

South Florida Ecosystem Restoration Task Force

Invasive Exotic Species Strategic Action Framework

EDRR Case Study: Lumnitzera

The mangrove tree lumnitzera (*Lumnitzera racemosa*) was introduced to the United States in 1964 when two specimens obtained from Taiwan were planted in Fairchild Tropical Botanic Garden in Coral Gables, Florida. From these plants, Fairchild staff propagated more. Eventually 14 individuals were planted at Fairchild and six additional plants were sold to garden members in the 1970s. The fate of the sold plants is unknown. Lumnitzera was discovered to have escaped from cultivation at Fairchild in late 2008. Surveys conducted in 2009 found that the species had spread to approximately 19 acres of mangrove habitat in Fairchild and neighboring Matheson Hammock Park, a Miami-Dade County Park with natural areas managed by the County's Environmentally Endangered Lands (EEL) Program. The aggressive growth of the plant in native mangrove habitat raised concern among regional invasive species specialists who initiated a concerted effort to respond rapidly with monitoring and removal efforts. Field observations and scientific literature were provided to the University of Florida Institute of Food and Agricultural Sciences for a risk assessment using the Assessment of Non-native Plants in Florida's Natural Areas Predictive Tool. Lumnitzera was determined to have a high invasion risk. The US Department of Agriculture's Animal and Plant Health Inspection Service (USDA-APHIS) lists lumnitzera as "Not Authorized Pending Risk Analysis." Ongoing management efforts are aimed at eradication due to the localized distribution of the plant in Florida.

Case Presentation

The discovery of the lumnitzera invasion happened to co-occur with formation of the Everglades Cooperative Invasive Species Management Area (ECISMA). Through ECISMA, biologists from multiple agencies across South Florida participated in monitoring and removal workdays. These efforts not only resulted in the removal of an estimated 4,500 plants, but also served to train biologists throughout the region to identify this species, which can be very difficult to tell apart from co-occurring native mangroves. Some of the agencies participating in the

efforts included Miami-Dade County Natural Areas Management, Miami-Dade County EEL, Miami-Dade County Department of Environmental Resources Management, US Fish and Wildlife Service, Florida Fish and Wildlife Conservation Commission (FWC), the National Park Service, The Nature Conservancy, Broward County Parks, the Miccosukee Tribe of Indians of Florida, the National Oceanic and Atmospheric Administration, the US Army Corps of Engineers, USDA, South Florida Water Management District, private vegetation management companies, and Fairchild Tropical Botanic Garden.



Finding lumnitzera amongst native mangroves can be like looking for a needle in a haystack. Photo: Brian Harding, Fairchild Tropical Botanic Garden.

Management Actions and Outcome

Though no formal rapid response program was in place at the time, collaborative efforts between Fairchild Garden, Miami-Dade County EEL, and other members of ECISMA resulted in significant progress toward eradication. However, the plant has proven to be challenging to eradicate from its very localized distribution. The greatest strides toward eradication were achieved when funding was obtained through FWC's Invasive Plant Management Uplands Program and contractors were hired to remove lumnitzera from the infested areas. To date, it is estimated that more than 50,000 stems have been removed by contractors and volunteers.

More than a decade after its spread was discovered, the complete eradication of lumnitzera continues to pose challenges. Academic research has shed some light on



More than 50,000 lumnitzera stems have been removed by volunteers and contractors since eradication began. Contracted work ceased in 2016 but annual volunteer workdays continue. Source: Fairchild Tropical Botanic Garden.

the species' ecology and biology. Its ability to colonize established, undisturbed mangrove communities was unsettling in part because these communities were previously thought to be somewhat immune to alien plant invasions. Fourqurean et al. (2009) explored the possibility that neotropical mangrove forests, with just four species, may be vulnerable to invasion by Old World mangrove species, where there are more than one dozen different species. Studies of cultivated plants by Dangremond (2015) revealed lumnitzera to be tolerant of a very wide range of environmental conditions. And Ye et al. (2004) showed that lumnitzera seeds exhibit true dormancy, unlike most other mangrove species. This last factor especially is a major stumbling block toward eradication since year after year, new seedlings appear in areas where eradication was thought to have been achieved. Currently, efforts are at the level of containment, however, there is hope that complete eradication of lumnitzera is not too far in the future. The success of the eradication efforts is attributed to close collaboration between stakeholders, availability of risk assessment tools, dedicated rapid response funding, management-relevant research, and sustained control efforts.

Key Recommendations

- Continued aggressive monitoring and removal efforts should continue until lumnitzera is determined to be eradicated from Florida.
- Expanded, systematic monitoring for new species introductions is needed to increase the likelihood of early detection in the South Florida Ecosystem.
- The experiences and lessons learned from the lumnitzera eradication initiative provide valuable insight for future rapid response efforts toward other invasive species. After action analysis should be developed and used to improve regional rapid response partnerships.

References

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