Melaleuca and Evaluations of Wetland Functions

Melaleuca presence does not justify losing wetlands

Invasive exotic plants have long been known to impact overall wetland functionality. One species in particular – melaleuca (*Melaleuca quinquenervia*) – has devastated Florida wetlands. Recent research, however, has cast a new light on the functional value of wetlands invaded by melaleuca and it is time to re-evaluate the way these wetlands are scored under current permitting and mitigation processes.

While long assumed to drain wetlands, melaleuca has not been definitively shown to lower groundwater levels through evapotranspiration at any greater rate than native species.[1] Consequently, melaleuca-invaded wetlands retain most of their natural capacities to store and attenuate flood waters, recharge aquifers, cleanse pollutants, and regulate base flows in watersheds.[2] Recent research has clearly established the increasing biological functionality of melaleuca-invaded wetlands as a result of successful introduction of biological control agents, starting in 1997, throughout south and southwest Florida.[3]

Essentially, wetlands invaded by melaleuca still grow fish, crayfish, amphibians and various invertebrates, and increasingly so as forest canopies have been opened up by biocontrol agent effectiveness. Audubon has documented wood stork foraging in melaleuca wetlands, demonstrating their capacity to support prey. This unique food chain support afforded even by melaleuca invaded wetlands, is an essential function that must be assessed properly in the Uniform Mitigation Assessment Method (UMAM).

An Audubon investigation of recent permit decisions has documented that the full role melaleuca-invaded wetlands play in food chain support for wildlife has been consistently underestimated or overlooked entirely. Lingering misunderstanding of actual melaleuca impacts and orientation toward crisis mode eradication appear to inaccurately depress current UMAM scoring of functions for these wetlands, resulting in unacceptable wetland losses.

Consequently, reconsideration is needed for the whole wetland permitting and mitigation process where melaleuca invasion is involved. Simultaneously, assessments of functional gain due to melaleuca removal can be considerably overestimated for the same reasons, resulting in actual wetland functional losses due to unintended and almost automatic miscalculations on both sides of the impact-mitigation permitting ledger. This practice allows unmitigated and cumulative destruction of Florida's wetland resources.

To address these problems, Audubon recommends meticulous accounting of all melaleuca wetlands' functions, for both impacts and mitigation with a goal of minimizing loss of areal extent and function. As the wealth of new knowledge on melaleuca wetlands presented on the following page exhibits, it is time to reevaluate the treatment of wetlands with the presence of melaleuca to avoid further significant loss of wetland acreages and functions.

Melaleuca Research Findings *(citations found in accompanying bibliography)*

- Up to 73% melaleuca mortality documented in an eight-year study, due to introduced biocontrols (weevil and psyllid) and several adventive natural enemies (scale, mold, and fungus). (Rayamajhi, et al., 2008)

- Melaleuca's status may change from an invasive tree to one which no longer will threaten spread into additional wetlands. This is due to effective major seed reduction by biocontrol-induced damages. (Tipping, et al., 2008)

- Seed production in melaleuca was reduced by greater than 98% due to herbivory by biocontrol agents. (Tipping, et al., 2009)

- Biocontrol agents (weevil and psyllid) exist in effective numbers throughout more than 70% of melaleuca's statewide range, which has resulted in substantial population scale damage to this exotic. (Balentine, et al., 2009)

- Increase in native plant diversity is expected in areas of former monoculture melaleuca as biocontrol herbivory thins and defoliates the canopies. (Rayamajhi, et al., 2008) Actual increases in diversity have now been documented (unpublished data, Rayamajhi)

- Melaleuca forests' measured evapotranspiration (ET) is about the same as other south Florida forests. Therefore, melaleuca appears to deplete groundwater no faster. (Chin, 1998)

Wood stork © RJ Wiley

- Lands invaded by melaleuca statewide have contracted, according to reconnaissance flight data, by 100,000 acres over the last ten years. (LaRoche, 1999)

- Many hydrologic functions remain in melaleuca-invaded wetlands, and replacing them with development would damage the overall ecology of south Florida. (Mazzotti, 1998)

- Data show species richness was highest in areas with moderate melaleuca, due to vegetative structural diversity (more niches). Authors advise, "Regional permitting and natural resource agencies should recognize that lands with moderate levels of melaleuca may retain significant habitat quality." (O'Hare and Dalrymple, 1997)

1. Chin, D.A. 1998. Evapotranspiration of melaleuca forest in south Florida. *Journal of Hydrologic Engineering*. 3 (2):131-139.
2. Mazzotti, F.J. 1998. Ecological consequences of invasion by *Melaleuca quinquenervia* in south Florida wetlands: Paradise damaged, not lost. IFAS. Gainesville, Fla.
3. See, for example, Rayamajhi, M.B., et al. 2006. Melaleuca quniquenervia dominated forests in Florida: analysis of natural-enemy impacts on stand dynamics. Plant Ecology, DOI. 14pp.