UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue
Seattle, Washington 98101

APR 6 1993

Publication # 93-10-202

Reply to
Attn of: WD-139

MEMORANDUM

SUBJECT: Recommendation for TMDL Approval
Lake Ballinger - (WA-08-9010) - Total Phosphorus

FROM: Amber Wong, Standards to Permits Specialist
Water Quality Section

TO: File

- **WA-08-9010 is not on Washington's §303(d) list, or on the water quality limited list. It is mentioned in the 1992 §305(b) report as a federal Clean Lakes Program Project - completed.**
- TMDL submitted August 25, 1992
- TMDL package completed March 23, 1993

  - EPA Approval Checklist
  - Document 1: Transmittal letter
  - Document 2: TMDL document
  - Document 3: An Interlocal Agreement for the Rehabilitation of Lake Ballinger, signed May 30, 1979

    Signatories: King County
    Snohomish County
    City of Edmonds
    City of Lynnwood
    City of Mountlake Terrace
    State of Washington
  - Document 4: Kramer, Chin and Mayo, Inc. 1986. Restoration of Lake Ballinger - Phase III, final report, for the City of Mountlake Terrace, Washington

Transmittal letter - Complete (see Document 1)

- states that TMDL has been established in accordance with Section 303(d)(1) of the Clean Water Act.

- **Review note: meets requirements**

Problem Assessment - Complete (see Document 2)

- Problems encountered (listed in Washington's 1992 §305(b) report): blue-green algae, hypolimnetic anoxia, high turbidity, tributary nutrient inputs, sediment phosphorus recycling, storm water, low transparency, fluctuating water level.

- There are no point sources to the lake. The main nonpoint sources have been identified as Hall Creek, surface water tributaries, waterfowl, and internal loading.

- The assessment is aimed at meeting the water quality standard for aesthetics. Total phosphorus was selected as the best indicator parameter for lake management. Interpretation of the narrative aesthetics standard is typically developed during the Clean Lakes project by the affected public.

- **Review note: Assessment gives problem parameter and outline of the water quality problem. Additional detail should be found in the Phase I report, which was not submitted.**

TMDL document - Complete (see Document 2)

- The load capacity for total phosphorus of 0.28 kg/day (102 kg/yr) has been established. This load was established to meet the goal of an in-lake mean summer total phosphorus concentration of 30 ug/l.

  Load allocations are as follows:

  Hall Creek - 160 kg P/yr
  Surface Water Tributaries - 100 kg P/yr
  Waterfowl - 55 kg P/yr
  Internal Loading - 20 kg P/yr

- **Review note: Document 3 contains the load allocations, which have been determined to be consistent with an in-lake concentration goal of 30µg/l. The derivation of the allocations was not included in the documentation, nor the basis for the 102 kg/yr figure.**

Supporting Studies - Complete (see Document 4)

- Three restoration techniques were used. These were divided into two phases. The first phase was the restoration of Hall Creek, construction of two regional sedimentation ponds, and the establishment of stormwater control ordinances concerning the construction on and development of land. These control measures were designed to reduce the inputs of solids and nutrients into the lake. The second phase was the construction of a hypolimnetic injection and withdrawal system. This in-lake effort was to provide dissolved oxygen to the hypolimnion, thereby reducing the internal cycling of phosphorus. It also provided for the flushing of nutrient-rich water from the bottom of the lake.

  Restoration of Hall Creek involved regrading, revegetating, and adding rip-rap to prevent erosion of the stream banks. The two sedimentation ponds effectively reduced sediment input to the lake.

  The hypolimnetic injection system transferred water from Hall Creek directly into the bottom waters of Lake Ballinger to aerate and flush the stratified layer.

- **Review note: Some of the necessary documentation has been provided - additional documentation (Phase I) would be nice to confirm numbers.**

Public participation - Complete (see Document 2)

- Community involvement program initiated during Phase I adequately involved public in management decisions.

- **Review notes: Adequate public participation.**

Enforceability - Complete

- The city of Mountlake Terrace, in conjunction with the other agencies, has implemented the restoration plan, evaluated its effectiveness, and come up with subsequent recommendations.

- **Review notes: Action has been taken. Additional monitoring is being conducted to determine whether the water quality goals have been achieved.**

TMDL effectiveness plan - Complete

- An ongoing monitoring program is in place to evaluate the effectiveness of the plan components.

- Review notes: Adequate monitoring is in place to assess compliance with the lake restoration plan.

Recommendation, approve TMDL.

ALW, 3/23/93

TOTAL MAXIMUM DAILY LOAD

Department of Ecology
P.O. Box 47600
Olympia, WA 98504-7600

Developed pursuant to 40 CFR 130.7 and the Federal Clean Water Act

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WATERBODY SEGMENT: WA-08-9010

Ballinger Lake

(outlet at TRS 27N-04E-32)

RECEIVING SYSTEM INFORMATION:

Basin: Cedar-Sammamish
Counties: Snohomish

TMDL PARAMETER:

Total Phosphorus

APPLICABLE RULES:

WAC 173-201-045(5)(viii)
City of Mountlake Terrace
Development Ordinances

SOURCES COVERED BY THIS TMDL:

Allocation Type	Source Description
LA	Hall Creek
LA	Other Surface Water Tributaries
LA	Waterfowl
LA	Internal Loading

TMDL:

A loading capacity for total phosphorus of 0.28 kilograms p per day (102 kg P/year) to Ballinger Lake has been established. This loading rates has been shown to be consistent with a mean summer total phosphorus concentration of 30 ug P/L. The LA for Hall Creek is set at 160 kg-P/year; for other surface water tributaries is set at 100 kg-P/year; for waterfowl is set at 55 kg-P/yr; and for internal loading is set at 20 kg-P/yr. These LA's have been set based on estimated loads needed to achieve a level of aesthetic enjoyment acceptable to the lake user community.

Technical Documents:

Kramer, Chin, and Mayo, Inc. 1987. Restoration of Lake Ballinger - Phase III Final Report. Report to City of Mountlake Terrace, WA.

Public Participation:

In 1979, an interlocal agreement to restore Lake Ballinger was signed by the Cities of Edmonds, Lynwood, Mountlake Terrace, King and Snohomish Counties, and the Washington State Department of Ecology. The cities and counties provided local matching funds for the restoration effort. In 1980, storm water control and development ordinances were adopted specifying performance standards for water quality improvement on runoff from new construction in the drainage basin.

Implementation:

The Phase II restoration project consisted to two parts. First, was the construction of two regional sedimentation facilities on Hall Creek completed in 1981. Second, a hypolimnetic injection and withdrawal system was installed in 1982 to remove phosphorus generated through internal loading.

Monitoring:

Monitoring of numerous quality constituents was conducted during and after the Phase II restoration effort. In 1987, the City of Mountlake Terrace began sampling for total phosphorus (and other parameters) in the lake and drainage basin. Currently, samples are taken monthly in the winter and twice monthly in the summer at 1 lake station and 7 stations on Hall Creek. The city does not plan to discontinue this monitoring in the foreseable future.