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

APR 8 1993

Reply to
Attn of: WD-139

MEMORANDUM

SUBJECT: Recommendation for TMDL Approval
Wapato Lake - (WA-10-9320) - Total Phosphorus

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

TO: File

- **WA-10-9320 is not on Washington's §303(d) list, nor 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: Canning, Douglas J., et al. 1976. "Wapato Lake: An Environmental Study on the Effects of Urbanization", Final report to the Washington State Department of Ecology, The Evergreen State College, Olympia, Washington
  - Document 4: Metropolitan Park District of Tacoma. 1978. Final Environmental Impact Statement for the Proposed Wapato Lake Rehabilitation Plan, Tacoma, Washington
  - Document 5: Entranco Engineers, Inc. 1986. Wapato Lake Restoration - A Discussion of Design Considerations, Construction Techniques, and Performance Monitoring, prepared for Metropolitan

Printed on Recycled Paper

Park District of Tacoma, 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)

- This is a Clean Lakes project. Problems cited were blooms of blue-green algae, low dissolved oxygen, turbidity, sediment phosphorus recycling, storm water, low transparency, and fecal coliform bacteria.

- There are no point sources to the lake. The main nonpoint sources have been identified as storm water runoff, precipitation, waterfowl, aquatic plants, 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 0.19 kg/day from May through August (23 kg P for the period) has been established.

  Load allocations are as follows:

  Storm water runoff - 0 kg P/day
  Precipitation - <0.01 kg P/day
  Waterfowl - 0.02 kg P/yr
  Aquatic Plants - 0.11 kg P/day
  Internal Loading - 0.06 kg P/yr

- **Review note: Documentation was not complete to verify the load capacity, or the derivation of the allocations. Should be contained in the Phase I report.**

Supporting Studies - Complete (see Documents 3, 4, and 5)

- Control measures implemented were: phosphorus precipitation/inactivation, diversion of stormwater, dilution/flushing, drawdown, structural storm water controls, and public education.

- Document 5 contains an evaluation of the effectiveness of the restoration. The effectiveness of the program, by component, is as follows:

- The stormwater diversion system has resulted in significant reductions in pollutant loading to the main basin of the lake. Approximately 450 kg P/yr was eliminated from the lake. Corresponding reductions in bacteria, heavy metals, and oil and grease loadings have also occurred. This diversion should continue.

- The effectiveness of the dilution portion of restoration strategy was difficult to determine. Problems occurred with supplying the necessary amounts of water. In the future, restoration efforts will be directed at stormwater diversion, a weed control program, and intermittent alum treatment.

- Lake drawdown was not found to be of continuing effectiveness.

- Wetland treatment of stormwater was found to be very successful in removing pollutants from stormwater flows, and should be continued.

- Alum treatment every 4 to 5 years (in conjunction with weed harvesting) was recommended to control phosphorus from sediment release.

- **Review note: Document 5 contains an evaluation of the effectiveness of the restoration plan components, and gives further recommendations for future lake management. The document also recommends implementation of an ongoing performance monitoring program to evaluate the need for modifications to the plan.**

Public participation - Complete (see Document 2)

- Community involvement program initiated during Phase I adequately involved public in management decisions. Eight public hearings were held. Community involvement also occurred through the SEPA process.

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

Enforceability - Complete

- Adoption of the restoration plan, evaluation of the effectiveness of the plan components, and an ongoing performance monitoring program ensure that the plan objectives are met.

- **Review notes: Although the restoration plan is not enforceable, the Metropolitan Park District has already taken the actions contemplated in the plan, evaluated them, and has plans for continued monitoring and evaluation. Therefore, an adequate feedback mechanism exists to ensure progress toward meeting water quality goals.**

TMDL effectiveness plan - Complete

- Both pre- and post-restoration monitoring was conducted to determine the effectiveness of the restoration plan. The lake is still being monitored (by the University of Washington) to determine the efficacy of treatment.

- **Review notes: Adequate monitoring is being conducted to assess compliance with the lake restoration plan.**

Other Information -

- Other documents in EPA files are listed in Attachment A.

Recommendation, approve TMDL for phosphorus.

ALW,3/23/93

Attachment A.

Clean Lakes Documents Judith has for Wapato Lake

Canning, D.J. Wisseman, R.W. and S.F. Jerry Cook. 1976. Wapato Lake: An Environmental Study on the Effects of Urbanization. Report to Washington State Department of Ecology.

Entranco Engineers, Inc. 1978. Wapato Lake Restoration Analysis.

Metropolitan Park District of Tacoma. 1978. Final Environmental Impact Statement for the Proposed Wapato Lake Rehabilitation Plan.

Entranco Engineers, Inc. 1979. Wapato Lake Restoration Pilot Study Scope of Work.

Entranco Engineers, Inc. 1979. Wapato Lake Restoration Dilution Pilot Study Status Report.

Entranco Engineers, Inc. 1980. Final Supplement to the Environmental Impact Statement for the Proposed Wapato Lake Rehabilitation Plan.

Entranco Engineers, Inc. 1980. Lake Wapato Restoration Grant Application and Executive Summary.

Entranco Engineers, Inc. 1980. Wapato Lake Restoration Analysis.

Entranco Engineers, Inc. 1981. Wapato Lake Design Calculations.

Entranco Engineers, Inc. 1986. Wapato Lake Restoration - Final Report. A discussion of design considerations, construction techniques and performance monitoring.

Entranco Engineers, Inc. March 1986. Wapato Lake Operation and Maintenance Manual.

Entranco Engineers, Inc. September 1986. Wapato Lake Operation and Maintenance Manual.

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-10-9320

Wapato Lake

(outlet at TRS 20N-03E-23)

RECEIVING SYSTEM INFORMATION:

Basin: Puyallup-White
County: Pierce

TMDL PARAMETER:

Total Phosphorus

APPLICABLE RULES:

WAC 173-201-045(5)(viii)

SOURCES COVERED BY THIS TMDL:

Allocation Type	Source Description
LA	Storm Water Runoff
LA	Precipitation
LA	Waterfowl
LA	Aquatic Plants
LA	Internal Loading

TMDL:

A loading capacity for total phosphorus of 0.19 kilograms p per day from May through August (23 kg-P for the period) has been established. The LA for storm water runoff is set at 0 kg-P/day; for precipitation is set at <0.01 kg-P/day; for waterfowl is set at 0.02 kg-P/yr; for aquatic plants is set at 0.11 kg-P/day; and for internal loading is set at 0.06 kg-P/yr. These LA's have been set based on estimated loads achieved (in 1984) after implementation of various restoration activities to the lake that achieved levels of aesthetic enjoyment acceptable to the lake user community.

Technical Documents:

Canning, D.J., Wisseman, R.W. and S.F. Jerry Cook. 1978. Wapato Lake: An Environmenatl Study on the Effects of Urbanization. Report to Washington State Department of Ecology.

Metropolitan Park distric of tacoma. 1978. Final Environmental Impact Statement for the Proposed Wapato Lake Rehabilitation Plan.

Entranco Engineers, Inc. 1987. Erie and Campbell Lakes - Final Report: Restoration and Evaluation. Report to Skagit County, WA.

Entranco Engineers, Inc. 1983. Water Quality and Restoration Plan - Erie and Campbell Lakes. Report to Skagit County, WA.

Public Participation:

Approximately 14 alternatives for lake restoration were developed between 1975 and 1980. The final restoration plan was developed through eight public hearings, an extensive community involvement process, and the SEPA process during EIS development.

Implementation:

The principal objectives of the restoration project was to allow the continued use of the lake as a storm water detention facility during winter months and to upgrade the water quality to acceptable levels for aesthetic enjoyment during the summer when storm water runoff is low. Restoration included 5 activities; (1) construction of a dike to divert summer storm runoff around the lake, (2) construction of a dilution water distribution system, (3) lake level drawdown, (4) construction of a wetland to enhance pollutant removal from storm water runoff, and (5) application of alum to control internal loading. The first four activities were completed by the summer of 1982. Alum was applied in 1984.

Monitoring:

Monitoring of numerous quality constituents was conducted during and after the lake restoration effort. Currently, a Phase III project is being conducted on the lake to evaluate the long-term effectiveness of the alum treatment. The lake is being sampled by the University of Washington twice a month from June through September for total phosphorus and other water quality parameters for three years (1992-1994).