

Attachment (rev. 7/5/13):

**Project name: Naples Bay Tidal Creek Restoration**

**Former name: Long-term enhancement of tropical mangrove wetland ecosystem services through tidal creek restoration**

**Project Sponsor:** Everglades Wetland Research Park, Florida Gulf Coast University, address: Kapnick Center at Naples Botanical Garden, 4940 Bayshore Drive, Naples FL 34112

**Project Partners:** FGCU, Rookery Bay, City of Naples, Naples Botanical Garden, Minto Florida, Inc., Turrell, Hall & Associates, Inc., Lewis Environmental, Conservancy of SW Florida, Collier Enterprises

**Project Description**

We are asking for \$750,000 for the first year support from RESTORE to complete the following: 1) completion of the engineering design of the entire project; 2) completion of all requests for necessary state, Federal, and local permits related to this project; and 3) implementation of Phase 1 of tidal creek restoration (see Figures 1 and 2), involving excavation of about 0.5 miles of tidal creek, and 4) construction of some monitoring infrastructure—boardwalks and monitoring stations for long-term water quality and greenhouse gas emissions.

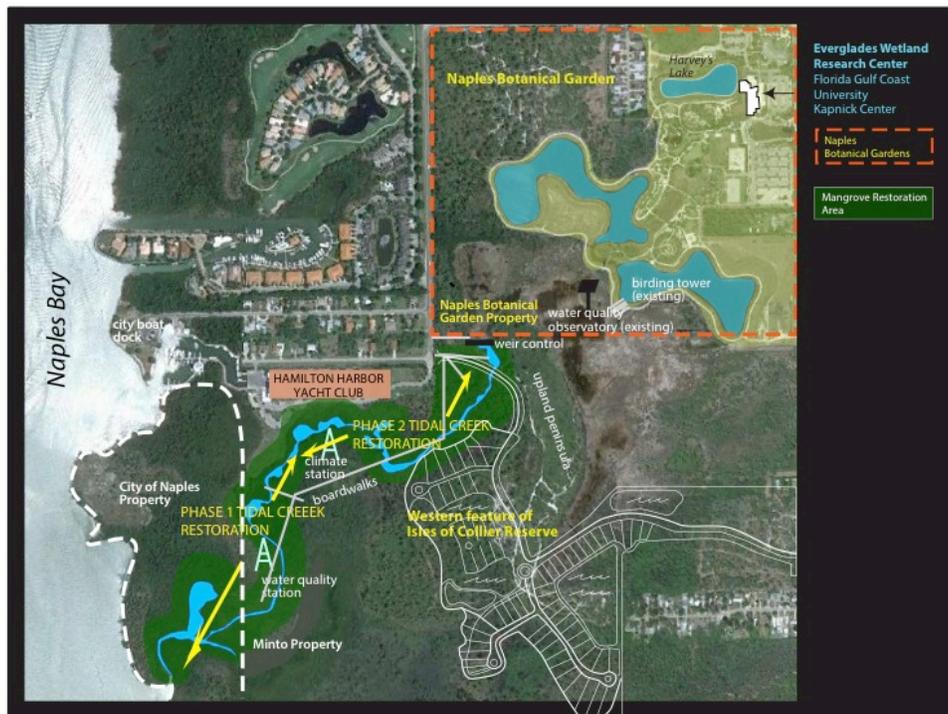


Figure 1. Sketch showing the two construction phases of Naples Bay tidal creek restoration area south of Hamilton Harbor and the Naples Botanical Garden in Naples, Florida. Also shown are the monitoring boardwalks and instrumentation, some of which will be installed in the Phase 1 part of this project supported by RESTORE.

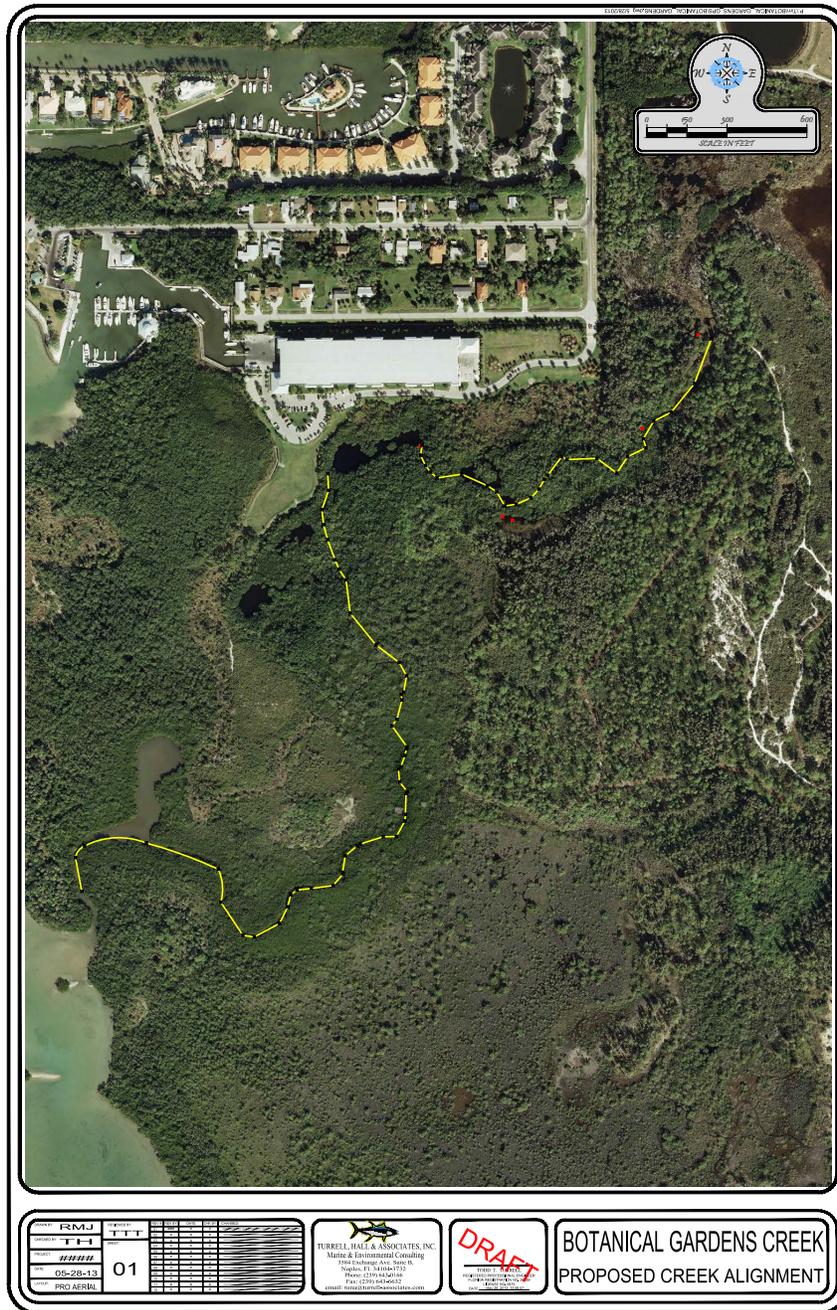


Figure 2. Draft map of centerline of Naples Bay tidal creek to be restored as determined in May 2013 survey. The left-hand portion of the tidal creek will be restored as part of Phase of this project, proposed to be supported by year-one funding provided by RESTORE.

Funding of \$2,750,000 is ultimately required for the completion of this project that includes excavation of the Phase 2 tidal creek and a tidal creek weir control between Minto property and NBG property, boardwalk construction, and ultimately, if Phases 1 and 2 show good results, continuation of the project into the Naples Botanical Garden.

## Tidal Creek Restoration and Mangroves

The project location is a major mangrove area closest in proximity of any, to downtown Naples on Naples Bay. Because of urban development, dredging, and other human activities, in addition to mangrove succession, the tidal creeks in this part of coastal Naples Bay have become clogged and no longer transport sea water twice per day to some of the mangroves that are further inland. Isolating mangroves from their tidal signature is akin to giving the mangroves a death sentence. They may grow fine for 20 years, after which they will start to turn decrease in productivity and eventually die off. Naples has had many situations, such as Pelican Bay, where this has occurred due to the stopping of tidal fluxes to the mangroves.

We plan to restore about 1 to 1.5 miles of tidal creek in this location to replenish tidal fluxes to about 100 acres of mangrove trees that have already had “heart attacks”, as described by Robin Lewis in his presentation at the Moonlight on the Marsh lecture at the Naples Botanical Garden in February 2013. We hope to revive these damaged mangrove wetlands, while at the same time, providing an ecological corridor for a wide variety of fish and other organisms to benefit from the proximity to these upstream mangroves.

This site could also provide a treasure chest of new information in its monitoring over the years of what to expect from sea level rise caused by climate change and also show how mangroves can adapt to these changes.

### **Allowable Uses for RESTORE Act Funds:**

- **Restoration and protection of the natural resources, ecosystems, fisheries marine and wildlife habitat, beaches and coastal wetlands of the Gulf Coast region.** THIS PROJECT WILL RESTORE 100 ACRES OF MANGROVES, PROVIDE CONDUITS FOR ANADROMOUS FISH AND OTHER ORGANISMS SUCH AS MANATEES, DOLPHINS, OTTERS.
- **Mitigation of damage to fish, wildlife, and natural resources** THE SMALL FISH SUPPORTED BY MANGROVES ARE ESSENTIAL FOR THE LARGER FISH POPULATIONS IN NAPLES BAY. THE TIDAL CREEK WILL ALLOW BETTER CONNECTION BETWEEN THESE TWO TROPHIC LEVELS IN THE ECOSYSTEM.
- **Workforce development in job creation** POTENTIAL JOBS TO BE CREATED BY THIS PROJECT INCLUDE 50 INTERPRETERS AT THE NAPLES BOTANICAL GARDEN TO GIVE TOURS, DOZENS OF WORKERS TO CARRY OUT THE RESTORATION THAT WILL BE LARGELY MANUAL, SEVERAL ENGINEERS AND SCIENTISTS FOR DESIGN AND MONITORING, AND UP TO 20 RESEARCHERS WHO WILL BE FUNDED ON GRANTS MADE POSSIBLE BY THIS RESTORATION.
- **Infrastructure projects benefitting the economy or ecological resources** THE INFRASTRUCTURE HERE WILL BE THE ECOSYSTEMS. THERE WILL BE SOME BOARDWALKS BUILT FOR TOURS AND FOR MONITORING. THE ECOSYSTEM SERVICES PROVIDED BY THE MANGROVES COULD BE UP TO SEVERAL \$1000 PER ACRE PER YEAR. THESE ECOSYSTEM BENEFITS INCLUDE IMPROVED WATER QUALITY, ENHANCED FISHERIES, AND PROTECTION OF COASTAL AREAS SUCH AS HAMILTON HARBOR, THE PUBLIC BOAT LAUNCH, LOCAL RESIDENTS, AND THE NAPLES BOTANICAL GARDEN FROM SIGNIFICANT COASTAL STORM/HURRICANE DAMAGE.
- **Administrative costs (no more than 3% can be for administrative costs)** WE WILL KEEP ADMINISTRATIVE COSTS AT A MINIMUM BY DONATING ALL OF THE EARLY

ADMINISTRATION AT THE EWRP AT FGCU. STUDENTS CAN BE HIRED TO DO SITE MONITORING THAT COULD BE PART OF THEIR RESEARCH PROJECTS.

• **Promotion of tourism in the Region, including recreational fishing** THE RESTORED TIDAL CREEKS SHOULD BE OPEN TO NON-MOTORIZED BOATS, DEVELOPING A NEW SPORT ALONG NAPLES BAY FOR ANOTHER TYPE OF RECREATIONAL FISHING. TOURISTS WILL FLOCK TO THE NAPLES BOTANICAL GARDEN TO VIEW ECOLOGICAL RESTORATION IN ACTION AND OBSERVE THE WILDLIFE THAT WILL CONGREGATE IN THIS SYSTEM.

This project also meets 5 guiding principles from the Collier County Commissioners as described in this proposal:

1. The project provides positive environmental and economic benefits, including job creation.
2. The project is consistent with local government comprehensive plans and community profiles.
3. The project incorporates other funding partners to fully leverage grant resources.
4. The project meets funding criteria set forth in the RESTORE Act.
5. The project is diverse and addresses all community's eligible needs including coastal and ecosystem restoration and development, flood protection, and tourism promotion.

### **Progress to Date**

July 2012—A YSI monitoring system (salinity, temperature, and water stage) and staff gauges was installed in the brackish marsh near the Naples Botanical Gardens at the northern part of the restoration site to monitor seasonal patterns of hydrology, salinity, and water quality at the upstream edge of our restoration area. Some data have since been collected at the downstream area part of the tidal creek too adjacent to Naples Bay.

October 2012 – April 2013—Several meetings were held with stakeholders Minto Florida, FGCU, Naples Botanical Garden, City of Naples, and several other organizations to refine an initial mangrove/tidal creek restoration on the property south of the Naples Botanical Garden adjacent to Naples Bay. The idea was also presented at several workshops including the FGCU Moonlight on the Marsh and the Naples Garden Club monthly meeting for feedback.

April 11, 2013—FGCU administrators, meeting with representatives of Minto Florida and the Naples Botanical Garden, agreed in principle to begin planning for this project. FGCU obtained permission from land-owners Minto Florida (developer of the now-under-construction Isles of Collier Reserve; before known as Sabal Bay) and the City of Naples (later) to carry out this tidal creek restoration.

April 26, 2013—FGCU meeting with Mike Bauer, City of Naples, to get feedback and discuss details of this tidal creek restoration. The City has agreed in principle to the tidal creek restoration on their property and is enthusiastic about its potential for improving water quality of Naples Bay.

May 20-27, 2013. A preliminary survey team of FGCU staff and students, led by Tim Hall of Turrell, Hall & Associates, Inc., mapped the location of the centerline of the tidal creek to be restored. Terrell, Hall & Associates is currently interviewing for engineering surveying company that will carry out the formal land elevation survey of this centerline and its adjacent mangroves.

June 20, 2013—A meeting of students, staff, consultants, fundraisers, and stakeholders was held at the Naples Botanical Garden to present the results of the May 2013 survey, to discuss salinity patterns, and to discuss sources of support. We all agreed that the BP RESTORE resources were essential for the success of this project.

mid-June-present—Final terms of a Tidal Creek Access Agreement are being negotiated between Minto and FGCU general counsel to allow FGCU access to the tidal creek and its environs.

#### Future Plans

The project will be engineering-ready and all necessary agreements among parties will be completed by the end of the summer 2013. Because of the simple nature of the tidal creek restoration, we expect permits to be obtained by mid-2014 and Phase 1 tidal creek restoration and some boardwalk construction to begin in summer/fall 2014. Monitoring can begin as soon as the Tidal Creek Access Agreement is signed between FGCU and Minto, hopefully by September 2013.

#### **Monitoring Plan**

A tidal creek stage/salinity/water temperature monitoring station will be installed at some upstream point of Phase 1 restoration site by late summer/early fall 2013. Before, during, and after the Phase 1 restoration, water quality samples will be collected regularly along the tidal creek after restoration and analyzed for nutrients and other water quality parameters in the FGCU labs at the Kapnick building located at the Naples Botanical Garden (center is called Everglades Wetland Research Park). Mangrove vegetation structure and function will be estimated along transects perpendicular to the tidal creek flow. Similar instrument and water sampling will be done on an un-impacted reference tidal creek about 2 miles to the east on Naples Bay as a reference.

#### **Economic and Environmental Benefits**

Economic benefits (including ecosystem services) will be estimated from this project, including protection and enhancement of ecotourism and beach tourism in southwest Florida; protection of human structures from hurricanes; improvement of water quality along the tidal creek; carbon sequestration by the wetlands. The site will be an ideal location for enhancing environmental education for thousands of visitors to the Naples Botanical Garden every year and will provide a secure site for wetland and coastal research for FGCU for many years at their new Kapnick Environmental Center located on the Naples Botanical Garden campus.

Fifty jobs will be preserved at Naples Botanical Gardens and FGCU for interpretation tours and research, and 50 jobs will be created during the construction in phases over years 1 through 3. This project could result in a permanent team of 10 to 20 researchers (professors, post-docs, and students from FGCU and collaborating institutions) conducting applied and basic research at these wetlands while based at the Everglades Wetland Research Park at the Naples Botanical Garden.

Approximately 60 to 100 acres of mangrove wetland habitat along 1.0 to 1.5 miles of tidal creek will be restored in Naples Bay area. At least 1,300 species of wildlife depend on or utilize these types of coastal ecosystems in Florida, including 628 species of fish, birds, mammals, reptiles, and amphibians. Some of these are endangered or threatened such as the wood stork, hawksbill sea turtle, and West Indian manatee. This mangrove forest corridor should attain a biodiversity similar to that of the mangrove forests in the area, such as nearby Rookery Bay National Estuarine Research Reserve and our adjacent reference tidal creek.

The restored mangrove forest would protect the immediate inland areas (residential areas and especially the Naples Botanical Gardens) from winds and storm surges generated by a direct hit by a tropical hurricane. In the long term it will serve as to enhance the coastal resilience should sea levels rise. The site is in a key location adjacent to an expanding urban area where preserving the biodiversity of this and adjacent coastal ecosystems is especially vital. Mangrove habitats are integral for a variety of marine life, from commercially caught fish and shellfish to threatened and endangered animals.

Protection of remaining mangrove communities and restoration of damaged mangrove forests is vital to the environmental and economic future of Southwest Florida. Without mangroves, fish populations would plummet and coastal areas would become vulnerable to beach erosion and the full force of hurricanes. The local community's economy is vitally connected to the vitality of its coastline.

Project partners/supporters for matching support

FGCU Foundation

Everglades Wetland Research Park, FGCU

Everglades Foundation

Rookery Bay

City of Naples

Naples Botanical Garden

Minto Florida Inc.

Turrell, Hall & Associates, Inc.

Grants:

National Science Foundation

U.S. Department of Energy

NASA