

Wildland Weeds

WINTER 2004

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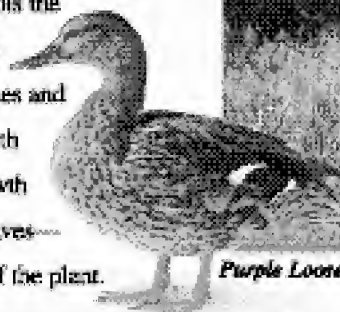
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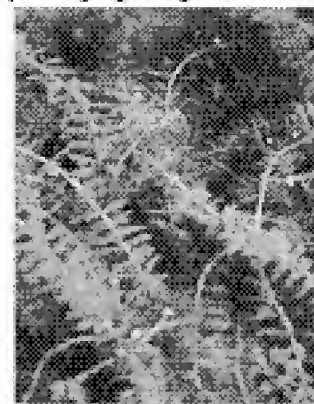
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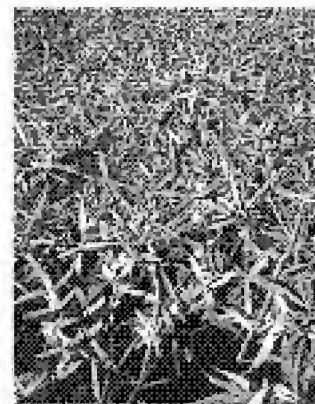
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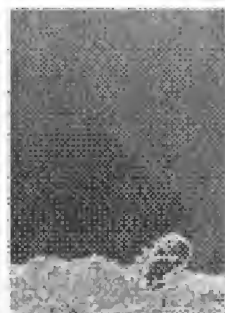
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Wildland Weeds

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Visit these websites:

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On the Cover: Australian pines (*Casuarina equisetifolia*) blanket houses after Hurricane Charlie hit south Florida.
Photo by Patrick Lynch, South Florida Water Management District

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The agony that has been the history of Australian pines on public lands on Sanibel Island is all but over.



Australian pines cover Periwinkle Way after hurricane Donna in 1960. Photo by Jim Pickins

One of the founding families of Sanibel planted [Australian] pines along both sides of the main road, Periwinkle Way, in the 1920's, thereby establishing an unnaturally tall and shady canopy popular with those that didn't know any better. Gaps of light after Hurricane Donna in 1960 allowed Australian pine seedlings to form virtually total monocultures at the beaches including Bowman's Beach, Lighthouse and Algiers public parks. Efforts to remove these scourges to re-establish native plant communities and wildlife habitat have previously been met with horrifically emotional resistance including death threats against land managers and people chaining themselves to pine trees. When Hurricane Charley hit on

Friday the 13th, such nonsense came to a screeching halt. Sanibel's roads were blocked for days, hundreds of homes had direct serious damage from falling pines and power was out for weeks due solely to pines falling on power lines and breaking whole stretches of power poles off like so many toothpicks.

Now the City has finished removing all of the scores of Australian pines in the Periwinkle Way right-of-way and is rapidly finishing removal of all pines at the beach parks, both those downed and those that remained standing (many shattered and broken off). Very few complaints have been heard from any who saw the mess following the storm. These trees are just too tall with too much wind loading to be

appropriate for barrier islands, not to mention the overwhelming damage they cause to natural systems. When the logging operation is over, the City will have removed approximately 370 acres of pines in just over 2 months with the financial help of FEMA, Greg Jubinsky and his DEP invasive species management team and physical labor assistance on Periwinkle Way from the USFWS. Most pine work was accomplished with feller-buncher, front-end loader and whole tree chipper machines. Plans are well underway for revegetating all of these areas with 100% natives. The missing habitats of these parks including beach dune, rare coastal scrub, West Indian hardwood hammock, salt marsh and mangrove forest will be



finally re-established and maintained. Hopefully, now that the public lands are free of pines (and Brazilian pepper and Melaleuca I might add), an effort to remove the remaining Australian pines from Sanibel's private lands will be next.

As far as hurricane effects on trees go, it was abundantly clear that properties well vegetated with 20-40' trees of either the native or exotic variety fared far better in terms of structural wind damage than those with grassy lawns, on golf courses or with tall exotic trees that tended to fall on roofs. Exotic fig trees, particularly *Ficus benjamina*, also did terribly, second only to the Australian pines, almost all being knocked down and many causing serious property damage. Of the natives, seagrapes appeared to fare the worst with palms and other native hammock species surviving the wind best.

Pictures say a thousand words. The photo to the left is a ringer, Periwinkle Way after hurricane Donna in 1960; we've finally learned our lesson only now, in 2004.

— Robert K. Loflin, Ph.D.
 Natural Resources Director, City of Sanibel



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Trying to Reason with Hurricane Season

a look at post-storm tree damage on Sanibel Island, Florida

by Amy Ferriter, Tony Pernas and Jim Burch • photos by Patrick Lynch

Hurricane Charley's wobble became a turn, and then a nightmare for Florida's southwest Gulf coast on the afternoon of Friday, August 13, 2004. The storm went wide right at the last minute—causing Bowdenesque cringes from forecasters as it made landfall 150 miles south of well-prepared Tampa.

Sanibel Island was the first to feel the brunt of the storm. It is a low-lying barrier island and residents were wisely ordered to evacuate on the one in/out island road (Periwinkle Drive). This “scenic” drive was lined with mature Australian pine (*Casuarina equisetifolia*) trees that threatened to topple in high winds. And indeed, after the storm, residents anxiously waited to return to their homes to survey damage. But streets littered with downed Australian pine and resulting downed powerlines prevented them from returning for several days. Crews worked around the clock clearing the pick-up-sticks-like debris on the roadways. Unfortunately, no amount of meteorological warning could have prevented much of this extensive damage - mature Australian pine trees topple no matter how well you batten down the hatches.

Tree Damage Assessment

Post storm National Oceanic and Atmospheric Administration (NOAA) wind field data revealed that Sanibel Island was battered by winds that ranged from Category 1 Hurricane force (74-95 mph) on the easternmost tip to Category 4 Hurricane force (131-155 mph) on the western tip (see Table 1). This wind gradient offered a unique opportunity to assess the effects of varying wind speeds on mature Australian pine stands in a coastal urban setting.

Aerial Observations: One week post-storm, three low-level transects were flown along the island. Observers recorded Australian pine damage and recorded damage categories.

Categories were:

- ▶ **Severe:** More than 50% of trees exhibited tip up (Crown on ground, roots snapped) and/or snap off (trunk snapped below crown and above roots). Remaining trees exhibit splitting, leaning and/or severe branch loss.
- ▶ **Moderate:** 10-50% of trees exhibited severe damage (tip-ups and snap offs). Major leaning (more than 45 degrees from vertical). Severe branch loss (more than 50%) common on remainder of trees.
- ▶ **Minimal:** Less than 10% of trees exhibited severe damage such as tip-ups and snap-offs. Majority of trees standing, with major “needle” loss and minor leaning and branch loss.

Ground Observations: The aerial data was complemented by ground observations. Trees were surveyed at .2-mile increments along major roads.



Mature Casuarina trees reach heights in excess of 100 feet. This means that when they do topple, their massive surface area tends to have a greater impact on surrounding vegetation and structures.

Information collected on the ground included:

- ▶ Tree species
- ▶ Type of damage – branches broken, trunk snapped, or tipped up (uprooted)
- ▶ Sizes of branches broken (usually 5 to 10 if available at each location)



Some native plants have survival mechanisms for high winds. Gumbo limbo, buttonwood and Jamaican dogwood are quick to lose branches and leaves when hurricane force winds hit. This results in less wind resistance, and the trees tend to survive.

- ▶ Sizes of trunks (Diameter at breast height (DBH)) for snapped or uprooted trees
- ▶ Height above ground of snapped trunks
- ▶ Type of habitat
- ▶ Natural or landscaped habitat
- ▶ Estimated damage to canopy where canopy removal was apparent.

Sanibel Island's Australian pine trees suffered extensive damage as the result of Hurricane Charley. This in itself is not surprising since Australian pines dominated much of the island before the hurricane. Aerial and ground estimates of damage reveal that the eastern side of the island, which experienced Category 1 Hurricane force winds, had minimal Australian pine damage. Aerially observed damage was estimated at less than 10% while ground estimates show damage to be at 34.3%. This variance in damage estimates can be attributed to the abundance of Australian pines lining roadways where the ground surveys were concentrated.

The western side of the island was exposed to a stronger gradient of hurricane force winds. Aerial estimates show moderate (10%-50%) to severe (greater than 50%) damage along the gradient. Ground observations show that 73.2% of the Australian pines on the western side of the island were either uprooted or snapped at 10' to 20' above ground. Australian pine trees that grew gregariously (mostly inland) on the island commonly had broken trunks; those that grew as solitary trees or grew near the coast were commonly uprooted.

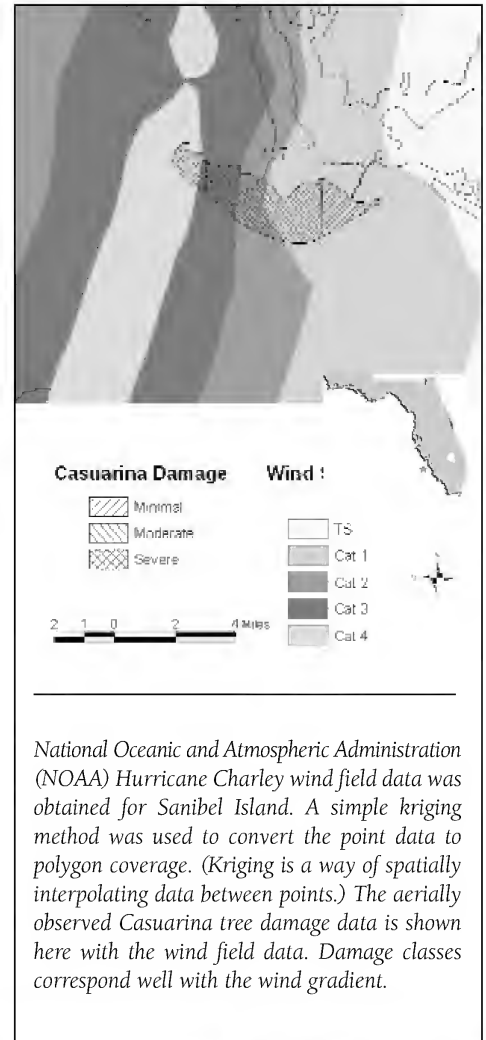
Native tree species also experienced extensive damage in hurricane force winds. Much of the damage to native trees occurred when Australian pine trees fell into them or uprooted them as the shallow Australian pine roots were pulled from the ground. On the southwestern part of the island, many seagrape (*Coccoloba uvifera*), buttonwood (*Conocarpus erectus*) and gumbo limbo (*Bursera simaruba*) trees were damaged, but the damage was primarily the loss of branches. These native trees were often not uprooted or otherwise mortally damaged. Palms – coconut (*Cocos nucifera*), royal

(*Roystonea regia*) and sabal (*Sabal palmetto*) – in general had little damage.

Ficus species (native and exotic) that were supported and stabilized by a thick base of aerial roots were often upright and virtually unscathed, even in the highest winds. However, *Ficus* species that had been trimmed into single-trunk trees or hedges often toppled and/or were uprooted in lower wind gradients. Throughout the island, *Ficus* trunks and branches were the second most common component (after Australian pine) in the roadside debris piles. Also common in these piles were mahogany (*Sweitenia mahogany*), Norfolk Island pine (*Araucaria heterophylla*) and seagrape branches, and gumbo limbo trunks and branches.

After the Storm

The 2004 hurricane season is one for the record books. The above observations were made one week post-Charley when most of us (reasonably) thought that it would be the Storm of the Decade. Little did we know that we would soon have more post-storm tree damage data opportunities than we could handle. Windshield surveys of other storm ravaged areas in Palm Beach and Martin Counties concur with the results found on Sanibel Island.



National Oceanic and Atmospheric Administration (NOAA) Hurricane Charley wind field data was obtained for Sanibel Island. A simple kriging method was used to convert the point data to polygon coverage. (Kriging is a way of spatially interpolating data between points.) The aerially observed Casuarina tree damage data is shown here with the wind field data. Damage classes correspond well with the wind gradient.



Palms (foreground) had little damage. *Ficus* species survived well when allowed to put down a thick base of stabilizing aerial roots. They survived very poorly when trimmed into a single trunk or hedge (background).

Plants Not Recommended for Hurricane-prone Areas in Florida

- Australian pine (*Casuarina spp.*)
- Earleaf acacia (*Acacia auriculiformis*)
- *Ficus* spp. (when hedged or limbed up)
- Java plum (*Syzygium cumini*)
- Norfolk Island pine (*Araucaria heterophylla*)
- Queen palm (*Arecastrum romanzoffianum*)
- Washingtonia palm (*Washingtonia robusta*)
- Yellow tabebuia (*Tabebuia caraiba*)

As for what to replant, the following list provides some recommendations for more wind-resistant, coastal-adapted native species.



Crews worked around the clock to clear *Casuarina* debris from Sanibel and Captiva Islands



Other common landscape species like Norfolk Island Pine and yellow tabebuia offer interesting post-storm photo opportunities, but should be discouraged in storm-prone areas.

Plant Recommendations

The proper selection and placement of trees in south Florida is vital to maintain a healthy landscape. Native coastal species have evolved through centuries of hurricanes. The following is a list of recommended trees/shrubs/groundcovers for South Florida:

Trees

- Sabal Palm (*Sabal palmetto*)
- Royal Palm (*Roystonea regia*)
- Buccaneer Palm (*Pseudophoenix sargentii*)
- Florida Thatch (*Thrinax radiata*)
- Silver Palm (*Coccothrinax argentea*)
- Buttonwood (*Conocarpus erectus*)
- Seagrape (*Coccoloba uvifera*)
- Gumbo Limbo (*Bursera simaruba*)
- Shortleaf Fig (*Ficus citrifolia*)
- Jamaican Dogwood (*Piscida piscipula*)
- Lignum Vitae (*Guaiacum sanctum*)
- Geiger Tree (*Cordia sebestena*)
- Strong Bark (*Bourreria ovata*)
- Wild Tamarind (*Lysiloma bahamense*)

CATEGORY	WINDS	EFFECTS
One	74-95 mph	No real damage to building structures. Damage primarily to unanchored mobile homes, shrubbery, and trees. Also, some coastal road flooding and minor pier damage
Two	96-110 mph	Some roofing material, door, and window damage to buildings. Considerable damage to vegetation, mobile homes, and piers. Coastal and low-lying escape routes flood 2-4 hours before arrival of center. Small craft in unprotected anchorages break moorings.
Three	111-130 mph	Some structural damage to small residences and utility buildings with a minor amount of curtainwall failures. Mobile homes are destroyed. Flooding near the coast destroys smaller structures with larger structures damaged by floating debris. Terrain continuously lower than 5 feet ASL* may be flooded inland 8 miles or more.
Four	131-155 mph	More extensive curtainwall failures with some complete roof structure failure on small residences. Major erosion of beach. Major damage to lower floors of structures near the shore. Terrain continuously lower than 10 feet ASL may be flooded requiring massive evacuation of residential areas inland as far as 6 miles.
Five	greater than 155 mph	Complete roof failure on many residences and industrial buildings. Some complete building failures with small utility buildings blown over or away. Major damage to lower floors of all structures located less than 15 feet ASL and within 500 yards of the shoreline. Massive evacuation of residential areas on low ground within 5 to 10 miles of the shoreline may be required.

TABLE 1 The Saffir Simpson Scale was formulated in 1969 by Herbert Saffir, a consulting engineer, and Dr. Bob Simpson, director of the National Hurricane Center. The World Meteorological Organization was preparing a report on structural damage to dwellings due to windstorms, and Dr. Simpson added information about storm surge heights that accompany hurricanes in each category. *ASL = Above sea level. Source: NOAA

Shrubs

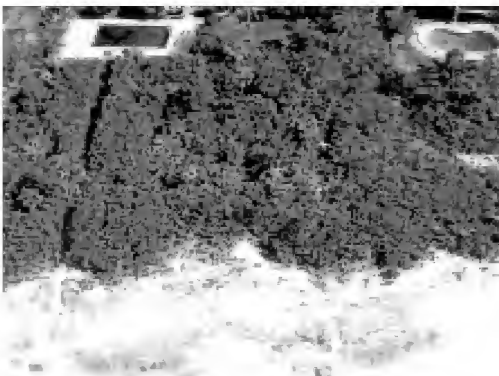
- Saw Palmetto (*Serenoa repens*)
- Jamaican Caper (*Capparis cynophallophora*)
- Joewood (*Jacquina keyensis*)
- Black Torch (*Erithalis fruticosa*)
- Florida Privet (*Forestiera segregate*)
- Cocoplum (*Chrysobalanus icao*)
- Bay Cedar (*Suriana maritima*)
- Inkberry (*Scaevola plumieri*)
- Bay Lavender (*Argusia gnaphalodes*)
- Schillings Dwarf Holly (*Ilex vomitoria*)
- Florida Boxwood (*Scheeffaria frutescens*)
- Seven Year Apple (*Casasia clusifolia*)

Ground Covers

- Golden Creeper (*Ernodea litoralis*)
- Beach Sunflower (*Helianthus debilis*)
- Beach Morning Glory (*Ipomoea imperati*)
- Railroad Vine (*Ipomoea pes-carpe*)



Seagrape is well adapted to coastal winds if allowed to grow in mounds with multiple branches acting as a support system. These trees rarely completely tip up, unless they are trimmed into a single-trunked tree.



This line of Seagrape was virtually unscathed on the Gulf side of Sanibel Island. When allowed to grow in its natural mounded form, it has a very high wind tolerance.

For more information, contact Amy Ferriter at the South Florida Water Management District, aferrite@sfwmd.gov, 561/687-6097.



PAUL C. MYERS
1948 - 2004

Mr. Paul Charles Myers of Winter Haven passed away in his home September 19, 2004 after a 27-year battle with a rare cancer. He was 55.

Paul worked for the Florida Department of Pollution Control from 1971-1977, then served as director of Polk County's Environmental Services Aquatic Plant Management Department until 1983. He founded Applied Aquatic Management, Inc. in 1981 and served as Executive Vice President until his passing. He was president of the Florida Aquatic Plant Management Society in 1984 and was a past editor of *Aquatics* magazine.

Paul developed and perfected many of the invasive weed management techniques currently in widespread use in Florida. Around 1990, while working with the South Florida Water Management District, he evaluated various "hack and squirt" combinations for melaleuca control and was the first to use contract labor for this work. Paul also was a willing educator and assisted and taught many applicators. His ready smile and laid-back style endeared him to everyone who met him. In recognition of his friendly nature, the Aquatic Plant Management Society awarded the "Max C. McCowen Friendship Award" to Paul in 2000. Paul's professional contributions on behalf of invasive weed management were numerous and his expertise and friendship will be missed.

Paul was a devoted husband, father and grandfather. He was an avid outdoorsman who enjoyed hunting, fishing and traveling. He was a member of the First Baptist Church of Lake Alfred. Paul is survived by his wife of 34 years, Linda Webster Myers; daughter Robin Myers, Gainesville, FL; son, Paul C. Myers, Jr., daughter-in-law, Jennifer Myers, and two grandchildren, Jake and Jordan Myers, Winter Haven.

As a tribute to Paul, memorial contributions may be made to the Florida Aquatic Plant Management Society Scholarship and Research Foundation for the newly formed "Paul C. Myers Applicator Dependent Scholarship," c/o Don Doggett, PO Box 60005, Ft. Myers, FL 33906, or to the First Baptist Church of Lake Alfred Building Fund, 280 East Pierce St., Lake Alfred, FL 33850.

Invasive Species Management Tour: Lower Coastal Plain Habitat Restoration

Approximately 50 participants from federal, state, and local government agencies throughout the Southeast met to see and learn about invasive species management for restoration of lower coastal plain ecosystems in the mid-south. Activities took place over three days in October in Alabama, Arkansas, Louisiana, Mississippi, and Tennessee. Hosted by the GeoResources Institute (GRI) of Mississippi State University (MSU), the tour was co-sponsored by the Mississippi Invasive Species Alliance, the Southern Weed Science Society, and BASF.

The tour began with an in-depth examination of Longleaf Pine restoration on the Judd Brooke's Plantation near Nacaise, Mississippi. Participants received an up-close view of the inter-relationship between land management, invasive species management, wildlife management and economics in the restoration of this significant community. Longleaf pine restoration and management involves a close working relationship between the private landowner and county, state, and federal agencies.

The next day focused on the importance of collaboration between university research, extension and outreach, and resource management agencies in the battle with invasive species. Cogongrass management research plots were the first stop, with a presentation by study director Dr. John Byrd of MSU. Herbicide application rates and product selections developed by research plots were used in interagency demonstrations near Pascagoula, a cooperative project of the Mississippi Department of Transportation (DOT), the MS Department of Environmental Quality, and MSU. Participants later viewed the MS DOT's efforts



to control Chinese privet along highway rights-of-way in southern Mississippi, and the joint tropical soda apple eradication efforts of USDA-APHIS and the MS Department of Agriculture and Commerce, Bureau of Plant Industry.

Participants returned to the Judd Brooke's Plantation to view local education and outreach efforts on cogongrass management and longleaf pine restoration. Over 100 landowners and local residents came to participate in the Forestry and Wildlife Field Day for management of private forests, an effort by Hancock County, MSU Extension Service, USDA Natural Resource Conservation Service and USDA Forest Service. Presenters included representatives from the US Fish and Wildlife Service, USDA Natural Resources Conservation

Service, Mississippi Forestry Commission, MSU and the MSU Extension Service, The Nature Conservancy, BASF, and private consultants. Field tour topics included cogongrass management, longleaf pine forest management, conversion of slash pine to longleaf pine forests, plant diversity and the importance of blanket bogs in the longleaf pine ecosystem, demonstrations of mechanical and chemical forestry management practices, and federal cost-share programs. This tour was followed by a catfish dinner and presentations on invasive species, wildlife management, and remote sensing.

On the final day of the tour, the Mississippi Invasive Species Alliance hosted a meeting to discuss the possible formation of a Mid-South Invasive Species Alliance. Twenty-two invited participants attended from state and federal agencies in Alabama, Arkansas, Louisiana, Mississippi and Tennessee. Dr. David Shaw (GRI) and Dr. Randy Westbrook (US Geological Survey, Biological Resources Discipline) first discussed the need for a regional effort to cooperate and coordinate between all agencies and groups focused on invasive species efforts, followed by a state-by-state discussion of invasive species management activities. Attendees agreed to the need to cooperate and coordinate more fully between states, and outlined future steps to take towards a formal organization.



For information on the Mississippi Invasive Species Alliance, or to find out more about regional efforts and the formation of a Mid-South Invasive Species Alliance, contact Dr. John Madsen, GeoResources Institute, Box 9652, Mississippi State, MS 39762, 662/325-2428, or jmadsen@gri.msstate.edu. Visit the GeoResources Institute web site at www.gri.msstate.edu.

Storm Damage Assessment by Mike Bodle

As the summer storms of 2004 tore across Florida, folks living in the shadow of tall trees faced a risk increased by each additional foot of trees growing overhead. Those who had already removed potentially hazardous trees could breathe somewhat more easily. The greatest tree damage occurred, logically, in zones of the greatest wind speeds (see Ferriter *et al.*, this issue, pp.6-9). But did native or non-native trees pose greater risks?

Stuart Krantz with the City of Parkland in Broward County is facing local opposition to a project to remove remaining Australian pine trees from city parks. Some residents object strongly enough that the Parkland City Commission has backed away from removing the trees. Roger Clark, Land Stewardship Manager for Lee County, reports that \$1 million is being spent removing downed and broken Australian pines in four parks totaling 500 acres. The damaged Casuarinas pose such high public risks that these parks have remained closed for more than two months. Jim Duquesnel, a biological scientist with the Florida Department of Environmental Protection in the Keys, holds that Australian pines tend to establish in beaches and spoil sites with unconsolidated soils that provide less foundational support. Trees grow to 100-foot heights, usually with long, straight branch extensions. The combination of loose soils,



JIM DUQUESNEL

“Their growth form and habit is like no native tree, particularly when they grow on barrier islands...They behave like a sail and catch the wind instead of the wind blowing through as occurs with native pines.”

– Roger Clark, Lee County Land Stewardship Manager

Raise your sail one foot and you get ten feet of wind. – Chinese proverb

extreme height and branch length subject them to more wind pressure. If trees do not topple, very long sections of broken limbs often result. Also, Casuarinas frequently share root systems and, as one tree falls, others can be pulled over.

Of course, native trees also can fall and wreak havoc. Parks and public lands remain closed elsewhere littered mainly with downed native trees. Oaks, mahoganies and slash pines, for example, reach sufficient heights to cause terrific damage when they fall. Their branches also readily shatter in severe winds. Millions of dollars now are being spent removing fallen native trees from millions of acres of Florida.



DON DOGGETT, LEE COUNTY HYACINTH CONTROL DISTRICT

“After Hurricane Andrew flattened approximately 400 acres of Casuarinas (75 to 100 feet tall) at Bill Baggs Cape Florida State Recreation Area in 1992, a hundred or perhaps more 30 to 40 foot tall native sea grapes (*Coccoloba uvifera*), gumbo limbos (*Bursera simaruba*) and strangler figs (*Ficus*) were revealed, previously having been hidden within the nearly monocultural Casuarina stand.”

– Jim Duquesnel, Florida Department of Environmental Protection Biological Scientist

Yet at storm landfall sites along South Florida shores, Australian pines are usually the dominant and the tallest components of tree communities. Following Hurricane Andrew's path in 1992, they caused the most debris, by far, on Key Biscayne at Bill Baggs Cape Florida State Park. Similarly, Australian pines caused the most debris, home and power line damage on Sanibel Island after Charley's pass in August 2004. Native shoreline trees, including sea grape, buttonwood and gumbo limbo, reach maximum heights of only 30 or 40 feet. Their lower heights may be one reason why they tend to survive storms better than gangly, sprawling Australian pines. They are coastally adapted species, although the same could be said for Australian pines. Natives, such as gumbo limbo and mahogany, also shed expendable foliage, twigs and minor branches, reducing wind resistance and preserving major limbs and trunk. Conversely, Casuarina hangs on until the trunk fails (often at or near the ground) or the entire tree topples from the windload.

However, Australian pines in Florida are not subject to the pressures exerted by biological controls in their native Indo-Pacific regions. Generally, biocontrols (insects, pathogens, and other naturally occurring organisms) tend to limit tree growth in various ways. In their native lands, with biocontrols in effect, trees are generally shorter in stature, often with contorted growth, and with few branches spanning long distances without differentiation. Obviously, this is not the case with typical Australian pine growth habit along Florida's shores. One lesson from the storms of 2004 should be that, especially for our coasts, Casuarinas, both literally and figuratively, cast a taller and more ominous shadow when hurricane winds doth blow. Many sites would have had far less damage, recovery needs, and costs had the exotic Australian pines been removed prior to these extraordinary calamities of nature.

FLEPPC Education and Outreach Small Grants

The Florida Exotic Pest Plant Council is soliciting grant proposals for non-native invasive plant education and outreach projects in the State of Florida. The intent of these grants is to provide up to \$1,000 in grant funding to organizations or individuals who wish to educate the public about non-native invasive plants and their affect on the environment and economy of Florida. Proposals will be accepted from individuals, public or private nonprofit organizations, and academic institutions.

Preference will be given to proposals that meet the following criteria:

- ✓ Involve a plant or plants listed on FLEPPC's 2003 List of Invasive Species (found on www.fleppc.org).
- ✓ Educational message will reach a large segment of the community.
- ✓ Include partnerships (please specify type and degree of involvement for partner entities).
- ✓ Demonstrate matching funds or in-kind contributions.
- ✓ Increase local community awareness of non-native plants through local charettes, volunteer events, web site development, and distribution of educational materials.
- ✓ Assist local communities in developing area specific non-native plant control ordinances and programs.
- ✓ Heighten community awareness about non-native invasive plant identification, control, and prevention.
- ✓ For more information and application instructions visit the FLEPPC website at www.FLEPPC.org or contact Leesa Souto, FLEPPC Education Committee Chair at:

Stormwater Management Academy
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 Telephone: 321-722-2123 • Email: Lsouto@mail.ucf.edu



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Solutions for Invasive Weed Control

Editor's Note: This article brings some good news on progress against exotic pest plants in New Zealand and elsewhere in the Southern Hemisphere. It also offers a summary of basic approaches to the problem. Florida readers will probably recognize the "habits" discussed here as already well-established strategies for invasive plant management in the Sunshine State.

Seven Habits of Highly Effective Weed Programmes

by Ian Popay and Susan Timmins, New Zealand Department of Conservation

Mosquitoes, crazy ants or black widow spiders slip into a country inside shipping containers or old tyres. By contrast, few plants new to the country are brought in accidentally. They are already here, brought in quite legally for horticultural, agricultural or forestry purposes. Gardens, farms and plantations are the main source of new weeds in several countries: New Zealand (74%: Buddenhagen et al., 1998), Australia (65%: Blood, 2003), South Africa (66%: Lesley Henderson, pers. comm.), UK (48%: Preston et al., 2002). In North America Reichard, 1994 (in Reichard and White, 2001) reported that 99% of naturalised woody species had been deliberately introduced. These garden plants, lurking in cultivation, are the future alien plant invaders.

New Zealand has over 24,700 introduced plant species (Williams et al., 2002). Over 2100 species are already naturalised; a proportion will become invaders. Proactive management is essential for handling species that escape garden boundaries and threaten ecosystems. Establishing strategies and tools allows us (country, industry or agency) to deal quickly with new weeds, and effectively with widespread weeds. This paper discusses the steps and the science needed to effectively manage these future invaders. The steps are based loosely on Covey's (1989) seven habits of highly effective people. Most of the procedures discussed were developed for weeds of concern to conservation in New Zealand, but they can be applied to weed management elsewhere.

SEVEN HABITS

The seven essential ingredients of effective weed management are: get ready, set objectives, prioritise, understand weeds, get everyone involved, actively control weeds, and "sharpen the saw."



Helicopter spraying gorse (*Ulex europaeus*)

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1) BE PROACTIVE - GET READY

We know for certain new weeds will appear, but not which species, nor when, nor where. We need to act quickly, whether they arrive fresh from overseas or, more likely, as recent garden escapes.

"Being ready" nationally involves having in place strategies for dealing with newly discovered weeds, and "seamless" procedures for dealing with these species once they have spread beyond the scope of early response. Such strategies must include tools like:

- Effective surveillance for early detection of new naturalisations
- Weed risk assessment for all newly naturalised species
- Work teams to contain and control new and spreading threats
- Monitoring procedures to assess progress in eradication, containment or management

Similar strategies and tools are required for states or regions, where authorities may wish to protect the general public,

landowners or conservation areas from new "internal escapes," new incursions, and, sometimes, established invasives.

In several countries scientifically based tools for weed risk assessment, surveillance, monitoring and control are now in place, and science will continue to improve their value.

Because of the unpredictability of weeds, the strategies and tools must be based on principles, rather than being weed or place specific. They may need to be backed up by appropriate legislation: unpopular or drastic actions may sometimes be necessary to achieve important goals.

2) BEGIN WITH THE END IN MIND: SET OBJECTIVES

Objectives establish what we aim to do to the weed and what we want to achieve in the affected environment; they keep us focused. This allows us to get beyond just controlling weeds for the sake of it. For example we may continue to con-



Helicopter spraying *Clematis vitalba*

trol a weed because we've always done it, even though in some circumstances that weed may be useful, e.g. blackberry may protect seedlings of native trees from browsing animals, frosts or drought.

The sort of measurable and time-bound objectives we might have are:

- Eradicate *Hydrilla* from the South Island by 31 December 2004.
- Reduce *Salix* spp. to zero density (no obvious sign of plant, although seeds may still be in the soil) in Whangamarino by 31 December 2004.
- 95% reduction in identified weeds on Kapiti Island by 31 December 2004.

In the past, the nominal long-term goal of many weed control projects has been "eradication." This has often been next to impossible and thus the objective did not serve a useful purpose. Having an *appropriate* objective helps keep us on target.

3) PUT FIRST THINGS FIRST: PRIORITISE

Decide which weeds are worth controlling and at which sites weed control is most beneficial. In New Zealand we have encapsulated these approaches, coining the words *weed-led* for programmes to eradicate new infestations early and *site-led* for control of widespread weeds at important sites. Before we can set those priorities, we need to know about the weeds

themselves, or the sites, or both. For a weed we need to know how it grows and spreads, how widespread it is now and, most importantly, whether we can control it. For a site, we need to know its conservation value.

The priority setting systems are based on scientific knowledge of weed ecology (Timmins and Owen 1999). Models to determine the future spread of weeds under different levels of management are currently being developed in New Zealand (PestSpread; Kean et al., 2003) and Australia. They will be used to predict the future benefits and costs of different control scenarios, including no control. Research that helps improve priority setting, especially in determining which weeds have the greatest potential to spread and which sites are most at risk, will be valuable.

Early kill of new infestations of a weed is the most cost-effective approach (Harris and Timmins 2004). However, once a weed is established and widespread, often the most cost-effective approach is to focus control just at high-value sites.

Sometimes we have to admit defeat, and give up. Some weeds in New Zealand, like gorse and blackberry, have been treated as noxious for over 100 years, but despite this they have steadily spread. Wide scale control seems inappropriate: efforts are better channelled into targeted control where it counts.

4) UNDERSTAND WEEDS

Knowing how weeds behave helps in their control and in efforts to limit their spread and impact on ecosystems. Historically, most weed research efforts have concentrated on the biology and control of agricultural weeds. More research is needed on the invasive environmental weeds that we now have to deal with. Australia's Cooperative Research Centre for Weed Management sets a good example, as research on the basic principles of weed biology and control is conducted in both environmental and cropping ecosystems.

Studies of the impacts of invasive species on native ecosystems are few and far between. Such studies often need to be long term for various reasons: because native vegetation may eventually overcome some weeds; to assess the long-term impacts; or to allow the ecological processes to play out. Sometimes, invasive species can actually serve as nurse crops for the recovery of native systems, as happens in the case of gorse (Hackwell, 1980) and other species (Williams, 1983) in New Zealand. But recent work has shown that even while acting as a nurse crop, weeds may alter the trajectory of natural succession (Williams et al., 2004).

The role of propagule pressure in promoting weed establishment and spread is only now being investigated. Enserink (1999) pointed out that marketing an exotic species over a period of time increases its chances of establishment, and Perrings et al. (2002) that repeated introductions (or escapes from gardens) have the same effect. Propagule pressure is related to closeness to settlements and roads, aspects discussed by Timmins and Williams (1991) and Sullivan et al. (in press).

A fruitful area of future research would be on factors that encourage invasiveness. This may lead to better ways of preventing weed invasion of ecosystems. It might include controlling seed vectors or establishing quarantine strips between weeds and conservation areas. Better methods of finding individual weeds and mapping their precise positions would be useful. Dogs, already used for finding pest mammals like stoats, could possibly be trained to search for isolated weed plants. Further improvements in weed control methods – better herbicide or application

technology, or novel methods of killing isolated plants – could make weed control more effective.

5) GETTING EVERYONE INVOLVED

Finding new weed invasions is hard; controlling weeds is slow and laborious. Everybody—public, non-government organisations, local and central government—must work together. Members of the public have important roles to play at all stages of weed invasions, and early planning must ensure cooperation among agencies and with individuals. This is true at national, state or regional level for new weeds or weeds of very limited distribution.

A good example of communities working together in New Zealand is the National Pest Plant Accord (<http://www.maf.govt.nz/biosecurity/pestsdiseases/plants/accord.htm>, cited 9/17/04). This was put together as a cooperative effort by central and local government and the nursery and gardening industries. Listed plants are classified as “unwanted organisms” which means they cannot be sold, displayed or distributed.

These garden plants, lurking in cultivation, are the future alien plant invaders.

Getting the public “on side” with weed control efforts is vital—people are both the problem and the solution. Commonly, the “weeds” being controlled are attractive plants in home gardens. People may share these nuisance plants with friends and neighbours or distribute weeds by dumping their garden waste in nearby natural areas. Greater awareness of weeds and the problems they cause can help curb such inappropriate behaviour. Individuals and communities can play many parts in weed management, from spotting the first escaped invader through to actively helping to manage weeds in their local area.

The South African “Working for Water” scheme, which targets invasive weeds because they use more scarce water than native species, has been a success in combating both weeds and unemployment (<http://www-dwaf.pwv.gov.za/wfw/>, cited 9/21/2004).

The Weedbusters movement, coordinating weed efforts within each of

Australia, South Africa, New Zealand and parts of America recognises that people are both the problem and the solution and facilitates activities on both fronts (Bill et al. 2004).

6) ACTIVELY CONTROL WEEDS

Plans, objectives and committees have never stopped the spread of a single weed. People kill plants.

Teams of people on the ground must be available to eradicate new invasives, early, and contain established alien species. The action must be in line with established plans, and the correct approach must be chosen for each weed or, more often, for a precious site.

Mechanical control (pulling, digging or cutting) is adequate for some weed species, but soil disturbance should be minimal. Some conservation groups prefer not to use herbicides, but chemical control can be effective and efficient, especially where weed control is necessary over large areas.

7) SHARPEN THE SAW

Covey’s 7th habit involves “balanced self-renewal.” In a weed context, that means learning from the past to improve future weed control. To do this, we must accurately assess progress against proper objectives (set in step 2). This requires scientifically robust monitoring, evaluation of progress, and if necessary, re-jigging future management.

After measuring progress against objectives, control methods may need to be changed. Often, suppressing the weeds is only the means to an end. The real aim is protection or restoration of a patch of bush, or protection of a larger area from the potential ravages of a new alien invasive species. Monitoring our progress in protecting biodiversity, i.e. measuring the response of the native species to our weed control, must be conducted at selected sites so we can tell if we are making a conservation difference.

We have talked about measuring progress in weed control and in improve-



Vegetation monitoring

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ment of national heritage. Equally important is assessment of the progress of public awareness about weeds. Recruiting the public to help in detecting new invasions, stopping inappropriate garden rubbish dumping and assisting in weed control operations are important parts of getting everybody involved. A survey of awareness of weed issues among the general public of New Zealand, carried out in 2003 (Bill et al. 2004), served to establish appropriate goals for Weedbusters New Zealand, and also serves as a benchmark against which to measure gains in weed awareness.

In conclusion, the seven essential ingredients of highly effective weed programmes mirror those of highly effective people—have plans in place, set objectives, prioritise to achieve those objectives, understand the weeds, get people involved and working together, take action, and engage in constant improvement. Science is a vital part of effective weed management at all steps. Taking New Zealand as an example, we have reported some progress, but we have also identified some of the further research required to improve our ability to perfect the seven habits.

For references, please contact the authors: Ian Popay or Susan Timmins, Scientists, Northern Regional Office, Department of Conservation, PO Box 112, Hamilton, New Zealand, ipopay@doc.govt.nz or stimmings@doc.govt.nz

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Note: See the Summer 2002 issue for an index to Winter 1997 (Charter Issue) through Spring 2002. Both indexes also are available on the FLEPPC website at www.fleppc.org

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REQUEST FOR PROPOSALS FOR INVASIVE PLANT RESEARCH

Deadline: February 27, 2005

The Florida Exotic Pest Plant Council (FLEPPC) has available funding for a small number of research grants/scholarships for students conducting studies related to invasive exotic plant management in Florida.

The deadline for proposal submission is February 27, 2005. Written proposals should be no more than three pages in length and should request funding for no more than \$2,500. The proposal should include a summary of the research project and its relationship with Florida exotic plant management problems. Particular plant species involved in the study should be one or more of the Category I or Category II exotic pest plant species listed by FLEPPC (see web site: www.fleppc.org). In addition, the applicant should provide complete contact information and detailed budget -- with an explanation of how the funding will be used. Examples include (but are not limited to) travel funds for field work, funds for research equipment or supplies (or temporary use of specialized equipment), stipend for applicant's project work time not otherwise supported, travel funds for presentation of the research, etc. In developing the budget, funds requested are to be used for the direct costs of conducting research on the proposed project and are not to be used for indirect costs incurred by the student's university.

Proposals will be evaluated and ranked on the critical management need for scientific results in the area of study and on the clarity of the submitted request.

Basic eligibility requirements:

To be eligible for funding, applicants must be an undergraduate or graduate student enrolled at an accredited institution of higher learning anywhere within the United States. However, the research must be on a listed Florida invasive plant (http://www.fleppc.org/Plant_list/list.htm). An accompanying letter of recommendation from a faculty advisor is strongly encouraged.

Send proposals by e-mail, fax, or mail to:

John C. Volin, Chair
Research Committee, FLEPPC
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BASF

National Association of Exotic Pest Plant Councils – Update 2004 by Brian Bowen

The National Association of Exotic Pest Plant Councils (NAEPPC) met in Chicago in conjunction with the 31st Annual Natural Areas Conference on October 14, 2004. EPPC representatives attended from the Southeast, North Carolina, Kentucky, Mid-Atlantic, Florida, California, Tennessee, Midwest, and Ohio (soon to be forming) councils. Those attending the meeting approved a proposal to establish NAEPPC as a 501C3 non-profit organization using SE-EPPC's group exemption authority. This status will provide greater recognition for NAEPPC as a bona fide organization and greater opportunities to participate at the national level.

Another step taken at this meeting was the adoption of a provisional set of bylaws to provide organizational structure for NAEPPC. A board of directors will be made up of one delegate from each participating EPPC organization, to be selected by December 31, 2004. The Board will then be empowered to elect officers at the next meeting in Washington DC scheduled on February 28th during National Invasive Weeds Awareness Week (NIWAW). Once the Board has elected its officers, they can for-

mally adopt the bylaws to complete the process begun in Chicago.

NAEPPC will meet twice a year, once in October at the Natural Areas Conference and then again in February at National Invasive Weeds Awareness Week. NAEPPC recently signed a Memorandum of Understanding (MOU) with the Natural Areas Association (NAA) to collaborate as national organizations on natural area and wildland weed issues. NAEPPC has sponsored symposia and sessions at the NAA Conference and has held annual meetings there since NAEPPC's inception in 1995. The MOU formalized our organizations' interests in collaborating on national issues.

Meeting in DC during NIWAW will enhance NAEPPC's participation at this important national event. It will give the EPPC's an official presence and provide opportunities for us to interact with other weed organizations that attend. Meeting at NIWAW should provide impetus for NAEPPC to focus its attention on issues of national importance, which is the major reason NAEPPC was originally established in 1995.

NIWAW VI

NIWAW VI events focus on the important roles the Federal government must play to help the United States deal with invasive weed problems, and includes structured group briefings with leaders of the key federal agencies involved with invasive plant management and research. The schedule provides ample time for attendees to meet with their Congressional offices, individual federal agencies and each other.

NIWAW VI Highlights

- Standing exhibits at the United States Botanic Garden Conservatory
- Sunday Kid's Fun Day Activities at the United States Botanic Garden Conservatory
- Sunday evening Orientation Session for First Time Attendees
- Monday morning breakfast and kickoff session on current national invasive weed issues
- Tuesday morning briefings with the United States Department of Agriculture leadership and Agency Administrators
- Wednesday morning briefings with United States Department of the Interior leadership and Agency Administrators
- Special monthly meeting of FICMNEW (Federal Interagency Committee for the Management of Noxious and Exotic Weeds)
- Afternoon NGO Partnership Building Roundtable
- Evening reception at the United States Botanic Garden Conservatory for participants and Washington allies to mingle in a pleasant and relaxed setting.

NIWAW VI is sponsored by the Invasive Weed Awareness Coalition, a Washington, DC based coalition dedicated to increasing awareness of invasive weed problems and the associated research and management needs. Although some events during the week are open to the public, access to the full array of activities will require payment of a modest registration fee. Further details will be posted at http://www.nawma.org/niwaw/niwaw_index.htm.

WHAT: Sixth Annual National Invasive Weeds Awareness Week
WHEN: February 27 to March 4, 2005
WHERE: Washington, DC
WHO: Organizations and Individuals who Support Invasive Weed Management and Ecosystem Restoration

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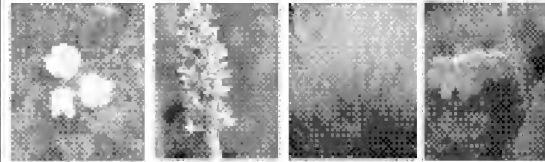
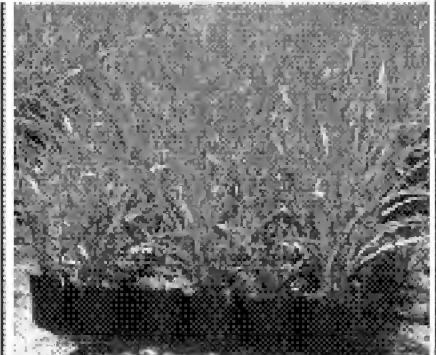
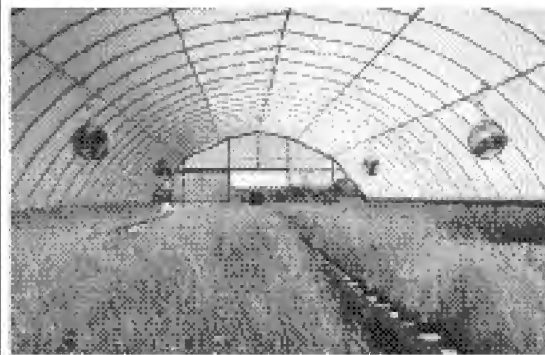
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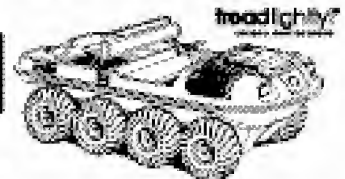
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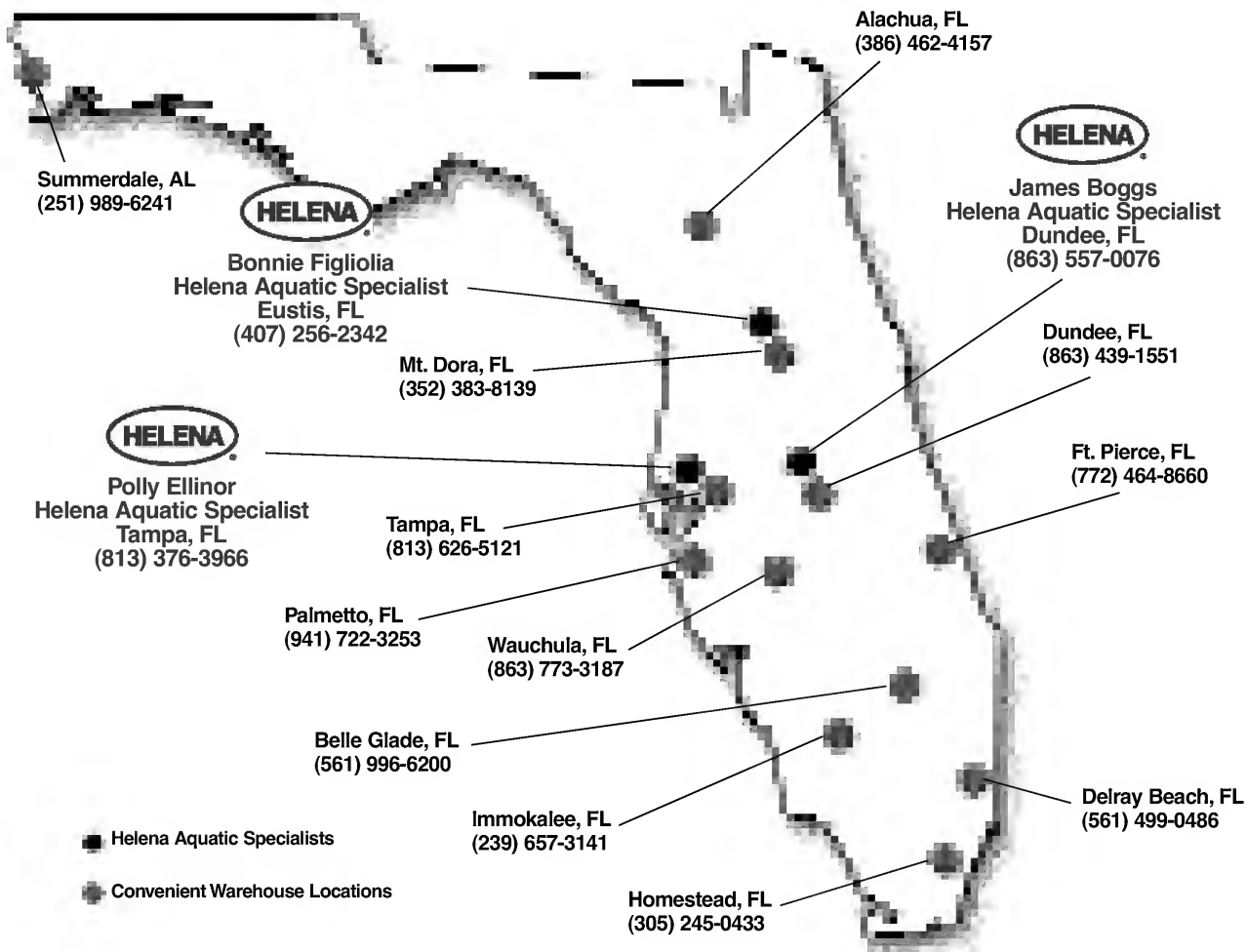
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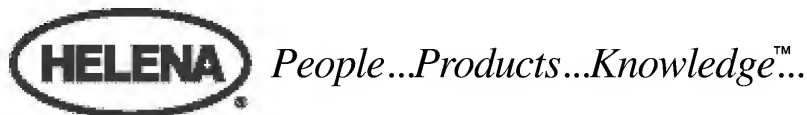
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Internodes

Mark Your Calendar

- 45th Annual Meeting of the Weed Science Society of America, **February 7 – 10, 2005**, Honolulu, Hawaii. <http://www.wssa.net/>
- 6th National Invasive Weed Awareness Week (NIWAW VI), **Feb. 27 – March 4, 2005**, Washington, DC. www.nawma.org/niwaw/niwaw_index.htm
- 66th Annual Meeting of the Association of Southeastern Biologists (ASB), **April 13-15, 2005**, University of North Alabama, Florence, AL. Scott Jewell, 336/421-0034, A2ZConvention@yahoo.com or www.asb.appstate.edu/
- *Invasive Species: Their Ecological Impacts and Alternatives for Control*, American Society for Testing and Materials (ASTM) Invasive Species Conference, **April 18 – 22, 2005**, sponsored by ASTM Committee-E47 on Biological Effects and Environmental Fate, Reno, NV. The symposium will focus on supporting the assessment and monitoring of invasive species. Specific topics pertinent to invasive species issues include the identification of standardizations that Committee-E47 might develop to meet technical and regulatory challenges. ASTM is seeking international participation and plans to focus on both terrestrial and aquatic habitats and species. www.astm.org Click on Symposia and Workshops, then Current Call for Papers.
- Annual meeting of the Florida Vegetation Management Association, **April 19-21, 2005**. P.O. Box 141977, Gainesville, FL 32614-1977.
- 7th Annual Southeast Exotic Pest Plant Council (SE-EPPC) and 3rd Annual Alabama Invasive Plant Council (ALIPC) Meeting, **May 4-6, 2005**, Birmingham, Alabama. www.se-eppc.org
- International Workshop: *Biological Invasions in Inland Waters*, **May 5–6, 2005**, Florence, Italy Contact: Francesca Gherardi, gherardi@dbag.unifi.it - <http://labo.univ-poitiers.fr/craynet> or <http://www.dbag.unifi.it> (click on Eventi)
- 20th Annual Symposium, Florida Exotic Pest Plant Council (FLEPPC), **May 9-11, 2005**, Key West, Florida. www.fleppc.org
- 2005 AQUATIC WEED CONTROL SHORT COURSE, **May 16-20, 2005**, Fort Lauderdale, Florida. Aquatic, upland and invasive weed control; aquatic plant identification. A new concurrent session will focus on first time attendees with a morning of equipment calibration training and an afternoon of aquatic and natural area weed control training. Tyler J. Koschnick, University of Florida, IFAS, Center for Aquatic and Invasive Plants, 352/392-5126, FAX: 352/ 392-3462, tjkoschnick@ifas.ufl.edu or <http://conference.ifas.ufl.edu/aw/>
- 45th Annual Meeting of the Aquatic Plant Management Society (APMS), **July 10-13, 2005**, Paseo del Alamo, Texas. www.apms.org
- Mid-Atlantic EPPC Annual Meeting and Biannual Symposium (co-sponsored by the Morris Arboretum), **August 16-17, 2005**, Philadelphia, PA. <http://www.ma-eppc.org/>

Publications

- *Atlas of the Vascular Plants of Texas, Vol. 1. Introduction; Dicots. Vol. 2. Ferns, Gymnosperms, Monocots*, by B. L. Turner, H. Nichols, G. Denny, and O. Doron. Sida Botanical Miscellany, Number 24, BRIT Press, Ft. Worth, Texas, 2003. The *Atlas of the Vascular Plants of Texas* is the first atlas of the Texas flora ever, and provides distributional information for about 5,100 species of vascular plants native and naturalized in the state of Texas. While the purpose of this atlas is to document plant distributions, it is *de facto* a checklist for the vascular plants of the region.
- *Biological Control of Invasive Plants in the United States*, ed. by E.M. Coombs, J.K. Clark, G.L. Piper, and A.F. Cofrancesco, Jr. Oregon State University Press, Corvallis, 2004. Leading experts review the discipline of biological control of invasive terrestrial and aquatic plants, and describe 39 target plants and 94 biocontrol agents. Concludes with information about invasive plants targeted for biological control in the future. Distributed by University of Arizona Press, <http://www.uapress.arizona.edu/home.htm>
- *Declared Plants of Australia – An Identification and Information System* (CD), by Sheldon Navie. University of Queensland, Centre for Biological Information Technology, Brisbane, Australia, 2004. The CD contains a tutorial, an identification key, fact sheets on all State declared weed species in Australia, references, a glossary and links to other web sites. Contains over 5,000 color photographs and identifies over 300 species of declared plants. <http://www.cbit.uq.edu.au/software/declaredplants/default.htm>
- *Weeds of the Wet/Dry Tropics of Australia - A Field Guide*, by Nicholas M. Smith, ISBN 095807008, 2002. Environment Centre NT, 112 pages. richardson@weedinfo.com.au, www.weedinfo.com.au
- *14th Australian Weeds Conference Proceedings*, edited by B.M. Sindel and S.B. Johnson, ISBN 0975248804, 2004. Weed Society of NSW Inc., 718 pages. richardson@weedinfo.com.au, www.weedinfo.com.au

Web Sites

- NatureServe has released *An Invasive Species Assessment Protocol: Evaluating Non-Native Plants for Their Impact on Biodiversity*, designed to make the process of assessing and listing invasive plants objective, systematic, and transparent: <http://www.natureserve.org/getData/plantData.jsp> NatureServe is a non-profit conservation group dedicated to providing the scientific information and technology needed to guide effective conservation action: www.natureserve.org

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- A comprehensive national field guide to native and invasive plants for gardeners has been launched by the National Wildlife Federation and eNature at http://enature.com/native_invasive/invasives_top.asp The guide focuses on plants readily found in garden centers and plant catalogs so it's an important tool for home gardeners. Searchable by state and natives or invasives and subdivided by plant type (evergreens, vines, wildflowers, aquatics, etc). Each plant has a color photo and full field guide description. Check it out and tell your friends and neighbors!

Nodes of Interest

- **S. 144, the Noxious Weed Control Act of 2004**, passed through Congress on October 9th. It currently awaits signature by the president. As passed, the bill funds weed removal from Bureau of Land Management and Forest Service lands. \$15 million per year is authorized from 2005-2009. S. 144 will establish a program in the Office of the Secretary of Agriculture to provide assistance to eligible weed-management entities for noxious weed control projects.
- **NASA** has been formally invited to join the National Invasive Species Council. NASA's remote earth-sensing capabilities may be of use in monitoring invasive species populations in both the aquatic and terrestrial systems. In addition, NASA's Planetary Protection Office continues to work to reduce the risk of accidental cross-contamination of the planets by hitch-hiking life forms during interplanetary missions.
- ***Chondrostereum purpureum*** strain PFC 2139, a new microbial herbicide, has been registered for inhibiting sprouting and regrowth in cut stumps of certain deciduous tree species in rights-of-way and forests. **Chontrol™ Paste** is a biological control alternative for situations where chemical treatments are no longer acceptable or desirable. Applied to fresh cut stumps during summer or autumn, it prevents sprouting by colonizing and decaying the stump. *C. purpureum* strain PFC 2139 was reviewed jointly by Health Canada's Pest Management Regulatory Agency (PMRA) and EPA within the North American Free Trade Agreement's Technical Working Group (NAFTA TWG) on Pesticides Joint Review Program.
- **The Nature Conservancy (TNC)** helps address invasive species threats in China at the national scale. The TNC was invited to participate in a high-level workshop in Beijing designed to help develop a national strategy for prevention and management of invasive species in China. The November 2-4 workshop was organized by the Chinese Academy of Agricultural Sciences with help from CABI (formerly Commonwealth Agricultural Bureau International) and support from the National Natural Science Academy of China and the Chinese Ministries of Agriculture and of Science & Technology. The result will be a report to the Central Government of China with recommendations for a national invasive species strategy which embraces prevention, early

detection, on-the-ground management and information needs using public policy, the creation of institutional and sectoral linkages and public awareness campaigns. John Randall states, "We were particularly pleased when we realized that [we] are two of just 10 people from outside China who have been invited to participate, indicating the respect that TNC has generated in China and on this issue. Our inclusion at this level is also noteworthy in enabling us to give a prominent voice to biodiversity concerns because a majority of the other participants will be from agricultural and industry sectors. China's status as a leader in the Asia-Pacific region means its position on invasive species issues will influence their neighbors and important trade practices throughout Asia and the Pacific Rim." John Randall, The Nature Conservancy, jarandall@ucdavis.edu

- At the **North American Plant Protection Organization (NAPPO)** annual meeting in Vancouver, British Columbia, Canada, NAPPO decided to create a new panel to address the issue of invasive species. NAPPO, a Regional Plant Protection Organization of the International Plant Protection Convention, "coordinates the efforts among Canada, the United States and Mexico to protect their plant resources from the entry, establishment and spread of regulated plant pests, while facilitating intra/interregional trade." http://www.nappo.org/menu_e.shtml
- For the first time in history, Queensland's Land Protection Act has prohibited the sale of 20 environmental weed species, a move welcomed by the **Cooperative Research Centre for Australian Weed Management (Weeds CRC)**. "What most people don't realize," said Weeds CRC CEO, Dr. Rachel McFadyen, "is that 65 percent of all invasive plants in Australia have escaped from parks and home gardens." Some 22,000 plant species have been brought to Australia over the last 200 years, and about 3,000 of them have become weed problems. <http://www.weeds.crc.org.au/index.html>

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notes from the disturbed edge - chapter 14

The fun definitely never seemed to end for them. Five hours earlier, she'd seen him trundle north as she'd headed south, scouting for outliers among the flatwoods. The plants were there to be treated, but they were few and far between, so the day had involved a lot of solitary walking, which was good. It gave her time to think about things, about her life. Weather-wise, it was a perfect day for a change, but she'd worked up a sweat and acquired a patina of dirt and dust. She felt at peace, felt strong and limber and alive. She felt she'd done good work today for herself and for Mother Earth.

She heard him coming before she saw him, whistling as he strode down the trail, the absence of that telltale slosh telling her he'd used up the contents of his backpack sprayer. She heard the light metal clang of his machete blade pushing aside branches in the path. She saw him in her mind's eye far before he came around the bend, and then he came into the clearing and just stood there, looking at her. She waited for what seemed like forever, and finally asked him, "What are you looking at?" and there was no hesitation in his reply.

"You." The single word escaped his smiling face as if he were a traveler arriving at the end of a long journey intended only to deliver him to stand in this place and say it.

"Oh." This was unexpected.

She felt something - maybe it was just all the major arteries surrounding her brain contracting, but more likely it was her social alert mechanism, the reference librarian in the corner of her mind who catalogued away her missteps and faux pas, and kept them neatly arranged so they could easily be paraded before her at a moment's notice in the aftermath of another disaster - that told her this was one of those times when she should just say nothing, to avoid digging a hole deep enough to bury herself in, but something else closer to the surface, something ethereal and warm and just far enough away from that blood-starved brain, told her it was OK to go on, to just roll with her gut reaction, and she dove head first. "And what do you see?" She felt the librarian tearing pell-mell down the corridors of her medulla to fetch that ultimate I-told-you-

so reminder off the deepest darkest archives the moment she completed the sentence, but it was too late. She had dived, or dove, or whatever else the librarian would not approve of, and once again he immediately replied with another perfect single word. "Everything."

This was way beyond the unexpected, but somehow it felt right, as if a moment of truth had arrived. Again her head was reeling, feeling that same librarian now converted to a cause by two simple words, throwing down the lists of bygone blunders and frantically thumbing through the stacks, wanting to do nothing but dredge up the ideal poetic response from some perfect archaic source, but her gut, her reliable gut, took the wheel and allowed her to simply whisper "oh" again, as she felt the librarian clench her fists and bite her lip and giggle with a foolish grin.

But after that she was speechless, realizing that she could hear her heart pounding a mile a minute, and swore that she could feel the damn thing going "pitty pat." What the hell was going on here? This was crazy. The man she had spent so much time working beside was looking at her and talking mush, and she was swooning. Aaah! Never trust a man who whistles after more than five hours of hard work. Now the racket of her heartbeat was upstaged by her breathing, deep and huffy. She tried to convince herself that she was just hyperventilating, in need of nothing more than a paper bag and a few minutes with her head between her knees, but he was still just standing there, looking straight at her. She closed her eyes momentarily but the librarian interceded, dancing on the back of her retinas, and giving her a crazy-ass double thumbs up. She snapped her eyes open and there he was right next to her, looking full of concern, on the verge of speaking. She looked into his eyes and realized that, for some time now, she had possessed the ability to understand exactly what he was thinking without either of them having spoken a word. Now he was afraid he'd overstepped the boundaries of their relationship, and he didn't know whether to say something more. Thank goodness she wasn't alone on this roller coaster of sense and sensitivity.

She was pretty sure that he felt the same as she did, but she also knew why she felt herself hesitating. She loved to dance, but she'd always liked the way she felt when she danced by herself - not alone but by herself - and she'd always felt that even attempting to dance as half of a couple had only made her feel awkward. She recognized that he was one with whom things could be not too complicated, and yet not too simple. It was an elusive balance, an enviable partnership, and hard to find.

She saw his lips begin to move, on the verge of saying something, but she summoned her willpower, managed to break free of her monosyllabic cooing, to utter three words in a row, "Don't say anything." And suddenly, everything around them was quiet, as if the woods themselves had heeded her words (or, hey, maybe she was having a mild stroke) except for the sound of birds singing and the whisper of the breeze. Peripheral vision faded (how far to the closest hospital?) and all she saw was him. She realized she was sweating profusely, definitely disheveled and probably stinky, but she felt radiant. This really blew her mind, but she simply accepted it. She reached out her hand and placed it in his and they stood like a pair of grimy little Hummel figurines, just staring at one another, both of them allowing themselves to see each other in this way for, maybe, the first time.

Again she asked him, in a way that would with time become their trademark phrase, "What are you looking at?" and again he replied, without hesitation, "You," and once again reduced to cooing, she barely whispered "Oh" and kissed him.

She had come to realize, perhaps a while ago, maybe a second ago, that hearts that are brave are hearts set free, and some folks are just meant to be together. In the end, despite all our insecurities and posturing, it is Love that makes the world go 'round.

THE END

- J.A.

An excerpt from "*The Adventures of Hack Garlon & His Buxom Sidekick Squirt*"

epilogue

Dear Fellow FLEPPC Members:

This has been quite a ride - I hope that you've enjoyed it as much as I have. In the summer of 2001, I left my office at lunchtime and drove my minivan to a shopping strip mall to pick up my shoes from a repair shop.

Somewhere along the way I was inspired to write what became the first chapter of this Wizard of Oz odyssey that has continued quarterly since then. Now I awaken dazed from the dream, and see you looking down at me, asking where have I been. The answer of course is that I have been on a journey with you. You are the strong, sensitive, intelligent, outspoken, and crazy heroes of this story. You embody the knowledge, foresight, initiative and humanity that he and she possess, and together you are an unbeatable team.

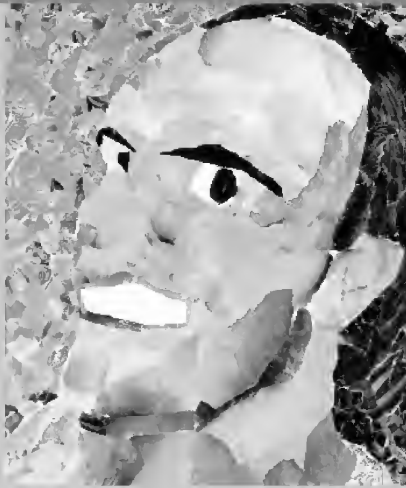
Thank you for granting me supposed anonymity for the past few years. Your consideration has allowed me to let this story self-evolve in a vacuum relatively devoid of prompting. I hope that angle didn't seem too weird, but it just worked best that way.

Thank you to my muse, the Goddess of the Moon, for your constant encouragement, and many thanks to The Fern Queen, who read Chapter 1 and expressed her support by publishing it. Look what can happen with just one spark of positive energy.

And so this story ends, but continues. Live it, and love it. There is work to be done.

Thank you,

J.A. (a/k/a Tom Fucigna)



PRESENTS



A series of seminars and field tours held throughout south Florida to demonstrate biologically based melaleuca management strategies.

What will be featured?

- Mechanical and chemical control techniques
- Biological control
- Integrated management

Who should attend?

- Public and private land managers
- Land owners and homeowners
- Vegetation management professionals
- Tree trimmers
- Anyone interested in melaleuca management

Where and when?

- Lee County – **February 15 & 16, 2005**
- Broward County – **March 10-12, 2005**
- Collier, Hendry and Palm Beach Counties – To be announced

Details on demonstration dates, locations, and registration will be posted on the TAME Melaleuca website

<http://tame.ifas.ufl.edu>

CEUs available.

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