

LAKE COUNTY

DEPARTMENT OF ENVIRONMENTAL SERVICES

**DIVISION OF
MOSQUITO AND AQUATIC PLANT MANAGEMENT**

**Training and Operational Procedures for
AQUATIC PLANT MANAGEMENT SECTION**

Developed 1985
Amended: 1990, 1992, 2005

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B – FOREWORD

Aquatic plant management is a multi-disciplinary field that involves the understanding of aquatic resources and the impact aquatic plants have on these resources. All aquatic plant management programs worldwide have their own unique control measures for their own specific management problems. However, the primary goal of all aquatic plant management programs is to enhance the aquatic resource and maintain recreational opportunities for all citizens.

This manual is a comprehensive guide for aquatic plant management operations in Lake County, Florida. The information contained in this document is intended for operational and instructional purposes. The following policies and procedures will not preclude those established in Chapter 369, F.S. and Chapters 62C-20 and 62C-54, F.A.C. Also, items within this manual that do not have a fiscal or economic impact on any operational function can be changed by the Director without prior approval from the Lake County Board of County Commissioners.

C – INTRODUCTION

C-1: Mission Statement

The Lake County Aquatic Plant Management Section manages invasive aquatic plants for all users of public water bodies in order to minimize potential flooding situations, restore reasonable navigational opportunities, and maintain the natural integrity of these water bodies with respect to aquatic vegetation.

C-2: Objectives and Tasks

1. Conduct a water body investigation program to establish, schedule, and prioritize aquatic plant management strategies, assess effectiveness of management activities, and respond to public service requests.
 - Task: Prepare and maintain a schedule for management activities based on an established aquatic plant and water body priority system.
 - Task: Locate invasive aquatic plant infestations on approved water bodies, residential canals, and potential mosquito breeding sites using established survey techniques.
 - Task: Perform post-treatment inspection activities to assess effectiveness of aquatic plant management applications and determine appropriate follow-up measures.
 - Task: Investigate with integrity and professionalism all public service requests in an acceptable time period.
2. Manage invasive and problematic aquatic plants to reduce potential flooding situations, restore reasonable navigational opportunities, and enhance the natural integrity of Lake County water bodies.
 - Task: Use established chemical, biological, and mechanical control methods to manage exotic and problematic aquatic plants on approved water bodies and residential canals.
 - Task: Manage aquatic plants in approved sites determined by Mosquito Management staff as potential mosquito breeding habitat.

C-3: Aquatic Plant Management Organization

1. Director: Plans, directs, implements, and monitors the aquatic plant management program.
State license requirements: Aquatics, Public Health Pest Control, Research and Demonstration, Director Certification
2. Assistant Director: Assists the Director in the managerial, administrative, operational, and technical aspects of the aquatic plant management program.
State license requirements: Aquatics, Public Health Pest Control, Research and Demonstration
3. Office Associate III: Performs administrative tasks and coordinates office functions and activities.
State license requirements: None
4. Aquatic Biologist/Supervisor (Senior Biologist): Supervises and coordinates all field activities of the aquatic plant management program.
State license requirements: Aquatics, Public Health Pest Control
5. Aquatics Technician: Performs technical level aquatic plant management activities.

State license requirements: Aquatics

6. Biological Technician: Performs technical level aquatic plant management activities. This position is shared between the Aquatic Plant Management and Mosquito Management Sections.
State license requirements: Aquatics, Public Health Pest Control

Note: The job title listed in parentheses is provisional and awaiting County approval.

D – SUPPORTING AGENCIES

D-1: Florida Department of Environmental Protection

The Florida Department of Environmental Protection (DEP) is the regulatory agency for all aquatic plant management performed in the state. The Department's Bureau of Invasive Plant Management includes staff in Tallahassee responsible for program administration. DEP Regional Biologists are located throughout the state and charged with enforcement of rules, regulations, and requirements. A DEP Regional Biologist is assigned to Lake County.

D-2: Florida Fish and Wildlife Conservation Commission

The Florida Fish and Wildlife Conservation Commission (FWCC) is a cooperating state agency responsible for fish and wildlife habitat management. Fisheries management involves all aspects of aquatic resource enhancement including aquatic plant management. FWC Fisheries Biologists review and assess plant diversity on Lake County lakes and make comments regarding management strategies. Cooperation is maintained between FWC and Lake County Aquatic Plant Management staff.

D-3: St. Johns River Water Management District

The St. Johns River Water Management District (SJRWMD) is a cooperating state agency responsible for aquatic and wetland resource management. This agency is responsible for watershed development, hydrological studies, surface water management, water quality assessment, and aquatic plant management. The SJRWMD has developed and implemented aquatic resource preservation projects in Lake County, including the Lake Apopka Marsh Restoration Project and the Lake Griffin Resource Recovery Project. District staff surveys local water bodies and reports invasive aquatic plant observations to Lake County as a cooperative effort in the success of invasive aquatic plant management objectives.

D-4: Lake County Water Authority

The Lake County Water Authority (LCWA) is a state independent special district responsible for aquatic and wetland resource management specific for the Palatka and Ocklawaha River watersheds and basins. The LCWA addresses recreation, conservation, and navigational safety issues for the Harris and Clermont chain of lakes. Aquatic plant issues relating to recreation and safety are conveyed by LCWA staff.

D-5: Army Corps of Engineers

The Army Corps of Engineers (ACOE) is a government agency under leadership of the U.S. Army and responsible for maintaining navigation on federal waterways. The St. Johns River is the only federal waterway in Lake County. The ACOE manages major exotic aquatic plants within the central channel of the river while Lake County manages other invasive plant species in residential canals.

D-6: University of Florida, Center for Aquatic and Invasive Plants

The University of Florida, Center for Aquatic and Invasive Plants is a research institution devoted to aquatic plant issues. Their primary focus is management concepts for invasive plant species. Other areas

of interest include aquatic and invasive plant biology, limnology, and research extension.

E – LAKE COUNTY APPROVED INVASIVE PLANTS

E-1: Requirements

Some aquatic plants demonstrate growth characteristics with potential invasive and problematic qualities. One or more of the following requirements must be met before management activities are considered.

- The plant is exotic to Florida.
- The plant is specified in Florida Statute for management.
- The plant creates potential flooding situations.
- The plant creates potential navigational hazards.
- The plant prevents access by the general public to open water or recreational area.
- The plant creates potential monoculture conditions and disrupts the overall diversity of desirable native vegetation.
- The plant provides favorable mosquito breeding habitat and mosquito breeding is documented.

Management activities are not considered for the following.

- The plant creates aesthetic problems only.
- The plant is listed as endangered or threatened.
- The plant is a desirable native species and has not been documented or observed as invasive or problematic.

The Director has final authority in determining what aquatic plants will be managed by Lake County.

E-2: Major Exotic Aquatic Plants

Three major exotic aquatic plants are considered highest priority for management in Lake County. Each is described in detail.

1. Water hyacinth (*Eichhornia crassipes*) is a floating aquatic plant considered native to South and Central America and exotic to Florida waters. This plant was believed introduced to the St. Johns River around 1900 and has spread throughout most inland and coastal fresh water systems. Few or no natural predators or pathogens exist in Florida waters. Lack of natural controls and subtropical climate provide ideal conditions for uninterrupted growth and expansion.

Water hyacinths show variation in size, ranging from a few inches to nearly 3 feet in height. “Bull” hyacinths represent larger associations of the tall varieties. Plants reproduce largely by vegetative means and are connected by stolons. Within a large population, plants produce seed settling to the bottom and remaining dormant until periods of drought. Seeds germinate when water levels increase.

2. Water lettuce (*Pistia stratiotes*) is a floating aquatic plant believed to have originated in South America. The time of introduction to Florida waters is unknown but may have occurred in the St. Johns River at Jacksonville. This plant has spread to most fresh water systems of Florida. Occasional insect damage may occur on water lettuce.

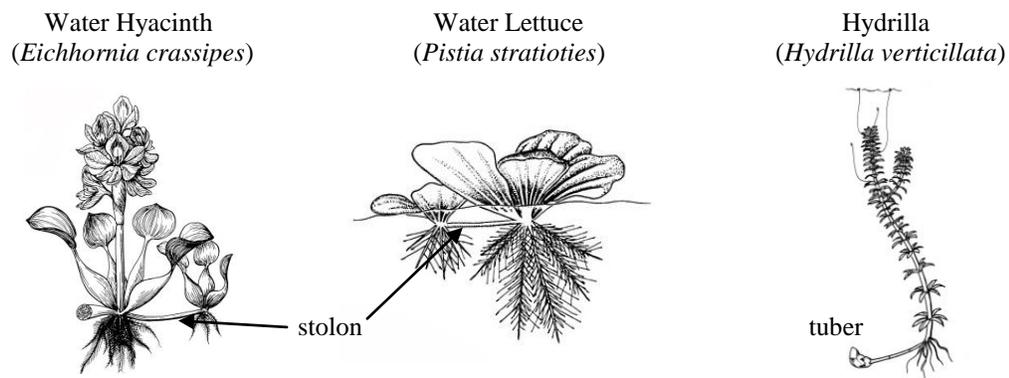
Water lettuce growth is mostly outward but under ideal conditions heights over a foot are sometimes observed. Plant reproduction is mainly vegetative from buds connected by stolons. Seed production

is questionable.

3. Hydrilla (*Hydrilla verticillata*) is a submersed aquatic plant rooted to the substrate of lakes, ponds, and streams. It is native to South America and Southeast Asia and introduction to Florida waters occurred in the 1950's supposedly by the aquarium trade. Hydrilla is found in several large Florida lakes, drainage and irrigation canals, and flowing and tidal streams. No endemic predators or pathogens are known.

Hydrilla needs little light to grow and has been found in water over 12 feet deep. Rapid growth is observed during long summer days. Reproduction occurs by fragmentation, turion development at leaf nodes, and formation of underground tubers. Seed production is minimal.

Figure E-2: Illustrative drawings of water hyacinth, water lettuce, and hydrilla.



E-3: Minor Exotic Aquatic Plants

Minor exotic aquatic plants are found in Lake County. These plants may display invasive tendencies and jeopardize flora diversity. Generally, growth habits are not as active or widespread as water hyacinth, water lettuce, and hydrilla but problems may exist in small streams and canals, along lake shores and ditch banks, or other wetland areas.

Table E-3: Minor exotic aquatic plants found in Lake County, Florida. Plants noted with an "*" are found along ditch banks, lake shorelines, or other wetland areas.

<u>Botanical Name</u>	<u>Common Name</u>
<i>Alternanthera philoxeroides</i>	Alligatorweed
<i>Casuarina equisetifolia</i>	Australian Pine*
<i>Egeria densa</i>	Brazilian Elodea
<i>Urochloa mutica</i>	Paragrass
<i>Panicum repens</i>	Torpedograss
<i>Sapium sebiferum</i>	Chinese tallow*
<i>Schinus terebinthifolius</i>	Brazilian Pepper Tree*
<i>Scirpus cubensis</i>	Scirpus

E-4: Problematic Native Aquatic Plants

Most native, or endemic, aquatic plants in Lake County do not exhibit growth characteristics detrimental to the aquatic system. However, some endemic species become problematic in small canals and streams by restricting water flow and causing navigational hazards. Others create monoculture conditions along lake shorelines preventing growth of desirable vegetation.

Table E-4: Problematic native aquatic plants found in Lake County, Florida.

<u>Botanical Name</u>	<u>Common Name</u>
<i>Ceratophyllum demersum</i>	Coontail
<i>Hydrocotyle umbellata</i>	Water Pennywort
<i>Landoltia punctata</i>	Landoltia Duckweed
<i>Lemna</i> spp.	Common Duckweed
<i>Salvinia minima</i>	Salvinia, Water Fern
<i>Spirodela polyrhiza</i>	Giant Duckweed
<i>Typha</i> spp.	Cattail

E-5: Algae

Lake County does not manage algae. However, large infestations of *Lyngbya* spp. may be considered.

F – LAKE COUNTY APPROVED SITES

F-1: Requirements

A site must include all of the following requirements before aquatic plant management is considered.

- The water body is located within the jurisdictional boundaries of Lake County or, for water bodies outside county boundaries, connected by a navigable channel.
- The water body is publicly owned or considered sovereignty lands.
- The water body has accessibility for launching boats and maneuvering equipment.

Furthermore, the site must include one or more of the following requirements.

- Accessibility is provided to the general public by boat ramp, recreational area, or any other public easement.
- Water hyacinth or water lettuce is documented on the water body and threat of infestation to sovereignty water bodies is probable.
- The site is located on public easement, produces plants favorable as mosquito breeding habitat, and mosquito breeding is documented.

Management activities are not considered for the following sites.

- The water body is located in an area inaccessible by truck, boat, or other equipment currently used by Lake County.
- The water body is located on privately or commercially owned property where access to the general public is denied.
- The water body does not have a documented invasive aquatic plant problem.

The Director has final authority in determining what sites will be managed by Lake County.

F-2: Eligible Waters Criteria for State Funding

Chapter 62C-54.0035(2), FAC, defines eligibility criteria for water bodies which state and federal aquatic plant management funding will be considered.

- a) The water body must be sovereignty lands, or a site which might adversely impact sovereignty lands.
- b) The water body must have access to the boating public by way of an established, improved boat ramp or a direct navigable connection to an eligible water body.
- c) There must be a sign at the boat ramp stating it is a public boat ramp or use area. A ramp fee may be charged provided the fee is not unreasonable (in keeping with ramp fees charged in the area).
- d) There must be at least one directional sign on the nearest paved roadway indicating the way to the public boat ramp.
- e) The boat ramp must have sufficient space to safely turn a vehicle and trailer around and ample

parking space within one-quarter mile distance from the boat ramp.

F-3: Waters Bodies Eligible for State Funding

Water bodies satisfying state eligible waters criteria are considered for aquatic plant management activities and qualify for state funding. The water body must be located within the jurisdictional boundaries of Lake County or, if outside county boundaries, connected by a navigable channel.

Table F-3: Water bodies satisfying state funding eligibility requirements in Lake County, Florida. Water bodies noted with an “*” are located partially or completely outside the jurisdictional boundaries but are connected by a navigable channel.

<u>Water Body Name</u>	<u>Water Body Name</u>
Apopka-Beauclair Canal	Lake Griffin
Bugg Springs Run	Lake Harris
Cherry Lake	Lake Hiawatha
Cook Lake	Lake Holly
Crescent Lake	Lake Louisa
Dead River	Lake Lucy
Dora Canal	Lake Minnehaha
Grasshopper Lake	Lake Minneola
Haines Creek	Lake Norris
Helena Run	Lake Palatlakaha
Johns Lake*	Lake Susan
Lake Carlton*	Lake Umatilla
Lake Dalhousie	Lake Wilson
Lake David	Lake Winona
Lake Denham	Lake Yale
Lake Dora	Palatlakaha River
Lake Dorr	Sellers Lake*
Lake Ella*	Trout Lake
Lake Emma	Wildcat Lake
Lake Eustis	

F-4: Water Bodies Ineligible for State Funding

Water bodies not satisfying eligible waters criteria for state funding are considered for aquatic plant management activities on an individual basis. The water body must be located within the jurisdictional boundaries of Lake County and contain water hyacinth or water lettuce. Water bodies with hydrilla or other invasive aquatic plants are not considered for management activities unless severe infestation to eligible water bodies is imminent.

Table F-4: Water bodies not satisfying state funding eligibility requirements in Lake County, Florida. Management activities are conducted for water hyacinth and water lettuce.

<u>Water Body Name</u>	<u>Water Body Name</u>
Lake Catherine	Dukes Lake
Lake Saunders	Lake Erie
Lake Unity	Lake Junietta
Pretty Lake	Lake Lulu
Big Bear Lake	

F-5: Residential Canals

Residential canals located on approved water bodies are considered for aquatic plant management activities. The canal cannot have intimidating structures, such as “No Trespassing Signs”, gates, chains, etc, and must allow access to the general public. Overhanging tree limbs, sand bars, and other natural obstructions must be removed by property owners before management activities are performed. Residential canals not located on approved water bodies are not considered unless the aquatic flora creates potential flooding or mosquito breeding conditions and evidence of these conditions are verified.

The Florida FFWCC has determined certain residential canals and other aquatic sites have potential for sport fisheries enhancement. Communication is maintained with this agency when aquatic plant management activities are performed on these sites.

1. Lake Griffin: Orange Canal, Yale/Griffin Canal, Lake Griffin State Park, Coca Cola Private Park Canal, Pine Island Canals, Sawgrass Canals.
2. Lake Harris: Ninth Street Canal, Imperial Terrace West Canal, Double Run, Helena Run, Palatlahaha River at Hawthorne, Long Canals in Astatula.
3. Lake Eustis: Welder’s Canal, Vista Del Lago Canal, Western Shores Main Canals, Harbor Shores Main Canals, Three Lakes Park Canal.
4. Apopka-Beauclair Canal: Venetian Village Canals, Main Channel.

F-6: Arthropod Breeding Sites

Retention ponds and other aquatic sites are considered for management activities. The site must be located on county easement and produce aquatic plants documented as arthropod breeding habitat.

G – PRIORITY SYSTEM

G-1: DEP Funding Priorities

Chapter 62C-54.005(2), FAC, states “Although a water body may meet eligibility criteria, funding and workforce availability may be insufficient to manage noxious plants for a period of time. When federal or state funds are involved, the bureau shall disperse funds according to the following priorities”.

- a) To manage water hyacinth and water lettuce, including those plants in waters which could infest connected eligible lakes and rivers.
- b) To manage new hydrilla infestations, particularly those at boat ramps or in waters connected to eligible waters which contain little or no hydrilla.
- c) To manage any noxious aquatic plant restricting access at public boat ramps, or to establish trails which connect boat ramps to major use areas.
- d) To provide open areas in dense stands of hydrilla for navigation and recreational use.
- e) To provide for large-scale hydrilla management operations.
- f) To provide open areas in dense stands of other noxious plants for navigation and recreational use.
- g) To manage noxious plants in residential or dead end canals which are connected to eligible waters, unless they contain:
 1. Water hyacinth or water lettuce.
 2. Hydrilla, and there is a navigable connection to eligible water, and the eligible water contains little or no hydrilla.

G-2: Lake County Priority System

DEP funding priorities are incorporated into the Lake County aquatic plant management priority system. Priority levels are established for planning and scheduling purposes. The Senior Biologist is responsible for ensuring compliance with the priority system.

1. Water bodies eligible for state funding, including connected residential canals, channels, and other aquatic systems having a direct flow into the eligible water body, containing water hyacinth or water lettuce.
2. Water bodies eligible for state funding, including connected residential canals, channels, and other aquatic systems having a direct flow into the eligible water body, containing hydrilla.
3. Water bodies eligible for state funding, including connected residential canals, channels, and other

aquatic systems having a direct flow into the eligible water body, containing minor exotic aquatic plants of documented concern.

4. Water bodies eligible for state funding, including connected residential canals, channels, and other aquatic systems having a direct flow into the eligible water body, containing documented problematic native aquatic plants.
5. Water bodies ineligible for state funding containing water hyacinth or water lettuce.
6. Retention ponds and other sites containing documented aquatic plants suitable for arthropod breeding.
7. Water bodies eligible for state funding, including connected residential canals, channels, and other aquatic systems having a direct flow into the eligible water body, containing exotic ditch bank or shoreline vegetation.

H – PERMITS

H-1: Authority

Chapter 62C-20, FAC, states “No person shall attempt to control, eradicate, remove, or otherwise alter any aquatic plants in waters of the state... except as provided in a permit issued by the department unless the waters in which aquatic plant management activities are to take place are expressly exempted.” Waters exempt from permitting are as follows.

- Waters wholly owned by one person, other than the state, provided there is no connection to waters of special concern.
- Class IV waters or artificially created waters used exclusively for agricultural purposes, provided there is no connection to waters of special concern.
- Electrical power plant cooling ponds, reservoirs, or canals unless used as or connected to waters designated as manatee aggregation sites.
- Waters of 10 surface acres or less provided there is no connection to waters of special concern.
- In a specific area of a water body where a dredge and fill activity is permitted and aquatic plants are removed as part of the permitted activity.

H-2: Chapter 62C-54, FAC, Cooperative Aquatic Plant Control Program

Lake County enters into agreement with DEP each year, as specified in Chapter 62C-54, FAC, to manage aquatic plants associated with water bodies eligible for state funding. This agreement is known as the Cooperative Aquatic Plant Control Program. A work plan is developed and includes name and map of the water body, aquatic plant, permitted acreage, allocated costs, control methods, and type of public notification to be used. Upon DEP approval, the plan serves as the aquatic plant management permit for the listed water bodies. The work plan is maintained in the division office and the Director is responsible for program administration. Work plan development is described in the Administration Procedures manual.

Management activities performed under the Cooperative Aquatic Plant Control Program must follow the requirements stated on the work plan. A monthly report is generated detailing the acreage treated and acres remaining for each aquatic plant by water body. Aquatic Plant Management staff review the report and recommend any changes as needed. Modifications to the work plan must be approved by DEP. The Senior Biologist is responsible for ensuring all activities conducted under this program conform to the provisions of the work plan.

H-3: Chapter 62C-20, FAC, Aquatic Plant Management Permit

Water bodies ineligible for state funding require an aquatic plant management permit, as specified in Chapter 62C-20, FAC, unless exempt criteria are met. A permit application is completed for each water body and includes specific location, target aquatic plant, acres to be treated, and control methods. Upon DEP approval, a permit is issued and valid for three years. The permits are maintained in the division

office and the Director is responsible for administration. Aquatic plant management permit applications are described in the Administration Procedures manual.

Management activities must follow the requirements stated on the aquatic plant management permit. A report is generated as needed detailing the acreage treated for each aquatic plant by water body. Aquatic Plant Management staff review the report and recommend any changes as needed. The Senior Biologist is responsible for ensuring all activities conform to the provisions of the permit.

H-4: Exempt Water Bodies

Residential canals less than 10 acres are exempt from permitting requirements. Management activities performed on exotic aquatic plants present in these canals are eligible for state funding and, therefore, are included in the Cooperative Aquatic Plant Control Program. Residential canals and other sites greater than 10 acres with problematic and exotic aquatic plants not listed in the Cooperative Aquatic Plant Control work plan are included in the Chapter 62C-20, FAC, permit. Retention ponds and other sites containing aquatic plants suitable for arthropod breeding are exempt from permitting requirements.

H-5: Permit Type Coding

In-house Permit Type (PT) codes were developed when most aquatic plant management activities performed by Lake County required state permitting. The PT code differentiated permit types and allowed data coding for specific report generation required for each permit.

Rule changes over the years have eliminated some state permitting requirements for aquatic plant management activities. PT codes are still used to allow data coding for specific management activities but no longer denote certain permit types.

- PT1: management activities performed for the Cooperative Aquatic Plant Control Program (Chapter 62C-54, FAC).
- PT2: management activities requiring an aquatic plant management permit and not included in the Cooperative Aquatic Plant Control Program (Chapter 62C-20, FAC).
- PT3: management activities conducted in residential canals and other aquatic sites where permits are not required.
- PT4: management activities conducted on sites containing aquatic plants suitable for arthropod breeding.

PT codes correspond to the Lake County priority system. PT1 activities are given highest priority and scheduled first, PT2 activities are second, PT3 activities are third, and PT4 activities are considered lowest priority and scheduled last.

I – PLANNING AND SCHEDULING

I-1: Planning

Management activities are planned to maximize efforts and provide effective results. Knowledge of aquatic plant biology and management techniques is necessary to successfully plan operations. Planning methods range from verbal communication for simple routine activities to detailed analysis of management strategies for large scale hydrilla treatments. The Senior Biologist is responsible for planning and organizing all field activities. Verbal communication is maintained with Aquatic Plant Management and Administrative staff on a daily basis. Written correspondence is included when necessary.

Morning briefings are held to discuss daily management activities and work assignments. Routine small scale investigation and treatment activities require only immediate discussion and planning. Large scale hydrilla, water hyacinth, and water lettuce management activities require Administrative review and approval. DEP and other supporting agencies are contacted as needed. The Senior Biologist, at the discretion of the Director, is responsible for conducting the morning briefings.

I-2: Scheduling

A written schedule is required for all aquatic plant management field and educational activities. This schedule is used as a guideline for planning daily activities and informing other agencies of management objectives. The Senior Biologist is responsible for developing the weekly schedule and ensuring all affected agencies, including Administrative staff, are forwarded a copy.

The “Tentative Schedule of Operations” form is formatted as an Excel spreadsheet and has two components. The first component details all scheduled activities for the Cooperative Aquatic Plant Control Program and is considered highest priority. The second is a schedule of minor aquatic plant activities. Both components are similarly formatted and require the same types of information.

The “Tentative Schedule of Operations” must include the date prepared and the week planned for scheduling. The water body and work area are recorded for each day of the week. For each work area, the target plant, estimated acres, herbicide, and rate/acre are listed. A scheduled survey or inspection activity is noted on the form and estimated acres, herbicide, and rate/acre are not required. A notation, such as “no scheduled activities”, is made on days where no field or educational activities are planned.

The “Tentative Schedule of Operations” form is completed no later than the previous business day of the week scheduled on the form. The printed form is retained by the Senior Biologist. Copies are made for distribution to Aquatic Plant Management and Administrative personnel. The Office Associate is responsible for faxing the weekly schedule to DEP Bureau of Invasive Plant Management and FWC. This tentative schedule is used as a guideline for planning weekly management activities. Changes may

be made at any time as a result of inclement weather or management priorities. However, affected agencies are informed when changes occur.

Figure I-2: Excel spreadsheet for Tentative Schedule of Operations. The first component details all scheduled activities for the Cooperative Aquatic Plant Control Program. The second is a schedule of minor aquatic plant activities.

LAKE COUNTY AQUATIC PLANT MANAGEMENT - TENTATIVE SCHEDULE OF OPERATIONS							
Date: <u>February 3, 2006</u>		Week of <u>2 / 6 / 06 - 2 / 10 / 06</u>			Crew # 13601		
Chapter 62C-54, FAC (Cooperative Aquatic Plant Control Program)							
DAY OF WEEK	RESCHEDULE	WATER BODY	WORK AREA	TARGET PLANT	est. ACRES	HERBICIDE	RATE (gls/lbs/acre)
Monday		lk beauclair	shoreline	hydrilla survey	na	na	na
		dead river	shoreline and canals	water hyacinth	1.00	24d amine	0.75
Tuesday							
		lk eustis	north shoreline / harbor shores cove	hydrilla survey	na	na	na
		lk harris	railroad cove / airport cove	hydrilla survey	na	na	na
Wednesday							
		lk harris	lane park cove double run	hydrilla survey water hyacinth	na 1.00	na 24d amine	na 0.75
		lk dorr	shoreline	water hyacinth	0.50	24d amine	0.75
Thursday							
		lk griffin	kings cove / treasure island	water hyacinth water lettuce	1.00 1.00	24d amine diquat	0.75 0.50
Friday		lk griffin	yale griffin canal / east shoreline	water lettuce	3.00	diquat	0.50
		abc canal	shoeline and canals	water lettuce	2.00	diquat	0.50

LAKE COUNTY AQUATIC PLANT MANAGEMENT - TENTATIVE SCHEDULE OF OPERATIONS

Date: February 3, 2006

Week of 2 / 6 / 06 - 2 / 10 / 06

Crew # 13601

minor plant tentative schedule							
DAY OF WEEK	RESCHEDULE	WATER BODY	WORK AREA	TARGET PLANT	ACRES	HERBICIDE	RATE (gls:lbs/acre)
Monday							
		no treatment scheduled					
Tuesday							
		no treatment scheduled					
Wednesday							
		no treatment scheduled					
Thursday							
		no treatment scheduled					
Friday							
		no treatment scheduled					

J – EQUIPMENT

J-1: Trucks

Pick-up trucks are used for towing boats and hauling herbicides. These trucks are ¾ or ½ ton, 4-wheel drive, and installed with heavy duty towing package. Utility vehicles are used for towing boats and transporting personnel and equipped with 4-wheel drive and heavy duty towing package.

Safe operation of trucks and utility vehicles is required by all Aquatic Plant Management staff. Periodic inspections are performed and defects are reported to the Maintenance Section. Trucks and utility vehicles will be washed, waxed, and interior cleaned as needed to remove mud, dirt, grime, and to maintain a professional appearance.

J-2: Boats

Airboats and tunnel-hull boats are used for water body surveys, inspections, and management applications. Airboats have spray systems permanently installed but systems may be removed to conduct specialized activities. Tunnel-hull boats do not have permanently installed spray systems but are equipped for installation if needed.

Safe and proficient operation of all boats is required by all Aquatic Plant Management staff. Daily inspections are performed and minor defects are repaired immediately. Major defects are reported to the Maintenance Section. All boats will be washed after each use to remove herbicide residue and debris. A power wash system is supplied for this process. OSHA Lockout/Tagout safety procedures are followed when entering the cage of an airboat for cleaning and maintenance.

J-3: Spray Systems

1. Conventional spray systems are used for tank mix herbicide applications. These systems comprise a small HP motor, diaphragm pump, 50 or 100 gallon mix tank with paddle and jet agitation, and spray apparatus with hoses. Spray apparatus consist of spray gun or boom with trailing hoses.
2. Invert spray systems are used for direct injection and invert emulsion herbicide applications. These systems comprise a positive displacement pump, small HP motor, blender, chemical pick-up lines, and spray apparatus with hoses. Spray apparatus consist of spray gun or boom with trailing hoses.
3. Blower spray systems are used for granular herbicide applications. These systems comprise a small HP motor, air pump, herbicide hopper, and spreader or blower wand apparatus.
4. Back pack and hand held spray systems are used for small tank mix herbicide applications. A back pack system includes a shoulder harness, small mix tank, hand operated pumping mechanism, and spray wand. A hand held system comprises a tank with hand operated pump and spray wand. A hand scoop is used for applying granular herbicide to spot treatments of submersed aquatic vegetation.

Aquatic Plant Management staff is responsible for calibration, maintenance, and operation of spray systems. The Senior Biologist is responsible for ensuring all spray systems are properly used and maintained.

J-4: Spray System Calibration

Calibration is necessary to ensure spray systems are delivering correct amounts of herbicide formulation. Calibration is performed at least two times per year for all spray systems. Additional calibration is necessary after maintenance or if irregularities in machine performance are noticed. The Senior Biologist will ensure calibration procedures are followed.

- Spray is collected in a large container for 1 minute and measured. Three measurements are taken to calculate an average application rate/minute.
- Boat is engaged to a standard spray speed, driven over a measured distance, and time is recorded. At least two measurements are taken, usually with and against the wind, and averaged. The measured distance is divided by the averaged time to obtain a distance traveled/minute.
- The application rate/minute is divided by the distance traveled/minute to obtain an application rate/distance traveled. Knowing the amount of formulation applied over a particular distance, the swath width of the spray pattern is adjusted to obtain the correct application of herbicide/acre.

These methods are applied for conventional, invert, and blower spray systems. When calibrating the invert system, the procedures will be repeated for each chemical and water orifice size. The back pack and hand held systems employ the same methods but the distance traveled/minute is calculated by the walking speed of the applicator.

J-5: Equipment Fuel and Oil

Trucks, boats, and motorized spray systems will be fueled and fluids checked before each use or as needed. A separate “Monthly Gas and Oil Log” form is completed for every truck and boat. The amount

of gas and oil used is recorded by date. The mileage is recorded for trucks and hour meter reading for boats.

J-6: Other Equipment

Other equipment is used periodically for various aquatic plant management activities. Aquatic Plant Management personnel are required to operate and maintain all equipment.

A fathometer is used to observe the water body substrate for submersed aquatic plant growth. A hydrilla rake is a pronged device attached to a rope and used to verify any submersed aquatic plant growth observed by the fathometer. A GPS receiver is used to record waypoints for survey and treatment plots.

Water velocity, dissolved oxygen (DO), and pH meters are used to determine the movement, dissolved oxygen concentration, temperature, and pH of the water. These meters are used for submersed aquatic plant applications only.

K – WATER BODY INVESTIGATION

K-1: Premise

Water body investigations are conducted to observe and document aquatic plant communities and respond to service requests. Information gathered from surveys is used to prioritize and schedule management activities. Inspection activities are used to assess treatment applications and determine further management strategies. Service request investigations are used as a survey method to determine management needs for specific sites. Individuals requesting service occasionally report success or failure of treatment applications. This information is useful as an inspection tool.

Surveys are conducted throughout the year in a coordinated effort between Lake County administrative staff and DEP regional biologists. These surveys are used to determine the total acres of exotic aquatic plant species and to document increasing or decreasing growth levels.

The type and frequency of surveys and inspections is dependent upon the aquatic site and vegetation. All Aquatic Plant Management personnel conduct water body surveys and inspections using truck or boat. The Senior Biologist is responsible for planning, organizing, and assigning these activities.

K-2: Water Hyacinth and Water Lettuce

Water bodies are visually surveyed for water hyacinth and water lettuce on every visit. These floating plants are distributed by wind and water currents and are occasionally found in and around shoreline vegetation. Absence of water hyacinth and water lettuce at individual sites during a visit does not exclude the need for further surveys. The high proliferation and distribution rates of these plants require

continual survey efforts.

Specific sites where water hyacinth and water lettuce have been treated are inspected within three days after application. If needed, additional management activities are conducted at time of inspection or referred to the Senior Biologist for scheduling.

K-3: Hydrilla

Water bodies are visually observed for hydrilla on every visit. Extensive survey methods are utilized if hydrilla is noticed.

1. Boundaries are determined an appropriate distance beyond all sides of visual observation. A series of transect lines is established within the measured boundaries such that thorough coverage of the plot is achieved.
2. A fathometer is used while following the transect lines to determine water depth and detect irregularities along the substrate. If irregularities are noticed, a hydrilla rake is thrown overboard and retrieved. Hydrilla presence or absence is noted. If hydrilla is retrieved at the end of the transect line, the survey is continued along the line until no hydrilla is collected. The plot boundary is extended beyond the point of last retrieval to account for possible missed hydrilla.
3. A GPS receiver is used to record waypoints at the four corners of the surveyed plot. A large plot may require secondary waypoint recordings along the boundaries. Appropriate names are assigned to the waypoints such that plot corners are easily recognized.
4. The GPS receiver is attached to a computer and mapping software is initialized. The waypoints are exported into the mapping module. The size of the survey plot, measured in acre-feet, is calculated and a map is plotted. The waypoints are saved to a computer file for future reference.

These methods are used in areas where historical hydrilla treatment activities are documented. Previous hydrilla treatment sites are surveyed monthly. However, survey frequency during summer months is dependent upon management priorities and man-power limitations.

Specific sites or plots where hydrilla has been treated are inspected within one week after application and continued every two weeks until treatment success or failure is determined. Additional management activities are considered if treatment failure is imminent.

K-4: Residential Canals

Residential canals are surveyed for problematic aquatic plants. Visual observations for navigational and flooding hazards are made. Surveys are performed on every visit but frequency of visits during summer months is dependent upon management priorities and man-power limitations.

Specific residential canals where treatment activities have been conducted are inspected within three days after application. If needed, additional management activities are conducted at time of inspection or referred to the Senior Biologist for scheduling.

K-5: Arthropod Breeding Sites

Mosquito Management personnel perform investigations at sites containing aquatic plants favorable as

mosquito breeding habitat. Aquatic Plant Management staff performs periodic surveys and inspections dependent upon management priorities and man-power limitations. Coordination is maintained between the two sections.

K-6: Service Request Investigation

Public service requests are received daily. If a service request requires field investigation, the water body, exact location, caller's name (if applicable), request number, and all information regarding actions taken will be documented on the service request report and "Aquatic Plant Management Daily Log". Also, the date and time of investigation or service will be noted. Any detailed maps, drawings, and other pertinent documents will be submitted with the service request form after the investigation or service is completed. Response time will be 48 working hours. The Senior Biologist will determine appropriate response and assignment of all service requests.

K-7: Reporting

All water body investigations are reported on the "Aquatic Plant Management Daily Log". Required information includes permit type code, date, water body name, location of survey, and aquatic plant. For surveys and inspections where immediate treatments are not performed, a "No Treatment" activity code is circled. Applicable crew, trucks, and boats are circled. Time is recorded in ¼ hour increments for each listed function and comments are noted in the provided space. Survey/Inspection time must be recorded.

The Aquatic Plant Field Survey section located at the bottom of the form must be completed for all PT1 surveys and inspections only. The appropriate reason code is circled. Surveys normally require a code "R" for regular maintenance or "C" for complaint by. If "C" is circled, the service request name or number is recorded. Post-treatment inspections require a code "T" for treatment follow-up or "M" for mechanical follow-up. The date treated, target plant, acres treated, and chemicals used must be recorded. Comments on observations, recommendations, and other miscellaneous items are recorded in the appropriate block. If maps are included, the "Yes" box is checked at the bottom of the form.

L – AQUATIC PLANT APPLICATIONS

L-1: Labels and Material Safety Data Sheets

Aquatic herbicides and adjuvant products are the primary tools used for managing aquatic plants in Lake County. Herbicides are a formulation of active ingredient and inert emulsifiers. Specific herbicides are used for specific aquatic plants. The label is used as a reference for deciding what plants are controlled, permissible application sites, and other pertinent information such as water use restrictions and personal protective equipment (PPE). Also, application rates and additives needed for drift control and surfactant requirements are listed on the label. **IT IS A VIOLATION OF FEDERAL LAW TO USE ANY AQUATIC HERBICIDE IN A MANNER INCONSISTENT WITH ITS LABELING.**

Material safety data sheets (MSDS) are used as a reference for safety, toxicological, physiological, and chemical parameters of aquatic herbicides and adjuvant products. A binder containing an alphabetized list of MSDS is maintained at each storage location. The Senior Biologist is responsible for updating the MSDS when reorders and new products are received.

L-2: Inventory of Aquatic Herbicides and Adjuvant Products

An inventory of aquatic herbicides and adjuvant products are maintained for daily operations. Product packaging ranges in size from quart bottles to 250-gallon totes. A monthly inventory ledger is compiled for each product. The ledger lists the product name, unit of measure for product packaging, and beginning balance for the month. When a product is retrieved from inventory, the employee name and amount taken is recorded. When activities are completed for each day, the amount returned to inventory and amount used are recorded. A remaining balance is calculated and recorded. At the end of the month,

all inventory ledgers are checked for accuracy and forwarded to administration. The Senior Biologist is responsible for ensuring inventory procedures are followed and verifying end-of-month stock reconciliation.

Bulk requisitions of aquatic herbicide for large scale applications are made prior to the treatment date. Delivery is scheduled such that storage time at the facilities is minimal. Delivery on the treatment date at the treatment site is preferable. An inventory of bulk shipments is made prior to application and verified against the requisition order.

Table L-2: Aquatic herbicides used in Lake County, Florida. The active ingredient and primary target aquatic or wetland plant(s) are listed.

<u>Active Ingredient</u>	<u>Primary Target Aquatic or Ditch Bank Plant(s)</u>
2,4-D amine	Hyacinths, pennywort, cattail
Copper	Hydrilla
Diquat	Water lettuce, salvinia, duckweed, cattail
Endothol	Hydrilla, coontail
Fluridone	Hydrilla
Glyphosate	Torpedograss, paragrass, cattail, salvinia
Imazapyr	Brazilian pepper
Triclopyr	Brazilian pepper

Trade names frequently change for adjuvant products but the active ingredient and intended purpose remain consistent. Adjuvant products include de-foaming additives, surfactants (wetting or sticking agents), drift suppression polymers, inverting emulsifiers, sinking agents, and pH buffers.

L-3: Tank Mix Applications

Tank mix applications are made by conventional, back pack, and hand held spray systems. Back pack and hand held systems are used for small herbicide applications while conventional systems are used for larger treatments. A hand gun or spray wand is utilized for spraying the herbicide formulation onto the target species. When using a conventional system for submersed aquatic plant treatments, trailing hoses may be used.

Appropriate procedures are needed when mixing herbicide formulations. This will maximize the effectiveness of herbicide and adjuvant products. Before mixing, all filters and connections are checked for cleanliness and proper working condition.

1. The mix tank is primed by adding enough water to initiate the pumping process.
2. A de-foaming agent is added.
3. If glyphosate is used, a pH buffer may be added to neutralize the solution.
4. A surfactant is added when the tank is about half full of water.
5. The correct amount of herbicide is added according to the label instructions.
6. When the tank is almost full, the drift suppression polymer or sinking agent is added.

L-4: Invert Spray System Applications

Invert spray systems are used for direct injection and invert emulsion herbicide applications. This method is best used for large scale and moving water aquatic plant herbicide treatments. Also, it is designed for multiple herbicide application within one trial. A hand gun is utilized for spraying the

herbicide formulation onto the target species. Trailing hoses are used when submersed aquatic plant applications are made but a hand gun may be used for spot treatments. Because of the complexity of operating the invert spray system, extensive training is required.

L-5: Granular Applications

Granular application systems are used for applying granular herbicides. These systems involve loading a hopper with herbicide and applying the product over the target area. The application process is dependent upon the expertise of the boat operator. A hand scoop is used for isolated spot treatments or in areas where direct application to the target plant is critical so as not to adversely impact non-target species.

L-6: Mechanical Applications

Large scale mechanical applications are not conducted by Lake County but may be considered. Other agencies may employ contractual vendors for mechanical harvesting.

Hand removal of aquatic vegetation is conducted only when the amount of vegetation does not warrant herbicide applications and the plants are easily accessible. The plants are placed in the boat or upland at a distance where reintroduction to the water body is not likely to occur. Plants brought to the compound are disposed in a refuse container.

L-7: Biological Control Applications

Biological control methods are used in areas where herbicide applications are not practical or as a supplement to herbicide applications as part of an integrated pest management plan. These methods include triploid grass carp or invertebrate biological control agents.

Triploid grass carp is used for hydrilla management in areas where migration of fish can be monitored and controlled. FFWCC has authority over grass carp stocking and issues permits for these activities.

Invertebrate biological control agents include various species of herbivorous insects. The alligatorweed flea beetle is established in Lake County. This insect is collected in the field and introduced to new infestations of alligatorweed. However, most insect agents have had limited success in central Florida lakes. Consultation with staff from DEP and research institutions is necessary before introduction of new invertebrate biological control agents. Ongoing research is being conducted to investigate potential biological control agents for exotic aquatic plants.

L-8: Reporting

All aquatic plant applications are reported on the "Aquatic Plant Management Daily Log". Required information includes permit type code, date, water body name, location of treatment, aquatic plant, and acres treated. The appropriate activity code and applicable crew, trucks, and boats are circled. Time is recorded in ¼ hour increments for each listed function and comments are noted in the provided space. Effective time must be recorded.

The herbicide and adjuvant products are located on the list and the amount used is recorded. The concentration, expressed as amount of herbicide/gallons of water/acre, is calculated by dividing the acres treated into the amount of herbicide used. This number is recorded in the D&C block along with the name of the herbicide and gallons of water minus the amount of herbicide. If more than one

herbicide is used, record this concentration on the following lines. Granular herbicide applications do not require gallons of water.

A 2,4-D amine application requires a temperature inversion burn-off time, weather forecaster's name, and time called. Hourly wind speed readings are recorded for all floating and emergent aquatic plant applications. Large scale submersed aquatic plant treatments require dissolved oxygen readings at the surface and 1-meter depth and pH reading.

L-9: DEP Application Monitors

DEP has established an application monitoring program. These monitors are used to document the effectiveness of aquatic plant management activities performed by contracted cooperators. The DEP regional biologist performs random surveys on a monthly basis. Recent treatment activities as reported on the DEP invoice for reimbursement are the primary focus of these surveys.

M – MOSQUITOES ASSOCIATED WITH AQUATIC PLANTS

M-1: Mosquito Species

Some mosquito species found in Lake County utilize aquatic plants for egg deposition and larval development. The three primary species of concern are *Mansonia dyari*, *Mansonia titillans*, and *Coquillettidia perturbans*. The two *Mansonia* species use the root structures of water hyacinth or water lettuce. *Coquillettidia perturbans* prefers cattails, pickerel weed, and duck potato.

M-2: Control Procedures

Because aquatic plants can produce heavily vegetated stands, the use of conventional mosquito management techniques may be ineffective. Predatory fish are usually not effective because of the dense vegetation. Monomolecular surface oils do not work because the immature mosquitoes are located below the water surface and do not require the need to breath at the waters surface. Other chemical larvicides may be effective if the product is applied directly to the infested areas. This may be difficult and labor intensive if the aquatic vegetation is dense.

Eradication or maintenance level control of the aquatic plants and mosquito adulticiding are the best methods for managing these mosquitoes. The Senior Biologist is responsible for coordinating activities with the Mosquito Management section.

N – SPECIAL PROJECTS

N-1: Public Awareness and Education Project

Presentations are given to schools, civic organizations, and homeowners associations. Aquatic plant management topics are discussed to educate and inform individuals on the various aspects of Lake County's program and the aquatic plant management industry in general. Informational brochures and hand-outs are used. The Director and Assistant Director are the primary points of contact for these events but all Aquatic Plant Management staff may be asked to give presentations.

N-2: Other Agency Activities

Aquatic plant management activities are performed on request from other governmental agencies. These activities include FWC, city government, and other state agency requests specific for Lake County water bodies. All work performed will be recorded on the "Aquatic Plant Management Daily Log – City" form.

O – PERFORMANCE MEASURES

O-1: Time Format

Performance measures are used to evaluate overall success of program objectives over a specific time period. Lake County uses a fiscal year (October – September) time format for measuring performance. However, aquatic plant management activities for October, November, and December are directly correlated to environmental and climatic events occurring during the previous spring and summer months. Significant aquatic plant growth is not normally observed during the cooler months of January through March. Therefore, a calendar year time format is more appropriate for measuring the seasonality of aquatic plant management performance.

O-2: Benchmarks

Benchmarks are comparable statistics normally taken from an independent but similar function and used as a standard to objectively evaluate performance data. All aquatic plant management programs have differing objectives specific to their operational needs. Considering these differences, other program statistics may not be suitable as a benchmark for Lake County aquatic plant management operations. Therefore, an historical baseline derived from local program data is used.

Quantifiable data is averaged over the three previous calendar years and utilized as a benchmark for comparison of similar data from the current calendar year. A percent increase or decrease of the current year data from the benchmark is assessed. Individual performance is measured relative to these program indicators. Benchmarks and performance measures are reevaluated annually.

O-3: Outline of Performance Measure Statements

A list of performance statements and brief descriptions are compiled. The list is reviewed annually by all Aquatic Plant Management supervisory personnel and statements will be selected based upon current management strategies. The Director has final authority for deciding appropriate performance measure statements. The list below is not all inclusive and other statements may be added as needed.

- Number of sites surveyed and inspected for aquatic plants
- % increase (+) or decrease (-) from three year historical benchmark

- % approval from customer satisfaction survey
- % increase (+) or decrease (-) from three year historical benchmark

- Number of acres treated for water hyacinths
- % increase (+) or decrease (-) from three year historical benchmark

- Number of acres treated for water lettuce
- % increase (+) or decrease (-) from three year historical benchmark

- Number of acres treated for hydrilla
- % increase (+) or decrease (-) from three year historical benchmark

- Number of acres treated for minor plants on residential canals
- % increase (+) or decrease (-) from three year historical benchmark

P – APPENDIX 1: FORMS

- Aquatic Plant Management Daily Log
- Section 5E-2.033: Organo Auxin Rule
- Aquatic Plant Management Daily Log - City
- Inventory Ledger
- Monthly Gas and Oil Log

Aquatic Plant Management Daily Log

Header:

- PT Code: circle one for permit type: PT1, PT2, PT3, or PT4.
- Date: record the date of activity.
- Water Body: record the water body where activity took place.
- Location: record the specific location(s) on the water body where activity took place.
- Plant: record the plant.
- Acres: if treatment was performed, record the number of acres. If inspection or survey, leave blank.
- Activity: circle one: No Treatment, Herbicide, Mechanical, Biological, Contractual, or Other.
- Crew: circle all that apply. If “Other” is circled, record position.
- Truck: circle all that apply. If a truck not listed is used, record ID #.
- Boat/Spray Rig: circle all that apply.

Time (by 0.25 hrs):

- Effective Time: for treatments only.
- Travel Vehicle: for time spent traveling to and from destination by vehicle.
- Travel Boat: for time spent traveling to and from destination by boat.
- Lost/Weather: for time lost due to weather while at activity site.
- Minor Repairs: for time lost due to minor repairs while at activity site. Minor repairs include

mechanical problems fixed in the field.

- Major Repairs: for time lost due to major repairs while at activity site. Major repairs include mechanical problems not fixable in the field.
- Other Duties: reserved for time spent at meetings, such as FAPMS, where reimbursement from DEP is allowed.
- Survey/Insp: for water body surveys, post-treatment inspections, and service request investigation.
- Preparation: for time spent preparing for activity.
- Removing Obstr: for time spent removing obstructions to activity site.
- Misc: for any time not listed above.

Herbicide/Adjuvant Block:

- Herbicide Amt (G/#): locate herbicide(s) used for activity and record gallons or pounds.
- Adjuvant Amt (G/#): locate adjuvant(s) used for activity and record gallons or pounds.
- D&C: record concentration and name of herbicide(s) used and amount of water per acre.

Comments:

- D.O. @ Surface: record the dissolved oxygen level at the water's surface when performing a submersed aquatic plant treatment.
- 1 Meter: record the dissolved oxygen level at the 1 meter depth when performing a submersed aquatic plant treatment.
- pH: record the pH of the water when performing a submersed aquatic plant treatment.
- Comment Block: record all pertinent information not asked on the form for all management activities.

Weather:

- Inversion Burn off Time: record the temperature inversion burn-off time when using 2,4-D amine.
- Ag. Forecaster: record the weather forecaster's name.
- Time Called: record the time when an inversion burn-off time was requested.
- Wind Speed / Dir: record the wind speed and approximate direction when performing a treatment.
- Time: record the time(s) when wind speed and direction parameters were taken.

Aquatic Plant Field Survey: (completed for PT1 surveys and inspections only)

- Reason Code: circle the appropriate code.
- If Follow-up Survey: for a post-treatment inspection, record the date treated, target plant, acres treated, and chemicals used.
- Observations, Recommendations, Miscellaneous: record all pertinent information regarding the survey or inspection.
- Maps Included: check the appropriate response.

Aquatic Plant Management Daily Log - City

This form follows the same recording procedures as the “Aquatic Plant Management Daily Log” form.

AQUATIC PLANT MANAGEMENT DAILY LOG - CITY

Checked: _____

CITY:				DATE: / /	
WATERBODY:			LOCATION:		
PLANT:				ACRES TREATED .	
TRUCK:	4X2	4X4 Utility	4X4	4X4 w/ Spray Rig	
	CREW:		AquBio	SprTch	
BOAT:	V-Hull	V-Hull w/ Spray Rig		Airboat	
	Direc		AsstDir		
TIME (BY 0.25 HRS)		HERBICIDE	AMT (G/#)	ADJUVANT	AMT (G/#)
Spray Time .		Aquathol Gran	.	Surfactant	.
Travel Vehicle .		Aquathol K	.	Cidekick	.
Travel Boat .		Reward (Diquat)	.	Foambuster	.
Survey/Insp .		Rodeo	.	Buffer	.
Preparation .		2,4-D Amine	.	Polymer 30%	.
Removing Obstr* .		Viskorhap LV2D	.	Polymer 1%	.
Misc* .			.	Visko Inv Oil	.
. .			.		.
. .			.		.
. .			.		.
. .			.		.
. .			.		.
*Explain in Comments Section			.		.
Diluent and Conc. 1. .		gals /		gals water/acre	
Diluent and Conc. 2. .		gals /		gals water/acre	
REMARKS					
D.O.: S 1M		pH	WIND Speed	Dir	Time (per hour)
Inversion Burnoff Time:		Ag. Forecaster/Time Called:		Weather:	
*Comments:					

Monthly Inventory Ledger

Month:	Record the month for inventory.
Chemical:	Record the pesticide product for inventory.
Beginning Balance:	Top line under Balance column is reserved for beginning monthly balance brought forward from previous month.
Initial:	Employee receiving product from inventory initials here on date of receipt.
Checked Out:	Record the amount of product checked out by employee from inventory.
Checked In:	Record the amount of product checked in by employee or received from a requisitioned order.
Amount Used:	Record the amount of product used by subtracting the Checked In amount from the Checked Out amount.
Balance:	Subtract the Amount Used from the previous balance.

MONTHLY CHEMICAL INVENTORY

MONTH: _____

CHEMICAL: _____

DAY	INITIAL	CHECKED OUT	CHECKED IN	AMOUNT USED	BALANCE	DAY	INITIAL	CHECKED OUT	CHECKED IN	AMOUNT USED	BALANCE
1						17					
2						18					
3						19					
4						20					
5						21					
6						22					
7						23					
8						24					
9						25					
10						26					
11						27					
12						28					
13						29					
14						30					
15						31					
16											

MONTH: _____

CHEMICAL: _____

Monthly Gas and Oil Log

- Hour: record the time fueling is performed.
- Gas: record the amount of gas pumped.
- Oil: record the amount of oil dispensed.
- Mileage/Hours: for trucks, record the mileage when fueling; for boats, record the hour meter reading when fueling.
- Mon Yr: record the month and year.
- Truck/Boat: record the truck or boat description.
- Property #: record the property I.D. number.

LAKE COUNTY AQUATIC PLANT MANAGEMENT
MONTHLY GAS AND OIL LOG

DAY	HOUR	GAS	OIL	MILEAGE/HOURS
1				
2				
3				
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				

MON YR: _____

TRUCK/BOAT: _____

PROPERTY #: _____

Q – APPENDIX 2: GLOSSARY

1. Direct injection herbicide application: a non-mixing herbicide application method where pick-up lines are inserted into the herbicide container and the pump, through a vacuum process, injects the product into the spray carrier, usually water.
2. Endemic aquatic plant: an aquatic plant believed to have originated in Florida waters. A native aquatic plant.
3. Exotic aquatic plant: an aquatic plant originating from an area other than Florida.
4. Integrated pest management: a management approach where two or more techniques, usually chemical, biological, or mechanical, are used simultaneously to control a pest.
5. Invasive aquatic plant: an aquatic plant characterized by its ability to out-compete other aquatic plants and spread throughout an aquatic system.
6. Invert emulsion herbicide application: an herbicide application method where a specifically formulated herbicide is blended with oil creating a thick suspension.
7. Monoculture: a plant community consisting of one species.
8. Noxious aquatic plant: an aquatic plant creating a harmful condition to an aquatic system due to its exotic, invasive, or problematic characteristics.
9. Problematic aquatic plant: an aquatic plant that may, at times, create undesirable conditions.
10. Residential canal: any continuous or dead-end navigable channel used, or potentially used, as a means to allow homeowners or boaters access to a water body.
11. Sovereignty lands: any parcel of land or water body belonging to the state.
12. Transect line: a predetermined straight line course used as a sampling method to evaluate a larger plotted area.

R – APPENDIX 3: REVIEW AND APPROVAL

This document was written by Bob Rinehart, Assistant Director, with consultation from Scott Grippin, Aquatic Biologist (Senior Biologist), and Eric Cotsenmoyer, Director. All information is believed to be concise and accurate. A copy of the “Training and Operational Procedures for Aquatic Plant Management Section” manual will be distributed to employees having state certification in Aquatics.

Reviewed

Scott Grippin
Aquatic Biologist (Senior Biologist)

Date

Approved

Eric Cotsenmoyer
Division Director

Date