

<b>1.0 Performance Measure Title</b>
<b>WS-3 Potential for High Water Levels in South Miami-Dade Agricultural Area</b> <b>Last Date Revised: March 14, 2005</b>
<b>2.0 Justification</b>
<p>In preparing land to plant groves, farmers plow the top four to eight inches and dig trenches down to an average of 24 inches. The tree roots are found in the plow and trench layers. An occurrence of the water table within two feet of the ground surface for a duration of greater than 24 hours is considered a flood event with the potential for causing agricultural crop loss (Jonathan Crane, Institute of Food and Agricultural Science [IFAS], personal communication).</p> <p>The property east of the L-31N and C-111 Canals, south of Richmond Drive, was provided a beneficial level of flood protection during the 1983 to 1993 period due to how the canals were operated. During that period, the canal system was operated to allow the diversion of large quantities of seepage from Northeast Shark River Slough through south Dade County without causing increased water levels during the wet periods. Under alternative canal management rules, farmers in the area have experienced a decreased ability to prevent water levels from rising into the root zones of their crops.</p>
<b>3.0 Source of Performance Measure</b>
<p>Section 373.0361(2)(a)(1), Florida Statutes C&amp;SF Project Restudy (USACE and SFWMD 1999)</p>
<b>4.0 Restoration Expectation</b>
<b>4.1 Predictive Metric and Target</b>
<p>The evaluation target attempts to represent water table conditions necessary for the successful cultivation of tree crops in the Homestead area. 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 (R10C25, R13C25, R15C26, R17C27, R19C27, and R20C27) in the southern Dade area, based on the stage hydrographs from 1983 to 1993. This is the historical pattern that gave adequate performance.</p>
<b>4.2 Assessment Parameter and Target</b>
<p>Maintain existing flood protection in accordance with applicable laws</p>
<b>5.0 Evaluation Application</b>
<b>5.1 Evaluation Protocol</b>
<p>The South Florida Water Management Model (SFWMM) is used to evaluate this performance measure. An alternative is compared to the target in the 1 to 20 percentile portion of the stage duration curve for each indicator cell. An alternative is considered to "significantly exceed" when the stages are noticeably higher than the 1983-1993 curve and when the higher stages occur for longer periods of time. The "significantly exceed" determination is somewhat subjective, but some general rules can be applied:</p> <p>Differences occurring in the lower stages of the stage duration curve deeper than -2 feet land surface elevation in that cell are disregarded.</p> <p>An alternative with stages 0.1 feet above the target for the entire 1 to 20 percentile area, or with 0.2 or more feet above the target for more than 5% of the 1 to 20 percentile area would be considered "borderline" and further information is needed.</p> <p>Any greater differences would be considered to "significantly exceed" the target.</p>

When the stage duration curve indicates an alternative has "significantly exceeded" the target, the table values are used in combination with the stage duration curve to describe and quantify the performance.

Model output format is 1) a stage duration curve for each indicator cell, where performance at the 1 to 20 percentiles are evaluated, and 2) a table that includes the following three groups of data: change in peak stage (feet) from the target; change in stage at the 10% duration line from the target; and the difference between the alternative and target in duration that the water table is within 2 feet of ground surface.

(Note: The change in stage at the 10% duration line from the target was formerly used for a numerical scoring of alternatives. It may be used again if numerical scoring for evaluations are required.)

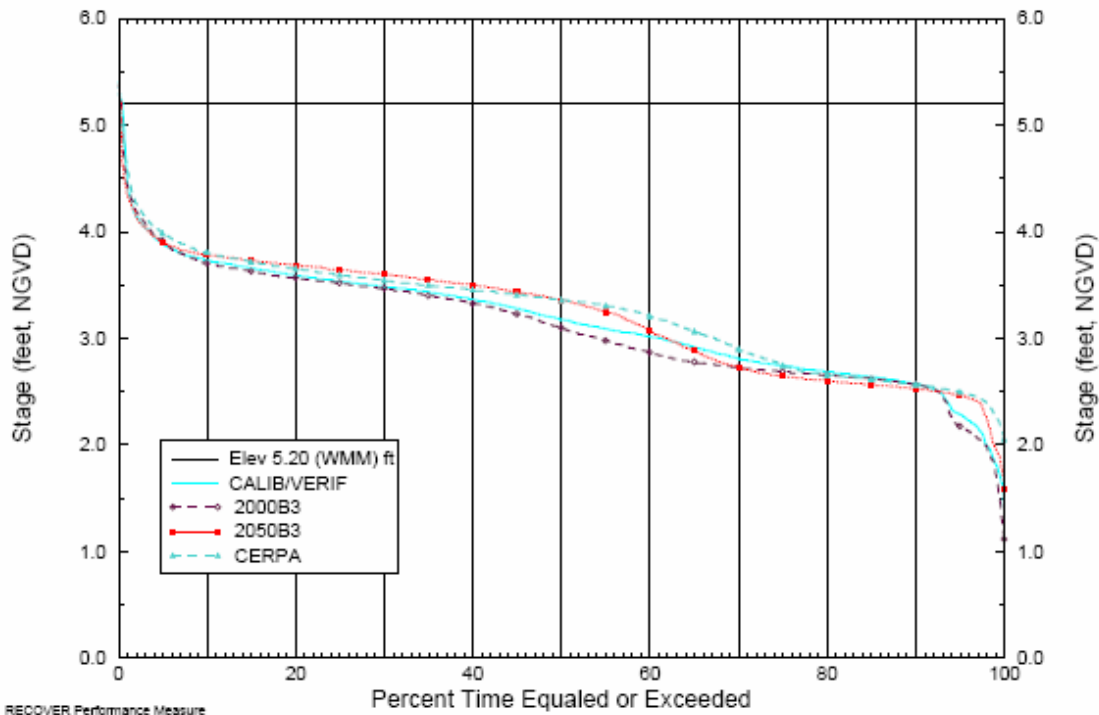
The SFWMM has no capability to directly measure flood control on individual fields or during relatively short events, but can be used as a coarse-scale tool that gives an indication of a potential change in flood risk. However, using the 1983 to 1993 stage duration curve data, the percentage of time the stage is above the root zone can be calculated and the information can be used to give an indication that additional flood control evaluation in the vicinity of a cell(s) may be a needed. The most important part of the stage duration curve is the range of higher stages. Therefore, exceedance was evaluated for wet periods. Specifically, frequency and magnitude evaluations are made at the highest 1 to 20 percentiles of the curve, and relative magnitude of difference evaluations are made at the 10% frequency of stage duration.

**5.2 Normalized Performance Output**

**5.3 Model Output (example attached)**

**Stage Duration Curves for Cell Row 10 Col 25 in the LEC**

for the 1983 to 1993 Time Window



RECOVER Performance Measure

Note: The simulated groundwater and surface water stages represent areally AVERAGED values over a 2-mile-by-2-mile region; the values DO NOT represent specific stages, or surface water depths and durations, for specific locations within the 4-square-mile grid cell. Land elevation values also represent areally AVERAGED values over the 4-square-mile grid cell.

For Planning Purposes Only  
 Run date: 05/05/05 17:10:40  
 SFWMM V5.4.3  
 Script used: dur\_8393.scr, V1.1  
 Filename: 1025\_daL\_stgDur\_8393.fig

<b>5.4 Uncertainty</b>	
<b>6.0 Monitoring and Assessment Approach</b>	
See <i>CERP Monitoring and Assessment Plan: Part 1 Monitoring and Supporting Research</i> - South Florida Hydrology Monitoring Network Module section 3.5.3.6 (RECOVER 2004a)	
<b>7.0 Future Tool Development Needed to Support Performance Measure</b>	
<b>7.1 Evaluation Tools Needed</b>	
<b>7.2 Assessment Tools Needed</b>	
<b>8.0 Notes</b>	
<b>9.0 Working Group Members</b>	
Linda McCarthy, FDACS Brenda Mills, SFWMD Carl Woehlcke, SFWMD	
<b>10.0 Acceptance Status</b>	
WS Working Group	March 14, 2005
ET	
AT	
Public Review	
Final Acceptance Date	
<b>11.0 References</b>	
RECOVER. 2004a. <i>CERP Monitoring and Assessment Plan: Part 1 Monitoring and Supporting Research</i> . Restoration Coordination and Verification Program, c/o United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.	
USACE and SFWMD. 1999. <i>Central and Southern Florida Project Comprehensive Review Study Final Integrated Feasibility Report and Programmatic Environmental Impact Statement</i> . United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.	