North Palm Beach Part 1 (NBP Pt1) RECOVER EVALUATION OF PROJECT-LEVEL PERFORMANCE MEASURES (Final 081304)

Prepared by the Regional Evaluation Team (RET) and Water Quality Team (WQT)

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1.0 Introduction

The role of the Restoration Coordination and Verification (RECOVER) team is to organize and apply scientific and technical information in ways that are most effective in supporting the objectives of the Comprehensive Everglades Restoration Plan (CERP). RECOVER links science and the tools of science to a set of system-wide planning, evaluation and assessment tasks. These links provide RECOVER with the scientific basis for meeting its overall objectives of evaluating and assessing Comprehensive Plan performance and refining and improving the plan during the implementation period. RECOVER fulfills this role by working with the project delivery teams (PDTs) to help them meet CERP's system-wide goals and objectives. Specifically, RECOVER reviews the performance measures for project-level evaluation of alternatives for consistency with the system-wide evaluation performance measures developed by RECOVER.

The purpose of this performance measures consistency review is: 1) to identify general compatibility of project-level performance measures with applicable system-wide performance measures, and 2) to provide information to project mangers and others, as appropriate, regarding compatibility of project-level and system-wide performance measures of the NPB Pt1 as submitted to RECOVER in July 2004. RECOVER recognizes and appreciates the time and effort that went into developing these performance measures. The review comments below are intended to enhance the existing set of performance measures. Comments on the specific project-level performance measure are presented in the attached table (Attachment A).

2.0 General Document Comments

The NPB Pt1 PMs are generally well developed. RECOVER does however have suggestions regarding the PM fact sheets, the categorization of water quality metrics, and PM targets to provide additional information for document reviewers and developers.

Fact Sheets – The NPB PT1 PM fact sheets are generally well developed and clearly define justification for the presented PMs. It would be helpful to readers and reviewers to clearly demonstrate the link between the PMs and project goals and objectives on the PM documentation sheets. RECOVER suggests the PDT consider adding relevant references to the project goals and objectives in the title block of the PM documentation sheets.

Water Quality (WQ) - From a WQ perspective, RECOVER feels it would be helpful to understand which performance measures are associated with Category A project

components and which are associated with Category C components as defined in CGM 23.0. It appears that NPB Pt1 PMs consistently treat nutrients as constraints (no degradations and compliance with Class I or III water quality standards) rather than including nutrient restoration targets when associated with Category A projects. There are several water bodies associated with WQ improvement goals in this project, but there are not clear associated nutrient improvement type PMs (Category A). Examples include *PM7 Total Phosphorus (TP) Concentrations for the Northwest Fork of the Loxahatchee River*; *EC8 Other Water Quality Parameters for the Northwest Fork of the Loxahatchee River*; *PM10 Inflow Concentrations of TP for the Water Catchment Area/ Grassy Waters Preserve (WCA/GWP) and Loxahatchee Slough*; and *EC11 Inflow Concentrations of Other Water Quality Parameters for the WCA/GWP and Loxahatchee Slough*. These are all worded as WQ constraints and may be more appropriately worded as WQ improvement PMs. Additionally, when associated with a Category A project it is appropriate to categorize the metric as a PM. When associated with a Category C project or considered a constraint, it is appropriate to categorize the metric as an EC.

PM Targets. In general, the NPB Pt1 PDT has done an excellent job of considering ecological effects when determining hydrologic and salinity targets for their PMs. RECOVER has minor suggestions to improve several of the PM targets.

For *PM1 Salinity in the Northwest (NW) Fork of the Loxahatchee River* and *PM3 Reduced Incidence and Magnitude of Large-Volume, Peak Flow Discharges to the Loxahatchee Estuary via the S-46 Structure* the PDT could consider developing a volume target through a structure to accompany the existing targets.

In *PM12 Increase in Greenbelt Acreage* RECOVER suggests the PDT adopt a minimum value, equivalent to the Restudy conceptual plan, and establish a unit of measure. The unit of measure could include a measure of land functionality as well as acreage.

In *PM13 Natural Area with Hydrologic Connectivity* RECOVER suggests the unit of measure for the PM target be changed from acreage to avoid duplication with *PM5 Hydrologic Regimes of Major Plant Communities in the Loxahatchee Watershed and Adjacent Wetlands*. The PDT could consider a target where reduced obstructions to connectivity are a target such as removal of linear feet of canal, levee, culverts, etc. Thus it is possible to make comparison between alternatives in a unit different than acres, for example 10 miles of levee versus no levee. More detail in the target such as units of several types would be possible. For example linear feet of barrier to connectively removed, number of culvers removed, feet of road removed are all possible examples.

3.0 Consistency with RECOVER System-Wide Evaluation Performance Measures

There is general compatibility between the project-level performance measures developed by the PDT for the NPB Pt1 and the system-wide evaluation performance measures developed for the Comprehensive Plan by RECOVER. RECOVER does however have suggestions regarding the content, target and classification for several of the performance measures/evaluation criteria. General comments of significance are

noted below, while comments on each specific project-level performance measure are presented in the attached table (Attachment A).

Conceptual Ecological Models (CEMs) – In general, the NPB PT1 PDT has considered the link between hydrologic stressors and ecological attributes. RECOVER suggests the PDT continue to consider these links and ensure that PMs are consistent with the Loxahatchee Watershed CEM (MAP Appendix A) as targets are finalized.

Water Supply – RECOVER has adopted a practice of separating water supply needs from ecological needs when developing PMs. With this in mind, RECOVER suggests the NPB Pt1 PDT consider separating *EC6 Stage Level in the WCA/GWP* into separate ecological and water supply ECs. The PDT could set an ecological target for this EC and develop a water supply EC to ensure city water supply demands are addressed rather than combining the two in a single EC. Ecological targets could be developed which are more consistent with the goal of enhancing ecological values such as hydroperiods for sawgrass prairies, cypress forests, and snail kite forage/nest habitat. Additionally since rehydrating the GWP is a project objective, the ecological EC could be made a PM. If the PDT chooses not to develop ecological targets, RECOVER suggests this EC be re-titled to reflect that the targets are associated with improving water supply

In *PM17 Regional Water Supply (Public, Agricultural, and Industrial)* the simulation period remains undefined in the target section. RECOVER suggests the NPB Pt1 PDT define the period of record to ensure consistency with RECOVER PM WS-E8. RECOVER WS-E8 uses a 36-year period of record (POR) for the simulation period. If the NPB Pt1 project uses less than a 36-year POR then a target of three or fewer years may not be consistent. This applies to both the frequency and duration targets.

WQ – The targets for nutrient concentrations in *EC9 Nutrient Concentrations (Nitrogen and Phosphorus) and Other WQ Parameters for the Loxahatchee Estuary* appear to be inconsistent with RECOVER PM NE-A13. RECOVER Assessment PM NE-A13 has targets for the Loxahatchee Estuary of 80ppb TP and 700ppb TN. The PDT may want to determine why the targets are inconsistent and whether the selection of different WQ stations for historical data may contribute to the difference.

Evaluation of Community Types Using Hydrologic Regimes – RECOVER recognizes the innovative nature of *PM5 Hydrologic Regimes of Major Plant Communities in the Loxahatchee Watershed and Adjacent Wetlands* and commends the NPB Pt1 PDT on its development. However, RECOVER would like to note that the method of identifying target hydroperiods for each community type differs with RECOVER's evaluation method. Additionally, the PDT may wish to consider including additional detail for the indicator regions used in evaluating the PM. Questions related to whether one cell or several cells be used and whether all cells in the indicator region should be averaged will need to be addressed. RECOVER suggests the PDT review the RET requirements for indicator regions including such considerations as location not too close to model boundary, minimum number of cells required, etc. The specific criteria could be modified to suit specific project requirements.

4.0 Conclusions

The PDT has done an outstanding job developing and coordinating their performance measures. There is general compatibility between the project-level performance measures and evaluation criteria developed for the NPB Pt1 and the system-wide performance measures of the Comprehensive Plan. Some revisions are suggested to increase the degree of consistency between project and system-wide performance measures. RECOVER suggests that the PDT reexamine some PM targets to address their relationship to WQ and project goals and objectives. RECOVER also suggests considering modification of some PM and EC targets to link ecological attributes to hydrologic stressors. RECOVER also suggests the PDT consider separating ecological and WQ goals currently combined in EC 6. Additionally, RECOVER suggests that some of the NPB Pt1 PMs be reviewed for consistency with RECOVER targets and evaluation methods. RECOVER appreciates the opportunity to review these performance measures.

NORTH PALM BEACH PHASE 1 PROJECT PM CONSISTENCY REVIEW REPORT
ATTACHMENT A

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

PM#1 Salinity in the Northwest Fork of the Loxahatchee River

Target: The SFWMD has established an MFL for flows to the Northwest Fork of the Loxahatchee River, and while this MFL serves as the policy-mandated minimum flow, a higher discharge rate could be appropriate for encouraging ecosystem restoration activities such as those proposed under the NPBC – Part 1 project. Accordingly, a low flow target is proposed that varies from the above MFL because of the different program objectives.

The following low flow targets will be applied for the NPBC – Part 1 project alternatives evaluation:

- Achieve and maintain a 2 ppt. or less bottom salinity under low flow conditions at Rivermile 6.2
- Maintain a minimum low flow of ___ cfs* over Lainhart Dam

Additionally, the following high flow condition target will be used in evaluating alternative watershed management strategies:
Maintain a 2 to 4-day rolling average of flow over Lainhart Dam not to exceed 500 cfs to address reductions in incidence and duration of large, pulsed discharges associated with flood control operations upstream
* The initial CERP Target was 65 cfs

Evaluation Method: The LRHSM Model, RMA 2-D, CH3D.

Is this PM consistent with RECOVER PMs?
RECOVER commends the PDT on considering ecological impacts when setting PM targets; however, RECOVER suggests the link between salinity at River Mile 6.2 with an associated volume at a structure be completed if possible.

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

EC #2 Loxahatchee Estuary Salinity Envelope

Target: Salinity envelope will be developed for different portions of the Estuary to protect estuarine health based on the responses of identified Valued Ecosystem Components (VECs). Target pending

Evaluation Method: The LRHSM Model, RMA 2-D, CH3D.

Is this PM consistent with RECOVER PMs?
RECOVER suggests once a target for this PM is developed, the PDT should ensure it is consistent with the stressors and drivers contained in the Conceptual Ecological Model (CEM) for the Loxcahatchee Watershed in Appendix A of the MAP.

NORTH PALM BEACH PHASE 1 PROJECT PM CONSISTENCY REVIEW REPORT
ATTACHMENT A

CERP Goal: Enhance Ecologic Values
Project Objective/Constraint:
PM #3 – Reduced Incidence and Magnitude of Large-Volume, Peak Flow Discharges to the Loxahatchee Estuary via the S-46 Structure. **Target:** ___% Reduction of incidence and/or magnitude of peak flows through S-46 to achieve ecological benefits downstream in the estuary **Evaluation Method:** Lower East Coast sub Regional (LECsR) Model. To translate the LECsR output into ecological benefits, the model output may be linked to a hydrodynamic estuarine model to predict the resultant salinity regimes' adherence to the preferred salinity envelopes for the subject estuarine system segment. (LRHSM, RMA 2-D, CH3D)
Is this PM consistent with RECOVER PMs? This PM takes into consideration oyster and seagrass health to set its hydrologic target, which is consistent with RECOVER's approach to PM developmentRECOVER suggests the PDT consider developing a volume target or a salinity target to link salinity to volumes through structures. RECOVER suggests the PDT review similar methods used in RET Southern Estuaries Team PMs as examples.

CERP Goal: Enhance Ecologic Values
Project Objective/Constraint:
PM #4 Salinity in the Central Portion of Lake Worth Lagoon **Target:** The target salinity envelop for the central zone of Lake Worth Lagoon is 15 to 23 ppt. To attain this salinity envelop, inflows should be between 0 and ____cfs* based on a ___-day* rolling average. High flows should not exceed __ cfs* for more than __ days*.: *The current flow target proposed by RECOVER Performance Measure NE-E2 is 0 to 500 cfs based on a 7 day rolling average and high flows should not exceed 1000 cfs for more than 2 days. **Evaluation Method:** The Lower East Coast Sub-Regional (LECsR) model will be used to predict future without project condition levels of fresh water likely to be discharged into Lake Worth Lagoon via the S-155 Structure and the values needed to maintain the current level of flood protection. The Regional Simulation Model (RSM) will be used, if available at a later date to verify the results of the LECsR model. The Environmental Fluid Dynamics Code (EFDC)-based computer model developed on behalf of SFWMD for Lake Worth Lagoon will be run to establish the flow targets to met the desired salinity range
Is this PM consistent with RECOVER PMs? RECOVER recognizes that the targets for this PM have not been finalized. Once completed, RECOVER suggests the PDT ensure consistency with the latest version of RECOVER PM NE-E2

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

PM #5 – Hydrologic Regimes of Major Plant Communities in the Loxahatchee Watershed and Adjacent Wetlands

Target: Seasonal hydrologic regimes to be within five percent (plus or minus) of desired values for major wetland plant communities at specified indicator regions. Desired values will be based on literature data (Figures 1-8; Table 1) and/or model outputs for predevelopment conditions or existing conditions in unimpacted areas. At minimum these literature based community hydrologic regimes will be used as targets for each major wetland plant community. However, they are subject to refinement based on comparison and validation of model outputs from RSM – P or LECsR to actual field conditions in unimpacted areas.

Plant Community Type	Annual Average Water Depth (inches)	Inundation Duration* (days/year)
Mesic flatwood	Below ground	≤30
Mesic (Oak) Hammock	Below ground	0-60
Hydric Flatwood	0-6	30-60
Hydric Hammock	0-6	30-60
Depression Marsh	12-24	180-300
Wet Prairie	6-16	60-180
Strand Swamp	18-36	210-300
Floodplain Swamp	18-30	270-360
Dome Swamp	12-24	210-300

* Frequency coincides with wet weather patterns and existing groundwater conditions

Table1. Annual average water depth and annual inundation for major wetland plant communities identified within the Loxahatchee watershed.

Evaluation Method: The Lower East Coast Sub-Regional Model (LECsR) has been modified for this project study area and will be utilized to characterize future without conditions and compare the effects of various watershed management alternatives. Light Detection and Ranging Survey Data (LIDAR) will be used with the model runs to determine relative community types with respect to elevation and landscape position.

Is this PM consistent with RECOVER PMs?

RECOVER recognizes the innovative nature of this PM and commends PDT on its development. However, RECOVER would like to note that the method of calculating hydroperiods for each community type differs from RECOVER's evaluation method. Additionally, the PDT may wish to consider including additional detail for the indicator regions used in evaluating the PM. Questions related to whether one cell or several cells be used and whether all cells in the indicator region should be averaged will need to be addressed. RECOVER suggests the PDT review the RET requirements for indicator regions including such considerations as location not too close to model boundary, minimum number of cells required, etc. The specific criteria could be modified to suit specific project requirements.

Additionally, RECOVER suggests the PDT change the evaluation method section referring to LIDAR to read, "The best topographic data available will be used with the model runs to determine relative community types…"

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

EC #6. Stage levels in the Water Catchment Area/Grassy Waters Preserve (WCA/GWP)

Target: WCA/GWP target stage elevations at the Nature Center station (south side of Northlake Blvd.):

- Minimum at 17.6 feet not to exceed seven days
- Maximum at 19.2 feet not to exceed seven days
- Dry Season: 18.20 feet (Nov 1- Jan 31) and 17.80 feet (Feb 1-April 30)
- Wet Season: 18.20 feet (May); 18.40 feet (June); 18.50 feet (July); 18.50 feet (August); 18.50 feet (September); 18.50 feet (October)

Evaluation Method: Post processing of output from model runs using the Lower East Coast Regional Model (LECsR) will generate stage hydrographs and stage duration curves for each alternative at the selected indicator regions including GWP.

Is this PM consistent with RECOVER PMs?

RECOVER suggests the PDT consider separating this EC into separate ecological and water supply ECs. The PDT could set an ecological target for this EC and develop a water supply EC to ensure city water supply demands are addressed rather than combining the two in a single EC. Ecological targets could be developed which are more consistent with the goal of enhancing ecological values such as hydroperiods for sawgrass prairies, cypress forests, and snail kite forage/nest habitat. Additionally since rehydrating the GWP is a project objective, the ecological EC could be made a PM. If the PDT chooses not to develop ecological targets, RECOVER suggests this EC be re-titled to reflect that the targets are associated with improving water supply

Additionally, it would be helpful to see the PM target expressed in water depths as well as stage elevations.)

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

PM #7 –Total Phosphorus Concentrations for the Northwest Fork of the Loxahatchee River

Target: Five year rolling average of Total Phosphorus concentration is not to exceed 44 ppb measured at the in-stream monitoring stations (stations #67, 68 and 69).

Evaluation Method: The Lower East Coast Regional Model (LECsR) will be run to predict hydrologic flows to the receiving waters under different watershed management alternatives.

An additional evaluation protocol/tool may be exercised during the alternatives evaluation steps of the USACE CERP planning process. FDEP has developed a pollutant loading and abatement analysis tool for land areas within Palm Beach County including those contained within the North Palm Beach County – Part 1 project study area. The water quality constituent loadings to the Loxahatchee Estuary from the North Palm Beach County project study area can be modeled using a Watershed Assessment Model (WAM) model developed for this study area while water quality responses in the Loxahatchee River and Estuary can be modeled with an Environmental Fluid Dynamics Code (EFDC)-based model using tributary inflow output from WAM. The loading and abatement analysis tool applies these models to evaluate the receiving water responses to varied loadings of nutrients and total suspended solids in surface waters. Discussions remain ongoing regarding the utility of this tool to support this CERP project.

Is this PM consistent with RECOVER PMs?
RECOVER notes that the justification for this PM states protection of class III waters or designated uses. According to CGM 23 this is a constraint rather than a performance measure. Based on these indications, the target and justification for this PM do not reflect the goal of enhancement, restoration, or improvement of ecological conditions that may be associated with reduced nutrient concentrations and loads. RECOVER suggests the PDT ensure consistency with CGM 23.

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

Project EC# 8. Other Water Quality Parameters for the Northwest Fork of the Loxahatchee River

Target:

1. Five year rolling average of Total Nitrogen concentration is not to exceed 0.99 mg/L measured at the in-stream monitoring stations (stations #67, 68 and 69).

2. Five year rolling average of Total Suspended Solid Concentration is not to exceed 4.2 mg/L measured at the in-stream monitoring stations (stations #67, 68 and 69).

3. As water quality constraints, all the other water quality parameters will comply with the Class III water quality standards.

Evaluation Method: The Lower East Coast Regional Model (LECsR) will be run to predict hydrologic flows to the receiving waters under different watershed management alternatives.

An additional evaluation protocol/tool may be exercised during the alternatives evaluation steps of the USACE CERP planning process. FDEP has developed a pollutant loading and abatement analysis tool for land areas within Palm Beach County including those contained within the North Palm Beach County – Part 1 project study area. The water quality constituent loadings to the Loxahatchee Estuary from the North Palm Beach County project study area can be modeled using a Watershed Assessment Model (WAM) model developed for this study area while water quality responses in the Loxahatchee River and Estuary can be modeled with an Environmental Fluid Dynamics Code (EFDC)-based model using tributary inflow output from WAM. The loading and abatement analysis tool applies these models to evaluate the receiving water responses to varied loadings of nutrients and total suspended solids in surface waters. Discussions remain ongoing regarding the utility of this tool to support this CERP project.

Is this PM consistent with RECOVER PMs?
As in PM7, RECOVER notes that this PM should be consistent with CGM 23. If this PM is associated with a class A project, then nitrogen is considered a nutrient and should be treated as a PM during the formulation process. RECOVER suggest that TN be included with other nutrient TP in PM7 if this is the case.

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

EC# 9. Nutrient Concentrations (Nitrogen and Phosphorus) and Other Water Quality Parameters for the Loxahatchee Estuary

Target:

1. Five year rolling average of Total Phosphorus concentration is not to exceed 41 ppb measured at the downstream estuarine location (Station #60)

2. Five year rolling average of Total Nitrogen concentration is not to exceed 1.21 mg/L measured at the downstream estuarine location (Station #60)

3. Five year rolling average of Total Suspended Solids concentration is not to exceed 5.4 mg/L measured at the downstream estuarine location (Station #60)

4. As a constraints, all the other water quality parameters will comply with the Class II water quality standards.

Evaluation Method: The Lower East Coast Regional Model (LECsR) will be run to predict hydrologic flows to the receiving waters under different watershed management alternatives.

An additional evaluation protocol/tool may be exercised during the alternatives evaluation steps of the USACE CERP planning process. FDEP has developed a pollutant loading and abatement analysis tool for land areas within Palm Beach County including those contained within the North Palm Beach County – Part 1 project study area. The water quality constituent loadings to the Loxahatchee Estuary from the North Palm Beach County project study area can be modeled using a Watershed Assessment Model (WAM) model developed for this study area while water quality responses in the Loxahatchee River and Estuary can be modeled with an Environmental Fluid Dynamics Code (EFDC)-based model using tributary inflow output from WAM. The loading and abatement analysis tool applies these models to evaluate the receiving water responses to varied loadings of nutrients and total suspended solids in surface waters. Discussions remain ongoing regarding the utility of this tool to support this CERP project.

Is this PM consistent with RECOVER PMs?

The targets for nutrient concentrations in this EC appear to be inconsistent with RECOVER PM NE-A13. RECOVER Assessment PM NE-A13 has targets for the Loxahatchee Estuary of 80ppb TP and 700ppb TN. The PDT may want to determine why the targets are inconsistent and whether the selection of different WQ stations for historical data may contribute to the difference.

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

PM #10 – Inflow Concentrations of Total Phosphorus for the Water Catchment Area/Grassy Waters Preserve (WCA/GWP) and Loxahatchee Slough

Target: The total phosphorus target will be based upon the best available phosphorus reduction technology (BAPRT) which commonly are stormwater treatment areas (STAs) in this geographic region, From the current information regarding STA performance, the achievable phosphorus concentrations could range from 20-50 ppb. The proposed phosphorus target for inflows entering GWP/WCA and Loxahatchee Slough is: annual mean concentration ranging from of 20 to 50 ppb the measured at Control 3 (inflows to GWP/WCA) and an appropriate location in the Loxahatchee Slough (to be determined) or any other CERP-related inflows to these two areas which could serve as routes for more water to the Loxahatchee River.

Evaluation Method: Currently, the modeling strategy for this CERP project is based on use of the Lower East Coast Regional Model (LECsR) to evaluate hydrologic flows through the study area under different alternative watershed management strategies.

Is this PM consistent with RECOVER PMs?

RECOVER notes that the justification section of this PM details a reduction in nutrient concentrations in inflows to GWP. Additionally, restoration and ecological enhancement are project goals. If the goal is to enhance ecological conditions in GWP and the Loxahatchee Slough, RECOVER suggests the PM target worded to reflect restoration, enhancement, or improvement rather than wording consistent with a non-degradation constraint. Information provided at the July 14, 2004 briefing meeting included that the efficiency of STAs of around 20-50ppb TP was considered when choosing the target for this PM. This rationale is not inconsistent with CERP plan formulation

RECOVER recognizes that traditionally interior portions of GWP have experienced TP concentrations as low as 13ppb. The project alternatives currently under consideration would involve sheet-flowing relatively high TP (the PM target is 20-50 ppb) water from the M-canal thru areas of the Preserve that are currently rain-driven and have low TP (10 ppb). RECOVER suggests the PDT consider changing the PM target to include a target of 10 ppb at reference points within the Preserve interior.

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

EC# 11. Inflow Concentrations of Other Water Quality Parameters for the Water Catchment Area/Grassy Water Preserve (WCA/GWP) and Loxahatchee Slough

Target: Compliance with Class I Standards at Control 3 (inflows to GWP/WCA) and at an appropriate location in the Loxahatchee Slough (to be determined), or an acceptable demonstration of no net degradation compared to the Comprehensive Environmental Restoration Program (CERP)-defined base condition (2000). However, if related information becomes available after the base condition, it will still be used to further refine the proposed target.

Evaluation Method: Currently, the modeling strategy for this CERP project is based on use of the Lower East Coast Regional Model (LECsR) to evaluate hydrologic flows through the study area under different alternative watershed management strategies.

Is this PM consistent with RECOVER PMs?

RECOVER notes that the wording for this EC appears to be consistent with that of a constraint. This EC may be more appropriate as a PM, as the goals of the C-17 and C-51 backpumping projects (Category A projects) are to provide additional flows to the GWP. Additionally, since the targets defined above for this EC are the minimum needed to meet water quality standards (constraint); targets could be refined to provide enhanced water quality. The PDT could also ensure that TN is not included in this EC but in the PM consistent with CGM 23.

CERP Goal: Enhance Ecologic Values
Project Objective/Constraint:
PM #12- Increase in Greenbelt Acreage **Target:** Increase in Greenbelt Acreage **Evaluation Method:** Natural areas that are under public ownership in the northern portion of the project area have been identified, along with key natural areas (in private ownership) that if acquired, provide opportunities to enhance continuity of the protected natural areas.
Is this PM consistent with RECOVER PMs? RECOVER suggests further definition of this PM's target. The Restudy recommendation for "Pal-Mar and Corbett WMA Hydropattern Restoration" includes a purchase of a 3,000-acre parcel between J.W. Corbett WMA and Pal-Mar. Given this Restudy recommendation; RECOVER suggests the PDT set the evaluation target for this PM at or above 3,000 acres.

CERP Goal: Enhance Ecologic Values
Project Objective/Constraint:
PM #13 - Natural Areas with Hydrologic Connectivity **Target:** Increase in acreage of natural areas with hydrologic connectivity **Evaluation Method:** Natural areas that are under public ownership in the northern portion of the project area will be identified, along with key natural areas (in private ownership) that if acquired, provide opportunities to enhance hydrologic connectivity. Also existing drainage systems that inhibit sheet flow will be identified and likely opportunities for improvement will be considered. Hydrological connectivity will be assessed based on the area expert knowledge, historical information, evaluation of aerial maps, presence/absence of culverts, canals, ditches, etc., watershed modeling outputs and any other related information that can supplement the existing documents. This information will be used to identify the acreage of land that ideally could be hydrologically connected. The hydrologic connectivity provided by the various alternatives in the corridor from the Northwest Fork of the Loxahatchee River to Dupuis will be compared and the alternative providing the greatest extent of connectivity and associated benefit would be rank the highest.
Is this PM consistent with RECOVER PMs? RECOVER suggests the unit of measure for the PM target be changed from acreage to avoid duplication with PM5. The PDT could consider a target where reduced obstructions to connectivity are a target such as removal of linear feet of canal, levee, culverts, etc. Thus it is possible to make comparison between alternatives in a unit different than acres, for example 10 miles of levee versus no levee. More detail in the target such as units of several types would be possible. For example linear feet of barrier to connectively removed, number of culvers removed, feet of road removed are all possible examples.

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

PM #14 - Area of Sediment Removed and/or Capped

Target: __ Acres of C-51 bottom improved through sediment management actions.
__ Acres of Lagoon bottom improved through sediment management actions.

Evaluation Method: The muck deposit information produced by Palm Beach County and the C-51 survey will be used with two sediment transport models to establish the priority areas within the Lagoon that have muck deposits which warrant removal or capping and will provide the most direct and immediate benefit. Since measurable benefit to the benthic habitat is measured in acres, the target is based on aerial cover (acres) rather than volume. Actions associated with each alternative will be compared to the targeted acres

Is this PM consistent with RECOVER PMs?

CERP Goal: Enhance Ecologic Values

Project Objective/Constraint:

PM #15 - Annual Average Loading of Total Suspended Solids Discharged Through S-155

Target: % Reduction in total suspended solids (TSS) loading will be quantified for different alternatives, with the greatest level of reduction achieved viewed as the best alternative.

Evaluation Method: The best projection method would be to generate two sediment transport models, one for the C-51 Canal, and one for the Lagoon. The C-51 model would consist of a straight channel model and would be used to predict sediment load under different flow conditions and the effect of various management measures. The Lagoon model would be based on the existing Lake Worth Lagoon EFDC hydrodynamic model. A sediment transport component would be developed to predict the dispersal effects of the sediment load entering Lake Worth Lagoon under future scenarios. These models would provide the best information needed to select the final management measures combinations, achieving the greatest level of sediment load reduction to the Lagoon.

Is this PM consistent with RECOVER PMs?

CERP Goal: Enhance Economic and Social Well Being

Project Objective/Constraint:

PM #16 - Level of Flood Protection

Target: Up to approximately 1 Inch per day of peak discharge for ITID (Acreage).
Up to approximately 1 Inch per day of discharge for Corbett Wildlife Management Area

Evaluation Method: Hydrologic models to be applied (Lower East Coast sub-Regional Model (LECsR) or the Regional Simulation Model (RSM)) will be able to quantify the amount of drainage that can be afforded to these areas that have experienced flooding in the past to document ancillary flood protection benefits that might be realized through watershed management alternatives. Stages in the affected reaches of the C-18 Canal, M-O, Canal, M Canal and L-8 Canal will be used to determine the amount of discharge that could be allowed without reducing the level of flood protection for other areas.

Is this PM consistent with RECOVER PMs?

RECOVER notes that the NPB Pt1 project goal reads, "maintain or enhance the current level of flood protection in the L-8 basin". Additionally, the project PMP states, "The purpose of this project is to increase water supply availability and provide ancillary drainage benefits for northern Palm Beach County areas." RECOVER suggests this PM reflect the project goals. Additionally, The inclusion of Corbett WMA discharges as part of the "Level of Flood Protection" PM is not appropriate, as the goal of Corbett discharges is habitat sustainability, not to "Enhance Economic and Social Well-Being". RECOVER notes that PM5 adequately captures benefits to hydropatterns in Corbett WMA.

CERP Goal: Enhance Economic and Social Well Being

Project Objective/Constraint:

PM #17 Regional Water Supply (Public, Agricultural, and Industrial)

Target: The evaluation target is to minimize the frequency, severity and duration of any water restrictions over and above those that might be expected when drought levels exceed a 1-in-10 year severity. The minimum duration for shortages is typically one month. The target for the frequency of water restrictions is that there will be three or fewer years in the 36-year simulation period with regionally significant water restrictions. Water restrictions are considered regionally significant only if they last 3 months or longer.

The duration established for the Lower East Coast Service Area is that there be no more than a cumulative total of 18 months with water shortages during the simulation period. This duration is based on experience in the Restudy (USACE and SFWMD 1999). For consistency, this duration is also proposed as the target for the North Palm Beach County - Part 1 Project.

To minimize severity, it is desirable that cutback volumes during the restriction period in any year would unlikely cause significant economic losses. The minimum severity for water shortages is the Phase I "moderate" water shortage in which the overall reduction in use is up to 15%. Based on the Lower East Coast Service Area performance measure documentation, Phase 1 restrictions are likely to cause significant economic losses and Phase 1 restrictions can be expected when frequencies of water shortages approximate the 1-in-10 level of service. For these reasons, and consistency with the regional performance measures for the Lower East Coast Service Area, the evaluation target will be Phase 1 criteria.

Evaluation Method: The South Florida Water Management Model (SFWMM) results or the Lower East Coast sub-Regional model (LECsR) results will be used in the evaluation.

Is this PM consistent with RECOVER PMs?

This PM is generally consistent with RECOVER PM WS-E8; however, RECOVER suggests the NPB Pt1 PDT define the period of record to ensure consistency with RECOVER PM WS-E8. RECOVER WS-E8 uses a 36-year period of record (POR) for the simulation period. If the NPB Pt1 project uses less than a 36-year POR then a target of three or fewer years may not be consistent. This applies to both the frequency and duration targets.

General Document Comments:

From a WQ perspective, RECOVER feels it would be helpful to understand which performance measures are associated with Category A project components and which are associated with Category C components as defined in CGM 23.0. It appears that NPB Pt1 PMs consistently treat nutrients as constraints (no degradations and compliance with Class I or III water quality standards) rather than including nutrient restoration targets when associated with Category A projects. There are several water bodies associated with WQ improvement goals in this project, but there are not clear associated nutrient improvement type PMs (Category A).