

Lake Okeechobee Performance Measure Vegetation Mosaic

Last Date Revised: March 7, 2007

Acceptance Status: Accepted

1.0 Desired Restoration Condition

Littoral plant communities – The performance targets for spikerush and beakerush will be met when these plants recolonize much of their historic coverage areas. Large reductions in the distribution of torpedograss and cattail also are targeted; this will encourage the development of a more diverse landscape dominated by open water and desirable native plant assemblages. Willow (*Salix* spp.) and pond apple (*Anona glabra*) trees provide important nesting habitat for wading birds. The performance target for these plants will be a moderate increase (500 to 1,000 acres) in the distribution of continuous stands of trees in areas that are surrounded by open water (e.g., not adjacent to the Herbert Hoover dike or canal banks where protection from predators would be reduced).

Submerged plant communities - Maintaining >40,000 acres of total SAV in the Lake, and >20,000 acres of vascular plants (in particular *Vallisneria* and *Potamogeton*) in most years (excluding years of extreme regional drought).

Bulrush - The target is to have a nearly continuous and thick band of bulrush located along the lakeward edge of the littoral zone from Clewiston north to the area near the mouth of the Kissimmee River (>30 miles), and around Kings Bar and Eagle Bay islands.

1.1 Predictive Metric and Target]

1.2 Assessment Parameter and Target

2.0 Justification

Landscapes that consist of a moderately diverse mosaic of emergent and submerged plants in Lake Okeechobee's littoral and nearshore zones provide important habitat for wading birds, sport fish, and other wildlife. Bulrush (*Scirpus californicus*) also provides important habitat, stabilizes bottom sediments (e.g., reduced turbidity) and reduces potentially damaging wave energy that otherwise may uproot submerged aquatic vegetation (SAV) along the lakeward edge of the littoral zone. SAV provides habitat for fish and wildlife, stability for sediments, and a substrate for periphyton, which can sequester nutrients from the water column. These effects of SAV are widely documented in both the freshwater and marine literature. In Lake Okeechobee, healthy SAV corresponds to good conditions in terms of resource availability, habitat structure, and water quality. Under current conditions, the spatial extent of SAV varies widely from one year to the next. During prolonged periods of high stage, spatial extent is reduced to near zero. During years of moderate to low stage, spatial extent can reach >50,000 acres. In years of recovery from high water stress, much of the SAV community may be initially comprised of pioneer species, such as *Chara*, which do not provide optimal habitat or water quality benefits.

In the early 1970s, there were more than 28,000 acres of spikerush (*Eleocharis cellulosa*) and beakrush (*Rhynchospora tracyi*) in Lake Okeechobee's littoral zone. These native plants provide important wildlife habitat that is selectively used by wading birds and sport fish. During the past 25 years, about 65% of this native habitat (18,000 acres) has been lost due to expansion of torpedograss and cattail (*Typha* spp.).

A thick band of bulrush was present in the north and west shoreline regions of the Lake in the early 1990s. However, by 1999, more than 50% of the bulrush community was lost in conjunction with a prolonged period of high lake stage.

3.0 Scientific Basis

3.1 Relationship to Conceptual Ecological Models

The indicator for this performance measure is ecological attribute (Vegetation) in the following conceptual ecological models:

Regional Models

Lake Okeechobee

Ecological Model for Hypothesis Clusters

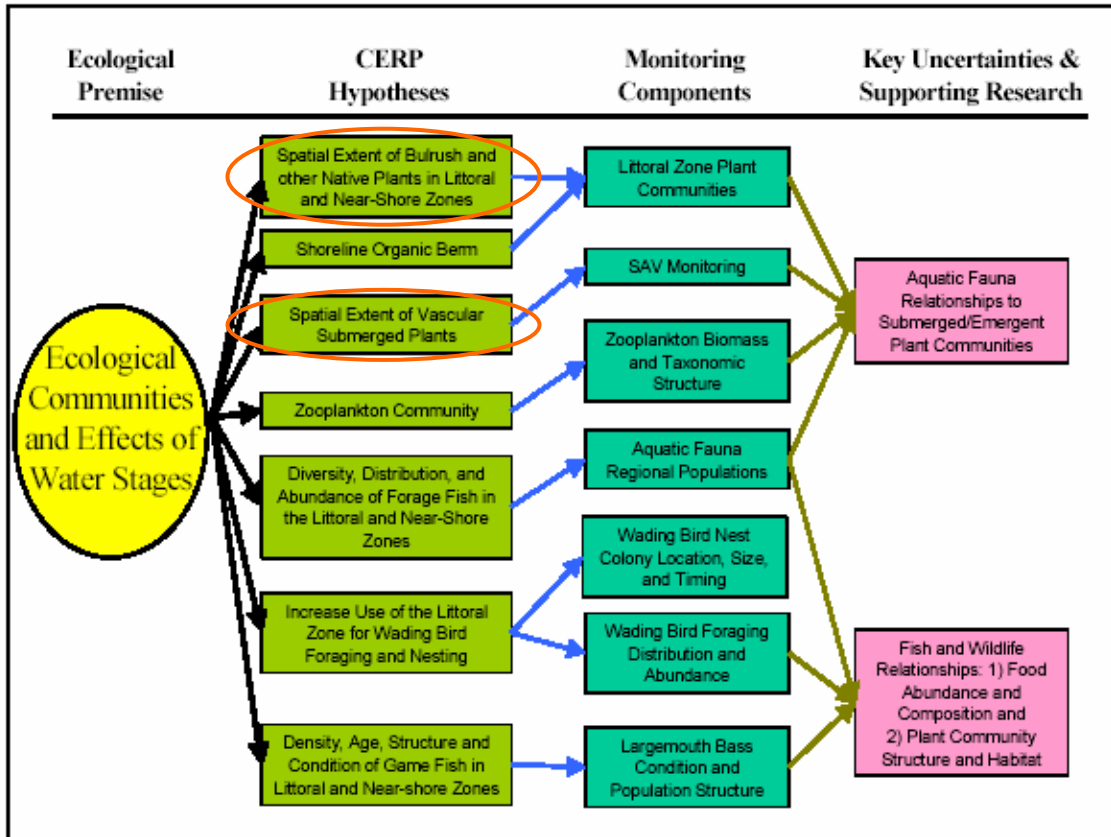
Ecological Communities and Effects of Water Stages Conceptual Ecological Model

3.2 Relationship to Adaptive Assessment Hypothesis Clusters

Ecological Premise: Sustained lake levels and a reduction of spring recession conditions have resulted in the reduction and degradation of predrainage emergent and submergent communities in Lake Okeechobee.

CERP Hypotheses: Providing a reduction in the frequency of extreme high water levels (stage >17 feet and stage >15 feet for more than 12 consecutive months) and low water levels (stage <11 feet and stage <12 feet for more than 12 consecutive months) and an increase in the frequency of spring recessions (yearly stage decline from near 15.5 feet in January to near 12.5 feet in June, with no reversal >0.5 feet) will result in the following changes (see Havens 2002 for details):

- Increase in spatial extent of bulrush along the western lakeshore; increased spatial extent of spikerush, beakrush, willow, and other native plants in the littoral zone; and a reduction in the rate of expansion of exotic and nuisance plants.
- Increase in spatial extent of vascular submerged plants, in particular eelgrass, peppergrass, and southern naiad.



4.0 Evaluation Application

4.1 Evaluation Protocol

4.2 Normalized Performance Output

4.3 Model Output

5.0 Monitoring and Assessment Approach

5.1 MAP Module and Section

See *CERP Monitoring and Assessment Plan: Part 1 Monitoring and Supporting Research* - Lake Okeechobee Module section 3.4.3.2 (RECOVER 2004a). Monitoring will be accomplished by producing a spatially, and technically accurate vegetation map of Lake Okeechobee's littoral zone (emergent marsh) using color infrared (CIR) aerial orthophotographs. Vegetation maps will be created for three geographically separate areas of the lake, 1) Kreamer, Torry, and Ritta Islands in the south; 2) The emergent marsh near Henry Creek in the northwest region of the lake; 3) the marsh from the Kissimmee River around the western shore of the Lake to the town of Clewiston. The Western marsh is the largest of these geographic areas and the majority of the lakes bulrush is located in this region of the lake. Bulrush along the lakeward edge of the emergent marsh will be mapped annually, the

western marsh (>70,000 acres) will be mapped every 2 years and the remaining areas will be mapped no less than once every five years. Bulrush distribution along the entire western marsh or portions of the marsh has been documented nearly every year since 1999. Directly comparable maps indicating the distribution and areal coverage of vegetation in the western marsh were produced in 1996 and 2003. The first vegetation maps describing the distribution of vegetation on the southern islands and Henry Creek were produced in 2003.

See *The RECOVER Team's Recommendations for Interim Goals and Interim Targets for the Comprehensive Everglades Restoration Plan – Indicator 2.4 Lake Okeechobee Aquatic Vegetation* (RECOVER 2005)

5.2 Assessment Approach

6.0 Future Tool Development Needed to Support Performance Measure

6.1 Evaluation Tools Needed

6.2 Assessment Tools Needed

7.0 Notes

This Performance Measure supersedes and addresses LO-11 Lake Okeechobee Native Vegetation Mosaic - Littoral Plant Communities and Bulrush (Last Date Revised: Nov 8, 2004), and LO-12 Lake Okeechobee Native Vegetation Mosaic – Submerged Aquatic Vegetation (Last Date Revised: Nov 8, 2004).

8.0 Working Group Members

Bruce Sharfstein (SFWMD)

Bob Pace (USFWS)

David Hallac (USFWS)

Greg Graves (SFWMD)

Linda McCarthy (FDACS)

Tom James (SFWMD)

Andy Rodusky (SFWMD)

9.0 References

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