

ACTION PLAN *Habitat Restoration Enhancement and Monitoring*

EM-2

Develop a Fish Monitoring Program

ACTION:

Develop a long-term, comprehensive database on fish and selected invertebrate species inhabiting the Lake Worth Lagoon (LWL).

BACKGROUND:

A quantitative fish assessment has never been conducted in the LWL. Baseline data on fish needs to be gathered in order to assess changes over time and allow managers to identify problems, opportunities and design solutions. Tracking the health of the lagoon's fish population is an important component for the on-going restoration.

Steps outlined in the AP 2008 EM-2 Develop a Fish Monitoring Program were not achieved due to the costs to establish and maintain a meaningful lagoon wide data set. The comprehensive sampling protocol, originally proposed in partnership with the Fish and Wildlife Research Institute's Fisheries Independent Monitoring Survey (FIMS), would require monthly sampling over a 1-2 year period to establish and monitor the relative abundance of fish in the system. While the aggressive sampling plan would quantify some LWL fish populations and provide information about status and trends, is not feasible at this time.

The LWL has heterogeneous habitat types; therefore, previously proposed net sampling may not be applicable in habitats likely to support higher species diversity. A fish monitoring plan that incorporates multiple methodologies is proposed to gather LWL fish data. Additionally, project specific survey methods need to be established to record baseline data and demonstrate the increase in fish associated with habitat creation projects. This information will be useful to demonstrate habitat utilization and project success, which will facilitate the acquisition of grants and foster partnerships.

Many of the resident fishes and invertebrates in LWL live in association with the relatively small amount of hard substrate present. The hard substrate is varied and includes: rocks exposed at inlets, jetties, channel edges, artificial reefs, bridges, dock pilings/supports and seawalls. In these areas traditional net sampling either by hand or tow is difficult, therefore the methodology needs to be adjusted.

A list of specific monitoring and research objectives needs to be formulated and prioritized. A preliminary list of objectives includes:

1. Compile a current species list and compare it to anecdotal records.
2. Document the fish species and size classes utilizing restored lagoon habitats (seagrass, mangrove, oyster reef, and artificial reef).
3. Document the fish species and size classes utilizing existing lagoon habitats

- (sand flats, muck bottom, seawalls, riprap, piers, dredge holes),
4. Evaluate the effects of large scale storm water discharges on local fish populations.
 5. Evaluate fish health and concentrations of toxic compounds such as mercury.
 6. Evaluate the extent of movement of certain species between habitat types with a focus on linkages between restored and natural lagoon and offshore habitats.
 7. Document the catch per unit effort of key economically-important species.

To compile a species list and estimate fishing effort, the following strategies could be used:

- Literature search and review of WPB Fishing Club records.
- Creel survey to estimate the catches made by small scale or recreational fishermen through interviews and inspection of individual catches at fishing areas and boat ramps.
- Volunteer angler surveys (mail or email).
- Angler website to report catches in LWL and create on-going virtual “fishing tournament”

For those projects assessing change, consideration should be given to using the BACI (Before-After Control-Impact) experimental design when designing the surveys. Reference areas will need to be selected and monitored with similar methods to have a meaningful comparison. Ideally there would be pre-restoration sampling conducted at select restoration sites to get a better understanding of the extent of change. Sampling methods will depend on the question being asked and the habitat being sampled. A listing of potential fish sampling methods that have been suggested includes:

- Visual sampling using divers’ surveys, potentially limited by high turbidity, low visibility and currents in LWL. This method is currently used to monitor LWL artificial reefs close to inlets where visibility is less limited (see Chapter 2).
- Remote visual sampling: 1) using underwater cameras deployed from surface vessels and moved around the sampling sites; or 2) using fixed cameras with 360° view with video feed to remote shore stations. Cameras have better detection/resolution than humans.
- Seine or trawl net surveys, however these methods have limited use when sampling diverse habitats in an urbanized estuary.
- Net enclosed areas using visual counts or dip net.
- Hook-and-line sampling, a time-intensive method for the amount of data collected and affected by biases due in part upon the type of gear and bait used.

To better understand the relationship between restored habitats and nearly natural habitats, it is important to document movement of fish between estuarine and ocean habitats. Expansion of the existing Florida Atlantic Coast Acoustic Telemetry (FACT) network to include the LWL would be important in creating a more complete picture. FACT already includes receivers at Lake Worth Inlet, reefs north of the inlet, Loxahatchee River and Indian River Lagoon.

STRATEGY:

STEP 1 Develop a prioritized list of research questions and define the most appropriate sampling method to answer them. Since restoration is the main focus in the management plan, sampling at restored projects should be the highest priority for fish monitoring. This monitoring should include comparisons with control or reference sites.

Potential Partners: FWC, PBCERM, PBAU, WPBFC, HBOI/FAU, NOVA, FIU

STEP 2 Apply the best methodology at the selected locations for regular sampling.

Potential Partners: FWC, ERM, PBAU, WPBFC, HBOI/FAU

STEP 3 Conduct monthly/quarterly sampling (depending on support level/funding).

Potential Partners: FWC, ERM, NOVA, FIU, WPBFC, NMFS

STEP 4 Prepare annual reports that summarize the data from the LWL study area(s). The report will include a summary of overall sampling effort, species composition and abundance from the study area, and more detailed data summaries such as catch rates, size distribution, spatial and temporal distribution for more abundant species and species of economic importance.

Potential Partners: FWC, ERM

STEP 5 Seek funds for an underwater video camera and passive acoustic tag receivers to monitor restoration project sites. Conduct baseline and quarterly monitoring to determine habitat utilization.

Potential Partners: ERM, FWC, HBOI/FAU, PBAU

SCHEDULE:

Step 1 will be initiated when Potential Partners agree on methods and participation effort. Step 2 and 3 are contingent upon Step 1.

COST:

The estimated annual cost for this monitoring program is \$120,000. The estimated costs are based on monthly sampling including three full-time staff personnel, boat and vehicle fuel, travel time, nets, boat/vehicle repairs and upkeep, and expendable routine supplies.

EXPECTED BENEFITS:

Quantify LWL fish population and establish a monitoring program that will provide more comprehensive information about status and trends. Its implementation will allow managers to identify problems and design solutions to preserve and enhance fish stocks in the LWL.

MONITORING ENVIRONMENTAL RESPONSES:

The information will assist managers in monitoring the health and the abundance of fisheries within the LWL. Monthly or quarterly monitoring will be incorporated in annual reports that will be used for restoration purposes.

REGULATORY NEEDS:

None anticipated.

FUNDING:

TBD

POTENTIAL PARTNERS AND FUNDING SOURCES*:

ERM, FWC, NOAA / NMFS, WPB FISHING CLUB, PBAU, HBOI/FAU

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