



Restoration Coordination and Verification (RECOVER)
Evaluation Team, Regional Evaluation Report

TRANSMITTAL LETTER

August 3, 2005

Project Managers and Planning Technical Leads
Combined Structural and Operational Plan

Dear Project Team Managers and Planning Technical Leads,

RECOVER has completed its project-level performance measure consistency review of the Combined Structural and Operational Plan (CSOP) and our final report is attached.

RECOVER's evaluation of project performance measures fulfills the following requirements as prescribed by the Programmatic Regulations:

1. Ensure project will be achieving consistency with the CERP's goals and objectives
2. Document consistency of the project performance measures with RECOVER's approved system-wide performance measures
3. Suggest improvements to the project performance measures with the intent of improving target or evaluations methods to better evaluate project alternative plans, that, if pursued, would contribute to selecting a tentative plan with the best performance by the project in achieving ecosystem restoration goals

Specifically, RECOVER reviews the performance measures of CERP for consistency with the system-wide evaluation performance measures developed by RECOVER. Although CSOP is not one of the components of CERP its performance measures are evaluated by RECOVER due to the anticipated effects that CSOP will have on the Greater Everglades Wetlands, flood protection and perhaps water supply for urban and agricultural areas.

Comments provided in this report are to be used at the discretion of the CSOP project team for considering refinements to the CSOP performance measures. This technical review follows the Evaluation Team's processes and guidelines with an additional review by the RECOVER Leadership Group.

Best regards,

Evaluation Team Chairs
(Orlando Ramos-Ginés, Kim Jacobs, Steve Gilbert)

FINAL

RECOVER EVALUATION OF PROJECT-LEVEL PERFORMANCE MEASURES for Combined Structural and Operational Plan (CSOP) July 27, 2005

Prepared by RECOVER's Evaluation Team

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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. Although Combined Structural and Operational Plan (CSOP) is not one of the components of CERP its performance measures are evaluated by RECOVER due to the anticipated effects that CSOP will have on the Greater Everglades Wetlands, flood protection and perhaps water supply for urban and agricultural areas.

The purpose of this performance measures consistency review is: 1) to identify general compatibility of project-level performance measures with applicable CERP system-wide performance measures and 2) to provide information to project managers and others, as appropriate, regarding compatibility of project-level and system-wide performance measures of the CSOP as submitted to RECOVER June 1, 2005. When there is no system-wide performance measure with which to compare a project-level performance measure target, the performance measure's intent is compared to that of RECOVER performance measures and the goals and objectives of the Plan.

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 based on the latest scientific understanding. In order to fulfill this expectation, RECOVER relies on experts on the various resources included in CSOP's study area. Some of these RECOVER members also participate on

the CSOP project delivery team, thereby preventing a strictly defined independent review. Comments provided in this report are to be used at the discretion of the CSOP project team for considering refinements to the CSOP PMs. This technical review follows the Evaluation Team's processes and guidelines with an additional review by the RECOVER Leadership Group. Comments on the specific project-level performance measures are presented in Attachment A.

2.0 General Document Comments

The CSOP PMs are generally well-developed. RECOVER does, however, have suggestions regarding the use of quantifiable targets with ecological significance, targets developed for specific model applications, and duplicative performance measures.

Quantifiable Targets - Several CSOP performance measures lack quantifiable targets and use such substitutes as 'minimize' and 'maximize'. These soft targets do not provide a means of quantifying project benefits and do not convey ecological significance of a specific target. RECOVER suggests that targets be set to achieve a desired target based on natural system variability and benefits to the ecosystem. For example, the target for performance measure 1.c.ii is to maximize the ratio of dry season flow to annual flow through Taylor Slough. If the PM target remains as "maximize", a literal reading would define the best performance as an improbable 100% dry season flow. Even a more reasonable reading could be inconsistent with ET targets for marl areas if too much dry season flow prevents adequate drydown in flanking marl. In this instance, RECOVER suggests the target set a limit on the maximum flow ratio that would be considered beneficial.

Project Boundary Effects - Based on our experience with other efforts to model the Modified Water Deliveries and C-111 projects, RECOVER expects that performance changes may occur outside the CSOP project boundaries. RECOVER suggests the CSOP project look at areas outside the project boundaries to evaluate all of the effects on significant resources. Other areas to be evaluated might include Lake Okeechobee, WCA-1, WCA-2, WCA-3B and Biscayne Bay. Relevant RECOVER performance measures for these areas can be found on the Everglades Plan website at: http://www.evergladesplan.org/pm/recover/ret_perf_measures.cfm.

ModBranch and the SFWMM - Some CSOP PMs were originally developed for use with both the ModBranch model and the SFWMM. Since the CSOP team is now planning to use the SFWMM for almost all evaluations, targets originally developed for ModBranch have been modified for use with the SFWMM; however, these targets may not be relevant when used for the SFWMM. For example, Taylor Slough targets developed on a smaller grid scale may not be applicable at the larger 2-mile by 2-mile resolution of the SFWMM. Additionally, dry, wet, and average year targets developed for ModBranch may not be applicable to the SFWMM, which uses a 36-year period of record. For those PMs where it is unclear if there is consistency or if PMs have been deemed inconsistent with RECOVER PMs based on the ET's review methodology, additional analysis, oriented toward comparing the PMs using a common metric, may

determine whether the targets are consistent.. For example, PMs with a 36-year annual average target and PMs with a wet-average-dry year target could be compared using annual hydroperiod versus frequency of exceedance.

Natural System Model (NSM) – The RECOVER ET is currently re-evaluating some of its performance measures targets in order to make them less model dependent. The NSM is currently being questioned as the target in several regions. In general, it is felt that NSM provides an indication of spatial and temporal variation; however, the absolute values indicated by NSM are not felt to represent the habitats of the pre-drainage condition or validate in comparison to pre-drainage information. Targets are expected to change in the near future based on historical, paleoecological, and other empirically based evidence.

Duplication of Performance Measures - There appears to be duplication of many performance measures for a single metric within the current suite of CSOP performance measures. Some performance measure could be eliminated without affecting the overall metric being measured. For example, there are currently five performance measures for fish and invertebrates that evaluate the frequency of water depths in Taylor Slough < 1ft. Additionally, there are duplicative performance measures for Florida Bay. Performance measures have been developed for both stages and flows into Florida Bay. It is not clearly defined in the performance measure documentation why these two measures of the same metric were chosen, and what the advantages are of each. Additionally, RECOVER recognizes the utility of multiple PMs to determine benefits for a single indicator; however, the CSOP project team should consider including documentation to address how multiple PMs would be integrated for evaluation of project alternatives.

3.0 Consistency with RECOVER System-Wide Evaluation Performance Measures

There is general compatibility between most of the project-level performance measures developed by the PDT for the CSOP 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 Attachment A.

Marl Prairie Habitat Targets - In general, some evaluation targets may be inappropriate. Previous RECOVER evaluations have shown inconsistencies between NSM and best professional judgment targets for marl habitat hydroperiod and inundation patterns. The ET has worked with marl prairie experts from several agencies to set targets for marl areas that are independent of the NSM predictions. The inundation targets set for marl areas west of Shark Slough and near Taylor Slough are inconsistent with these targets. It is recognized that there are different subtypes of marl prairie, but a hydroperiod range of 7 to 10 months during average years and up to 11 months in wet years appears to be outside the range necessary to maintain marl soils. Rather, peat soils

would likely start to develop. ET targets for marl areas are attached for consideration (Attachment B).

Inundation Duration, Extreme High, and Extreme Low Stages - In general, CSOP performance measures are consistent with ET performance measures GE-E2 Inundation Pattern and GE-E3 Extreme High and Low Water Levels. There are a few exceptions as noted above. Besides evaluation targets related to marl prairies (1.a.iv.1), there also appear to be inconsistencies with inundation and extreme water level targets for fish and invertebrates (1.b.iii.1, 1.b.iii.2), snail kite foraging habitat (2.vi), Loxahatchee peat forming wetland (2.xii), and tree islands (2.xvii.1, 2.xvii.2). Generally, targets related to these performance measures are inconsistent with individual IR targets in ET performance measures. Please see specific comments contained in Attachment A for each performance measure for details.

Flow Targets - RECOVER has tabled performance measures based on flow volume across transects due to high levels of uncertainty with the model and the targets. To address this uncertainty, RECOVER suggests a target reflecting the NSM temporal (seasonal or monthly) distribution of flows across transects may be more appropriate in lieu of a volumetric target. If flow targets are used by the CSOP project team, RECOVER suggests more detail be added to the performance measure documentation to specify whether flow targets are for annual, seasonal or monthly flow.

Duration of Stage Targets - The modelers responsible for application of SFWMM highly recommend comparison of the longest stage durations possible, yet still relevant to the performance measure. At a minimum, average weekly stages should be used. The accuracy of the model improves as the temporal scale increases. RECOVER's Evaluation Team compares weekly water stages and depths and monthly flows. Using longer stage durations also avoids short dips or blips that do not have ecological significance, yet may be included in event counts.

4.0 Conclusions

There is general compatibility between most of the project-level performance measures developed for the CSOP 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 CSOP project team reexamine some performance measure targets to address uncertainty and best professional judgment. RECOVER also suggests reevaluating multiple performance measures for the same metric to avoid possible duplication. Overall, a continuing effort to integrate scientific knowledge between the CSOP project team and the RECOVER ET may be the best process to ensure an increasing level of consistency and efficiency in the application of performance measures for the region.

ATTACHMENT A

Objective 1: Ecosystem Restoration in Taylor Slough and Eastern Panhandle
MARL HABITATS
1.a.ii.4 Fish and invertebrates:
Restoration of hydropatterns typical of predrainage <u>marl prairies</u> to increase the total biomass of fishes and increase the proportion of fish and invertebrate species
<u>Metric:</u> Normalized (Divide Monthly Flow by Total flow) monthly distribution (volume distribution pattern)
<u>Target:</u> Toward NSM distribution not volume
<u>Model Comparison:</u> CSOP Base, NSM
<u>Contact:</u> Bruce Boler
<u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER's PM? YES RECOVER has dropped PMs based on NSM flow volumes across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. However, evaluating monthly distribution of flows is more preferable to volumetric targets.

1.a.iii.1 Fish and invertebrates:
Refugia is the term used for solution holes and ponds which offer pools of water to aquatic organisms when marsh surface water has been lost. However, water depths that exceed 1 foot below the ground surface cause the loss of water in a large proportion of the available refugia, rendering them non-functional, and killing the occupants.
<u>Metric:</u> # acres cells of marl prairie with minimum depth below -1.0 ft
<u>Target:</u> Minimize the number of continuous days that water depth is 1.0 ft or more below ground surface
<u>Model Comparison:</u> NSM, all alternatives
<u>Model:</u> SFWMM
Apply to IRs 143, 144, 145, 133, 147, 148 for period of record
NOTES: Evaluate all events lasting 2 or more continuous days where minimum depth is => 1 ft below ground surface. For each cell in each IR, sum all days counted as 'events'. Final score has unit of 'cell-days'. Evaluate NSM and all alternatives
Is the PM generally consistent with RECOVER's PM? YES

ATTACHMENT A

1.a.iii.2 Fish and invertebrates: Water recession rate

Metric: Water recession rate. Number of days during which water recession rates exceed 0.1 feet/day. Evaluate this metric for all days where water depth is between 1.2 and -0.5 feet. Water recession rates at depths > 1.2 feet and less than -0.5 feet are less important for the survival of fish and invertebrates.

Target: Minimize number of days when metric is exceeded

Model Comparison: NSM, all alternatives

Model: SFWMM

NOTES: evaluate the following cells of the SFWMM for the POR: C22, R9-17. Sum all days in all cells where critical recession rate is exceeded. Final score has unit of 'cell-days'.

Is the PM generally consistent with RECOVER's PM? **YES**

RECOVER recognizes this PM is consistent with the system-wide objectives, although it may not be directly comparable to a specific RECOVER PM. It is unclear why only cells C22, R9-17 are evaluated. Perhaps this PM should be applied to the entire landscape or rely upon indicator regions defined by RECOVER.

1.a.iii.3 Fish and invertebrates: Water level below ground surface

Metric: Number of events when water level is below ground surface.

Target: Minimize # of events.

Model Comparison: CSOP BaseNSM, all alternatives

Model: SFWMM

Apply to IRs 143, 144, 145, 133, 147, 148 for period of record

Notes: 'event' is defined as 1 day. Sum all events for each cell for all IR.

Is the PM generally consistent with RECOVER's PM? **Perhaps NO**

Rather than minimizing the number of drydown events, Evaluation Team's PMs GE-E2 and GE-E3 recognize that marl areas should experience substantial drydowns in most years. NSM predicts multiple drydown events in most years, particularly in spring as the wet season starts. Minimizing days below ground may conflict with Evaluation Team's targets for these PMs, and may result in change in soil type from marl to peat. Possible modifications to this PM to make it consistent with Evaluation Team's PM targets include modifying to count the number of dryout events only during the wet season or defining an event as 1 week.

ATTACHMENT A

1.a.iv.1 Marl prairie vegetation

Marl prairie vegetation can persist across a wide range of hydroperiods. Drier conditions lead to increased risks of either drought or fire risk, reduced periphyton development and increased expansion into marshes of woody plants

Metric: Flooding duration and depth

Target: Maximize number of cells in each IR that meet the targets for all years

Dry year: 0.1- ft water depth for 60-150 days

Wet year: 0.5-2 ft for 240-330 days

Average year: .25-1.75 ft water depth for 210-300 days

(Reference Tabb 1990 report to ACE)

Model Comparison: calculate for all alternatives, and NSM

Model: SFWMM

Apply to IRs 143, 144, 145

Is the PM generally consistent with RECOVER's PM? **NO**

Although there is no RECOVER PM for marl prairie vegetation, this PM is inconsistent with the inundation durations outlined in Evaluation Team's PM GE-E2 and with CSOP PM 2.xi. It is recognized that there are different subtypes of marl prairie, but a hydroperiod range of 7 to 10 months during average years and up to 11 months in wet years appears to be outside the range necessary to maintain marl soils. Rather, peat soils would likely start to develop. Evaluation Team's targets for GE-E2 are 56-112 days for IR143, 112-140 for IR144 and 144-168 for IR145

SLOUGH HABITAT

1.b.ii.1 Fish and Invertebrates

Restoration of NSM hydropatterns typical of predrainage Taylor Slough to increase the total biomass of fishes and increase the proportion of fish and invertebrate species

Metric: Flow Distribution

Target: Toward NSM *shape of curve*

Model Comparison: Normalized monthly distribution compared to NSM (volume and distribution pattern)

Model: SFWMM and NSM

Is the PM generally consistent with RECOVER's PM? **YES**

Although this PM is consistent with RECOVER PMs, the SFWMM does not model Taylor Slough as accurately as other areas of the Greater Everglades. Additionally, RECOVER notes that this PM appears to be duplicative of PM 1.a.ii.4 and is applied to the same transects twice.

ATTACHMENT A

1.b.iii.1 Fish and Invertebrates

Decrease the frequency and number of reversals and increase the duration of inundation in Taylor Slough

Metric: Minimum depth

Target: Maintain ground water levels no lower than ground surface elevation

Model Comparison: Compare with NSM

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **NO**

The target for this PM is not consistent with Evaluation Team's PM GE-E3 and GE-E2. Evaluation Team's targets are based on NSM, which predict numerous dry down events below ground surface for Taylor Slough and a hydroperiod of approximately 72% (NSM 4.6). RECOVER suggests modifying the target by adding "towards NSM" as in 1.b.iii.3 below. Additionally, the large spatial scale of the SFWMM includes adjacent marl prairie habitat as well as slough habitat. It would not be appropriate to maintain water levels at the ground surface for the marl prairie habitat. In addition, the SFWMM does not simulate this area well. Even when comparing to other simulations, performance changes are difficult to detect.

1.b.iii.2 Fish and Invertebrates:

Decrease the frequency and number of reversals and increase the duration of inundation in Taylor Slough

Metric: No of consecutive days depth < 1.

Target: Maintain minimum depths in the sloughs that support larger fish species (at least 1.0 feet for 365 days/year in average to wet years).

Model Comparison: Compare with NSM

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **NO**

Although RECOVER does not have a target for minimum water depths, Evaluation Team's targets for inundation duration, as well as high and low water events are based on NSM. Because NSM predicts depths of less than 1 foot in Taylor Slough in all years, even 1995, the target for this PM appears to be inconsistent. RECOVER suggests modifying the target for this PM by adding "toward NSM" as in 1.b.iii.3 below. It is not clear how the criteria for average to wet years will be applied to the SFWMM 36 year POR or to which IRs will be evaluated. Additionally, the SFWMM does not simulate Taylor Slough well, so it may not be possible to apply this criterion to that area. The project team may be able to calibrate to the Taylor Slough IR and apply an offset.

ATTACHMENT A

1.b.iii.3 Fish and Invertebrates

Decrease the frequency and number of reversals and increase the duration of inundation in Taylor Slough

Metric: No of times that depth is < 1 foot above ground surface in sloughs.

Target: Toward NSM

Model Comparison: CSOP Base, NSM

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **YES.**

While the intent of this performance measure is consistent with RECOVER system-wide performance measures, it is not clear what the event durations should be for it to be counted. Weekly average water stages are used for the majority of the Evaluation Team's performance measures.

Coastal Wetland and Estuarine HABITAT

1.c.i Maximize dry season flows through Shark Slough (ENP)

Metric: Ratio of dry season flow volume (Nov 1 – Mar 31) to annual flow

Target: Maximize this ratio for transect T27

Model Comparison: CSOP Base

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **MAY BE INCONSISTENT.**

RECOVER notes that the PM target of "maximize" may be problematic; it does not specify a quantifiable target. The target should set a target on the maximum ratio that would be considered beneficial. If the PM target remains as "maximize", it could be inconsistent with Evaluation Team's targets for marl areas if too much dry season flow prevents adequate dry down in flanking marl. RECOVER suggests this PM target be modified to read, "match NSM ratio".

1.c.ii Maximize dry season flows through Taylor Slough (ENP)

Metric: Ratio of dry season flow volume (Nov 1 to Mar 31) to annual flow

Target: Maximize this ratio for transect 23B

Model Comparison: CSOP Base

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **MAY BE INCONSISTENT.**

RECOVER notes that the PM target of "maximize" may be problematic; it does not specify a quantifiable target. The target should set a target on the maximum ratio that would be considered beneficial. If the PM target remains as "maximize", it could be inconsistent with Evaluation Team's targets for marl areas if too much dry season flow prevents adequate dry down in flanking marl. RECOVER suggests this PM target be modified to read, "match NSM ratio".

ATTACHMENT A

1.c.iii Maximize early dry season flows through ENP panhandle (ENP)

Metric: Ratio of early dry season flow volume (Nov 1 – Dec 31) to annual flow

Target: Maximize this ratio for transect 23C

Model Comparison: CSOP Base\

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **MAY BE INCONSISTENT.**

RECOVER notes that the PM target of “maximize” may be problematic; it does not specify a quantifiable target. The target should set a target on the maximum ratio that would be considered beneficial. If the PM target remains as “maximize”, it could be inconsistent with Evaluation Team's targets for marl areas if too much dry season flow prevents adequate dry down in flanking marl. RECOVER suggests this PM target be modified to read, “match NSM ratio”.

1.c.iv Minimize high-salinity events in specified coastal basins (ENP)

Metric: Summation of the amount that the weekly mean salinity exceeds the upper salinity reference

Target: Minimize the summation of high salinity (above the specified reference salinity) for each site and for the mean of all sites weighted equally. Sites include Manatee Bay, Joe Bay, Little Madeira Bay, Terrapin Bay, North River, Whitewater Bay East. Mean salinity for each basin must be between the low and high salinity reference values.

Model Comparison: CSOP Base

Model: SFWMM, Marshall Regression Model

Is the PM generally consistent with RECOVER's PM? **YES**

This PM uses the evaluation techniques developed by RECOVER. If the “specified reference salinity” values are those listed in Table 1 of Attachment E, they are consistent with the previous “thresholds” used by RECOVER for Evaluation Team's PM SE-E2. A newer version of SE-E2 is available based on NSM, these thresholds and multi-linear regressions. These values are currently under review by the South Estuaries sub-team of the RECOVER Evaluation Team. Soft targets such as “minimize” are not recommended, as they do not specify a quantifiable target. Natural fluctuation of salinity in response to rain is expected. Minimizing high salinity events does not reflect these natural fluctuations, so the target should set a limit on the minimum number of events that would be considered beneficial.

ATTACHMENT A

1.c.v Maximize low salinity days in specified coastal basins (ENP)

Metric: Summation of the amount that weekly mean salinity is below the lower salinity reference.

Target: Maximize the summation of low salinity (below the specified reference salinity) for each site and for the mean of all sites weighted equally. Sites include Manatee Bay, Joe Bay, Little Madeira Bay, Terrapin Bay, North River and Whitewater Bay East. Mean salinity must be between the low and high salinity reference values.

Model Comparison: CSOP Base

Model: SFWMM, Marshall Regression Model

Is the PM generally consistent with RECOVER's PM? **YES**

This PM uses the evaluation techniques developed by RECOVER. If the "specified reference salinity" values are those listed in Table 1 of Attachment E, they are consistent with the previous "thresholds" used by RECOVER for Evaluation Team's PM SE-E2. A newer version of SE-E2 is available based on NSM, these thresholds and multi-linear regressions. These values are currently under review by the South Estuaries sub-team of the RECOVER Evaluation Team. Soft targets such as "minimize" are not recommended, as they do not specify a quantifiable target. Natural fluctuation of salinity in response to rain is expected. Minimizing low salinity events does not reflect these natural fluctuations; the target should identify the minimum number of low salinity events that would be considered beneficial.

1.c.vi Minimize early dry season salinity (ENP)

Metric: Mean of annual early dry season (Nov 1 – Dec 31) median salinity

Target: Minimize mean of annual early dry season (Nov 1 – Dec 31) median salinity for each site and for all sites, weighted equally. Sites include Manatee Bay, Joe Bay, Little Madeira Bay, Terrapin Bay, North River, and Whitewater Bay East

Model Comparison: CSOP Base

Model: SFWMM, Marshall Regression Models

Is the PM generally consistent with RECOVER's PM? **YES**

This PM uses the evaluation techniques developed by RECOVER. If the "specified reference salinity" values are those listed in Table 1 of Attachment E, they are consistent with the previous "thresholds" used by RECOVER for Evaluation Team's PM SE-E2. These values are currently under review by the South Estuaries sub-team of the RECOVER Evaluation Team. Soft targets such as "minimize" are not recommended, as they do not specify a quantifiable target. Natural fluctuation of salinity in response to rain is expected. Minimizing low salinity events does not reflect these natural fluctuations, so the target should identify the minimum number of events that would be considered beneficial.

ATTACHMENT A

Objective 2: ENP Natural Values
2.i CSSS nesting requirements (FWS)
<p>Probability curves are used to display the number of consecutive days during sparrow breeding season (March 1 to July 15) when water levels are below the ground surface within possible sparrow subpopulation Special Issue Regions 201-206.</p> <p><u>Metric:</u> Number of days water levels are below ground surface between March 1 and July 15, referred to as nesting days.</p> <p><u>Target:</u> Special Issue Region 201, a minimum of 50 to 60 consecutive nesting days, preferably 80 consecutive nesting days, in all years until sparrow numbers in this region have increased to at least 1,000 individuals (Walters et al. 1999). Special Issue Regions 202 to 206 – 40 consecutive nesting days for 8 out of 10 years is considered favorable for sparrow persistence; 40 consecutive nesting days for 7 out of 10 years is considered borderline for persistence; 80 consecutive nesting days for 7 out of 10 years is considered favorable; and 80 consecutive nesting days for 8 out of 10 years is considered very favorable.</p> <p><u>Model Comparison:</u> IOP Alt7r, No Action, CSOP Base, NSM</p> <p><u>Model:</u> SFWMM</p>
<p>Is the PM generally consistent with RECOVER's PM? YES</p> <p>The RECOVER Evaluation Team does not have an equivalent CSSS PM, but did review this PM previously at the request of FWS. Targets for this PM are compatible with Evaluation Team's targets for PM GE-E2 as applied to marl areas.</p>
2.ii CSSS – habitat suitability (FWS)
<p>Exceedance frequency curves are used to display the average discontinuous hydroperiod (days/year) when water levels are above ground surface within sparrow subpopulation Special Issue Regions 201-206.</p> <p><u>Metric:</u> Annual discontinuous hydroperiod</p> <p><u>Target:</u> 2 to 4 month (60 to 120 day) average discontinuous hydroperiod is considered favorable and supportive of <i>Muhlenbergia</i>-dominated habitat. 4 to 6 month (120 to 180 day) average discontinuous hydroperiod is considered good for other vegetation favorable to sparrow nesting.</p> <p><u>Model Comparison:</u> IOP Alt7r, No Action, CSOP Base, NSM</p> <p><u>Model:</u> SFWMM</p>
<p>Is the PM generally consistent with RECOVER's PM? YES</p> <p>The RECOVER Evaluation Team does not have an equivalent CSSS PM, but did review this PM previously at the request of FWS. Targets for this PM are compatible with Evaluation Team's targets for PM GE-E2 as applied to marl areas.</p>

ATTACHMENT A

2.v Snail Kite – Foraging Habitat Vegetation Structure

Metric: Average duration of flooding events over the 36 year period-of-record.

Target: Evaluations will be based on the second column (Avg Flood Duration) (Wks/Event) in the existing Inundation Duration Summary for Indicator Regions table. Indicator regions with average flood durations from 156 to 260 weeks will be considered optimal, indicator regions with average flood durations from 104 to 155 weeks or 261 to 312 weeks will be considered marginal.

Model Comparison: CSOP Base

Model: SFWMM

Apply to IRs 129-133

Is the PM generally consistent with RECOVER's PM? **YES**

This PM is identical to GE-E18

2.vi Snail Kite - Potential foraging habitat for snail kite.

For this analysis this performance measure estimates the number of acres with water depth between 0.2 and 1.3 meters for greater than 360 days/year.

Metric: Acres snail kite habitat

Target: Maximize # acres

Model Comparison: Modeled water depths will be analyzed throughout the study area to determine where potential snail kite habitat would be found and how that habitat would be changed by each alternative relative to the base, current conditions (IOP Alt7r) and NSM. Table of acres of suitable snail kite habitat by basin, for each alternative, base.

Model: Model: Model: SFWMM and NSM

Apply to IRs in 8.5SMA, Rem. Glades, BCNP, BCNP North, BCNP South, ENP, Holeland, Rotenberger, Pennsuco, WCA-1, WCA-2, WCA-2A, WCA-2B

Is the PM generally consistent with RECOVER's PM? **NO**

The target for this PM is currently inconsistent with Evaluation Team's PM GE-E18. Based on Bennetts et al. (1998) and Bennetts pers. comm. (2003), optimal snail kite foraging habitat supporting emergent wet prairie vegetation is maintained in areas where water levels fall below ground surface between 1 in 3 and 1 in 5 years (156-260 weeks average flood duration). Marginal habitat is maintained in slightly drier and slightly wetter areas with 1 in 2 to 1 in 3 year dry downs (104-156 weeks average flood duration) and 1 in 5 to 1 in 6 dry downs (260-312 weeks average flood duration). These hydroperiod classes correspond with the hydrologic requirements of emergent marsh vegetation reported in the scientific literature as reviewed in two recent publications (Wetzel 2001 and SFWMD 1995). The CSOP PM would only allow dry downs for 4 or less days/year. RECOVER suggests this PM be modified to allow occasional longer dry downs, which have been shown to be necessary for habitat maintenance. Additionally, RECOVER notes that the high end water depth for this PM target is inconsistent with Evaluation Team's PM GE-E3 for all IRs specified. This PM should only be applied where Snail Kites are most likely to forage, Holeland and Rotenberger WMA, WCA's and ridge and slough portions of ENP.

ATTACHMENT A

2.vii Manatees and Crocodiles

The frequency of input of annual flow volumes towards Shark Slough estuaries.

Metric: Frequency across transect. Crocs - salinity regimes for juvenile development

Target: [shape of the NSM curve](#)

Model Comparison: Relative frequency compared to NSM (volume and shape of the curve).

Model: SFWMM and NSM

Is the PM generally consistent with RECOVER's PM?

[RECOVER has dropped PMs based on NSM flow volumes, frequency or seasonal distributions across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. Suggest dropping or modifying metric to remove comparison to NSM flow volumes. Additionally, this PM would be better substantiated if seasonal flows were related to requirements of early spring hatchlings.](#)

2.viii Manatees and Crocodiles

The distribution of mean monthly freshwater flow volumes into Shark Slough.

Metric: Distribution across transects. Crocs - juvenile dispersal in estuaries

Target: [shape of the NSM curve](#); October – December

Model Comparison: Monthly distribution compared to NSM (volume and distribution pattern)

Model: SFWMM and NSM

Is the PM generally consistent with RECOVER's PM?

[RECOVER has dropped PMs based on NSM flow volumes across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. Suggest dropping or modifying metric to remove comparison to NSM flow volumes. Additionally, this PM would be better substantiated if seasonal flows were related to requirements of crocodile hatchlings.](#)

2.xi Marl prairie vegetation (all areas of marl prairie vegetation in the Park outside of the eastern Panhandle)

Marl prairie vegetation in any of several can persist across a wide range of hydroperiods ranging from about 3 to 8 months of annual flooding. At the dry end of this range there are increased risks of either drought and fire risk, reduced periphyton development and increased expansion into marshes of woody plants.

Metric: Flooding duration

Target: Hydroperiods with surface water in excess of 4 to 6 months annually are considered preferred over the drier state that characterizes current conditions. Assumption is that no alternative will cause annual hydroperiods to exceed 8 months because longer flooding brings the likelihood that vegetation will begin to develop slough-like characteristics within the marl prairie.

Model Comparison:

Model: SFWMM

Apply to IRs 140, 141, 147, 148

ATTACHMENT A

Is the PM generally consistent with RECOVER's PM? **YES**

The targets should be further clarified since not all areas have same requirements. RECOVER Evaluation Team has developed targets for individual indicator regions in the Marl Prairie. (see attached).

2.xii Loxahatchee peat forming wetland (ENP)

Metric: water depth and hydroperiod. Evaluated IR 130,131, and 129WEST (see notes)

Target: average dry season minimum depth of 0.8 feet and minimum hydroperiod of 300 days, AND average wet season minimum depth of 1.5 feet and minimum hydroperiod of 300 days.

Output table shows number of years per cell in each IR when targets are reached. Maximize number of cell-years where target is reached over the period of record. Cell-year is the sum of the total number of years when the target is reached, for all cells in the IRs.

Model Comparison: calculate for all alternatives and NSM

Model: SFWMM

Apply to IRs 130, 131, 129 West

Is the PM generally consistent with RECOVER's PM? **NO**.

This PM is inconsistent with Evaluation Team's PM GE-E2. Evaluation Team's PM targets for inundation duration for the specified IRs are based on NSM. For IRs 130 and 131, NSM predicts numerous dry season minimums less than 0.8 ft and several wet season minimums below 1.5 ft. IR 129W could not be evaluated since output was not available.

2.xiv Hydrologic Surrogate for Phosphorus – Phosphorus transport by Soil Oxidation (ENP)

Metric: Frequency of dry-down events, evaluated at indicator regions 121 through 126 and 128.

Target: Minimize number of dry-down events

Model Comparison: CSOP Base, NSM

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **MAY BE INCONSISTENT**

RECOVER recognizes that this PM uses a hydrologic surrogate of drydown events to evaluate TP flux. The title of this PM "Phosphorus transport by Soil Oxidation" appears to be misleading since the PM primarily evaluates TP flux. This PM is consistent with the intent of RECOVER WQ PMs and Evaluation Team's PM GE-E1. Evaluation Team's PM GE-E1 targets for the number of drydown events are based on NSM. Soft targets such as "minimize" are not recommended, as they do not specify a quantifiable target. Natural fluctuation of stage in response to rain is expected. Minimizing drydown events does not reflect these natural fluctuations, so the target should set a target for the minimum number of events that would be considered acceptable. Additionally, please note that research indicates dry down of less than one-month may lead to increased TP flux. The Evaluation Team's PM GE-E1 uses duration of one week for dry down events.

ATTACHMENT A

<p>2.xv Tree islands (RET) – Hydrologic Suitability for Elevated Everglades Tree Islands</p> <p><u>Metric:</u> See updated Evaluation Team’s GE-E6 <u>Model:</u> SFWMM</p> <p>Apply to IRs 129-133</p> <p>Is the PM generally consistent with RECOVER’s PM? YES</p> <p>RECOVER Evaluation Team’s PM GE-E6 was developed for all of the GE and is not specific to ENP. Tree islands within ENP may require different conditions than those in WCA-3 or other portions of the GE. For example, ENP did not see flooding effects on vegetation that were observed in the water conservation areas north of ENP (Jones et al in "Ecological Assessment of the 1994-1995 High Water Conditions in the Southern Everglades"). However, the relative heights of tree islands in slough habitats of ENP are very similar to those in WCA-3. (Reference Tabb 1990 report to COE). If NSM hydrology is considered an appropriate target for ridge and slough habitats in ENP, this PM could be applicable there as well.</p>
<p>2.xvii.1 Tree Islands (ENP)</p> <p><u>Metric:</u> Relative Drought Magnitude (RDM) <u>Target:</u> 0 <u>Model Comparison:</u> Modeled stage-duration versus stage-duration envelope generated from conditions in reference areas in 1986. <u>Model:</u> SFWMM</p> <p>Is the PM generally consistent with RECOVER’s PM? NO</p> <p>NOTE: This review is based on CSOP documentation received as of 6/15/05. Additional information was requested.</p> <p>This PM is inconsistent with Evaluation Team’s PMs GE-E3 and GE-E2 as described: Inconsistency with GE-E3. Target depths used in this performance measure are inconsistent with extreme low values for evaluating performance in GE-E3. GE-E3 PM presumes that there is a potential for soil loss only when the water level drops sufficiently below the surface that capillary action no longer occurs. A conservative measure of the level that this risk may occur in ridge and slough habitat is generally considered to be -1.0 ft below the average ground surface, as is implied under GE-E3. The dry condition depth targets that range from just below ground to 1.5 ft above ground are inconsistent with the Evaluation Team’s low water targets Inconsistency with GE-E2. Because this PM assumes greater extreme high water depths and higher extreme low water levels than those prescribed in GE-E3, it is possible that inundation periods could become too long with fewer dry downs than predicted under NSM. If this were to occur, this PM would constitute an inconsistency with GE-E2.</p>

ATTACHMENT A

2.xvii.2 Tree Islands (ENP)

Metric: Relative Flood Magnitude (RFM)

Target: Total score of 36 or less over the period of record (SFWMM); Annual targets less than or equal to 1 (ModBranch)

Model Comparison: Modeled stage-duration versus stage-duration envelope generated from conditions in reference areas in 1986 and 1995.

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **NO**

NOTE: This review is based on documentation received as of 6/15/05

This PM is inconsistent with Evaluation Team's PMs GE-E3, GE-E2, and GE-E6 as described:

Inconsistency with GE-E3. Target depths used in this performance measure are inconsistent with extreme high values for evaluating performance in GE-E3. The high water target allows depths >2.5 ft for 100% of the time, which is inconsistent with the Evaluation Team's high water target. For example, the CSOP *target* stage maximum of 3.0 to 4.0 ft depths in eastern WCA-3B in 1995, with depths > 3.0 ft for approximately 300 days is not consistent with extreme high water values with Evaluation Team's performance measure GE-E3, which has high water events greater than 2.5 ft of 4 weeks or less duration, less than 4 times during the 36 year POR.

Inconsistency with GE-E2. Because this PM assumes greater extreme high water depths and higher extreme low water levels than those prescribed in GE-E3, it is possible that inundation periods could become too long with fewer dry downs than predicted under NSM. If this were to occur, this PM would constitute an inconsistency with GE-E2.

Inconsistency with GE-E6. Target depths >2.0 ft used in this performance measure are inconsistent with targets outlined in Evaluation Team's PM GE-E6, which is based on no more exceedances >2.0 ft than predicted by NSM in a particular indicator region. Mean flooding depths that exceed 2.0 ft can have serious consequences even on flood tolerant species like bald cypress (Connor 2002).

General Comments for Objective 2 PMs:

RECOVER suggests using RECOVER PMs (GE-E1: Number and duration of Dry Events for SRS, GE-E2: Inundation pattern in the GE, GE-E3: Extreme High and Low Events in the GE, and GE-E6: Hydrologic Suitability for Elevated Everglades Tree Islands) to evaluate area throughout the WCAs and ENP. Because of the importance of the WCA's as foraging and nesting habitat for wading birds in the Everglades, tree island habitat, and home to large alligator populations, all applicable Everglades habitat should be evaluated as separate landscape types to understand and compare performance across multiple landscapes and locations. The CSOP PDT may wish to consider adopting an additional objective or constraint something like: "no incidental harm to other natural system areas".

ATTACHMENT A

Objective 3: Damaging Freshwater Flows
3.i Impacts of freshwater flow on Manatee Bay/Barnes Sound
Reduce frequency of high volume discharges to Manatee Bay/Barnes Sound <u>Metric:</u> Minimize the area beneath the curve of the frequency distribution of S-197 flows to provide flood related emergency discharges of freshwater to Manatee Bay as computed by the following statistic: $\sum (Q - Q_{\min})F(Q)$ where Q is the discharge, Q_{\min} is the minimum discharge thought to be significant (assumed to be zero), and F(Q) is the frequency of the discharge Q. <u>Target:</u> No flow through S-197 <u>Model Comparison:</u> Compare to CSOP base, NSM target, and IOP Alt7r <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER's PM? YES RECOVER suggests the PDT look at evaluation Team's PM SE-E4: Manatee Bay and coastal embayments of Barnes Sound to further refine these targets.
3.ii Impacts of mid to late dry season freshwater flow releases to ENP panhandle
Reduce frequency and discharge volumes from S-18C during the mid-late dry season (Jan 1 – April 30) <u>Metric:</u> Daily frequency distribution of S-18C releases during the mid to late dry season (Jan 1 – April 30) <u>Target:</u> No S-18C releases during the dry season <u>Model Comparison:</u> Compare to CSOP base, NSM target, and IOP Alt7r <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER's PM? There is no similar RECOVER PM.

ATTACHMENT A

Objective 4: Flood Protection for C-111 Basin

4.i Agriculture Flood Risks: Combined Row crops (USACE)

Metric: Map of model domain cells where stage is above critical depth for damaging duration. There will be two maps. The first will be for the POR and SFWMM; the second will be for 1995 and MODBRANCH. Increases in water depth and duration have the potential to damage agricultural activity. All agricultural cells from SFWMM 2x2 can be used as guide to indicate location of intensive agriculture to see if an alternative is better or worse when compared to 1994 GRR. The locator cells can then be related to MODBRANCH cells. For nursery and tree crops are affected year round. Field crops are most susceptible to flood damage from September to March.

Target: Target is equal to or better than 1994 C-111 GRR planning condition.

Model comparison: Compare to 1994 C-111 GRR planning condition, and no-action alternative.

Model: SFWMM and MODBRANCH

Apply in cells with dominant crop type of row crop

Is the PM generally consistent with RECOVER's PM?

A better explanation of the critical depths and durations is necessary to understand how sustained damages will be evaluated for this PM. Hyperlinked material specified in the PM documentation is no longer accessible. In addition how the maps will be compared to the stated evaluation criteria is not evident. Lastly, when converting MODBRANCH cells to SFWMM, cells containing canals may not be useful for evaluations, as the water levels will reflect canal operations.

4.ii Agriculture Flood Risks: Instantaneous Damages to Fruit Groves and Field Nurseries (USACE)

Metric: Map of model domain cells where stage is above critical depth for cells with dominant crop type of fruit grove or field nursery. There will be two maps. The first will be for the POR and SFWMM; the second will be for 1995 and MODBRANCH. Increases in water depth and duration have the potential to damage agricultural activity. All agricultural cells from SFWMM 2x2 can be used as guide to indicate location of intensive agriculture to see if an alternative is better or worse when compared to 1994 GRR. The locator cells can then be related to MODBRANCH cells. For nursery and tree crops are affected year round. Field crops are most susceptible to flood damage from September to March.

Target: Target is equal to or better than 1994 C-111 GRR planning condition.

Model comparison: Compare to 1994 C-111 GRR planning condition and no-action alternative.

Model: SFWMM and MODBRANCH

Is the PM generally consistent with RECOVER's PM?

A better explanation of the critical depths and durations is necessary to understand how instantaneous damages will be evaluated. This is critical when applying the performance measure to the SFWMM; the SFWMM is not a stormwater routing model and may not simulate short duration rain events well. The hyperlinked material specified in the PM documentation is no longer accessible. In addition how the maps will be compared to the evaluation criteria is not evident. Lastly, when converting MODBRANCH cells to SFWMM, cells containing canals may not be useful for evaluations, as water levels will reflect canal operations.

ATTACHMENT A

4.iii Agriculture Flood Risks: Sustained Damages to Fruit Groves and Field Nurseries (USACE)

Metric: Map of model domain cells where stage is above critical depth for damaging durations in cells with dominant crop type of fruit grove or field nursery. There will be two maps. The first will be for the POR and SFWMM; the second will be for 1995 and MODBRANCH. Increases in water depth and duration have the potential to damage agricultural activity. Locator cells (to be determined by field interviews in combination with land use survey) from SFWMM 2x2 can be used as guide to indicate location of intensive agriculture to see if an alternative is better or worse when compared to 1994 GRR. The locator cells can then be related to MODBRANCH cells. For nursery and tree crops are affected year round. Field crops are most susceptible to flood damage from September to March.

Target: Target is equal to or better than 1994 C-111 GRR planning condition.

Model comparison: Compare to 1994 C-111 GRR planning condition

Model: SFWMM and MODBRANCH

Is the PM generally consistent with RECOVER's PM?

A better explanation of the critical depths and durations is necessary to understand how sustained damages will be evaluated. The hyperlinked material specified in the PM documentation is no longer accessible. In addition how the maps will be compared to the criteria is not evident. Lastly, when converting MODBRANCH cells to SFWMM, cells containing canals may not be useful for evaluations, as water levels will reflect canal operations.

4.iv Agricultural Flood damages - delineate by watershed (USACE)

Spatial extent of project-induced flood damages to agricultural areas delineated by watershed for a specific event, 20 – 24 June 1995, a naturally occurring 1-in-10 year rainfall event.

Metric: Total number of agricultural acres where the water is within the root zone for a period sufficient to cause damages during the 1-in-10 year rainfall event. The period 20-24 June 1995 is a naturally occurring 1-in-10 year rainfall event.

Target: Target is equal to or better than the 1994 C-111 GRR planning condition

Model Comparison: Compare to 1994 C-111 GRR planning condition, and no-action alternative

Model: ModBranch

Is the PM generally consistent with RECOVER's PM? **YES, most likely.**

No Evaluation Team PM is directly comparable, but several have similar intent.

ATTACHMENT A

4.v Flood risks east of L-31N: Peak Stage Difference map (USACE)

Metric: Percent of days during a wt year (1995) that the maximum stage > 0.25 and 0.5 ft higher than 1994 C-111 GRR Planning Condition conditions.

Target: No increase in number of days where the maximum stage is > 0.25 and 0.5 ft higher than the 1994 C-111 GRR Planning Condition.

Model Comparison: No Action Alternative

Model: SFWMM and MODBRANCH

Is the PM generally consistent with RECOVER's PM?

When converting MODBRANCH cells to SFWMM, cells containing canals may not be useful for evaluations, as water levels will reflect canal operations.

4.vi Peak Stage (USACE)

Spatial extent of flood damages to areas during 1-in-10 year event

Metric: Area: total number of acres where the stage is greater than the existing ground surface elevation during the 1-in-10 year rainfall event. The period 20-24 June 1995 is a naturally occurring 1-in-10 year rainfall event.

Target: Target is equal to or better than 1994 C-111 GRR Planning Condition

Model Comparison: 1994 C-111 GRR planning condition, and no-action alternative

Model: MODBRANCH

Is the PM generally consistent with RECOVER's PM? **YES, most likely.**

No Evaluation Team PM is directly comparable, but several have similar intent.

Objective 5: Maintain the mitigation for project induced flood damages in the East Everglades, including the 8.5 SMA, the Osceola Camp, and the Tiger Tail Indian Camp.

5.i Maintain peak stages within 8.5 SMA (USACE)

This evaluation criterion addresses flood mitigation requirements of Everglades Expansion Act of 1989: Maintain level of flood mitigation within 8.5 SMA as specified in the 8.5 SMA Final GRRS

Metric: Change in the number of acres during a wet year (1995) where flood mitigation is maintained at or below the Base83 wet year (1995) peak stages. The period 20-24 June 1995 is a naturally occurring 1-in-10 year rainfall event. The period 1-7 July 1995 (week 26) has the highest ground water stages found during 1995.

Target: Areas within the levee will not have an increase in flooding impacts as specified by the Base 83 Planning Condition.

Model Comparison: "No Action" Planning Condition (includes 8.5 SMA alternative 6D), Base 83 Planning Condition, and CSOP Base Planning Condition

Model: MODBRANCH

Is the PM generally consistent with RECOVER's PM?

RECOVER does not have a flood mitigation PM for this area.

ATTACHMENT A

5.ii Maintain weekly average stages within 8.5 SMA - agricultural impact (USACE)

This evaluation criterion addresses flood mitigation requirements of Everglades Expansion Act of 1989: Maintain level of flood mitigation within 8.5 SMA as specified in the 8.5 SMA Final GRRS

Metric: Weekly average stage at specified indicator locations

Target: Indicator locations within the levee will not have an increase in peak stage (week 26 of 1995) as specified by the Base83 Planning Condition

Model Comparison: “No Action” Planning Condition (includes 8.5 SMA alternative 6D), Base83 Planning Condition, and CSOP Base Planning Condition

Model: MODBRANCH

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

5.iii Maintain hydroperiods within 8.5 SMA (USACE)

This evaluation criterion addresses flood mitigation requirements of Everglades Expansion Act of 1989: Maintain level of flood mitigation within 8.5 SMA as specified in the 8.5 SMA Final GRRS

Metric: Hydroperiod at specified indicator locations

Target: Indicator locations within the levee will not have an increase in hydroperiod as specified by the Base83 Planning Condition.

Model Comparison: “No Action” planning condition (includes 8.5 SMA Alternative 6D), Base83 Planning Condition, and CSOP Base Planning Condition.

Model: MODBRANCH

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

5.iv Consecutive days of inundation within 8.5 SMA (USACE)

This evaluation criterion addresses flood mitigation requirements of Everglades Expansion Act of 1989: Maintain level of flood mitigation within 8.5 SMA as specified in the 8.5 SMA Final GRRS

Metric: Consecutive days of inundation: number of consecutive days where the stage is above the ground surface elevation and where the stage is greater than 0.2 ft above the ground surface elevation.

Target: Areas within the levee will not have an increase in consecutive days of inundation as specified by the Base83 Planning Condition.

Model Comparison: “No Action” planning condition (includes 8.5 SMA Alternative 6D), Base83 Planning Condition, and CSOP Base Planning Condition.

Model: MODBRANCH

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

ATTACHMENT A

5.v Acres of root zone inundation within the 8.5 SMA (USACE)

This evaluation criterion addresses flood mitigation requirements of Everglades Expansion Act of 1989: Maintain level of flood mitigation within 8.5 SMA as specified in the 8.5 SMA Final GRRS

Metric: Acres of crops that are damaged (row, truck, and tree) during wet (1995), dry (1989), and average (1978) years

Target: Area within the levee will not have an increase in flooding impacts as specified by the Base83 Planning Condition.

Model Comparison: “No Action” planning condition (includes 8.5 SMA Alternative 6D), Base83 Planning Condition, and CSOP Base Planning Condition.

Model: MODBRANCH

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

5.vi Flooding impacts on the Tiger Tail Camp: Maintain flood protection for the residents of the Tiger Tail Camp

Metric: Compare stage hydrographs and stage duration curves at Tiger Tail Camp.

Target: Maintain stages below 11 feet NGVD at all times.

Model Comparison: No need to compare models. The target is an absolute.

Model: SFWMM

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

5.vii Flooding impacts on the Osceola Camp:

Metric:

1. Compare stage hydrographs, stage duration curves at Osceola Camp

Target: Maintain “No Action Plan” planning condition

Model Comparison: Compare to 1994 C-111 GRR planning condition and no-action alternative

Model: SFWMM

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

5.viii Flooding impacts on the Miccosukee Indians' Special Use Permit Area (SUPA):

Metric:

1. Compare stage hydrographs, stage duration curves at various locations within the SUPA.

Target: Maintain “No Action Plan” planning condition

Model Comparison: Compare to 1994 C-111 GRR planning condition and no-action alternative

Model: SFWMM

Is the PM generally consistent with RECOVER’s PM?

[RECOVER does not have a flood mitigation PM for this area.](#)

ATTACHMENT A

Objective 6: Ensure that C-111 project waters diverted to ENP meet all applicable water quality criteria; (1994 C-111 GRR)

Objective 7: Construct modifications to improve water deliveries into ENP and take steps to restore natural hydrologic conditions in ENP by:

TIMING

7.a.i Monthly and annual flow variation:

The 31-yr POR NSM data would be used to produce and accept range for flow volume for each month (one SD above and below the mean). For each Alt., monthly flows (avg. For all cells in transect) outside this range would be summed and plotted as a bar above and below the range, and the number of indicated flows outside the range would be noted

Metric: Flow volume

Target: Toward NSM

Model Comparison: Compare to CSOP base, NSM target, and current conditions

Model: SFWMM

Evaluation protocol: Compare flow-frequency curves of annual surface water flow at selected transects. The volume difference between each alternative flow-frequency curve and the NSM flow-frequency curve, at the specified transects, is used to measure volume deviation from NSM over the period of record, and variation between years.

Is the PM generally consistent with RECOVER's PM? **NO**

RECOVER has recently tabled PMs based on flow volume across transect due to high levels of uncertainty. A target of moving toward NSM monthly distribution curve may be more appropriate.

7.a.ii Normalized monthly hydrographs:

For each alternative, monthly flows (average for all cells in transect) would be plotted as a % of the annual to focus analysis on timing, independent of quantity (using same transects as the transect description described above)

Metric: Flow volume and timing

Target: Toward NSM

Model Comparison: Compare to CSOP base, NSM target, and current conditions

Model: SFWMM

Scoring of the PM: regression of the mean monthly runoff from each alternative with the mean monthly NSM runoff, at selected transects. Result is a scoring of the monthly runoff pattern, not absolute values of runoff volume.

Is the PM generally consistent with RECOVER's PM?

ATTACHMENT A

LOCATION
7.b.i Flow Distribution:
<u>Metric:</u> Flow volume and distribution <u>Target:</u> Toward NSM shape of the curve ? CSOP PM document says “Toward NSM” <u>Model Comparison:</u> CSOP base case, NSM and current conditions <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER’s PM? NO RECOVER has dropped PMs based on NSM flow volumes across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. Suggest dropping or modifying metric to remove comparison to NSM flow volumes.
7.b.ii Shark River Slough – Number and duration of dry events
<u>Metric:</u> See RET GE-E1 <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER’s PM? YES
7.b.iii Greater Everglades wetlands – Inundation pattern
<u>Metric:</u> See RET GE-E2 <u>Model:</u> SFWMM Apply to IRs 124-133, 140-148
Is the PM generally consistent with RECOVER’s PM? YES
7.b.iv Greater Everglades wetlands – Extreme high and low water levels
<u>Metric:</u> See RET GE-E3 <u>Model:</u> SFWMM Apply to IRs 124-133, 140-148
Is the PM generally consistent with RECOVER’s PM? YES

ATTACHMENT A

VOLUME
7.c.i Dry, average, wet year drought/flood hydroperiod Maps:
These maps should be produced relative to +1.0ft, ground surface, and -.5ft. They can also be plotted as hydroperiod differences to highlight differences between alternatives
<u>Metric:</u> Hydroperiod <u>Target:</u> Toward NSM <u>Model Comparison:</u> Compare to CSOP base, <u>Model:</u> SFWMM average year, '89 and '95 This “PM” is not scored for the quantification of benefits. The maps will be used to help interpret the results from hydroperiod-based performance measures. The maps show cell-by-cell which geographic areas are improved or impacted by the proposed alternatives. The same maps have been used in the past to evaluate performance of alternatives in other studies.
Is the PM generally consistent with RECOVER’s PM? YES

7.c.iii Distribution of Flow into and within ENP
<u>Metric:</u> Flow Volume <u>Target:</u> Toward NSM <u>Model Comparison:</u> CSOP Base, NSM <u>Model:</u> SFWMM For each CSOP alternative, the frequency distribution of the deviation of annual and seasonal flow volumes from NSM values across each model transect will be graphed. The frequency distribution of annual and seasonal rainfall amounts will also be displayed on each graph. Labels will identify the year represented by each point on the flow deviation and rainfall frequency distributions.
Is the PM generally consistent with RECOVER’s PM? NO RECOVER has dropped PMs based on NSM flow volumes across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. Suggest dropping or modifying metric to remove comparison to NSM flow volumes.

Additional Objective: Future Restoration Actions. Maximize compatibility with future authorized restoration (Made Performance Indicators)

Additional Objective 2: Socioeconomic Impacts
A.2.i Impact to business – delineate by watershed
<u>Metric:</u> Number of commercial parcels impacted due to locations and/or specific alternative features and performance. <u>Target:</u> Minimize <u>Model Comparison:</u> Not applicable <u>Model:</u> Model output not required
Is the PM generally consistent with RECOVER’s PM? RECOVER is not evaluating this performance measures.

ATTACHMENT A

A2.ii Impacts to residences – delineate by watershed

Metric: Number of residences relocated due to location and/or specific alternative features and performance.

Target: Zero

Model Comparison: Not applicable

Model: Model output not required

Is the PM generally consistent with RECOVER's PM?

RECOVER is not evaluating this performance measures.

A2.iii Lost agricultural land – delineate by watershed

Metric: Area: total number of acres of agriculture lands which will no longer be available for agricultural use due to an alternative (water elevation always within 8 inches of ground surface).

Target: Zero

Model Comparison: CSOP Alternatives

Model: SFWMM & MODBRANCH

Is the PM generally consistent with RECOVER's PM?

RECOVER is not evaluating this performance measures.

Additional Objective 3: Enhanced Flood Protection

A.3.i Flood Risks east of L-31N: Average groundwater stage difference map (Miami-Dade Co. DERM)

Metric: Maximum daily groundwater stage, stage duration curves for the average daily groundwater table and the 25% probability of exceedance groundwater table or October Water Table, indication of the groundwater stages during the wet season. The results could be obtained for each cell of the model and compared to the USGS October Groundwater table maps 1990-1999.

Target: Target is no statistically significant deviation from current conditions (IOP Alt7r), expressed as the Average October Groundwater table maps 1990-1999, produced by USGS and the frequency distribution curves obtained on the same wells used in the study. Target is the Modbranch wet year equal to or less than average October groundwater table.

Model Comparison: IOP Alt7r

Model: Modbranch, SFWMM

Is the PM generally consistent with RECOVER's PM?

A.3.ii Agriculture flood risks (FDACS) Comparison of stage difference map

Metric: Percent of time that the wet season and dry season weekly average stage differences are at least 0.25 feet and 0.50 feet higher than the ISOP 2001 conditions.

Target: ISOP 2001 conditions. No increase in number of days where the maximum stage is > 0.25 and 0.5 ft higher than the ISOP 2001 condition.

Model Comparison: ISOP 2001

Model: SFWMM

Is the PM generally consistent with RECOVER's PM?

ATTACHMENT A

A.3.iii Agriculture flood risks (FDACS) Water table position difference

Metric: Stage hydrograph of water table position and maximum monthly water table graph for a wet year(s) using 6 indicator cells (R10C25, R13C25, R15C26, R17C27, R19C27, R20C27)

Target: 1983-1993 condition. The target (goal) is not to exceed the daily stage duration curve taken from the model calibration and validation runs for each of the six indicator cells in the southern Dade area, based on the stage hydrographs from 1983 to 1993. This is the historical pattern that gave adequate performance.

Model Comparison: 1983-1993 condition to 1994 C-111 GRR Planning Condition and Alternatives

Model: SFWMM

Is the PM generally consistent with RECOVER's PM?

Additional Objective 4: Natural Values of WCA-3A. Protect the natural values of WCA-3A

A.4.i Deer (panther surrogate):

Water depths above 24 inches limit the movement (and therefore access to fresh browse) of deer in the Everglades marshes.

Metric: Water depth and duration

Target: The continuous duration of water depths over 24 inches used as a conservative measure of the conditions that limit deer movement. Particular focus is placed on duration exceeding 6 weeks of water depths exceeding 24 inches during the rainy season (defined as June 1 through Dec 31) as research has shown this to be the threshold for malnutrition impacts, and the duration exceeding 4 weeks which research has shown to be the duration sufficient to impact reproduction and fawn survival. Also, the duration of water depths more than 1.0 feet below ground will be used as a measure of extreme dry conditions that may result in the loss of critical tree island habitat from peat fires. The target is to minimize the number and duration of the aforementioned high and low water events.

Model Comparison: Return frequencies compared for the different alternatives

Model: SFWMM, NSM

Is the PM generally consistent with RECOVER's PM? **MAY BE INCONSISTENT**

RECOVER suggests clarifying which habitat and location this PM will be applied to. Consistency with Evaluation Team's NSM envelope targets could then be evaluated. Additionally, success of this PM may result in larger deer herds in WCA. Additionally, RECOVER suggests the wording in the PM description be updated to reflect the correct target depth as defined in the target section.

ATTACHMENT A

A4.iii Snail Kite – Foraging Habitat Vegetation Structure
<p><u>Metric:</u> Average duration of flooding events over the 36 year period-of-record. <u>Target:</u> Evaluations will be based on the second column (Avg Flood Duration) (Wks/Event) in the existing Inundation Duration Summary for Indicator Regions table. Indicator regions with average flood durations from 156 to 260 weeks will be considered optimal, indicator regions with average flood durations from 104 to 155 weeks or 261 to 312 weeks will be considered marginal. <u>Model Comparison:</u> CSOP Base <u>Model:</u> SFWMM Apply to IRs 114-128</p>
<p>Is the PM generally consistent with RECOVER’s PM? YES This PM is consistent with Evaluation Team’s PM GE-E18</p>
A4.iv Snail Kite - Potential foraging habitat for snail kite.
<p>For this analysis this performance measure estimates the number of acres with water depth between 0.2 and 1.3 meters for greater than 360 days/year. <u>Metric:</u> Acres snail kite habitat <u>Target:</u> Maximize # acres <u>Model Comparison:</u> Modeled water depths will be analyzed throughout the study area to determine where potential snail kite habitat would be found and how that habitat would be changed by each alternative relative to the base, current conditions (IOP Alt7r) and NSM. Table of acres of suitable snail kite habitat by basin, for each alternative, base. <u>Model:</u> SFWMM and NSM Apply to WCA-3A, WCA-3B</p>
<p>Is the PM generally consistent with RECOVER’s PM? NO See previous comments on this PM (Additional objective 2.vi)</p>
A4.v.1 Tree Islands (ENP)
<p><u>Metric:</u> Relative Drought Magnitude (RDM) <u>Target:</u> 0 <u>Model Comparison:</u> Modeled stage-duration versus stage-duration envelope generated from conditions in reference areas in 1986. <u>Model:</u> SFWMM</p>
<p>Is the PM generally consistent with RECOVER’s PM? NO See previous comments for Authorized objective 2.xviii.1</p>
A4.v.2 Tree Islands (ENP)
<p><u>Metric:</u> Relative Flood Magnitude (RFM) <u>Target:</u> Total score of 36 or less over the period of record (SFWMM) <u>Model Comparison:</u> Modeled stage-duration versus stage-duration envelope generated from conditions in reference areas in 1986 and 1995. <u>Model:</u> SFWMM</p>
<p>Is the PM generally consistent with RECOVER’s PM? NO See previous comments for Authorized objective 2.xviii.2</p>

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A4.vi Tree islands (RET) – Hydrologic Suitability for Elevated Everglades Tree Islands
<u>Metric:</u> See updated Evaluation Team’s GE-E6 <u>Model:</u> SFWMM Apply to IRs 114-128
Is the PM generally consistent with RECOVER’s PM? YES
A4.viii Snail Kite – Apple snail reproduction (FWS)
<u>Metric:</u> See Evaluation Team’s GE-E17 <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER’s PM? YES
A4.ix Greater Everglades wetlands – Inundation pattern
<u>Metric:</u> See Evaluation Team’s GE-E2 <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER’s PM? YES
A4.x Greater Everglades wetlands – Extreme high/low water levels
<u>Metric:</u> See Evaluation Team’s GE-E3 <u>Model:</u> SFWMM
Is the PM generally consistent with RECOVER’s PM? YES
Constraint 1: Federally Listed Species. Minimize adverse effects to federally listed species under the Endangered Species Act
C1.i CSSS nesting requirements (FWS)
Probability curves are used to display the number of consecutive days during sparrow breeding season (March 1 to July 15) when water levels are below the ground surface within possible sparrow subpopulation Special Issue Regions 201-206. <u>Metric:</u> Number of days water levels are below ground surface between March 1 and July 15, referred to as nesting days. <u>Target:</u> Special Issue Region 201, a minimum of 50 to 60 consecutive nesting days, preferably 80 consecutive nesting days, in all years until sparrow numbers in this region have increased to at least 1,000 individuals (Walters et al. 1999). Special Issue Regions 202 to 206 – 40 consecutive nesting days for 8 out of 10 years is considered favorable for sparrow persistence; 40 consecutive nesting days for 7 out of 10 years is considered borderline for persistence; 80 consecutive nesting days for 7 out of 10 years is considered favorable; and 80 consecutive nesting days for 8 out of 10 years is considered very favorable. <u>Model Comparison:</u> IOP Alt7r, No Action, CSOP Base, NSM <u>Model:</u> SFWMM Apply to Special Issue Regions 201-206
Is the PM generally consistent with RECOVER’s PM? YES

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C1.ii CSSS – habitat suitability (FWS)

Exceedance frequency curves are used to display the average discontinuous hydroperiod (days/year) when water levels are above ground surface within sparrow subpopulation Special Issue Regions 201-206.

Metric: Annual discontinuous hydroperiod

Target: 2 to 4 month (60 to 120 day) average discontinuous hydroperiod is considered favorable and supportive of *Muhlenbergia*-dominated habitat. 4 to 6 month (120 to 180 day) average discontinuous hydroperiod is considered good for other vegetation favorable to sparrow nesting.

Model Comparison: IOP Alt7r, No Action, CSOP Base, NSM

Model: SFWMM

Apply to Special Issue Regions 201-206

Is the PM generally consistent with RECOVER's PM? **YES**

C1.v Snail Kite – Foraging Habitat Vegetation Structure

Metric: Average duration of flooding events over the 36-year period-of-record.

Target: Evaluations will be based on the second column (Avg Flood Duration) (Wks/Event) in the existing Inundation Duration Summary for Indicator Regions table. Indicator regions with average flood durations from 156 to 260 weeks will be considered optimal, indicator regions with average flood durations from 104 to 155 weeks or 261 to 312 weeks will be considered marginal.

Model Comparison: CSOP Base

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **YES**

[This PM is consistent with Evaluation Team's PM GE-E18](#)

C1.vi Snail Kite - Potential foraging habitat for snail kite.

For this analysis this performance measure estimates the number of acres with water depth between 0.2 and 1.3 meters for greater than 360 days/year.

Metric: Acres snail kite habitat

Target: Maximize # acres

Model Comparison: Modeled water depths will be analyzed throughout the study area to determine where potential snail kite habitat would be found and how that habitat would be changed by each alternative relative to the base, current conditions (IOP Alt7r) and NSM. Table of acres of suitable snail kite habitat by basin, for each alternative, base

Model: SFWMM and NSM

Is the PM generally consistent with RECOVER's PM? **NO**

[See previous comments for Authorized Objective 2.vi](#)

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C1.vii Snail Kite – Potential foraging habitat for snail kite.

For this analysis this performance measure estimates the number of acres with water depth between 0.2 and 1.3 meters for greater than 360 days/year.

Metric: Acres snail kite habitat

Target: Maximize # acres

Model Comparison: Modeled water depths will be analyzed throughout the study area to determine where potential snail kite habitat would be found and how that habitat would be changed by each alternative relative to the base, current conditions (IOP Alt7r) and NSM. Table of acres of suitable snail kite habitat by basin, for each alternative, base.

Model: SFWMM and NSM

[Apply to WCA-3A, WCA-3B](#)

Is the PM generally consistent with RECOVER's PM? **NO**

[See previous comments for Authorized Objective 2.vi](#)

C1.viii Manatees and Crocodiles:

The frequency of input of annual flow volumes towards Shark Slough estuaries.

Metric: Frequency across transect. Crocs - salinity regimes for juvenile development

Target: NSM shape of the curve.

Model Comparison: Relative frequency compared to NSM (volume and shape of the curve).

Model: SFWMM and NSM

Is the PM generally consistent with RECOVER's PM? **NO**

[RECOVER has dropped PMs based on NSM flow volumes, frequency or seasonal distributions across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. Suggest dropping or modifying metric to remove comparison to NSM flow volumes. Additionally, this PM would be better substantiated if seasonal flows were related to requirements of early spring hatchlings.](#)

C1.ix Manatees and Crocodiles:

The distribution of mean monthly freshwater flow volumes into Shark Slough.

Metric: Distribution across transect. Crocs – juvenile dispersal in estuaries

Target: NSM [shape of the curve](#); October – December

Model Comparison: Monthly distribution compared to NSM (volume and distribution pattern)

Model: SFWMM and NSM

Is the PM generally consistent with RECOVER's PM? **NO**

[RECOVER has dropped PMs based on NSM flow volumes, frequency or seasonal distributions across transects due to high levels of uncertainty associated with simulating surface water flows. The SFWMM is not calibrated to surface water flows. Suggest dropping or modifying metric to remove comparison to NSM flow volumes. Additionally, this PM would be better substantiated if seasonal flows were related to requirements of early spring hatchlings.](#)

ATTACHMENT A

Constraint 2: State Listed Species. Minimize adverse effects to state listed endangered or threatened species or species of special concern consistent with Florida Statutes and regulations

Constraint 3: Water Quality Standards. Meet applicable water quality standards.

C3.i Phosphorous Limit for Inflows into Everglades Protection Area and Everglades National Park (DEP).

Metric: Monthly flows (in ac-ft) for each year in 36 year period of record (SFWMM) or POR from MODBRANCH and area of WCA-3B with phosphorus levels above 10 ppb due to surface water flows

Target: Long term average flow-weighted-mean inflow concentration of 10 parts per billion for EPA (WCA 3A and 3B), 8 ppb for the Shark River Slough and 6 ppb for Taylor Slough and Coastal basins. (Consent decree states that maximum flow weighted discharge limit is 11 ppb for Taylor Slough/Coastal Basins where frequency of values greater than 10 ppb must be less than 53.1%, and the limit of maximum flow weighted mean inflow concentration for Shark River Slough in any water year is determined by the following formula: $C=11.38-0.00538*Q+1.397*\sqrt{2.493-0.00231+0.00000170*Q^2}$). Flows and phosphorous concentrations developed for alternative comparison

Model Comparison: CSOP Base, No Action Alternative

Model: SFWMM, Modbranch

NOTE: There is a lot of additional text related to this constrain in the CSOP PM doc

Is the PM generally consistent with RECOVER's PM? **YES**

This PM is similar to Evaluation Team's PM GE-E7 in that both look at flow-weighted means for TP. RECOVER also evaluates TP loading through PMs GE-E8 and GE-E9. Loading provides additional information on long-term effects of P additions. In southern Everglades (ENP), distribution of water deliveries should consider volumes and concentrations. Even at low-level P concentrations, experimental evidence indicates P loading effects algal and plant community structure and function in the long-term. (Gaiser et al 2004, Childers et al).

Constraint 4: Original C&SF Purpose. Maintain the Original Purpose of the C&SF Project

C4.i Frequency of LEC SA3 Water Restrictions:

Calculate and compare the number of water supply restrictions for LEC SA3

Metric: Table showing number of months (rows) with each year (column) that water shortages occur (in water years)

Target: Maintain present LOS for LEC SA3 users

Model Comparison: CSOP Base and current conditions (IOP)

Model: SFWMM

Is the PM generally consistent with RECOVER's PM?

RECOVER suggests the PDT look at RECOVER PMs WS-E4, WS-E5, and WS-E2 for possible applicability.

ATTACHMENT A

C4.ii Water Supply: Total volume of water delivered to SDCS during major drought periods (1989-90, 2000-2001)

Metric: Table showing annual flows through S-331 while in water supply mode

Target: Maintain present LOS

Model Comparison: IOP Alt7r and C-111 GRR

Model: SFWMM

Is the PM generally consistent with RECOVER's PM?

RECOVER does not have a similar performance measure. Evaluation Team's performance measures focus on performance of natural system or effects to water supply and flood protection as opposed to operations of individual features. It may be useful to modify this PM to reflect actual changes in performance rather than operations.

C4.iii Minimum Freshwater Head Difference Frequency Distribution Upstream of the Salinity Structures

Canal at Structure	Operation Criteria for South Dade Canals to Protect Biscayne Aquifer During Drought Conditions (feet NGVD*)
C100A at S123	2.00
C-1 at S21	2.00
C-102 at S21A	2.00
C-103 at S20F	2.00

Metric: Two metrics are used: one for the dry conditions and one for the average conditions. The first metric is the difference between an alternative's 90% exceedance water stage in tenths of feet and the target stage (See Table 1). This information is used to calculate its score: $(2.00\text{ft} - \text{Stage Difference for } 90\%)/2$. The second metric uses the stage for 50% exceedance stage. This information is used to calculate the second score: $(2.00\text{ft} - \text{Stage Difference for } 50\%)/2$. The scores for these two measures across the four structures are then averaged to create an indexed performance.).

Target: the target is to maintain the canal stages at the following levels:

Model Comparison: Compare to CSOP Base, Alternative 7R5 and 1994 C-111 GRR planning condition, and no-action alternative

Model: SFWMM

Is the PM generally consistent with RECOVER's PM? **YES**

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C4.iv Water Supply: Flows delivered to S18C to C-111 spreader canal
Metric: Target: Model Comparison: Model:
Is the PM generally consistent with RECOVER's PM? RECOVER does not have a similar performance measure. Evaluation Team's performance measures focus on performance of natural system or effects to water supply and flood protection as opposed to operations of individual features. It may be useful to modify this PM to reflect actual changes in performance rather than operations.

ATTACHMENT B

Summary of performance measure (PM) targets agreed to by the Regional Evaluation Team's (RET) Greater Everglades Subteam that differ from targets presented on the RET's web site. These targets are used for indicator region (IR) evaluations in this report and in the RET's report on the Initial Comprehensive Everglades Restoration Plan Update.

<i>PM Number</i>	<i>Performance Measure Name</i>	<i>Area of Application</i>	<i>Landscape Type</i>	<i>Target</i>
GE-E1	Number and Duration of Dry Events For Shark Slough	IRs 129-132	Ridge and Slough	Natural System Model (NSM) 4.6.2
GE-E2	Inundation Pattern in the Greater Everglades Wetlands	IR 100	Ridge and Slough	9-22 events with ~74-222 weeks average duration
		IR 101	Ridge and Slough	2-9 events with ~222-962 weeks average duration
		IR 102	Ridge and Slough	2-9 events with ~ 624-936 weeks average duration
		IRs 110-133 and 160-190	Ridge and Slough and Sawgrass Plains	NSM 4.6.2
		IRs 140 and 141	Marl Marsh	24-34 weeks average duration with compatible number of events
		IR 143	Marl Marsh	8-16 weeks average duration with compatible number of events
		IR 144	Marl Marsh	16-20 weeks average duration with compatible number of events
		IR 145	Marl Marsh	20-24 weeks average duration with compatible number of events
		IR 146	Marl Marsh	28-32 weeks average duration with compatible number of events
		IR 147	Marl Marsh	~24 weeks average duration with compatible number of events
GE-E3	Extreme High and Low Water Levels	IRs 150 and 151	Mixed	2000B2*
		IR 100	Ridge and Slough	6-34 high events >2.5 feet of 0-5 weeks average duration and no more than one low event <-1.0 foot of no more than 2 weeks duration
		IR 101	Ridge and Slough	6-34 high events >2.5 feet of 0-5 weeks average duration and no more than one low event <-1.0 foot of no more than 2 weeks duration
		IR 102	Ridge and Slough	20-36 high events >2.5 feet of 10-25 weeks average duration and no more than one low event <-1.0 foot of no more than 2 weeks duration
		IRs 110-114, 117, 118-126 and 128-133	Ridge and Slough	No more high events >2.5 feet than NSM 4.6.2. Minimize low events <-1.0 foot. Except: for IR 129, the NSM number of high events is considered too large.

ATTACHMENT B

Table X-1. Continued.

<i>PM Number</i>	<i>Performance Measure Name</i>	<i>Area of Application</i>	<i>Landscape Type</i>	<i>Target</i>
GE-E3	Extreme High and Low Water Levels	IRs 115, 116, 127, and 190	Sawgrass Plains	No more high events >2.0 feet than NSM 4.6.2. Minimize low events <-1.0 foot
		IRs 143-145 and 148	Marl Marsh	No more than 7 high events >1.5 feet and >2 weeks duration. Minimize low events <-1.5 foot
		IRs 140, 141, 146 and 147	Marl Marsh	No more than 7 high events >2.0 feet and >2 weeks duration. Minimize low events <-1.5 foot
		IRs 150 and 151 IRs 160 and 170	Mixed Sawgrass Plains	Not evaluated No more high events >1.75 feet than NSM 4.6.2. Minimize low events <-1.0 foot
GE-E5	Monthly and Seasonal Overland Flow	N/A		Not evaluated due to high uncertainty

* Interim target for Corbett to preserve existing conditions until better information is available.