A Department of Ecology Report

Lake Whatcom 303(d) Listing Recommendations

Summary

Lake Whatcom is recommended to be included on the Washington State 303(d) list of water quality impaired waters. This recommendation is based on evidence of a declining trend in dissolved oxygen in the lower part of the lake, which is in conflict with the water quality goals set for the lake in the 1987 Lake Whatcom Watershed Management Plan.

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WA-01

October 29, 1997

TO: Steve Butkus

FROM: Karol Erickson KE

SUBJECT: Comment on 303(d) Listing for Lake Whatcom

Attached is a report I prepared, at the request of the Ecology Nooksack Office, on Lake Whatcom water quality. Please consider this report in making your final 1998 303(d) listing determination for Lake Whatcom.

Lake Whatcom 303(d) Listing Recommendations

Summary

Lake Whatcom is recommended to be included on the Washington State 303(d) list of water quality impaired waters. This recommendation is based on evidence of a declining trend in dissolved oxygen in the lower part of the lake, which is in conflict with the water quality goals set for the lake in the 1987 Lake Whatcom Watershed Management Plan.

Introduction and Background

Lake Whatcom is a ten-mile long lake located in Whatcom County, partially within the City of Bellingham. It is a highly valued lake for water supply, providing the primary drinking water source for most of Bellingham, as well as the water source for the Georgia-Pacific Corporation mill. The lake provides recreational opportunities and important habitat for fish and wildlife. Because of its aesthetic appeal, much of the Lake Whatcom watershed is highly valued for residential development.

In response to a number of comments from the community, the Bellingham Field Office asked me to examine water quality information for the lake relative to listing criteria for the Section 303(d) list under the Clean Water Act.

Every two years, Ecology prepares a list of surface waters that are not expected to meet state water quality standards after implementation of technology-based controls, as required by the Clean Water Act. Waterbodies on the list become candidates for TMDLs or other management procedures for improving water quality. The proposed 1998 list was published in August 1997 (Ecology, 1997).

Criteria for Listing

A waterbody becomes a candidate for 303(d) listing if its water quality is not expected to meet Washington State standards after application of technology-based controls. The most common standards used for this purpose are the numeric criteria set out in WAC 173-201A-030, "Water Quality Standards for Surface Waters of the State of Washington". However, when a Lake Restoration Project has been undertaken, the criteria for listing are somewhat different.

Phase I of a Lake Restoration Project usually results in development of a Lake Management Plan. If a Lake Management Plan has been written as part of a Lake Restoration Project, the water quality goals set forth in that plan are generally used for the purposes of evaluating potential 303(d) listings (Butkus, personal communication).

Phase II of a Lake Restoration Project involves implementation of the plan. Generally, for 303(d) listing purposes, if a Lake Restoration Project has been completed or is in

Phase II, it is assumed that the lake water quality is being managed in such a way that the goals of the plan, and hence the state water quality standards, will eventually be met. Federal regulations (40 CFR 130.7(b)(1)(iii)) allow exclusion of waters from the list in these cases. EPA guidance allows these exclusions if certain factors are met. (For example, waters cannot be excluded where the plan is not being implemented, or follow-up monitoring is not being done.) Therefore, the vast majority of lakes that have active or completed Phase II Lake Restoration projects are not included on the 303(d) list.

However, a closer analysis of a lake's compliance with 303(d) listing criteria may be performed for a lake in question. The analysis involves a more thorough look at the lake's water quality relative to the goals set out in the watershed plan. The results of this analysis are presented in this report.

Listing Status

Lake Whatcom is not proposed to be listed according to the Decision Matrix for the Proposed 1998 Section 303(d) list. The rationale for not listing is consistent with the general handling of lakes with Lake Restoration Projects as described above. The decision matrix states:

> A State Clean Lakes Restoration project was undertaken for Lake Whatcom. Phase I of this project was completed, and a Lake Whatcom Management Plan was published in 1987. Phase II, implementation of the plan, is underway. Numerous control actions have been taken or are planned. Post implementation monitoring will continue (the City of Bellingham in cooperation with Western Washington University have extensively monitored lake conditions for 30 years and has committed to continue this monitoring). This information meets EPA guidance for excluding the lake from the list under federal regulation 40 CFR130.7(b)(1)(iii).

Lake Whatcom Watershed Plan

Specific water quality goals are not explicitly stated in the Lake Whatcom Watershed Management Plan (Whatcom County, 1987). However, water quality goals of **1) preserving beneficial uses**, and **2) preventing degradation of water quality** can be inferred from the following statements:

> Executive Summary: The recommendations in the plan were developed to preserve the current high lake water quality and protect the other beneficial uses of the lake.
>
> Chapter 4, Recommended Management Options: The goal of the recommended management options for the Lake Whatcom watershed is to protect all of the beneficial uses through government regulation and public education regarding responsible use of the lake. The protection of Lake Whatcom through prevention of water quality degradation is simpler and less expensive than restoration of the lake after problems have developed.

> Chapter 5, Recommended Lake Whatcom Watershed Management Plan: The plan of action given here is intended to protect the uses of Lake Whatcom, to ensure that the generally high water quality is not degraded, and to mitigate specific problems that are now apparent such as periodic high bacteria levels in the northern basin of the lake.

As explained in the Criteria section, these goals are used for the purposes of 303(d) listing decisions.

Recent Water Quality Monitoring Results

The water quality of Lake Whatcom has been monitored for many years through a cooperative agreement with the Institute for Watershed Studies, Western Washington University. In the most recent report summarizing this monitoring work (Matthews et al., 1997), degradation of dissolved oxygen levels was discussed, as summarized below.

Data from the past ten years show increasing rates of oxygen depletion with depth at the site nearest the outlet to Whatcom Creek (Site 1) during September. The oxygen depletion is most noticeable at 5-15 meters. Figure 1 illustrates oxygen profiles between 5 and 15 meters depth for the years 1989 to 1997, based on the data listed in Table 1. The years since 1993 (shown in red and orange) show a more rapid drop-off of dissolved oxygen with depth than do the years prior to 1993 (shown in blue and green). These dissolved oxygen data indicate a declining trend in dissolved oxygen over time at this site.

Recommendation for 303(d) listing

The declining trend of dissolved oxygen at Site 1 is in conflict with the water quality goals set forth in the Lake Whatcom Watershed Management Plan. Therefore, Lake Whatcom is recommended to be included on the Washington State 303(d) list of water quality impaired waters.

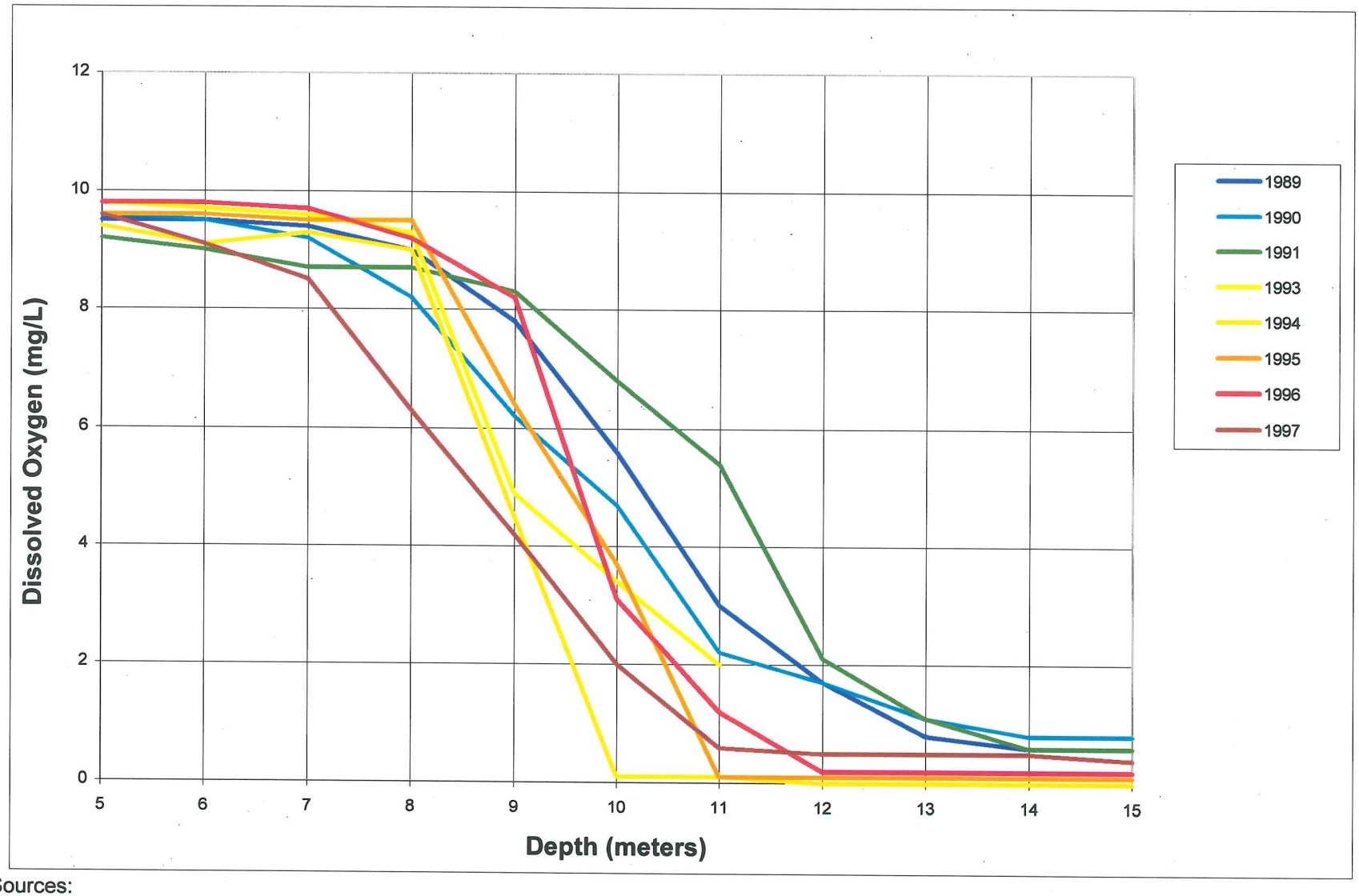
References

Matthews, R., M. Hilles, G. Matthews, 1997. Lake Whatcom Monitoring Project, 1995/96 Final Report. Institute for Watershed Studies, Huxley College of Environmental Studies, Western Washington University, Bellingham, WA.

Ecology, 1997. Impaired and Threatened Surface Waters Requiring Additional Pollution Controls – Proposed 1998 Section 303(d) List. Washington Department of Ecology, Olympia, Washington. Publication No. 97-14.

Whatcom County, 1987. Lake Whatcom Watershed Management Plan. Prepared for Whatcom County by the Institute for Watershed Studies, Western Washington University, Revised July 1987.

Figure 1. Lake Whatcom dissolved oxygen profiles at Site 1; early September data.



Data Sources:
1989 through 1986: Matthews et al., 1997
1997: Matthews, personal communication

Table 1. Lake Whatcom dissolved oxygen profiles at Site 1, early September data.

Depth	Dissolved oxygen (mg/L)							
(meters)	1989	1990	1991	1993	1994	1995	1996	1997
0	9.7	9.6	9.5	9.7	9.7	10.3	10	9.9
1	9.6	9.6	9.4	10.1	9.6	9.9	10	9.9
2	9.6	9.7	9.4	10	9.6	9.9	10	9.8
3	9.6	9.6	9.3	9.9	9.5	9.8	9.9	9.8
4	9.5	9.6	9.3	9.9	9.5	9.8	9.9	9.6
5	9.5	9.6	9.2	9.8	9.4	9.6	9.8	9.6
6	9.5	9.5	9	9.7	9.1	9.6	9.8	9.1
7	9.4	9.2	8.7	9.6	9.3	9.5	9.7	8.5
8	9	8.2	8.7	9.3	9	9.5	9.2	6.3
9	7.8	6.2	8.3	4.9	4.5	6.4	8.2	4.2
10	5.6	4.7	6.8	3.4	0.1	3.7	3.1	2
11	3	2.2	5.4	<2	0.1	0.1	1.2	0.6
12	1.7	1.7	2.1	<2	0	0.1	0.2	0.5
13	0.8	1.1	1.1	<2	0	0.1	0.2	0.5
14	0.6	0.8	0.6	<2	0	0.1	0.2	0.5
15	0.6	0.8	0.6	<2	0	0.1	0.2	0.4
16	0.5	0.8	0.6	<2	0	0.1	0.2	0.4
17	0.5	0.8	0.6	<2	0	0.1	0.2	0.4
18	0.5	0.9	0.6	<2	0	0.1	0.2	0.4
19	0.5	0.9	0.6	<2	0	0	0.2	0.4
20		0.9	0.7	<2	0	0	0.2	0.4
21		0.8						

Data Sources:
1989 through 1996 data: Matthews et al., 1997
1997 data: Matthews, personal communication