

## 7.0 Criteria and Guidelines for Performance Measure Development

A set of criteria and guidelines has been established to ensure that as new performance measures are developed, or as refinements are made to existing performance measures, a single standard exists to document scientific justification of performance measures and to ensure a consistent level of detail among documentation sheets.

### 7.1 Performance Measure Criteria

Performance measures for the natural system are derived from stressors and attributes contained in conceptual ecological models. Performance measures for the human system are presently based on water supply or flood protection policy or law.

Performance measures are chosen for their conceptual relevance and interpretation and utility. Specific criteria for performance measures are listed below and must be followed when developing, revising and reviewing performance measures:

- A performance measure indicator is expected to change directly in relation to CERP implementation; a clear linkage must exist between the indicator and expected changes.
- A performance measure indicator should appear in a conceptual ecological model or have a strong regulatory basis.
- A performance measure should characterize a strong indicator of ecosystem health or cause major stress on the system.
- A performance measure must contain an indicator of 1) an important ecological process (e.g., food webs, energy transfer), 2) an important ecological structure (e.g., fragmentation, compartment-alization, succession, disturbance, biodiversity), or 3) major environmental change (e.g., hydrology, fire, water quality).
- A performance measure indicator should be a regional or system-wide indicator of CERP performance.
- A performance measure should provide information not provided by other performance measures being recommended for the physiographic region.
- A performance measure indicator should be measurable or indirectly measured using surrogate indicators.
- A performance measure should have a relatively strong degree of predictability. Changes in indicator performance resulting from CERP implementation should be easily distinguished from those contributed by other factors and, ideally, a mechanism should be available to evaluate future performance for project planning purposes.
- A performance measure should have a relatively low measurement uncertainty.

When developing species performance measures, consideration should also be given to the following criteria:

- Is the species a state or federally-listed threatened or endangered species?
- Is the species a keystone species?
- Does the species have high aesthetic value or high public appreciation or is it a symbol of the Everglades?
- Does it have an important recreational value (e.g., value to fishermen, boaters or bird watchers)?
- Does it have important commercial value (e.g., fisheries)?

## 7.2 Guidelines to Complete Performance Measure Documentation Sheets

This section provides guidelines for completing performance measure documentation. Criteria specified above are overarching requirements for a performance measure to be viable for use in evaluating and assessing CERP's progress. These guidelines indicate what information needs to be provided within each section of a documentation sheet.

While it is ideal that a performance measure documentation sheet measure be complete, all information necessary to achieve this may not be currently available. This is especially true for measures for which an assessment component has been developed, but for which evaluation tools are not yet available. Also, uncertainty has not been calculated for many of the measures. These sections will be developed as additional tools are developed and information becomes available. Though incomplete, these measures can still be used when performing alternative evaluations and assessments as long they have been through the review process described below.

Information that should be included in the documentation sheet sections are as follows:

**Performance Measure Title.** The title should include a description of the region it is associated with (e.g., Greater Everglades, Total System, Water Supply and Flood Protection). The performance measure title should provide an adequate description of the performance measure without exceeding two lines of text. The title should be centered and in bold at the top of the page.

**Document Revision Date.** This must be updated following any revisions. This will help ensure that those working with documentation sheets, both those revising and applying them, are using the latest version.

**Acceptance Status.** The dates when the performance measure documentation reaches milestones within the approval process are also noted on the documentation sheet. The review process is outlined in more detail in the following section.

**1.0 Desired Restoration Condition.** For each indicator, this section outlines conditions and ecological characteristics expected to represent desired restoration of a physiographic region or a specific attribute. The desired restoration condition does not necessarily reflect CERP expected performance; rather, it represents the level of restoration to achieve a healthy and sustainable ecosystem as defined by our best scientific understanding of the system. This condition may represent a historical pre-drainage condition or some other desired condition, and is not typically quantitative in nature. Desired restoration condition is discussed in more detail in Section 4. Predictive and assessment targets are developed based on the desired restoration condition. The desired restoration concept is currently being reexamined by the RECOVER Leadership Group (RLG).

**1.1 Predictive Metric and Target.** These metrics and targets represent the desired restoration conditions as represented through simulation modeling or other methods. They are used to compare alternative project or program plan performance as determined through simulation modeling or other methods. Each evaluation target can be used to measure how well a component or combination of components will meet CERP's goals compared to other components or combination of components. In order to be used for project planning activities, it is necessary for the evaluation metric and target to be quantitative in nature and to be scientifically documented. If possible, it is important to identify if the performance measure target is inconsistent with other performance measures in the region.

**1.2 Assessment Parameter and Target.** Assessment parameter and target for each performance measure serve as the basis to assess responses monitored in the field in natural and human systems during and following CERP implementation. Each assessment target identifies one or more elements to be monitored and is designed to assist in determining whether program objectives have been or are being attained. Assessment targets may be a quantitative restoration target, a minimum level of performance expected, or a direction of change (trend) toward an expected endpoint.

**2.0 Justification.** The justification provides performance measure users with a brief, referenced history of the attribute or stressor being used as an indicator and how CERP implementation is expected to affect it. This section, at a minimum, details three subjects: 1) a pre-drainage description of the indicator, 2) a description of the current state of the indicator, and 3) a description of how CERP implementation is expected to affect the indicator.

**3.0 Scientific Basis or Regulatory Basis.** Scientific basis for performance measures includes conceptual ecological models and assessment hypotheses. This information is provided in the following subsections. The relationship of the performance measure to conceptual ecological models and adaptive assessment hypotheses is provided to demonstrate the performance measure indicator's relevance in determining restoration success with particular emphasis on how the indicator is expected to reflect CERP restoration. For those performance measures developed based on regulatory requirements, subsections will be removed and replaced by a citation for the statute or law that requires and authorizes the performance measure.

**3.1 Relationship to Conceptual Ecological Models.** This section references relevant overarching regional conceptual ecological models that are discussed in Section 8 of this document. These models can be found on the Conceptual Ecological Models web page: [www.evergladesplan.org/pm/recover/cems.aspx](http://www.evergladesplan.org/pm/recover/cems.aspx). Also, the indicator is identified as an attribute or stressor under this heading.

**3.2 Relationship to Adaptive Assessment Hypothesis Clusters.** Hypothesis clusters from the final draft of the *Monitoring and Assessment Plan (MAP), Part 2, 2006 Assessment Strategy for the MAP* (RECOVER 2006), referred to as the Assessment Strategy, related to the indicator are either 1) placed verbatim in this section along with CERP-specific conceptual ecological model diagrams describing hypotheses or 2) a link is included directing the reader to hypothesis clusters and conceptual ecological models provided as supplemental information on the CERP System-wide Performance Measure Report web page or within the Assessment Strategy.

The CERP System-wide Performance Measure Report web page ([www.evergladesplan.org/pm/recover/perf\\_systemwide.aspx](http://www.evergladesplan.org/pm/recover/perf_systemwide.aspx)) contains a link for hypothesis clusters and diagrams for each region under Supplemental Information:

- Lake Okeechobee:  
[www.evergladesplan.org/pm/recover/recover\\_docs/et/060507\\_pm\\_report/hypothesis\\_clusters\\_low.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/et/060507_pm_report/hypothesis_clusters_low.pdf)
- Northern Estuaries:  
[www.evergladesplan.org/pm/recover/recover\\_docs/et/060507\\_pm\\_report/hypothesis\\_clusters\\_ne.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/et/060507_pm_report/hypothesis_clusters_ne.pdf)
- Greater Everglades:  
[www.evergladesplan.org/pm/recover/recover\\_docs/et/060507\\_pm\\_report/hypothesis\\_clusters\\_ge.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/et/060507_pm_report/hypothesis_clusters_ge.pdf)
- Southern Estuaries:  
[www.evergladesplan.org/pm/recover/recover\\_docs/et/060507\\_pm\\_report/hypothesis\\_clusters\\_se.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/et/060507_pm_report/hypothesis_clusters_se.pdf)

Note that files for which the above links are provided are taken directly from the Assessment Strategy document, but contain only hypothesis clusters and conceptual ecological diagrams. Links to complete Assessment Strategy sections containing hypothesis clusters and diagrams are as follows:

- Lake Okeechobee Module:  
[www.evergladesplan.org/pm/recover/recover\\_docs/map\\_part2/section\\_9\\_app\\_of\\_guidance\\_low.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/map_part2/section_9_app_of_guidance_low.pdf)
- Northern Estuaries:  
[www.evergladesplan.org/pm/recover/recover\\_docs/map\\_part2/section\\_9\\_app\\_of\\_guidance\\_ne.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/map_part2/section_9_app_of_guidance_ne.pdf)

- Greater Everglades Module:  
[www.evergladesplan.org/pm/recover/recover\\_docs/map\\_part2/section\\_9\\_app\\_of\\_guidance\\_ge.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/map_part2/section_9_app_of_guidance_ge.pdf)
- Southern Estuaries:  
[www.evergladesplan.org/pm/recover/recover\\_docs/map\\_part2/section\\_9\\_app\\_of\\_guidance\\_se.pdf](http://www.evergladesplan.org/pm/recover/recover_docs/map_part2/section_9_app_of_guidance_se.pdf)

**4.0 Evaluation Application.** Performance measures will be applied during evaluation of project and program alternatives. Four categories of information are necessary to perform an alternative evaluation: evaluation protocol, normalized performance output, model output, and uncertainty.

**4.1 Evaluation Protocol.** The evaluation protocol provides details related to 1) the tool used to evaluate the performance measure, 2) features or components of the tool that are used to obtain necessary data, 3) any post-processing information or equations, and 4) procedure used to conduct the evaluation (e.g., specific comparisons to be made, different post-processing methods for individual locations, required statistical analysis of data).

**4.2 Normalized Performance Output.** Numeric performance measure results are normalized and related to desired restoration condition. That is, if a performance measure does not meet its required evaluation target, what is the ecological significance of the difference between the evaluation result and the target? Typically, performance measure results are normalized on a scale from 0 to 1.0, with 0 corresponding to fully degraded and 1.0 corresponding to fully restored. Each 0.1-0.2 segment between the two endpoints represents a different level of restoration success. Normalizing performance measure output is useful when making comparisons among alternative plans.

**4.3 Model Output.** Models or other tools provide output for each performance measure for the purposes of conducting an evaluation of alternatives. An example of output is provided to show evaluators how information will be presented during an evaluation and to aid in general understanding of concepts presented.

**4.4 Uncertainty.** Performance measures all have related uncertainty that needs to be taken into account when performing an evaluation. The ability an evaluation method to simulate observed conditions can be determined using a number of error statistics. Uncertainty should be continually reevaluated by comparison with assessment data in the adaptive management feedback loop between evaluation and assessment processes (see Section 3 of this document). Types of uncertainty associated with performance measure application are described in Section 16 of this document. Currently, this documentation sheet section is not fully developed for most performance measures.

**5.0 Monitoring and Assessment Approach.** Monitoring and assessment approach specifies monitoring and assessment methods related to the performance measure

indicator. These methods are found in other RECOVER documents, which are referenced on the documentation sheet.

**5.1 MAP Module and Sections.** This section references the appropriate module and monitoring components in the *CERP Monitoring and Assessment Plan: Part 1, Monitoring and Supporting Research* (RECOVER 2004).

**5.2 Interim Goals and Interim Targets.** If applicable, this section references the interim goal and interim target indicator presented in *The RECOVER Team's Recommendation for Interim Goals and Interim Targets for the Comprehensive Everglades Restoration Plan* (RECOVER 2005) that is related to the performance measure indicator.

**5.3 Assessment Approach.** This section references the appropriate assessment procedure in the final draft of the *Monitoring and Assessment Plan (MAP), Part 2, 2006 Assessment Strategy for the MAP* (RECOVER 2006).

**6.0 Future Tool Development Needed to Support Performance Measure.** Many performance measures need additional tools or information to be used effectively and these needs are indicated on the documentation sheet. This indicates limitations of the measures as well as provides justification to procure necessary resources to develop and refine these tools. If all tools and information necessary to apply the performance measure are available, then this section of the documentation sheet is left blank.

**6.1 Evaluation Tools Needed.** Specific tools needed to improve prediction of indicator performance when evaluating plans are discussed in this section.

**6.2 Assessment Tools Needed.** Specific tools needed to improve assessment of CERP implementation effects on the system are discussed in this section.

**7.0 Notes.** Any additional relevant information regarding the performance measure not covered elsewhere in the documentation sheet is noted in this section. If no additional information is required, this section of the documentation sheet is left blank.

**8.0 Working Group Members.** The members of the working group who are responsible for developing, editing and shepherding the performance measure through its approval process are provided on the documentation sheet.

**9.0 References.** References used to develop the documentation sheet are cited and provided at the end of the documentation sheet. These need to be updated with each revision to the documentation sheet.

### 7.3 References

RECOVER. 2004. CERP Monitoring and Assessment Plan: Part 1, Monitoring and Supporting Research. Restoration Coordination and Verification Program, c/o United States Army Corps of Engineers, Jacksonville District, Jacksonville, FL,

and South Florida Water Management District, West Palm Beach, FL.  
[www.evergladesplan.org/pm/recover/recover\\_map.aspx](http://www.evergladesplan.org/pm/recover/recover_map.aspx)

RECOVER. 2005. The RECOVER Team's Recommendations for Interim Goals and Interim Targets for the Comprehensive Everglades Restoration Plan. 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, FL.  
[www.evergladesplan.org/pm/recover/igit\\_subteam.aspx](http://www.evergladesplan.org/pm/recover/igit_subteam.aspx)

RECOVER. 2006. Monitoring and Assessment Plan (MAP), Part 2, 2006 Assessment Strategy for the MAP, Final Draft. Restoration Coordination and Verification Program, c/o United States Army Corps of Engineers, Jacksonville District, Jacksonville, FL, and South Florida Water Management District, West Palm Beach, FL. December 2006.  
[www.evergladesplan.org/pm/recover/recover\\_map.aspx](http://www.evergladesplan.org/pm/recover/recover_map.aspx)