Technical Review Team Meeting #1
Draft Goals, Performance Measures, Potential Impacts
Pre-Deliverable Draft Meeting Minutes
Lake Okeechobee Sediment Management Feasibility Study
November 14, 2000 – 10 a.m. to Noon at SFWMD

Attendees: Karen Smith – SFWMD Project Manager
Kathy Lukasiewicz – BBL Project Manager
R. Tom James – SFWMD
Kang-Ren Jin – SFWMD
Karl Havens – SFWMD
Benita Whalen - SFWMD
Katharine Murray – EQI
Alan Fowler – BBL
Jay Bloomfield – BBL
Sorrel Hoover – BBL
Michael Schoedinger – BBL

The purpose of the meeting was to obtain input from the TRT regarding the conceptual model for Lake Okeechobee and the development of goals, objectives, potential impacts, and performance measures, relative to internal loading in Lake Okeechobee.

Kathy Lukasiewicz read through BBL's concept of the project objective, which is to evaluate sediment management options to address internal loading of phosphorous in Lake Okeechobee; to improve water quality to the extent possible in terms of decreases in total phosphorous, decrease in turbidity, and decrease in blue-green algae; and to compare these options to a "No Action" or natural recovery baseline alternative.

The TRT Group generally agreed, however, there were some District representatives who questioned the ability or need to look at blue-green algae and turbidity. The District suggested that if it was not possible to look at blue-green algae and turbidity strictly quantitatively (using the existing tools available), then BBL might look at blue-green algae and turbidity categorically and use a point system to rank/weight items, thus having a somewhat quantitative performance measure.

BBL described the Conceptual Model of the Lake as it would be summarized in the Goals document. There was concurrence on the following key elements.

A. Internal loading is occurring and is a critical issue for the Lake.
Gross internal load, means more P goes down than comes up. Ratio is changing over time, and is almost equal.

B. Rate of internal loading has been increasing the past 20-30 years due to the legacy of phosphorous stored in the sediment. Evidence supporting this hypothesis includes:
    1. Analysis of annual nutrient budgets
    2. Empirical and mechanistic modeling
    3. Analysis of pore water chemistry (1988-1998, Reddy Volumes)

C. Mechanisms of Internal Loading
   1. High concentrations of phosphorous in pore water (chemical)
   2. Sediment re-suspension that is wind driven wave activity (physical)
   3. The District suggested that we should also add bioturbation as one of the mechanisms of internal Loading. The District also suggested BBL look at a paper written by a University of Florida student (under the direction of Ramesh Reddy) on this subject.

D. Biological induced reductions in K_{net} (the net retention coefficient for phosphorous in the Lake) caused by changes in lake trophic state and community structure due to long term excessive external loading in the Lake (blue green algae blooms, changes in benthic community).

   The District added that BBL should look at the Havens/Schelske paper entitled, "The Importance of Considering Biological Processes When Setting Total Maximum Daily Loads (TMDL) for Phosphorus in Shallow Lakes and Reservoirs.

E. High lake stages exacerbate suspended sediment and light transmission problems –
   1. Loss of favorable habitat, decrease efficiency of Lake for trapping phosphorous (i.e. reduced K_{net}).

F. The District's goal is to reduce external loads to the Lake. Given that understanding, the rationale behind this project is to:
   Improve the response time of the lake to changes in external loads, and improve the trapping efficiency of the lake (K_{net}). Embedded in this issue is the question whether restoration of K_{net} will occur only if some sediment mitigation measures are undertaken, or whether reductions in external loading alone will be adequate.

   The District and BBL agreed that the following computer water modeling scenarios would be considered:
   1. Current
   2. SWIM
   3. TMDL scenarios.
   4. 10 years, 30 years for the scenario for external load reduction. However, do not limit to 10, 30. Tell the model what your endpoint is and let the model determine the time frame to reach the endpoint.
   5. No Action

G. Composition of the Sediment:
   The District conveyed that the sediment in the Lake is comprised of 90% diatoms or sand/muck. They also stated that it is often hard to see where the water ends and the sediment begins. The sediment is described as an oozy, fluid mud. Sediment has also been described as a floc sitting on a mud bed. BBL will refer to the "Phosphorus Dynamics Study, Vol. V" prepared by D.R. Engstrom and P.L. Brezonik of the University of Minnesota for a more defined description.

Predictions:

External load will reduce internal loading, with lake response likely governed by two phases.
   a) Initial, rapid phase driven by lake residence time and magnitude of reduction; and
   b) Long term slow response driven to internal loading.

There was some discussion about calcium levels and the relationship of the Phosphorous on the rise and calcium declining. The District suggested that BBL review work by Walker and Reddy on this topic.

BBL presented an outline of the Work in Progress of Goals, Potential Impacts, and Performance Measures. Generally, the District agreed with each of the Goals listed below.

Goal #1 – Treat, remove, or manage lake sediments in a manner that will reduce internal phosphorous loading to the maximum extent possible and bring about the most substantial improvements in water quality, including the reductions in total phosphorous concentrations, turbidity, and algal blooms. (Defer to Walker/Havens "Concentrations for P," 1997)

Goal #2 – Minimize time to achieve substantial water quality improvements.

Goal #3 – Minimize project cost, both in the short term and long term

Goal #4 – Satisfy all applicable regulatory permitting and legal requirements.

BBL then presented the key principles and logic related to the Performance Measures (i.e. What will Happen and How to Predict it). The District directed BBL to take the information presented in the "Work In Progress" expand it with more detail, and summarize all the Performance Measures in accordance with the following items:

Description: *In general terms, what is being measured and why is it important to the goals and objectives?*
Rationale: *This is the hypothesis that forms the basis for the performance measure -- it's an explanation of the engineering, scientific, or economic basis for the performance measure.*
Metrics: *Exactly what is being measured? What are the units? Where are the measurements being taken, frequency, etc.?*
Target: *What is a desirable target in specific terms – this may be described in terms of a direction, i.e. we want less of this or more of that.*
Methods: *How will the evaluation of the performance measure be done in specific terms? For example:*
Will a model be used? What model?
What output will be used? How will the model output be formatted and used for evaluation? Are cost estimates needed? How will the cost estimate be developed? Will all costs be based on current value? How will depreciation/inflation be addressed?

BBL expressed concern that due to the nature of the project (focused on internal loading only) that it is somewhat difficult to address each of the performance measures quantitatively in the exact manner that Lewis had proposed. The District suggested that for the performance measures that are not directly quantifiable (i.e. through the scope of modeling efforts planned), that a categorical ranking and weighting system be proposed similar to that developed by Havens. It was agreed that other agencies such as the Fish and Game Commission (Gary Warren/Don Fox) and Audubon Society representatives could assist in the development of the ranking system for various performance measures. It was decided that the details of the exact ranking and weighting system did not need to be completed at this time for the Draft Goals, Performance Measures and Impacts document. However, the document would identify those factors for which a ranking system would be used in the future. The detailed ranking process will need to be developed and "flushed out" during development of the Work Plan for Alternatives Evaluation.