

On February 25, 2009, several members of the Weed Science Society of America (**WSSA**) Board of Directors along with Kurt Getsinger, U.S. Army Engineer Research and Development Center (**ERDC**) and Jill Schroeder, Professor of Weed Science, New Mexico State University, met with the U.S. Environmental Protection Agency (**EPA**) headquarters staff to discuss regulatory issues pertinent to weed science. Dr. Getsinger serves as the aquatic weed subject matter expert in the EPA Office of Pesticide Programs (OPP) Registration Division (RD) and Dr. Schroeder serves in a similar capacity as WSSA's terrestrial weed subject matter expert to EPA. One of the outcomes of this meeting was a fact-finding field tour for key EPA headquarters staff to gain a better understanding of how aquatic pest management decisions involving pesticides are regulated, applied and monitored by state and federal authorities. This report will cover the background, objectives, tour itinerary, summary, and recommendations derived from the southern Florida aquatic pesticide fact finding tour during May 11-14, 2009.

EXECUTIVE SUMMARY:

1. The invasive plant and mosquito problems in Florida are a special case, requiring major management efforts to be extensive and year-round. Without this first-class management effort, the public's health, safety, drinking water, food supply, natural resources, and economy of Florida would be severely impaired.
2. The success of the Florida pest management programs is **clearly linked to multi-agency and private sector cooperation and coordination**. This includes routine interactions with the regulatory community, and the effort of all partners to ensure that risks of using pesticides to control invasive plants and mosquitoes are minimal and acceptable. It also requires the recognition of, and action upon, the time-sensitive nature of invasive species and mosquito control efforts.
3. Maintaining a close working relationship with the university/government research and extension community is another factor for Florida's operational success. Developing and evaluating new management strategies and technologies, and educating the public on the need to implement them, play key roles in maintaining the resources and public will for complex operational programs. All of the management agencies recognized the **importance of providing resources for applied research** to groups, such as the Center for Aquatic and Invasive Plants at the University of Florida and the U.S. Army ERDC, so that new technology could be developed to improve cost-effective and environmentally compatible management strategies.
4. The routine use of **precision application technology** (PAT) in Florida, by land, water, or air, provides targeted, species-selective control and ensures that treatments are successful and cost-effective. This PAT process extends to the design of pesticide transfer activities and can greatly reduce mixer/handler exposure to pesticides. In addition, this digital technology provides precise records of application rates, treatment areas, and electronic reporting practices, which can be used to quantitatively evaluate treatment results and develop plans for future applications.
5. The agencies tasked with invasive plant management and mosquito control in Florida are keenly aware of the juxtaposition of threatened and endangered (T&E) species, and the more general need of protecting and maintaining critical fish and wildlife habitat. The planning and implementation of their operational programs are required to consider those factors, and substantial efforts are mounted for inspections and monitoring of critical habitat issues.
6. There is a strong commitment of mission in the activities of Florida's natural resource agencies in their **responsibility of managing invasive species and pests**. This is most clearly demonstrated in the knowledge, dedication and passion of the public servants and contractors who are striving to protect and enhance the unique natural resources of Florida.

RECOMMENDATIONS:

1. While invasive plant and mosquito problems are extensive and year-round in Florida, other states manage public waters on a smaller, but none-the-less important scale, and efforts can range from minimal to a coordinated effort similar to Florida.
 - The WSSA and the Aquatic Plant Management Society (APMS) should offer to assist EPA in identifying key experts and practitioners in other states/regions who can explain their invasive pest management efforts.
2. The definition of 'near water' is still undergoing debate within EPA. The final and accepted definition will have major implications in the breadth and enforcement of the **National Pollutant Discharge Elimination System (NPDES)** permits under the **Clean Water Act (CWA)**.
 - The WSSA and APMS should offer to identify and provide information that EPA can use to assist them in clearly defining this term.
3. The time frame of the potential NPDES permitting regulations greatly concerned the Florida regulators. On June 8, 2009, the Sixth Circuit Court granted EPA's petition to stay the mandate of the court decision until April 9, 2011. This means EPA now has **less than 22 months** to develop a NPDES permitting process. If the agency requires most of that time to accomplish their task, states will have little time to implement and adapt their local NPDES permit process.
 - The WSSA and APMS should be proactive in facilitating communication between these stakeholders and EPA.
4. Regulatory concerns such as environmental fate, non-target impacts, T&E species, NPDES permitting and etc., will be key issues impacting future uses of pesticides to manage wildlands, aquatic/riparian, and other sites. Therefore, it will be increasingly important for weed scientists, and other pest management scientists, to interact with the regulatory community on a routine basis to help resolve these issues in a science-based manner. As weed scientists, we must also learn from the regulators.
 - The WSSA and APMS should continue to support close interaction and cooperation with EPA and selected state regulators to include staffing of subject matter experts in liaison positions, continued support of the WSSA Science Policy Director position, hosting and leading fact-finding field tours, and promoting other educational and informational out-reach activities.

BACKGROUND:

The CWA requires a NPDES permit in order to discharge pollutants from point sources onto **navigable waters of the United States**. Since the passage of the CWA in 1972, EPA has **not required** a NPDES permit to apply aquatic pesticides as long as these applications **comply** with the Federal Insecticide, Fungicide, and Rodenticide Act (**FIFRA**).

In a 2001 decision called *Headwaters, Inc. v. Talent Irrigation District*, the Ninth Circuit Court in San Francisco, CA held that aquatic herbicide residue left in water from pesticide applications was a "chemical waste" and thus a "pollutant" requiring a permit under the CWA. The Ninth Circuit declined, in Talent, to decide whether a pesticide that leaves no chemical residue in the water falls within the definition of a pollutant.

Talent Irrigation District operates an irrigation canal system in Jackson County, Oregon, and uses an aquatic herbicide, Magnacide H (used since 1959), to control the growth of aquatic weeds and vegetation in the **irrigation canals**. Magnacide H contains acrolein which is toxic to fish and is stated directly on the label "Keep out of lakes, streams and ponds". Talent Irrigation District applied the herbicide to its irrigation canals from late spring to early fall. In May 1996, application of the herbicide resulted in the death of 92,000 juvenile steelhead fish when a leaking waste gate released water into nearby Bear Creek. In this regard, Talent Irrigation District was in direct **violation of FIFRA** because Magnacide H treated water must be held for 6 days before being released or allowed to drain into fish bearing waters.

Regardless, In January 1998, Headwaters, Inc., an environmental group, brought a citizen suit under the CWA, charging Talent Irrigation District with discharging chemicals without a NPDES permit. The Ninth Circuit overturned a district court decision and held that the registration and labeling of Magnacide H under FIFRA does not preclude the need for a permit under the CWA.

In 2002, in *League of Wilderness Defenders v. Forsgren*, the Ninth Circuit addressed whether an NPDES permit is required for the aerial application of insecticides to control pests, where some insecticide is inevitably discharged into waters. The court held that the application of insecticides over National Forest land constituted a “point source” discharge requiring an NPDES permit. The Forsgren court, however, did not address whether such insecticides were “pollutants,” assuming that they were.

In 2005, in *Fairhurst v. Hager*, the Ninth Circuit tackled the question remaining in Talent – namely, whether pesticides that are directly and intentionally applied to water bodies, in accordance with the requirements of FIFRA, are “chemical wastes”, and thus CWA “pollutants”, that require an NPDES permit. The Fairhurst court held that such pesticides that are intentionally applied to the nation’s waters, in compliance with FIFRA, and that produce no residue or unintended effects, are not “pollutants” requiring a CWA NPDES permit. The Court distinguished its previous finding in Talent on the grounds that, in Talent, the pesticide remained in the water after it performed its intended beneficial function.

On November 27, 2006, **EPA issued a final rule** that exempted the application of aquatic pesticides in compliance with FIFRA from the CWA. Specifically, EPA wrote that an NPDES permit was not required for: (1) the application of pesticides directly to water in order to control pests; or (2) the application of pesticides to control pests present over or near water (such as via aerial application) where a portion of the pesticides would unavoidably be deposited into waters. EPA intended the second circumstance, among other things, to cover pesticide spraying to control non-native plants growing at the water’s edge because some pesticide would unavoidably enter the water as a result of herbicide application.

Environmental and industry groups (*National Cotton Council et al.*) subsequently challenged EPA’s final rule in eleven circuit courts throughout the United States. The petitions for review were consolidated in the Sixth Circuit Court in Cincinnati, Ohio. Industry Petitioners argued that EPA’s final rule was arbitrary and capricious because, under that rule, pesticides applied in violation of FIFRA are “pollutants” while the same pesticides applied in compliance with FIFRA are not.

In light of the statutory language, the Sixth Circuit Court ruled on January 7, 2009 that EPA’s final rule was not a reasonable interpretation of the CWA since the plain language of the terms “chemical waste” and “biological materials” unambiguously include aquatic pesticides. Accordingly, the Court vacated EPA’s final rule. The Court did not analyze arguments addressing the relationship between the CWA and FIFRA.

The weed science and aquatic plant management communities are concerned about the ramifications of the Sixth Circuit Court’s ruling in *National Cotton Council et al. v. EPA*. EPA made clear that its 2006 rule was based on its longstanding policy that **pesticides applied according to FIFRA are not CWA “pollutants”** and, thus, do not require NPDES permits. Aquatic pesticides that are sprayed or otherwise applied consistent with FIFRA are not “chemical wastes” because they are products that EPA has evaluated and registered for the purpose of controlling target organisms, and are designed, purchased, and applied to perform that purpose. The WSSA wants to ensure that FIFRA remains the preeminent federal law for pesticide regulation that **protects both people and the environment**. The extensive research and science-based risk assessments required by FIFRA should not be jeopardized by politics.

On April 9, 2009, two motions were filed before the Sixth Circuit Court of Appeals regarding the *National Cotton Council et al. v. EPA* case:

1. Industry (CropLife America and others) petitioned the court to rehear the case “en banc” before the full 16 judge court. On April 27, the court directed the environmental community petitioners to respond to the re-hearing petition from industry. This response was due on May 8.

2. The government (EPA, in consultation with the Department of Justice) filed a motion to stay the court's mandate for 2 years before EPA has to vacate its current rule exempting pesticide applications from NPDES permits. EPA estimates that it needs until April 9, 2011 to develop, propose, and take final action to issue an NPDES general permit that would be consistent with and satisfy the CWA requirements.

Both motions are still pending a ruling by the Sixth Circuit Court. In the meantime, the EPA OW and OPP are working on procedures to implement the court ruling and the EPA OW has been designated the lead (Jack Faulk, EPA team leader) with the OPP supporting. Therefore, EPA team members assigned to this task were invited by Dr. William Haller, Acting Director, Center for Aquatic and Invasive Plants, University of Florida (**CAIP-UF**), and Kurt Getsinger to tour south Florida in May 2009.

One other outcome from the February meeting between EPA and WSSA leadership was that EPA requested a listing of the states that currently require some form of aquatic use permits before applying a pesticide. Currently 46 states are approved by EPA to issue CWA NPDES permits and 28 of those 46 states require some form of general aquatic use permits for the application of herbicides and insecticides. The Aquatic Ecosystem Restoration Foundation (**AERF**) compiled this information along with the contact information for each state's pesticide regulatory agency, endangered species agency, and Pesticide Safety Education Program (PSEP) Coordinator. (Please see **ATTACHMENT**).

AUTHOR'S NOTE: *On June 8, 2009, after the following report was written, A three-judge panel of the Sixth Circuit Court of Appeals granted EPA's request to stay for 2 years (until April 9, 2011) the court's mandate to vacate the current EPA rule exempting pesticide applications from NPDES permits. However, the full appellate court is still weighing a petition from industry groups for an en banc hearing to overturn the panel's ruling.*

TOUR OBJECTIVES:

The fact-finding field tour provided key EPA headquarters staff with a unique opportunity to understand operational aspects of using herbicides to manage invasive aquatic, wetland, and riparian plants and using insecticides for mosquito abatement, particularly as these applications interface with potential NPDES permits. The tour was organized and hosted by the US Army Corps of Engineers (USACE) and the University of Florida, and covered an area in central and south Florida from the Kissimmee Chain of Lakes near Orlando to the Everglades, a region where over 10 million people live, work, and recreate in aquatic surroundings. The field tour was designed to:

- a) allow EPA personnel to interact directly with Federal, state and local agency staff responsible for sponsoring, regulating and permitting aquatic pesticide applications.
- b) show the intricate interactions among 1) invasive species control practitioners; 2) federal and state regulators; 3) university and state researchers and extension personnel; and 4) public and private land and water users.
- c) provide information that could be used by the EPA in developing a CWA NPDES permit process pertaining to use of pesticides **in, on, or near water**, should the Agency ultimately be directed by the court to develop such a process.
- d) develop a contact list of subject matter experts and operational practitioners that can assist the Agency with realistic and technical aspects of potential NPDES permit issues.

TOUR ITINERARY:

Monday, May 11

1. Experimental Use Permit (EUP) sites near Orlando: Storm-water retention ponds (fenced and gated for security) next to roadways were treated with the herbicide, quinclorac, to control existing hydrilla

(*Hydrilla verticillata*) infestations under a Florida-issued EUP. These ponds have been treated with various EUP products including bispyribac sodium, flumioxazin, as well. Dr. Haller's CAIP-UF research group is evaluating herbicide performance under larger scale, natural environment conditions. Preliminary work had been conducted by CAIP-UF and ERDC investigators under greenhouse and growth chamber conditions to screen rates and formulations for efficacy and selectivity. The data will be used to help determine if the herbicide has characteristics that would make it a candidate for full aquatic registration.

2. Airboat tour of Lake Tohopekaliga (Toho) and aquatic weed discussion - Triangle Park Boat Ramp, west Lake Toho. Our guides were: Mike Netherland, ERDC; Jeff Schardt, Florida Fish and Wildlife Conservation Commission (FWC) Aquatic Coordinator - State Aquatic Program; Bruce Jagers, FWC restoration of riparian zones; Ed Harris, FWC Regional Biologist – endangered species.

- **Stop 1** was in a section of the lake where the contact herbicide, endothall, had been applied in 2009 to control the **submersed invasive plant, hydrilla**. In many large Florida water bodies, hydrilla has become resistant to the herbicide, fluridone - the chemical of choice for years. Currently, the herbicides endothall, penoxsulam, imazamox and others are being evaluated to control the fluridone-tolerant hydrilla in these systems. Dr. Netherland discussed the impact of hydrilla on the aquatic ecosystem (alters temperature distribution in water column and affects chemical properties of the water – pH, dissolved oxygen, etc), and the positive impact on the native submersed vegetation and fish populations when hydrilla is controlled. We observed populations of the native submersed plant, wild celery (*Vallisneria americana*) that had been suppressed by the hydrilla, but was now reclaiming areas in the herbicide-treated zone where hydrilla had been controlled.

Dr. Netherland also discussed the aqueous herbicide residue monitoring that has been conducted in and around the treatment zone as part of an R&D grant from EPA. Florida agencies are questioning the need for repetitive and intensive residue monitoring that would potentially be associated with an NPDES permit. **Once the dissipation and degradation characteristics of a pesticide have been defined, are there technically valid needs for continued, intensive (vs. limited) residue monitoring?** The labor and costs associated with intensive pesticide monitoring efforts are considerable, and these expenses greatly reduce the amount of resources that could be applied to operational management activities. Since available resources are limited (and becoming more critical as agencies face recurring budget shortfalls), **extra costs** associated with monitoring efforts translates into fewer acres of invasive weeds being managed, and ultimately, **less restoration** of public waters that are degraded by invasive species.

- **Stop 2** was in a section of the lake where hydrilla had not been controlled because of the presence of the Federally **endangered Everglade snail kite** (*Rostrhamus sociabilis*) a medium-sized hawk with a wingspan of about 45 inches found only in south Florida. Ed Harris discussed how herbicide treatment timing and location relative to the kite habitat, particularly during nesting season, was an important consideration of managers in order to minimize disturbance. We did see snail kites in both



Surface mats of the invasive submersed plant, hydrilla, in Lake Tohopekaliga, FL (Center). The endangered Everglades snail kite sits on perch hunting apple snails (Right).

managed and non-managed areas (i.e. the kites were not driven away by the management). The snail kite is uniquely adapted for a diet almost exclusively of freshwater apple snails (*Pomacea paludosa*) due to its greatly curved beak. In order to address concerns by US Fish and Wildlife Service biologists regarding enough submersed plant habitat to support the freshwater apple snails, some areas of the lake were left untreated. However, the **invasive Channeled Apple Snail** (*Pomacea canaliculata*) has a voracious appetite for the same aquatic vegetation and is displacing the much smaller native apple snail. There has been anecdotal evidence that the Everglade snail kite fledglings might not be able to feed on the larger invasive apple snails leading to the dilemma of whether the invasive snail should be controlled. The staff members also discussed the negative impact of the hydrilla in lake sections where options for management were limited by the presence of other endangered species or the presence of pumps which remove lake water for drinking.

- **Stop 3** was along the shoreline (*photo right*) where Bruce Jagers discussed efforts to control invasive trees such as, Brazilian pepper (*Schinus terebinthifolia*), melaleuca (*Melaleuca quinquenervia*, and Australian pine (*Casuarina* spp.) in the riparian zone surrounding the lake.



The Lake Toho tour illustrated the complex issues required to manage invasive species in public waters and how a diverse group of experts must work together to manage these valuable public water bodies. Jeff Schardt explained to the group how cooperative efforts among agencies and individuals work, and how aquatic herbicide applications on public waters are planned and executed in a transparent fashion, with much stakeholder and public input. He also emphasized the importance of providing resources for applied research to groups, such as the CAIP-UF and the ERDC, so that new technology could be developed to improve cost-effective and environmentally compatible management strategies.

Tuesday, May 12

1. Airboat tour of Lake Okeechobee; discussion of floating species, and observation of herbicide spray application - Moore Haven Boat Ramp southwest Lake Okeechobee. Guides were Jon Morton, USACE, Clewiston Project Office; P.J. Myers, Applied Aquatic Management (contractor for treatment); and Mike Bodle, South Florida Water Management District (**SFWMD**) – District weed control responsibilities.

- **Stop 1** was in a section of the lake where the floating invasive weed, water hyacinth (*Eichhornia crasippes*), had been controlled with a treatment of diquat plus 2,4-D. The guides discussed the



Surface treatment of floating mats of the invasive weed, water hyacinth, on Lake Okeechobee, FL (Left). A variety of white-colored wading birds (e.g. herons, storks, ibises, etc) are feeding in the background, where native vegetation is restored following herbicide applications. Shallow-water flats of native plants are critical for breeding and foraging habitat for tens of thousands of wading birds that depend upon native plant community food webs. Monoculture stands of invasive floating vegetation destroy that important habitat.

effectiveness of the treatment, the negative impacts of floating weeds and how floating weed mats are concerns for non-target organisms. The group observed that water hyacinth control was excellent and that native submersed and emergent plants were unaffected by the treatment.

- **Stop 2** was to visit with an applicator who works for *Applied Aquatic Management* and was spraying water hyacinth with a mixture of diquat and 2,4-D, using a flood nozzle (spray to wet) on an airboat. He described his applicators license, the annual training he takes to remain certified, the detailed record keeping process for each application, and the use of Personal Protective Equipment and other safety measures he takes during an application. The guides also discussed the limitations for applications – that no herbicides are applied near water intakes for potable water for urban uses, or in winds greater than 10 mph.
- **Stop 3** was to view a **mechanical harvester** parked off the main canal. The group had discussed the use of mechanical weed control and that it is several times more expensive than herbicide treatment and non-selective in that it removes native species as well as invasives including fish, invertebrates, etc... The disposal of the harvested material is problematic and a big part of the expense. However, there are situations where mechanical removal is a viable control measure.

2. Helicopter to Lee County (Fort Myers); observation of aquatic weed problems, particularly in irrigation canals, and the flood control canal network in and around Fort Myers where mosquito control is critical. Guides were Don Doggett and John Cassani, Lee County Mosquito/Hyacinth Control District, who pointed out features on/in Lake Okeechobee, agricultural irrigation canals, Caloosahatchee River, flood control canals in Fort Myers and neighboring islands, and initiated the discussion of mosquito control issues.



Aerial view of agricultural lands and flood control canals southwest of Lake Okeechobee (Left), and base of operations for the Lee County Mosquito/Hyacinth Control District in Fort Myers, FL (Right)

3. Mosquito and Aquatic Weed Control Discussion: Lee County Mosquito/Hyacinth Control District, Wayne Gale (District Director), Don Doggett, John Cassani and other Lee County staff.

Program:

- District video that described the lab and operations
- Overviews – included monitoring of emerging mosquito and aquatic weed populations as well as control efforts and monitoring of success of treatment
- Mosquito abatement – larviciding, adulticiding, statistics – treatments by month
- Aquatic plant management treatments
- Field displays:
 - spray demonstration (helicopter)

- trap trucks
- larvicide trucks
- spray helicopters
- C-47 (DC-3s) spray planes
- Kubota 4 wheel vehicles,
- airboats
- truck-mounted harvesters



The Lee County Mosquito/Hyacinth Control District maintains a fleet of helicopters and C-47 fixed winged planes to implement required control efforts for large-scale mosquito abatement and invasive weed management activities. In the photo above, Lee County staff demonstrated an aerial spray application for mosquito control using a Huey helicopter.

The group reconvened (*photo right*) after the field displays for discussion between Florida Department of Agriculture and Consumer Services representatives as well as Lee County personnel about issues of potential NPDES permitting, current state permitting, pesticide applications (extremely time sensitive), and next steps for EPA NPDES permit development.



4. Visit with Mike Page, Helicopter Applicators Inc, contractor/applicator for management of invasive trees in Everglades National Park (NP) and Loxahatchee National Wildlife Refuge (NWR), at Clewiston Hangar. Mr. Page applies herbicides to control Melaleuca and other invasive trees using a helicopter equipped with a patented Microfoil Boom and specially designed nozzle tips to reduce spray drift (fines < 4% of spray volume) providing precision application on target vegetation. He uses GPS technology to map the aerial application and has developed a specialized mixing truck equipped with water tanks, stainless-steel tanks to hold concentrated herbicide and mix tank. This technology is designed to nearly eliminate mixer/handler exposure to the herbicides and the truck is equipped with a landing pad so the helicopter can land for loading in the field.



(Left) Helicopter used for aerial herbicide treatments by Helicopter Applicators, Inc.. (Center) Spray-boom and Microfoil spray nozzles used in helicopter precision applications of herbicides to control invasive vegetation in Loxahatchee NWR and other areas in south Florida. (Right) Specialized herbicide mixing truck with helicopter landing pad mounted above the water and mixing tanks.

Wednesday May 13

1. Visit to subsidence pole at UF-Research and Extension Center, Belle Glade; Everglades Agricultural Area, sugarcane, turf and rice.

Bill Haller, tour organizer and guide (*photo right*) discussed the fact that the highly organic soils (known as muck) produced over thousands of years by the native sawgrass (*Cladium jamaicense*) prairies that preceded the plow, have subsided over 6 feet since draining and farming of the area began about 90 years ago. The muck soil level was at the top of subsidence pole (*photo right*) in the 1920's. Cropping techniques (e.g. alternating rice production and its requirement of saturated soils, with sugarcane and other crops) have been implemented to slow the subsidence problem. At some point in the future, agriculture/horticulture may end due to the continued loss of muck soils.



2. Loxahatchee NWR. Discussion with Silvia Pelizza, Refuge Manager; and Jim Galloway, François Laroche, and Dan Thayer, SFWMD land and water managers, about invasive species issues in the refuge (and Everglades system), and the strategies (chemical and biological) and costs of invasive species management in the refuge. Primary plant invaders include melaleuca, old world climbing fern (*Lygodium microphyllum*), Brazilian pepper, and Australian pine. Control efforts have concentrated on melaleuca management; however, lygodium has become a major threat to the all-important tree islands that dot the sawgrass prairie of the Everglades system, and efforts to control this species have met with limited success to date.

3. Helicopter to see lygodium, melaleuca, water hyacinth, water lettuce, Loxahatchee NWR, Everglades NP, canals and stormwater treatment areas (STAs). The trip allowed all to see the vast Everglades ecosystem, the proximity of canals and STAs, and control efforts for melaleuca in the refuge and associated lands. Loxahatchee is a primary water source for the Everglades NP. The melaleuca trees had been aerielly treated ca. 5 years ago. Crews were on the ground in the refuge, felling the dead trees in preparation for burning the timber. Participants also observed the lygodium infestations creeping over the tree islands, and water hyacinth and water lettuce (*Pistia stratiotes*) infested canals. These

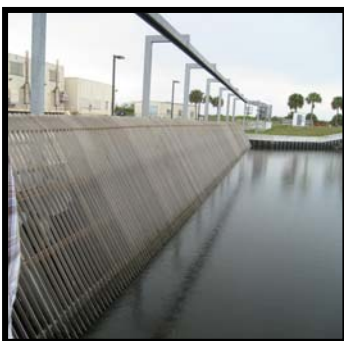


invasive floating plants interfere with critical water supply to the Everglades NP. The STAs are constructed wetlands adjacent to the refuge and are designed to allow vegetation within various zones to remove phosphorus in water flowing from agricultural regions before it enters the Everglades system. Currently the STAs comprise over 100,000 acres of reclaimed agricultural lands, with many more acres planned for wetland conversion in the near future.



(Top Left) Stormwater treatment areas (STAs) adjacent to Loxahatchee NWR just west of Ft. Lauderdale, FL. These constructed wetlands filter excess nutrients from waters flowing from agricultural lands into the refuge and ultimately into the Everglades NP. (Bottom Left) Herbicide-treated melaleuca trees that had been felled by ground crews in preparation for burning at Loxahatchee NWR. (Right) Native tree islands within the sawgrass prairie of the NWR

4. Pump station S5A - Jim Galloway and SFWMD staff showed us the 2nd largest pumps in the world designed to move water from canals draining the surrounding agricultural area into the Everglades. The pumping stations are critical for managing storm runoff during the rainy season and hurricanes, often running 24/7 to keep surrounding areas from flooding. Aquatic weeds in the canals can clog the pumps and cause major breakdowns; therefore, timely plant management in the canals is critical for flood control. Mechanical baskets remove objects (garbage, debris, automobiles) and vegetation from water



(Left) Giant pump (one of six) in the S5A pump station, (Center) Barrier to block debris from entering the pump station, and (Right) mechanical baskets that remove debris from the barrier.

moving into the pump station but are limited in capacity of material that can be handled. Time-sensitive herbicide treatments, upstream from the pumping station, are essential for efficient operation of the pumps.

5. Stormwater Treatment Areas (near S5A) - The group stopped at the viewing tower adjacent to STA 1 West. The SFWMD guides included François Laroche - invasive weed control, and Jim Galloway - STA manager. The development and maintenance of the STA's were discussed. Current practices have successfully reduced phosphorus (P) levels from 130 to 50 ppb; however, the goal is to reduce P concentrations to 10 ppb or less prior to release into the refuge (Loxahatchee NWR). Excessive P in the refuge water results in establishment of cattail (*Typha* spp.) and other species that thrive on higher P levels and are invading the Everglades; these species are not desirable in the Everglades sawgrass prairie habitat. Recovery of low P-using species, such as the native sawgrass, is a top priority of restoring the Everglades NP to its earlier state. However, several invasive plants, including hydrilla and water hyacinth, are allowed to grow in among native aquatic plants in the STAs, at least at some level, because they effectively remove P from the water. Therefore, invasive species management objectives in the STAs were described to be somewhat different from public waters. A secondary ecological consequence of STA operations has been the development of high-quality wintering and foraging habitat for large populations of migratory water birds, including ducks and geese. Controlled waterfowl hunting opportunities are provided to the public during fall and winter migration, as well as birding and other wildlife viewing events.

6. Visit STA test cells - Experimental Use Permit (EUP) research CAIP-UF. Ponds formerly used by SFWMD staff for developing phosphorous removal techniques in STAs are being utilized by Dr. Haller for the purposes of conducting research to evaluate herbicides that have been granted EUP's in ponds that contain mixed stands of invasive and native plants. This pond system allows for test of efficacy and species-selectivity of candidate aquatic herbicides under natural conditions (storm water retention ponds seen the first day of the tour typically contain only invasive plants so are less desirable for fully testing the candidate herbicides). Each pond receives a different dose of the candidate herbicide so that levels and duration of weed control and selectivity can be evaluated.

TOUR OUTCOMES:

- EPA personnel interacted directly with Federal, state and local agency staff responsible for sponsoring, regulating, and permitting aquatic pesticide applications in Florida's public waterways.
- Florida agency personnel showed EPA staff the detail and depth of complex activities that must occur within a state to manage pests (weeds and mosquitoes) in public waters.
- The state agency staff demonstrated the working relationships and coordination among agencies that are needed to accomplish their objectives. Many of these state staff interact on a regular basis through membership in the Florida Aquatic Plant Management Society (FAPMS) and National APMS.
- The tours illustrated the complexity of the aquatic ecosystem and that managing weeds is more than controlling a single target species. In addition to the invasive species, the state staff must consider the native vegetation, endangered and threatened species, plant communities critical for fish and wildlife habitat, water quality, potable water (drinking and irrigation), public health, and recreation in their management decisions.
- The state staff discussed the difficulties of identifying potential tools for management of invasive plants, and the research and evaluation process for selecting and registering herbicides for use in public waters.
- The state staff discussed the biological and hydrological urgency in implementing treatments in public waters - particularly with respect to tropical storm events where flood-waters must dissipate rapidly in order to protect lives and property, and reduce mosquito infestations. Predicting when new or recurring infestations need to be treated is not easy, and once the need is identified, the pests must be treated in a timely manner to ensure success.
- The state staff explained how successful management of invasive species in public waters

ensures a safe, clean, and ready supply of water for agriculture, industry, drinking, recreation, and preservation of native and endangered species.

- The state staff; 1) explained how pesticide applicators are trained and licensed on a regular basis; 2) described the record keeping that occurs for pesticide applications; and 3) discussed current pesticide monitoring programs that are in place either through grant funding or public funding.
- Current, state-of-the-art, precision pesticide application technology was demonstrated to EPA staff by professionals who contract with Florida agencies to apply pesticides in public waters.

RELATED ISSUE: Definition of Waters Protected under the Clean Water Act

The CWA governs discharges to “navigable waters” of the U.S. This definition has been under scrutiny by both Congress and the Judicial system. During the last several sessions of Congress, legislation has been introduced to expand the regulatory reach of the CWA in the wake of two Supreme Court rulings that have narrowed CWA jurisdiction over isolated wetlands, intermittent streams and other marginal waters.

On April 2, 2009, Sen. Russ Feingold (WI) introduced S. 787. In this bill, the proposed definition of “waters of the United States” would include “all interstate and intrastate waters and their tributaries...” This essentially means that all wet areas (or areas that have been wet at some time) within a state would fall under federal regulatory authority, including: groundwater, ditches, pipes, streets, gutters and desert features. The proposed definition also includes all “impoundments of the foregoing,” regardless of whether the impoundment is natural or man-made. Read broadly, it could be applied to include any accumulation and storage of waters that otherwise would not be regulated.

On May 21, 2009, the Obama Administration sent a letter to congressional leaders urging them to consider four general principles associated with the scope of the CWA:

1. broadly protect the nation's waters;
2. make the definition of covered waters predictable and manageable;
3. promote consistency between CWA and agricultural wetlands programs;
4. recognize long-standing practices (i.e. preserve existing regulatory CWA exemptions, such as those for prior converted croplands)

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(From Left) Dan Kenny, Beth Dalrymple, Lee Van Wychen, Michael Goodis, Jack Faulk, Skee Jones, Jordan Page. Photo courtesy of Don Doggett.

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