

1.0 Performance Measure Title

Roseate Spoonbill Nesting Patterns

Last Date Revised: December 2006

2.0 Justification

In 1979, 1,250 Roseate Spoonbill nests were located in Florida Bay, with more than half the nests located in the northeastern bay. The distribution of nesting by roseate spoonbills has shifted from northeastern Florida Bay to the western Bay since the advent of the South Dade Conveyance System and spoonbills are now listed as a “Species of Special Concern” by the Florida Fish and Wildlife Conservation Commission. The shift is attributed to altered hydrology and salinity patterns, and subsequent reduced abundance and concentrations of prey organisms in the coastal wetlands adjacent to northeastern Florida Bay. Those coastal wetlands represented the primary feeding grounds for the spoonbills that nested on islands in northeastern Florida Bay. Restoration of more historic hydrological conditions should promote greater prey abundance and availability, leading to an increase in the number of years spoonbills can successfully nest. Therefore, roseate spoonbills and their prey are good indicators for evaluating the CERP’s effectiveness at restoring estuarine conditions.

3.0 Relationship to CEMs and Adaptive Assessment Hypotheses

Everglades Mangrove Estuaries Conceptual Ecological Model attribute (RECOVER 2004b)

Ecological Premise: Reproduction of higher vertebrates that are dependent on aquatic food webs is food limited due to altered hydrologic and water quality conditions in the Greater Everglades Wetlands. As a result, the foraging distributions and nesting patterns of wading birds have been altered due to the redistribution of high concentrations of prey organisms. Increased prey densities in artificial pools of the Water Conservation Areas have attracted wading bird nesting colonies to those areas after the collapse of the coastal colonies. However, drying pattern interruptions in the Water Conservation Areas often disrupt prey concentrations that are required for successful foraging by the wading birds, resulting in failure of nesting colonies.

Restoration of historic spatio-temporal patterns of prey production and concentration is expected to reestablish wading bird nesting colonies in the coastal and tributary regions of the southern Everglades and, specifically, establish Roseate Spoonbill nesting colonies in northeast Florida Bay, which should be also increase the numbers and success of nesting Roseates.

Southern Estuaries Model Nearshore Nursery Function Hypotheses:

Hypothesis 1:

The implementation of CERP will affect the life cycle and abundance of fishery species not only through habitat dependencies (e.g., regarding food availability and shelter) but also through the direct physiological effects of salinity upon growth and survival.

Rationale: Species abundance and recruitment to adult populations is a function of the area of overlap of favorable habitat and favorable salinities for each species. Maintaining a discernable spatial salinity gradient with persistent salinities in the lower range will result in an expansion of the area of optimal nursery habitat for estuarine dependent species and this, in turn, will increase the overall abundance (density x area) of invertebrate and vertebrate species, including pink shrimp, pinfish, rainwater killifish, mojarras, gray snapper, and spotted seatrout.

Greater Everglades Wetlands Module Predator-Prey Interactions of Wading Birds and Aquatic Fauna Forage Base hypotheses:

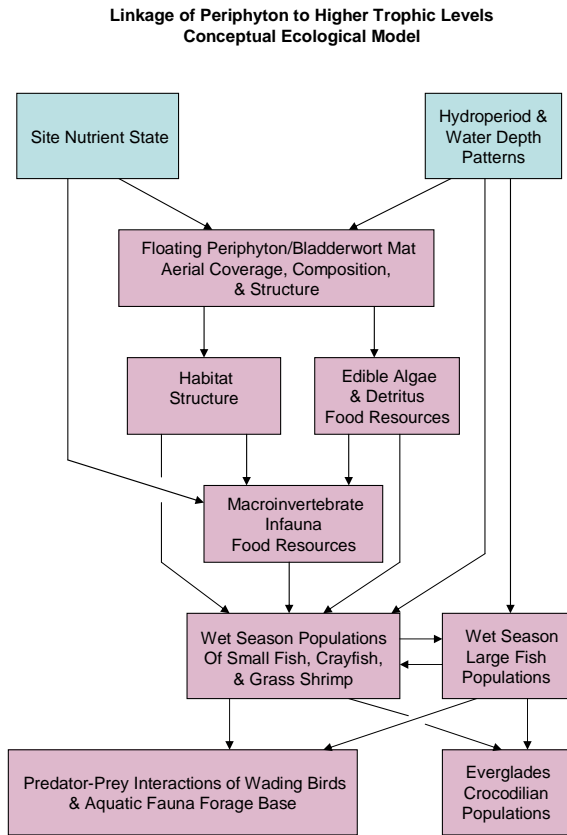
Hypothesis 5:

The floating mat comprised of a periphyton complex and various bladderworts provides critical support of the oligohaline Everglades food web, both as a food source and a refuge for aquatic invertebrates that are consumed by

small fish, crayfish, and grass shrimp.

Rationale. The floating mat provides both food and habitat structure for macroinvertebrates, including midge larvae, nematodes, amphipods, and juvenile snails. The floating mat complex harbors much higher density of macroinvertebrates than epiphyton and benthic substrates. These small invertebrates serve as a critical food source for Everglades consumers, including small fish, crayfish, and grass shrimp. Hydroperiods affect the aerial coverage of habitats where these food-rich mats are abundant and shortened hydroperiods reduce the area of extensive floating mats and decreases the length of the season when habitat is available for aquatic organisms. Additionally, higher nutrient levels stimulate invertebrate productivity, but change the community composition to favor pollution-tolerant taxa increasing the relative abundance of oligochaetes, while amphipods and chironomids decline. Also, sustained phosphorus enrichment leads to dissolution of the floating mat and loss of that habitat. Therefore, this hypothesis not only links the Everglades floating mat complex, and particularly the periphyton primary productivity and detrital production to higher trophic levels, but also to hydroperiod and site nutrient state (concentration), both which may be directly affected by management action (RECOVER 2005b).

Periphyton-trophic level conceptual model:



4.0 Restoration Expectation
Restoration of natural hydrologic conditions will re-establish distributions of prey densities and concentrations across the landscape that in turn will support the re-establishment of Roseate Spoonbill nesting colonies in northeast Florida Bay.
4.1 Predictive Metric and Target
No predictive metric and target are available at this time, but efforts to refine and update a predictive model are in development with an expected completion date beyond 2008.
4.2 Assessment Parameter and Target
The targets for reestablishing roseate spoonbill nesting patterns are as follows: <ul style="list-style-type: none"> ▪ Achieve roseate spoonbill nesting success in seven out of every 10 years ▪ Return breeding spoonbill numbers to 1,000 pairs nesting in Florida Bay annually, half of which would be located in the northeastern region of the bay ▪ Reestablish spoonbill nesting along the southwestern Gulf Coast between Lostman’s River and the Caloosahatchee River
5.0 Evaluation Application
5.1 Evaluation Protocol
Predictive models to evaluate this performance measure are still under development and refinement. At this time, this performance measure should not be used to conduct evaluations.
5.2 Normalized Performance Output
5.3 Model Output (example attached)
5.4 Uncertainty
Recognition of model uncertainty is needed when interpreting the ecological significance of model output. The Model Uncertainty Workshop Report provides guidance on the potential implications of uncertainty on model output interpretation (RECOVER 2002).
6.0 Monitoring and Assessment Approach
See <i>CERP Monitoring and Assessment Plan: Part 1 Monitoring and Supporting Research</i> - Greater Everglades Wetlands Module section 3.1.3.14 (RECOVER 2004a)
See RECOVER Team’s 2006 Assessment Strategy for the Monitoring and Assessment Plan. Final Draft (RECOVER 2006)
7.0 Future Tool Development Needed to Support Performance Measure
7.1 Evaluation Tools Needed
7.2 Assessment Tools Needed
Accessibility to the various data sources through an integrated database is needed for the complete evaluation of these hypotheses and for parameter refinement.
8.0 Notes

This Performance Measure supersedes and addresses GE-22 Roseate Spoonbill Nesting Patterns (Last Date Revised: November 22, 2005).

9.0 Working Group Members

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10.0 Acceptance Status

GE Working Group November 22, 2005

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Public Review

Final Acceptance Date

11.0 References

RECOVER 2002. Model Uncertainty Workshop Report: Quantifying and Communicating Model Uncertainty for Decision Making in the Everglades, Restoration Coordination and Verification Program (RECOVER), United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.

RECOVER. 2004a. 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, Florida, and South Florida Water Management District, West Palm Beach, Florida.

RECOVER. 2004b. Draft Conceptual Ecological Models. In: RECOVER. 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, Florida, and South Florida Water Management District, West Palm Beach, Florida, Appendix A.

RECOVER. 2006. 2006 Assessment Strategy for the Monitoring and Assessment Plan. Final Draft. c/o United States Army Corps of Engineers, Jacksonville District, Jacksonville, Florida, and South Florida Water Management District, West Palm Beach, Florida.

SFWMD. 2003. 2003 Everglades Consolidated Report. South Florida Water Management District, West Palm Beach, Florida. Appendix 6.