



Integrated Pest Management (IPM) Plan

Pesticide Stewardship Working Group

2019

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Contributors

This document was prepared by the Martin County Board of County Commissioners Pesticide Stewardship Working Group. The Pesticide Stewardship Working Group is comprised of members from the Public Works, Parks and Recreation, General Services, Utilities and Solid Waste, Growth Management Departments and the UF/IFAS Extension.

Definitions

Definitions for terms used within this document are consistent with those defined in Florida Statute 487.021 and outlined in the Martin County Integrated Pest Management Procedural Guidelines. These definitions are as follows:

Definitions per Florida Statute 487.021:

“Certification” means the recognition by the Florida Department of Agriculture and Consumer Services that an individual is a competent pesticide applicator and, thus, is eligible for a pesticide applicator’s license in one or more of the designated license types and categories.

“Certified Applicator” means any individual who has been recognized by the department as a competent pesticide applicator and, thus, is eligible to apply for licensure in one or more of the designated license types and categories.

“Licensed Applicator” means an individual who has reached the age of majority and is authorized by license from the Florida Department of Agriculture and Consumer Services to use or supervise the use of any restricted-use pesticide covered by the license.

“Pest” means any insect, rodent, nematode, fungus, weed; or any other form of terrestrial or aquatic plant life or animal life or virus, bacteria, or other microorganism, except viruses, bacteria, or other microorganisms on or in living humans or other living animals, which is declared to be a pest by the administrator of the United States Environmental Protection Agency or which may be declared to be a pest by the department by rule.

“Pesticide” means any substance or mixture of substances intended for preventing, destroying, repelling, or mitigating any insects, rodents, nematodes, fungi, weeds, or other forms of plant or animal life or viruses, except viruses, bacteria, or fungi on or in living humans or other animals, which the Department of Agriculture and Consumer Services by rule declares to be a pest, and any substance or mixture of substances intended for use as a plant regulator, defoliant, or desiccant; however, the term “pesticide” does not include any article that: is a “new animal drug” within the meaning of s. 201(w) of the Federal Food, Drug, and Cosmetic Act; has been determined by the Secretary of the United States Department of Health and Human Services not to be a new animal drug by a regulation establishing conditions for use for the article; or is an animal feed within the meaning of s. 201(x) of the Federal Food, Drug, and Cosmetic Act bearing or containing an article covered in this subsection.

“Restricted-Use Pesticide” means a pesticide which, when applied in accordance with its directions for use, warnings, and cautions and for uses for which it is registered or for one or more such uses, or in accordance with a widespread and commonly recognized practice, may generally cause, without additional regulatory restrictions, unreasonable adverse effects on the environment, or injury to the applicator or other persons, and which has been classified as a restricted-use pesticide by the Department of Agriculture and Consumer Services or the administrator of the United States Environmental Protection Agency.

1. Introduction

On September 25th, 2018 Martin County Board of County Commissioners (BOCC) directed staff to pursue an Integrated Pest Management (IPM) program. The Pesticide Stewardship Working Group was tasked with the completion of this IPM program and continual updates. To guide the development of the IPM program, the Pesticide Stewardship Working Group developed the ‘Martin County Integrated Pest Management Procedural Guidelines’. These procedural guidelines were largely borrowed from the successful IPM program in Sarasota County, FL. The purpose of developing the IPM Program is ensure sustainable pest management practices are utilized to control pests in an effective and economical manner that is the least detrimental to human health or the environment. Martin County is dedicated to establishing, reviewing, and updating best practices internally as well as with our contractors. This IPM program utilized the Eugene, OR ‘Integrated Pest Management (IPM) Policy and Operations Manual’ as a template.

2. Areas of Responsibility and Maintenance

Martin County is located in the southeastern region of Florida along the Treasure Coast and sits between St. Lucie and Palm Beach Counties. The Atlantic Ocean and Lake Okeechobee form the eastern and western aquatic borders of the County respectively. The County has a total area of 753 square miles. Martin County BOCC primarily serves unincorporated areas of the county; however, there are some properties and services in incorporated areas as well.

Pest control is required on and around Martin County properties in order to minimize impact and maintain level of service. For the purpose of the IPM plan, Martin County has divided treatments into the following categories:

- Environmentally-sensitive lands (ESL) and preserve areas
- Enhanced landscapes & Turf
- Athletic Fields & Golf Course
- Stormwater areas
- Mosquito control

Environmentally-Sensitive Lands and Preserve Areas

ESL and preserve areas are natural areas that are managed by Martin County to preserve, restore, maintain, or enhance their unique environmental resources. Martin County BOCC manages approximately 35,000 acres of ESL. Invasive plant management in aquatic and terrestrial habitats is the primary pest control need on ESL.

Enhanced Landscapes and Turf

Sections of expansive rural scenery which increase the aesthetic appeal of an area are located throughout Martin County. A vast majority of areas such as road ways, buildings, parks and others are surrounded by enhanced landscapes and turf. Enhanced landscape areas in Martin County include ornamental plants, turf, trees and palms. Some of these areas in Martin County include:

- All Martin County Parks
- Community centers
- Indian Riverside Park
- Sailfish Splash Water Park
- Roadside median landscapes & Rights-of-Way
- Libraries and other county buildings

Athletic Fields and Golf Course

Martin County maintains approximately 100 acres of athletic fields and a golf course. These areas must be maintained at a higher level for participant safety and playability. Maintenance practices and guidelines used by contractors and county staff are based on Best Management Practices from the University of Florida.

Stormwater Areas

Martin County manages stormwater to filter out/prevent pollutants from entering the estuary, to preserve and enhance water quality, and for flood control. The stormwater system is comprised of stormwater treatment areas (STAs), lakes, ponds, and stormwater channels (natural and artificial). STAs are constructed wetlands comprised of parcels of land typically composed of emerged and submerged vegetation that remove nutrients in the water through plant growth. Stormwater channels are artificial or natural conveyance systems used for the conduction of water. Vegetation needs to be controlled at these sites to ensure proper function.

Mosquito Control

Mosquito control is conducted over publicly owned lands to promote the health and welfare of residents and visitors. The Mosquito Control Division of Public Works monitors the mosquito population and conducts arboviral surveillance to determine when and where control is needed. These efforts are conducted in both incorporated and unincorporated areas of Martin County,

with the exception of the Town of Jupiter Island, which conducts mosquito control independently. Typical treatments sites for larvae include areas prone to flooding, temporary rain pools, drainage canals and ditches, swamps, ponds, stormwater treatment areas, catch basins, and containers around facilities. Adult treatments are conducted through truck Ultra Low Volume (ULV) spraying along residential streets, and when the mosquito population is particularly high and truck spraying is ineffective, aerial ULV adulticide applications are made over populated areas.

3. Common Pest Problems

There are many different pests that Martin County must manage including insects, rodents, nematodes, fungi, weeds, and microorganisms. Where possible, Martin County focuses on preventing pest problems through cultural practices. However, when this is not possible, control may be needed. Martin County follows the EPA and FDACS designations for pest species. Additionally, for all areas weeds shall be defined and categorized according to the latest publication of the Florida Exotic Pest Plant Council List of Invasive Species as well as the [UF Assessment of Non-native Plants in Florida's Natural Areas](#). Some plants not listed on the FLEPPC document have been added to this list due to their growth habits, and their ability to affect the performance of the area.

Environmentally-Sensitive Lands and Preserve Areas

Martin County BOCC manages approximately 35,000 acres of ESL. Invasive plant management in aquatic and terrestrial habitats is the primary pest control need on ESL. Martin County uses the Florida Exotic Pest Plant Council (FLEPPC) as a guide for determining priority exotic vegetation. Additionally, there are some vegetation species native to Martin County that are invasive and problematic (e.g. cattails and willows forming monocultures in wetland areas).

Enhanced Landscapes and Turf

Martin County is responsible for keeping invasive plants from these areas and managing a number of insects, diseases and fungus which threaten the health and beauty of the landscape and turf. These areas are maintained to be aesthetically pleasing, but not to same higher standards of athletic fields and the golf course. General turf areas are maintained primarily through cultural practices. UF provides the most up to date and environmentally responsible information available for the maintenance of enhanced landscapes. [Weed Management for Florida Lawns-UF/IFAS](#)

Athletic Fields and Golf Course

Athletic fields and golf course grasses are held to a higher pest tolerance threshold due to the safety and playability of fields. Weeds, insects and other pests are acceptable in other areas but must be kept to a minimum at athletic fields and the golf course.

Stormwater Areas

The Florida Exotic Pest Plant Council has listed over 100 species of invasive plants throughout the state. Many of these species are aquatic and have the ability to grow rapidly affecting drainage and water quality. Due to their rapid growth, plants can block drainage structures such as outfalls, weirs and others by preventing water flow; certain species of algae can also be toxic to humans if they are left unmanaged. Exotic invasive plant species also compete with native species, resulting in the loss of aquatic habitat for fish and birds, many of these species can rapidly take over an aquatic ecosystem limiting plant diversity and giving the invasive species exclusivity.

Mosquito Control

There are over 3,000 different species of mosquitoes (Culicidae) throughout the world, and approximately 80 within the state of Florida. Historical records suggest that there are approximately 38 mosquito species from 11 genera (*Aedes*, *Anopheles*, *Coquillettidia*, *Culex*, *Culiseta*, *Deinocerites*, *Psorophora*, *Mansonia*, *Toxorhynchites*, *Uranotaenia*, and *Wyeomyia*) within Martin County. Of the species within the county, only 14 are of primary concern and specifically targeted. These targeted species are associated with being highly aggressive and/or capable of transmitting vector-borne pathogens to humans.

Mosquitoes found in Martin County are capable vectors of the following pathogens: Eastern equine encephalitis (EEE), Highlands J encephalitis, St. Louis encephalitis (SLE), Venezuelan equine encephalitis (VEE), West Nile virus (WNV), Dengue fever virus (DENV), Chikungunya virus (CHIKV), Yellow fever virus (YFV), Zika virus, Malaria, and *Dirofilariasis* (dog heartworm). Of these, Martin County has a history of locally-transmitted dengue fever virus. In concert with the Florida Department of Health, Martin County actively conducts surveillance for mosquito-borne disease through the sentinel chicken program (EEE, SLE, WNV and Highlands J) and responding to human cases.

Preserve Area Management Plans

Martin County has over 10,000 acres in wetland and/or upland habitat that is protected and managed through site-specific Preserve Area Management Plans (PAMPs). These PAMPs require that preserved areas be maintained free of invasive plants, trash and debris and shall remain undeveloped for perpetuity. These 10,000 acres are contained in over 600 PAMPs, of which approximately 41 are on county-owned properties. The county-owned PAMP areas are scouted and controlled for invasive plants as described above for Environmental-Sensitive Lands and Preserve Areas.

The privately owned preserve areas are inspected annually by Growth Management Department staff to ensure ongoing compliance. The County requires property owners to employ licensed and qualified environmental professionals to conduct invasive plant removal. Enforcement action is taken by the County if the PAMP requirements are not met.

4. Scouting and Inspection Procedures

Martin County utilizes scouting and inspections to monitor the pest population and determine when control measures are needed. Scouting and inspections vary depending upon the area and target pest. Descriptions of primary pest problems, scouting areas and frequency, and action thresholds follow. Briefly, scouting and inspections will be completed by personnel with experience in identifying target pests. Personnel will complete inspections at specified frequencies and then determine whether or not the action threshold for the specific pest has been reached. If the action threshold has been reached, control measures will be implemented.

Environmentally-Sensitive Lands and Preserve Areas

Scouting and inspection procedures for ESL and preserve areas can be found in table 4.1.

Table 4.1 Scouting and inspection procedures for Environmentally-Sensitive Lands and Preserve Areas

Pest	Area	Scouting Frequency	Action Threshold
Old world climbing fern <i>Lygodium microphyllum</i>	Primarily swamp and marsh areas but also in pine flatwoods	2x/year	>5%
Brazilian pepper <i>Schinus terebinthifolius</i>	All preserve areas	1x/year	>5%
Downy rose-myrtle <i>Rhodomyrtus tomentosa</i>	Pine flatwoods and wetland edges	1x/year	>5%
Air potato <i>Dioscorea bulbifera</i>	Upland areas	Monthly May-October	>5%
Paperbark trees <i>Melaleuca quinquinervia</i>	Primarily swamp and marsh areas but also in pine flatwoods	1x/year	>5%
Hawaii half flower <i>Scaevola taccada</i>	Coastal areas including dune, hammock and mangrove edge	1x/year	>5%
Strawberry guava <i>Psidium cattleianum</i>	Primarily in uplands	1x/year	>5%
Cogon grass <i>Imperata cylindrica</i>	Open grassy areas	2x/year	>5%
Australian pine <i>Casuarina equisetifolia</i>	Disturbed habitats	1x/year	>5%
Queensland umbrella tree <i>Schefflera actinophylla</i>	Pine flatwoods and uplands	1x/year	>5%
Ear-leaf acacia <i>Acacia auriculiformis</i>	Pine flatwoods and uplands	1x/year	>5%

Enhanced Landscapes and Turf

Scouting and inspection procedures for enhanced landscapes can be found in tables 4.2 (Pest & Fungus) and 4.3 (Weeds).

Table 4.2 Scouting and inspection procedures for enhanced landscapes and turf for pests and

fungus.

Pest	Area	Scouting Frequency	Action Threshold
Fire Ants <i>Solenopsis</i> Fire Ants-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Mole Cricket <i>Grillotalpidae</i> Mole Cricket-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Grubs White Grubs-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Dollar Spot Dollar Spot-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Brown Patch Brown Patch-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Chinch Bugs <i>Bliss Leucopterus</i> Chinch Bugs-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%

Table 4.3 Scouting and inspection procedures for enhanced landscapes and turf for weeds.

Pest	Area	Scouting Frequency	Action Threshold
Goosegrass <i>Eleusine indica</i> Goosegrass-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Tropical Signalgrass <i>Urochloa subquadrifida</i> Tropical Signalgrass-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Yellow/Purple Nutsedge <i>Cyperus esculentus/rotundus</i> Nutsedge-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%
Broadleaf Weeds Weed Management for Florida Lawns-UF/IFAS	Enhanced Landscapes & Turf	Weekly	>25%

Athletic Fields and Golf Course

Scouting and inspection procedures for athletic fields and the golf course can be found in tables 4.4 (Pest & Fungus) and 4.5 (Weeds).

Table 4.4 Scouting and inspection procedures for athletic fields and golf course for pests and fungus.

Pest	Area	Scouting Frequency	Action Threshold
Fire Ants <i>Solenopsis</i> Fire Ants-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Mole Cricket <i>Grillotalpidae</i>	Athletic Fields, Golf Course	Weekly	>10%

Mole Cricket-UF/IFAS			
Grubs White Grubs-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Dollar Spot Dollar Spot-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Brown Patch Brown Patch-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Nematodes Nematodes-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%

Table 4.5 Scouting and inspection procedures for athletic fields and golf course for weeds.

Pest	Area	Scouting Frequency	Action Threshold
Goosegrass <i>Eleusine indica</i> Goosegrass-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Tropical Signalgrass <i>Urochloa subquadrifida</i> Tropical Signalgrass-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Yellow/Purple Nutsedge <i>Cyperus esculentus/rotundus</i> Nutsedge-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%
Broadleaf Weeds Weed Management for Florida Lawns-UF/IFAS	Athletic Fields, Golf Course	Weekly	>10%

Stormwater Areas

Scouting and inspection procedures for stormwater areas can be found in tables 4.6 (Emerged Aquatic Weeds), 4.7 (Submerged Aquatic Weeds), and 4.8 (algae).

Table 4.6 Scouting and inspection procedures for stormwater areas for emerged aquatic weeds.

Name	Area	Scouting Frequency	Action Threshold
Primrose-willow <i>Ludwigia peruviana</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Water Lettuce <i>Pistia stratiotes</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Torpedograss <i>Panicum repens</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Water Hyacinth <i>Eichhornia crassipes</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Cattails <i>Landoltia punctata</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Old World <i>Lygodium microphyllum</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%

Spotted Duckweed <i>Landoltia punctata</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Water Fern <i>Azolla</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Melaleuca <i>Melaleuca quinquenervia</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%
Alligator Weed <i>Alternanthera philoxeroides</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%

Table 4.7 Scouting and inspection procedures for stormwater areas for submerged aquatic weeds.

Name	Area	Scouting Frequency	Action Threshold
Hydrilla <i>Hydrilla verticillata</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%

Table 4.8 Scouting and inspection procedures for stormwater areas for algae.

Name	Area	Scouting Frequency	Action Threshold
Algae <i>Cyanobacteria</i>	STA, lakes/Ponds, Storm water Channels	Bi-Weekly	>10%

Mosquito Control

Mosquito control conducts regular surveillance for mosquitoes throughout the year. Action thresholds will vary depending upon a variety of factors including the target species, extent of the problem, and presence of mosquito-borne disease. Mosquito control operates under the authority provided in Chapter 388 Florida Statutes, and Chapter 5E-13, Florida Administrative Code. Scouting and inspection procedures for mosquito control can be found in tables 4.9 (primary targets) and 4.10 (other potential targets).

Table 4.9 Scouting and inspection procedures for primary target mosquitoes.

Mosquito Species	Area	Surveillance Method	Action Threshold
<i>Aedes aegypti</i>	Domestic containers; Catch basins; Treeholes; Shady locations close to or inside buildings	<u>Larvae</u> Property checks for containers and larvae <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- 25 adults/trap/night; landing rate of 1 per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of local arboviral transmission
<i>Aedes albopictus</i>	Domestic containers; Water holding leaf axils	<u>Larvae</u> Property checks for containers and larvae	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- 25

Mosquito Species	Area	Surveillance Method	Action Threshold
		<u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	adults/trap/night; landing rate of 1 per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of local arboviral transmission
<i>Aedes sollicitans</i>	Open grassy temporary pools in salt marshes; Can breed in fresh temporary pools of water	<u>Larvae</u> Larval dipping (after heavy rain events) <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- demonstrable increase or sustained elevation in population; minimum 25 adults/trap/night; landing rate of > 2 per minute Aerial treatments- conducted in the event of counts three fold above baseline
<i>Aedes taeniorhynchus</i>	Temporary pools in salt marshes and adjacent upland; Prefer shade; Highly salt tolerant	<u>Larvae</u> Larval dipping (after heavy rain events) <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- demonstrable increase or sustained elevation in population; minimum 25 adults/trap/night; landing rate of > 2 per minute Aerial treatments- conducted in the event of counts three fold above baseline
<i>Anopheles quadrimaculatus</i>	Permanent freshwater; Associated with aquatic vegetation; Also occurs in freshwater swamps and shallow semi-permanent pools	<u>Larvae</u> Larval dipping <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- 25 adults/trap/night; landing rate of > 2 per minute; more aggressive treatments in the event of <i>Plasmodium</i> transmission Aerial treatments- conducted in the event of local <i>Plasmodium</i> transmission
<i>Coquillettidia peturbans</i>	Permanent lakes and ponds; Associated with	<u>Adults</u> Landing rate counts (weekly);	<u>Adults</u> Ground treatments- minimum 25 adults/trap/night; landing rate of > 2

Mosquito Species	Area	Surveillance Method	Action Threshold
	cattails, sedges, maiden cane, and arrowhead	Mosquito Magnet trap counts 5x weekly	per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of local arboviral transmission
<i>Culex nigripalpus</i>	Any collection of water ranging from containers to permanent pools; Prefers fairly clean water; Greatest numbers in Summer and Fall	<u>Larvae</u> Larval dipping; Property checks for containers <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- 25 adults/trap/night; landing rate of > 2 per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of arboviral transmission and/or during high counts in Western areas
<i>Culex quinquefasciatus</i>	Prefers foul water such as cesspools, waste water from dairies and food processing plants, heavy oak-leaf infusion in natural pools or containers	<u>Larvae</u> Larval dipping <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- 25 adults/trap/night; landing rate of > 2 per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of local arboviral transmission and/or during high counts in Western areas
<i>Mansonia dyari</i>	Permanent lakes and ponds; Highly associated with water lettuce; Also occurs on water hyacinth, pickerel weed, and arrowhead	<u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- minimum of 25 adults/trap/night; landing rate of > 2 per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of local arboviral transmission
<i>Mansonia titillans</i>	Permanent lakes and ponds; Highly associated with	<u>Adults</u> Landing rate counts (weekly);	<u>Larvae</u> Presence of target species

Mosquito Species	Area	Surveillance Method	Action Threshold
	water hyacinth but also occurs on water lettuce, pickerel weed, and arrowhead	Mosquito Magnet trap counts 5x weekly	<u>Adults</u> Ground treatments- minimum of 25 adults/trap/night; landing rate of > 2 per minute; more aggressive treatments in the event of arboviral transmission Aerial treatments- conducted in the event of local arboviral
<i>Psorophora columbiae</i>	Temporary, grassy rain pools	<u>Larvae</u> Larval dipping (after heavy rain events) <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- demonstrable increase or sustained elevation in population; minimum of 25 adults/trap/night; landing rate of > 2 per minute Aerial treatments- conducted in the event of high counts in Western areas
<i>Psorophora ciliata</i>	Temporary, grassy rain pools	<u>Larvae</u> Larval dipping (after heavy rain events) <u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Larvae</u> Presence of target species <u>Adults</u> Ground treatments- demonstrable increase or sustained elevation in population; minimum of 25 adults/trap/night; landing rate of > 2 per minute Aerial treatments- conducted in the event of high counts in Western areas

Table 4.10 Scouting and inspection procedures for other potential target mosquitoes.

Mosquito Species	Area	Surveillance Method	Action Threshold
<i>Aedes vexans</i>	Floodwater or rain pools; Irrigation seepage water. Associated with citrus groves	<u>Larvae</u> Larval dipping (after heavy rain events)	<u>Larvae</u> Presence of target species
<i>Aedes atlanticus</i>	Temporary rain pools in heavily wooded areas	<u>Adults</u> Landing rate counts (weekly); Mosquito Magnet trap counts 5x weekly	<u>Adults</u> Ground treatments- demonstrable increase or sustained elevation in population; minimum of 25 adults/trap/night; landing rate of > 2
<i>Aedes tormentor</i>	Temporary rain pools in heavily wooded areas		
<i>Aedes infirmatus</i>	Woodland rain pools and grassy unshaded pools		
<i>Aedes mitchellae</i>	Unshaded temporary pools in pinelands or depressions with sparse tufts of grass in pastures		

Mosquito Species	Area	Surveillance Method	Action Threshold
<i>Aedes triseriatus</i>	Treeholes; may be in artificial containers or discarded tires		per minute
<i>Anopheles atropos</i>	Salt marshes; Permanent shallow pools with 1-12% salt		Aerial treatments- conducted in the event of sustained high counts primarily found in Western areas
<i>Anopheles crucians</i>	Ponds; Lakes; Swamps with acidic water (especially Cypress); Prefer partial shade		
<i>Anopheles walkeri</i>	Freshwater swamps; Associated with dense aquatic vegetation, cattails, water hyacinths, sawgrass		
<i>Culex restuans</i>	Prefers slightly foul water; found in winter and early spring		
<i>Culex salinarus</i>	Found in grassy pools, ditches, marshy places, waste water from citrus processing plants, sometimes artificial containers, bilge water		
<i>Culex cedecei</i>	Land crab holes; Cypress and maple swamps		
<i>Culex erraticus</i>	Swamps; Grassy pools		
<i>Culex iolambdis</i>	Brackish water; Mangrove swamps		
<i>Culex pilosus</i>	Grassy swales; Roadside ditches; Temporary rainpools		
<i>Culiseta melanura</i>	Pools in swamps or in water around the base of trees; Prefer dark, acid water in wooded swamps		
<i>Culiseta inornata</i>	Pools and ditches, in foul and brackish water; Occasionally in artificial containers; Winter mosquito		
<i>Deinocerites cancer</i>	Crabholes especially along salt marshes		
<i>Psorophora pygmaea</i>	Temporary rain pools		
<i>Psorophora ferox</i>	Temporary rain pools in hammocks; Overflow areas along streams		
<i>Psorophora howardii</i>	Shady or partly shaded rain pools and citrus groves		
<i>Uranotaenia lowii</i>	Ground pools; Grassy ditches; Margins of lakes and ponds		
<i>Uranotaenia sapphirina</i>	Ground pools; Lakes and ponds with duckweed		
<i>Wyeomyia mitchelli</i>	Bromeliads; May favor inland locations		

Mosquito Species	Area	Surveillance Method	Action Threshold
<i>Wyeomyia vanduzeei</i>	Bromeliads; May favor coastal hammocks		

5. Control Options

Martin County focuses on preventing pest problems through cultural practices. When this is not possible and action thresholds indicate that control is needed, an IPM approach is utilized. Specific pest problems and methodologies employed to control these pests are presented in tables in this section by category.

Methodology

The following codes are approved methods for removing pests listed in section 4.0 with the exception of Mosquitoes. Mosquito Control varies in methodology due to the unique characteristics of their work; these methodologies are listed under the section “Mosquito Control”.

Pursuant to the framework outlined in the Martin County Integrated Pest Management Procedural Guidelines, it is the goal of Martin County Government to reduce the risk to human health and the environment from pests through the application of integrated pest management practices and emphasizing proven, effective least-toxic and non-toxic approaches and products in County practices.

The following table 5.1 contains the standard treatment options best suited for each area. However, pest species, level of infestation, and the area being treated are the ultimate factors in determining the type of methodology that should be used. Methodologies are sometimes combined based on action thresholds in order to keep the pest populations under control. The least toxic treatment option will be the first methodology utilized, proceeding to more aggressive methodologies to maintain level of service.

Table 5.1 Standard treatment options.

Code	Methodology	Description
M0	Biological	For all pests: Refers to the introduction of a natural enemy or predator. Shall be limited to species approved by the USDA
M1	Remove by hand or through exclusion	For weeds: pull by hand, dig or uproot and remove plants including roots or rhizomes using a variety of hand tools including weed knives, weed poppers, shovels, hoes, weed wrenches and weed diggers. This treatment is widely used to control isolated invasions or weed occurrences of lower densities but requires increased labor costs and service intervals.
M2	Mechanical	For weeds: clipping by cutting or removing seed heads and/or fruiting bodies to prevent germination. Mowing may be performed using power trimmers with line or metal brush cutting heads or other mechanized mowing equipment. This treatment is often combined with another treatment, such as M3 or M4, for more effective control. Removal of seed heads or biomass may be required.

Code	Methodology	Description
M3	Non-selective pesticide application	For weeds: Includes spot spray, broadcast, girdle, basal bark, stump and other methods to target species using broad spectrum herbicides. A variety of spray equipment should be used for this methodology such as backpack, hand held, truck mounted sprayers and others.
M4	Selective pesticide application	For weeds: Includes spot spray, broadcast, girdle, basal bark, stump and other methods to target selective species as required. A variety of spray equipment should be used for this methodology such as backpack, hand held, truck mounted sprayers and others.

Enhanced Landscapes and Turf

Control options for enhanced landscapes and turf can be found in tables 5.2 (weeds) and 5.3 (pests & fungi).

Table 5.2 Control options for enhanced landscape weeds.

Pest	Area	Methodology	Treatment Options
Goosegrass <i>Eleusine indica</i> Goosegrass-UF/IFAS	Enhanced Landscapes & Turf	M1, M2, M3, M4	Removal by hand Glyphosate, Indaziflam
Tropical Signalgrass <i>Urochloa subquadrifera</i> Tropical Signalgrass-UF/IFAS	Enhanced Landscapes & Turf	M1, M2, M3, M4	Remove by hand Glyphosate, Pinoxadel
Yellow/Purple Nutsedge <i>Cyperus esculentus/rotundus</i> Nutsedge-UF/IFAS	Enhanced Landscapes & Turf	M1, M2, M3, M4	Remove by hand Halosulfuron-methyl
Broadleaf Weeds Weed Management for Florida Lawns-UF/IFAS	Enhanced Landscapes & Turf	M1, M2, M3, M4	Remove by hand Glyphosate

Table 5.3 Control options for enhanced landscape pests and fungi.

Pest	Area	Methodology	Treatment Options
Fire Ants <i>Solenopsis</i> Fire Ants-UF/IFAS	Enhanced Landscapes & Turf	M4	Inodoxacarb, Bifenthrin
Mole Cricket <i>Grillotalpidae</i> Mole Cricket-UF/IFAS	Enhanced Landscapes & Turf	M0, M4	Bifenthrin, Fipronil
Grubs White Grubs-UF/IFAS	Enhanced Landscapes & Turf	M0, M4	Bifenthrin, Imidacloprid
Dollar Spot Dollar Spot-UF/IFAS	Enhanced Landscapes & Turf	M4	Chlorothalonil
Brown Patch Brown Patch-UF/IFAS	Enhanced Landscapes & Turf	M4	Chlorothalonil
Chinch Bugs	Enhanced	M4	Bifenthrin

<i>Bliss Leucopterus</i> Chinch Bugs-UF/IFAS	Landscapes & Turf		
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Athletic Fields and Golf Course

Control options for athletic fields and golf course can be found in tables 5.4 (weeds) and 5.5 (pests & fungi).

Table 5.4 Control options for athletic fields and golf course turf weeds.

Pest	Area	Methodology	Treatment Options
Goosegrass <i>Eleusine indica</i> Goosegrass-UF/IFAS	Athletic Fields, Golf Course	M1, M2, M4	Remove by hand Indaziflam
Tropical Signalgrass <i>Urochloa subquadriflora</i> Tropical Signalgrass-UF/IFAS	Athletic Fields, Golf Course	M1, M2, M4	Remove by hand Pinoxadel
Yellow/Purple Nutsedge <i>Cyperus esculentus/rotundus</i> Nutsedge-UF/IFAS	Athletic Fields, Golf Course	M1, M2, M4	Halosulfuron-methyl
Broadleaf Weeds Weed Management for Florida Lawns-UF/IFAS	Athletic Fields, Golf Course	M1, M2, M4	Thiencarbozone, Foramsulfuron, Halosulfuron

Table 5.5 Control options for athletic fields and golf course turf pests and fungi.

Pest	Area	Methodology	Treatment Options
Fire Ants <i>Solenopsis</i> Fire Ants-UF/IFAS	Athletic Fields, Golf Course	M4	Indoxacarb, Bifenthrin
Mole Cricket <i>Grillotalpidae</i> Mole Cricket-UF/IFAS	Athletic Fields, Golf Course	M4	Bifenthrin, Fipronil
Grubs White Grubs-UF/IFAS	Athletic Fields, Golf Course	M4	Bifenthrin, Imidacloprid
Dollar Spot Dollar Spot-UF/IFAS	Athletic Fields, Golf Course	M4	Chlorothalonil
Brown Patch Brown Patch-UF/IFAS	Athletic Fields, Golf Course	M4	Chlorothalonil
Nematodes Nematodes-UF/IFAS	Athletic Fields, Golf Course	M0, M4	Quillaja Extract, Chitson, Fluopyram

Environmentally-Sensitive Lands and Preserve Areas

Control options for environmentally sensitive lands and preserve areas can be found in table 5.6.

Table 5.6 Control options for environmentally sensitive lands and preserve areas.

Pest	Area	Methodology	Treatment Options
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Pest	Area	Methodology	Treatment Options
Old world climbing fern <i>Lygodium microphyllum</i>	Primarily swamp and marsh areas but also in pine flatwoods	M0, M2,M3	Biocontrols. Poodle cut and foliar herbicide with glyphosate or triclopyr.
Brazilian pepper <i>Schinus terebinthifolius</i>	All preserve areas	M1,M2,M3	Biocontrols. Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.
Downy rose-myrtle <i>Rhodomyrtus tomentosa</i>	Pine flatwoods and wetland edges	M1,M2,M3+	Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.
Air potato <i>Dioscorea bulbifera</i>	Upland areas	M1,M3, M0	Biocontrols. Monthly treatments between May and September with foliar glyphosate. Hand collect tubers.
Paperbark trees <i>Melaleuca quinquinervia</i>	Primarily swamp and marsh areas but also in pine flatwoods	M1,M2,M3	Biological control. Hand pull seedlings <3'. Cut stump or frill and girdle treatment with imazapyr.
Hawaii half flower <i>Scaevola taccada</i>	Coastal areas including dune, hammock and mangrove edge	M1,M2,M3	Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.
Strawberry guava <i>Psidium cattleianum</i>	Primarily in uplands	M1,M2,M3	Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.
Cogon grass <i>Imperata cylindrica</i>	Open grassy areas	M3	Foliar application of imazapyr and/or glyphosate.

Pest	Area	Methodology	Treatment Options
Australian pine <i>Casuarina equisetifolia</i>	Disturbed habitats	M1,M2,M3	Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.
Queensland umbrella tree <i>Schefflera actinophylla</i>	Pine flatwoods and uplands	M1,M2,M3	Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.
Ear-leaf acacia <i>Acacia auriculiformis</i>	Pine flatwoods and uplands	M1,M2,M3	Hand pull seedlings <3', cut stump or basal bark with triclopyr treatment in place. Wetland areas will use triclopyr labeled for use in these sites. Mechanical treatment for large infestations >75%.

Stormwater Areas

Control options for stormwater areas can be found in tables 5.7 (Emerged Aquatic Weeds), 5.8 (Submerged Aquatic Weeds), and 5.9 (algae).

Table 5.7 Control options for emerged aquatic weeds in stormwater areas.

Pest	Area	Methodology	Treatment Options
Primrose <i>Ludwigia peruviana</i>	STA, lakes/Ponds, Storm water Channels	M1, M3	Hand pull >6". Foliar spray <6", non-selective, diquat, imazapyr, glyphosate
Water Lettuce <i>Pistia stratiotes</i>	STA, lakes/Ponds, Storm water Channels	M1, M3	Hand pull <100sq2. Mechanical harvesting, large water bodies in open water areas with machine access. Foliar spray, non-selective, diquat, imazapyr, glyphosate
Torpedograss <i>Panicum repens</i>	STA, lakes/Ponds, Storm water Channels	M2, M3	Foliar spray, non-selective, imazapyr, glyphosate

Pest	Area	Methodology	Treatment Options
Water Hyacinth <i>Eichhornia crassipes</i>	STA, lakes/Ponds, Storm water Channels	M1, M3	Hand pull <100sq2. Mechanical harvesting, large water bodies in open water areas with machine access. Foliar spray non- selective, diquat, imazapyr, glyphosate
Cattails <i>Typha</i> spp.	STA, lakes/Ponds, Storm water Channels	M2, M3	Foliar spray non- selective, diquat, imazapyr, glyphosate
Old World Climbing Fern <i>Lygodium microphyllum</i>	STA, lakes/Ponds, Storm water Channels	M1, M2, M3	Biological Controls, Brown Lygodium moth. Old World Climbing Fern Control Methods
Spotted Duckweed <i>Landoltia punctata</i>	STA, lakes/Ponds, Storm water Channels	M3	Foliar spray non- selective, diquat, imazapyr
Water Fern <i>Azolla</i>	STA, lakes/Ponds, Storm water Channels	M3	Foliar spray non- selective, diquat, imazapyr
Melaleuca <i>Melaleuca quinquenervia</i>	STA, lakes/Ponds, Storm water Channels	M1, M2, M3	Hand pull seedlings < 3'. Infestations >80% mechanical. Melaleuca Control Methods
Alligator Weed <i>Alternanthera philoxeroides</i>	STA, lakes/Ponds, Storm water Channels	M3	Foliar spray, non- selective, glyphosate. Aquatic Weeds

Table 5.8 Control options for submerged aquatic weeds in stormwater areas.

Pest	Area	Methodology	Treatment Options
Hydrilla <i>Hydrilla verticillata</i>	STA, lakes/Ponds, Storm water Channels	M0, M1, M3	Hand pull < 5%. Mechanical harvesting, large water bodies in open water areas with machine access. Aquatic Weeds

Table 5.9 Control options for algae in stormwater areas.

Pest	Area	Methodology	Treatment Options
Algae <u>Cyanobacteria</u>	STA, lakes/Ponds, Storm water Channels	M3	Sodium Carbonate Peroxyhydrate

Mosquito Control

Control options for mosquitoes can be found in table 5.10.

Table 5.10 Control options for mosquitoes.

Species	Control Measure	Description	Applicability	Treatment Options
All target species	No Action	No Actions Taken	Population levels below action thresholds, rainfall events, wind conditions, low human populations may all result in no action taken	N/A
<i>Aedes taeniorhynchus</i> <i>Aedes sollicitans</i>	Source Reduction	Impoundment management	Coastal wetlands fringing Indian River Lagoon	Artificial flooding
<i>Aedes aegypti</i> <i>Aedes albopictus</i> <i>Culex nigripalpus</i>	Source Reduction	Container control program	Used in urban areas	Elimination of container breeding sites
All target species	Biological Control	Mosquitofish and others that eat mosquito larvae	Used in detention ponds, abandoned swimming pools, ornamental ponds, low lying permanent and semi-permanent waterbodies	Hand placement
All target species	Biological Control	Mosquitofish and others that eat mosquito larvae	Used in detention ponds, abandoned swimming pools, ornamental ponds, low lying permanent and semi-permanent waterbodies	Hand placement
All target species	Larviciding	Larvicide application (<i>Bacillus thuringiensis</i> , <i>Bacillus sphaericus</i> ,	Roadside ditches, swales, retention ponds, low lying permanent and semi-permanent waterbodies, coastal	Application made by hand, backpack blowers, truck mounted sprayers, and buffalo turbine

Species	Control Measure	Description	Applicability	Treatment Options
		Methoprene, Spinosad, larviciding oil)	wetlands	
<i>Aedes taeniorhynchus</i> <i>Aedes sollicitans</i>	Aerial Larviciding	Larvicide application (<i>Bacillus thuringiensis</i> , <i>Bacillus sphaericus</i> , Methoprene)	Coastal wetlands fringing Indian River Lagoon	Rotary or fixed-wing aircraft
All target species	Adulticiding	Barrier application to vegetation (Bifenthrin, Tau-fluvalinate)	Used along fringes of breeding sites where mosquitoes rest and in urban settings	Back pack sprayers ATV mounted blower
All target species	Adulticiding	Hand-held ULV spraying (deltamethrin)	Used in mosquito harborage areas	Hand-held sprayers
All target species	Adulticiding	Ground ULV application (Etofenprox, Sumithrin, Permethrin, Pyrethrin, Deltamethrin, Malathion)	Used in residential and urban areas	Truck- mounted ULV sprayer
Typically floodwater species that hatch off in large numbers: <i>Culex sp.</i> <i>Psorophora columbiae</i> <i>Aedes taeniorhynchus</i>	Aerial Adulticiding	Aerial application (Naled)	Used in residential and urban areas	Fixed-wing aircraft with GPS in-flight capability
Species associated with aquatic vegetation <i>Mansonia dyari</i> <i>Mansonia titillans</i> <i>Coquillettidia perturbans</i>	Aquatic Weed Control	Removal of aquatic vegetation utilizing IVM practices	Used in aquatic waterbodies that contain cattails, water lettuce, and/or water hyacinth	Mechanical removal, Herbicide

6. Personnel and Licensing

Florida pesticide laws, Chapters 388, 482, and 487 FS, govern certified applicators working in

Florida. Many pesticide applications conducted by Martin County personnel and contractor staff require that the applicator hold a valid Florida Department of Agriculture and Consumer Services (FDACS) pesticide applicator license in the appropriate category for the application being conducted.

Martin County recognizes that the certification process requires applicators to demonstrate knowledge surrounding pesticide applications and safety. As such, all pesticide applications made by Martin County personnel shall be conducted by or under the direct supervision of a certified pesticide applicator. The certified applicator shall hold a valid Florida Department of Agriculture and Consumer Services (FDACS) pesticide applicator license in the appropriate category for the application being conducted. Currently, Martin County has several positions that require the employee to hold an FDACS pesticide applicator license as a condition for their employment. These positions are listed in Table 6.1 along with the required license category specific to the position.

In addition to FDACS pesticide licensing, Martin County also recognizes the importance of following Florida-Friendly Landscaping practices. As such, the Parks and Recreation Department participates in the Green Industry Best Management Practices Certification program held by the UF/IFAS annually. Additionally, the Pesticide Stewardship Working Group will support at least one member obtaining a Florida Nursery, Growers and Landscape Association (FNGLA) Certification(s) in Landscape Maintenance and/or Horticulture depending upon the needs of the County. Additional training and certification programs through the FNGLA will also be pursued as appropriate.

Table 6.1. Martin County positions requiring the employee to hold a valid FDACS issued pesticide applicator license and the category needed.

Department/Division	Position(s)	Public Health	Aquatic Weed	Right of Way	Limited Lawn & Ornamental	Natural Areas	Ornamental and Turf
Public Works							
Mosquito Control	Division Manager	•	•	•			
	Operations Supervisor	•	•	•			
	Research Entomologist	•	•	•			
	Resource Specialist	•	•	•			
	Foreman	•	•	•			
	Specialist	•	•	•			
	Technician	•	•				
Ecosystem Restoration and Management	Project Manager					•	
	Technician					•	
Stormwater	Field Operations Superintendent		•	•	•	•	
Parks and Recreation							
Operations	Deputy Director				•		
	Safety & Operations Administrator				•		
	Superintendent						•
	Lead Park Service Specialist						•

Personnel handling (mixing, loading, transferring, applying, or disposing of) pesticides, but working under the direct supervision of a supervised applicator, shall obtain pesticide training as required by and detailed in Ch 388 FS, Ch 482 FS, and Ch 487 FS. FDACS requires either continuing education or re-testing to maintain professional licensing. Continuing education units (CEUs) are available through the University of Florida Institute of Food and Agricultural Sciences (UF/IFAS) Extension and other FDACS-approved providers. A complete listing of approved CEU classes is available on the FDACS website (<http://ceupublicsearch.freshfromflorida.com/>). Martin County will utilize local UF/IFAS Extension services and FDACS-approved providers to obtain needed CEU credits to maintain licensing. Personnel participating in prescribed burns shall have the appropriate training detailed in the Martin County Prescribed Fire Standard.

7. Pesticide Storage Facilities

Martin County stores pesticides at various locations throughout the county. Each facility that stores pesticides is required to have the following:

- Label and SDS sheet for every product listed in the inventory
- Eye wash station

- Posted emergency phone numbers
- Spill kit
- Fire extinguisher
- No smoking signs
- Access control

Facilities storing large amounts of pesticides are required to also have a safety shower. A list of facilities where pesticides are being stored can be seen in table 7.1.

Table 7.1. Key facilities where pesticides are stored.

Department/Division	Facility	Address
Public Works	Mosquito Control Chemical Building	2551 SE Avenger Circle Stuart, FL 34996
Parks and Recreation	Martin County Golf Course	2000 SE Saint Lucie Blvd Stuart, FL 34996
	Park Operations Compound	2990 SE Dixie Hwy Stuart, FL 34996
	UF/IFAS Extension Office	2614 SE Dixie Hwy Stuart, FL 34996

8. Current Contracts

Martin County utilizes contractors to assist in managing pest populations. All contractors shall abide by the standards set forth in this IPM plan, it is the responsibility of each contractor to acquaint themselves with the county's IPM plan. Shall the need arise to deviate from set plans the contractor must submit justification to the county in writing, providing ample time and explanation for the proposed change. The Pesticide Stewardship Group will review each request and approve or deny on a case by case basis.

Contractors are required to obtain and maintain FDACS pesticide applicator licenses in the appropriate category for the contract. Pesticide licensing requirements for each contract can be found in the Scope of Work where applicable. Contracts requiring pesticide licensing are listed in table 8.1.

Table 8.1 Current contracts requiring FDACS pesticide applicator certification in one or more categories.

Contract	Description	Contractor(s)
Public Works Department		
RFB2018-3031	Aerial Mosquito Spraying	-Clarke Environmental Mosquito Management -Vector Disease Control International
RFB2018-2963	Nuisance Vegetation Management	-Ecological Associates Inc. (Primary) -Aquatic Vegetation Control (Secondary) -Lake & Wetland Management (Secondary)
RFB2015-2743	Roadway Mowing & Landscape Maintenance	-Brightview
RFB2017-2905	Exotic Vegetation Removal	-Lake & Wetland Management

Contract	Description	Contractor(s)
		-Wetlands Management SF -Aquatic Vegetation Control -Native Creations
Parks and Recreation		
RFB2016-2884	Parks Landscaping	-Brightview -Sunshine Land Design -Greenscape Services
General Services		
RFB2015-2763	Landscape Maintenance for County Facilities	-Sunshine Land Design

9. Cooperative Agencies

Martin County partners with various agencies to help develop and implement best management practices for integrated pest management. Some of these groups provide financial support, training, research, and technical advice. A list of partner agencies can be found in table 9.1.

Table 9.1 Cooperative agencies that partner with Martin County

Acronym	Stands for	Website
FLEPPC	Florida Exotic Pest Plant Council	https://www.fleppc.org/
FDACS	Florida Department of Agriculture and Consumer Services	https://www.freshfromflorida.com/
FDEP	Florida Department of Environmental Protection	https://floridadep.gov/
TC CISMA	Treasure Coast Cooperative Invasive Species Management Area	https://www.floridainvasives.org/Treasure/
FISP	Florida Invasive Species Partnership	https://www.floridainvasives.org/
UF IFAS	University of Florida Institute of Food and Agricultural Sciences	https://ifas.ufl.edu/
SFWMD	South Florida Water Management District	https://www.sfwmd.gov/
FFWC	Florida Fish and Wildlife Conservation Commission	https://myfwc.com/
SOMM	Subcommittee on Marsh Management	http://www.leg.state.fl.us/statutes/index.cfm?App_mode=Display_Statute&Search_String=&URL=0300-0399/0388/Sections/0388.46.html

Appendices

Appendix A: Universal Pesticide Application Record Keeping Form

Martin County Board of County Commissioners Universal Pesticide Application Record Keeping Form

1. Application Information:

Department _____ Site Type _____
Licensed Applicator _____ License Number _____
Applicator (if different than licensed above) _____
Location or Address _____
Target Pest(s) _____

2. Chemical Information

Is this application for maintenance control (circle one)? Yes or No
Pesticide Brand Name _____ EPA # _____
Active Ingredient _____ Application Rate _____
Size of Treatment Area _____ Quantity of Pesticide Used _____
Application Method _____

3. Meteorological Conditions

Temperature _____ Wind Speed _____
Weather Conditions _____
Time Started _____ Time Finished _____

4. Comments

Appendix B: Parks and Recreation Facilities

Park Name	#	Street	Area
Jensen Causeway	889	NE Causeway Blvd	Hutchinson Island
Glascock Beach	4775	NE Ocean Blvd	Hutchinson Island
Jensen/Sea Turtle Beach	4191	NE Ocean Blvd	Hutchinson Island
Bob Graham Beach	3225	NE Ocean Blvd	Hutchinson Island
Broward St Boat Ramp	4973	SE Dixie Hwy	Port Salerno
Chastain Beach	1213	SE MacArthur Blvd	Hutchinson Island
Bathtub Beach	1585	SE MacArthur Blvd	Hutchinson Island
Virginia Forrest Beach	1951	NE Ocean Blvd	Hutchinson Island
Stokes Beach		NE Ocean Blvd	Hutchinson Island
Stuart Beach	889	NE Ocean Blvd	Hutchinson Island
Greenfield Park	4900	SE Cabot St	Hobe Sound
Port Mayaca Park		SR #76	Port Mayaca
Beachwalk Pasley Beach	2801	NE Ocean Blvd	Hutchinson Island
Bryn Mawr Beach	2661	NE Ocean Blvd	Hutchinson Island
Stuart Causeway		SE Ocean Blvd	Hutchinson Island
Fletcher Beach	45	NE MacArthur Blvd	Hutchinson Island
Sandsprit Park	3443	SE St Lucie Blvd	Port Salerno
Phipps Park	2175	SW Locks Rd	Tropical Farms
Peck Lake Park	8108	Gomez Ave	Hobe Sound
Pendarvis Cove Park	1000	SW Chapman Way	Palm City
Cove Road Park		SE Cove Rd	Port Salerno
Hobe Sound Beach		S Beach Rd	Jupiter Island
Tiger Shores	1337	NE Ocean Blvd	Hutchinson Island
Hosford Park	7474	Gaines Ave	Port Salerno
Timer Powers Park	14100	SW Citrus Blvd	Indiantown
J & S Boat Ramp		SW Wood St	Lake Okeechobee
Palm City Recreation Center	2701	SW Cornell Ave	Palm City
Cassidy Center	2824	SE Ellendale St	Golden Gate
Costella Williams Learning Center	4450	SE Field St	New Monrovia
Hobe Sound Civic Center	8980	SE Olympus St	Hobe Sound
Port Salerno Civic Center	4950	SE Anchor Ave	Port Salerno
County Line Community Center	18530	SE County Line Rd	Tequesta
Big Mound Recreation Center	15205	SW Indian Mound Dr	Indiantown
Hawk's Hammock	7201	Markel St	Palm City
Santa Lucea Beach	55	NE MacArthur Blvd	Hutchinson Island
Porter Park	17295	SW Conch Bar Rd	Tequesta
Jimmy Graham Park	8555	SE Gomez	Hobe Sound
Manatee Park		Park Dr	Port Salerno
Twin Rivers Park		Seamark Place	Port Salerno
Halpatiokee Park	7645	SW Lost River Rd	Port Salerno
Boat Ramp Road Park		Boat Ramp Rd	Palm City
Indian Riverside Park	2101	NE Indian River Dr	Jensen Beach
Alex's Beach		NE Ocean Blvd	Hutchinson Island
Curtis Beach			Hutchinson Island
Rio Nature Park	150	NW Alice St	Rio

Park Name	#	Street	Area
Dutcher		NE Ocean Blvd	Hutchinson Island
Muscara		NE Ocean Blvd	Hutchinson Island
Spoil Islands			
Stuart Beach Addition		NE Ocean Blvd	Hutchinson Island
Sundial		NE Ocean Blvd	Hutchinson Island
Tilton Parcel			
Poinciana Ridge Conservation Area		US 1	Hobe Sound
Albeiz Property	7645	SW Lost River Rd	Port Salerno
Parker School Track	1050	E 10th St	Stuart
Lamar Howard Park	2824	SE Ellendale St	Golden Gate
Mary Brogan Park	5050	SE Willoughby Blvd	Port Salerno
Pinewood Track	5200	SE Willoughby Blvd	Port Salerno
J.V. Reed Park	9004	SE Athena Ave	Hobe Sound
Banner Lake Park	12212	SE Lantana Ave	Hobe Sound
Hobe Sound Parking Islands		SE Dixie Hwy	Hobe Sound
Eastridge Park	8764	Sandy Lane	Hobe Sound
Zeus Park	12044	SE Zeus Crescent	Hobe Sound
Pettway Park	8243	SE Pettway St	Hobe Sound
South County Park	10000	SE Dixie Hwy	Hobe Sound
County Line Park	18530	SE County Line Rd	Tequesta
Fire Station #36 Park	18405	SE County Line Rd	Tequesta
Gomez Parcel	8101	SE Gomez	Hobe Sound
Loxahatchee River Park		Loxahatchee River	Tequesta
Zeus Pocket-Sheridan(SW)	9016	SE Athena St	Hobe Sound
Zeus Pocket-Jackson(NW)	8989	SE Apollo St	Hobe Sound
Zeus Pocket-Lee(SE)	9186	SE Athena St	Hobe Sound
Zeus Pocket-Grant(NE)	9091	SE Apollo St	Hobe Sound
Leighton Park	2701	SW Cornell Ave	Palm City
Palm City Park	2050	SW Mapp Rd	Palm City
Danforth Site		CR 714/Mapp Rd (SW)	Palm City
Hidden Oaks Middle School	2801	SW Martin Hwy	Palm City
Joch Leighton Park		CR 714/Mapp Rd (SE)	Palm City
C-23 Canal		Murphy Rd	Palm City
Wojcieszak Park	4733	SE Grouper Ave	Port Salerno
New Monrovia Park	4450	SE Field St	New Monrovia
Oxbow Park		St Lucie St	Port Salerno
Rocky Point Hammock Park	3854	SE Kubin Ave	Rocky Point
Station 30 Park	4725	SE Dixie Hwy	Port Salerno
A1A ROW Port Salerno Garden		SE Dixie Hwy	Port Salerno
Murray Middle School	4400	SE Murray St	New Monrovia
Port Salerno Civic Center	4950	SE Anchor Ave	Port Salerno
Hibiscus Park Recreation Center		SE Cypress St	Hibiscus Park
Old Salerno Schoolhouse		Salerno Rd/Ebbtide	Port Salerno
Tropical Farms Park	8446	SW Tropical Ave	Tropical Farms
Kiplinger		Hwy 76/ Indian St	Stuart
Big Mound Park	15205	SW Indian Mound Dr	Indiantown

Park Name	#	Street	Area
Martin Grade Park	24201	SW Martin Hwy	Martin Grade
Booker Park	15101	SW 169th St	Booker Park
Kiwanis Park	15700	SW Warfield Blvd	Indiantown
Westbrook Park		174th Court	Booker Park
Indiantown Middle School	16303	SW Farm Rd	Indiantown
Lake Okeechobee Ridge		Hwy 441/ Hwy 76	Port Mayaca
Parks Administrative Office	2401	SE Monterey Rd	Stuart
Operations' Compound	2990	SE Dixie Hwy	Stuart

Appendix C: Storm Water Areas and Locations

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
STAs					
SR A1A Gateway	SW-D1-0001	0.0000	0.8165	0.0000	0.8165
Lake Pitchford	SW-D1-0010	0.0000	0.0000	1.8192	1.8192
Warner Creek Trib. I Ditch	SW-D1-0020	0.2082	0.0000	0.0000	0.2082
Rio STA	SW-D1-0025	0.0000	1.7747	0.0000	1.7747
Warner Creek STA	SW-D1-0026	0.6380	0.3279	3.0498	4.0157
Beau Rivage STA	SW-D1-0029	0.0000	0.1967	0.0000	0.1967
Palm Lake Park STA	SW-D1-0030	0.0000	5.1399	0.0000	5.1399
North River Shores Ditch	SW-D1-0040	0.0000	0.0000	0.4520	0.4520
Lake George	SW-D2-0050	0.0000	0.0000	2.8944	2.8944
Lake Martin	SW-D2-0060	0.0000	0.0000	0.9843	0.9843
Coral Lakes Ditch	SW-D2-0070	0.4905	0.0000	0.0000	0.4905
Coral Gardens STA	SW-D2-0080	0.0000	5.2609	0.0000	5.2609
Fern Creek STA	SW-D2-0090	1.0694	0.0000	0.0000	1.0694
Golden Gate STA	SW-D2-0100	1.0694	7.4017	0.0000	8.4711
Golden Gate Phase III STA	SW-D2-0110	0.0000	1.2226	0.0000	1.2226
East Hanson Grant STA	SW-D4-0120	0.0000	0.6555	0.0000	0.6555
Hibiscus Park Outfall Ditch	SW-D4-0140	0.6738	0.0000	0.0000	0.6738

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
Hibiscus Park Outfall Trib. II Ditch	SW-D4-0150	0.0344	0.0000	0.0000	0.0344
Hibiscus Park STA	SW-D4-0160	0.0000	0.2974	0.0000	0.2974
Salerno Creek STA	SW-D4-0170	0.0000	16.2022	0.0000	16.2022
Salerno Creek Outfall	SW-D4-0180	0.8754	0.0000	0.0000	0.8754
Salerno Road Retentions 1, 2, 3	SW-D4-0190	0.0000	0.1568	0.0000	0.1568
A1A/ Broward St. Wetland	SW-D4-0200	0.0000	0.3092	0.0000	0.3092
Manatee Creek STA	SW-D4-0210	0.6301	12.0774	0.0000	12.7075
Manatee Creek STA PH 2 & 3	SW-D4-0211	1.0670	8.9964	0.0000	10.0634
East Fork Creek Wetland	SW-D4-0220	0.5922	0.0000	0.0000	0.5922
Tropical Farms STA	SW-D4-0225	0.4147	5.1761	10.2235	15.8143
Orange Blossom Trail STA	SW-D4-0230	0.0467	0.0000	2.9726	3.0193
Poinciana Gardens STA	SW-D4-0240	0.0000	1.4065	0.0000	1.4065
Amethyst Retention	SW-D4-0241	0.0000	0.0000	0.5710	0.5710
MacArthur Lake STA	SW-D4-0250	0.8202	0.0000	3.7919	4.6121
Longview Retention	SW-D4-0260	0.0000	0.0572	0.0000	0.0572
Floral Retention	SW-D4-0270	0.0000	0.1137	0.0000	0.1137
Jimmy Graham Park	SW-D3-0275	0.0000	4.0983	0.0000	4.0983
Kitching Creek STA	SW-D3-0280	0.0000	5.0206	0.0000	5.0206
Kitching Creek Central Flow Way	SW-D3-0281	0.0000	25.8788	0.0000	25.8788
Tropic Vista STA	SW-D3-0290		0.0000	6.5382	6.5382
Little Club STA	SW-D3-0300	0.0000	0.7821	0.0000	0.7821
Old Palm City STA	SW-D5-0310		1.2773	0.0000	1.2773
Old Palm City Phase III (East and West)	SW-D5-0311	0.1042	4.8929	0.0000	4.9971
Veteran's Memorial Bridge Lake	SW-D5-0312	0.0000	1.0947	2.9100	4.0047

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
CR-714 Ponds E & W	SW-D5-0313	0.0000	0.0000	10.5000	10.5000
Danforth Creek	SW-D5-0320	2.4784	0.0000	0.0000	2.4784
34th St. Retention	SW-D5-0330	0.0000	3.5972	0.0000	3.5972
Citrus Blvd. STA	SW-D5-0340	0.0000	25.3400	0.0000	25.3400
Danforth Creek STA	SW-D5-0350	0.3031	7.4865	0.0000	7.7896
		11.5157	147.0577	46.7069	205.2803
Ditches					Total
Jensen Park Estates Outfall	AD 25	0.012	0	0	0.012
Warner Creek	AD 35	0.792	0	0	0.792
Warner Creek	AD 40	0.633	0	0	0.633
Warner Creek	AD 45	0.732	0	0	0.732
Warner Creek	AD 50	0.171	0	0	0.171
Warner Creek	AD 55	0.872	0	0	0.872
Warner Creek	AD 65	0.405	0	0	0.405
Warner Creek	AD 66	0.007	0	0	0.007
Warner Creek Trib. I	AD 85	0.122	0	0	0.122
Warner Creek Trib. I	AD 90	0.149	0	0	0.149
Pinecrest Lakes Ditch (Parcel A)	AD 100	0.325	0	0	0.325
Pinecrest Lakes Ditch (Parcel A)	AD 105	0.058	0	0	0.058
Beau Rivage Ditch (East)	AD 165	0.058	0	0	0.058
Beau Rivage Ditch (East)	AD 170	0.081	0	0	0.081
Beau Rivage Ditch (West)	AD 175	0.023	0	0	0.023
Britt Rd. (North)	AD 185	0.037	0	0	0.037
Vista Del Largo Ditch	AD 195	0.025	0	0	0.025
Vista Del Largo Ditch	AD 200	0.088	0	0	0.088
Spruce Ridge Dr. Outfall I	AD 205	0.026	0	0	0.026
Spruce Ridge Dr. Outfall II	AD 225	0.032	0	0	0.032
Poppleton Creek	AD 270	0.066	0	0	0.066
Poppleton Creek	AD 275	0.680	0	0	0.680
Willoughby Blvd. Outfall I	AD 280	0.102	0	0	0.102
Willoughby Blvd. Outfall I	AD 285	0.352	0	0	0.352
Willoughby Blvd. Outfall II	AD 290	0.352	0	0	0.352
Airport Ditch	AD 295	0.046	0	0	0.046
Airport Ditch	AD 300	0.206	0	0	0.206
Airport Ditch	AD 305	0.669	0	0	0.669
Airport Ditch Trib. I	AD 310	0.115	0	0	0.115
Airport Ditch Trib. I	AD 311	0.186	0	0	0.186

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
Airport Ditch Trib. I	AD 312	0.617	0	0	0.617
Airport Ditch Trib. II	AD 315	0.879	0	0	0.879
Airport Ditch Trib. II	AD 316	0.102	0	0	0.102
Willoughby Creek	AD 325	0.058	0	0	0.058
Willoughby Creek	AD 330	0.115	0	0	0.115
Willoughby Creek	AD 335	0.237	0	0	0.237
Willoughby Creek	AD 340	0.147	0	0	0.147
Willoughby Creek	AD 341	0.146	0	0	0.146
Willoughby Creek Trib. I	AD 345	0.193	0	0	0.193
Port Sewall Ditch	AD 365	0.071	0	0	0.071
Port Sewall Ditch	AD 370	0.164	0	0	0.164
Retention Ditch West of CR A1A	AD 440	0.996	0	0	0.996
Stuart Yacht and Country Club Ditch	AD 445	0.323	0	0	0.323
Stuart Yacht and Country Club Ditch	AD 446	0.283	0	0	0.283
East Hansen Grant Ditch	AD 455	0.398	0	0	0.398
East Hanson Grant Ditch	AD 465	0.242	0	0	0.242
Port Salerno Ditch	AD 555	0.096	0	0	0.096
Port Salerno Ditch	AD 560	0.058	0	0	0.058
Port Salerno Ditch	AD 570	0.245	0	0	0.245
Port Salerno Ditch	AD 580	0.409	0	0	0.409
Port Salerno Ditch	AD 585	0.040	0	0	0.040
Hibiscus Park Outfall	AD 600	0.141	0	0	0.141
Hibiscus Park Outfall	AD 605	0.284	0	0	0.284
NE Monrovia Ditch (47th Outfall)	AD 610	0.252	0	0	0.252
Avalon Ditch	AD 690	0.072	0	0	0.072
Avalon Ditch	AD 695	0.217	0	0	0.217
Meyer's Estates Ditch	AD 730	0.976	0	0	0.976
Harrison St. Ditch	AD 735	0.218	0	0	0.218
Darling St. Ditch (South Side)	AD 755	0.068	0	0	0.068
Darling St. Ditch (South Side)	AD 760	0.178	0	0	0.178
Darling St. Ditch (North Side)	AD 770	0.113	0	0	0.113
Tower Road Ditch	AD 775	0.337	0	0	0.337
Tower Road Ditch	AD 780	0.871	0	0	0.871
Tower Road Ditch	AD 785	0.471	0	0	0.471
Coral Gardens Ditch	AD 790	0.270	0	0	0.270
Coral Gardens Ditch	AD 795	0.251	0	0	0.251
Coral Gardens Ditch	AD 796	0.240	0	0	0.240
Coral Gardens Ditch	AD 800	0.590	0	0	0.590

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
Coral Gardens Ditch	AD 801	0.198	0	0	0.198
Coral Gardens Ditch	AD 802	0.122	0	0	0.122
Coral Gardens Ditch	AD 805	0.201	0	0	0.201
Coral Gardens Ditch	AD 810	0.338	0	0	0.338
Vista Salerno Ditch Trib. I	AD 840	0.024	0	0	0.024
48th Ave. Outfall (East)	AD 845	0.021	0	0	0.021
48th Ave. Outfall (West)	AD 850	0.021	0	0	0.021
Field St. Ditch	AD 855	0.017	0	0	0.017
Vista Salerno Ditch	AD 865	0.615	0	0	0.615
Seabranh Blvd. Ditch	AD 905	0.200	0	0	0.200
Poinciana Gardens Outfall	AD 910	0.237	0	0	0.237
Poinciana Gardens Outfall	AD 935	0.112	0	0	0.112
Poinciana Gardens Outfall	AD 940	0.021	0	0	0.021
Poinciana Gardens Outfall Trib. II	AD 945	0.091	0	0	0.091
Flora Ave. Ditch (West)	AD 960	0.118	0	0	0.118
Flora Ave. Ditch (West)	AD 961	0.080	0	0	0.080
Flora Ave. Ditch (East)	AD 965	0.067	0	0	0.067
Flora Ave. Ditch (East)	AD 966	0.085	0	0	0.085
SE Bridge Rd. at SE Flora Ave.	AD 970	0.032	0	0	0.032
Powerline Ave. Ditch (West)	AD 975	0.022	0	0	0.022
Powerline Ave. Ditch (West)	AD 980	0.042	0	0	0.042
Powerline Ave. Ditch (East)	AD 985	0.112	0	0	0.112
Kitchen Creek	AD 990	0.878	0	0	0.878
Kitchen Creek	AD 995	1.088	0	0	1.088
138th St. Ditch (South)	AD 1000	1.704	0	0	1.704
138th St. Ditch (North)	AD 1005	0.072	0	0	0.072
138th St. Ditch (North)	AD 1010	0.463	0	0	0.463
138th St. Ditch (North)	AD 1015	0.324	0	0	0.324
CR 708 Ditch (North)	AD 1020	1.679	0	0	1.679
CR 708 Ditch (North)	AD 1025	0.650	0	0	0.650
CR 708 Ditch (North)	AD 1030	0.431	0	0	0.431
CR 708 Ditch (South)	AD 1035	1.191	0	0	1.191
CR 708 Ditch (South)	AD 1040	0.813	0	0	0.813
CR 708 Ditch (South)	AD 1045	1.126	0	0	1.126
CR 711 Ditch (West)	AD 1175	3.183	0	0	3.183
CR 711 Ditch (West)	AD 1180	6.163	0	0	6.163
Bessy Creek	AD 1570	0.660	0	0	0.660
Bessy Creek	AD 1575	0.335	0	0	0.335
Bessy Creek	AD 1580	0.375	0	0	0.375
Bessy Creek	AD 1585	0.214	0	0	0.214

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
Bessy Creek	AD 1590	1.218	0	0	1.218
Bessy Creek	AD 1595	0.957	0	0	0.957
Bessy Creek Trib. I	AD 1600	0.314	0	0	0.314
Bessy Creek Trib. I	AD 1605	0.248	0	0	0.248
Bessy Creek Trib. I	AD 1610	0.237	0	0	0.237
Bessy Creek Trib. II	AD 1615	0.102	0	0	0.102
Bessy Creek Trib. II	AD 1616	0.519	0	0	0.519
Bessy Creek Trib. II	AD 1620	0.522	0	0	0.522
Martin Commons Outfall	AD 1625	0.169	0	0	0.169
Martin Commons Outfall	AD 1626	0.145	0	0	0.145
Bessy Creek Trib. III	AD 1630	0.419	0	0	0.419
Bessy Creek Trib. IV	AD 1635	0.141	0	0	0.141
Bessy Creek Trib. V	AD 1640	0.174	0	0	0.174
Bessy Creek Trib. VI	AD 1645	0.158	0	0	0.158
Bessy Creek Trib. VII	AD 1650	0.716	0	0	0.716
Bessy Creek Trib. VII	AD 1655	0.232	0	0	0.232
Bessy Creek Trib. VII	AD 1660	0.119	0	0	0.119
Bessy Creek Trib. VII	AD 1665	0.116	0	0	0.116
Bessy Creek Trib. VII	AD 1670	0.063	0	0	0.063
Bessy Creek Trib. VII, Lat. I	AD 1675	0.037	0	0	0.037
84th Ave. (Landfill Rd.) East	AD 1680	0.478	0	0	0.478
84th Ave. (Landfill Rd.) East	AD 1685	0.011	0	0	0.011
84th Ave. (Landfill Rd.) West	AD 1690	0.114	0	0	0.114
84th Ave. (Landfill Rd.) West	AD 1695	0.483	0	0	0.483
Busch St. (North)	AD 1700	0.065	0	0	0.065
Busch St. (South)	AD 1705	0.441	0	0	0.441
Moore St. Ditch (North)	AD 1710	0.038	0	0	0.038
Boat Ramp Ave. Ditch	AD 1715	0.078	0	0	0.078
Boat Ramp Ave. Ditch	AD 1720	0.163	0	0	0.163
Boat Ramp Ave. Ditch	AD 1725	0.339	0	0	0.339
Boat Ramp Ave. Ditch	AD 1730	0.436	0	0	0.436
Boat Ramp Ave. Ditch	AD 1735	0.180	0	0	0.180
Leighton Farms Ave. Ditch	AD 1740	0.140	0	0	0.140
Leighton Farms Ave. Ditch	AD 1745	0.112	0	0	0.112
Leighton Farms Ave. Ditch	AD 1750	0.055	0	0	0.055
Danforth Creek	AD 1755	0.118	0	0	0.118
Danforth Creek	AD 1760	0.469	0	0	0.469
Danforth Creek	AD 1765	0.170	0	0	0.170
Danforth Creek	AD 1770	0.265	0	0	0.265
Danforth Creek	AD 1775	0.323	0	0	0.323
Danforth Creek	AD 1780	0.756	0	0	0.756

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
Danforth Creek	AD 1785	0.481	0	0	0.481
Danforth Creek Trib. III	AD 1790	0.214	0	0	0.214
Danforth Creek Trib. III	AD 1795	0.236	0	0	0.236
Danforth Creek Trib. III	AD 1800	1.278	0	0	1.278
Danforth Creek Trib. III	AD 1805	0.213	0	0	0.213
Danforth Creek Trib. IV (North)	AD 1815	0.689	0	0	0.689
Danforth Creek Trib. IV (South)	AD 1820	0.207	0	0	0.207
Danforth Creek Trib. IV (South)	AD 1825	0.299	0	0	0.299
Danforth Creek Trib. IV (South)	AD 1830	0.362	0	0	0.362
Danforth Creek Trib. IV (South)	AD 1840	0.518	0	0	0.518
Danforth Creek Trib. IV (South)	AD 1845	0.117	0	0	0.117
Danforth Creek Trib. V	AD 1855	1.071	0	0	1.071
Danforth Creek Trib. V	AD 1860	0.143	0	0	0.143
Oakbrook Estates Outfall Ditches	AD 1870	2.991	0	0	2.991
Danforth Creek Trib. IV A	AD 1875	0.161	0	0	0.161
Danforth Creek Trib. IV A	AD 1880	0.245	0	0	0.245
Danforth Creek Trib. IV A	AD 1885	0.178	0	0	0.178
Danforth Creek Trib. IV A	AD 1890	0.460	0	0	0.460
Citrus Blvd. Ditch (East)	AD 1895	0.121	0	0	0.121
Markel St. Ditch	AD 1985	0.282	0	0	0.282
Markel St. Ditch	AD 1990	2.627	0	0	2.627
Markel St. Ditch	AD 1995	1.131	0	0	1.131
S-1 Canal (North of Markel St.)	AD 2000	0.576	0	0	0.576
S-1 Canal (South of Markel St.)	AD 2005	3.062	0	0	3.062
Hog Creek	AD 2010	2.557	0	0	2.557
Hog Creek	AD 2011	0.162	0	0	0.162
Hog Creek	AD 2015	0.523	0	0	0.523
Hog Creek	AD 2020	0.482	0	0	0.482
Ludlum St. Outfall	AD 2025	0.130	0	0	0.130
Ludlum St. Outfall	AD 2030	0.335	0	0	0.335
Cherokee St. (North)	AD 2035	0.084	0	0	0.084
Cherokee St. (South)	AD 2040	0.119	0	0	0.119
Citrus Blvd. Ditch (East)	AD 2045	0.355	0	0	0.355
Citrus Blvd. Ditch (East)	AD 2050	0.079	0	0	0.079
Citrus Blvd. Ditch (East)	AD 2055	0.082	0	0	0.082
Citrus Blvd. Ditch (East)	AD 2060	0.087	0	0	0.087
Citrus Blvd. Ditch (East)	AD 2065	0.078	0	0	0.078
Citrus Blvd. Ditch (West)	AD 2080	0.084	0	0	0.084
Citrus Blvd. Ditch (West)	AD 2085	0.087	0	0	0.087
Citrus Blvd. Ditch (West)	AD 2090	0.086	0	0	0.086
Citrus Blvd. Ditch (West)	AD 2095	0.093	0	0	0.093

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
Citrus Blvd. Ditch (West)	AD 2100	0.341	0	0	0.341
Citrus Blvd. Ditch (East)	AD 2105	0.339	0	0	0.339
96th St. Ditch (South)	AD 2110	0.437	0	0	0.437
Citrus Blvd. Ditch (South)	AD 2120	0.049	0	0	0.049
Citrus Blvd. / Indian Mound Ditch	AD 2125	0.016	0	0	0.016
Yalaha St. Ditch	AD 2130	0.011	0	0	0.011
Indian Mound Outfall	AD 2135	0.230	0	0	0.230
Indian Mound Outfall	AD 2140	0.100	0	0	0.100
Indian Mound Outfall	AD 2145	0.318	0	0	0.318
Indian Mound Outfall	AD 2150	0.150	0	0	0.150
Indian Mound Dr. Ditch	AD 2155	0.054	0	0	0.054
Indian Mound Dr. Ditch	AD 2160	0.338	0	0	0.338
Osceola St. Ditch	AD 2190	0.035	0	0	0.035
Osceola St. Ditch	AD 2195	0.039	0	0	0.039
Osceola St. Ditch	AD 2200	0.032	0	0	0.032
Osceola St. Ditch	AD 2205	0.026	0	0	0.026
Osceola St. Ditch	AD 2210	0.014	0	0	0.014
Monroe Ave. @ 153rd St. Outfall	AD 2250	0.078	0	0	0.078
Monroe Ave. @ 153rd St. Outfall	AD 2255	0.015	0	0	0.015
American St. Outfall	AD 2260	0.238	0	0	0.238
Palm Beach St. Ditch	AD 2265	0.029	0	0	0.029
Charleston St. Ditch	AD 2270	0.026	0	0	0.026
New Hope Outfall (North)	AD 2275	0.096	0	0	0.096
New Hope Outfall (South)	AD 2280	0.035	0	0	0.035
New Hope Outfall (South)	AD 2285	0.025	0	0	0.025
New Hope Outfall (South)	AD 2290	0.054	0	0	0.054
168th Ave. Ditch	AD 2295	0.084	0	0	0.084
168th Ave. Ditch	AD 2300	0.019	0	0	0.019
174th Ct. Outfall	AD 2305	0.064	0	0	0.064
SW Farm Rd. @ MLKJ Blvd Outfall	AD 2310	0.029	0	0	0.029
Rowland Canal	AD 2315	0.138	0	0	0.138
Rowland Canal	AD 2315	0.212	0	0	0.212
Rowland Canal	AD 2325	0.872	0	0	0.872
Rowland Canal	AD 2330	0.212	0	0	0.212
Rowland Canal	AD 2335	0.142	0	0	0.142
Rowland Canal	AD 2340	0.266	0	0	0.266
Rowland Canal	AD 2345	0.474	0	0	0.474
Rowland Canal	AD 2350	0.394	0	0	0.394
Rowland Canal	AD 2355	0.303	0	0	0.303
Rowland Canal	AD 2360	0.087	0	0	0.087

LOCATION NAME	ROUTE NO.	Channel (Acres)	STA (Acres)	Lake (Acres)	Total (Acres)
SW Tommy Clements Rd. (North Side)	AD 2365	0.606	0	0	0.606
SW Tommy Clements Rd. (South Side)	AD 2370	0.645	0	0	0.645
CR 609 Outfall Ditch	AD 2375	0.303	0	0	0.303
CR 609 Outfall Ditch	AD 2380	0.600	0	0	0.600
CR 609 Outfall Ditch	AD 2385	1.709	0	0	1.709
South CR 609 Ditch (East Side)	AD 2390	0.296	0	0	0.296
South CR 609 Ditch (East Side)	AD 2395	0.733	0	0	0.733
South CR 609 Ditch (West Side)	AD 2400	0.513	0	0	0.513
North CR 609 Ditch (West Side)	AD 2410	0.241	0	0	0.241
North CR 609 Ditch (West Side)	AD 2415	1.811	0	0	1.811
North CR 609 Ditch (West Side)	AD 2420	2.127	0	0	2.127
North CR 609 Ditch (East Side)	AD 2425	1.801	0	0	1.801
North CR 609 Ditch (East Side)	AD 2430	3.626	0	0	3.626
Fox Brown Rd. Ditch (East)	AD 2440	0.580	0	0	0.580
Fox Brown Rd. Ditch (East)	AD 2445	1.026	0	0	1.026
Fox Brown Rd. Ditch (West)	AD 2450	0.599	0	0	0.599
Fox Brown Rd. Ditch (West)	AD 2455	0.751	0	0	0.751
Alderman Ditch	AD 2465	1.931	0	0	1.931
Alderman Ditch	AD 2470	1.245	0	0	1.245
Alderman Ditch	AD 2475	0.134	0	0	0.134
		105.532	0.000	0.000	105.532

Appendix D: Mosquito Population Monitoring Sample Form

Species	1/1	1/2	1/3	1/4	1/5	1/6	1/7	1/8	1/9	1/10	1/11	1/12	1/13	1/14	1/15	1/16
All Mosquitoes	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Aedes sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Aedes aegypti</i>																
<i>Aedes albopictus</i>																
<i>Aedes atlanticus</i>																
<i>Aedes infirmatus</i>																
<i>Aedes michellae</i>																
<i>Aedes sollicitans</i>																
<i>Aedes taeniorhynchus</i>																
<i>Aedes tormentor</i>																
<i>Aedes triseriatus</i>																
<i>Aedes vexans</i>																
Other Aedes																
Culex sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Culex cedeciei</i>																
<i>Culex erraticus</i>																
<i>Culex iolambdis</i>																
<i>Culex nigripalpus</i>																
<i>Culex pilosus</i>																
<i>Culex quinquefasciatus</i>																
<i>Culex restuans</i>																
<i>Culex salinarius</i>																
Other Culex																
Psorophora sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Psorophora ciliata</i>																
<i>Psorophora columbiae</i>																
<i>Psorophora ferox</i>																
<i>Psorophora howardii</i>																
<i>Psorophora pygmaea</i>																
Other Psorophora																
Anopheles sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Anopheles atropos</i>																
<i>Anopheles crucians</i>																
<i>Anopheles quadrimaculatus</i>																
<i>Anopheles walkeri</i>																
Other Anopheles																
Culiseta sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Culiseta inornata</i>																
<i>Culiseta melanura</i>																
Other Culiseta																
Wyeomyia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Wyeomyia mitchelli</i>																
<i>Wyeomyia vanduzeei</i>																
Other Wyeomyia																
Deinocerites sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Deinocerites cancer</i>																
Other Deinocerites																
Mansonia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Mansonia dyari</i>																
<i>Mansonia titillans</i>																
Other Mansonia																
Coquillettidia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Coquillettidia perturbans</i>																
Other Coquillettidia																
Uranotaenia sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Uranotaenia lowii</i>																
<i>Uranotaenia sapphirina</i>																
Other Uranotaenia																
Toxorhynchites sp.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
<i>Toxorhynchites rutilus</i>																
Other Toxorhynchites																
No-see-ems																
Deer flies																
Midges																