Executive Summary

Lake Okeechobee and Phosphorus

The Lake Okeechobee Sediment Management Feasibility Study was initiated by the District in the fall of 2000 in order to analyze all of the possible options for reducing internal phosphorus loading in the lake. Internal phosphorus loading – which occurs when wind-driven waves move across the lake and stir up the phosphorus-rich mud into the water – is a problem because the high levels of phosphorus can lead to decreased water quality, more frequent blooms of blue-green algae, and other problems that may affect drinking water supplies, interfere with recreation and commercial activities, and harm plants and wildlife.

Status of the Feasibility Study

The Sediment Management Feasibility Study consists of five main tasks:

Task 1. Development of Goals and Performance Measures

Task 2. Development of Alternatives

Task 3. Work Plan for Evaluation of Alternatives

Task 4. Evaluation of Alternatives

Task 5. Stakeholder Prioritization of Alternatives

The "Goals and Performance Measures" report was finalized in June 2001, and this report focuses on Task 2 – the development of a set of alternatives that, if implemented, could potentially meet the objective of reducing internal phosphorus loading in Lake Okeechobee.

Technology Assessment

The heart of this report is the evaluation of 36 different sediment management technologies, also called process options. In Section 2, each one of the 36 technologies is evaluated based on its advantages and disadvantages, numerous case studies examining use in other sediment management projects, findings and information presented in current research, and considerations unique to Lake Okeechobee (see Table 1 for a list and general descriptions of the technologies).

The technologies discussed in Section 2 were drawn from the universe of sediment management approaches, with the 36 deemed potentially applicable for managing internal phosphorus loading in Lake Okeechobee further evaluated with respect to potential feasibility for use in the lake. To conduct the technology assessments, a set of screening criteria were developed based on and compatible with the 5 goals and 26 performance measures finalized in Task 1 (see Appendix 1). The four screening criteria applied were:

- Effectiveness,
- Implementability,
- Applicability to Lake Okeechobee, and
- Risk and Reliability.

Through the assessment process, some of the technologies and specific process options were "screened out" and therefore not carried forward into the assembly of overall sediment management alternatives. Section 2.2 describes the screening criteria and steps in the assessment process in greater detail. The 14 technologies retained for further consideration and assembly into alternatives are:

1. No in-lake action; monitoring of external loads (Section 2.3.1)
2. In-place chemical treatment with aluminum compounds (Section 2.5.1)
3. In-place chemical treatment with calcium carbonate (Section 2.5.3)
4. Breakwaters (limited role associated with island confined disposal facilities) (Section 2.9.1)
5. Mechanical dredging (Section 2.11.1)
6. Hydraulic dredging (Section 2.11.2)
7. Barge transport of dredged sediments and construction materials (Section 2.13.1)
8. Pipeline transport of dredged sediments (Section 2.13.2)
9. Passive dewatering of dredged sediments (Section 2.14.5)
10. Geotubes (Section 2.14.6)
11. Lake-side treatment and discharge of water from dredged sediments (Section 2.15.1)
12. Confined disposal facilities (Section 2.17.2)
13. In-lake sump (for in-lake "collection" of sediment) (Section 2.17.4)
14. Beneficial reuse of dredged sediments – soil blending (Section 2.18.1)

Brief tabular summaries of each technology assessment are presented at the start of each subsection throughout Section 2. Each subsection then provides a more detailed explanation of the assessment results against each of the four screening criteria.

Development of Alternatives

Based on the screening-level assessment described in Section 2, the technologies having the best potential to be effective, implementable, and reliable in Lake Okeechobee were used as "building blocks" to create a set of sediment management alternatives. Some alternatives are made up of just one technology, while others combine several different technologies. For example, the dredging alternatives combine technologies for sediment removal, transport, dewatering, and disposal, while the baseline No In-Lake Action alternative is made up of just one stand-alone process option.

Thus, the 14 technologies retained after the screening-level assessment were assembled in various combinations to develop seven overall sediment management alternatives. These seven alternatives (and a number of related sub-alternatives) are listed below and briefly outlined on a preliminary conceptual basis in Section 3. During Task 4 of the feasibility study, these alternatives will be fully described and evaluated against the 5 goals and 26 performance measures developed in Task 1. This analysis will be presented in the Evaluation of Alternatives report, which is scheduled to be issued in 2003 as part of Task 4.

1) No in-lake action

2) In-lake chemical treatment (single application)

3) Long-term periodic in-lake chemical treatment

4) Dredging

- 4A) Dredging with disposal in in-lake island confined disposal facilities (CDFs)
- 4B) Dredging with disposal in near-shore CDFs
- 4C) Dredging with disposal in upland CDFs
- 4D) Dredging with beneficial reuse of dredged material

5) In-lake chemical treatment followed by dredging

- 5A) In-lake treatment followed by dredging with disposal in in-lake island CDFs
- 5B) In-lake treatment followed by dredging with disposal in near-shore CDFs
- 5C) In-lake treatment followed by dredging with disposal in upland CDFs

5D) In-lake treatment followed by dredging with beneficial reuse of dredged material

6) Dredging followed by in-lake chemical treatment

6A) Dredging followed by disposal in in-lake island CDFs and in-lake treatment

6B) Dredging followed by disposal in near-shore CDFs and in-lake treatment

6C) Dredging followed by disposal in upland CDFs and in-lake treatment

6D) Dredging followed by beneficial reuse of dredged material and in-lake treatment

7) Long-term periodic dredging from in-lake sumps followed by in-lake chemical treatment

7A) Long-term dredging from in-lake sumps followed by disposal in in-lake island CDFs and in-lake treatment

7B) Long-term dredging from in-lake sumps followed by disposal in near-shore CDFs and in-lake treatment

7C) Long-term dredging from in-lake sumps followed by disposal in upland CDFs and in-lake treatment

7D) Long-term dredging from in-lake sumps followed by beneficial reuse of dredged material and in-lake treatment

For More Information

The feasibility study is an ongoing process and one that is vitally important to charting a future course for Lake Okeechobee. With the development of a work plan (Task 3) and the detailed evaluation of alternatives (Task 4) and prioritization of those alternatives (Task 5) still ahead, the District welcomes public and interagency involvement in the process. For more information, access to other reports, and news regarding this feasibility study, please visit the project website at http://www.sfwmd.gov/org/wrp/wrp_okee/projects/sedimentmanagement.html or contact the District Project Manager as follows:

Jorge Patino, P.E.
South Florida Water Management District
Phone: (561) 682-2731
Fax: (561) 640-6815
E-mail: jpatino@sfwmd.gov