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, 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.

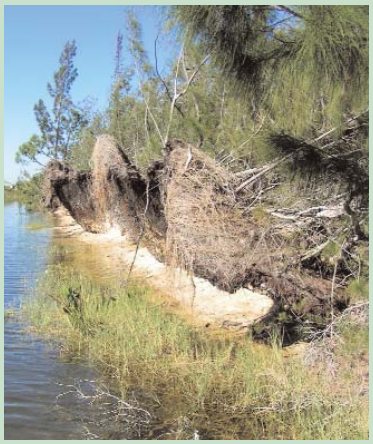
JIM DUQUESNEL

"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

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.