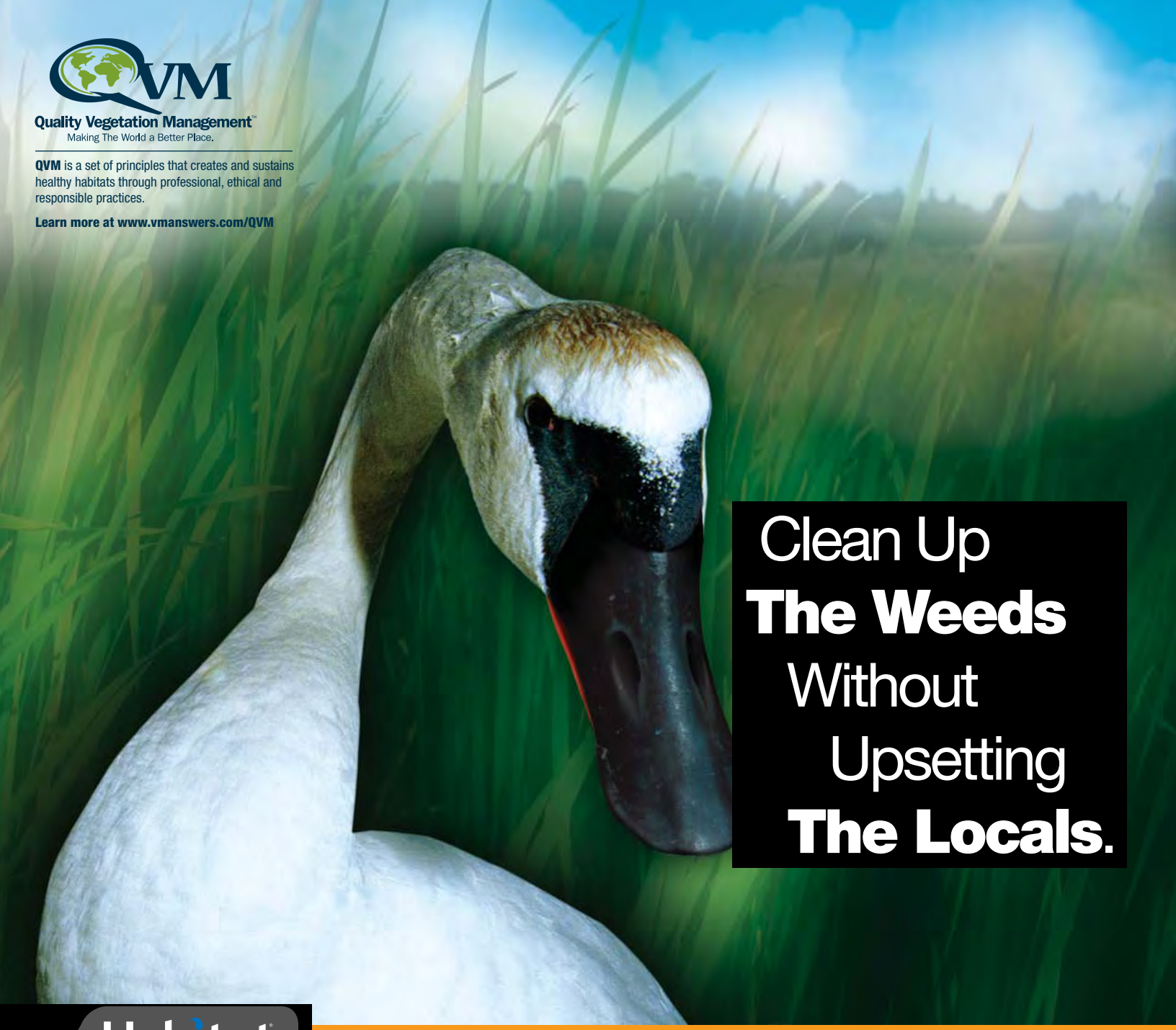
Wildland Weeds

SUMMER 2006

Amelia Exotica Goes to Washington

Prsrt std
U.S. Postage
P A I D
Gainesville, FL
Permit No. 726



QVM
Quality Vegetation Management™
Making The World a Better Place.

QVM is a set of principles that creates and sustains healthy habitats through professional, ethical and responsible practices.

Learn more at www.vmanswers.com/QVM

Clean Up **The Weeds** Without Upsetting **The Locals.**

Habitat® herbicide

WITH HABITAT® HERBICIDE, YOU CAN RESTORE AQUATIC AREAS WITHOUT HARMING WILDLIFE.

As part of a responsible **Quality Vegetation Management™** program, **Habitat** provides long-term control, eliminating the need for repeat applications. And **Habitat** uses less active ingredient and breaks down quickly, so it's gentle on the environment. Be tough on weeds, not wildlife. Use **Habitat**.

1-800-545-9525 | www.vmanswers.com

Professional Vegetation Management

BASF
The Chemical Company

Wildland Weeds

SUMMER 2006, VOLUME 9, NUMBER 3

Table of Contents

The mission of the Florida Exotic Pest Plant Council is to support the management of invasive exotic plants in Florida's natural areas by providing a forum for the exchange of scientific, educational and technical information.

An **exotic plant** has been introduced to Florida, either purposefully or accidentally, from a natural range outside of Florida. A **naturalized exotic plant** is one that sustains itself outside of cultivation (it is still exotic; it has not "become" native). An **invasive exotic plant** not only has become naturalized, but it is expanding its range in Florida plant communities.

Wildland Weeds (ISSN 1524-9786) is published quarterly by the Florida Exotic Pest Plant Council (FLEPPC) and the Southeast Exotic Pest Plant Council (SE-EPPC) to provide a focus for the issues and for information on exotic pest plant biology, distribution and control.

Direct all editorial and advertising inquiries to:
Karen Brown, Editor
Wildland Weeds
7922 NW 71st Street
Gainesville, FL 32653
352/392-1799; FAX 352/392-3462
kpbrown@ifas.ufl.edu

Editorial Committee:
Kathy Craddock Burks
Jim Cuda
Ken Langeland
Michael Meisenburg

Direct address changes to:
Jackie Smith
DEP - Invasive Plant Management
9737 Gumbo Limbo Lane
Jensen Beach, FL 34957
561/722-2479
jackie.c.smith@dep.state.fl.us

On the Cover: 'Amelia Exotica' invades Washington at the 7th National Invasive Weeds Awareness Week (NIWAW 7). Amy Richard (a/k/a/ Amelia Exotica) created and wore this lush costume to attract attention and raise awareness about exotic pest plants. Invasive plant facts on leaf-shaped paper were handed out to hundreds of people. See page 4. (*photos by Karen Brown*)

Meetings, Meetings and More Meetings

The past few months have been the season for meetings with gatherings of NIWAW, NAEPPC, SE-EPPC, FLEPPC, and others. To find out what these mysterious acronyms mean, and what happens at these functions (*besides* coffee and doughnuts), read on ~

Amy Richard, a/k/a Amelia Exotica, University of Florida-IFAS, Center for Aquatic and Invasive Plants

NIWAW 7

National Invasive Weeds Awareness Week 7 (NIWAW 7), hosted by the Invasive Weed Awareness Coalition (IWAC), took place February 26th – March 3rd in Washington, DC. The mission was to raise public and legislative awareness of the invasive weed problem, and it was a whirlwind week for anyone and everyone with an interest in exotic pest plants. NIWAW focuses on sharing invasive weed information with government officials and collaborating with experts to address what has become a national and global environmental concern.

Participating federal agencies included the Department of Agriculture, the Army Corps of Engineers, the Department of Interior, the Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW) and the National Invasive Species Council (NISC). FICMNEW is a partnership of the EPA and 15 federal agencies from the Departments of Agriculture, Interior, Defense, Energy and Transportation. The NISC is an interdepartmental council that helps to coordinate and ensure complementary, cost-efficient and effective Federal activities regarding invasive species.

A weeklong invasive weed exhibit was set up at the U.S. Botanic Gardens with a special "Kid's Fun Day" that was attended by approximately 800 children and their parents. Amelia Exotica, Lucy Loosestrife, and other characters were on hand to raise awareness and distribute information, and there was even story telling and a sing along with live music for entertainment and education. An evening reception for attendees and invited guests also was held at the Botanic Gardens later in the week.

"Because weeds know no borders, we must set aside our own organizational boundaries and work together to address problems collaboratively. NIWAW provides an opportunity to share our successes and help each other design programs that are well planned and well implemented, in order to increase the rate of success." Nelroy Jackson, Invasive Weed Awareness Coalition (IWAC)

Many participants used the national gathering as an opportunity to hold board meetings, including the North American Weed Management Association (NAWMA), the National Exotic Pest Plant Council (NAEPPC)(see below), and the Aquatic Ecosystem Restoration Foundation (AERF). In addition, the estimable Ecological Society of America (ESA) presented their Invasive Species Position Paper, **Biological Invasions: Recommendations for U.S. Policy and Management** at a National Press Club breakfast on the final day. The ESA is a non-profit, non-partisan society of professional scientists with more than 9,000 members. Part of their mission is to ensure the appropriate use of ecological science in environmental decision-making by enhancing communication between the ecological

community and policy-makers.

Since the federal agencies held their respective briefings at their home buildings in Washington, there was much running around on the quick and efficient METRO system. In addition, attendees were encouraged to visit their legislators on Capitol Hill to help members of Congress and their staff to understand the economic and environmental threat of invasive and noxious weeds at the national level.

Presentations held at the host hotel included speakers from the Invasive Weeds Awareness Coalition, the Department of Defense (Army-Civil Works), the Environmental Protection Agency Office of Pesticide Programs, The Nature Conservancy, the Weed Science Society of America (WSSA), and others. The Department of Interior briefings consisted of director's reports from the Bureau of Land Management, Fish and Wildlife Service, National Park Service, Bureau of Reclamation, Geological Survey and Bureau of Indian Affairs. An afternoon session was devoted to non-governmental organizations (NGOs) and a morning session coordinated by FICMNEW covered Cooperative Weed Management Area (CWMA) development.

A CWMA is a partnership of federal, state, and local government agencies, tribes, individuals, and various interested groups that manage noxious weeds or invasive plants in a defined area. The basic characteristics include a steering committee, a commitment to cooperation, a comprehensive plan to manage or prevent one or more invasive plants, involvement or representation of the majority of private landowners and natural resource managers in a defined geographical area with a common geography, weed problem, community, climate, political boundary or land use. In other words, CWMAs facilitate the partnership of multiple stakeholder groups whose common goal is the control and eradication of noxious and invasive plant species. Steve Schoenig from the California Department of Food and Agriculture gave an excellent presentation on CWMAs and listed the statewide accomplishments of CWMAs in California. These included over $6 million distributed to California CWMAs over 5 years; work towards eradication of over 2,000 high priority weed infestations (more than 128,000 acres); over $7 million in matching funds from outside grant funding and in-kind donations and services; new local partnerships between public agencies, private landowners, agriculturalists and conservationists, with outreach programs reaching more than 88,000 people; and attendance by almost 7,000 people at regular weed management meetings throughout the state. CWMAs are common in the western U.S. and aid in the distribution of federal funding for weed management programs. Eastern regions are being encouraged to develop similar partnerships in order to take advantage of cooperative management efforts and funding possibilities when they become available.

NAEPPC

A **National Exotic Pest Plant Council (NAEPPC)** meeting took place during NIWAW7 and was attended either in person or by conference call by representatives from Florida, Georgia, California, the intermountain states, Tennessee, North and South Carolina, Mid-Atlantic, Midwest, Wisconsin, Kentucky, New England, and New York councils, associations, networks and groups. All of the organizations have a website and most, but not all, have acquired non-profit status (501c3). An Intermountain EPPC may form consisting of Idaho, Montana, Oregon, Washington, Nevada, and Canada to help protect natural areas in those states.

The objective of NAEPPC is to communicate with one voice on issues and policies of national importance relating to exotic pest plants threatening natural areas and wildlands in the U.S.

The original Memorandum of Understanding (MOU) establishing NAEPPC was signed in 1995 by California, Florida, Tennessee, and Pacific Northwest EPPCs. In 2003, another MOU was developed to incorporate new EPPCs and to update goals and provisions. NAEPPC members have been meeting annually at the national Natural Areas Association (NAA) conference where successes and failures have been shared. At this most recent meeting, it was decided to meet twice a year, once at the NAA conference and once by conference call. A draft mission statement was discussed, with the following being tentatively agreed upon: "To serve as a national organization representing member councils in order to speak in unison on national issues regarding invasive plants in natural areas of the U.S." Combined EPPC membership totals 3,000 – 4,000 individuals, enough to have considerable impact on policy.

"Because weeds know no borders, we must set aside our own organizational boundaries and work together to address problems collaboratively. NIWAW provides an opportunity to share our successes and help each other design programs that are well planned and well implemented, in order to increase the rate of success." Nelroy Jackson, Invasive Weed Awareness Coalition (IWAC)

Projects discussed during the NAEPPC meeting included establishing committees for data management and standards to enable information sharing, shared projects such as mapping, working with green industries, ecological modeling and forecasting, participating in updating North American Weed Management Association (NAWMA) standards, and more. Also discussed was an invasive plant management network/clearinghouse similar to

continued on page 6

the western Center for Invasive Plant Management (CIPM) in Bozeman, Montana but focusing on the Midwest and East. This type of information clearinghouse might qualify for federal funding similar to the CIPM.

A NAEPPC.org domain name has already been retained and a website was discussed which will function as a national portal with links to all EPPCs/IPCs and include a mission statement, an overview of exotic pest plant problems, and a national listserver. Another recommendation was that NAEPPC "position papers" should be generated; for example, to support the funding of weed management areas. Also, weed management areas in the eastern U.S. need a definition similar to that of the western areas of the country since future federal funding may be allocated using weed management areas as recipients.

Officers were elected with Tony Pernas serving as Chair, Brian Bowen as Vice Chair, Mike Bodle as Secretary, and Nancy Fraley as Treasurer (although no dues will be collected). All agreed to serve until at least the NAA meeting in Flagstaff, Arizona September 20th – 23rd, 2006. For a copy of the minutes, bylaws, and MOUs, contact Tony Pernas at Tony_Pernas@nps.gov.

SE-EPPC

The 8th Annual Southeast Exotic Pest Plant Council symposium was held in conjunction with the 4th Annual North Carolina EPPC Meeting May 23rd – 25th at the North Carolina Museum of Natural Sciences in Raleigh. Concurrent sessions were held for biological control; best management practices; assessment, monitoring and mapping; environmental education and volunteer success; non-chemical control methods; invasive plant ecosystem effects; restoration of invaded ecosystems; and stopping new weed infestations. Dr. Lee Van Wychen, director of science policy for the Weed Science Society of America (WSSA) discussed eastern invasive species management initiatives. Other special presentations included herbicide resistance and gene flow by Dr. David Mortensen, University of Pennsylvania, and invasive weed assessment by Dr. Randy Westbrooks, Bureau of Land Management. Dr. Alan Weakley, Herbarium Curator for the University of North Carolina at Chapel Hill, described new nonnative additions to the southeastern flora, and Dr. Alison Fox, University of Florida, discussed risk assessment and the Florida nursery industry. Several hands-on workshops and field trips also were offered. Tony Pernas has taken over as SE-EPPC President from Brian Bowen, and Lee Patrick is now Treasurer.

FLEPPC

FLEPPC hosted their 21st annual symposium April 24th – 26th in Gainesville with the amusing theme, *"Little Crop of Horrors."* Dr. Lloyd Loope from the USGS Pacific Island Ecosystems Research Center, Haleakala Field Station in Makawao, Maui, Hawaii presented the keynote address. He discussed the management of invasive species in Hawaii since the 1993 Office of Technology Assessment (OTA) report to U.S. Congress, which devoted a chapter to Hawaii and Florida as two case studies due to the severity of their invasive species problems and their experience in addressing those problems. Dr. Loope made the important point that agricultural and natural areas bear the brunt of invasive species impacts, while those responsible for the presence of those species do not bear the associated costs.

More than 200 people attended the meeting, which included 35 oral presentations, a panel discussion, 25 poster presentations, and numerous field trips. Approximately 18 vendors lent their support and displayed their wares in the exhibitor space. The evening social included musical entertainment by *The Weeds* with plenty of poolside dancing. FLEPPC's first annual Photo Contest was held with awards given in the following categories: natural area landscape infestation; Category I or II close-up; before/after control; weed workers working; humorous; and artistic. The winning photos in each category are shown throughout this issue.

The FLEPPC symposium included the annual business meeting where four new board members were elected to replace outgoing board members Roger Clark, Drew Leslie, Cressida Silvers and Jim Duquesnel. Alison Fox took over as Chair from Jim Burney, and Dianne Owen (pictured) was presented with the **Member of the Year** award for her tireless, and always cheerful, work as FLEPPC secretary. Congratulations, Dianne!

— *KB, Ed.*

Pop Quiz!

Spell out the following acronyms:

IWAC _____

FICMNEW _____

ISAC _____

FLEPPC _____

WMA _____

NIWAW _____

NAWMA _____

NGO _____

NA-EPPC _____

WSSA _____

SE-EPPC _____

AERF _____

OTA _____

New Board Members at FLEPPC

Alison Higgins is Land Conservation Program Manager for The Nature Conservancy of the Florida Keys, and chair of the Florida Keys Invasive Exotics Task Force. She also serves as Chair of the Florida Keys National Wildlife Refuge's non-profit Friends group, and is Vice-Chair of the Keys Green Living and Energy Education group. She recently received her Master's Degree in Environment and Community from Antioch University.

Cheryl McCormick-Rote is a Plant Ecologist at the Center for Aquatic and Invasive Plants, Department of Agronomy, University of Florida. She completed a B.A. in Biology and Chemistry at the State University of New York at Plattsburgh, received an M.A. in Geography at the University of Georgia, and is currently completing her Ph.D. in Plant Ecology at the Institute of Ecology, University of Georgia. The species she loves to hate include Chinese tallow (*Sapium sebiferum*) and latherleaf (*Colubrina asiatica*).

Gary Nichols is the Invasive Plant Program Manager with the St. Johns River Water Management District in Palm Bay, Florida. He has been managing exotic invasive plants for DEP and the District for more than 30 years.

Donna Watkins has an A.S. in Park Technology from Lake City Community College, and a B.S. in Communications from Florida State University. She is a Special Projects Coordinator for the Bureau of Natural and Cultural Resources, Division of Recreation and Parks, in Tallahassee.

JOIN NOW!

JOIN AN EPPC TODAY AND HELP PROTECT YOUR NATURAL AREAS FROM INVASIVE EXOTIC PLANTS. JOIN AT WWW.SE-EPPC.ORG OR JOIN YOUR STATE CHAPTER FROM THE LINKS PROVIDED.

You do not need to join both SE-EPPC and your state chapter.

Hurricanes Help Fight Invasive Trees

by Stuart Krantz

Located in the northwest corner of Broward County, the City of Parkland is quite a "green" city. Originally built for people wanting to get away from the maddening crowds and live in the country, Parkland became horse country and its first two home developments still have agricultural zoning. Parkland's newer developments, numbering almost 30, moved away from the ranch/horse country style, but the city's density is still approximately one home per acre, on average, compared to densities in other south Florida areas such as Hialeah, with about 23 homes/acre; Miami Lakes, with about 12 homes/acre; and Coral Springs, with about six homes/acre.

Brazilian pepper trees *(Schinus terebinthifolius)* line several of our major eastern thoroughfares in Parkland and they are found within (and without) our city parks. Also growing throughout many city parks are Australian pines (*Casuarina* spp.). In the early 1990s, Parkland removed Australian pine from the city's nuisance plant list because it served as a buffer to a water treatment area behind Quigley Park. However, Hurricane Wilma took care of those Australian pines in October 2005, blowing down all save one in Quigley Park. The only one not blown down was a large tree sheltered behind a homeowner's residence.

Parkland's Riverglades Elementary School had their entire population of carrotwoods *(Cupaniopsis anacardioides)* removed, also with the help of Hurricane Wilma. Riverglades Elementary is a Broward County school that sits immediately north of the Broward County / Parkland Doris Davis Forman Preserve, and carrotwood saplings were starting to grow inside the fence line of the preserve. Four near-miss hurricanes in 2004 actually began the carrotwood removal by knocking down the first of 34 trees. Seventeen were knocked down by Hurricane Wilma in October 2005. After the Broward County School District realized that most of their Hurricane Wilma tree damage was from various invasive exotic species, as reported by Deputy Superintendent Mike Garretson, the district made a decision to remove invasive species from their properties. During the week of December 12, 2005, the district cleared out the last of the 34 carrotwood trees from Riverglades Elementary. Thus, Hurricane Wilma became the wake-up call for the Broward County Scool District. Recent reports state that the carrotwoods will be replaced with native live oaks and sable palms.

Carrotwood fruit.

PHOTO BY ANN MURRAY, UF-IFAS CENTER FOR AQUATIC & INVASIVE PLANTS

Hopefully, the City of Parkland will follow the excellent lead of Broward County Schools and begin removal of the remaining carrotwoods that continue to stand in our city. Carrotwoods can be seen in the medians of neighboring Coral Springs and around businesses in nearby Coconut Creek. Both of these cities are to be commended, however: Coral Springs for removing Australian pines, and Coconut Creek for becoming Broward County's first Community Wildlife Habitat. In the meantime, I can find new infestations of carrotwood on almost every street and berm in Parkland. They are attractive trees and it will take much effort to get the public interested in removing them.

THANKS again, Broward County.

I wish to thank the following individuals for the help they extended in getting the Carrotwood trees removed: School Board Chairperson Stephanie Kraft; School District Superintendent Dr. Frank Till; Deputy Superintendent Mike Garretson; Environmental Manager Gary S. Hines; North Area Superintendent Joanne Harrison; North Area Deputy Superintendent Craig Anderson; Marci Lindemann (past Riverglades Elementary School Assistant Principal) & Coordinator, Interim Assistant Principal Program; Riverglades School Advisory Forum Chairperson 2003-2006 Tina Ronder; Roy Rogers, Past Vice President Arvida Corporation, Weston FL. – Contact Stuart Krantz at stuartkrantz@mindspring.com

CARROTWOOD, native to Australia, is a slender evergreen tree that can grow to 33 feet tall. It has dark gray outer bark and orange inner bark (hence the common name of carrotwood). The fruits are distinctly yellow-orange colored and contain three shiny, oval black seeds covered by a yellow-red crust. The seeds are dispersed by birds. Carrotwood flowers in late winter/early spring, with fruits maturing in late spring. The trees are tolerant of salt, full sun, full shade, poor soils, poor drainage, and dry areas, and can tolerate cold temperatures to 22º F.

Carrotwoods were introduced for landscaping in the 1960s. By 1990, seedlings were established in various habitats on both coasts of Florida. The tree invades spoil islands, beach dunes, marshes, tropical hammocks, pinelands, mangrove and cypress swamps, scrub habitats, and coastal strands. It is now found in natural areas of 14 coastal counties in central and south Florida. So far, the greatest densities of seedlings and saplings have been found in mangrove forests, where they greatly alter the understory habitat. Carrotwood fares well even against other invasive, non-native species such as Brazilian pepper.

Carrotwood was listed by the Florida Department of Agriculture & Consumer Services as a Florida Noxious Weed (5b-57.007 FAC) in 1999. It has been a FLEPPC Category 1 species since 1995.

Text from Identification & Biology of Non-Native Plants in Florida's Natural Areas by K.A. Langeland and K. Craddock Burks, eds. (1998)

For information on native species to replace carrotwood trees and for herbicide and application methods to control carrotwood, please refer to University of Florida-IFAS Extension Publication SS AGR 165 by Dr. K.A. Langeland, available at the UF-IFAS EDIS web site: http://edis.ifas.ufl.edu

While Hurricane Wilma helped rid Broward County of some 200,000 invasive exotic trees, the destruction of their parks was massive.

Broward County Parks Recover from Hurricane Wilma

Hurricane Wilma, an intensely powerful hurricane that formed in the Atlantic basin last October, struck Broward County with devastating force on October 24th, 2005. Broward County high-rises, the 14-story Broward County School Board building and the county courthouse all were heavily damaged, and schools were closed for two weeks. The storm struck the west coast of Florida between Everglades City and Marco Island as a Category 3 hurricane (wind speeds of 111-130 mph). After severely damaging the city of Naples and surrounding areas, Wilma traveled east across the state, exiting into the Atlantic Ocean. The western side of the storm spawned several tornadoes as it moved across the state, compounding the damage from the hurricane's rain and wind.

Toppled Australian pine trees in Quiet Waters Park after Hurricane Wilma.

Fully six months later, Broward County's Parks and Recreation Division is still recovering from the devastation wrought by Wilma. Their local and regional parks and natural areas were decimated, with tree casualties estimated at 200,000 – 250,000. To date, approximately $20 million has been spent on debris removal, with more still to accomplish. Bob Harbin, Director of the Parks and Recreation Division, estimates that they are 85-90% finished with clean up. They expect FEMA to reimburse them for approximately 20% of their expenses.

The silver lining in this dark cloud is that more than 200,000 exotic invasive trees were removed by the forces of nature, leaving Broward County's parks and natural areas wide open for restoration with an emphasis on native species. In response to the damage from Hurricane Wilma, a Tree Replacement Action Plan for County Parks was prepared in March 2006 for the Broward County Board of Commissioners. The report states that exotic invasive tree species accounted for 90% of the tree casualties in the county park system.

Broward County's Tree Replacement Action Plan includes a hurricane resistant landscape design with a target of 70% native species that are wind and disease resistant, and drought tolerant. These include live oaks, gumbo limbo, cypress, silver buttonwoods, sea grapes, lignum vitae, and others. The county parks department has not yet received approval from the county commission of the more than $11 million budget request, but hopes to begin soon repairing the "desolate and damaged landscape remaining in many park areas."

– *KB, Ed.*

Tree Casualties from Hurricane Wilma

Australian pine	65%
Melaleuca	15%
Ficus	5%
Brazilian pepper	5%
Others	10%

For more information, contact Bob Harbin, Director, Broward County Parks and Recreation Division, 954-357-8106, rharbin@broward.org

Is Glyphosate Use Responsible for Global Decline in Amphibians?

by Kenneth A. Langeland, Professor, Agronomy Department, Center for Aquatic and Invasive Plants, University of Florida-IFAS

Land and water managers who apply herbicides to control invasive plant species and other nuisance vegetation strive to minimize environmental impacts as a matter of policy and daily operations. It is, therefore, not surprising that concern has been expressed and many questions asked relative to recent publications by Relyea (2004, 2005a, 2005b), which implicate use of glyphosate-containing herbicides in the global decline of amphibians. The purpose of this article is to put these recent publications in perspective relative to aquatic and terrestrial natural area weed management, and to explain why land managers should continue to use glyphosate-containing products to protect managed habitats from weeds without concern for unreasonable adverse environmental impacts.

Relyea (2005a) conducted tank studies to test the toxicity of a glyphosate-containing herbicide on amphibian species. Roundup Weed and Grass Killer, which contains 25.2% glyphosate (2.5 lb glyphosate a.i. (active ingredient) per gallon) with an unknown amount of polyethoxylated tallowamine (POEA) surfactant, was applied to water in test tanks. This product is not registered for application to aquatic sites. Tests were conducted for 16 days with solution (water and initial herbicide concentration) renewal every four days. Relyea (2005a) predicted from his data that application of product equivalent to 3.7 ppm a.i. glyphosate would kill 90% to 100% of tadpoles of all six amphibian species tested. This concentration represents the maximum that would occur when Roundup is broadcast at the highest label rate to water 15 cm (5.4 in) deep with no intercepting vegetation (an unlikely scenario). In another study (Relyea 2005b), the maximum rate of glyphosate-containing product was applied to three species of juvenile terrestrial amphibians to simulate a direct application to an agricultural field with no intercepting vegetation. Across all species, only 21% of the glyphosate-treated amphibians survived after one day. Relyea (2005a) concluded that "Roundup with the POEA surfactant has the potential to play a major role in amphibian declines."

Data presented in Table 1 shows the wide range of toxicities to forms of glyphosate and glyphosate-containing products. Roundup is 10 to 100 times more toxic to indicator species than either the parent glyphosate acid or Rodeo, which contains the isopropylamine salt of glyphosate. POEA, the surfactant contained in the original Roundup, was the most toxic surfactant of 19 tested on bluegill sunfish (Haller and Stocker 2003). Several studies have reported toxicity levels of glyphosate products to amphibian species (Edgington et al. 2004, Howe 2004, Man and Bidwell 1999, Wojtaszek et al. 2004, Perkins et al. 2000). Toxicity of Roundup to aquatic organisms because of the POEA surfactant was known by Monsanto when Roundup was originally labeled in 1978 and data was provided to the Environmental Protection Agency (EPA). This is why the formulation was not registered for aquatic uses; nor are glyphosate-containing products with POEA now registered for aquatic use. Most glyphosate-containing products that are registered for aquatic use are manufactured without surfactant (Touchdown Pro, the exception, contains a different surfactant) so that the applicator can use one of the many commercial surfactant products available that have low toxicity to aquatic organisms and instructions for aquatic applications. While the contents of commercial surfactants is proprietary information, they are regulated and only contain ingredients that are approved by EPA or the Food and Drug Administration.

When applying glyphosate-containing herbicides that do not contain POEA, Relyea's studies are not applicable. When applying glyphosate-containing products that contain no surfactant and are registered for application to vegetation growing in water, addition of only those surfactants with aquatic use directions should be used. This will prevent unreasonable adverse impacts to aquatic organisms.

Assumptions of Relyea's experimental design exaggerate the potential impact of glyphosate-containing products relative to application for control of invasive plants in upland natural areas and in wetlands. Because glyphosate-containing products that are labeled only for terrestrial application are not applied to aquatic

Table 1. Toxicity of glyphosate and glyphosate-containing herbicides to aquatic organisms when applied in different forms (Vencil 2002).

Toxicity	Glyphosate acid	Touchdown Pro	Rodeo	Roundup
	mg/L			
Daphnia 48 hr LC50	780	160	930	5.3-37
Bluegill sunfish 96 hr LC50	120	>180	>1000	5.8-14
Rainbow trout 96 hr LC50	86	180	>1000	8.2-26

This information is available on the UF/IFAS Electronic Data Information Sources (EDIS) as "Safe Use of Glyphosate Containing Products in Aquatic and Upland Natural Areas" (http://edis.ifas.ufl.edu/pdffiles/AG/AG24800.pdf).

sites, concern for exposure to aquatic organisms is an issue of drift or contact with temporary pockets of water. Concentration much lower than that resulting from maximum application rates are expected. When spot treatments of herbicide using hand-held equipment are made, the applicator has direct control of where the spray solution is applied and little to no herbicide contacts standing water. Likewise, direct application of spray solution to amphibians is unlikely. Broadcast application of glyphosate-containing products with POEA are rarely made to upland natural areas because of potential damage to non-target plant species, and if broadcast applications are made, vegetation is present that intercepts a majority of the spray solution. Exposure of test organisms for 16 days with solution renewal every four days is not consistent with realistic exposure under vegetation management practices. Under field conditions, active ingredients and adjuvants are broken down or sequestered through natural processes. Renewal of test solution every four days is equivalent to four separate applications. Field studies to assess impacts under representative natural conditions, and monitoring studies conducted under conditions relevant to product use indicate that glyphosate herbicides registered for terrestrial application are not likely to result in adverse effects to amphibians when used according to label directions (Wojtaszek et al. 2004, Thompson et al. 2004).

When applying glyphosate-containing products containing POEA to upland natural areas, there is a wide margin of safety to amphibians and other wildlife relative to toxic levels and realistic potential exposure levels. Applicators who apply glyphosate-containing products according to instructions on the herbicide label and on the surfactant label will have an acceptable margin of safety to wildlife. Land managers should continue to use glyphosate-containing products to protect managed habitats from weeds without concern for unreasonable adverse environmental impacts, as originally determined by regulatory agencies when these products were considered for registration. There is no data that suggests the use of glyphosate containing herbicide products is responsible for global declines in amphibian populations.

Kenneth Langeland can be contacted at kalangeland@ifas.ufl.edu

Literature Cited

Edgington, A. N., P.M. Sheridan, G. R. Stephenson, D. G. Thompson and H. J. Boermans. 2004. Comparative effects of pH and Vision7 Herbicide on two life stages of four anuran amphibian species. Environ. Toxicol. Chem. 23:815-822.

Haller, W. T. and R. K. Stocker. 2003. Toxicity of 19 adjuvants to juvenile *Lepomis macrochirus* (bluegill sunfish). Environ. Toxicol. Chem. 22:615-619.

Howe, C. M., M. Berrill, B. D. Pauli, C. C. Helbing, K. Werry and N. Veldhoen. 2004. Toxicity of glyphosate-based pesticides to four North American frog species. Environ. Toxicol. Chem. 23:1928-1938.

Mann, R. M. and J. R. Bidwell. 1999. The toxicity of glyphosate formulations to four species of southwestern Australian frogs. Arch. Environ. Contam. Toxicol. 36:193-199.

Perkins, P. J., H. J. Boemans, G. T. Stephenson. 2000. Toxicity of glyphosate and triclopyr using the frog embryo teratogenesis assay - *Xenopus.* Environ. Toxicol. Chem. 19:940-945.

Relyea, R. A. 2005a. The lethal impacts of Roundup and predatory stress on six species of North American tadpoles. Arch. Environ. Contam. Toxicol. 48:351-357.

Relyea, R. A. 2005b. The impact of insecticides, and herbicides on the biodiversity and productivity of aquatic communities. Ecological Applications 15:618-627.

Thompson, D. G., B. F. Wojtaszek, B. Staznik, D. T. Chartrand, and G. R. Stephenson. 2004. Chemical and biomonitoring to assess potential acute effects of Vision7 Herbicide on native amphibian larvae in forest wetlands. Environ. Toxicol. Chem. 23:843-849.

Vencill, W. K. ed. 2002. Herbicide Handbook. Weed Science Society of America, Lawrence, KS. 493 pp.

Wojtaszek, B. F., B. Staznik, D. T. Chartrand, G. R. Stephenson, and D. G. Thompson. 2004. Effects of Vision herbicide on mortality, avoidance response, and growth of amphibian larvae in two forest wetlands. Environ. Toxicol. Chem. 23:832-842.

The beauty of Sonar* is measured by what it does not do.

A beautiful lake can turn ugly once invasive aquatic weeds like hydrilla or Eurasian watermilfoil take over. But before you introduce non-selective grass carp or launch a mechanical harvesting program, consider what Sonar Aquatic Herbicide does not do.

Sonar does not eliminate desirable vegetation. SePRO has the technology to manage application rates and monitor the treatment progress to ensure that invasive species are removed with minimal effect on native plants and the lake's ecosystem. After treatment, desirable native species are allowed to thrive and often become more abundant, creating a more diverse habitat.

Sonar does not harm fish or waterfowl nor carry any restrictions for using treated water for swimming, fishing, boating or drinking—when used according to label directions—which is unique among aquatic herbicides.

The one thing Sonar does do is restore a lake to its more natural, pristine condition. Sonar has been used by wildlife groups to successfully restore numerous aquatic habitats. In addition, a lake treated with Sonar often requires fewer re-applications than lakes treated with other aquatic herbicides. That's because results can last for more than just one season.

For more information about Sonar Aquatic Herbicide and the entire line of SePRO aquatic products, visit our web site at **www.sepro.com** or call **1-800-419-7779**.

SePRO Corporation Carmel, IN 46032

Sonar*

Restores Aquatic Habitats

Phil munching on 'Godum' (lygodium)

Philip Myers 8/04/1964 – 4/30/2006

On April 30, 2006 the environmental community lost a dedicated steward whose passion for the environment will be sorely missed. Philip Myers, a Florida Park Service Biologist, was killed by a motorist while riding his bicycle, a hobby that he loved.

Phil's professional efforts and accomplishments in the field of exotic plant removal in south Florida are well known. He was very skilled at forming partnerships, securing funding (over one million dollars in 2005 alone), and creating enthusiasm for the cause. From the years prior to his arrival, to the most recent year of record, he increased the number of acres treated for exotic plant species in his district by over 400%. The programs that he established have served as models for the Florida Park Service and other local agencies. He was responsible for the organization of many multi-agency exotic plant removal workdays throughout south Florida from Fort Pierce to the Florida Keys, and mentored numerous people in various land management activities. His mentorship, with the knowledge that he was always willing to share and his "get it done" work ethic, has given his employees and coworkers an opportunity to continue his legacy.

Phil will greatly be missed on a personal level as well. He had great stories to share about his travels during his Peace Corps days, his trips to Europe to watch the Tour de France, as well as his adventures at Jazz Fest in New Orleans. These stories and his sense of humor (some of his jokes were not original, but he would let you know ahead of time) are what many will remember him for. His coworkers are still not sure whether his tales were truly to share his adventures or simply to take their minds off chopping lygodium in knee high muck for eight hours a day during the middle of summer. Either way, the story telling, the sense of humor, and his one syllable "HA!" laughter will be greatly missed. He was a valuable colleague and a good friend to many who crossed his path.

Phil also will be remembered for his love of music, socializing with friends, repeating the jokes from the previous night's episode of The Simpsons (verbatim) and especially, his personal dedication to the conservation of the environment. His passion was truly global in nature, from the family he adopted in Ecuador and his 400-acre rain forest project there, to contacts in France and the various conservation efforts that he supported around the world. Phil's legacy will continue through the many programs that he helped establish and personally supported, and his professional dedication and friendship will be missed by all.

In memory of Philip, donations may be made to: Philip's Rain Forest Project, c/o 8430 Shell House Road, Edisto Island, SC 29438.

– Greg Kaufman, Florida Park Service

Phil Myers – A Personal Note

Phil's work ethic and love for fieldwork are legend among those of us fortunate to have known him. Phil and I became friends instantly due to our "Carolina roots," a love for fieldwork, a hatred for Old World climbing fern and other invasive plants, and an appreciation for beer. In fact, Phil's enthusiasm in managing invasive plants eventually led me to pursue a degree in Weed Science. We worked together for two very short years in Hobe Sound, initially (and naively) taking on a large Australian pine removal project at St. Lucie Inlet Preserve State Park. We kayaked about 1.5 miles into the interior of the preserve at least 40 times carrying coolers with drinks and food, chainsaws, machetes, and several gallons of Garlon 4 spray mix. At the end of many days, after hacking and squirting hundreds of Australian pines and Brazilian peppers, I remember sitting on the edge of the mangrove / hammock ecotone being eaten by no-see-ums and trying to get enough energy to paddle back. We always made it and looked forward to doing it again. My most vivid memory of Phil, however, was that I never once heard him complain. Rest in peace, brother; I already miss you very much.

– Jeff Hutchinson, University of Florida-IFAS, Center for Aquatic and Invasive Plants

FLEPPC PHOTO CONTEST WINNERS

JEFFREY HUTCHINSON, UF-IFAS, CENTER FOR AQUATIC AND INVASIVE PLANTS

Category: Category I Close-Up

Macfadyena unguis-cati, cat's-claw vine flower

DEBBIE CHAYET, PINELLAS COUNTY PARKS & RECREATION

Category: Natural Area Landscape Infestation

"It won't die!!" *Syngonium podophyllum* (arrowhead vine – foreground) and *Nephrolepis cordifolia* (sword fern – background). These two species had been treated with Roundup at 10%. The *Syngonium* yellowed a bit but did not die. A small strip of *Nephrolepis* died but most was unaffected. The photo was taken in an oak hammock at the edge of Maple Swamp.

Jennifer Possley and Dallas Hazelton hold a boa constrictor found at The Deering Estate at Cutler in Miami.

Boa Constrictors Breeding in Miami Park

"This is the third time Kristie and I have found a red-tailed boa while working in the woods together," writes Jennifer Possley, a field biologist with Fairchild Tropical Botanic Garden in Miami. Dallas Hazelton, also pictured, caught the large snake. Boa constrictors (*Boa constrictor*) are an introduced species, most likely pets that outgrew their owners. This boa was found at the Deering Estate off Old Cutler Road in Miami, where there is both a breeding population and an active removal program for the species.

The Deering Estate at Cutler is one of the most unique parks in south Florida. An environmental, archaeological, historical and architectural preserve, it is listed in the National Register of Historic Places. The 444-acre property encompasses globally endangered pine rockland habitat, as well as coastal tropical hardwood rockland hammocks, mangrove forests, salt marshes, a coastal dune island and the submerged resources of Biscayne Bay. Alície Warren-Bradley, Natural Resources Manager at the Estate says, "Since 1989 we have removed more than 60 boas from tropical hardwood hammock, pine rockland, and coastal habitats, as well as from the main grounds of the Estate. We are still trying to get a handle on population size, which may be in the hundreds."

Boas not placed for educational use are surrendered to Dr. Kenney Krysko, Sr. Biological Scientist, Division of Herpetology at the Florida Museum of Natural History. The snakes become part of the museum's specimen collection, although a few are kept alive to collect data on their reproduction (seasonality and number of offspring).

Dallas, a biologist with Miami-Dade County Natural Areas Management and a self-described snake wrangler, says boa constrictors usually are fairly docile and are not poisonous, but they can give a nasty bite.

For more information, contact Alície Warren-Bradley, Natural Resources Manager, Deering Estate at Cutler, Miami-Dade County Parks & Recreation Department, 305-235-1668, ext. 228; axw@miamidade.gov www.deeringestate.org or Dallas Hazelton, Natural Areas Management, Miami-Dade County Parks & Recreation Department, 305-257-0933 ext. 237, HAZELD@miamidade.gov

Dallas and Erick Revuelta prepare to capture a Burmese python in South Dade Wetlands just a couple of days after the boa constrictor was caught at Deering. This snake was very aggressive, striking at Dallas and biting his boots a couple of times before capture.

Go, TAME!

The Area-wide Management and Evaluation of Melaleuca project, or **TAME Melaleuca**, recently was selected to receive the USDA Agricultural Research Service's 2005 Technology Transfer Award for Superior Effort. Every year this national award recognizes individuals and groups within the USDA-ARS who have performed outstanding work in transferring technology to users outside of the agency. The TAME project's Technology Transfer Team was recognized for developing and disseminating area-wide suppression technology for the invasive plant *Melaleuca quinquenervia* in South Florida. Team members representing the USDA-ARS, the University of Florida IFAS and the South Florida Water Management District traveled to Washington, DC in February to attend the award ceremonies and receive their plaques. Secretary of Agriculture Mike Johanns was the keynote speaker and USDA-ARS Administrator Edward B. Knipling (far left in picture) presented the awards.

– *Cressida Silvers*

Team members in attendance (left to right) were Paul D. Pratt, Francois B. Laroche, Ken T. Gioeli, Michael J. Meisenburg, Ernest S. Delfosse, John C. Scoles, Cressida S. Silvers, and Robert M. Faust. Richard J. Brenner, Assistant Administrator for the ARS Office of Technology Transfer is at far right. Team members unable to attend the awards ceremony were Amy P. Ferriter, Ken A. Langeland, Alan W. Hodges, and Ted D. Center.

FLEPPC Photo Contest Winner:
DANIELLE FLOYD, FLEPPC MEMBER

Category: Humor

"Duck in the potato" The shadow on the air potato *(Dioscorea bulbifera)* leaf looks like a duck and is natural, not enhanced.

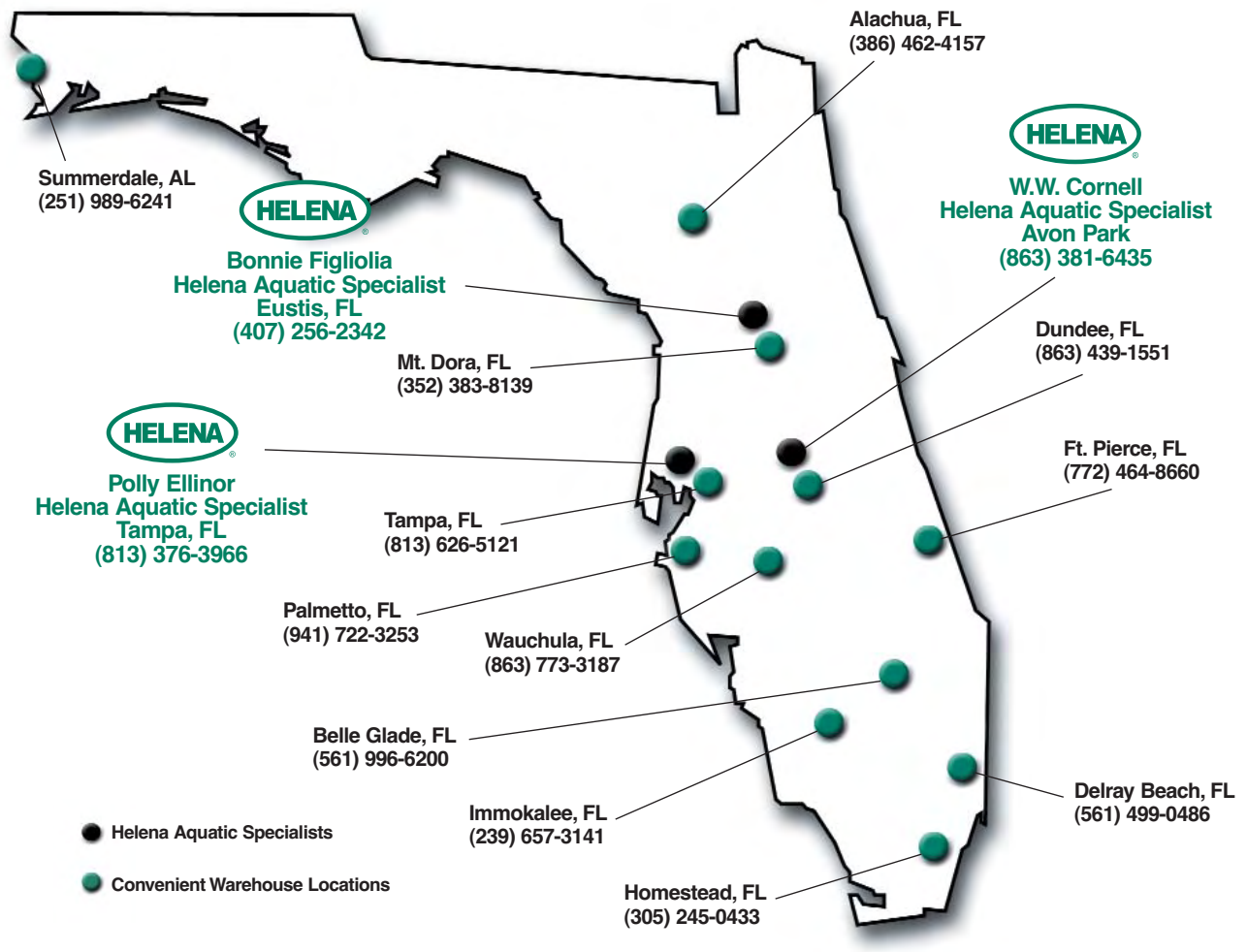
THANK YOU

to the following sponsors for supporting this issue of *WILDLAND WEEDS*:

FLEPPC Photo Contest Winner:
ADAM GRAYSON, ALLSTATE RESOURCE MANAGEMENT

Category: Before / After Control

Flamingo Gardens is a not-for-profit botanical garden and wildlife sanctuary in Davie, Broward County, Florida. Our initial treatment targets included cattail, water primrose, Bischofia, wetland nightshade, carrotwood, rubbervine and torpedograss, to name a few. For control we used foliar applications of glyphosate and triclopyr. The before shot was taken in August 2003 and the after shot was taken in May 2004. The initial treatment and a subsequent replanting was done as a cooperative effort between the South Florida Aquatic Plant Management Society and Allstate Resource Management as a donation to Flamingo Gardens to help restore their wetland area.



Aquatic Weed Control Products From Helena Chemical Company

Agent for the Sonar Product Line in Florida: NEW!

Sonar* A.S. • Sonar SRP • Sonar PR • **Sonar "Q" Quick Release* Pellets**

Complete Line of Herbicides including:

Nautique* • Aqua-Kleen® • Aquathol® K • Aquathol® Super K • Hydrothol® 191
Reward® • Rodeo® • Weedar® • **Renovate®** • **HardBall®** NEW!

Florida Distributor for SePRO Products:

Sonar* A.S. (pints & quarts) • Captain* Algaecide • Revive*

Complete Line of Adjuvants including:

Kinetic® HV • Optima® • Quest® • Induce® • Dyne-Amic®

HELENA *People...Products...Knowledge™...*

Helena Chemical Company • PO Box 1758 • Dade City, FL 33526

Internodes

Mark your calendar

- **Aquatic Plant Management Society (APMS),** Annual Meeting, July 16-19, 2006, Portland, OR. www.apms.org
- **FLERA** 2006 Annual Conference, Florida Local Environmental Resource Agencies, August 2-4, 2006, Sarasota, FL. 850/561-0904; www.flera.org/index.html
- 33rd Annual **Natural Areas Association** Conference, September 20-23, 2006, Flagstaff, AZ. http://www.naturalarea.org/
- 33rd Annual Conference, **Ecosystems Restoration & Creation,** November 2-3, 2006, Plant City, FL. 813/253-7523; www.hccfl.edu/depts./detp/ecoconf.html
- 30th Annual **Florida Aquatic Plant Management** Society Meeting, October 30 - November 2, 2006; St. Petersburg, FL. www.fapms.org
- **Public Land Acquisition & Management Partnership** Conference, November 1-2, 2006, Jacksonville, FL. www.ces.fau.edu/plam2006

Publications

- FLEPPC's Brazilian Peppertree Task Force has released an updated 'Florida Brazilian Peppertree Management Plan' that discusses the biology and management of *Schinus terebinthifolius*, one of Florida's worst invasive weeds. The updated management plan explains ecological processes that can have a selective and predictable population level impact on Brazilian peppertree and that can be manipulated using appropriate control technologies to effectively alter the plant's invasive characteristics. To download the plan in PDF, go to: http://ipm.ifas.ufl.edu/
- The Ecological Society of America (ESA) presented their Invasive Species Position Paper, **Biological Invasions: Recommendations for U.S. Policy and Management** at the National Invasive Weeds Awareness Week in Washington, DC. A PDF version and/or a PowerPoint presentation can be downloaded from the ESA website at: http://www.esa.org/ Click on Public Affairs, then ESA Positions, to find this Position Paper and others from the venerable ESA.

Good Points

- Quote of the Quarter: "If I had to name the one thing in this profession that has changed the most, it would be the people. Thirty years ago it was just a pay check to most. Today it is a shared challenge that we all take pride in!!!" Gary Nichols, FLEPPC Board Member.
- Castor bean *(Ricinus communis)* is the source of ricin, a potent poison implicated in bioterrorist threats. It is a FLEPPC Category II pest plant native to Asia and Africa. The large seeds can remain viable for years after the parent tree is gone. Bill Neill with Riparian Repairs writes, "The ricin toxin present in castor bean seeds, foliage, and wood is persistent in the human body, where one ricin molecule can destroy thousands of ribosome molecules necessary for protein synthesis. Unlike synthetic, manufactured compounds, the human health effect of low-level exposure to natural poisons such as ricin have not been studied by the U.S. Environmental Protection Agency." bgneill@earthlink.net
- **Public-Private Partnerships to Manage Invasive Weeds -** Pulling Together Initiative (PTI) grants are administered by the National Fish & Wildlife Foundation. Proposals are solicited from non-profit organizations and government agencies interested in managing invasive plant species. Grants provide support on a competitive basis for the formation of local Weed Management Area (WMA) partnerships. These partnerships engage federal resource agencies, state and local governments, private landowners, and other interested parties in developing long-term weed management projects within the scope of an integrated pest management strategy.

continued on page 23

Invasive Plant Control, Inc. manages invasive species throughout the United States. Clients range from the National Park Service to non profit land managers. IPC strives to build a strong relationship with each and every client. Invasive Plant Control, Inc.'s work with the Pittsburgh Parks Conservancy is an excellent example of the benefits of a strong partnership. The following interview with Mary Beth Steisslinger, Ecological Restoration Coordinator for the PPC, highlights some of this organization's achievements.

Who is the Pittsburgh Parks Conservancy?

The Pittsburgh Parks Conservancy's mission is to work in partnership with the City of Pittsburgh to restore, renew, revitalize and preserve the four great parks of Pittsburgh - Frick, Highland, Riverview and Schenley. Since 1998, the PPC has been a Private Non-Profit Partner with the City of Pittsburgh. The PPC works closely with the Department of Public Works (DPW), Parks Division, on planning, restoration and maintenance efforts to continually improving Pittsburgh's four historic parks. Pittsburgh has 1700+ acres in the center of the City in Frick, Highland, Riverview and Schenley Parks. The parks are over 100 years old, and revitalization efforts include the stewardship of historic structures, landscapes and plantings.

What is the Pittsburgh Parks Conservancy's involvement with invasives?

The Pittsburgh Parks Conservancy has received many grants to work on natural area restoration with a goal being the reestablishment of biodiversity in these urban settings. Often times, the invasive plant threats hinder the true recovery of a functioning native plant community. The PPC contracted with Invasive Plant Control, Inc. to help with the initial intensive treatments for 1, 2 and 3 year periods, depending on the severity of invasive plant infestation. Once the severe populations have been suppressed the PPC takes over maintenance of invasive eradication with the help of the DPW Parks and Urban EcoStewards.

Who are the key players IPC, Inc. and the PPC partner within Pittsburgh?

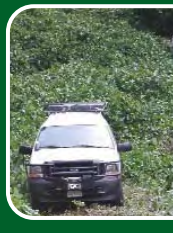
Besides the City of Pittsburgh, our main partners include members of the Pittsburgh Urban Ecological Collaborative (UEC) made up of over a dozen environmental organizations including the Nine Mile Run Watershed Association, PA Cleanways, Friends of the Riverfront and Partners in Parks... Additionally, we work with many community groups, schools and individuals in a program collaboratively run thru the UEC called Urban EcoStewards. Once a natural area in the parks or greenspace of the City has undergone some focused restoration activities, Urban EcoStewards are assigned to the areas to keep invasive plants out and steward native plantings.

What relationship does the PPC have with IPC?

Invasive Plant Control, Inc. and the Pittsburgh Parks Conservancy have collaborated on activities that include a county-wide symposium on invasive plants, development of one of the first cooperative weed management areas (CWMA) in the NE, to trainings, consulting and advising for PPC staff, field partners and municipal land managers in the Pittsburgh area.





What are some of the current invasive plants being controlled by IPC, Inc. and the PPC?

Invasive Plant Control, Inc. and the Pittsburgh Parks Conservancy are currently working on an 80 acre restoration of the historic landscape and natural areas in the Panther Hollow Watershed in Schenley Park. Invasive plant challenges include garlic mustard threatening old stands of trillium, May apple and Solomon's seal; Norway maple which has rapidly eliminated many species found in the original sugar maple-basswood community and Japanese knotweed which has spread along all the stream banks and wetland areas, choking out moist meadow species such as Joe-pye, ironweed, Sylphium cup-plant and seed-box.

What are some invasive plant management projects on the horizon?

Invasive Plant Control, Inc. and the Pittsburgh Parks Conservancy are currently working with city, county, state and federal partners through the newly formed CWMA, Three Rivers Invasive Species Coalition (TRISC). One of the driving forces behind this coalition is to respond early to eliminate mile-a-minute vine in the western half of the state where it has only recently established a foothold.

For additional information about the Pittsburgh Parks Conservancy visit their website at www.pittsburghparks.org.

You can also find this interview online at www.invasiveplantcontrol.com

---

615.385.4319

WWW.INVASIVEPLANTCONTROL.COM




The goals of PTI are:

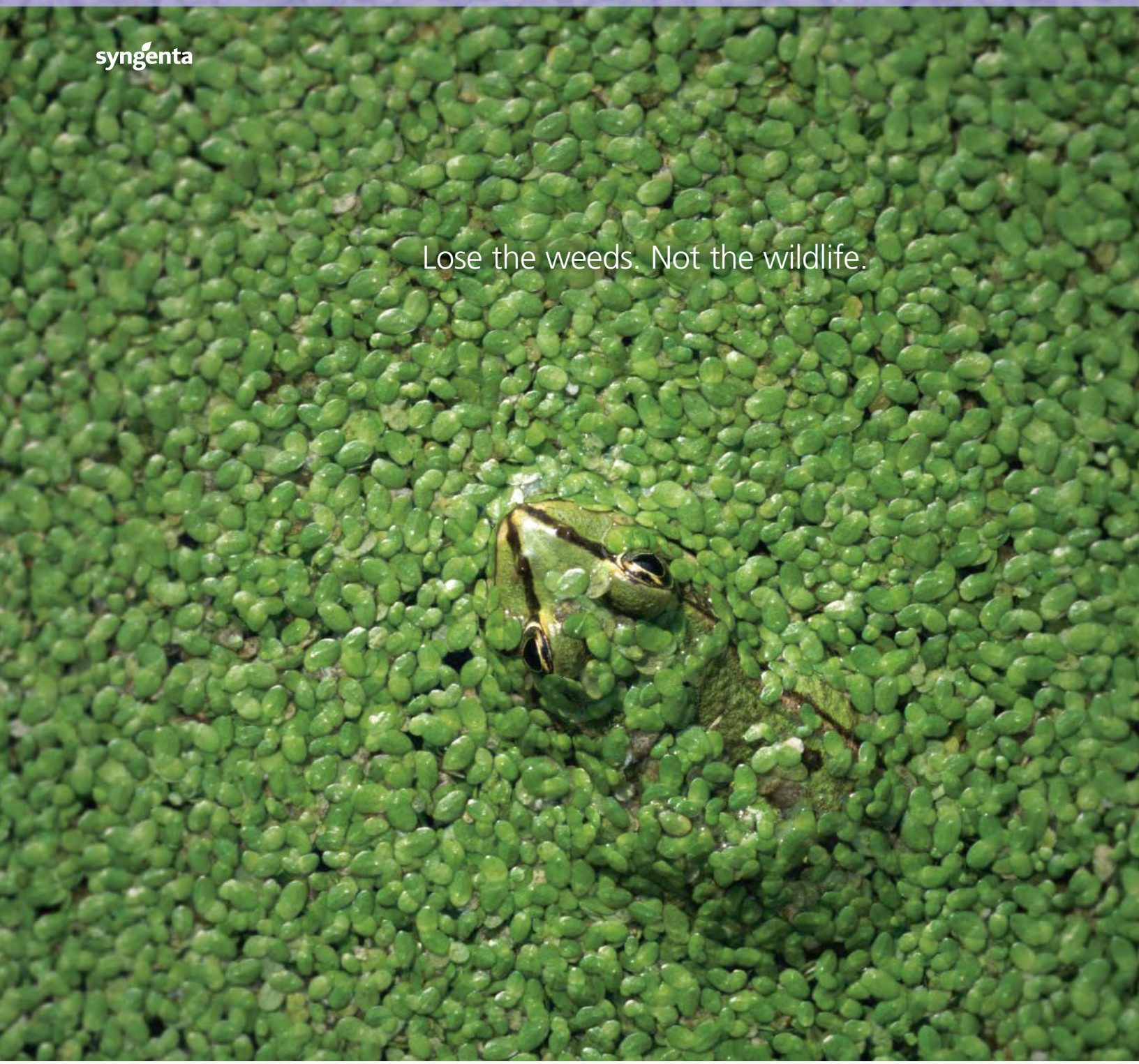
- to prevent, manage, or eradicate invasive plants through a coordinated program of public/private partnerships, and
- to increase public awareness of the adverse impacts of invasive plants.

PTI grants are financed by funds from federal agencies, which must be matched by cash or in-kind contributions from state, local, and private partners on at least a 1:1 basis. Proposal submission is invited and encouraged nationwide. All proposals are reviewed by a national steering committee composed of weed management experts from government, industry, academia, and non-profit organizations. Preproposals for next year will be due at the end of October 2006. To learn more about the PTI, visit http://www.nfwf.org/programs/pti.cfm

Making the Most of the Plentiful Kudzu


MAX SHORES

Kudzu flower jelly, kudzu baskets and sculptures, kudzu tea, kudzu art exhibits, kudzu hay, kudzu herbal remedies, deep-fried kudzu and kudzu quiche…the list goes on and on. There is even a kudzu documentary, and numerous books have been published on the vine that is arguably the poster plant for invasive exotic pest plants in the South. It reportedly covers over 7 million acres of the deep South, but you can still purchase seeds and root crowns on the Internet, in spite of the fact that the vine is prohibited by both the Florida Department of Agriculture & Consumer Services and the U.S. Department of Agriculture. I was recently bestowed with a jar of kudzu blossom jelly from North Carolina, as yet unopened. I guess if we can't beat it, we may as well eat it!
— KB, Ed.



With Reward® aquatic herbicide, it's easy to restore habitats and preserve species that live near waterways. Reward herbicide controls a broad spectrum of weeds — including submersed, marginal, and floating — starting within hours of application. But it isn't harmful to fish or wildlife. No wait. No worry. For more information, call your Syngenta rep at 1-800-395-8873.

REWARD®
Landscape and Aquatic Herbicide

www.syngentaprofessionalproducts.com