Aquatic Ecosystem Restoration Foundation

Tour of Florida Aquatic Plant and Mosquito Control Operations

June 1-5, 2015

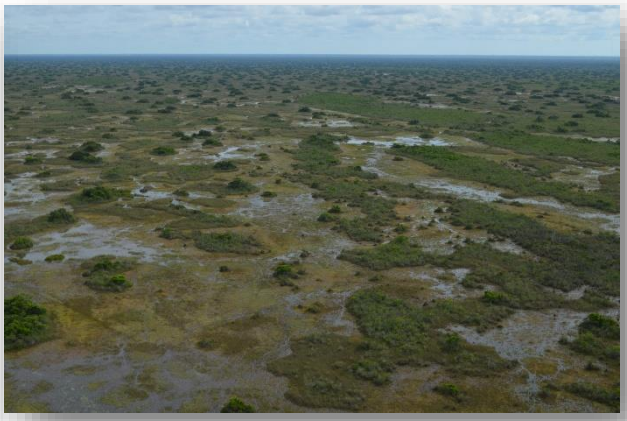
On June 1-5, 2015 the Aquatic Ecosystem Restoration Foundation (AERF) sponsored a tour of aquatic and wetland systems in Florida to provide insight for pesticide regulatory personnel at the U.S. Department of Environmental Protection (EPA) into conditions faced by aquatic plant and mosquito managers when applying EPA-registered pesticides. EPA representatives toured natural and highly managed areas, observed pesticide applications, and spoke directly with managers and field personnel (Attachment 1 – Tour Agenda). Especially important was conveying unintended consequences that may result when pesticide label language that is pertinent to large-scale crop management is written to include small-scale, preemptive, or preventive measures in aquatic plant and mosquito control.

Day 1 included travel to South Florida and meeting with aquatic plant researchers and managers. Information was presented regarding the importance of aquatic plant management to conserve the multiple uses and functions of Florida's 1.25 million acres of public lakes and rivers under the direction of the Florida Fish and Wildlife Conservation Commission (FWC). South Florida Water Management District personnel explained their aquatic plant maintenance programs to sustain water transportation and flood protection in the extensive canal system in South Florida as well as efforts to maintain acceptable levels of vegetation in Everglades restoration and storm water mitigation areas.

Managers stressed the need for EPA to register multiple herbicide modes of action to facilitate rotational strategies and to provide active ingredients (ai) and formulations to accommodate control of different target plants or differing water chemistries, water movement patterns, sediment types, and scales of plant management (spot vs. large-scale applications) in aquatic plant control.

In crop management, broad spectrum herbicides are often applied to control multiple weed species growing among 1-2 crop species. When managing aquatic plants growing in natural areas, most often 1-2 invasive plant species must be controlled while conserving dozens of non-target plant and animal species. Attendees were directed to the UF / FWC aquatic plant management website (http://plants.ifas.ufl.edu/manage/) that addresses 26 different biological, physicochemical, and climatological considerations made by managers when selecting herbicides for each management operation that will provide cost-effective control of target plant species while conserving or enhancing non-target plants and animals.

Day 2 began with an aerial tour over the South Florida Water Conservation Area -1 (WCA-1) (Loxahatchee National Wildlife Refuge). This area is heavily infested with invasive Australian melaleuca trees and old world climbing fern. Adjacent to WCA-1 is an approximate 6,500-acre storm water treatment area (STA). Invasive plants are under intensive management in WCA-1 to sustain the natural water flow and native plant habitat in the system. Native and non-native plants are managed in the STA to conserve an optimum assemblage of vegetation to sequester nutrients,



Left: Aerial view of Loxahatchee Wildlife Management Area showing a tree island highly invaded and intensively managed for melaleuca trees and Old World climbing fern (yellow/green) to conserve habitat and water flow. Right: Water sheet flow among uninvaded tree islands within Loxahatchee NWR.

especially phosphorus as water leaves upstream agriculture areas and before it enters the downstream conservation areas and ultimately Everglades National Park. Integral to the proper functioning of this system is consistent and optimum water flow, requiring frequent maintenance

of floating invasive plants (water hyacinth and water lettuce) that can block water movement and clog intake pipes at strategic pumping stations.

Water and plant managers stressed the importance of numerous small-scale herbicide applications; to control floating plants that accumulate on cable barriers in the canals, and to control old world climbing fern in the WCAs that quickly recovers after control events from the billions of spores in the soils and air of South Florida. There is increasing discussion regarding

Aquatic plant management contractor controlling invasive water lettuce in a canal (left) upstream of the water pumping station (right) that regulates water flow from the Everglades Agricultural Area and STA before entering the Loxahatchee Wildlife Management Area. Water lettuce is frequently managed throughout the year along the canal banks to prevent plant jams in the downstream water control structure.

limiting the numbers of herbicide applications or amount of active ingredient that can be applied to an area during a year's time. Floating plants that collect on canal cable barriers or on the shores of canals may be controlled 3-5 times per year. This aquatic scenario differs from crop management in that only a minute portion of the canal system is managed with herbicides, and water flow and dissipation disperses herbicides from the precise control area.

Day 2 ended with a tour of the University of Florida (UF), Institute of Food and Agricultural Sciences (IFAS) research station in the Everglades Agricultural Area in Belle Glade. Researchers discussed efforts to manage agricultural pests, especially in sugar cane, in South Florida's humid climate and organic soils. The group gathered at the subsidence pole that gauges the settling of

soils since the removal of native sawgrass and construction of drainage ditches and canals that have dried and compressed the formerly saturated soils. Soils have subsided about six feet since the pole was driven into the bedrock in 1921.

Tour group at the subsidence pole at Belle Glade.

On Day 3, the group began with an airboat tour of the rim canal and marshes on the south end of Lake Okeechobee in Clewiston, with U.S. Army Corps of Engineers (USACE) aquatic plant management staff. About 12,000-15,000 acres of water hyacinth and water lettuce are controlled with herbicides on the lake each year by for-hire contractors under the supervision of the

Explaining and observing floating invasive aquatic plant maintenance control operations on Lake Okeechobee near Clewiston.

USACE and FWC. Similar to the cables and structures in water management canals seen the previous day, floating plants accumulate along edges of marshes and in the lake's 25 water control and navigation lock structures, and must be managed several times in the same general locations each year. Plants must be managed around endangered Everglades snail kite nesting (January-August) as well as waterfowl hunting locations (October-January). Managers again stressed the importance of multiple herbicide active ingredients with activity in controlling water hyacinth and water lettuce that are almost always growing among native plants that must be conserved for fish and wildlife habitat.

The group observed a helicopter loading and application demonstration (Helicopter Applicators, Inc.) before leaving Clewiston. Different nozzle apertures and boom arrays were displayed to aerially apply herbicides ranging from large-scale applications to torpedograss fields covering a thousand or more acres (40ft boom), to spot treating (8ft boom) individual melaleuca trees in remote Everglades locations out of reach by ground or airboat crews. The helicopter crew demonstrated a rapid herbicide loading system that cuts, drains, and applies a water volume equivalent to triple rinsing 2.5 gallon containers in just a few seconds.

Demonstrating rapid loading and rinsing 2.5-gallon herbicide containers for helicopter applications.

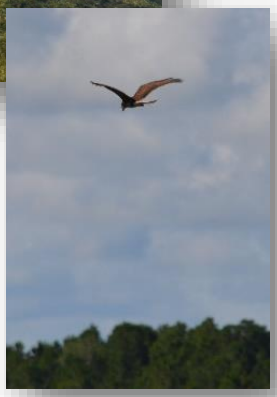
Day 4, was spent with the Lee County Mosquito and Hyacinth Control Districts. Lee County controls a variety of mosquito species in freshwater ponds and lakes as well as in thousands of acres of salt marshes in the District. Mosquito control operators advised that pesticide labels need to consider the lifecycles of mosquitoes to allow for applications and reapplications (that may be just a few days apart) at times that are best suited to suppress populations at the lowest

Mosquito control demonstration in a Lee County mangrove salt marsh.

Explaining aquatic plant control in Lee County to reduce mosquito habitat.

levels or to kill juveniles before they become egg-laying adults. The group also observed aquatic plant management operations in District ponds prior to heading to Orlando to close out the tour.

On Day 5, the group observed an infestation of submersed hydrilla in 20,000-acre Lake Toho south of Kissimmee. Lake Toho is at the headwaters of the Kissimmee Chain of Lakes and is a USACE Designated Federal Flood Control and Navigation Project. Lake Toho is also a world class bass fishery and ecotourism destination, and supports a significant population of endangered Everglades snail kites. FWC and UF staff described the mapping and planning process for controlling the submersed invasive plant hydrilla, emphasizing the need for multiple herbicides to use alone or in combination for hydrilla control. During peak summer growth,



Explaining FWC hydrilla management program on Lake Toho to accommodate flood control and navigation while conserving recreation and fish and wildlife habitat – especially for endangered snail kites (far right).

hydrilla stems can elongate by as much as 8-10 inches per day, quickly reaching and matting at the surface in shallow Florida lakes. Large-scale hydrilla control (1,000-5,000 acres) is generally applied in cooler months from February-April, with spot control (10-100 acres) applied as necessary and as conditions allow, throughout the lake during the rest of the year.

As in other systems, target plants, whether floating or submersed, must be cost-effectively managed under a variety of conditions; in Toho's case, while conserving snail kite nesting and foraging sites, fish and waterfowl habitat, and flood control and navigation attributes. No single

herbicide active ingredient or management strategy fits all current conditions. Therefore, effective management requires a number of herbicide active ingredients to apply under different water conditions, plant assemblages, and plant growth stages.

The tour ended observing a mechanical harvesting operation, removing dense masses of rhizome and submersed shoot growth of invasive primrose willow. While harvesting has proven too slow and costly for large-scale invasive plant management, it is effective in removing dense submersed and floating masses of emergent plant roots, stems, and rhizomes.

Harvesters removing dense masses of primrose willow and cattail from Lake Toho.

Explaining submersed plant mapping procedures.

Attachment 1: Agenda and USEPA Participants

Agenda
AERF/PA/UF
Florida Aquatic Plant and Mosquito Control Tour
June 1-5, 2015

Monday, June 1, 2015

12:30pm	Deli buffet luncheon in the Sabal Board Room at WPB Airport Hilton Inn. Field trip participants and South Florida Water Management District Staff.
1:15pm – 4:00pm	Field trip overview and presentations/discussion of aquatic weed control in Florida and the SFWMD. -Jeff Schardt, Florida Fish and Wildlife Conservation Commission, Biologist/Program Admin. – retired "Florida Statewide Aquatic Weed Control Program" -Francois LaRouche, Mike Bodle, and SFWMD staff. Presentations by imminent biologists. "From flood to drought to everglades restoration – operations of the South Florida Water Management District" and "Invasive weed control activities and district priorities"
4:00pm – 5:00pm	Adjourn, room check-in, etc.
5:30pm – 6:00pm	Dinner. Overnight: WPB Airport Hilton Inn.

Tuesday, June 2, 2015

7:30am	Hotel check-out.
8:30am	Arrive at STA 1-W, Test cell ponds (2).
9:00am – 12:00am	Tour weed control activities in WCA-1, re-vegetation site, storm water treatment area, S5A pump station.
12:30pm	Lunch and drive to Belle Glade
2:30pm – 3:00pm	Everglades Research and Education Center, Belle Glade. Everglades agriculture, soil loss and water quality issues.
4:30pm – 5:00pm	Arrive Roland Martin, Bass Resort on Lake Okeechobee (Clewiston). Overnight at resort. www.RolandMartinMarina.com, 800-473-6766.

Wednesday, June 3, 2015

7:30am – 8:00am Check-out of Martin's Bass Resort.

AM: Host: **Jacksonville District, Clewiston Field Station**
U.S. Army Corps of Engineers

- Airboat tour on south end of Lake Okeechobee
- Visit herbicide treated sites
- Cut-stump and hack/squirt
- View/interview aquatic weed application/applicator
- Endangered species concerns
- Discuss Corps/FWC weed program
- Lunch

PM: Host: **Captain Mike Page**

- Visit Helicopter Applicators, Inc.
- Drift control booms, container rinsing and disposal, other aerial operational considerations.

5:00pm Arrive at Hotel Indigo, Downtown Ft. Myers, FL (1520 Broadway), 239-337-3446

Thursday, June 4, 2015

8:00am Hotel checkout. Drive to Lehigh Acres.

8:30am – 1:00pm Host: Lee County Mosquito Control District
Wayne Gale, Executive Director
https://www.LCMCD.org

- Observe mosquito control aerial application on island in Caloosahatchee River
- Visit herbicide applications in freshwater ponds
- Laboratory presentations on mosquito and aquatic plant control operations
- Lunch at Lee County

Afternoon Travel to Orlando, possible stop at Corkscrew Swamp – time permitting.

5:00pm Check-in Hilton Garden Inn (Airport/Lee Vista Blvd).

Friday, June 5, 2015

8:30am	Travel to Neptune Road/Lake Toho – FWC Fisheries Office Ramp
9:00am – 10:30am	Hosts: **Dean Jones, UF/IFAS** **Ed Harris (FWC)**

- Monitoring submersed weed treatments
- Endangered species
- Multi-use urban lake
- New invasive aquatic weed – Ludwigia grandiflora
- Observe ludwigia and cattail harvesting operation

11:00am	Return to Hotel.
12:00pm	Check-out, shuttle to Orland Airport for return flight.

USEPA Participants

Dan Kenny - Chief of the Herbicide Branch, Registration Division (RD), Office of Pesticides Programs (OPP) - Responsible for risk management and regulatory decisions for proposed new herbicide chemicals, herbicide uses, and herbicide products.

Rachel Holloman - Chief of the Fungicide-Herbicide Branch, RD, OPP - Responsible for similar risk management and regulatory decisions for certain herbicides and fungicides (copper).

Maggie Ruddick - Invertebrate-Vertebrate Branch I, RD, OPP - Responsible for Project management and risk management development involved with the review of applications for certain new insecticides, insecticide uses, and insecticide products.

Eric Miederhoff - Chemical Review Manager, Risk Management and Implementation Branch III, Pesticide Reevaluation Division, OPP - Responsible for the product management and risk management strategies involved with the registration review of existing and older pesticides.

Harry Zhong - Biologist, Environmental Risk Branch I, Environmental Fate and Effects Division, OPP - Responsible for the preparation of risk assessments addressing the environmental fate properties and ecotoxicity potential of pesticides under review in OPP's registration and reregistration review programs.