

ACTION PLAN *Habitat Restoration Enhancement and Monitoring*

HE-7

Enhance Resilience and Sustainability to Climate Change

ACTION:

Enhance resilience to climate change within the Lake Worth Lagoon (LWL) through Living Shorelines and other adaptation approaches. Monitor the response of the LWL and its species to climate change.

BACKGROUND:

Climate change presents a significant threat to fish, wildlife and natural ecosystems and will likely exacerbate and couple with many existing threats, including habitat loss, nonnative species, and water pollution. Preparing for the future impacts of climate change is an emerging concern for the LWL and involves proper planning, implementation of adaptive measures, and long-term monitoring.

Of the major climate change impacts recognized by scientists, the most recognized in terms of the potential scale of its impact on the ecology and economy of Southeast Florida is sea level rise (FWC, 2011). Sea level rise will result in the disappearance of seagrasses, mangrove, and salt marshes at their deeper, more waterward edge. Where unobstructed, the habitats will expand at their upland edge as long as the species can grow faster than the rising sea level. Upland migration of estuarine species in the LWL will be severely limited as approximately 87% of the LWL shoreline is hardened, and there is a concern that more erosion, storm damage and flooding as a result of sea level rise will lead to more intense armoring of shorelines.

Living shorelines are an alternative adaptive strategy recommended by the Southeast Florida's Regional Climate Action Plan to both reduce ecological impacts, and enhance resilience to climate change. As a softer alternative or addition to hardened shorelines, living shorelines incorporate natural elements, such as limerock and native vegetation, and mimic natural slopes to facilitate migration upland. Eleven "climate-smart" living shoreline projects have been identified within the LWL, and six will be constructed over the next five years. At completion, 10,000 linear feet of living shoreline will provide a vegetative buffer for the land, improve water quality, and provide essential habitat for many species of fish and wildlife (see Action Plan HE-2).

The Southeast Florida's Regional Climate Action Plan also recommends the development of a biological monitoring program to study parameters, such as rate of sea level rise, landscape-level vegetation patterns, water temperature, pH, and occurrence and range of invasive plant and animal species. Many organizations and Universities are currently monitoring climate changes on a regional or state level; however, partnerships can be

established to study the effects on a micro-scale. Small scale approaches offer the opportunity to evaluate ‘keystone species’ through specific monitoring studies, identify areas less affected by climate change, which can be used as a ‘seed source’ for recovery or destination of climate-sensitive migrant species, and evaluate restoration techniques. The public should be encouraged to actively participate in programs, such as the National Phenology Network’s *Nature’s Notebook* project, which monitors the influence of climate on specific plants and animals.

STRATEGY:

STEP 1 Identify, design and obtain permits for living shoreline projects identified in Table C-1.

Potential partners: ERM, HBOI/FAU, SFWMD, FDEP, USCAE

STEP 2 Establish Interlocal Agreements with municipalities or landowners to create living shorelines within their jurisdiction, and protect these habitat through education.

Potential partners: ERM, State, municipalities, private landowners

STEP 3 Identify funding sources and construct 10,000 linear feet of living shoreline.

Potential partners: PBC, FDEP, SFWMD, FWC, USFWS, EPA, NOAA

STEP 4 Monitor living shorelines and other adaptation and restoration projects (existing 295 acres of mangroves), to evaluate their response to climate change.

Potential partners: ERM, HBOI/FAU, and other universities

STEP 5 Establish partnerships to monitor effects of climate change on keystone species and identify areas less affected by climate change and identify funding for monitoring.

Potential partners: ERM, HBOI/FAU, FWC, USFWS, EPA, NOAA

STEP 6 Encourage public participation in monitoring climate change in the LWL through existing programs.

Potential partners: ERM, FAU Center for Environmental Studies

SCHEDULE:

STEP 1 was initiated with the identification of projects. Conceptual design and permitting will begin in 2013, with the cooperation of municipalities and private landowners. **STEP 2** will occur once a design has been agreed upon. **STEP 3** will be dependent on municipal support and funding. **STEP 4** will begin at the completion of each individual project. **STEP 5** and **STEP 6** can occur concurrently with other steps.

COST: Cost for each step needs to be further evaluated.

EXPECTED BENEFITS:

- Shoreline protection and enhanced resilience to effects of sea level rise and other effects of climate change.
- Water quality/clarity improvements through filtration of runoff & sediment trapping.
- Habitat and nursery grounds for invertebrates and fisheries with important recreational and commercial value.
- Roosting and nesting sites for wading and overwintering birds.

MONITORING ENVIRONMENTAL RESPONSES: Progress in implementing living shoreline and other restoration and adaptation projects and their response to climate change will be monitored by ERM. Partnerships with local Universities and organizations will be also be established.

REGULATORY NEEDS: Permits for construction will required by FDEP or SFWMD and USACE. Legislation to streamline the permitting process, for Government sponsored limited restoration or enhancement projects (including living shorelines), is currently being evaluated for inclusion in the Statewide Environmental Resource Permit rule as a Restoration General Permit. Some of the habitat restoration/enhancement projects may qualify for the USACE Nationwide Permit #27. Steps are being considered by USACE to streamline the permitting for "Living Shoreline" shoreline stabilization projects.

FUNDING: Funding will be sought by PCERM and partners.

POTENTIAL PARTNERS AND FUNDING SOURCES*:

PBC, SFWMD, FDEP, FWC, FIND, HBOI/FAU, USACE, USFWS, NOAA, EPA, FAU

*Listed Agencies have not committed funds and are subject to Agencies' budget approvals