review.¹⁴³ If the administrator decides he may initiate a Special Review, he must notify affected registrants and applicants and solicit their comments for a 30 day period.¹⁴⁴ The administrator must then make a final public announcement of whether to initiate Special Review.¹⁴⁵ If the administrator proposes not to initiate Special Review, he must issue a proposed decision in the Federal Register

¹³⁸ 7 U.S.C.A. § 136d(b).

¹³⁹ *Id.* § 136d(c)(1). If EPA determines that suspension of a pesticide use is warranted, then EPA must notify the registrant and include findings pertaining to the question of "imminent hazard." *Id.* The registrant may request a hearing within five days of receipt of notification of a suspension order. *Id.* § 136d(c)(2). If a hearing is requested, EPA must commence the hearing within five days of receipt of the request unless EPA and the registrant agree that it can commence at a later time. *Id.* The hearing officer has 10 days from the completion of the presentation of evidence to issue a recommended order. *Id.* EPA then has 7 days to render a final order on the issue of suspension. *Id.*

¹⁴⁰ 7 U.S.C.A. § 136d(c)(3).

¹⁴¹ *Id.* §§ 136d(c)(4), 136d(h), 136n. A discussion of jurisdiction, standards of review, causes of action, and standing begins on page 30 of this report.

¹⁴² 40 C.F.R. Part 154 (July 1, 1991).

¹⁴³ *Id.*

¹⁴⁴ *Id.* § 154.21.

¹⁴⁵ *Id.* § 154.25.

and provide for public comment for 30 days.¹⁴⁶ A decision not to initiate Special Review must be accompanied with a statement of reasons and published in the Federal Register.¹⁴⁷ A decision to initiate Special Review must also be published in the Federal Register.¹⁴⁸

If the agency decides to initiate a Special Review, it also will initiate a Current Benefits Review. Although the Current Benefits Review is not considered in the decision of whether to initiate Special Review, the review is used to assist the EPA in deciding whether to allow continued use of the pesticide pending a detailed risk benefit analysis.¹⁴⁹ In addition, the Current Benefits Review is used by EPA in identifying potential regulatory options and in preparing for a more detailed benefits analysis.¹⁵⁰

After the administrator issues notice of the decision to initiate a Special Review proceeding, any person may comment on whether the pesticide use meets the risk criteria necessary for initiation of a Special Review.¹⁵¹ In addition, any interested person may request a meeting with EPA to discuss matters relating to the Special Review proceeding.¹⁵² The administrator may also conduct an informal public hearing to gather relevant information.¹⁵³ As part of its risk benefit evaluation, EPA evaluates potential risks by examining factors such as the nature of any adverse effect, the magnitude of exposure of humans and other non-target

¹⁴⁶ *Id.* § 154.23.

¹⁴⁷ *Id.* § 154.25(b).

¹⁴⁸ *Id.* § 154.25(c).

¹⁴⁹ 50 Fed. Reg. 49004 (Nov. 27, 1985).

¹⁵⁰ *Id.*

¹⁵¹ 40 C.F.R. § 154.26 (July 1, 1991).

¹⁵² *Id.* § 154.27.

¹⁵³ *Id.* § 154.29.

organisms, and the size of the population at risk.¹⁵⁴ Data relating to these factors may be supplied by the registrant, EPA, or any interested person.¹⁵⁵

EPA evaluates benefits of continued use by assessing the availability, efficacy, and cost of alternative control methods.¹⁵⁶ After the initial comment period the administrator must prepare a notice of preliminary determination, which must set forth the facts the administrator used in reaching a decision and include explanations of the decision.¹⁵⁷ The administrator must also request comments from the Secretary of Agriculture¹⁵⁸ and the Scientific Advisory Panel.¹⁵⁹ Finally, the administrator must prepare a notice of final determination which must include: a discussion of the administrator's reasoning with respect to determinations about pesticide uses; comments received from the Secretary of Agriculture and the Scientific Advisory Panel; the administrator's responses to any significant public comments; and instructions to registrants, applicants, and other interested persons concerning future regulatory action.¹⁶⁰

The elaborate procedure required in Special Review proceedings reflects congressional desire that EPA carefully consider environmental, human, social, and economic benefits and costs in evaluating pesticide uses. Review by the Secretary of Agriculture envisions adequate evaluation of benefits and costs to the agricultural economy, while Scientific Advisory Panel review envisions an unbiased scientific assessment of benefits and costs by the nation's leading

¹⁵⁴ 50 Fed. Reg. 49004 (Nov. 27, 1985).

¹⁵⁵ 40 C.F.R. §§ 154.21(b), 154.26, 154.27, 154.29 (July 1, 1991).

¹⁵⁶ *Id.*

¹⁵⁷ 40 C.F.R. § 154.31 (July 1, 1991).

¹⁵⁸ *Id.* § 154.31(b). Referral to the Secretary of Agriculture enables the administrator to more adequately analyze the impact of the proposed action on agricultural commodities, retail food prices, and the agricultural economy. *Id.* § 154.31(b)(2).

¹⁵⁹ *Id.* § 154.31(b)(3). The Scientific Advisory Panel consists of seven representatives appointed by the administrator from a list of nominees nominated by the National Institutes of Health and the National Science Foundation. The members are representatives from the disciplines of toxicology, pathology, environmental biology, and related sciences. 7 U.S.C.A. § 136w(d).

¹⁶⁰ 40 C.F.R. § 154.33(b) (July 1, 1991).

scientists. In addition, comments are solicited from all affected and interested persons. Ultimately, however, the decision of whether to initiate a Special Review proceeding and the final outcome of a Special Review proceeding lie within the discretion of the EPA administrator.

2. Judicial Remedies

Several opportunities exist for persons to challenge EPA decisions under FIFRA and to enforce various provisions of FIFRA in the Federal courts. Unfortunately, FIFRA provisions addressing judicial review are somewhat confusing and unclear. The array of potential plaintiffs and their stated causes of action and desired remedies further confuse standing issues. Generally, potential plaintiffs attempting to bring suits under FIFRA can be either registrants, non-registrants who participated in earlier proceedings, or non-registrants who did not participate in earlier proceedings. Plaintiffs may be seeking to challenge an EPA decision concerning a pesticide, or plaintiffs may be seeking an injunction against a third party's use of a pesticide. An examination of pesticide cases provides some clarification as to how various factors affect judicial review under FIFRA. This section discusses federal court jurisdiction, standards of review, causes of action, and standing.

a. Jurisdiction and Standards of Review

FIFRA provides for district court review of agency orders which refuse to cancel or suspend registrations or change classifications not following a hearing, and other final agency orders not committed to agency discretion.¹⁶¹ District courts may also enforce and prevent violations of FIFRA.¹⁶² FIFRA does not indicate the appropriate standard of review for these types of actions. In the absence of an explicit statement of the appropriate standard of review by the enabling statute, the standard of review under the Administrative Procedure Act (APA) is determined by the nature of the agency action being reviewed by the court. Courts typically apply the arbitrary and capricious standard when reviewing informal non-adjudicatory type agency actions and the substantial evidence standard when reviewing formal adjudicatory type agency actions.¹⁶³ FIFRA also provides for immediate federal district court review of any

¹⁶¹ 7 U.S.C.A. § 136n(a).

¹⁶² *Id.* § 136n(c).

¹⁶³ B. SCHWARTZ, ADMINISTRATIVE LAW §§ 10.7, 10.13 (2d ed. 1984).

suspension order entered prior to a hearing, to determine whether the agency action was arbitrary, capricious, an abuse of discretion, or whether the order was issued in accordance with procedures established by law.¹⁶⁴

Agency orders entered after a public hearing may be challenged in federal circuit court.¹⁶⁵ In order to bring an action in circuit court, the following statutory conditions must be met: 1) an agency order must have been issued after a public hearing, 2) an actual controversy must exist as to the validity of the order, 3) there must be an adversely affected person, and 4) the adversely affected person must have been a party to the proceedings.¹⁶⁶ Circuit courts which review agency orders under FIFRA must sustain the order of the administrator if "it is supported by substantial evidence when considered on the record as a whole."¹⁶⁷ Challenges to agency orders must be filed in the circuit court within sixty days of the entry of the order being challenged.¹⁶⁸

Although FIFRA provisions provide guidance as to the jurisdiction of federal district and circuit courts, there remains some confusion as to the appropriate forum for particular causes of action. For example, Section 136n(a) provides that "final actions of the administrator not committed to the discretion of the administrator by law are judicially reviewable by the district courts of the United States." However, Section 136n(b) provides that courts of appeal may review orders issued by the administrator following a public hearing which adversely affect any person. These two provisions appear to grant concurrent jurisdiction for challenges of certain agency actions or orders.

¹⁶⁴ 7 U.S.C.A. § 136d(c)(4). Any registrant or interested person with registrant's permission may request review by the district court. Under this provision, a district court is limited to ordering a temporary stay of the suspension order until the Administrator makes a final decision concerning cancellation. A temporary court order to stay an agency suspension order does not prohibit action under any other administrative review proceedings authorized by FIFRA. *Id.*

¹⁶⁵ *Id.* § 136n(b).

¹⁶⁶ *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ *Id.*

In Amvac Chemical Corporation v. U.S. Environmental Protection Agency, plaintiff Amvac filed suit simultaneously in district and circuit court, challenging EPA's refusal to hold a public hearing prior to publication of an amended notice of intent to cancel the registration of dibromochloropropane, a nematode control pesticide. Defendant EPA moved to dismiss the suit from district court, arguing that Congress intended for decisions regarding pesticide registrations to be decided by the circuit courts. The court of appeals disagreed with EPA, stating that "a decision not to hold a public hearing is not an order issued following a public hearing"¹⁶⁹ and accordingly the agency decision canceling the registration "is not yet ripe for review" by the circuit court.¹⁷⁰ The court subsequently dismissed the petition from circuit court, holding that district court was the appropriate forum. One commentator has suggested that there may be overlapping jurisdiction in the district and circuit courts for certain FIFRA matters and that the safest course is to file simultaneous suits in each of the two forums.¹⁷¹

b. Causes of Action and Standing to Restrain Violations of FIFRA

FIFRA, unlike most other federal environmental protection statutes, has no express citizen's suit provision. FIFRA does provide detailed procedures for challenges to agency decisions concerning pesticides, but does not provide for private actions against states or private polluters. The legislative history surrounding FIFRA indicates that although Congress rejected an express citizen's suit provision,¹⁷² it did want to encourage review of agency actions in the federal courts.¹⁷³ Courts have consistently allowed challenges of final EPA orders regarding suspension, cancellation, or reclassification of pesticide registrations.

¹⁶⁹ 653 F.2d 1260, 1265 (9th Cir. 1981).

¹⁷⁰ *Id.* at 1262.

¹⁷¹ See W. RODGERS, ENVIRONMENTAL LAW, PESTICIDES AND TOXIC SUBSTANCES 58 (1988).

¹⁷² S. Rep. No. 92-970, 92d Cong., 2d Sess. 4-5 (1972).

¹⁷³ See W. RODGERS, ENVIRONMENTAL LAW, PESTICIDES AND TOXIC SUBSTANCES § 5.7 (1988).

Standing for adversely affected citizens to challenge EPA final decisions was firmly established in the early 1970s in the case of Environmental Defense Fund, Inc. v. Hardin.¹⁷⁴ In Hardin, plaintiffs, five environmental organizations, sought cancellation and suspension of registration for all pesticides containing DDT. The court applied the "zone of interests" test, and held that plaintiff's alleged injury of biological harm to man and other living things was sufficient to meet the constitutional case and controversy requirement.¹⁷⁵

In addition, the court held that plaintiffs met standing requirements under the Administrative Procedure Act (APA) because plaintiffs were "aggrieved by agency action within the meaning of the relevant statute."¹⁷⁶ The court cited affirmatively earlier cases which established that environmental groups may bring suits to protect the public interest.¹⁷⁷

Hardin establishes that persons who are adversely affected by EPA decisions concerning pesticides have standing to challenge those decisions in a Federal Court of Appeals. The court in Hardin takes a broad view of FIFRA standing requirements, despite the absence of an express citizen's suit provision. Clearly, Hardin encourages non-registrant parties to scrutinize and challenge EPA's regulation of pesticides. The decision in Hardin was reaffirmed in a related case, Environmental Defense Fund, Inc. v. Ruckelshaus.¹⁷⁸

The courts have generally allowed actions challenging EPA decisions regarding pesticides. In addition, the courts have generally allowed suits by adversely affected persons against federal agencies allegedly using pesticides in violation of FIFRA. Jurisdiction in these suits is often based on the APA and FIFRA. Under Section 10 of the APA, persons adversely affected by

¹⁷⁴ 428 F.2d 1093 (D.C. Cir. 1970).

¹⁷⁵ *Id.* at 1096, citing Association of Data Processing Service Organizations v. Camp, 397 U.S. 150, 90 S.Ct. 827, 25 L.Ed.2d 184 (1970); Flast v. Cohen, 392 U.S. 83, 88 S.Ct. 1942, 20 L.Ed.2d 947 (1968).

¹⁷⁶ 428 F.2d 1093, 1097 (D.C. Cir. 1970). The court stated that the "zone of interests" test is equivalent to the APA test. *Id.* at 1097, n. 16.

¹⁷⁷ *Id.* at 1097.

¹⁷⁸ 439 F.2d 584, 590 (D.C. Cir. 1971).

federal agency action are entitled to judicial review of that action.¹⁷⁹ Persons alleging they have been adversely affected by a federal agency that is violating FIFRA are therefore entitled to judicial review.

However, the courts have been reluctant to allow adversely affected parties to sue to enjoin other users of pesticides, such as states and private parties, who are violating FIFRA. Section 136n(c) of FIFRA states that "the district courts of the United States are vested with jurisdiction specifically to enforce, and to prevent and restrain violations ... [of FIFRA]."¹⁸⁰ This provision, in combination with Section 10 of the APA, appears to allow suits to enjoin user violations of FIFRA. However, use of this section has been limited to specific plaintiffs and defendants. Section 136n(c) has been interpreted by reviewing courts to allow suits by EPA and the United States Attorney General against any defendant,¹⁸¹ but citizens have only been allowed to use this provision to obtain review of federal "agency actions" which allegedly violate FIFRA.¹⁸²

Potential plaintiffs have sought to invoke other statutes to establish jurisdiction under FIFRA for actions to enjoin private parties or states which are allegedly violating FIFRA. Several successful suits have been brought alleging that federal agency actions violate the National Environmental Policy Act, because the agency actions result in violations of FIFRA which should have been the subject of an Environmental Impact Statement.¹⁸³

¹⁷⁹ 5 U.S.C.A. § 702.

¹⁸⁰ 7 U.S.C.A. § 136n(c).

¹⁸¹ See *People for Environmental Progress v. Leisz*, 373 F.Supp. 589 (D. Cal. 1974), stating that enforcement of FIFRA is reserved for the U.S. Environmental Protection Agency and the U.S. Attorney General and does not extend to civil actions by private citizens.

¹⁸² See *Kelly v. Butz*, 404 F.Supp. 925 (W.D. 1975), holding that a state attorney general may bring suit on behalf of the citizens of the state to enjoin FIFRA violations by a federal agency. See also *Sierra Club v. Peterson*, 705 F.2d 1475 (9th Cir. 1983) and *Oregon Environmental Council v. Kunzman*, 714 F.2d 901 (9th Cir. 1983), both holding that plaintiff environmental groups could use Section 10 of the Administrative Procedure Act to challenge federal agency spraying programs for allegedly violating FIFRA.

¹⁸³ See *Save Our Ecosystems v. Clark*, 747 F.2d 1240 (9th Cir. 1984); *Southern Oregon Citizens Against Toxic Sprays, Inc. v. Clark*, 720 F.2d 1475 (9th Cir. 1983), *cert. denied* 469 U.S. 1028, 105 S.Ct. 446, 83 L.Ed.2d 372 (1984).

Several suits have been brought alleging jurisdiction through the Declaratory Judgment Act and FIFRA. The Declaratory Judgment Act states that "in a case of actual controversy within its jurisdiction ... any court ... may declare the rights and other legal relations of any interested party seeking such declaration, whether or not further relief is or could be sought."¹⁸⁴ This provision has been uniformly interpreted to allow actions only when there is a separate basis for jurisdiction.¹⁸⁵ Several cases have held that FIFRA does not provide a basis for jurisdiction when a private party is suing to enjoin an unlawful pesticide user that is not a federal agency.¹⁸⁶

Private plaintiffs have also attempted to use Section 1983 to challenge state spraying programs. In Almond Hill School v. U.S. Department of Agriculture,¹⁸⁷ plaintiffs argued that a private cause of action exists through 42 U.S.C. § 1983 to enforce provisions of FIFRA.¹⁸⁸ On review, the circuit court held that plaintiffs were barred from pursuing private enforcement of FIFRA through section 1983.¹⁸⁹ The court reviewed the legislative history of FIFRA and found that remedial devices were "sufficiently comprehensive" to suggest that private causes of action were not part of the legislative scheme.

Private plaintiffs may also bring actions against federal agencies for procedural violations of the APA. In Defenders of Wildlife v. Administrator, Environmental Protection Agency, plaintiffs sought an injunction to prohibit the continued above-ground use of the pesticide strychnine. Plaintiffs asserted that the EPA's actions were arbitrary and capricious within the meaning of the APA because EPA had violated APA procedural requirements.

¹⁸⁴ 28 U.S.C.A. § 2201(a).

¹⁸⁵ Fielder v. Clark, 714 F.2d 77, 77 (9th Cir. 1983); Skelly Oil Co. v. Phillips Petroleum Co., 339 U.S. 667, 671-74 (1950).

¹⁸⁶ Fielder v. Clark, 714 F.2d 77, 79 (9th Cir. 1983); In re "Agent Orange" Product Liability Litigation, 635 F.2d 987, 991-92 n. 9 (2d Cir. 1980).

¹⁸⁷ 768 F.2d 1030 (9th Cir. 1985).

¹⁸⁸ *Id.* at 1033.

¹⁸⁹ *Id.* at 1039.

The Defenders of Wildlife court ultimately held that EPA actions were arbitrary and capricious and not in accordance with law because EPA failed to follow proper APA procedure. The court stated explicitly that the strychnine registration process is governed by the APA, despite the existence of FIFRA judicial review provisions. The court characterized the EPA administrative action as informal rulemaking which was subject to judicial review under the APA absent "legislative intention to preclude review."¹⁹⁰ Under the APA, the standard of review for informal rulemaking is whether the action is arbitrary and capricious and in accordance with law.

Table 1. Potential Causes of Action under FIFRA for an Injunction to Prohibit Unlawful Pesticide Use

Plaintiff	Defendant	Does Viable C/A Exist?
EPA	Any User	Yes ¹
U.S. Attorney General	Any User	Yes ¹
State Attorney General	Any User	Yes ¹
Citizens	Federal Agency	Yes ²
Citizens	Users other than Federal Agency	No ³

Basis for C/A:

¹ Action under 7 U.S.C.A. § 136n(c) and 7 U.S.C.A. 1361, and APA

² Action under Section 10 of APA and FIFRA, APA and NEPA

³ Action under APA, FIFRA, Declaratory Judgment Act, and Section 1983

¹⁹⁰ *Id.* at 1347.

II. The Federal Clean Water Act

The second federal enactment with potential application is the Clean Water Act (CWA). The CWA regulates toxic substances by establishing effluent limitations for some of these substances and requiring that the best available technology economically achievable be applied to control sources.¹⁹¹ However, permitting requirements under the CWA for toxic substances and other pollutants apply only to discharges of pollutants.¹⁹² A "discharge of a pollutant" is defined as any addition of a pollutant to waters from any point source.¹⁹³

Point sources are defined as any "discernible, confined, discrete conveyance, including but not limited to any pipe, ditch ... from which pollutants are... discharged."¹⁹⁴ It is unclear whether aerial applications of pesticides which are deposited in water meet the statutory definition of a point source. EPA currently does not require mosquito control operations to obtain point source pollution permits.

The CWA does require states to establish Water Quality Standards for state waters.¹⁹⁵ States have addressed toxic pollutants in their water quality standards but violations and lack of regulatory mechanisms to enforce these standards are widespread.¹⁹⁶

III. The Federal Toxic Substances Control Act

The Federal Toxic Substances Control Act (TSCA)¹⁹⁷ regulates the manufacture of a variety of new and existing chemical substances.¹⁹⁸ EPA has the power to forbid the manufacture of both new and existing chemicals that studies have shown present an unreasonable

¹⁹¹ 33 U.S.C.A. § 1317.

¹⁹² *Id.* § 1342(a)(1).

¹⁹³ *Id.* § 1362(12).

¹⁹⁴ *Id.* § 1362(14).

¹⁹⁵ *Id.* § 1313.

¹⁹⁶ W. RODGERS, 2 ENVIRONMENTAL LAW, AIR AND WATER 245-52 (1986).

¹⁹⁷ 15 U.S.C.A. §§ 2601 - 2654 (1988).

¹⁹⁸ *Id.* § 2601.

risk to health or the environment.¹⁹⁹ However, pesticides are expressly exempted from regulation under TSCA.²⁰⁰

IV. The Endangered Species Act

The Endangered Species Act of 1973 (ESA)²⁰¹ prohibits takings of threatened or endangered species. The use of mosquito control pesticides which harm threatened or endangered species may be a violation of the ESA. The following section discusses the requirements and prohibitions of the ESA and its regulatory programs, and identifies potential causes of action under the ESA regarding mosquito control pesticides which adversely affect threatened or endangered species.

A. General Statutory Scheme

The ESA mandates the protection of fish, wildlife, and plants that are "endangered or threatened" species as defined in the Act.²⁰² Endangered species are those that are in danger of extinction throughout all, or a significant portion of their range.²⁰³ Threatened species are those that are likely to become endangered throughout all, or a significant portion of their range in the foreseeable future.²⁰⁴ The Act provides for the creation of a list of endangered species and a list of threatened species.²⁰⁵ The Secretary must consider the following factors in determining whether a species is endangered or threatened: 1) present or threatened modification of its habitat or range; 2) overutilization for commercial, sporting, scientific, or educational purposes; 3) disease or predation; 4) inadequacy of existing regulatory mechanisms; and 5) other

¹⁹⁹ *Id.* § 2605.

²⁰⁰ *Id.* § 2602(2)(B)(ii).

²⁰¹ 16 U.S.C.A. §§ 1531 - 1544.

²⁰² *Id.* § 1531.

²⁰³ *Id.* § 1532(6).

²⁰⁴ *Id.* § 1532(20).

²⁰⁵ *Id.* § 1533(c)(1).

natural or human-made factors affecting its continued existence.²⁰⁶ The Secretary of the Interior may add or subtract species from the list depending upon the status of the species.²⁰⁷

Section 9 of the ESA protects these species by making it illegal to take endangered or threatened species.²⁰⁸ The term "take" means to "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct."²⁰⁹ The U.S. Fish and Wildlife Service has by regulation defined "harm" to "include habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."²¹⁰ Clearly, the poisoning of an endangered species with a mosquito pesticide would meet the definition of "take."

Another form of protection for listed species is the development and implementation of recovery plans by the Secretary of the Interior.²¹¹ The Secretary must create a recovery plan unless he finds that a plan will not promote the conservation of the species.²¹² The Secretary, when developing and implementing recovery plans, must give priority to endangered or

²⁰⁶ *Id.* § 1533(a)(1)(A)-(E).

²⁰⁷ *Id.* § 1533(c). The Secretary must consider the factors and follow the procedures in Sections 1533(a) and 1533(b) of the ESA when deciding whether to add, remove, or reclassify a species. *Id.* In addition, the Secretary must review all species on the lists at least once every five years to determine whether the status of the species should be changed. *Id.* § 1533(c)(2).

²⁰⁸ *Id.* § 1538(a)(1)(B). In addition to the prohibition on taking endangered species, the ESA makes it illegal, except with regard to fish or wildlife held for noncommercial purposes prior to the effective date of the ESA, to import or export endangered species within the United States or Territorial Seas of the United States, to take endangered species upon the High Seas, to sell or offer for sale any endangered species in interstate or foreign commerce, to possess, sell, deliver, carry, transport, or ship any species taken in violation of the ESA, or to engage in any trade in specimens or to possess any specimens in violation of the Convention on International Trade in Endangered Species of Wild Fauna and Flora. *See* Annotation, Validity, Construction, and Application of the Endangered Species Act of 1973 (16 U.S.C.S. §§ 1531-1543), 32 A.L.R. 332, 340-342 (1989).

²⁰⁹ 16 U.S.C.A. § 1532(19).

²¹⁰ 50 C.F.R. § 17.3 (July 1, 1991).

²¹¹ 16 U.S.C.A. § 1533(f)(1).

²¹² *Id.*

threatened species which are most likely to benefit from a recovery plan, and which are threatened by construction, other development projects, or other forms of economic activity.²¹³ Recovery plans must include: 1) site-specific management actions which are necessary to ensure the conservation and survival of the species; 2) objective, measurable criteria to measure the success of the plan; and 3) estimates of the time and cost to achieve the plan's goal.²¹⁴ Also, in a further effort to protect threatened and endangered species, the ESA provides the Secretary of the Interior with the power to acquire land in order to establish and implement a program to conserve endangered plants, fish and wildlife.²¹⁵

Section 7 of the ESA requires that federal agencies must abide by the prohibitions contained in the ESA and carry out programs for the conservation of threatened and endangered species.²¹⁶ Federal agencies must also consult with the Secretary of the Interior and insure that actions authorized, funded, or carried out by the agencies do not jeopardize the continued existence of threatened or endangered species, nor result in destruction or modification of the habitats of such species.²¹⁷ After initiating the consultation required under this section, an agency or permit applicant may not make any "irreversible or irretrievable commitment of resources...which has the effect of foreclosing the formulation or implementation of any reasonable and prudent alternative measures."²¹⁸ The restrictions of this section extend to actions with direct or indirect effects on endangered or threatened species, or their habitat.

The Environmental Protection Agency (EPA) is the federal agency that is responsible for the registration of pesticides for use in the United States. The duty under Section 7 to ensure that agency actions do not jeopardize listed species extends to licensing activities, such as the

²¹³ *Id.* § 1533(f)(1)(A).

²¹⁴ *Id.* § 1533(f)(B).

²¹⁵ *Id.* § 1534(a).

²¹⁶ *Id.* § 1536(a)(1).

²¹⁷ *Id.* § 1536(a)(2).

²¹⁸ 16 U.S.C.A. § 1536(d).

registration of pesticides by EPA.²¹⁹ Accordingly, EPA must ensure that its actions regarding pesticide registrations do not harm listed species.²²⁰ Approval of registration of a pesticide that is likely to harm endangered or threatened species would probably be a violation of the ESA.²²¹ However, it might be difficult to prove harm prior to registration and subsequent use of the pesticide. A more likely scenario would be to use evidence that the current use of a particular pesticide is adversely affecting listed, threatened or endangered species, to prevent the EPA from re-registering the pesticide, or to prompt the EPA to suspend or cancel a pesticide already in use.

The ESA directs the Secretary of the Interior to cooperate with the states to the maximum extent practicable.²²² This involves allowing the states to: 1) manage programs for the protection of threatened and endangered species pursuant to a cooperative agreement with the federal government, 2) manage areas established for the conservation of endangered species, 3) adopt import and export laws concerning endangered species so long as there is no conflict with federal law, and 4) make other laws protecting endangered species that are stricter than those found in the ESA.²²³

The ESA provides sanctions for violations of the Act, including civil penalties, forfeiture, fines, and imprisonment.²²⁴ In addition, the ESA provides for citizen's suits against any person, including any local, state, or federal government or agency, to enjoin actions that would violate the ESA.²²⁵ The Secretary and the alleged violator must be given written notice sixty days prior to the commencement of any action under the citizen's suit provision.²²⁶ The ESA

²¹⁹ Part III, Environmental Protection Agency, Endangered Species Protection Program: Notice of Proposed Program, 54 Fed. Reg. 27,984 (1989).

²²⁰ *Id.*

²²¹ *See* notes 268 - 270 and accompanying text.

²²² 16 U.S.C.A. § 1535(a).

²²³ *Id.* § 1535(a)-(d).

²²⁴ *Id.* § 1540(a)-(d).

²²⁵ *Id.* § 1540(g).

²²⁶ *Id.* § 1540(g)(2)(A)(i).

also mandates that the Secretary of the Interior or the Secretary of Commerce enforce the Act to prevent the taking of threatened or endangered species.²²⁷ There are, however, exceptions from the prohibitions of the ESA that are allowed at the discretion of the Secretary.²²⁸

B. Endangered Species Protection Program

The EPA is charged with implementing and enforcing the ESA. The EPA has created a program which attempts to minimize the adverse effects of pesticides on threatened and endangered species.

1. Purpose

Section 7 of the ESA requires all federal agencies to insure that actions authorized, funded or carried out by such agency will not be "likely to jeopardize the continued existence" of a listed species or to result in the destruction or adverse modification of the critical habitat of a listed species.²²⁹ This mandate applies to the registration of pesticides by the EPA. Therefore, EPA must ensure, as part of the registration process, that pesticides do not adversely affect threatened or endangered species. In an effort to comply with the Endangered Species Act, the EPA has implemented a program called the Endangered Species Protection Program (ESPP).²³⁰ The ESPP is a pesticide labeling program enacted to protect threatened and endangered species from pesticides, while allowing for the continuation of agricultural food and fiber commodity production.²³¹

²²⁷ *Id.* § 1540(e)(1).

²²⁸ *Id.* § 1539(a)-(j). Exceptions at the Secretary's discretion include: undue economic hardship (one year only), Alaska natives if for subsistence purposes, pre-Act endangered species parts, antique articles greater than 100 years of age composed in whole or in part from endangered species, and experimental populations.

²²⁹ 16 U.S.C.A. § 1536(a)(2).

²³⁰ Part III, Environmental Protection Agency, Endangered Species Protection Program: Notice of Proposed Program, 54 Fed. Reg. 27,984 (1989).

²³¹ *Id.* at 27,984.

2. History

The ESPP started in 1982 as a case-by-case approach with the EPA conducting consultations in response to requests for registration of individual pesticides.²³² This approach was slow, often did not consider older and more toxic pesticides, and fostered market inequity among registrants of different pesticides for the same uses. The case-by-case approach resulted in the inadequate protection of listed species.²³³

In order to rectify the situation, the EPA in cooperation with the U.S. Fish and Wildlife Service (USFWS), developed the "cluster" approach to conducting consultations. All pesticides registered for the same use pattern were to be addressed at the same time. Each pesticide in a cluster was evaluated independently for its toxicity and expected exposure to threatened and endangered species. The individual evaluations were grouped together and referred to the USFWS for consultation as a cluster. This approach accelerated the review of a larger number of pesticides that could affect threatened and endangered species, treated new and old pesticides alike, and eliminated market inequities by reviewing pesticides with similar uses as a single group.²³⁴

The cluster approach, however, had several problems associated with it. First, the EPA encountered difficulties in obtaining accurate maps and map information for its county-specific Pesticide Use Bulletins. These bulletins were to contain habitat maps and descriptions of pesticide use limitations within the habitat of threatened and endangered species, and were to supplement pesticide product labeling. Second, the EPA received numerous suggestions from other federal agencies, states, and users regarding the overall cluster approach that might be incorporated into the plan, or perhaps into a new plan. Third, lack of public participation in the formation of the program caused great criticism. These factors prompted the EPA to conclude that more time was necessary to develop the ESPP.²³⁵

²³² *Id.* at 27,985.

²³³ *Id.*

²³⁴ *Id.*

²³⁵ *Id.*

3. The Current ESPP

The EPA began implementing the current version of the ESPP in January of 1991.²³⁶ The new ESPP was created to fulfill two objectives: 1) to provide the best protection for endangered species by developing a species-based approach to biological consultation, focusing on the endangered species themselves rather than on clusters of pesticide use sites, and 2) to be responsive to the needs of agricultural production in this country by developing a program that can be readily implemented without an unnecessary burden on pesticide users.²³⁷

EPA is beginning the new the new species-based program by determining which listed species are in the most need of protection. Endangered species are being ranked according to their status, vulnerability to pesticides, and other pertinent factors.²³⁸ The EPA, with the assistance of the USFWS, will identify: the counties in which each of the ranked species are located; the agricultural crops and other pesticide use sites that are in the county; and the pesticides registered for use on those sites. For each pesticide that is identified, the EPA will evaluate all possible uses to determine those that "may affect" listed species.²³⁹ The EPA will determine the threshold (lowest) application rate on the pesticide label that "may affect" endangered species. This rate will then be used to evaluate all uses of a particular pesticide. EPA will then request a consultation from the USFWS for those pesticide uses that result in "may affect" determinations.²⁴⁰ Consultation with the USFWS is limited to specific application rates

²³⁶ *Id.* at 27,991.

²³⁷ *Id.* at 27,988. The program attempts to ease implementation burdens by creating refined maps, by developing threshold application rates, and by considering different exposures resulting from various application methods when determining whether a pesticide "may affect" endangered species.

²³⁸ *Id.* at 27,988.

²³⁹ In evaluating "may affect" determinations, the EPA will take into account, to the extent the information is available: validated toxicity data; newer, more precise mathematical systems models; and information on exposure and other aspects of exposure such as application methods, timing, and species biology. Often, pesticide threats to endangered species are from acute toxicity from direct exposure. However, "may affect" determinations may be made on the basis of secondary toxicity; cumulative, reproductive, or chronic effects; or effects on habitat or food supply. *Id.* at 27,989.

²⁴⁰ *Id.* at 27,988.

that "may affect" endangered species. Application rates which fall below the threshold application rate will not be part of the consultation request.²⁴¹ This procedure allows the USFWS to include all species that may be affected by pesticides that are referred to them.

Subsequent consultations will focus on the next group in the species ranking and their associated pesticides until all species and pesticides have been reviewed. When all species and pesticides have been reviewed, additional consultation will occur on a case-by-case basis depending on the receipt of new information, registration applications, or listing of new species.²⁴²

4. Public Comment

The EPA will provide notice to the public thirty (30) days prior to initiating consultation with the USFWS. The notice will identify the pesticides, use sites, species evaluated, and will summarize the "may affect" determinations. Submission of information or scientific data early in the process by concerned citizens, users, states, and other federal agencies, will help the EPA in making its "may affect" determinations. The EPA will also review its preliminary "may affect" determination if a pesticide registrant applies for an amendment to the registration that is based on reducing or nullifying the effects of a pesticide on endangered species.²⁴³ This provision encourages identification of additional reasonable and prudent actions that will protect endangered species while minimizing the limitations on pesticide use.²⁴⁴

5. Consultation

After the thirty day period, consultation with the USFWS begins. At this time the EPA, the USFWS, and the U.S. Department of Agriculture (USDA) exchange information on exposure, work to identify relationships between species and pesticide use sites, and attempt to identify modifications of use which could be used as reasonable and prudent actions to protect

²⁴¹ *Id.*

²⁴² *Id.*

²⁴³ For example, a registrant might show elimination of high exposure use patterns or modification of application rates that reduce exposure to endangered species.

²⁴⁴ Part III, Environmental Protection Agency, Endangered Species Protection Program; Notice of Proposed Program, 54 Fed. Reg. 27,989 (1989).

listed species.²⁴⁵ The final result will be a Biological Opinion (BO) developed by the USFWS. The BO will contain currently occupied habitat maps and habitat descriptions. This information will be available to the public for comment prior to adoption of regulations. The EPA will then address new problems, implement viable actions, or reinitiate consultation with the USFWS if necessary.²⁴⁶ It is important to note that not all pesticides that EPA refers to the USFWS via a "may affect" determination will necessarily be found by the USFWS to cause jeopardy to a species or result in reasonable and prudent measures to reduce incidental take. The jeopardy opinion can be based on an assessment of whether a species will actually be exposed to the pesticide in question.²⁴⁷

6. Implementation

EPA will institute the new species-based program in several phases: 1) the "catch-up" phase during which the EPA will reinitiate consultation to update existing BO's, including those generated from the cluster approach consultations, to incorporate newly listed species, all uses, and additional information now available on the pesticides involved; 2) the "additional consultations" phase during which EPA will use the new species-based approach to evaluate all remaining registered pesticides; and 3) the "maintenance" phase during which the EPA will maintain ongoing compliance with the ESA by evaluating registration actions for new pesticide uses and referring those that exceed the "may affect" criteria to the USFWS.²⁴⁸

The EPA will implement the new species-based ESPP through pesticide labeling that will refer users to, and require compliance with, county-specific bulletins rather than listing all affected counties on the label. Because the label statement is generic and counties will not be listed, registrants will not need to change their product labels whenever use limitations are extended to new counties or rescinded in currently listed counties. Label changes will be necessary only if the reasonable and prudent actions specified in a BO are rescinded for all uses

²⁴⁵ *Id.*

²⁴⁶ *Id.*

²⁴⁷ *Id.*

²⁴⁸ *Id.* at 27,989-90.

of a product.²⁴⁹ The EPA will also refine habitat maps and identify reasonable and prudent actions to mitigate jeopardy and anticipated incidental take. When modifications in pesticide use are necessary to protect a threatened or endangered species, the product registrant will be instructed that in order to remain in compliance with FIFRA, the product label must be modified to inform the user that the product can only be used in compliance with a county bulletin.²⁵⁰

The county bulletins will contain a county map showing the geographic area associated with each threatened or endangered species and general information pertaining to the protection of listed species. In addition, the county map will identify the pesticides that may harm these species and describe the use limitations necessary to protect them. If a county has no use limitations the bulletin will state that use of the pesticide according to label directions is appropriate. All bulletins will contain an address to which a pesticide user or other interested party may direct comments.²⁵¹ Bulletins will be updated no more than once a year.²⁵² Technically valid information received by the EPA may be used to reinitiate consultation with the USFWS.²⁵³

7. State Plans

States affected by the ESPP may develop a state-initiated plan for protecting threatened and endangered species from pesticides.²⁵⁴ State plans are submitted to the EPA for review and approval,²⁵⁵ subject to consultation with the USFWS to determine if the provisions of the plan constitute reasonable and prudent actions to protect endangered species. If approved, EPA will

²⁴⁹ *Id.* at 27,991.

²⁵⁰ *Id.* at 27,990.

²⁵¹ Persons may make suggestions for improving the information contained in the bulletins, pertinent technical information, and suggestions for less stringent but equally protective reasonable and prudent alternatives to the use limitations.

²⁵² Part III, Environmental Protection Agency, Endangered Species Protection Program: Notice of Proposed Program, 54 Fed. Reg. 27,991 (1989).

²⁵³ *Id.* at 27,990.

²⁵⁴ *Id.* at 27,991.

²⁵⁵ States may submit plans to EPA at any time. *Id.*

adopt the state plan and issue bulletins that require users to comply with the restrictions of the plan.²⁵⁶ All federal programs are in effect until a state plan is approved.

The only complete exemption to the requirements of the ESPP is the indoor use of pesticide products.²⁵⁷ Public health emergencies may also constitute an exemption, but only during the period of the emergency.²⁵⁸

8. Enforcement

Enforcement of the pesticide use limitations imposed by the ESPP will be carried out under the misbranding²⁵⁹ and misuse²⁶⁰ provisions of FIFRA. Products found to be misbranded may be subject to cancellation.²⁶¹ Also, the USFWS may take enforcement action under the ESA if a person harms an endangered species through pesticide use or any other means,²⁶² unless the USFWS has provided for an incidental take.²⁶³ States with primary enforcement responsibility under FIFRA will enforce the ESPP through existing cooperative enforcement agreements with EPA. Otherwise, enforcement will remain with EPA.

²⁵⁶ *Id.* at 27,991.

²⁵⁷ *Id.*

²⁵⁸ Under section 18 of FIFRA (40 C.F.R. Part 166), a state or federal public health agency may request that the EPA grant an emergency exemption for a public health emergency or utilize the crisis provision (40 C.F.R. 166.50), if a state or federal agency can demonstrate that: 1) an emergency, non-routine condition exists that requires the use of a pesticide; 2) effective registered pesticides or alternative practices are not available or economically or environmentally feasible; and 3) the situation will present significant risks to human health.

²⁵⁹ 7 U.S.C. § 136j(a)(1)(E). Products which do not carry the required label language to protect threatened and endangered species are misbranded.

²⁶⁰ 7 U.S.C. § 136j(a)(2)(G).

²⁶¹ Part III, Environmental Protection Agency, Endangered Species Protection Program: Notice of Proposed Program, 54 Fed. Reg. 27,992 (1989).

²⁶² *Id.* See also, 16 U.S.C.A. § 1540(e)(1), authorizing the use of other federal agencies for enforcement of the ESA.

²⁶³ Under Section 10 of the ESA the secretary may issue permits allowing incidental takings of endangered and threatened species, provided that the applicant submits an acceptable conservation plan. 16 U.S.C.A. § 1539 (1989).

9. Critique of the Endangered Species Protection Program

The ESPP under the "cluster" approach has been criticized for a number of reasons, several of which may also hinder the effectiveness of the new species-based approach.²⁶⁴ First, it is difficult to get adequate data regarding certain pesticides because of product marketing and trade secret considerations. Second, it is difficult to obtain adequate data demonstrating that the application of a particular pesticide to an endangered species or its habitat actually causes harm. Third, there is a serious lack of sophisticated data on pesticide application, specifically, "how much goes where." At this time, it would appear that any attempt to apply such information to an assessment is purely speculative. These factors make it difficult, if not impossible, to quantify the effects of a pesticide on threatened and endangered species when the data used to assess the situation is either non-existent, difficult to obtain, or is purely speculative. One solution would be to fund more research in these areas, thus supplying information to make future assessments more accurate.

It is only fair to point out that the EPA, in switching from a case-by-case method of analysis to the cluster approach, has significantly increased the efficiency of its review process. The cluster approach allowed a greater number of pesticides to be reviewed at a much faster rate than before. The new species-based approach falls prey to the same criticisms as noted above, but it is far better that pesticides are being assessed in this manner than to curtail all analysis because of poor data.

C. Opportunities for Judicial Review

There have been a number of decisions favoring the application of the ESA to block the actions of persons, businesses, and federal agencies that were detrimental to listed, threatened or endangered species.²⁶⁵ To date, no cases have dealt specifically with mosquito pesticides.

²⁶⁴ See Part III, Environmental Protection Agency, Endangered Species Protection Program: Notice of Proposed Program, 54 Fed. Reg. 27,984, 27,985 (1989).

²⁶⁵ See, *Wildlife Federation v. Coleman*, 400 F.Supp. 705 (D.Miss. 1975) holding that where the Federal Highway Administration had been found to have breached its duties under § 7 of the ESA by authorizing and funding construction of a highway through the critical habitat of an endangered species of bird, the state agency doing the construction was subject to an injunction brought against the federal agency until it brought the highway project into compliance with § 7; *People v. K. Sakai Co.*, 56 Cal. App. 3d 531 (1976) where the court stated that the

(continued...)

However, in Defenders of Wildlife v. Administrator, Environmental Protection Agency,²⁶⁵ the ESA was used to enjoin the EPA's registration of a pesticide that was adversely affecting a listed, threatened or endangered species.

In Defenders, environmental organizations brought suit against the EPA, challenging the continued registration of strychnine pesticides and rodenticides for above-ground use. The court held that the environmental organizations could maintain a suit under the citizen suit provision of the ESA, even if an incidental result of a successful suit would be a cancellation of a pesticide registration, because the ESA citizen suit provision expressly provides a private right of action.²⁶⁷ The court also held that continued registration of the strychnine pesticides resulted in a prohibited "taking" because endangered species (black-footed ferret) had directly or indirectly ingested strychnine bait and had died as a result.²⁶⁸ The Defenders of Wildlife had submitted to the EPA information that they had compiled on poisonings of threatened and endangered species, the so called "Kill Book."²⁶⁹ This type of proof, it appears, helped persuade the court that the continued registration of strychnine pesticides was effecting a "taking" of listed, threatened or endangered species. If the EPA had obtained an incidental taking statement from the USFWS prior to the taking of endangered species, then the strychnine registration would not have constituted a taking.²⁷⁰ Finally, the court held that the environmental organizations could

²⁶⁵ (...continued)

ESA is a constitutional exercise of the police power since protection of endangered species of wildlife is a matter of general concern and in the interest of the public.

²⁶⁶ 882 F.2d 1294 (8th Cir. 1989), aff'g, 700 F. Supp. 1028 (D. Minn. 1988), 688 F. Supp. 1134 (D. Minn. 1988).

²⁶⁷ 882 F.2d 1294, 1298 (8th Cir. 1989); See 16 U.S.C.A. § 1540 (g)(1) (1990).

²⁶⁸ 882 F.2d 1294, 1301 (8th Cir. 1989).

²⁶⁹ *Id.* at 1298.

²⁷⁰ *Id.* See 16 U.S.C. § 1536(b)(4),(o)(2); 50 C.F.R. § 402.14(g)(7), 14(i) (1987). EPA may issue incidental take permits to federal agencies if, after consultation, the EPA determines that the agency action "is not likely to jeopardize the continued existence of any endangered or threatened species or result in the destruction or adverse modification of [critical] habitat of such species." 16 U.S.C. § 1536(a)(2),(b)(4). Applicants for incidental take permits must propose a conservation plan which minimizes and mitigates the impacts of takings. *Id.* § 1536(b)(4).

not maintain their claims under the Bald and Golden Eagle Protection Act (BGEPA) and the Migratory Bird Treaty Act (MBTA), because neither the BGEPA nor the MBTA provides a private right of action.²⁷¹ Although Section 704 of the APA provides for review of "final agency action for which there is no other adequate remedy in a court . . .,"²⁷² the court held that use of this provision was precluded because FIFRA provides for judicial review.²⁷³

D. Conclusions

The ESA prohibits activities which result in "takings" of endangered or threatened species. The term "takings" includes most activities which result in harm to endangered or threatened species. It is important to note that a taking may occur in the absence of direct physical injury. A taking occurs when a challenged action has "some prohibited impact on an endangered species."²⁷⁴ For example, a prohibited impact can take the form of allowing an endangered species' critical habitat to be adversely affected when no direct physical damage is being done to the species.²⁷⁵ Acts which result in significant habitat modification or degradation which "actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering" are defined as takings.²⁷⁶ These examples illustrate that taking includes actions that directly or indirectly result in injury or death.

Spraying of mosquito control pesticides which results in direct or indirect harm to endangered or threatened species would probably be a violation of the taking prohibition contained in the ESA. Mosquito control applications which caused direct mortality of endangered

²⁷¹ 882 F.2d 1294, 1298 (8th Cir. 1989).

²⁷² 5 U.S.C. § 704 (1982).

²⁷³ 882 F.2d 1294, 1302, 1303 (8th Cir. 1989).

²⁷⁴ *Palila v. Hawaii Dep't. of Land and Natural Resources*, 639 F.2d 495, 497 (9th Cir. 1981). In this case, the state's maintenance of sheep and goats in critical habitat of an endangered species, causing destructive impact on the species, was found to be a taking under the ESA.

²⁷⁵ *Sierra Club v. Lyng*, 694 F.Supp. 1260, 1268-72 (E.D.Tex. 1988). In this case, the United States Forest Service's tree-cutting practices harmed the habitat of an endangered species thus constituting a taking under the ESA.

²⁷⁶ 50 C.F.R. § 17.3 (July 1, 1991).

or threatened species would definitely be a violation of the Act. Likewise, pesticides which caused long term adverse effects, such as sub-lethal poisoning or depletion of the affected species' food supply, would also probably be a violation of the Act.

One difficulty in establishing that a taking has occurred or will occur comes in proving that a particular pesticide is causing or will cause harm to the endangered species. The likelihood of success of a suit alleging a taking can be greatly enhanced through the presentation of scientific documentation of actual or potential direct or indirect harm to the endangered or threatened species. However, collection of scientific evidence can be both costly and time consuming. In addition, the taking must be presently occurring or be likely to occur in the foreseeable future. Allegations of past violations are unlikely to be persuasive.

Parties engaged in the spraying of mosquito control pesticides can insulate themselves from potential liability under the ESA by obtaining an incidental take permit. EPA may issue incidental take permits if the applicant proposes a conservation plan which minimizes and mitigates the impacts of the takings. Conservation plans have the dual benefit of protecting applicants from liability while providing enhanced protection for endangered species.

The ESPP establishes an elaborate system designed to minimize or eliminate the effects of pesticides on endangered and threatened species. The ESPP has just begun to be implemented and it is too early to draw any conclusions as to its effectiveness. However, the program, if implemented properly, should provide significant additional protection for endangered and threatened species. At a minimum, the program requires agencies to consider and evaluate the effects of various pesticides on endangered and threatened species. A potential pitfall of the program is that, like FIFRA, the ESPP relies heavily on applicator compliance with the new restrictions.

FLORIDA REGULATORY FRAMEWORK

I. Overview

Regulation of mosquito control activities in Florida involves several agencies. The Florida Department of Health and Rehabilitative Services (HRS) is the lead agency charged with regulating mosquito control activities. The Department of Agriculture and Consumer Services (DACS) is responsible for registering pesticides for mosquito control use in Florida. The U.S. Environmental Protection Agency is responsible for ensuring that federal pesticide law is enforced. The Florida Department of Natural Resources and the Florida Department of Environmental Regulation have some authority with respect to mosquito control activities on certain lands and waters of the state.

The DACS regulates the registration, distribution, and application of pesticides within Florida pursuant to Chapter 487, Florida Statutes. Like FIFRA, Chapter 487 focuses primarily on the registration and distribution of pesticides, and relies on label restrictions to regulate the use of pesticides. Chapter 487 requires registrants to submit information about a pesticide, including an ingredient statement, a complete copy of the labeling for the pesticide, a statement of claims including directions for use, and a guaranteed analysis of the active ingredients contained in the pesticide.²⁷⁷ The DACS must also adopt rules governing the review of data submitted by a registrant, and may require the registrant to submit the complete formula, evidence of the efficacy and the safety of the pesticide, and any other relevant data.²⁷⁸

DACS rules governing pesticide registration requirements are contained in Rule 5E-2.031, Florida Administrative Code. Generally, DACS requires that all information submitted to EPA in support of federal registration must be submitted to DACS in the form of data summaries.²⁷⁹ If DACS determines that the data summaries are inadequate to allow adequate public health and environmental assessments, then DACS may require the applicant to submit or generate additional data.²⁸⁰ In its review of applications for registration, DACS must consider product

²⁷⁷ FLA. STAT. § 487.041(1)(c) (1989).

²⁷⁸ *Id.* § 487.041(3).

²⁷⁹ FLA. ADMIN. CODE Rule 5E-2.031(2)(a) (August 2, 1989).

²⁸⁰ *Id.* Rule 5E-2.031(2)(b).

chemistry data, toxicological data, environmental fate data, residue chemistry data, and worker/applicator data.²⁸¹ DACS must also consider data from other authoritative sources.²⁸²

Chapter 487 provides DACS with authority to fully approve a registration, conditionally register a product subject to additional data, or to deny the registration.²⁸³ A pesticide use may be restricted or limited through labeling or by creation of rules which regulate the use of a product.²⁸⁴ As in federal pesticide registrations under FIFRA, registrants are under a continual duty to report any new information which indicates that a pesticide has or may cause any unreasonable adverse effect on public health or the environment.²⁸⁵ DACS may also consider new information made available by persons other than the registrant.²⁸⁶

Chapter 487 expressly exempts persons licensed or certified under Chapter 388 (mosquito control) from the licensing and certification requirements of Chapter 487.²⁸⁷ The U.S. Environmental Protection Agency has delegated primary enforcement authority to DACS for pesticide misuse violations under FIFRA. Under the delegation agreement, the Florida Department of Health and Rehabilitative Services is responsible for regulation of mosquito control programs and participates in a cooperative agreement with the EPA.²⁸⁸ Accordingly, the use of mosquito control pesticides is regulated primarily by HRS under the authority of FIFRA and Chapter 388, Florida Statutes.

²⁸¹ *Id.* Rule 5E-2.031(3).

²⁸² *Id.* Rule 5E-2.031(4).

²⁸³ *Id.* Rule 5E-2.031(6).

²⁸⁴ *Id.* Rule 5E-2.031(7). Specific rules which apply to the use of mosquito control pesticides are contained in Rule 10D-54, Florida Administrative Code. Rule 10D-54 is discussed later in this report and is contained in full in Appendix E.

²⁸⁵ *Id.* Rule 5E-2.031(8).

²⁸⁶ *Id.* Rule 5E-2.031(9).

²⁸⁷ FLA. STAT. § 487.081(4) (1989).

²⁸⁸ EPA/DHRS Consolidated Cooperative Agreement, FY-91, obtained from the Florida Department of Health and Rehabilitative Services, Entomology Services.

Mosquito control programs in Florida may choose whether to participate in a state funded assistance program. The assistance program, which is implemented by the HRS, provides technical and monetary support for participating mosquito control programs, in exchange for increased state control over the operations of participating programs. The assistance program is established by Chapter 388, Florida Statutes, and is implemented by HRS through Chapter 10D-54, Florida Administrative Code. Non-participating mosquito control programs must also comply with some of the requirements in Chapters 388 and 10D-54, although the statute and rule are not entirely clear regarding which requirements apply only to participating programs and which requirements also apply to non-participating programs.

Most mosquito control districts and large programs are participating operations. Mosquito control "districts" are distinguished from other mosquito control programs by their authority to levy taxes on property owners within such districts.²⁸⁹ There are currently about 50 participating programs in Florida. Non-participating programs are usually small local government or private operations. There are currently hundreds of non-participating programs in Florida. All mosquito control operations must abide by federal pesticide regulations and many HRS rules. Mosquito control programs which participate in the HRS mosquito control program must submit monthly reports documenting their mosquito control accomplishments and expenditures. Mosquito control programs which are not participating in the HRS program must abide by HRS rules and must maintain records, but they are not required to submit monthly reports to HRS.

The following discussions examine the requirements which Florida law places on participating and non-participating programs. Unfortunately, it is difficult to determine how well non-participating programs are abiding by the regulations because there are no regular reporting requirements. An individual examination of each non-participating program's records is beyond the scope of this research project. Accordingly, the analysis of compliance and enforcement does not include data on non-participating programs. This section begins with a general discussion of the statutory authority for creation, operation, and regulation of mosquito control districts and other programs in Florida, and then discusses specific regulatory provisions which relate to protection of non-target species.

²⁸⁹ FLA. STAT. § 388.221 (1989).

A. Statutory Authority, Charge, and Organization of Mosquito Control Programs

Chapter 388, Florida Statutes, provides statutory authority for regulation of mosquito control programs. Chapter 388 states it is the public policy of the state to control arthropods to a level that will protect human health and safety, protect the quality of life, promote economic development, and facilitate the enjoyment of nature.²⁹⁰ However, arthropod control must be conducted in a "manner consistent with protection of the environmental and ecological integrity of all lands and waters throughout the state."²⁹¹

The Florida Department of Health and Rehabilitative Services (HRS) is charged with administering Chapter 388 and adopting rules to regulate arthropod control.²⁹² While ultimate authority to regulate arthropod control activities is placed with HRS, local governments are authorized to create mosquito control districts²⁹³ and have the power to do whatever is necessary to carry out the intent and purposes of Chapter 388.²⁹⁴ Mosquito control districts may use any chemicals approved by HRS but "only in such quantities as may be necessary to control mosquito breeding and not be detrimental to fish life."²⁹⁵

Mosquito control districts may be composed of any city, town, or county, or any portion or combination of any city, town, or county, and possess the power to assess a special tax for the control of arthropods.²⁹⁶ Mosquito control districts may be governed by a district board of commissioners, composed of three to five nonpartisan elected persons,²⁹⁷ or, if no special board of commissioners has been formed, by the board of county commissioners of the appropriate

²⁹⁰ FLA. STAT. § 388.0101 (1989).

²⁹¹ *Id.*

²⁹² *Id.* § 388.361.

²⁹³ *Id.* § 388.021.

²⁹⁴ *Id.* §§ 388.161, 388.181.

²⁹⁵ *Id.* § 388.161(1).

²⁹⁶ *Id.* §§ 388.021, 388.221.

²⁹⁷ *Id.* § 388.101.

county.²⁹⁸ Each member of the mosquito control district's board of commissioners is required to post a surety bond which is conditioned on the member's faithful performance of the duties under Chapter 388.²⁹⁹

If a board of county commissioners has assumed the authority to regulate arthropods, the board may delegate this authority to the appropriate county health department.³⁰⁰ Delegation to county health departments is conditioned upon the county health department keeping all records and submitting all reports required by Chapter 388, following county commission purchasing procedures, and submitting monthly reports of expenses to the county commissioners.³⁰¹

B. State Assistance to Mosquito Control Programs

Mosquito control programs, including districts and other programs, may receive state assistance if they participate in the HRS mosquito control program. Mosquito control programs may receive state equipment and supplies, and state matching funds on a dollar to dollar basis if they submit an arthropod control plan to HRS and HRS approves the plan.³⁰² Mosquito control programs with approved plans, known as "participating programs," must submit monthly reports to HRS detailing expenditures, activities, and accomplishments pertaining to arthropod control.³⁰³ Non-participating programs are not required to submit monthly reports, although they are subject to many other requirements of Chapter 388 and HRS regulations.

Participating programs, which receive state funds, must use state matching funds in a manner which is consistent with an HRS approved plan.³⁰⁴ State matching funds may be used for all types of control measures approved by HRS, including temporary control measures such

²⁹⁸ *Id.* § 388.241.

²⁹⁹ *Id.* § 388.131.

³⁰⁰ *Id.* § 388.251.

³⁰¹ *Id.*

³⁰² *Id.* § 388.261.

³⁰³ *Id.* § 388.341.

³⁰⁴ *Id.* § 388.281.

as spraying, or for permanent control measures such as structural habitat manipulation.³⁰⁵ HRS has the duty to "guide, review, approve, and coordinate the activities of all county governments and special districts receiving state funds for furtherance of the goal of integrated arthropod control."³⁰⁶ The term "integrated arthropod control" is defined as the "implementation of arthropod control measures, including, but not limited to, the use of pesticides and biological control agents and source reduction, to control arthropods without an unreasonable adverse effect on the environment."³⁰⁷ This definition indicates that mosquito control programs must consider and minimize adverse environmental consequences of their control activities.

The term "unreasonable adverse effects on the environment" is defined as "any unreasonable risk to man or the environment, with due consideration of the economic, social, and environmental costs and benefits of the use of any arthropod control measure."³⁰⁸ This definition suggests a cost-benefit analysis must be conducted which considers health, economic, social, and environmental costs of the mosquito control program. However, the definition fails to designate the relative weights to be given to the factors being considered and does not define the term "unreasonable."

HRS is directed to supervise source reduction measures and to advise programs on the best and most effective measures to obtain temporary control and to permanently eliminate breeding conditions.³⁰⁹ Source reduction measures include controls for sanitary landfills and

³⁰⁵ *Id.* Counties or districts may receive up to \$15,000 per year on a matching basis, and this money can be used for all control measures approved by the department. *Id.* §§ 388.261(1), 388.281(1). In addition, counties or districts may receive from the state up to 75 percent of the amount of local funds budgeted for control, and this money must be used for permanent control measures. *Id.* §§ 388.261(2), 388.281(2). However, if permanent control measures are not feasible, HRS may authorize the program to use the 75 percent matching funds for temporary control measures. *Id.* § 388.281(3).

³⁰⁶ *Id.* § 388.271(1).

³⁰⁷ *Id.* § 388.011(5).

³⁰⁸ *Id.* § 388.011(8).

³⁰⁹ *Id.* § 388.291.

drainage, diking, and filling of arthropod breeding areas.³¹⁰ HRS may discontinue state aid at its discretion if it determines the jointly agreed upon program for arthropod control is not being efficiently and effectively administered.³¹¹ In addition, if the arthropod problem in a particular county or district is reduced or eliminated, state funds will be reduced to the amount necessary to meet the actual need.³¹²

C. HRS Responsibilities Under Chapter 388, Florida Statutes

1. General

HRS must promulgate, adopt, administer, and enforce rules in accordance with Chapter 388.³¹³ Specifically, HRS must develop: 1) criteria by which an increase or other indicator of arthropod population levels is shown to constitute a public health or nuisance problem;³¹⁴ 2) criteria to govern aerial spraying of pesticides or other substances on private lands for control of arthropods, which "minimize the deposition onto and the potential for substantial adverse effects to environmentally sensitive and biologically highly productive public lands caused by such airborne substances;"³¹⁵ 3) requirements that all pesticides be used in accordance with the registered label or otherwise be accepted by the United States Environmental Protection Agency or the Department of Agriculture and Consumer Services;³¹⁶ 4) criteria which protect the health, safety, and welfare of arthropod employees, the general public, and the natural resources

³¹⁰ *Id.* § 388.281(2).

³¹¹ *Id.*

³¹² *Id.* § 388.281(4).

³¹³ *Id.* § 388.361.

³¹⁴ *Id.* § 388.361(2)(a).

³¹⁵ *Id.* § 388.361(2)(b). When promulgating these rules, HRS must also consider the recommendations of the Florida Coordinating Council on Mosquito Control. *Id.* § 388.361(2)(b). The Council has a variety of responsibilities including research, developing guidelines to assist in resolving disputes arising from control of arthropods on public lands, and preparing reports on arthropod control activities in the state.

³¹⁶ *Id.* § 388.361(2)(c).

of the state;³¹⁷ and 5) criteria to license applicators and "require record keeping and reporting of applicator activities in furtherance of the goal of integrated arthropod control."³¹⁸

2. Licensing

HRS rules require that applicators of mosquito control pesticides must be properly licensed or be working under the supervision of a licensed applicator. However, applicators applying mosquito control pesticides on personally owned land or agricultural land are exempted from the licensing requirement. To become properly licensed, an arthropod control pesticide applicator must submit an application to HRS and pass an examination which demonstrates the applicant possesses a "practical knowledge of the principles and practices of arthropod control and the safe use of pesticides and ... practical knowledge of vector-disease transmission as it relates to and influences application programs."³¹⁹ In addition, applicators must keep accurate records so that HRS can assess, on a monthly basis, activities such as pesticide application, source reduction, water management, biological control, and surveillance.³²⁰

3. Inspections and Enforcement

HRS has authority to inspect the premises of any licensee, to inspect lands upon which a licensee has applied or has been reported to apply arthropod control pesticides, to inspect storage and disposal areas, to inspect or investigate any complaints against licensees for injury to humans or lands, and to sample pesticides which the licensee is currently applying or is planning to apply in the future.³²¹ HRS conducts routine inspections and attempts to inspect all mosquito control programs in the state once a year. HRS also inspects mosquito control programs in response to complaints about specific programs. In addition, HRS has the authority to enter into cooperative agreements with any other state or federal agency in order to carry out and enforce the provisions

³¹⁷ *Id.* § 388.361(2)(d).

³¹⁸ *Id.* § 388.361(4). *See supra* text accompanying note 307 (defining the term "integrated arthropod control").

³¹⁹ FLA. ADMIN. CODE Rule 10D-54.040 (Feb., 1987).

³²⁰ *Id.* Rule 10D-54.040(8).

³²¹ FLA. STAT. § 388.361(5) (1989).

of Chapter 388.³²² HRS has entered into a cooperative enforcement agreement with the U.S. Environmental Protection Agency.³²³

D. HRS Declaration of a Threat to Public Health

Chapter 388 authorizes the secretary of HRS to declare a threat to public health if "the department discovers in the human or surrogate population the occurrence of an infectious disease that may be transmitted from arthropods to humans."³²⁴ A declaration of a public health threat must include the geographical boundaries and duration of the threat.³²⁵ Once the secretary has declared a public health threat, the secretary "shall order such preventive treatment and ameliorative arthropod control measures as may be necessary to prevent spread of disease, notwithstanding contrary provisions of this chapter or the rules promulgated hereunder."³²⁶ The HRS must notify the departments of Agriculture and Consumer Services, Natural Resources, and Environmental Regulation within 24 hours of the declaration.

Public health threat provisions in Chapter 388 allow HRS to conduct whatever treatment is necessary to prevent the spread of disease, regardless of other provisions in Chapter 388 or HRS rules. Accordingly, provisions in the statute and rules protecting non-target species can be ignored in times of a declared public health threat. However, mosquito control programs must abide by the provisions contained in the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), unless the state obtains an emergency exemption from the administrator of the U.S. Environmental Protection Agency.³²⁷ Similarly, mosquito control programs must abide by the

³²² *Id.* § 388.361(6).

³²³ EPA/DHRS Consolidated Cooperative Agreement, FY-91, obtained from the Florida Department of Health and Rehabilitative Services, Entomology Services. *See infra* note 361, and accompanying text.

³²⁴ FLA. STAT. § 388.45 (1989). "Surrogate population" means a population of non-human species, such as chicken flocks, that is monitored for certain infectious diseases

³²⁵ *Id.*

³²⁶ *Id.*

³²⁷ 7 U.S.C. § 136p (1989).

requirements of the Endangered Species Act, which prohibits takings of endangered or threatened species.³²⁸

II. Florida's Mosquito Control Regulations and Estuarine Non-Target Species

A. FIFRA and the Endangered Species Act

Generally, mosquito control operations must abide by applicable federal regulations, regardless of conflicting state regulations. Applicable federal regulations include pesticide labeling and use requirements imposed by FIFRA,³²⁹ and requirements of the Endangered Species Act.

B. Surveillance of Mosquito Populations

HRS rules direct mosquito control programs to apply pesticides only when the program has determined, through the use of designated criteria, that there is: 1) a specific need because of a potential for a mosquito-borne disease outbreak, 2) an increase in numbers of disease vector mosquitoes, or 3) a quantifiable increase in the numbers of pestiferous mosquitoes.³³⁰ Specific criteria to determine whether there has been an adequate increase in mosquito or other arthropod population to warrant the application of adulticides are listed in Table 2.

³²⁸ The Endangered Species Act also provides for exceptions under certain circumstances. *See supra* note 228 and 16 U.S.C. § 1539.

³²⁹ Mosquito control programs must also comply with labeling and use requirements contained in Chapter 487, Florida Statutes. FLA. STAT. §§ 487.011-487.166 (1989). Chapter 487 regulates registration, distribution and application of pesticides within Florida. However, Chapter 487 does not regulate the licensing and certification of applicators engaged in operations under Chapter 388, Florida Statutes. *Id.* § 487.155(1).

³³⁰ FLA. ADMIN. CODE Rule 10D-54.036 (Feb., 1987).

Table 2. Criteria to Determine Whether to Spray Adulticides.

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- (1) When a large population of adult mosquitoes is demonstrated by either a quantifiable increase in, or a sustained elevated, mosquito population level as detected by standard surveillance methods.
 - (2) Where adult mosquito populations build to levels exceeding 25 mosquitoes per trap night or 5 mosquitoes per trap hour during crepuscular (twilight) periods.
 - (3) When service requests for arthropod control from the public have been confirmed by one or more recognized surveillance methods.
 - (4) When counts as determined by normal surveillance methods in the daytime exceed 5 per minute for stable flies (dogflies) on beaches and bayshores.
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FLA. ADMIN. CODE Rule 10D-54.036(1)-(4) (Feb., 1987).

C. Aerial Applications

HRS rules provide that aerial applications for the control of mosquitoes on private lands, where there is a possibility that pesticides may be deposited on public lands which have been designated as environmentally sensitive and biologically highly productive, must be conducted in a manner to minimize the deposition onto such lands.³³¹ In addition, all aerial applications of adulticides must comply with the criteria summarized in Table 3.

³³¹ *Id.* Rule 10D-54.037(1). See *infra* notes 336-340 and accompanying text for an explanation of "environmentally sensitive and biologically highly productive" public lands.

Table 3. Aerial Applications of Adulticides.

- (1) Only in specific areas where surveillance indicates control is needed. Three-fold increase required along beaches or bayshores;
- (2) Must be labeled for aircraft application and used so they do not cause unreasonable adverse effects on the environment;
- (3) Must be timed to be most effective during mosquito activity periods (no later than two hours after sunrise or earlier than two hours before sunset);
- (4) Must be conducted with properly calibrated equipment;
- (5) Must be applied, taking into account wind speed and direction, so the pesticide is deposited on land (pesticide labels prohibit aerial application of adulticides directly over water);
- (6) Must maintain records for a minimum of three years (records must include the area treated, the application rate and the material used, the equipment and technique used, the name of the pilot in charge, and the date, time, temperature, and general wind speed and direction);
- (7) Must include pre-treatment and post-treatment surveillance records of mosquito presence; and
- (8) Must document apparent non-target effects.

FLA. ADMIN. CODE Rules 10D-54.036(5), 10D-54.037 (Feb., 1987).

HRS rules allow aerial applications on public lands identified as environmentally sensitive and biologically highly productive, of adulticides containing the active ingredients listed in Table 4. However, the use of these adulticides on environmentally sensitive and biologically highly productive public lands must first be authorized by a public lands control plan.³³²

³³² See *infra* text accompanying notes 335-344 for an explanation of public lands control plans.

Table 4. Mosquito Control Adulticides Which May Be Applied Aerially to Environmentally Sensitive and Biologically Highly Productive Public Lands.

Active Ingredient
chlorpyrifos
fenthion
malathion
naled
pyrethrins and piperonyl butoxide
resmethrin
propoxur
bendiocarb
resmethrin and piperonyl butoxide
phenothrin

FLA. ADMIN. CODE Rules 10D-54.037(2)(b), 10D-54.046(6)(b) (Feb., 1987).

D. Use Requirements and Natural Resources

HRS rules specifically provide that all uses of registered arthropod control pesticides must be conducted in a manner consistent with the pesticide's labeling.³³³ In addition, all methods of control on private lands, where natural resources are of major concern, must be conducted so as to "protect the environmental and ecological integrity of the lands and waters."³³⁴

E. Mosquito Control on Public Lands

In addition to regulating arthropod control activities on private lands, HRS regulates control activities on public lands where arthropods constitute a public health or nuisance problem.³³⁵ HRS rules require that all land management agencies identify environmentally sensitive and biologically highly productive public lands under their control.³³⁶ HRS rules require that land management agencies include, in their determinations of which land is environmentally sensitive and biologically productive, a statement of purpose for which the lands

³³³ FLA. ADMIN. CODE Rule 10D-54.038.

³³⁴ *Id.* Rule 10D-54.039(1).

³³⁵ FLA. STAT. § 388.4111(1) (1989).

³³⁶ *Id.* § 388.4111(2)(a).

are managed, a description of ecological data upon which the determination is based, and a specification of the potential ecological harm which should be avoided in planning an arthropod control program.³³⁷ Land identified as environmentally sensitive and biologically highly productive is subject to a public lands control plan which the local arthropod control agency must propose.³³⁸ The public lands control plan must use methods which "shall be the minimum necessary and economically feasible to abate a public health or nuisance problem and impose the least hazard to fish, wildlife, and other natural resources protected or managed in such areas."³³⁹ All other public lands are subject to the local arthropod control agency's general work plan.³⁴⁰

The proposed public lands control plan must specify: 1) the need for arthropod control on the identified lands, 2) periodic restrictions as applicable, such as during peak fish spawning times, 3) criteria to be used in determining application of pesticides, and 4) methods and rates of application for each pesticide.³⁴¹

Public lands control plans become effective upon mutual agreement of the land management agency and the local arthropod control agency.³⁴² Until a public lands control plan becomes effective, arthropod control activities may only take place at the consent of the

³³⁷ FLA. ADMIN. CODE Rule 10D-54.042(3) (Feb., 1987).

³³⁸ FLA. STAT. § 388.4111(2)(a),(b).

³³⁹ *Id.* § 388.4111(1).

³⁴⁰ *Id.* § 388.4111(2)(a).

³⁴¹ FLA. ADMIN. CODE Rule 10D-54.042(4)(b) (Feb. 1987).

³⁴² FLA. STAT. § 388.4111(2)(b) (1989). If the land management agency and the arthropod control agency are unable to agree, the Florida Coordinating Council on Mosquito Control may recommend a plan to the two agencies. *Id.* § 388.4111(2)(c) (1989). If the two agencies are still unable to agree, either agency may petition the Land and Water Adjudicatory Commission to consider the proposed public lands control plan. A hearing officer will then conduct a hearing and issue a recommended order. The Land and Water Adjudicatory Commission may adopt or modify the proposed control plan, which then becomes binding on the land management agency and the arthropod control agency. *Id.*

Board of Trustees of the Internal Improvement Trust Fund.³⁴³ If the adopted public lands control plan prohibits a local arthropod control agency from performing control activities on certain designated parcels of public land, then the agency is relieved of responsibility for arthropod control on those lands.³⁴⁴

F. Chapter 403 Alternative Permitting Process for Application of Pesticides to Waters

Chapter 403, Florida Statutes, establishes a mechanism which allows approved mosquito control programs to apply pesticides to waters without obtaining a specific water pollution operation permit from the Department of Environmental Regulation (DER).³⁴⁵ Chapter 403 directs DER to enter into interagency agreements for HRS approval of mosquito control program applications of pesticides to waters.³⁴⁶ The interagency agreements must provide for public health, safety, and welfare, including environmental factors. Approved programs must use chemicals approved by the Federal Environmental Protection Agency, and apply the chemicals in accordance with the registered label instructions, state standards for application, and the provisions of the Florida Pesticide Law, Chapter 487, Florida Statutes.³⁴⁷

HRS rules establish standards for participation in the alternative permitting process described in Section 403.088(1), Florida Statutes.³⁴⁸ A mosquito control program which wishes to exercise the alternative permitting process must complete a form provided by HRS which is then filed with DER.³⁴⁹ Upon approval by HRS, the mosquito control program may apply pesticides to waters without obtaining a specific water pollution permit.³⁵⁰

³⁴³ *Id.* § 388.4111(2)(e).

³⁴⁴ *Id.* § 388.4111(2)(d).

³⁴⁵ *Id.* § 403.088(1).

³⁴⁶ *Id.*

³⁴⁷ *Id.*

³⁴⁸ FLA. ADMIN. CODE Rule 10D-54.046(1) (Feb., 1987).

³⁴⁹ *Id.* Rule 10D-54.046(2).

³⁵⁰ *Id.* Rule 10D-54.046(3).

Pesticides which may be applied under this program include those which are labeled and registered under FIFRA or Chapter 487, Florida Statutes, and are composed of the active ingredients listed in Table 5.³⁵¹

Table 5. Section 403.088, Florida Statutes, Alternative Permitting Process for Application of Mosquito Control Pesticides to Waters.

Larvicides	Adulticides
distillate petroleum oils	chlorpyrifos
methoxychlor	fenthion
methoprene	malathion
chlorpyrifos	naled
fenthion	pyrethrins and piperonyl butoxide
malathion	resmethrin
temephos	propoxur
non-petroleum oils	bendiocarb
pyrethrins	resmethrin and piperonyl butoxide
allethrin	phenothrin
biological materials	

FLA. ADMIN. CODE Rule 10D-54.046(6)(b) (Feb., 1987).

HRS rules further provide that all pesticides must be applied in accordance with labeling instructions and good standards regarding safety and efficacy, and that records must be kept that meet the criteria specified in the rule.³⁵²

III. Enforcement

HRS has authority to enforce the provisions of Chapter 388, HRS rules, and certain provisions of FIFRA. HRS rules address the penalties for failure to comply with FIFRA and

³⁵¹ *Id.* Rule 10D-54.046(5),(6).

³⁵² *Id.* Rule 10D-54.046(7),(8). Records must address the following factors: types of pesticides, amount of pesticides used, pesticide application rates, and costs of applications. *Id.*

EPA rules.³⁵³ When the board of commissioners of a mosquito control district, or county, whichever is applicable, is notified that a mosquito control program director is violating state or federal laws or regulations, the board must take appropriate action to prevent future violations.³⁵⁴ If the board of commissioners of the district or county fails to take appropriate action when violations have been brought to their attention, or HRS determines that fines or sanctions should be imposed, then HRS has the duty to notify EPA of all evidence of violations, and EPA may take whatever action it feels is warranted.³⁵⁵

HRS may enforce Chapter 388 and its rules by any appropriate action in circuit court, including, but not limited to, an application for a temporary or permanent injunction to restrain any person from violating the chapter or its rules.³⁵⁶ HRS may deny, suspend, or revoke any license, certification, or state aid if a person 1) violates any rule of the department or Chapter 388, 2) violates the Federal Insecticide Fungicide and Rodenticide Act (FIFRA) or any relevant EPA rule, or 3) fails to supply HRS with true information.³⁵⁷ HRS enforcement authority is summarized in Table 6.

³⁵³ *Id.* Rule 10D-54.034.

³⁵⁴ *Id.* Rule 10D-54.034(1).

³⁵⁵ *Id.* Rule 10D-54.034(5).

³⁵⁶ FLA. STAT. § 388.3711(1) (1989).

³⁵⁷ *Id.* § 388.3711(2).

Table 6. HRS Enforcement Authority.

Enforcement by all proper and necessary actions, including:

- (1) Temporary or permanent injunction.
 - (2) Deny, suspend, revoke any license or certification.
 - (3) Probation for up to 2 years but allow program to continue.
 - (4) Administrative fines of \$25-\$500 per offense.
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FLA. STAT. § 388.3711 (1989).

HRS has discretion to place an offending party on probation if it determines a more severe action would be detrimental to the public or would be unreasonably harsh under the circumstances.³⁵⁸ HRS may impose administrative fines of up to \$500 per day for each separate violation and must consider the severity of the violation, actions taken by the licensee to correct the action, and any previous violations by the licensee when determining the amount of any penalty.³⁵⁹ In addition, HRS must publish a quarterly list of all disciplinary actions, and this list is available to the public.³⁶⁰

HRS is participating in a Cooperative Enforcement Agreement with the U.S. Environmental Protection Agency.³⁶¹ Under this agreement, HRS shares enforcement authority with EPA and receives federal assistance in exchange for agreeing to meet certain EPA enforcement goals. There is currently only one person, hired jointly by HRS and EPA, who inspects mosquito control programs in Florida. EPA conducts bi-annual written reviews of the Florida program.

³⁵⁸ *Id.* § 388.3711(3).

³⁵⁹ *Id.* § 388.3711(4).(5).

³⁶⁰ *Id.* § 388.3711(6).

³⁶¹ EPA/DHRS Consolidated Cooperative Agreement, FY-91, obtained from the Florida Department of Health and Rehabilitative Services, Entomology Services.

IV. Research and Support

Chapter 388 established the John A. Mulrennan, Sr., Arthropod Research Laboratory, which is charged with developing formulations and application techniques for pesticides and biological control agents for the control of arthropods.³⁶² The laboratory must make recommendations for safe and effective control of arthropods which create a health or nuisance problem, and must conduct environmental impact studies to determine the effects of pesticides, with a special emphasis on integrated arthropod control.³⁶³

The Florida Medical Entomology Laboratory (FMEL) also provides support for mosquito control programs in Florida.³⁶⁴ FMEL conducts basic and applied research in biology and control of mosquitos, and provides quarterly reports to the HRS to assist the agency in performing its duties under Chapter 388.

Chapter 388 also creates the Florida Coordinating Council on Mosquito Control (Council).³⁶⁵ The Council has a variety of responsibilities including research, developing guidelines to assist in resolving disputes arising from control of arthropods on public lands, and preparing reports on arthropod control activities in the state.

The U.S. Environmental Protection Agency (EPA) has a laboratory in Gulf Breeze, Fla. where research is conducted on the effects of pesticides on the environment, including aquatic resources. In addition, there are several private laboratories in Florida where researchers have studied the effects of mosquito control pesticides on the environment.³⁶⁶ Mosquito control

³⁶² FLA. STAT. § 388.42(1) (1989 & Supp. I 1990). The John A. Mulrennan, Sr., Arthropod Research Laboratory is located in Panama City, Fla.

³⁶³ *Id.* § 388.42(1).

³⁶⁴ FLA. STAT. § 388.43 (1989). The Florida Medical Entomology Laboratory is located in Vero Beach, Fla., and is part of the University of Florida's Institute of Food and Agricultural Sciences. *Id.*

³⁶⁵ *Id.* § 388.46 (1989).

³⁶⁶ Researchers at the Harbor Branch Oceanographic Institution, located in Fort Pierce, Fla., and the Mote Marine Laboratory, located in Sarasota, Fla., have conducted research concerning mosquito control pesticides and non-target species.

programs have also conducted research relating to mosquito control pesticides and non-target species.

V. Summary

Chapter 388, Florida Statutes, establishes a fairly comprehensive framework for regulation of mosquito control programs. Applicator certification requirements, surveillance requirements, and technical and monetary state support are strong points of the existing system. Since the passage of amendments to Chapter 388 in 1984, regulation of mosquito control programs has greatly improved. Of particular significance is the requirement that efforts be made at using integrated arthropod control. The concept of integrated control, commonly known as integrated pest management (IPM), was originally developed as a response to over-spraying by farmers attempting to control insects which destroyed their crops.³⁶⁷ Over-spraying of pesticides increases pesticide pollution, results in adverse effects to non-target species,³⁶⁸ and accelerates the buildup of resistance by target species. IPM also provides protection for organisms which are not the target of control and prevents excess pollution of the environment.³⁶⁹ Although it is clear that Chapter 388 embraces integrated arthropod control as a philosophy, the extent to which mosquito control programs actually practice comprehensive integrated control varies with the resources of each particular program.

Despite significant accomplishments and improvements in mosquito control programs and regulatory programs, a number of deficiencies relating to implementation and substance serve to undercut the effectiveness of Florida's mosquito control regulations. Problem areas include pesticide labels, spray drift, surveillance and reporting requirements, enforcement, pest control

³⁶⁷ E. ODUM, FUNDAMENTALS OF ECOLOGY 445-447 (1971). In the agricultural context, IPM has been defined as the use of multiple tactics in a compatible manner to maintain insect pest populations below levels which cause economic damage to the crop. G. Leibee, Report on Entomology, prepared for Open House and Research Update at the Agricultural Research and Education Center, Sanford, FL., Institute of Food and Agricultural Sciences, University of Florida (April 20, 1982).

³⁶⁸ E. ODUM, FUNDAMENTALS OF ECOLOGY 445-447 (1971).

³⁶⁹ G. Leibee, Report on Entomology, prepared for Open House and Research Update at the Agricultural Research and Education Center, Sanford, FL., Institute of Food and Agricultural Sciences, University of Florida (April 20, 1982).

philosophies, research, public education, and funding. The following section details specific problem areas that were identified through this research project and suggests solutions for these problems.

FINDINGS AND RECOMMENDATIONS

PESTICIDE LABELS

Mosquito control pesticides used in Florida are registered by the U.S. Environmental Protection Agency (EPA) and the Florida Department of Agriculture and Consumer Services (DACS) for mosquito control. Labels are developed for pesticides as part of the registration process and are intended to protect the environment from unreasonable adverse effects of pesticide use. Users of pesticides must abide by all label instructions and warnings. Both EPA and DACS have the authority and responsibility to require that pesticide labels include adequate environmental warnings and directions for use. EPA or DACS can require modification of existing labels or cancellation of uses when a pesticide label is found to be inadequate. In Florida, a number of problems exist with respect to some mosquito control pesticide labels.

Some of the labels for Florida mosquito control pesticides contain conflicting warnings and directions for use, particularly with respect to whether the products can be applied to waters. For example, the label for Cythion, a formulation of malathion manufactured by American Cyanamid Company, states "avoid direct applications to lakes, streams, ponds, tidal marshes and estuaries." However, the label instructions provide how to apply the pesticide aerially for adult control "over [populated areas] where ... pleasure boats are present." The label for the larvicide Abate, a formulation of temephos manufactured by American Cyanamid, states "[t]his product is toxic to fish. Fish and other aquatic organisms in water treated with this product may be killed." However, the label instructions provide rates for application of Abate to "standing water, shallow ponds, lakes, woodland pools, tidal waters, marshes, swamps and waters high in organic content, and highly polluted waters." These labels do not provide clear guidance for pesticide applicators. The Florida Department of Health and Rehabilitative Services (HRS) mosquito control section has requested that EPA issue a policy statement clarifying these labels. To date, EPA has not responded to the HRS request. Appendix C contains examples of mosquito control labels with conflicting language.

It is not clear what is meant by "waters." Federal water pollution laws define waters broadly to include marshes, swamps, and tidal pools. Some labels state that applications to waters are not allowed, but that applications to swamps, marshes, and estuaries are allowed. Other labels state only that application of the pesticide to "waters" is prohibited. Large areas of

wetlands, isolated tidal ponds, and marsh are sprayed regularly with pesticides which may be hazardous to estuarine organisms.

Some mosquito control pesticide labels state that the pesticide should not be applied where certain organisms, such as crabs, shrimp, and fish are "important resources." Examples include formulations of chlorpyrifos (Dursban) manufactured by Dow Chemical Company, Southern Mill Creek Products Company, and Cornbelt Chemical Company; formulations of malathion manufactured by American Cyanamid Company, Southern Mill Creek Products Company, and Clarke Outdoor Spraying Company; and Abate, a formulation of temephos manufactured by Southern Mill Creek Products Company. The label for the larvicide Pyrenone, which is a formulation of pyrethrins and piperonyl butoxide manufactured by Fairfield American Corporation, states "[t]his product is toxic to fish, shrimp, crabs and other aquatic organisms. Do not apply directly to lakes, streams, or ponds. May be used in mosquito breeding areas such as marshy areas, pools and ponds where fish, shrimp, crabs and other desirable aquatic animals will not be harmed." These labels are subjective and ripe for abuse. Although some of the labels direct the applicant to consult with the state game and fish department, others provide no additional direction. Appendix D contains examples of mosquito control pesticide labels which allow applicators to subjectively interpret environmental factors.

Florida mosquito control regulations include a list of pesticides which may be applied to waters of the state subject to approval by the HRS and the Department of Environmental Regulation. However, the labels of many of these pesticides prohibit applications to waters. Appendix E contains examples of label precautions for pesticides which qualify for application to waters under Rule 10D-54.046, F.A.C.

Recommendation #1

The DACS and the EPA should clarify inconsistent mosquito control pesticide labels. Specifically, the labels should be changed to remove ambiguity as to whether drift and indirect applications to water constitute violations.

Recommendation #2

The DACS and the EPA should clarify the meaning of "water" as it is used in labels.

Recommendation #3

The DACS and the EPA should clarify what is meant by "important resources" and should state who is responsible for making this determination.

Recommendation #4

Rule 10D-54.046, FLA. ADMIN. CODE (Feb. 1987) should be amended to remove pesticides whose labels prohibit application to waters.

PESTICIDE DRIFT

Most significant problems with mosquito control pesticides and non-target species result from aerial applications of mosquito adulticides. Pesticide effectiveness is enhanced if slow moving winds are present, thereby causing the pesticide to stay suspended in the air longer and to cover a greater area. Fast moving winds, or changes in wind direction, may cause pesticides to move out of the targeted area. Changes in wind direction and speed are particularly critical in areas adjacent to water. Shifting winds may cause pesticides released over water, which are intended to drift and be deposited on land, to be deposited into water. Similarly, shifting winds may cause pesticides released over land to be deposited in water. HRS personnel and enforcement records indicate that spray drift and spray releases into water continue to occur. Current EPA and HRS enforcement policies are unclear with respect to pesticides which drift and are deposited in water.

Recommendation #5

The EPA and HRS should clarify whether applications of pesticides to water, by drift or by direct application, constitute violations of mosquito control pesticide labels. EPA and HRS should respond to violations in a consistent and rigorous manner.

SURVEILLANCE

Chapter 388, F. S., requires that all mosquito control programs assess the apparent effects of aerial applications of mosquito control pesticides on non-target species. Mosquito control personnel and HRS officials indicate that many programs do not have the resources or expertise to regularly monitor effects of aerial applications of pesticides on non-target species. In addition, the term "apparent effects" is vague and subject to varied interpretations. Ultimately, it is doubtful that many mosquito control programs have the resources to effectively monitor non-target effects.

Mosquito control programs are also required to conduct surveillance prior to spraying mosquito control pesticides and may spray only if mosquito populations reach levels designated by HRS rules. Mosquito control programs must also assess mosquito populations after spray

events. It is unclear whether mosquito control programs routinely conduct surveillance to assess mosquito populations before and after spray events. In addition, there has been criticism of some of the surveillance techniques used by mosquito control programs. The current rule allows the use of "recognized surveillance methods." Certain techniques, such as monitoring of telephone complaints by citizens, may not consistently provide an accurate indication of mosquito population levels.

Recommendation #6

The HRS should amend its rule to define what is meant by "apparent effects" and should provide minimum standards for mosquito control programs to follow in monitoring and assessing effects to non-target species.

Recommendation #7

State laws relating to assessment of non-target species should be rigorously enforced.

Recommendation #8

State laws requiring pre- and post-spray surveillance of mosquito populations should be rigorously enforced.

Recommendation #9

HRS should develop minimum guidelines detailing which surveillance techniques are acceptable indicators of mosquito population levels. HRS should insure that accurate surveillance techniques are used.

Recommendation #10

Additional funding should be provided to train mosquito control personnel to thoroughly assess non-target effects and conduct adequate pre- and post-spray surveillance and environmental monitoring.

REPORTING REQUIREMENTS

Chapter 388, F. S., requires that all mosquito control programs participating in the HRS program submit monthly reports to HRS detailing expenditures and work accomplishments. Although participating mosquito control programs are regularly submitting reports to HRS, the reporting forms emphasize the amount of money spent and the total acres or miles treated and do not require any reporting of environmental monitoring or effects. Accordingly, HRS review of environmental monitoring by mosquito control programs is limited to occasional HRS inspections of the programs. Appendix H contains HRS monthly reporting forms.

There are a significant number of mosquito control operations which do not participate in the HRS program. Most of these operations consist of municipalities, condominium associations, or other private pest control operations. While these programs must abide by most HRS regulations, they are not required to submit monthly reports. Accordingly, the only state oversight of these programs occurs when HRS conducts an inspection of the program, either routinely or in response to a complaint.

Recommendation #11

HRS should require that participating mosquito control programs report environmental monitoring and surveillance.

Recommendation #12

HRS should require that all mosquito control programs submit reports to the regulatory agency, whether or not the program is participating in the HRS mosquito control program.

Recommendation #13

Chapter 388, F.S., should be amended to require non-participating mosquito control programs to submit monthly reports to HRS.

ENFORCEMENT

The enforcement authority of HRS is not being fully utilized. Prior to 1986, HRS oversight of mosquito control programs primarily involved monetary and technical support. In 1986, Chapter 388, F.S. was amended to provide HRS with explicit enforcement authority. HRS may apply for an injunction, revoke a license, place an offending party on probation, or impose administrative fines from \$25 to \$500 per day. Despite this additional grant of authority, HRS has been reluctant to assume the role of an aggressive enforcer. To date, the HRS mosquito control rule, Chapter 10D-54 FLA. ADMIN. CODE (Feb. 1987), has not been amended to reflect the 1986 authorization to impose administrative fines.

While HRS does conduct inspections and write warning letters, no other enforcement options have been utilized despite apparent violations of state and federal law. HRS currently has one inspector for the entire state of Florida. Many of the investigations concerning aerial applications of pesticides to waters have been brought to the attention of HRS by citizens and the Department of Natural Resources. Ultimately, the lack of enforcement actions by HRS stems from a combination of factors, including vague and ambiguous pesticide labels, insufficient

numbers of enforcement personnel, and inadequate adherence to rigorous enforcement. Figure 5 illustrates recent trends in enforcement by HRS.

Recommendation #14

Enforcement of mosquito control laws could be improved by placing the enforcement authority for Chapter 388, F. S., in a separate state agency. HRS should retain responsibility for support and oversight of mosquito control programs.

Recommendation #15

The agency responsible for enforcement should establish and practice a rigid enforcement policy.

Recommendation #16

More personnel should be provided for enforcement. More funding should be provided for all aspects of enforcement. Recommendation #25 discusses potential funding sources.

Recommendation #17

The penalties available under Chapter 388, F. S., should be upgraded so that they will act as a real deterrent to violations of state and federal pesticide laws. The current maximum limit of \$500 per violation may not be sufficient to deter violations by mosquito control programs with large operating budgets. The penalties should be upgraded to reflect federal guidelines under FIFRA (up to \$5000 per offense), including provisions for criminal penalties (up to \$25,000 or imprisonment for one year, or both).

Recommendation #18

Chapter 10D-54, FLA. ADMIN. CODE (Feb. 1987) should be amended to reflect HRS enforcement authority.

Recommendation #19

The agency responsible for enforcement should conduct random unannounced inspections of mosquito control programs.

Recommendation #20

State agencies and individuals should continue to bring violations of Florida's mosquito control regulations to the attention of HRS, and whatever state agency is charged with enforcement under a future regulatory scheme.

INTEGRATED PEST MANAGEMENT

Participating mosquito control programs are required to employ integrated pest management (IPM) practices. However, HRS monthly reporting forms do not require any reporting of IPM practices. Appendix H contains HRS monthly reporting forms. Chapter 388, F. S., and Chapter 10D-54, F.A.C, are unclear as to whether non-participating programs are required to follow IPM practices. In addition, non-participating programs are exempt from reporting requirements and are therefore not regularly monitored.

A good IPM program should minimize adverse effects to the environment while maintaining mosquito populations at acceptable levels. Typical IPM techniques include minimal use of pesticides, rotation of pesticides, avoidance of spraying areas containing particularly sensitive non-target species, avoidance of spraying at times when non-target species are particularly vulnerable to pesticides, use of spray techniques which are least harmful to non-target species, and use of alternatives to pesticides, including biological control. HRS mosquito control personnel have indicated that the degree to which mosquito control programs follow IPM practices varies widely with the monetary resources, geographical characteristics, and philosophical attitude of individual mosquito control programs.

Recommendation #21

All mosquito control programs, participating and non-participating, should be required to implement and report IPM practices, including: assessment of non-target species within their jurisdiction which are likely to be adversely affected by spraying; avoidance of spraying in areas containing sensitive non-target species; avoidance of spraying when non-target species are most likely to be affected; determination of which application techniques pose the least risk to non-target species; and use of alternatives to pesticides, including biological control, and source reduction.

ALTERNATIVES TO PESTICIDES

Mosquito control pesticides may cause adverse effects to certain non-target species. Alternatives to pesticides do exist, but significant research is needed before those techniques might be used for large scale control. Potential alternatives include source reduction, biological control, biotechnology, repellents, and attractants.

Permanent control measures, such as impounding and draining wetlands, are generally frowned upon by environmental and land management agencies because they result in destruction and degradation of wetlands.

Recommendation #22

There should be increased emphasis placed on research into alternative methods of control. Adequate funding should be provided to impartial and qualified scientists. Recommendation #25 discusses potential funding sources.

Recommendation #23

Re-construction of early permanent control projects would result in improved mosquito control and environmental benefits.

RESEARCH

Scientists indicate that many of the effects of mosquito control pesticides on non-target species are unknown. While direct effects may be fairly easily observed, indirect effects are more difficult to detect and may require complex, time consuming, and costly research. Particularly, research is needed regarding the sublethal and long term effects of these pesticides on non-target species. Although the Florida Medical Entomology Laboratory and the John A. Mulrennan, Sr. Laboratory both conduct mosquito control research, there remains a serious need for research in this area.

Recommendation #24

Significant research needs to be done regarding the effects of mosquito control pesticides on non-target species. Recommendation #25 discusses potential funding sources for additional research.

FUNDING

HRS does not have sufficient monetary resources to adequately regulate mosquito control operations in Florida. Unfortunately, funding for the HRS mosquito control program was reduced this year by over 75 percent. Similarly, individual mosquito control programs need more funds for development and implementation of environmentally sound control techniques, including IPM, surveillance, and environmental monitoring. District programs are typically better funded than programs without taxing authority, and are therefore better able to support extensive surveillance and education programs.

Recommendation #25

Increase funding for state oversight of mosquito control programs in Florida, particularly in the areas of public education, research, and enforcement. Possible mechanisms for obtaining funding include: an excise tax on mosquito control pesticides; a legislative mandate requiring mosquito control districts to increase taxes within their district; and an appropriation from the legislature. The additional funds should be controlled by the state agency (or agencies) responsible for state oversight and enforcement, and should be designated specifically for public education, research, and enforcement.

Recommendation #26

Increase state funding for mosquito control programs and provide incentives for local governments to establish special taxing districts for mosquito control.

LEGAL REMEDIES

Specific pesticide registrations could be challenged under FIFRA. An interested person could challenge a registration by requesting a special review procedure, or by participating in a re-registration procedure. Interested persons may submit newly discovered scientific data concerning a particular pesticide use. These procedures could result in the modification, relabeling, suspension, or cancellation of a pesticide use.

The Endangered Species Act could be used to challenge the registration and use of mosquito control pesticides which are adversely affecting endangered or threatened species. Specifically, interested persons could take the following actions: 1) Notify the EPA or USFWS of instances of mosquito control pesticides harming endangered or threatened species: 2) Initiate a citizen's suit to challenge an EPA registration of a particular mosquito control pesticide which is harming endangered or threatened species: or 3) Initiate a citizen's suit to request an injunction against a mosquito control program from spraying pesticides which harm endangered or threatened species.

Section 403.412, F. S., authorizes citizen's suits to enforce laws relating to protection of environmental resources. This provision could be used to compel HRS to enforce Chapter 388, F. S., Chapter 10D-54, F.A.C., and FIFRA. It might also be possible to use Section 403.412, F. S., to challenge a pesticide use approved by the Florida Department of Agriculture and Consumer Services. Although a cause of action would probably exist under Section 403.412, this may not be a good approach because the non-prevailing party must pay attorney's fees.

Recommendation #27

As necessary, the Endangered Species Act citizen's suit provision should be used to enjoin applications of mosquito control pesticides which harm endangered or threatened species.

Recommendation #28

Legal remedies available under FIFRA and Florida law should be considered if there is evidence of ongoing violations and other options have failed to produce adequate results. Unfortunately, actions of this type are usually both costly and lengthy.

PESTICIDE REVIEW COUNCIL

The Pesticide Review Council has the duty to recommend scientific studies of pesticide uses which may pose an unreasonable adverse effect on the environment. The Council also has the duty to make recommendations regarding the sale and use of pesticides.

Recommendation #29

An interested party could petition the Pesticide Review Council to consider recommending that additional label restrictions be placed upon existing labels of pesticides registered for mosquito control use in Florida.

FLORIDA COORDINATING COUNCIL ON MOSQUITO CONTROL

The Florida Coordinating Council on Mosquito Control is charged with making recommendations regarding research priorities for mosquito control. In addition, the Coordinating Council must report to the Pesticide Review Council and other governmental organizations on mosquito control activities in Florida.

Recommendation #30

An interested party could petition the Florida Coordinating Council on Mosquito Control to consider recommending that additional research be conducted and that additional label restrictions be placed upon existing labels of pesticides registered for mosquito control use in Florida.

MOSQUITO CONTROL DISTRICT WORK PLAN BUDGET

Mosquito control programs which are receiving state funds from HRS must adopt a work plan budget which includes a budget and a plan of operations. Work plan budgets must be adopted at a public hearing. Chapter 388, F. S., requires that the governing board of the mosquito control district consider objections which are filed against the tentative detailed work

plan budget. Accordingly, the public hearing presents an opportunity for interested citizens to comment on the budget and plan of operations of the mosquito control program.

Recommendation #31

The public should scrutinize the work plan budget to make sure it contains adequate proposed expenditures for environmental monitoring, including assessment of non-target species which are likely to be affected by spraying, assessment of non-target species which are known to be affected by spraying, and development of a legitimate Integrated Pest Management Program. The work plan budget should also contain adequate funding for routine pre- and post-spray surveillance. Monetary appropriations for specific pesticides could also be challenged at this time.

PUBLIC AWARENESS AND ATTITUDES

Mosquito control in Florida is driven to a large extent by public expectations and desires. Many residents and tourists in Florida have grown to expect mosquito free conditions and are increasingly intolerant of relatively low levels of mosquitos. The declaration of legislative intent in Chapter 388, F. S., reinforces the idea that reduction of mosquito populations is a desirable and necessary goal. Florida's mosquito control regulations allow for citizen input regarding the need to spray, and often spray events are instigated by citizen complaints of too many mosquitos.

Citizens may be unaware of the potential harm of mosquito control pesticides to human and other non-target species, and may be unfamiliar with concepts such as resistance, bio-accumulation, sub-lethal effects, long term effects, and biological control. Old time Florida residents coped with intense mosquito populations by avoiding mosquito infested areas during certain times of the day or year, and by wearing appropriate clothing. Today many repellents are available which offer effective protection from mosquitos.

With the recent outbreaks of St. Louis and Equine Encephalitis, public pressure has increased to spray mosquitos. While the severity of those diseases should not be disregarded, it is important to remember that actual occurrences of the diseases are very rare. Most mosquito control efforts in Florida are targeted at non-disease carrying nuisance mosquitos.

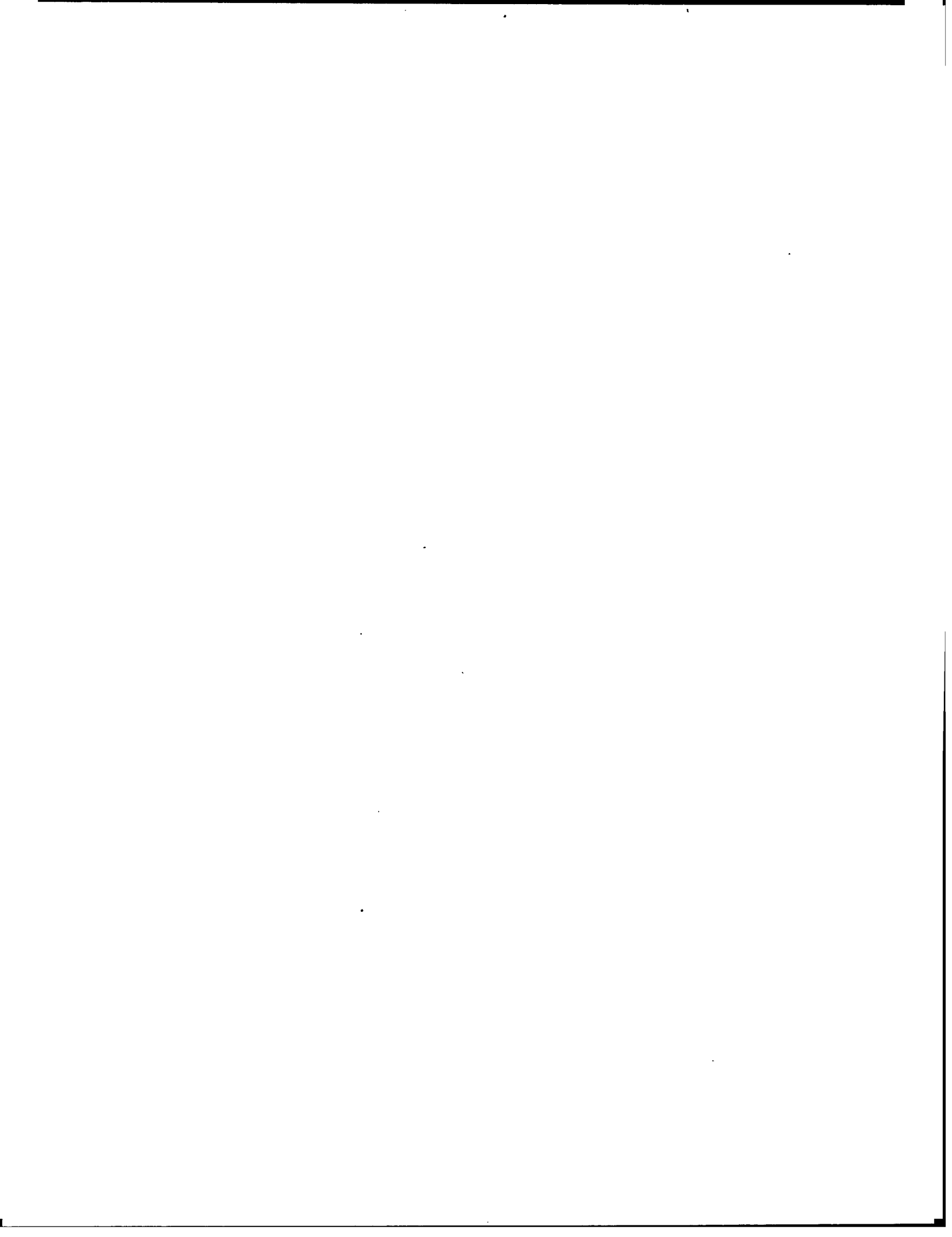
Representatives of HRS and the Florida Medical Entomology Laboratory have indicated that past efforts at public education have focused primarily on prompting people to eliminate mosquito breeding areas on their own property. While this is a laudable goal, many public education efforts have neglected to inform citizens of the potential negative health and environmental consequences of excessive or long-term use of mosquito control pesticides. A more informed public might become more tolerant of moderate levels of mosquitos.

Recommendation #32

HRS should inform people of the potential dangers of excessive or long-term use of mosquito control pesticides to humans and other non-target species. Informed people are more likely to change their attitudes and become more tolerant of modest levels of mosquitoes.

Recommendation #33

Mosquito control spraying should be avoided on publicly held lands for which the management goal is to approximate a natural environment.



Appendix A. Figures 1 - 5

Figure 1: Ground Applications of Mosquito Adulticides

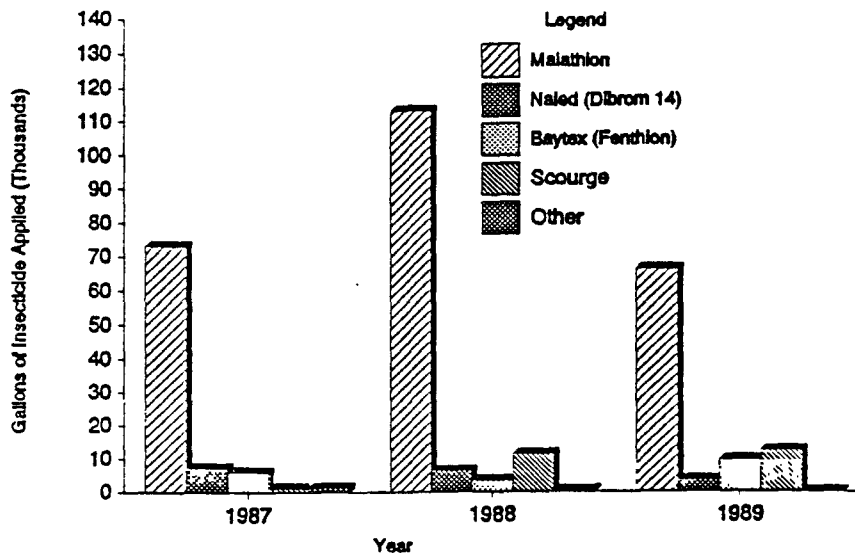
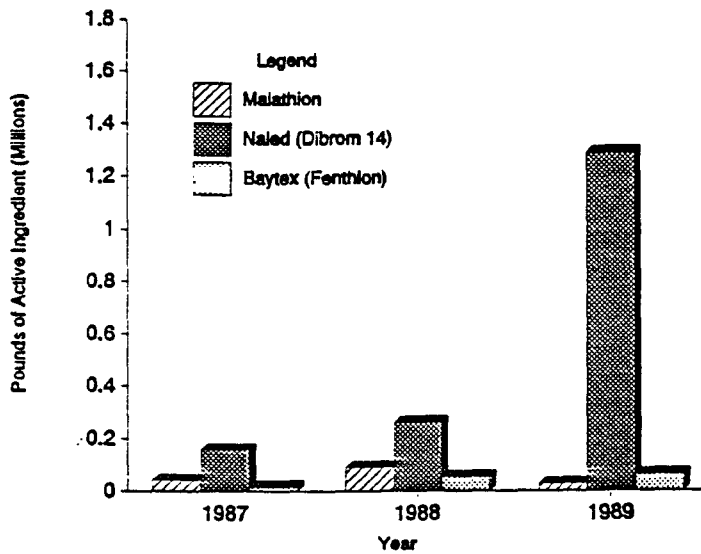


Figure 2: Aerial Applications of Mosquito Adulticides



Figures 1 and 2 were derived from the Florida Department of Health and Rehabilitative Services, Entomology Services, Mosquito Control Section, Annual Reports (1988, 1989).

Figure 3: Ground Applications of Mosquito Larvicides

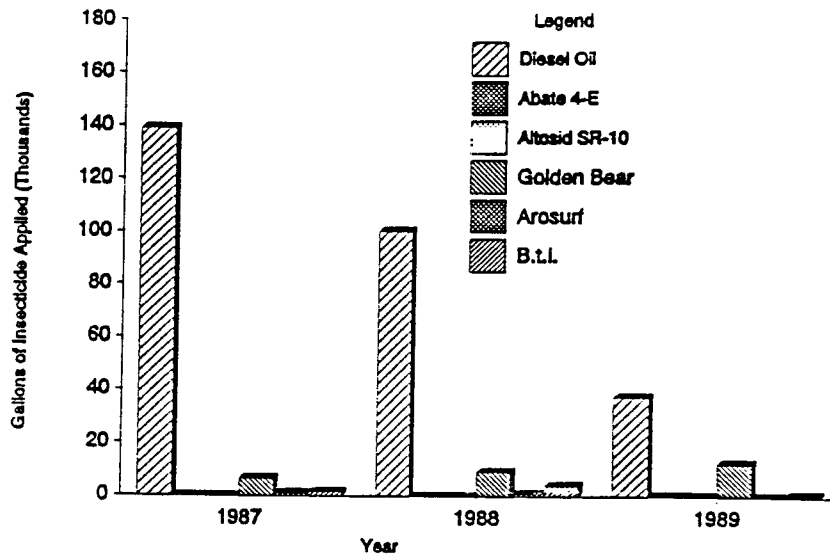
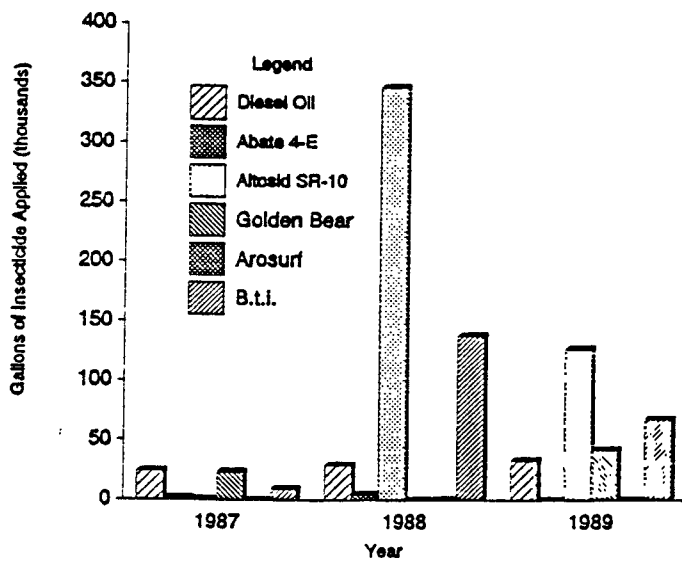


Figure 4: Aerial Applications of Mosquito Larvicides



Figures 3 and 4 were derived from the Florida Department of Health and Rehabilitative Services, Entomology Services, Mosquito Control Section, Annual Reports (1988, 1989).

Figure 5: Florida/EPA Cooperative Enforcement Agreement
Inspections and Enforcement

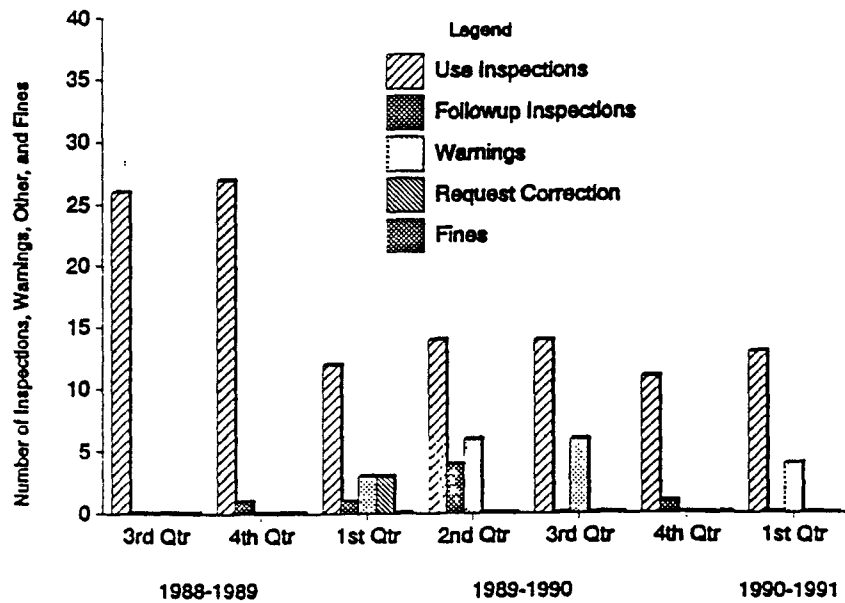


Figure 5 was derived from Florida Department of Health and Rehabilitative Services/U.S. Environmental Protection Agency Pesticides Enforcement and Applicator Certification Cooperative Agreement Quarterly Accomplishment Reports for 1988-1989.

Appendix B. Mosquito Control Pesticides in Florida.

Pesticide	1987	1988	1989
GROUND ADULTICIDING			
<u>THERMAL FOGGING</u>			
Malathion (91-95%)			
Number of Counties	1	1	1
Gallons Applied	229	319	138
Miles Fogged	3,022	1,909	738
Naled (Dibrom 14)			
Number of Counties	5	5	4
Gallons Applied	2,389	1,551	294
Miles Fogged	1,708	2,245	6,581
Baytex LC (93%)			
Number of Counties	0	2	2
Gallons Applied	0	61	4,803
Miles Fogged	0	657	251
<u>ULTRA LOW VOLUME (ULV)</u>			
Malathion (91-95%)			
Number of Counties	38	34	32
Gallons Applied	52,765	51,224	50,424
Miles Fogged	315,524	319,288	308,603
Naled (Dibrom 14)			
Number of Counties	9	12	14
Gallons Applied	5,095	5,030	3,310
Miles Fogged	96,477	92,466	62,521
Baytex LC (93%)			
Number of Counties	12	9	11
Gallons Applied	6,082	3,615	4,883
Miles Fogged	127,615	79,799	106,742
Scourge			
Number of Counties	9	15	15
Gallons Applied	1,366	11,597	12,438
Miles Treated	11,042	102,632	141,206

Pesticide	1987	1988	1989
Other (pyrocide, Baygon, pyrethrum, and Scythe).			
Number of Counties	12	4	1
Gallons Applied	1,489	682	337
Miles Treated	11,682	2,355	1,763
GROUND LARVICIDING			
Diesel Oil			
Number of Counties	21	19	15
Gallons Applied	139,178	100,514	37,780
Miles Treated	30,446	18,167	6,802
Abate 4-E			
Number of Counties	6	9	7
Gallons Applied	183	143	407
Acres Treated	25,409	21,928	20,100
Altosid SR-10			
Number of Counties	5	7	3
Gallons Applied	12	8	3
Acres Treated	402	227	384
Altosid Briquets (Field Treatment and Catch Basins)			
Number of Counties	22	21	19
Briquets Used	1,736,457	1,481,153	850,057
Basins Treated	313,016	288,916	248,752
Pyrethrum Tossits			
Number of Counties	5	3	3
Tossits Used	12,108	3,628	3,384
Miles Treated			
Pyrenone Tossits			
Number of Counties	0	3	3
Tossits Used	0	7,638	3,856
Miles Treated			
Golden Bear			
Number of Counties	3	2	11
Gallons Applied	6,810	9,400	12,635
Acres Treated	3,418	4,600	5090

Pesticide	1987	1988	1989
Arosurf[®]MSF 1SA = Arosurf[®]66-52 (Monomolecular Surface Film)			
Number of Counties	9	11	5
Gallons Applied	1,201	1,076	11
Acres Treated	1,665	1,165	88
Skeetal			
Number of Counties	3	2	4
Gallons Applied	216	315	536
Acres Treated	1,264	1,780	2,005
<u>Bacillus thuringiensis israelensis (B.t.i.) Liquid</u>			
Number of Counties	25	28	28
Gallons Applied	1,614	3,812	199
Acres Treated	39,698	56,135	70,961
<u>Bacillus thuringiensis israelensis (B.t.i.) Wettable Powder</u>			
Number of Counties	5	0	0
Pounds Applied	283	0	0
Acres Treated	439	0	0
<u>Bacillus thuringiensis israelensis (B.t.i.) Granules</u>			
Number of Counties	11	14	14
Pounds Applied	14,971	21,279	18,144
Acres Treated	2,249	3,192	2,680
<u>Bacillus thuringiensis israelensis (B.t.i.) Briquets (Donuts)</u>			
Number of Counties	17	13	17
Briquets Used	42,926	138,965	63,966
Miles Treated			

AERIAL ADULTICIDING

Fogging with Malathion 91-95%			
Number of Counties	1	1	1
Gallons Applied	1,693	2,305	499
Acres Treated	338,475	460,625	247,610
Fogging with Naled (Dibrom 14)			
Number of Counties	1	1	1
Gallons Applied	2,101	1,577	356,760
Acres Treated	420,201	314,384	662,760

Pesticide	1987	1988	1989
Fogging with Baytex LC (fenthion) (93%)			
Number of Counties	2	2	2
Gallons Applied	1,666	5,589	6,369
Acres Treated	555,238	1,863,359	1,752,876
Spraying with Malathion (91-95%)			
Number of Counties	1	1	1
Gallons Applied	818	989	971
Acres Treated	36,333	43,020	43,423
<u>ULTRA LOW VOLUME (ULV)</u>			
Malathion (91-95%)			
Number of Counties	1	3	2
Gallons Applied	2,170	6,625	1,701
Acres Treated	144,666	435,306	103,043
Naled (Dibrom 14)			
Number of Counties	14	15	15
Gallons Applied	9,359	17,121	50,996
Acres Treated	1,962,109	3,386,016	2,792,706
Baytex LC (93%)			
Number of Counties	2	1	1
Gallons Applied	190	140	70
Acres Treated	31,100	27,580	11,638
AERIAL LARVICIDING			
Diesel Oil (Florida Formula)			
Number of Counties	6	7	5
Gallons Applied	24,343	29,310	33,322
Miles Treated	4,192	6,093	3,521
Abate			
Number of Counties	6	5	6
Gallons Applied	1,694	4,692	217
Acres Treated	217,553	230,660	238,238
Altosid SR-10			
Number of Counties	5	8	7
Pounds Applied	612	18,768	86,385
Acres Treated	40,560	47,401	67,066

Pesticide	1987	1988	1989
Arosurf[®]MSF (Monomolecular Film = ISA-20E - Arosurf[®] 66-E2)			
Number of Counties	1	3	1
Gallons Applied	5	838	33
Acres Treated	5	2,670	193
<u>Bacillus thuringiensis israelensis (B.t.i.) Liquid</u>			
Number of Counties	7	10	8
Gallons Applied	5,210	4,448	61,369
Acres Treated	52,033	69,627	45,745
<u>Bacillus thuringiensis israelensis (B.t.i.) Granules</u>			
Number of Counties	8	6	9
Pounds Applied	127,804	153,710	198,695
Acres Treated	18,728	23,862	27,717
Golden Bear			
Number of Counties	1	0	3
Gallons Applied	23,508	0	42,124
Acres Treated	11,702	0	13,316
Skeletal			
Number of Counties	3	2	3
Gallons Applied	4,005	133,930	6,790
Acres Treated	21,262	32,140	14,160
SURVEILLANCE			
Surveillance			
Number of Counties		45	49

These values were taken from the Florida Department of Health and Rehabilitative Services, Entomology Section, Annual Reports (1988. 1989).

**Appendix C. Mosquito Control Pesticide Labels with Conflicting Language
(quoted from labels).**

Chemical & Mfg.	Environmental Hazards	Directions for Use
Scourge (Resmethrin & Piperonyl Butoxide) Penick Corporation	This product is toxic to fish and birds. Do not apply to lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated.	May be used as a[n] ...adulticide...in municipalities, around the outside of apartment buildings, golf courses, athletic fields, parks, campsites, woodlands, swamps, tidal marshes, and overgrown waste areas.
Cythion (Malathion) American Cyanamid Company	This product is toxic to fish. Avoid direct applications to lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from areas treated.	[Aerial] adult mosquito control over cities, towns, and other areas where ...pleasure boats are present.
Pyrethrum ULV (Pyrethrins & Piperonyl Butoxide) Summit Chemical Company	This product is toxic to fish. Keep out of ponds, lakes, and streams... Do not overdose any swamp area or any area bordering streams or lakes.	This product may be used in mosquito adulticiding programs involving...swamps and marshes ...where adult mosquitoes are present in annoying numbers.
Dibrom (Naled) Summit Chemical Company	This product is toxic to fish, birds and other wildlife. Birds and other wildlife in treated areas may be killed. Keep out of lakes, streams or ponds. Do not apply when weather conditions favor drift from areas treated. Do not apply where runoff is likely to occur.	This product may be used in mosquito adulticiding programs involving...tidal marshes, swamps, and woodlands....
Abate 5-CG (Temephos) American Cyanamid Company	This product is toxic to birds and fish. Fish and other aquatic organisms in water treated with this product may be killed. You must consult your State Fish and Game Agency before applying this product to waters or wetlands.	Areas of treatment: Standing water, shallow ponds, lakes, woodland pools, tidal waters, marshes, swamps and waters high in organic content. highly - polluted waters.
Altosid (Methoprene) Zoecon Corporation	Do not apply to known fish habitat. Briquets are designed to control mosquitoes in small bodies of water which are not known fish habitats.	Examples of application sites are... freshwater swamps and marshes, salt and tidal marshes, woodland pools, flood plains and dredge spoil sites.

Appendix D. Mosquito Control Pesticide Labels Which Allow Subjective Interpretation by the Applicator (quoted from labels).

Pesticide & Mfg.	Subjective Language
Dursban 2E (Chlorpyrifos) Southern Mill Creek Products Company	Shrimp and crab may be killed at application rates recommended on this label. Do not apply where these are important resources.
Mosquito Larvicide GB-1356 (Petroleum Distillate) Witco Corporation	Do not apply to moving water when there is danger of damage to valuable fish or wildlife. Do not apply to lakes, streams, ponds, tidal marshes and estuaries where there is danger of damage from drift into sensitive areas.
Altosid XR (Methoprene) Zoecon Corporation	Do not apply to known fish habitat. Briquets are designed to control mosquitoes in small bodies of water which are not known fish habitats.
Cythion (Malathion) American Cyanamid Company Baytex Liquid Concentrate (Fenthion) Mobay Chemical Corporation	Shrimp and crab may be killed at application rates recommended on this label. Do not apply where these are important resources.

Appendix E. Label Precautions for Mosquito Control Pesticides Qualifying for Application to Waters (Rule 10D-54.046, F.A.C.) (quoted from labels).

Sample Label		
Pesticide	Product Name/Mfg	Environmental Precaution
Chlorpyrifos	Dursban 2E Southern Mill Creek Products Company	This product is toxic to fish, birds, and other wildlife. Keep out of lakes, streams, or ponds. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from areas treated.
Petroleum Distillate	Mosquito Larvicide GB-1356 Witco Corporation	Do not apply to moving water when there is danger of damage to valuable fish or wildlife. Do not apply to lakes, streams, ponds, tidal marshes and estuaries where there is danger of damage from drift into sensitive areas.
Methoprene	Altosid XR Zoecon Corporation	Do not apply to known fish habitat. Briquets are designed to control mosquitoes in small bodies of water which are not known fish habitats.
Malathion	Cythion American Cyanamid Company	This product is toxic to fish. Avoid direct applications to lakes, streams, ponds, tidal marshes and estuaries. Do not apply where runoff is likely to occur. Do not apply when weather conditions favor drift from areas treated.
Fenthion	Baytex Liquid Concentrate Mobay Chemical Corporation	This product is toxic to fish and wildlife. Birds feeding on treated areas may be killed. Do not apply when weather conditions favor drift from areas treated. Do not apply where runoff is likely to occur.
Bendiocarb	Ficam ULV NOR-AM Chemical	This pesticide is toxic to wildlife. Keep out of lakes, streams and ponds. Do not apply within 320 feet of any body of water.
Resmethrin & Piperonyl Butoxide	Scourge Penick Corporation	This product is toxic to fish and birds. Do not apply to lakes, streams, or ponds. Do not apply when weather conditions favor drift from areas treated.
Resmethrin	Vectrin 3% Velsicol Corporation	This product is toxic to fish. Do not apply directly to water.
Pyrethrins & Piperonyl Butoxide	Pyrenone Fairfield American	This product is toxic to fish, shrimp, crabs and other aquatic organisms. Do not apply directly to lakes, streams or ponds.
Naled	Dibrom 14 Summit Chemical Company	This product is toxic to fish, aquatic invertebrates and wildlife. Do not apply directly to water. Runoff from treated areas may be hazardous to aquatic organisms in neighboring areas.
Temephos	Abate 4-E American Cyanamid Corporation	This product is toxic to birds and fish. Fish and other aquatic organisms in water treated with this product may be killed. You must consult your State Fish and Game Agency before applying this product to waters or wetlands.

CHAPTER 388. MOSQUITO CONTROL

388.0101. Declaration of legislative intent--It is declared to be the public policy of this state to achieve and maintain such levels of arthropod control as will protect human health and safety and foster the quality of life of the people, promote the economic development of the state, and facilitate the enjoyment of its natural attractions by reducing the number of pestiferous and disease-carrying arthropods. It is further declared to be the policy of the state to conduct arthropod control in a manner consistent with protection of the environmental and ecological integrity of all lands and waters throughout the state.

388.011. Definitions--As used in this chapter:

(1) "County" means a political subdivision of the state administered by a board of county commissioners.

(2) "District" means any mosquito control district established in this state by law for the express purpose of controlling arthropods within boundaries of said districts.

(3) "Board of commissioners" means the governing body of any mosquito control district, and may include boards of county commissioners when context so indicates.

(4) "Arthropod" means those insects of public health or nuisance importance, including all mosquitoes, midges, sand flies, dog flies, yellow flies, and house flies.

(5) "Integrated arthropod control" means the implementation of arthropod control measures, including, but not limited to, the use of pesticides and biological control agents and source reduction, to control arthropods without an unreasonable adverse effect on the environment.

(6) "Department" means the Department of Health and Rehabilitative Services.

(7) "Source reduction" means the physical land or water management of arthropod breeding areas to reduce the area's suitability for arthropod breeding.

(8) "Unreasonable adverse effects on the environment" means any unreasonable risk to man or the environment, with due consideration of the economic, social, and environmental costs and benefits of the use of any arthropod control measure.

(9) "Nuisance" means a condition in which pestiferous arthropods occur in such numbers as to be annoying,

obnoxious, or inimical to human comfort.

(10) "Land management agency" means the agency charged with managing publicly owned lands.

(11) "Local arthropod control agency" means the county, city, or district charged with arthropod control over publicly owned lands.

388.021. Creation of mosquito control districts--

(1) The abatement or suppression of arthropods, whether disease-bearing or merely pestiferous, within any or all counties of this state is advisable and necessary for the maintenance and betterment of the comfort, health, and welfare of the people thereof and is found and declared to be for public purposes. Areas where arthropods incubate, hatch, or occur in significant numbers so as to constitute a public health, welfare, or nuisance problem may be controlled or abated as provided in this chapter or the rules promulgated hereunder. Therefore, any city, town, or county, or any portion or portions thereof, whether such portion or portions include incorporated territory or portions of two or more counties in the state, may be created into a special taxing district for the control of arthropods under the provisions of this chapter.

(2) It is the legislative intent that those mosquito control districts established prior to July 1, 1980, pursuant to the petition process formerly contained in s. 388.031, [FN1PP] may continue to operate as outlined in this chapter. However, on and after that date, mosquito control districts may be created pursuant to s. 125.01 or s. 189.404.

388.101. District boards of commissioners; term of office--

(1) Following the creation of the district, and in the general election each 4 years thereafter, the district board of commissioners shall be elected on a nonpartisan basis by the electors of the district. The three persons receiving the highest number of votes cast in the general election shall serve 4 years and shall take office at the same time as do other county officers, on the first Tuesday after the first Monday in January next after their election, and serve on the same cycle as do other constitutional county officers.

(2) The district board of commissioners may, by resolution, elect to increase the membership of the board to five commissioners to be elected on a nonpartisan basis in the manner specified by

subsection (1) to terms of 4 years each.

(3) The district board of commissioners may, by resolution, elect to stagger the terms of office of the members of the board. If the board of commissioners is composed of three members, at the first general election following the resolution the electors of the district shall elect three commissioners, one to a term of office of 2 years and the other two to terms of office of 4 years. If the board of commissioners is composed of five members, the electors of the district shall, at the first general election following the resolution, elect five commissioners, two to terms of office of 2 years and three to terms of office of 4 years. The board of commissioners shall, in their resolution, designate the term of office of each seat on the board for the purposes of the initial election following the resolution. Each commissioner shall hold his office until his successor is elected and qualified. Thereafter, each commissioner shall be elected to a 4-year term of office.

(4) The district board of commissioners, if it resolves to increase the membership of the board or stagger the terms of office of the members of the board, must do so at least 1 month prior to the opening of the qualifying period for the next general election. Resolutions to increase board membership and stagger terms of office may be effective at the same general election.

(5) The board of county commissioners shall call and provide for said election. Members of the district board of commissioners shall be resident registered electors.

388.111. District boards of commissioners; vacancies--

In the event of a vacancy due to any cause in any board of commissioners, the same shall be filled by appointment by the Governor for the unexpired term.

388.121. District boards of commissioners; organization--

As soon as practicable after such commissioners have been elected and qualified, they shall meet and organize by the election from among their number of a chairman, a secretary and a treasurer. Two members of the board shall constitute a quorum. The vote of two members shall be necessary to transact business.

388.131. Commissioners; surety bond--Each commissioner, before he assumes office, shall be required to give the Governor a good and sufficient surety bond in the sum of \$2,000, the cost thereof being

borne by the district, conditioned on the faithful performance of the duties of his office, said bond to be approved and filed in the same manner as is that of the board of county commissioners. The failure of any person to make and file this bond within 10 days after his election shall create a vacancy on said board.

388.141. Commissioners; compensation--Members of the board of commissioners of independent special tax districts may each be paid a salary to be determined by unanimous vote of the board which shall not exceed \$4,800 for each commissioner during any one year; however, this section shall not be construed to limit compensation of district commissioners where higher amounts have otherwise been authorized by special act or general act of local application. Said members may be reimbursed for expenses incurred in the performance of their duties as provided in s. 112.061.

388.151. District boards of commissioners; meetings--

All boards of commissioners shall hold regular monthly meetings, and special meetings as needed, in the courthouse or in the offices of the district. The time and place of said regular meetings shall be on file in the office of the Department of Health and Rehabilitative Services.

388.161. District boards of commissioners; powers and duties

(1) The board of commissioners may do any and all things necessary for the control and elimination of all species of mosquitoes and other arthropods of public health importance and the board of commissioners is specifically authorized to provide for the construction and maintenance of canals, ditches, drains, dikes, fills, and other necessary works and to install and maintain pumps, excavators, and other machinery and equipment, to use oil, larvicide paris green, or any other chemicals approved by the Department of Health and Rehabilitative Services but only in such quantities as may be necessary to control mosquito breeding and not be detrimental to fish life.

(2) The board of commissioners shall have all the powers of a body corporate, including the power to sue and be sued as a corporation in said name in any court; to contract, to adopt and use a common seal and alter same at pleasure, to purchase, hold, lease, and convey such real estate and personal property as

said board may deem proper to carry out the purpose of this chapter; to acquire by gift real estate, personal property, and moneys and to employ a field director and such trained personnel, legal, clerical or otherwise, and laborers as may be required. The board of commissioners shall promulgate such rules and regulations not inconsistent with the provisions of this chapter or with other legislation which in its judgment may be necessary for the proper enforcement of this chapter provided such rules and regulations are approved by the Department of Health and Rehabilitative Services.

388.162. Direction of the program

The program shall be administered for the board of commissioners by a qualified person. The Department of Health and Rehabilitative Services shall establish minimum qualifications for employment of a director in accordance with the responsibilities attached to the position.

388.171. Power to perform work

The board of commissioners may have any and all work performed by contract with or without advertisement, or without contract, by machinery, equipment, and labor employed directly by the board of commissioners.

388.181. Power to do all things necessary

The respective districts of the state are hereby fully authorized to do and perform all things necessary to carry out the intent and purposes of this law.

388.191. Power of eminent domain

The board of commissioners may hold, control, and acquire by gift or purchase for the use of the district, any real or personal property, and may condemn any land or easements needed for the purposes of said district. Said board may exercise the right of eminent domain and institute and maintain condemnation proceedings as provided in chapter 73.

388.201. District budgets; hearing

(1) The fiscal year of districts operating under the provisions of this chapter shall be the 12-month period extending from October 1 of one year through September 30 of the following year. The governing board of the district shall before July 15 of each year complete the preparation of a tentative detailed work plan budget covering its proposed operations and

requirements for arthropod control measures during the ensuing fiscal year and, for the purpose of determining eligibility for state aid, shall submit copies as may be required to the department for review and approval. The tentative [FN1PP] detailed work plan budget shall set forth, classified by account number, title and program items, and by fund from which to be paid, the proposed expenditures of the district for construction, for acquisition of land, and other purposes, for the operation and maintenance of the district's works, the conduct of the district generally, to which may be added an amount to be held as a reserve.

(2) The tentative detailed work plan budget shall also show the estimated amount which will appear at the beginning of the fiscal year as obligated upon commitments made but uncompleted. There shall be shown the estimated unobligated or net balance which will be on hand at the beginning of the fiscal year and the estimated amount to be raised by district taxes and from any and all other sources for meeting the district's requirements.

(3) The budget and maintenance tax levy shall be adopted in accordance with the provisions of s. 200.065.

(4) The governing board:

(a) Shall give consideration to objections filed against adoption of the tentative detailed work plan [FN2PP] budget and in its discretion may amend, modify, or change such [FN3PP] budget; and

(b) Shall by September 15 following adopt and execute on a form furnished by the department a certified budget for the district which shall be the operating and fiscal guide for the district. Certified copies of this budget shall be submitted by September 15 to the department for approval.

(5) County commissioners' mosquito and arthropod control budgets shall be made and adopted as prescribed by subsections (1) and (2); summary figures shall be incorporated into the county budgets as prescribed by the Department of Banking and Finance.

388.211. Change in district boundaries

(1) The board of commissioners of any district formed prior to July 1, 1980, may, for and on behalf of the district or the qualified electors within or without the district, request that the board of county commissioners in each county having land within the district approve a change in the boundaries of the

district.

(2) If the board of county commissioners approves such change, an amendment shall be made to the order creating the district to conform with the boundary change.

388.221. Tax levy

(1) The board of commissioners of such district may levy upon all of the real and personal taxable property in said district a special tax not exceeding 10 mills on the dollar during each year as maintenance tax to be used solely for the purposes authorized and prescribed by this chapter. Said board shall by resolution certify to the property appraiser of the county in which the property is situate, timely for the preparation of the tax roll, the tax rate to be applied in determining the amount of the district's annual maintenance tax. Certified copies of such resolution executed in the name of said board by its chairman and secretary and under its corporate seal shall be made and delivered to the property appraiser and the board of county commissioners of the county in which such district is located, and to the Department of Revenue not later than September 30 of such year. The property appraiser of said county shall assess and the tax collector of said county shall collect the amount of taxes so assessed and levied by said board of commissioners of said district upon all of the taxable real and personal property in said district at the rate of taxation adopted by said board for said year and included in said resolution, and said levy shall be included in the warrants of the property appraiser and attached to the assessment roll of taxes for said county each year. The tax collector shall collect such taxes so levied by said board in the same manner as other taxes are collected and shall pay the same within the time and in the manner prescribed by law to the treasurer of said board. The Department of Revenue shall assess and levy on all the railroad lines and railroad property and telegraph and telephone lines and telegraph and telephone property situated in said district in the amount of each such levy as in case of other state and county taxes and shall collect said taxes thereon in the same manner as it is required by law to assess and collect taxes for state and county purposes and remit the same to the treasurer of said board. All such taxes shall be held by said treasurer for the credit of said board and paid out by him as ordered by said board.

(2) The tax officers of the county are hereby authorized and directed to perform the duties devolving

upon them under this chapter and to receive compensation therefor at such rates or charges as are provided by law with respect to similar services or charges.

388.231. Restrictions on use, loan or rental of equipment; charges

(1) Equipment purchased for use in control of mosquitoes and other arthropods and paid for with funds budgeted for arthropod control shall not be used for any private purpose. No county or district shall lend or rent equipment so purchased to any other department within the county, or to another county, district or any public agency or political subdivision of the state without the prior written approval of the Department of Health and Rehabilitative Services; nor shall it be so lent or rented without making a use or rental charge for the use thereof. The department is authorized to establish a fair use or rental charge on equipment so purchased and may require the maintenance of reasonable and proper records in connection with the loan or rental of such equipment.

(2) Any district, county, municipality or public agency using said equipment on a use or rental basis shall send a warrant made payable to the county or district, or to such control fund of the county owning the equipment, for the full payment of such use or rent at the end of each month. All funds received by a county or district from the renting of its equipment shall be deposited promptly by the county or district in their state fund account. Upon failure of any county or district to secure prior written approval from the department before lending or renting its equipment, or upon the failure of the county or district to collect rents due for the use of its equipment at rates established by the department, and to deposit said rents promptly under state funds, the department may immediately remove the equipment and utilize it for arthropod control purposes in any other area of the state.

388.241. Board of county commissioners vested with powers and duties of board of commissioners in certain counties

In those counties where there has been no formation of a separate or special board of commissioners, all the rights, powers, and duties of a board of commissioners as conferred in this chapter shall be vested in the board of county commissioners of said county.

388.251. Delegation of authority to county health department

The board of county commissioners may authorize the county health department to administer and direct arthropod control in the county provided by this chapter, upon the following conditions:

(1) The county health department shall keep the books and make all reports required by this chapter.

(2) All purchases, whether by bid or otherwise, shall be made in accordance with the procedure followed by the board of county commissioners in making other purchases.

(3) The county health department shall submit to the board of county commissioners, with supporting vouchers and invoices, monthly itemized statements of expenses incurred in carrying out the control program in the county.

388.261. State aid to counties and districts for arthropod control; distribution priorities and limitations

(1) Every county or district budgeting local funds, derived either by special tax levy or funds appropriated or otherwise made available for the control of mosquitoes and other arthropods under a plan submitted by the county or district and upon approval by the Department of Health and Rehabilitative Services, shall be eligible to receive state funds, supplies, services, and equipment on a dollar for dollar matching basis up to but not exceeding \$30,000 for any one county for any one year. A county or district may, without contributing matching funds, receive state funds, supplies, services, or equipment in an amount of no more than \$30,000 per year for up to 3 years for any new or expanded program which serves an area not previously served by the county or district. These funds may be expended for any and all types of control measures approved by the department.

(2) In addition, every county or district budgeting local funds to be used exclusively for the control of mosquitoes and other arthropods under a plan submitted by the county or district and approved by the department, shall be eligible to receive state funds and supplies, services, and equipment for control measures up to but not exceeding 50 percent of the amount of local funds budgeted for such control. Should state funds appropriated by the Legislature be insufficient to grant each county or district 50 percent of the amount budgeted in local funds, the department shall prorate said state funds based on the amount of matchable local

funds budgeted for expenditure by each county or district.

(3) Every county shall be limited to receive a total of \$100,000 of state funds, exclusive of state funds brought forward, during any one year, however, a county or district that receives funds under subsection (1) for service to an area not previously served may receive up to \$130,000 during any one year. (4) Up to 20 percent of the annual funds appropriated to local governments for arthropod control may be used for arthropod control research or demonstration projects as approved by the department.

388.271. Prerequisites to participation

(1) When state funds are involved, it is the duty of the department to guide, review, approve, and coordinate the activities of all county governments and special districts receiving state funds in furtherance of the goal of integrated arthropod control. Each county or district eligible to participate hereunder may begin participation on October 1 of any year by filing with the department not later than July 15 a tentative work plan and tentative detailed work plan budget providing for the control of arthropods. Following approval of the plan and budget by the department, two copies of the county's or district's certified budget based on the approved work plan and detailed work plan budget shall be submitted to the department not later than September 15 following. State funds, supplies, and services shall be made available to such county or district by and through the department immediately upon release of funds by the Executive Office of the Governor.

(2) All purchases of supplies, materials and equipment by counties or districts shall be made in accordance with the laws governing purchases by boards of county commissioners, except that districts with special laws relative to competitive bidding shall make purchases in accordance therewith.

388.281. Use of state matching funds

(1) All funds, supplies, and services released to counties and districts hereunder shall be used in accordance with the detailed work plan and certified budget approved by both the Department of Health and Rehabilitative Services and the county or district. The plan and budget may be amended at any time upon prior approval of the department.

(2) All funds, supplies, and services released on the 50-percent matching basis shall be used exclusively

for source reduction measures, public education, personnel training and certification, arthropod population surveillance, research and demonstration projects, larvicides, equipment, and epidemic alerts as approved by the department. Source reduction measures may include measures to improve management and enhance the ecological integrity of source reduction areas. If source reduction measures require permits, approvals, or agreement by federal, state, regional, or local agencies, such permits, approvals, or agreement shall be obtained prior to commencement of the source reduction project. These measures include sanitary landfills, drainage, diking, filling of arthropod breeding areas, and the purchase, maintenance, and operation of all types of equipment including trucks, dredges, draglines, bulldozers, or any other type of machinery and materials utilized in ditching, ditch lining, ditch construction, diking, filling, hiring personnel, rental of equipment, and payment for contract work awarded to the lowest responsible bidder.

(3) In any county or district where the arthropod problem has been eliminated, or reduced to such an extent that it does not constitute a health, comfort, or economic problem as determined by the department, the maximum amount of state funds available under this chapter shall be reduced to the amount necessary to meet actual need.

388.291. Source reduction measures; supervision by department

(1) Any county or district may perform source reduction measures in conformity with good engineering practices in any area, provided that the department cooperating with the county or district has approved the operating or construction plan and it has been determined by criteria contained in rule that the area or areas to be controlled would produce arthropods in significant numbers to constitute a health or nuisance problem.

(2) The county or district shall manage the detailed business affairs and supervise said work, and the department shall advise the districts as to the best and most effective measures to be used in bringing about better temporary control and the permanent elimination of breeding conditions. The department may at its discretion discontinue any state aid provided hereunder in the event it finds the jointly agreed upon program is not being followed, or is not efficiently and effectively administered.

(3) Property owners in a developed residential area

are required to maintain their property in such a manner so as not to create or maintain any standing freshwater condition capable of breeding mosquitoes or other arthropods in significant numbers so as to constitute a public health, welfare, or nuisance problem. Nothing in this subsection shall permit the alteration of permitted stormwater management systems or prohibit maintained fish ponds, xeriscaping, or other maintained systems of landscaping or vegetation. If such a condition is found to exist, the local arthropod control agency shall serve notice on the property owner to treat, remove, or abate the condition. Such notice shall serve as prima facie evidence of maintaining a nuisance, and upon failure of the property owner to treat, remove, or abate the condition, the local arthropod control agency or any affected citizen may proceed pursuant to s. 60.05 to enjoin the nuisance and may recover costs and attorney's fees if they prevail in the action.

388.301. Payment of state funds; supplies and services

State funds shall be payable quarterly, in accordance with the rules and regulations of the Department of Health and Rehabilitative Services, upon requisition by the department to the Comptroller. The department is authorized to furnish insecticides, chemicals, materials, equipment, vehicles, and personnel in lieu of state funds where mass purchasing may save funds for the state, or where it would be more practical and economical to utilize equipment, supplies, and services between two or more counties or districts.

388.311. Carry over of state funds and local funds

State and local funds budgeted for the control of mosquitoes and other arthropods shall be carried over at the end of the county or district's fiscal year, and rebudgeted for such control measures the following fiscal year.

388.321. Equipment to become property of the county or district

All equipment purchased under this chapter with state funds made available directly to the county or district shall become the property of the county or district unless otherwise provided, and may be traded in on other equipment, or sold, when no longer needed by the county or district.

388.322. Record and inventory of certain property

A record and inventory of certain property owned by the district shall be maintained in accordance with s. 274.02.

388.323. Disposal of surplus property

Surplus property shall be disposed of according to the provisions set forth in s. 274.05 with the following exceptions:

(1) Serviceable equipment no longer needed by a county or district shall first be offered to any or all other counties or districts engaged in arthropod control at a price established by the board of commissioners owning the equipment. If no acceptable offer is received within a reasonable time, the equipment shall be offered to such other governmental units as defined in s. 274.05.

(2) The alternative procedure for disposal of surplus property, as prescribed in s. 274.06, shall be followed if it has been determined no other county, district, or governmental unit has need for the equipment.

(3) All proceeds from the sale of any real or tangible personal property owned by the county or district shall be deposited in the county's or district's state fund account unless otherwise specifically designated by the Department of Health and Rehabilitative Services.

388.331. Audit

All counties and districts carrying out programs for the control of mosquitoes and other arthropods involving the expenditure of state funds shall set up and maintain books and records under a method approved by the Auditor General and be subject to audit by same.

388.341. Reports of expenditures and accomplishments

Each county and district participating under the provisions of this chapter shall within 30 days after the end of each month submit to the Department of Health and Rehabilitative Services a monthly report for the preceding month of expenditures from all funds for arthropod control, and such reports of activities and accomplishments as may be required by the department.

388.351. Transfer of equipment, personnel, and supplies during an emergency

The Department of Health and Rehabilitative Services, upon notifying a county or district and obtaining its approval, is authorized to transfer equipment, materials, and personnel from one district to

another in the event of an emergency brought about by an arthropod-borne epidemic or other disaster requiring emergency control.

388.361. Rules; administration

(1) This chapter and all rules adopted and promulgated hereunder shall be administered and enforced by the department.

(2) The department shall promulgate rules to implement the provisions of this chapter. Such rules shall provide for:

(a) Criteria by which a demonstrable increase or other indicator of arthropod population levels is determined to constitute a public health or nuisance problem.

(b) Criteria regarding aerial spraying on private lands of pesticides, petroleum products, or other substances for control of adult arthropods which minimize the deposition onto and the potential for substantial adverse effects to environmentally sensitive and biologically highly productive public lands caused by such airborne substances. In the promulgation of such rules, the department shall consider the recommendations of the Florida Coordinating Council on Mosquito Control.

(c) Requirements that all arthropod control pesticides, including adulticides and larvicides, be used only in accordance with the registered label and labeling or be otherwise accepted by the United States Environmental Protection Agency or the Department of Agriculture and Consumer Services.

(d) Protection of the health, safety, and welfare of arthropod control employees, the general public, and the natural resources of this state in conformity with the provisions of this chapter.

(3) The department is authorized to promulgate rules which are more detailed or stringent than, but not otherwise inconsistent with, the label requirements of the United States Environmental Protection Agency and the Department of Agriculture and Consumer Services.

(4) The department shall, by January 1, 1987, promulgate rules which establish criteria for the licensure or certification of all private and public arthropod control applicators and program directors and require recordkeeping and reporting of applicator activities in furtherance of the goal of integrated arthropod control. No licensure or certification shall be required of private applicators controlling arthropods upon their own individual residential or

agricultural property.

(5) In order to carry out the provisions of this chapter, the department's duly authorized arthropod control operation inspectors may enter upon any licensee's premises or any location where the licensee keeps or stores records or equipment, at reasonable times, in order to have access for the purpose of inspecting records or any equipment, to inspect lands actually or reported to be exposed to arthropod control pesticides applied by the licensee, to inspect licensee storage or disposal areas, to inspect or investigate complaints against licensees of injury to humans or land resulting from arthropod control pesticides applied by the licensee, or to sample arthropod control pesticides being applied or to be applied by the licensee.

(6) The department shall have the authority to cooperate with federal and state agencies and to enter into such cooperative agreements or commitments as the department may determine necessary to carry out and enforce the provisions of this chapter.

388.3711. Enforcement

(1) The department is empowered to enforce this chapter or its rules by commencing and maintaining all proper and necessary actions and proceedings, including, but not limited to, application for injunction to the proper circuit court to grant a temporary or permanent injunction, or both, restraining any person from violating or continuing to violate any of the provisions of this chapter or from failing or refusing to comply with the requirements of this chapter or the rules promulgated thereunder.

(2) The department may deny, suspend, or revoke any license or certification, or the disbursal of state aid, in accordance with the provisions of chapter 120, upon any one or more of the following grounds as may be applicable:

(a) Violation of any rule of the department or provision of this chapter.

(b) Violation of FIFRA or any relevant EPA rule or regulation pertaining to the use of arthropod control pesticides by the licensee.

(c) Failure to give the department, or any authorized representative thereof, true information upon request regarding methods and materials used, work performed, or other information essential to the administration of this chapter.

(3) The department may, if it finds a violation is of such nature or circumstances that denial, revocation, or suspension of a certification or license or disbursal of

state aid would be detrimental to the public or be unnecessarily harsh under the circumstances, in its discretion, place the offending party on probation for a period of not more than 2 years. If the department determines that the terms of such probation have been violated, it may reinstitute license or certification or state aid denial, suspension, or revocation proceedings.

(4) The department, pursuant to chapter 120, in addition to or in lieu of any other remedy provided by state or local law, may impose an administrative fine not exceeding \$500, or less than \$25, for the violation of any of the provisions of this chapter. Each day that a violation continues shall constitute a separate violation. All amounts collected pursuant to this section shall be deposited in the Health and Rehabilitative Services Aid to Local Governments Arthropod Control Program to be used for arthropod control research.

(5) In determining the amount of any penalty authorized by this section, the following factors shall be considered:

(a) The severity of the violation, including the probability that death or serious harm to the health or safety of any person or the environment will result or has resulted; the severity of the actual or potential harm; and the extent to which the provisions of this chapter were violated.

(b) Actions taken by the licensee or certified operator in charge to correct the violation or to mitigate actual or potential harm.

(c) Any previous violations of this chapter.

(6) The department shall publish quarterly a list of disciplinary actions taken pursuant to this chapter and shall provide such a list to each licensee.

388.381. Cooperation by counties and district

Any county or district carrying on an arthropod control program may cooperate with another county, district, or municipality in carrying out a program for the control of mosquitoes and other arthropods, by agreement as to the program and reimbursement thereof, when approved by the Department of Health and Rehabilitative Services.

388.391. Control measures in municipalities and portions of counties located outside boundaries of districts

Any district whose operation is limited to a portion of the county in which it is located may perform any

control measures authorized by this chapter in any municipality located in the same county or in any portions of the same county, where there is no established district, when requested to do so by the municipality or county, pursuant to s. 388.381.

388.401. Penalty for damage to property or operations

Whoever shall willfully damage any of the property of any county or district created under this or other chapters, or any works constructed, maintained, or controlled by such county or district, or who shall obstruct or cause to be obstructed any of the operations of such county or district, or who shall knowingly or willfully violate any provisions of this chapter or any rule or regulation promulgated by any board of commissioners of any county or district shall be guilty of a misdemeanor of the second degree, punishable as provided in s. 775.082 or s. 775.083.

388.411. Public lands; arthropod control

(1) It is declared to be in the best interests of the state that certain environmentally sensitive and biologically highly productive public lands owned by the state or any political subdivision thereof where arthropods incubate, hatch, or occur so as to constitute a public health or nuisance problem may be subject to arthropod control measures. Such measures shall be approved by the department and performed by the local arthropod control agency consistent with a public lands control plan as described in subsection (2). The methods employed shall be the minimum necessary and economically feasible to abate a public health or nuisance problem and impose the least hazard to fish, wildlife, and other natural resources protected or managed in such areas.

(2)(a) The department shall by January 1, 1987, promulgate rules to specify procedures for development and promulgation of a public lands control plan. Such rules shall require that all land management agencies identify environmentally sensitive and biologically highly productive public lands under their control which shall be subject to a public lands control plan. Such public lands shall be identified to the department and the local arthropod control agency along with a description of the purpose for which the lands are managed. All public lands not identified by a land management agency as environmentally sensitive or biologically highly productive shall be subject to the local arthropod control agency's general work plan.

(b) The local arthropod control agency shall propose a public lands control plan to the land management agency and the department which shall become effective upon mutual agreement of the land management agency and the arthropod control agency.

(c) If the land management agency and the local arthropod control agency are unable to agree on a public lands control plan, the Florida Coordinating Council on Mosquito Control may recommend a control plan to the department, which shall propose a recommended public lands control plan. If the land management agency and the local arthropod control agency fail to agree to such recommended public lands control plan within 30 days of the rendering of such plan, either agency may petition the Land and Water Adjudicatory Commission to determine whether the proposed control plan employs methods which are the minimum necessary and economically feasible to abate a public health or nuisance problem and which impose the least hazard to fish, wildlife, and other natural resources protected or managed in such areas. Unless both parties waive their right to a hearing, the Land and Water Adjudicatory Commission shall direct a hearing officer to hold a hearing within the jurisdiction of the local arthropod control agency pursuant to the provisions of s. 120.57 and submit a recommended order. The commission shall, within 60 days of receipt of the recommended order, issue a final order adopting a public lands control plan. Consistent with s. 120.57(1)(b)10., [FN1PP] the commission may adopt or modify the proposed control plan. The commission shall adopt rules on the conduct of appeals before the commission.

(d) If the adopted public lands control plan provides that the local arthropod control agency shall perform no arthropod control on designated parcels of publicly owned property within the local arthropod control agency's jurisdiction, the local arthropod control agency shall be deemed to be relieved of responsibility for arthropod control on that parcel for the effective period of the adopted public lands control plan.

(e) Until a public lands control plan pertaining to lands identified by the Board of [FN2PP] Trustees of the Internal Improvement Trust Fund as environmentally sensitive and biologically highly productive is adopted, arthropod control activities shall be conducted on such lands only with the consent of the Board of [FN2PP] Trustees of the Internal Improvement Trust Fund.

388.42. John A. Mulrennan, Sr., Arthropod Research Laboratory

(1) The John A. Mulrennan, Sr., Arthropod Research Laboratory, located in Panama City shall be a research laboratory under the supervision of the department. The laboratory shall perform basic and applied research to develop and test formulations, application techniques, and procedures of pesticides and biological control agents for the control of arthropods. Special attention shall be given to the needs of arthropod control districts, counties, and municipalities of the state by providing information, assistance, and recommendations for the safe and effective control of arthropods which create a health or nuisance problem. The laboratory shall also conduct environmental impact studies to determine the effects of arthropod control pesticides, with a special emphasis on integrated arthropod control.

(2) Any funds which may become available from the Federal Government, from any district or county, from funds appropriated to local arthropod control agencies by the state, or from any other sources may be used according to law in constructing, equipping, and operating the laboratory.

388.43. Florida Medical Entomology Laboratory

(1) The Florida Medical Entomology Laboratory, located in Vero Beach, shall be a research and training center for the state under the supervision of the Board of Regents. The laboratory shall be an operational unit of the University of Florida and an integral part of the Institute of Food and Agricultural Sciences. (2) The Florida Medical Entomology Laboratory shall perform basic and applied research in the biology and control of biting insects and other arthropods of importance as transmitters of disease or as pest annoyances, with special attention to the needs of the various mosquito-control organizations, districts, counties, and municipalities of the state. On a quarterly basis, the laboratory shall provide the Department of Health and Rehabilitative Services with such information as the department shall require to assist it in the performance of its duties with respect to mosquito control under this chapter. The laboratory shall also be a center for the training of students and personnel in the entomological aspects of public health, veterinary science, sanitation, mosquito control, drainage and irrigation design, wetlands management, and other areas of service requiring knowledge of medical entomology. Research and training may extend to international programs of the university under appropriate contract and grant

arrangements with international, foreign, and federal agencies.

388.45. Threat to public health

The secretary of the department is authorized to declare that a threat to the public health exists when the department discovers in the human or surrogate population the occurrence of an infectious disease that may be transmitted from arthropods to humans. Such declaration shall contain the geographical boundaries and duration of the declaration. After such declaration, the secretary shall order such preventive treatment and ameliorative arthropod control measures as may be necessary to prevent the spread of disease, notwithstanding contrary provisions of this chapter or the rules promulgated hereunder. Within 24 hours of such declaration, the department shall notify the agency heads of the Department of Agriculture and Consumer Services, Department of Natural Resources, and Department of Environmental Regulation of such declaration.

388.46. Florida Coordinating Council on Mosquito Control; establishment; membership; organization; responsibilities

(1) Establishment of council; legislative intent.--It is declared to be in the best interest of the state that public agencies responsible for and involved in arthropod control activities work together to reduce duplication of effort, foster maximum efficient use of existing resources, advise and assist the agencies involved in arthropod control in implementing best management practices and best available technology in controlling arthropods, develop outside funding sources and establish priorities for research into the environmental effects of arthropod control, and enhance communication between all interests involved in arthropod control activities. It is therefore the intent of the Legislature to establish the Florida Coordinating Council on Mosquito Control. The Florida Coordinating Council on Mosquito Control shall be an advisory body, as defined in s. 11.611(3)(a).

(2) Membership, organization, and responsibilities.--

(a) Membership.--The Florida Coordinating Council on Mosquito Control shall be comprised of the following representatives or their authorized designees:

1. The Secretary of Environmental Regulation and the Secretary of Health and Rehabilitative Services;

2. The executive directors of the Game and Fresh Water Fish Commission and the Department of Natural Resources;

3. The state epidemiologist;

4. The Commissioner of Agriculture; and

5. Representatives from:

a. The University of Florida, Institute for Food and Agricultural Sciences, Florida Medical Entomological Research Laboratory;

b. The United States Environmental Protection Agency;

c. The United States Department of Agriculture, Insects Affecting Man Laboratory;

d. The United States Fish and Wildlife Service; and

e. Two mosquito control directors to be nominated by the Florida Mosquito Control Association, two representatives of Florida environmental groups, and two private citizens who are property owners whose lands are regularly subject to mosquito control operations, to be appointed to 2-year terms by the Governor.

(b) Organization.--The council shall be chaired by the Secretary of Health and Rehabilitative Services or his authorized designee. A majority of the membership of the council shall constitute a quorum for the conduct of business. The chairman shall be responsible for recording and distributing to the members a summary of the proceedings of all council meetings. The council shall meet at least three times each year, or as needed. The council may designate subcommittees from time to time to assist in carrying out its responsibilities, provided that the Subcommittee on Managed Marshes shall be the first subcommittee appointed by the council. The subcommittee shall continue to provide technical assistance and guidance on mosquito impoundment management plans and develop and review research proposals for mosquito source reduction techniques.

(c) Responsibilities.--The council shall:

1. Develop and implement guidelines to assist the department in resolving disputes arising over the control of arthropods on publicly owned lands.

2. Identify and recommend to the department research priorities for arthropod control practices and technologies.

3. Develop and recommend to the department a request for proposal process for arthropod control research.

4. Identify potential funding sources for research or implementation projects and evaluate and prioritize proposals upon request by the funding source.

5. Prepare and present reports, as needed, on arthropod control activities in the state to the Pesticide Review Council, the Florida Coastal Management Program Interagency Management Committee, and other governmental organizations, as appropriate.

**CHAPTER 10D-54
MOSQUITO CONTROL PROGRAM
ADMINISTRATION**

Rule 10D-54.021 Definitions.

In addition to those terms contained in Section 388.021, F. S., the following terms shall mean:

(1) "District" - any defined area of the state or a county established for express purpose of controlling arthropods within said boundaries under the provisions of Chapter 388, F. S. or other legislative acts. These rules shall apply only to districts participating under Chapter 388, F. S., except as provided in Sections 388.323, F. S. and 388.281, F. S.

(2) "County" - any of the sixty-seven (67) political subdivisions of the state created for purpose of local self-government.

(3) "Arthropods" - those insects of public health or nuisance importance, including all mosquitoes, midges, dog flies, house flies, yellow flies, and sand flies.

(4) "Certified budget" - district or county budget for control of arthropods attested to by the clerk of the circuit court, secretary of the board of commissioners or any other person duly authorized by law under the official seal of the district or county.

(5) "Permanent control projects" - planned methods to control arthropods through construction designed to alter environmental conditions in arthropod breeding areas.

(6) "Temporary control activities" - planned methods of controlling arthropods for short periods of time through application of repetitive measures.

(7) "State I funds" - funds received from the state pursuant to Section 388.261(1), F. S. expended for any and all types of arthropod control measures approved by the department.

(8) "State II funds" - funds received from the state pursuant to Section 388.261(2), F. S. expended only for permanent control measures approved by the department.

(9) "Beaches and bayshores" - the areas within 1500 feet landward of the high-tide mark.

(10) "Department" - the Department of Health and Rehabilitative Services.

(11) "Adulticide" - a pesticide intended to affect an adult arthropod.

(12) "Use" - any act of handling or release of a

pesticide or exposure to man or the environment of a pesticide through acts including but not limited to:

(a) Application of a pesticide, including mixing and loading and any required supervisory action in or near the area of application;

(b) Storage actions for pesticides and pesticide containers;

(c) Disposal actions for pesticides and pesticide containers and;

(d) Transportation actions for pesticides and pesticide containers.

(13) "Labeling" - all labels and all other written, printed, or graphic matter:

(a) Accompanying the pesticide or device at any time; or

(b) To which reference is made on the label or in literature accompanying the pesticide or device, except to current official publications of the Environmental Protection Agency, the United States Departments of Agriculture and Interior, the Department of Health, Education and Welfare, and other similar federal or state institutions or agencies authorized by law to conduct research in the field of pesticides.

(14) "Person" - any individual, partnership, association, corporation, organized group of persons, whether incorporated or not, or governmental agency or governmental arthropod control agency's program director.

(15) "Certification" - the recognition by the department that a person is competent in the use of pesticides and other arthropod control measures. Thus, upon completion of all requirements for licensing as an applicator, shall be authorized to use or supervise the use of arthropod control pesticides.

(16) "Certified applicator" - any person 18 years or older who is licensed to use or supervise the use of a pesticide intended for arthropod control.

(17) "Commercial applicator" - a licensed applicator, whether or not he is a private applicator with respect to some uses, who uses or supervises the use of a pesticide intended for arthropod control on any property other than his own individual residence or on agricultural property regulated by Chapter 487 FS.

(18) "Arthropod control pesticide" - any substance or mixture of substances intended for preventing, destroying, repelling or mitigating any arthropod as

defined in Section 388.011(4) FS.

(19) "Arthropod control program" - a program organized for the purpose of controlling arthropod populations on property other than that exempted under Section 388.361(4) FS.

(20) "Director" - a person responsible for the supervision of a district as defined under Section 388.011(2) FS.

(21) "Public health pest control" - a category or classification of certification that includes private applicators, federal, state, or other governmental employees using or supervising the use of general or restricted- use pesticides in public health programs for the management and control of pests having medical and public health and nuisance importance.

(22) "Environmentally sensitive" - public lands that have special ecological values and which values may be lost to a substantial degree by the application of certain pesticides or other practices used in the control of arthropods.

(23) "Biologically highly productive" - those public lands that make exceptionally high beneficial contributions to the overall ecology of a region or area.

(24) "Public land management agency" - any federal, state, or county agency that may be responsible for the management of such public lands as parks, wildlife management areas, preserves, fishing grounds, sea shores, etc., including but not limited to the Florida Department of Natural Resources, Florida Department of Environmental Regulation, Florida Department of Agriculture and Consumer Services, Game and Fresh Water Fish Commission, and Trustees of the Internal Improvement Trust Fund.

(25) "Public lands control plan" - those plans formulated by a public land management agency and a local arthropod control agency for the purposes of achieving the legislative intent as declared in Section 388.0101 FS.

(26) "Other public lands" - those lands not identified by a land management agency as environmentally sensitive or biologically highly productive.

Specific Authority 388.361 FS. Laws Implemented 388.361, 388.4111 FS. History - New 1-1-77, Formerly 10D-54.21, Amended 2-10-87.

Rule 10D-54.022 Eligibility for State Aid.

(1) A district or county may be eligible to receive state aid for control of arthropods when it provides an item in its annual budget for such purpose and complies

with provisions of Section 388.271(1), F. S.

(2) Nonparticipating counties shall be admitted to the state aid program only on October 1 of any given year.

Specific Authority 388.361 FS. Laws Implemented 388.361 FS. History - New 1-1- 77, Formerly 10D-54.22.

Rule 10D-54.023 Participation Prerequisites.

When proposing permanent control projects a district or county shall prepare and submit to the department:

(1) Entomological investigation report on suspected arthropod breeding areas.

(2) Maps, aerial photographs or photostats of aerial photographs on which location of proposed project is shown and identified by appropriate number. Locations of proposed drainage ditches, dikes, impoundments, hydraulic fills, grading and filling areas, etc., indicated with nonpermanent markings.

(3) Description of proposed projects, complete as possible, including the location with reference to known landmarks, soil and vegetation type, arthropod producing data, approximate acres of arthropod producing area to be eliminated, method of control employed, type and size of construction equipment used. If applicable include size and length of drainage ditches or dikes, acreage to be filled or flooded, etc.

Specific Authority 388.361 FS. Laws Implemented 388.361 FS. History - New 1-1- 77, Formerly 10D-54.23.

Rule 10D-54.024 Project Inspections.

Department personnel shall inspect proposed projects in the field with local directors or their representatives. Inspection reports shall be examined for entomological, engineering and feasibility objectives by the department.

Specific Authority 388.361 FS. Laws Implemented 388.361 FS. History - New 1-1- 77, Formerly 10D-54.24.

Rule 10D-54.025 Project Approval Construction.

(1) The department in writing shall approve or deny in whole or in part each individual project and total program.

(2) Work shall not be commenced by a district or county until approvals are received by district or county.

Specific Authority 388.361 FS. Laws Implemented

388.361 FS. History - New 1-1- 77, Formerly 10D-54.25.

Rule 10D-54.026 Annual Work Plans and Budgets.

Not later than July 15 a district or county shall submit to the department two copies of a tentative work plan and a tentative work plan budget. The department will review and return one copy with written approval or recommendations for use in preparation of district or county certified budget. The tentative work plan and budget shall consist of:

(1) Narrative description of temporary control activities including methods, equipment, personnel, chemical mixtures, etc.

(2) List of approved permanent control projects indicating order of priority.

(3) Itemized and detailed budget showing amount of local funds, including estimated cash carry-over, budgeted by district or county for arthropod control; anticipated amount of state funds, including estimated cash carry-over, and all other anticipated receipts budgeted.

(4) Work plan budget showing breakdown of expenditures by account classification, fund charged and distribution according to the various temporary control activities and permanent control measures, general expense and capital investment.

(5) Contingency fund amounts not exceeding ten percent (10%) of total budget.

(6) Cash budgeted carried over at end of year for operating expenses for ensuing year not exceeding twenty percent (20%) of total budget unless approved by the department to create a reserve for a specific purpose.

Specific Authority 388.361 FS. Laws Implemented 388.271(1) FS. History - New 1- 1-77, Formerly 10D-54.26, Amended 2-10-87.

Rule 10D-54.027 Certified Budgets, Filing.

Not later than September 15 each district or county shall submit to the department two (2) copies of a certified budget on prescribed forms. Differences in amounts shown on the approved detailed budget and certified budget must be explained by accompanying requests for approval of changes to be made in the detailed budget. The certified budget shall show all estimated cash carry-over amounts as a beginning cash balance. When the estimated cash carry-over amount in any fund is found to be less than the actual cash

carry-over amount, a budget amendment shall be submitted to budget the additional amount of funds. However, only local fund carryovers rebudgeted by October 30th will be matched.

Specific Authority 388.361 FS. Laws Implemented 388.371 FS. History - New 1-1- 77, Formerly 10D-54.27.

Rule 10D-54.028 Certified Budgets, Amendments.

Budget amendments on prescribed forms shall be prepared and submitted to the department prior to over-expending funds in any account or expending funds in non-budgeted accounts. Budget amendments must be explained by accompanying requests for approval of changes to be made in the detailed budget. Department approval of the amendment(s) must be received before such expenditures are made.

Specific Authority 388.361 FS. Laws Implemented 388.271 FS. History - New 1-1- 77, Formerly 10D-54.28.

Rule 10D-54.029 Reports of Expenditures, Accomplishments.

(1) A district or county shall submit a monthly financial report on prescribed forms to the department not later than thirty (30) days after the end of each month.

(2) A district or county shall submit two (2) copies of its September financial report to the department not later than sixty (60) days after close of each fiscal year. Copies of report shall be signed by program director or person responsible for administration of the program and funds. The department will acknowledge acceptance of the report by signing and returning one (1) copy to the district or county for the official files.

(3) A district or county shall submit monthly reports of accomplishments and an inventory of chemicals, on prescribed forms to the department not later than thirty (30) days after the end of each month.

(4) Any county or district withdrawing from participation in state matching funds under Chapter 388, F. S. shall continue to submit financial reports as required in 10D-54.029(1) until funds received under this program are exhausted.

Specific Authority 388.361 FS. Laws Implemented 388.341 FS. History - New 1-1- 77, Formerly 10D-54.29.

Rule 10D-54.030 State Aid Basis and Availability.

(1) A district or county may be eligible to receive State I funds on a dollar-for-dollar matching basis not to exceed fifteen thousand dollars (\$15,000.00) for any one (1) county for any one (1) fiscal year based on local funds budgeted and approved by the department, or on total approved expenditures of local funds for arthropod control, whichever is the lesser. Tentative allocations and payments shall be made on the basis of approved local funds budgeted. If total approved expenditures of local funds of a district or county for the fiscal year are under fifteen thousand dollars (\$15,000.00) and are under approved budgeted sum, a minus adjustment shall be made in the allocation and payment of State I funds in the manner described in Rule 10D-54.030(3) for State II funds.

(2) Maximum amount of State II funds available to a district or county for any one (1) fiscal year will be seventy-five percent (75%) of approved local funds budgeted or total approved expenditures of local funds for arthropod control, whichever is the lesser. For purpose of budgeting state funds in any fiscal year districts or counties shall calculate amounts of State II funds available to them at the percentage rate as notified by the department. Tentative allocations and payments shall be made on the basis of matchable local funds budgeted.

(3) Following receipt and review by the department of a district or county annual financial report submitted in compliance with Rule 10D-54.029(2) the amount of State II funds earned by a district or county for that fiscal year shall be determined by multiplying the final annual percentage rate for State II fund allocation by the matchable local fund expenditures, or matchable local fund budget, whichever is the lesser. Any over or under allocation so calculated for a district or county will be included in computing State II funds payable to the district or county the succeeding fiscal year. Districts or counties shall be notified of such adjustments in amount of funds to be allocated and if necessary shall amend amount of state funds budgeted.

(4) If amount of State II funds is insufficient to grant participating districts or counties seventy-five percent (75%) of local funds budgeted the department shall determine maximum percentage available following receipt and approval of certified budgets for fiscal year beginning October 1. Following the determination of maximum percentage used to calculate amounts available, if necessary the department shall make an

adjustment in amounts of money payable to the district or counties in the last three (3) quarters of current fiscal year. Districts or counties shall be notified of maximum percentage available and adjustments in amounts of money payable to them and if necessary shall amend amounts of state funds budgeted.

(5) The amount of state funds available to a district or county for any fiscal year shall be paid in quarterly installments following compliance with Rule 10D-54.026.

(6) The total amount of local funds shown in certified budget submitted to and approved by the department may be supplemented with additional local funds during fiscal year. State funds shall not be granted on a matching basis for additional funds in the budget after October 30 of the fiscal year.

(7) If there is more than one (1) district within a county final allocation and payment of state funds shall be prorated according to total approved expenditures of local funds for each district.

(8) State funds shall not be granted on a matching basis on following items in the budgeted local funds:

(a) Money used for repayment of loans when such loans have previously been matched with state funds.

(b) Interest on loans or carrying charges on the cost of equipment purchased on a lease-purchase plan.

(c) Amortization of the purchase price of equipment.

(d) Grants of funds from other state agencies.

(e) The collection of solid wastes.

(f) Funds expended for purchase or improvement of land.

(g) Purposes other than arthropod control.

Specific Authority 388.361 FS. Laws Implemented 388.281 FS. History - New 1-1- 77, Formerly 10D-54.30.

Rule 10D-54.031 District or County Use of Funds.

(1) Prior to advertising for the purchase of equipment the district or county shall jointly determine with the department the type and size of equipment necessary to perform the work planned. The district or county shall submit complete specifications to the department for all equipment to be purchased when the cost will exceed six thousand (\$6,000) dollars per unit, and shall receive an approved copy of said specifications before advertising for bids.

(2) Districts or counties as authorized by law may,

upon department approval, purchase equipment by borrowing funds, time-payment plan or lease-purchase plan. When purchases are made in whole or in part from local funds, amounts paid from local funds in each fiscal year for the purchase price or principal of loan shall be matched with state funds provided interest, carrying charges or other loan costs will not be matched.

(3) State funds shall not be used for payment of any item shown under Rule 10D-54.030(8)(a)-(g).

(4) Proceeds from sale or rental of property purchased with district, county or state funds shall be deposited and credited to State I funds. Districts or counties not having State I funds, proceeds shall be credited to State II funds and deposited to that account.

(5) Insecticide spray material shall not be sold by districts or counties without approval from the Department.

(6) State funds received shall be deposited in a separate depository account from local funds received. State I and State II funds may be deposited in a single account but separate financial records shall be kept. Disbursements shall be made on prenumbered checks or warrants drawn on proper depository accounts.

(7) Local and state funds shall be deposited in banks designated as depositories of public funds in accordance with provisions of Section 659.24, F. S.

Specific Authority 388.361 FS. Laws Implemented 388.281 FS. History - New 1-1- 77, Formerly 10D-54.31.

Rule 10D-54.032 Program Directors, Employment and Classification.

(1) Districts or counties in the state budgeting local funds in excess of fifteen thousand dollars (\$15,000.00) for arthropod control during a fiscal year shall employ a qualified person to plan, supervise and direct the execution of county or district arthropod control program.

(2) Persons seeking position of mosquito control program director must submit to the board of commissioners a written application setting forth his complete educational background, work experience and three (3) names of persons as reference to his ability in public or business administration.

(3) Commissioners shall forward to the department their recommendation, together with the individual's written application, for employment as mosquito control program director, and upon written approval of the

department, pursuant to Section 10D-54.032(4), the applicant can be employed following passing an examination as required in Section 10D-54.032(5).

(4) The following minimum director classifications are based upon amount of local funds budgeted for the fiscal year in which he is initially employed and for which he assumes responsibilities of administration.

(a) Director I -

Local budget \$15,000.00 to \$24,999.99.

Maximum state aid \$26,250.00 to \$33,749.99.

Minimum qualifications for Director I position: high school graduate with minimum of three (3) years of training and field experience in control of mosquitoes, or three (3) years experience in responsible charge of the operation of a business, or a graduate of four (4) year college or university with a degree in the basic sciences or engineering.

(b) Director II -

Local budget \$25,000.00 to \$99,999.99.

Maximum state aid \$33,750.00 to \$89,999.99.

Minimum qualifications for Director II position: Graduate of four (4) year college or university with a degree in the basic sciences or engineering. Requirements for college degree as described and listed by the U. S. Environmental experience record of four years directing or assisting in directing a large work program in the mosquito or arthropod control field.

(c) Director III -

Local budget \$100,000.00 and over.

Maximum state aid \$90,000.00 to \$150,000.00.

Minimum qualifications for Director III position: graduate of four (4) year college or university with a degree in the basic sciences or engineering. Requirements for college degree may be waived if applicant has proven satisfactory work experience record of five (5) years directing or assisting in directing a large work program in the mosquito or arthropod control field.

(5) When a mosquito control program director's position is to be filled, the applicant shall take and pass a written examination prior to appointment or within six months of employment, if specified by the department.

Specific Authority 388.361 FS. Laws Implemented 388.361 FS. History - New 1-1- 77, Formerly 10D-54.32, Amended 2-10-87.

Rule 10D-54.033 Individual Responsible for the Application of Restricted-Use Pesticides for Arthropod Control Required to Pass an Examination. (Repealed)

Specific Authority 388.361 FS. Laws Implemented 388.361 FS. History - New 1-1- 77, Formerly 10D-54.33, Repealed 2-10-87.

Rule 10D-54.034 Penalty for Failure to Comply with Public Law 92-516, the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) of the U. S. Environmental Protection Agency and Their Rules.

(1) The board of commissioners of a county, or mosquito control district, whichever is applicable, shall be notified when it is found that the mosquito control program director is violating the Federal or state laws or rules governing the application of restricted pesticides. The board of commissioners will take whatever action is necessary to prevent future violations.

(2) Certification of applicators may be suspended, revoked, or renewal thereof denied, by the Department, its successor agency or programs, upon one or more of the following grounds:

(a) Violation of FIFRA, any relevant EPA rule or regulation, or any ordinance or regulation of the Commissioners;

(b) Conviction in any court within this state of the violation of any provision of this Act, or any rule or regulation or ordinance of the Department or the Commissioners;

(c) A final order imposing civil penalties under Subsection 14(a), Public Law 92-516, or a criminal conviction under Subsection 14(b), of said Public Law;

(d) Knowingly using methods or materials unsuitable for control undertaken;

(e) Performing control in a negligent manner;

(f) Failure to give the Department or Commissioners or authorized representatives thereof, true information upon request regarding methods and materials used, work performed, falsification of records, or other information essential to the administration of this measure;

(g) Failure of the certified applicators to maintain for a period of at least two years operational records containing information on kinds, amounts, uses, dates, and places of application of restricted use of pesticides.

(3) The Board of Commissioners shall enact appropriate regulations or ordinances within a

reasonable time covering discharge or other disciplinary action in at least those areas as designated in 10D-54.034 (2), F. A. C.

(4) It shall be the duty of the Board of Commissioners to notify the Department when violations have been brought to the commissioner's attention and when action under 10D-54.034(3) is instituted.

(5) Should the Board of Commissioners fail to take appropriate action when violations have been brought to their attention, it will be the duty of the Department to present all evidence to the U. S. Environmental Protection Agency (EPA) for such action as that agency may determine is warranted.

Specific Authority 388.361 FS. Laws Implemented 388.361 FS. History - New 1-1- 77, Formerly 10D-54.34.

ANNOTATIONS

Authority

The Department of Health and Rehabilitative Services possesses no authority to impose administrative fines or sanctions for violations of F. S. A. Ch. 388, pursuant to Ch. 10D-54, F. A. C., or 7 U. S. C. Ch. 6 ss 136 et seq., the Federal Insecticide, Fungicide, and Rodenticide Act. Op. Atty. Gen., 85-44, May 1985.

Rule 10D-54.035 Intent.

It is the intent that Rules 10D-54.033 and 10D-54.034 shall be subject to provisions of Public Law 92-516 administered by the U. S. Environmental Protection Agency and their rules and/or by such laws and rules as may be passed by the State of Florida, regarding the use and application of restricted pesticides as described and listed in the Federal Register as rules of the U. S. Environmental Protection Agency.

Specific Authority 388.361 FS. Laws Implemented 388.361 FS, U. S. Pub. Law 92- 516. History - New 1-1-77, Formerly 10D-54.35.

Rule 10D-54.036 Demonstrable Increase or Other Indicator of Arthropod Population Level.

Mosquito and other arthropod control programs will insure that the application of pesticides are made only when necessary by determining a need in accordance with specific criteria that demonstrate a potential for a mosquito-borne disease outbreak, or numbers of disease vector mosquitoes sufficient for disease

transmission or defined levels of, or a quantifiable increase in numbers of pestiferous mosquitoes or other arthropods as defined by Section 388.011(4) FS. To determine the need for applications of adulticides, at least one of the following criteria will be met and documented by records:

(1) When a large population of adult mosquitoes is demonstrated by either a quantifiable increase in, or a sustained elevated, mosquito population level as detected by standard surveillance methods.

(2) Where adult mosquito populations build to levels exceeding 25 mosquitoes per trap night or 5 mosquitoes per trap hour during crepuscular periods.

(3) When service requests for arthropod control from the public have been confirmed by one or more recognized surveillance methods.

(4) When counts as determined by normal surveillance methods in the daytime exceed 5 per minute for stable flies (dogflies) on beaches and bayshores.

(5) Aircraft applications of mosquito adulticides along beaches and bayshores shall be justified only when there is a demonstrable three-fold increase over a base population.

Specific Authority 388.361 FS. Laws Implemented 388.361(2)(a) FS. History - New 2-10-87.

Rule 10D-54.037 Aircraft Application for the Control of Adult Arthropods.

(1) Any arthropod control activities conducted under this section by local arthropod control agency on private lands where there is a possibility of deposition of airborne substances on public lands determined to be environmentally sensitive and biologically highly productive under Section 10D-54.042 will be conducted in a manner to minimize the deposition onto such lands. An adopted public lands control plan approved under Section 10D-54.042 shall supersede the requirements of this rule when the terms conflict.

(2) Once the decision to apply an adulticide by aircraft is made, the following will apply:

(a) Only specific areas where a need is documented by the criteria outlined in Section 10D-54.036 will be treated.

(b) Adulticides selected shall be those labeled for aircraft application in accordance with 10D-54.046(6)(b) to provide adequate control of the problem mosquitoes or other arthropods and when used in accordance with widespread and commonly recognized practice it will

not cause unreasonable adverse effects on the environment. Adulticide labels will be strictly followed.

(c) Application shall be timed to be most effective during mosquito activity periods. Application shall not be later than 2 hours after sunrise nor earlier than 2 hours before sunset. Other arthropod treatment and treatments for disease epidemics involving *Aedes aegypti* or *Aedes albopictus* can be made during daytime hours.

(d) Equipment shall be calibrated to insure correct particle size and accurate and uniform dosages in accordance with labeling specifications.

(e) Pesticide labels prohibit aerial application of adulticides directly to open water of the ocean, gulf, bays or lagoons thereof, therefore, when aircraft release sprays over water targeted to drift over land, wind speed and direction shall be sufficient to carry spray to land.

(f) After an aerial adulticiding operation takes place, records shall be maintained for a minimum of 3 years which will include at least the following:

1. The area treated.
2. The application rate and the material used.
3. The equipment and technique used.
4. The name of the pilot in command.
5. The date, time, temperature, and general wind speed and direction.
6. Pretreatment and post-treatment records of mosquito and other arthropod presence including:
 - a. Number and type of trapping and surveillance methods used.
 - b. Trap and surveillance site location.
 - c. Pretreatment and post-treatment trap catches, landing rates or surveillance levels by mosquito species involved.
7. Apparent non-target effects.

(3) Exemptions - Aerial applications of adulticides made for research purposes that have been properly permitted by federal and state agencies are exempt from this rule.

Specific Authority 388.361 FS. Laws Implemented 388.361(2)(a) FS. History - New 2-10-87.

Rule 10D-54.038 Use Requirements for All Arthropod Control Pesticides.

No person shall do the following:

(1) Use a registered arthropod control pesticide in a manner inconsistent with its labeling.

(2) Use any arthropod control pesticide which is under an experimental use permit contrary to the provisions of such permit.

(3) Use any arthropod control pesticide exempted from registration requirements under Chapter 487, FS, and Section 5E-2.032 contrary to the conditions under which the exemption was granted.

Specific Authority 388.361 FS. Laws Implemented 388.361(2)(c) FS. History - New 2-10-87.

Rule 10D-54.039 Protection of Natural Resources and of the Health, Safety, and Welfare of Arthropod Control Employees and the General Public.

(1) Methods of mosquito control performed on private land where natural resources are a major concern shall be conducted in a manner to protect the environmental and ecological integrity of the lands and waters.

(2) To protect the health, safety and welfare of arthropod control employees and the general public, applicators certified in public health pest control or health related pest control will supervise no more than 15 uncertified employees and shall provide instructions and training to those employees to include the following:

(a) The safety procedures and precautions to be followed in handling or applying arthropod control pesticides as specified by their labeling.

(b) The proper use and care of safety clothing and equipment to be worn or used as may be specified in the label.

(c) The common symptoms of pesticide poisoning.

(d) The dangers of eating, drinking or smoking while handling or applying pesticides and the need to wash clothing worn and bathe after working with pesticides in order to avoid unnecessary prolonged exposure to pesticides residues.

(e) The name and location of nearby medical facility at which emergency treatment for pesticide exposure may be obtained.

(f) Instructions regarding operation of application equipment in or over residential areas to minimize exposure to the general public.

(g) Instructions regarding emergency procedures to be followed in the event of an accidental pesticide spill particularly those relating to a vehicular accident and resultant spill and dumping procedures in the event of an aircraft emergency.

Specific Authority 388.361 FS. Laws Implemented

388.361(2)(d) FS. History - New 2-10-87.

Rule 10D-54.040 Criteria for Licensure or Certification of Applicators.

(1) It is a violation of these rules for a person to apply or supervise the application of a pesticide intended to control arthropods on property other than his own individual residential or agricultural property unless he is licensed to do so or is working under the supervision of a licensed applicator.

(2) Licensing and exemptions. All persons who apply an arthropod control pesticide, unless they operate under the direct supervision of a licensed applicator, shall apply to the department for certification and be licensed as an arthropod control pesticide applicator by the department whether such pesticides used are classified as general use or restricted use, except those applicators controlling arthropods upon their own individual residential or agricultural property. All applicators licensed by the department as of January 1, 1987, do not require relicensing.

(3) Certification standards. Competency standards for the certification of public health pest control applicators will be determined by an examination that demonstrates a practical knowledge of the principles and practices of arthropod control and the safe use of pesticides and a category examination which demonstrates a practical knowledge of vector-disease transmission as it relates to and influences application programs. A passing grade of 75 percent, or above, will be required.

(4) Recertification. All certified applicators shall provide evidence of continued competency prior to license renewal by completing, once every 4 years, one of the following:

(a) Short course and examination.

(b) Workshop and examination.

(c) Convention or meeting and examination.

(d) Examination.

(5) Licenses shall be renewed every 4 years from the date of the original certification. Licenses will expire 60 days after renewal date.

(6) Re-examination shall be required to renew licenses after the 60-day grace period.

(7) All applicators performing public health pest control shall be licensed by January 1, 1988.

(8) Public Health Pest Control applicators will keep accurate records so that monthly activity reports

relative to pesticide application, source reduction, water management, biological control and surveillance activities can be assessed by the department. These reports shall be retained for a period of 3 years and be made available to the department upon request.

Specific Authority 388.361 FS. Laws Implemented 388.361(4) FS. History - New 2- 10-87.

Rule 10D-54.041 Authorization for the Department to Promulgate Rules and Regulations More Stringent Than EPA.

The procedures to be followed by the department in promulgating rules more detailed or stringent than the registered label will be the same as those described in detail in the Memorandum of Understanding (September 9, 1986) between the Department of Agriculture and Consumer Services and the Department of Health and Rehabilitative Services, is incorporated by reference. A copy is on file with the department.

Specific Authority 388.361 FS. Laws Implemented 388.361(3) FS. History - New 2- 10-87.

Rule 10D-54.042 Criteria for Arthropod Control That May Affect Environmentally Sensitive and Biologically Productive Public Lands and Other Public Lands.

(1) It is the intent of this rule to implement Section 388.4111 FS by establishing the procedures to be followed to implement arthropod control plans on environmentally sensitive and biologically highly productive public lands.

(2) Land management agencies and local arthropod control agencies are encouraged to work cooperatively to informally achieve agreement on public land control plans. To that end, local arthropod control agencies shall, upon request of a land management agency, describe alternative arthropod control measures which may be appropriate for particular public land and otherwise upon request provide information relative to arthropod control.

(3) Each public land management agency managing lands in Florida shall:

(a) Determine whether it is managing public lands in Florida that are environmentally sensitive and biologically highly productive.

(b) Give written notice to the department and any affected local arthropod control agencies which lands are environmentally sensitive and biologically productive. A list of the mosquito control agencies shall

be provided by the department to all land management agencies. Written notice shall include but not be limited to:

1. Aerial photographs or maps depicting the public lands made subject to the notice;

2. A statement of the purpose for which the lands are managed along with a description of ecological data giving rise to the determination of the land management agency;

3. A specification of the potential ecological harm to be guarded against in planning arthropod control on such land with a detailed statement, in so far as reasonably feasible, of what arthropod control measures, if any, the land management agency believes would be suitable for such lands; and

4. Such other pertinent information relative to such determination that provides a better understanding of the land management agency's problems that need to be addressed in an arthropod control plan for the land subject to such determinations.

(4) A local arthropod control agency upon receipt of a written notice shall:

(a) Prepare a written plan for arthropod control on the environmentally sensitive and biologically highly productive public lands identified in the notice. Such proposed plan shall be submitted to the public land management agency within 45 days from receipt of the notice.

(b) The proposed Public Lands Control Plan shall include but not be limited to:

1. The need for arthropod control on the identified lands.

2. The areas where arthropod control measures are proposed.

3. The location of any rotary ditching or other land modification activity.

4. Operational schedules for water level fluctuations.

5. Notification of public lands manager before commencement of control measures.

6. Periodic restrictions as applicable, for example peak fish spawning times.

7. The criteria to be used in determining application of pesticides. Such criteria shall not be less restrictive than Section 10D-54.036.

8. The common or chemical name of the pesticides expected to be used.

9. The method of application to be used for each specific product.

10. The rate of application to be used for each specific product.

(5) The proposed public lands control plan shall:

(a) Become effective immediately upon agreement between the Public Lands Management Agency, the local arthropod control agency and the department or

(b) Become effective within 45 days, or such other period of time agreed to by both parties, from receipt by the Public Lands Management Agency unless the Public Lands Management Agency objects to the proposed plan. The objection(s) of the land management agency shall be filed with the local arthropod control agency and the department with a statement of the reasons for the objection(s) and suggested alternatives. Failure to object to a proposed control plan or a portion thereof shall be deemed consent to perform control methods not objected to.

(6) If the land management agency and the local arthropod control agency are unable to agree on a public lands control plan, either party may, by written notice, request the department initiate the dispute resolution process pursuant to Section 388.4111(2)(c) FS. The department shall, within 15 days of receipt of such written notice forward the proposed control plan, the land management agency's objections, and any other pertinent correspondence or information to the Florida Coordinating Council on Mosquito Control for consideration and recommendation.

(7) Lands identified as environmentally sensitive and biologically highly productive shall remain subject to the local arthropod control agency's general work plan prior to approval of a control plan pursuant to this rule. However, environmentally sensitive and biologically highly productive public lands identified and managed by the Trustees of the Internal Improvement Trust Fund shall not be subject to control measures without the Trustees' consent.

(8) Approved control plans shall be kept on file with the department. If neither the land management agency or the local arthropod control agency give notice of the need to revise an approved plan, the approved plan shall continue in effect until replaced by substitute plan. If either the land management agency or the local arthropod control agency wishes to revise an approved plan, written notice shall be given to the department and the other agency. A response shall be given within 45 days. Agreed upon revisions shall be submitted to the department. In the event the parties are unable to agree, the dispute resolution procedures of subsection (6) of

this rule shall be utilized.

Specific Authority 388.361, 388.4111 FS. Laws Implemented 388.4111 FS. History - New 2-10-87.

Rule 10D-54.045 Determination of Excessive Costs for Transferring Maintenance Spoil.

(1) The Department desires to determine whether the cost of using a self-contained uplands spoil site for the maintenance of existing insect control structures is so excessive that it will inhibit proposed insect control. In which event existing spoil sites or dikes may be used upon the notification to the Department of Environmental Regulation in accordance with Section 403.813(2)(g), Florida Statutes. On such a determination the Department may authorize the exemptions specified therein.

(2) The Department shall review each maintenance project which involves an insect control structure. If the project proposes that spoil be deposited on existing spoil sites or dikes and the deposition of which will result in a discharge to the waters of the State or the placement of the spoil material in the waters of the State as regulated in Chapter 17-4, Florida Administrative Code, then the Department will perform an engineering survey of the proposal and alternative means of spoil disposal. The engineering survey shall include the relative costs of the project with the spoil being transferred to an appropriate self-contained uplands spoil site, alternative disposal methods, and placement of the spoil on existing spoil sites or dikes. The cost determination shall be done using professionally accepted methodology.

(3) The following information shall be considered in making the cost determinations required by Rule 10D-54.045(2):

(a) The volume of the spoil and its specific characteristics including physical characteristics which result in excessive concentrations of spoil in waters of the state (this will include a size fraction test and a determination of the percentage of volatile materials in the spoil).

(b) Distance from the area of excavation to the nearest upland disposal site.

(c) Value of the upland disposal site and any associated title problems.

(d) The use cost of equipment presently under the control of the agency and the cost of acquiring or renting additional equipment.

(e) Deposition of spoil for each alternative.

(f) Economic value of environmental damage to areas affected.

(g) Costs, detriments and benefits associated with taking no action.

(h) All other relevant and necessary information.

(4) Information relating to the proposal shall be submitted pursuant to the procedures described in Rule 10D-54.023, Florida Administrative Code.

(5) On the determination of the costs of a proposal the Department shall determine whether the use of a self-contained uplands spoil site is so excessive in comparison to the alternative spoil disposal sites that it will inhibit proposed insect control, then the Department may authorize the use of the exemption contained in Section 403.813(2)(g), Florida Statutes, in which event existing spoil sites or dikes may be used for spoil disposal upon notification to the Department of Environmental Regulation. The determination of whether the cost inhibits proposed insect control shall take into account the need for the insect control, the benefits derived from the insect control, the effects of the costs on monies available for insect control, and any other relative and necessary factors.

(6) In accordance with Section 403.813(2)(g), Florida Statutes, in the case of insect control where upland spoil sites are not used pursuant to the exemption, turbidity control devices shall be used to confine the spoil material discharge to that area previously disturbed when the receiving body of water is used as a potable water supply, is designated as shellfish harvesting waters, or functions as a habitat for commercially or recreationally important shellfish or finfish.

(7) Such a determination shall be completed within ninety (90) days from receipt of a written request. Upon completion of the determination the Department will provide the Department of Environmental Regulation with copies of the final decision of the agency with appropriate documentation, and the documentation of the applicant's spoil containment methods and turbidity control devices to be used.

Specific Authority 388.361 FS. Laws Implemented 403.813 (2)(g) FS. History - New 5-26-80, Formerly 10D-54.45.

Rule 10D-54.046 Alternate State Water Quality Permitting Program for Insect Control Agencies.

(1) The Department desires to establish the minimum standards for participation in an approved program for application of pesticides to waters of the State for the

control of insects, so that governmental insect control programs may exercise the alternate permitting system noted in Section 403.088(1), Florida Statutes.

(2) Any insect control program desiring to exercise the Section 403.088(1), Florida Statutes, Alternate to water pollution permitting shall complete HRS Form 1298, Jul 80, "Application to Operate an Approved Program for the Application of Pesticides for Insect Control," which is incorporated by reference. The completed application shall be filed annually with the Department and a copy shall be filed with the Department and a copy shall be filed with the Department of Environmental Regulation. All existing programs must file within ninety (90) days after this rule becomes effective and all new programs must file and obtain approval prior to the initiation of operations.

(3) Upon approval the insect control program may apply pesticides in accordance with this rule without obtaining a specific water pollution permit from the Department of Environmental Regulation pursuant to Section 403.088(1), Florida Statutes.

(4) All programs operating under Rule 10D-54.046 shall conduct a pesticide applicator's safety training program consistent with and at least equivalent to that in the "Using Pesticides Safely" section of the University of Florida Cooperative Extension Service manual "Apply Pesticides Properly." Before June 30 each year, each program director shall attest to the Department that the referenced material has been reviewed by all employees handling pesticides under his supervision and that such employees have demonstrated their understanding of its contents.

(5) Only pesticides which are labeled by the United States Environmental Protection Agency or the Department of Agriculture and Consumer Services, pursuant to Chapter 487, Florida Statutes, and are applied pursuant to the instructions on the label, and the standards of the Department, as contained in Chapter 10D-54, F. A. C., will be allowed under Section 403.088(1), Florida Statutes.

(6) This rule applies only to pesticides, the active ingredients of which are listed below:

(a) Larvicides: distillate petroleum oils, methoxychlor, methoprene, chlorpyrifos, fenthion, malathion, temephos, non-petroleum oils, pyrethrins, allethrin, and biological materials.

(b) Adulticides: chlorpyrifos, fenthion, malathion, naled, pyrethrins and piperonyl butoxide, resmethrin,

propoxur, bendiocarb, resmethrin and piperonyl butoxide, and phenothrin.

(7) All applications of pesticides shall be in accordance with the good standards regarding safety and efficacy. Technical recommendations issued by the Department are available as guidelines in the area of safety and efficacy. If guidelines are unavailable, then the procedures which will be used for the applications by each registrant shall be recorded and copies of these records shall be furnished to this Department prior to application of the pesticides.

(8) All registrants shall report to the Department on a monthly basis. The reports shall address the following factors: types of pesticides, amount of pesticides used, pesticide application rates, and costs of such applications. A copy of each report shall be sent to the Department of Environmental Regulation by the Department.

(9) Within ninety (90) days after the filing of a completed application, the applicant should provide written information to the district office Department of Environmental Regulation, in which the insect control program will be operated, on the following: name of liaison officer for pesticide applications, address, business telephone number, office hours and home telephone number.

(10) Single copies of forms incorporated by reference within this rule may be obtained without cost from the HRS District General Services Office in your geographic area. See Rule 10-2.091, F. A. C., HRS Departmental Forms Index, for locations of these offices.

Specific Authority 403.088(1), 388.361 FS. Laws Implemented 403.088(1) FS. History - New 1-20-81, Amended 2-10-87.

Appendix H. Florida Department of Health and Rehabilitative Services Monthly Reporting Forms

MONTHLY REPORT OF ACCOMPLISHMENTS AND EXPENDITURES
AERIAL APPLICATION FORM

TO: OFFICE OF ENTOMOLOGY
DEPARTMENT OF HRS
POST OFFICE BOX 210
JACKSONVILLE, FLORIDA 32231

DISTRICT OR COUNTY: _____

FOR MONTH/YEAR OF : _____

SUBMITTED BY : _____

CODES:	AERIAL ULV - AU	AERIAL THERMAL FOGGING - AT	AERIAL LV/MISTING - AM	AERIAL LARVICIDING - AL			
	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
	HOURS OPERATED	AMOUNT APPL MIX USED	APPROX ACRES TREATED	SALARIES PAID	EQUIPMENT MAINTENANCE COSTS	APPLICATION MIXTURE COSTS	TOTAL COSTS

TYPE AIRCRAFT:	INSECTICIDE USED:			APPL.MIX/RATE:	CODE:
THIS MONTH					
FISCAL YEAR					

TYPE AIRCRAFT:	INSECTICIDE USED:			APPL.MIX/RATE:	CODE:
THIS MONTH					
FISCAL YEAR					

TYPE AIRCRAFT:	INSECTICIDE USED:			APPL.MIX/RATE:	CODE:
THIS MONTH					
FISCAL YEAR					

TYPE AIRCRAFT:	INSECTICIDE USED:			APPL.MIX/RATE:	CODE:
THIS MONTH					
FISCAL YEAR					

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THIS MONTH					
FISCAL YEAR					

TYPE AIRCRAFT:	INSECTICIDE USED:			APPL.MIX/RATE:	CODE:
THIS MONTH					
FISCAL YEAR					

TYPE AIRCRAFT:	INSECTICIDE USED:			APPL.MIX/RATE:	CODE:
THIS MONTH					
FISCAL YEAR					

COMMENTS: _____

**MONTHLY REPORT OF ACCOMPLISHMENTS AND EXPENDITURES
GROUND LARVICIDING FORM**

TO: OFFICE OF ENTOMOLOGY
DEPARTMENT OF HRS
POST OFFICE BOX 210
JACKSONVILLE, FLORIDA 32231

DISTRICT OR COUNTY: _____
FOR MONTH/YEAR OF : _____
SUBMITTED BY : _____

	COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4	COLUMN 5	COLUMN 6	COLUMN 7
	APPL. RATE	AMOUNT OF APPLICATION MIX USED	APPROXIMATE ACRES TREATED	SALARIES PAID	EQUIPMENT MAINTENANCE COST	APPLICATION MIXTURE COST	TOTAL COST

ESTICIDE FORMULATION:

THIS MONTH							
SCALAR							

ESTICIDE FORMULATION:

THIS MONTH							
SCALAR							

ESTICIDE FORMULATION:

THIS MONTH							
SCALAR							

ESTICIDE FORMULATION:

THIS MONTH							
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THIS MONTH							
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ESTICIDE FORMULATION:

THIS MONTH							
SCALAR							

ESTICIDE FORMULATION:

THIS MONTH							
SCALAR							

REMARKS:

MONTHLY REPORT OF ACCOMPLISHMENTS AND EXPENDITURES

GROUND ADULTICIDING FORM

**TO: STATE OF FLORIDA
DEPARTMENT OF HEALTH AND REHABILITATIVE SERVICES
OFFICE OF ENTOMOLOGY
P.O. BOX 210
JACKSONVILLE, FLORIDA 32231**

DISTRICT OR COUNTY: _____
FOR MONTH/YEAR OF : _____
SUBMITTED BY : _____

INSECTICIDE USED: _____ **FORMULATION:** _____ **CODE:** _____

ULV MACHINE UNIT NO.	NO. OF FLUID OZ. MACHINE IS SET TO DELIVER	HOURS ULV MACHINE OPERATED	TOTAL OUNCES OF INSECTICIDE (ONLY) USED	TOTAL GALLONS OF FORMULATION APPLIED	MILES TREATED	AV.OZ./MILE
MONTHLY TOTALS						
FISCAL YEAR TOTALS						

	SALARIES PAID	OPER. & MAINT. OF EQUIP.	FORMULATION COST	TOTAL COSTS
MONTHLY TOTALS				
FISCAL YEAR TOTALS				

COMMENTS:

H-3

