Givney Key Native Plant Survival: One Year Monitoring Update

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Background

On September 9, 2006, 18 people participated in the restoration of Givney Key, a 0.8 acre island of Matlacha Pass NWR (*see Wildland Weeds*, Winter 2006). The primary goal of the project was to restore the ecological integrity of the barrier island following the destructive impacts from Hurricane Charley. This was to be accomplished in two ways: 1) treating established invasive exotic plants, and 2) planting native ground, shrub, and tree species common to, or representative of, southwest Florida coastal island habitats to supplement the island vegetation that survived the hurricane. A total of 153 native plants were planted, and numbered aluminum tags were placed on 84 plants (55%) for monitoring purposes. On August 24, 2007, Givney Key was revisited to collect information on native plant survival (NPS) and to evaluate exotics treatments.

Discussion and Results

Refuge staff spent 2.5 hours scouring Givney Key for tagged plants. Unfortunately, only 29 tags (35%) of the original 84 were recovered. Three staff members had participated in the original planting and were familiar with the areas, but still had extreme difficulty locating tagged plants. Many factors contributed to the poor tag recovery. The island appeared to have been inundated or washed over by either a severe high tide, or a combination of high tide and wave action. The high water shifted woody debris that had been stacked to create open spaces for native plantings. Much of the debris was re-scattered across the island, including within the planted areas. This combination of flooding, wave action, and shifting debris likely destroyed many of the original plantings, negatively affecting tag recovery. Many of the tags secured to ground plants were buried beneath loose shell, confirming sediment deposition from an extreme high water event. It also was noted that wave action appeared to have completely removed one of the shell ridges where a multitude of ground plants had been planted. Finally, previously cleared planted areas were overrun with native weedy vegetation such as moon vine (*Ipomoea alba*), common nightshade (*Solanum americanum*) and rouge plant (*Rivina humilis*), making it difficult to identifying plantings and recover tags.

Of the 29 tags recovered, 21 plants were alive and eight were dead. Of the 21 plants that survived, 18 were of eight separate tree species, and three were ground species. Some of the tagged plant species that did well included ambrosia or coastal ragweed (*Ambrosia hispida*), bay bean (*Canavalia maritima*), green buttonwood (*Conocarpus erectus*), gumbo limbo (*Bursera simaruba*), sea grape (*Coccoloba uvifera*), strangler fig (*Ficus aurea*) and wild olive (*Forestiera segregata*). Native plant survival within this small subsample was 73%. Obviously, planted tree species were somewhat easier to locate as most were a minimum of one meter tall when planted, and could still be identified even amongst the weeds. Of the eight plants that did not survive, seven were tree species and one was a ground cover. Finding any living plantings was a surprise given the flooding event that occurred, coupled with the extensive drought that Sanibel and the rest of South Florida experienced throughout winter 2006 and spring 2007 respectively. In the future, it is highly recommended that personnel or agencies conducting similar projects consider utilizing flourescent colored flagging as another means to aid in the recovery of tagged plants.

Originally, overall native plant survival (NPS) was to be evaluated using the following equation or formula: (*To determine the estimated total number of native plants of all types that survived*)

$$\text{NPS} = \frac{\text{\# of tagged plants alive}}{\text{total \# of tagged plants}} \ (\%) \text{ x Total \# Planted } (N = 153)$$

Since all 84 tagged plants were not recovered, and the majority of those recovered (86%) and determined to be alive (46%) were of the tree variety, NPS was evaluated solely for tree species using the formula above. Eighteen (18) tagged trees were determined to be alive out of 39 total trees tagged. The total number of trees planted was 52 (N = 52). This yielded an estimated NPS of 24 trees.

$$\text{NPS} = \frac{18}{39} \ (\%) \text{ x 52 Plants Planted} = 23.9999 \text{ or } 24 \text{ trees}$$

Overall NPS survival for all species could not be accurately calculated because of the tag recovery bias toward planted trees.

In addition to the difficulties experienced in locating tagged plants, personnel encountered an extensive amount and variety of invasive exotic plants. This was an extreme disappointment, as initial efforts and subsequent visits to check the island and treat invasive exotics missed during initial treatments had indicated that very few exotics were present. Many of the exotic plants were approaching six to eight feet in height and could have been missed during initial exotic control efforts. However, many appeared to be newly established, and could have experienced rapid growth due to the excessive nutrients (guano) in the shell-sand substrate deposited from roosting and nesting birds. Many exotics were lo-

cated within the previously cleared planted areas indicating new recruitment. In one case, it was apparent that an earleaf acacia had previously been severed but the stump was not treated with herbicide.

Five species of invasive exotic plants were encountered during data collection and were hand pulled: Brazilian pepper (*Schinus terebinthifolius*, 19), earleaf acacia (*Acacia auriculiformis*, 1), lead tree (*Leucaena leucocephala*, 3), seaside mahoe (*Thespesia populnea*, 1), and umbrella tree (*Schefflera actinophylla*, 3). Lead tree was not encountered nor treated during initial treatment efforts. Another visit will be needed to treat those exotic shrubs and trees considered too large to be hand-pulled.

Conclusion

Although tag recovery rate was disappointing, the fact that NPS was nearly 50% for tree species indicates that exotics removal followed by native plantings can be a viable option for island restoration. Larger island restorations can be handled by the majority of Florida's invasive exotic plant management contractors, and can be incorporated into the project scope of work. Numerous local, county, state, and federal agencies are conducting island restoration projects of a similar nature, but much larger in size and complexity. Results also indicate that smaller restoration projects can incorporate a successful volunteer or conservation organization component.

The flooding or high tide event, coupled with an extended drought, most likely contributed to high mortality of ground species as these plantings were concentrated on exposed shell ridges as opposed to the higher upland portions of the island where shrub and tree species had been planted. Monitoring results also indicate the need for continuous exotic plant maintenance on restored islands until planted native shrub and tree species reach maturity. Hopefully, as planted native shrubs and trees grow, they will create enough shade to aid in surpressing the germination and establishment of exotic plant species, thus reducing the costs associated with exotic plant management. Continous site maintenance extends to the occasional control of native but weedy species such as moon vine, which can inhibit the establishment and growth of more desirable natives, including supplemental plantings.

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