

# Loxahatchee River Watershed Restoration Project Performance Measure and Evaluation Criteria Summary Document

Date: 28-JAN-2014

## Purpose:

1. Performance Measures: Documents process to evaluate restoration performance related to achieving project objectives. Process must be scientifically defensible, repeatable, and be able to illustrate restoration project alternative improvements in ecosystem structure and function of an area that can be quantified as Habitat Units.
2. Evaluation Criteria: Documents process to evaluate project effects on a constraint identified by law or stakeholders. Same requirements apply as above, except that the performance is not used to quantify habitat units and can be more qualitative but must have clear logic for how to evaluate the criteria (e.g., nutrients, threatened and endangered species).

## Performance Measures

Prior planning effort had a number of performance measures (PM) for determining habitat units and evaluation criteria for evaluating constraints. Keeping SMART planning process in mind, we want to use as much of the performance measures as possible that still make sense. Only when new information and models are readily available would we consider developing new performance measures or modifying existing ones.

Other evaluation criteria that we might use later to capture additional environmental effects will be captured as part of the National Environmental Policy Act (NEPA) environmental evaluation.

### **PM1 - Seasonal Flows to Manage Salinity and Floodplain Hydroperiod in the Northwest Fork of Loxahatchee River**

Need to update PM to focus on salinity only for the river and estuary. Instead of using flows at Lainhart dam and below Lainhart for tributary flow as a surrogate for desired salinities. A salinity model will be run to determine how well different salinity zones are met and incorporate the equivalent of what was captured looking at low and high flows.

### **PM2 - Manage Salinity Envelope through Reduction in Frequency and Duration of Peak Flow Discharges via S-46**

This performance measure focused on avoiding high flows to the southwest fork of the Loxahatchee River that affected the estuary. The prior planning effort wasn't able to improve high flow performance even with 46,000 acre-ft of storage. The principle of the performance

measure relates high flows to low salinities and avoiding low salinity in areas that are more estuarine. The modified PM 1 can evaluate this same objective. Recommendation is to not use the old PM2, and develop a new one specific to the river's cypress floodplain.

### **PM 3 – Salinity Management in the Central Portion of Lake Worth Lagoon**

The prior planning effort screened out the Lake Worth Lagoon project components and objectives as a separate project. This performance measure related high flow discharges at structure S-155 on the C-51 canal to desired salinities measured by the Environmental Fluid Dynamics Code (EFDC) model. This performance measure and model are not recommended for use in this planning effort.

### **PM 4 – Hydrologic Patterns of Major Plant Communities in the Project Area**

Performance measure 4 evaluated hydro patterns in natural areas primarily in the Loxahatchee River watershed. The procedure used to relate hydro patterns to ecosystem structure and function was the Wetland Rapid Assessment Procedure. This performance measure should be used to evaluate benefits to the watershed. The performance measure inputs and outputs will likely need to be reviewed and reexamined to extend the original 36 year period of record to a 41 year period of record, as well as update land use assumptions. Some areas have improved since the original assessment in 2004 and 2005, but those changes are not likely to have influenced the existing conditions dramatically.

### **Evaluation Criterion 5 - Stage levels in the Grassy Waters Preserve/Water Catchment Area**

This evaluation criteria examined stages in Grassy Water Preserve to measure potential improvements from a water supply stand point. This evaluation tool will not be used for restoration benefits, and will be considered by the LRWRP subteam that examines the savings clause constraints and water supply/flood damage risk reduction benefits.

### **Evaluation Criteria 6-8 – Nutrient Concentration (N and P) in Northwest Fork Loxahatchee River; Nutrient Concentrations in Loxahatchee River Estuary; Inflow Concentration of Total Phosphorus for Grassy Waters Preserve;**

These evaluation criteria were specific to ensure nutrients impacts did not occur because of restoration specific actions. Because a lot of analysis is available from the prior planning effort, an understanding of compatible water sources can be used to help with screening project alternatives. A small water quality subteam will be put together to help synthesize the old data, support screening of alternatives and determine how best to evaluate the final array and Tentative Selected Plan from a nutrients standpoint. Water quality team members - Inger Hansen, Bud Howard, Mark Shafer, Paul Julian, someone from SFWMD.

## **PM 9 – Hydrologic Spatial Connectivity**

Performance measure qualitatively measures criteria for evaluating connectivity between watershed areas. Performance measure could be updated to include connections to Loxahatchee River and Estuary. Potentially, alternatives that improve what is close to the river, are more likely to benefit the river from a connectivity standpoint.

## **PM 10 – Substrate Enhancement in Lake Worth Lagoon**

Because Lake Worth Lagoon project components are going to be a separate project component, this performance measure which looks at area of substrate improved due to sediment removal management measures is not recommended for use in this study.

## **EC 12, 13– Flood Damage Risk Reduction and Water Supply Metrics**

Evaluation criteria 12 and 13 were for evaluating constraints specific to Flood Damage Risk Reduction and Water Supply and will be handled by team members working on those tasks.

## **Fish and Wildlife 1**

The purpose of this evaluation criteria was to recognize and capture species benefits not recognized in the performance measures. Supportive habitat was defined as habitat which can support federally and state listed species. It is not meant to be as restrictive as the legal definition of critical habitat, but rather to recognize that the LRWRP project area supports a number of significant breeding and foraging grounds for imperiled species.

## **Fish and Wildlife 2**

The purpose of this evaluation criteria was to recognize project area habitats that have national significance, regional importance or are considered to be scarce. This matrix item allowed the PDT to capture benefits not recognized in the performance or that were otherwise overshadowed in acreage biased habitat unit calculations.

## **Additional Discussion**

Due to time and resources being limited, additional performance measures are recommended to not be developed for oysters and submerged aquatic vegetation because they are likely to only move and not increase in acreage or performance would be limited. Salinity will be used as a surrogate to evaluate these value ecosystem components:

Riverine – 0-5 practical salinity units (PSU) – Freshwater (0-0.5) and oligohaline (0.5-5) zones support a variety of freshwater species.

Estuarine – (5-30) – mesohaline (5-18) and polyhaline zones (18-30) supports estuarine species

## **Habitat Units Methodology:**

The prior North Palm Beach County Part 1 (now LRWRP) planning effort focused on evaluating benefits to the watershed (a large area), the riverine flood plain (small area), and estuary (small to medium area). Because USACE benefits process uses habitat units which are based on area (acres) of performance lift (improvement in structure and function), areas that have a larger acreage have a higher chance of influencing which alternative plans are the best performers and best buys from a cost perspective.

There are several ways to look at calculating restoration benefits that are cost effective for alternative plans for each areas, as well as for all the areas as a whole -

1. Calculate habitat units of each ecosystem area, and look at habitat unit lift.
2. Examine % lift by ecosystem area, rather than area (habitat unit lift) to avoid having 2,000 acres of watershed lift (2% lift) be greater than 1,000 acres of river and river flood plain lift (25% lift).
3. Look up objectives – compare how well each alternative achieves each objective.

Based on what is known now, there are approximately 4 areas that relate to 4 different objectives: Watershed, Floodplain, River, and Estuary. Weighting or a normalized approach to look at how well each alternative does for each of these areas is possible. Examples have been based on performance indices (see Biscayne Bay Coastal Wetlands as an example<sup>1</sup>). Process will need to be able to document and define the assumptions used in weighting or evaluating by objective. Hopefully, results will show alternatives that are cost effective from habitat units are also cost effective from the weighting approach.

## **Ecosubteam Organization**

In order to be able to present performance measures and make recommendations to the project delivery team, the ecosubteam needs to get organized soon and meet ideally before the PDT meeting on 30 –JAN-2015. In order to be efficient and address all issues, there are likely to be discussions between ecosubteam members with similar areas of expertise. These areas include the watershed, water quality, river/estuary, and potentially fish and wildlife.

---

<sup>1</sup> Biscayne Bay Coastal Wetlands Project habitat units discussion can be found on pg. 6-47 in the 2012 project implementation report by opening the following link:  
[http://www.evergladesplan.org/pm/projects/project\\_docs/pdp\\_28\\_biscayne/010612\\_fpir/010612\\_bbcw\\_vol\\_1\\_main\\_report\\_rev\\_mar\\_2012.pdf](http://www.evergladesplan.org/pm/projects/project_docs/pdp_28_biscayne/010612_fpir/010612_bbcw_vol_1_main_report_rev_mar_2012.pdf)