

Clean Lakes in Oregon? DEQ's Changing Role as Expediter

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Andy Schaedel, Portland, ODEQ: A program called the Clean Lakes Program was established in 1972 as part of a major piece of environmental legislation entitled the Clean Water Act. The Oregon Department of Environmental Quality (DEQ) administered this program in Oregon, under direction of the Environmental Protection Agency (EPA). Clean Lakes Program funding occurred from 1976 – 1994 but the program has not been funded over the last decade.

This article is intended to give a brief review on what happened in Oregon under this program and what is currently happening since the loss of funding to address lake water quality. This article only focuses on programs that are managed by the Department of Environmental Quality and does not discuss the status of work done independently through federal agencies, other state agencies, universities, etc.

SOME BACKGROUND The Clean Lakes Program was established in 1972, under section 314 of the Federal Water Pollution Control Act, to provide financial and technical assistance to States in restoring publicly-owned lakes. The program was set up as a multiple-part program:

Classifications surveys and Lake Water Quality Assessments: where states were to identify and rate their lakes according to trophic conditions in order to be eligible for further funding. The *Atlas of Oregon Lakes* (OSU Press, 1985) was funded using this grant and further statewide assessments (including the Citizen Lake Watch) were done in the early 1990s under this funding;

Phase I - Diagnostic/Feasibility Studies: Funds were awarded for studies which would analyze a lake's condition, determine the causes of eutrophication and procedures necessary to protect and restore its quality;

Phase II – Restoration and Protection Implementation: Funds were awarded to implement procedures recommended in the Phase I study for restoring and protecting the lake. Most of the federal funding went to this category;

Phase III – Post Restoration Monitoring: Limited funding was available to monitoring and document the implementation

The Clean Lakes Program, under the direction of EPA, funded approximately \$145 million in grant activities since 1976 to address lake problems. There have been no general appropriations for the program since 1994. The program provided a widely varying amount of funding to States, ranging from \$2.7 - \$20 million per year but was typically in the \$4 - \$9 million range. Oregon received approximately \$2 million of funding. The Oregon Department of Environmental Quality (DEQ) administered the program and most of the work was done under contract to private sector limnologists. A list of the Phase 1 and 2 projects that were funded under this program is in Table 1.

Table 1 Summary of Section 314 Phase 1 and 2 Lakes Studies in Oregon

Lake (Basin)	Phase	Date of Project	319 Funding	Total Cost	Summary
Mirror Pond (Deschutes)	1 2	1980-82 1983-84	\$21,376 \$150,000	\$30,480 \$150,000	Pond was filled with sediment and rooted vegetation. Study recommended dredging and stormwater sediment controls. Pond was dredged in 1983-1984.
Upper Klamath Lake (Klamath)	1	1980-83	\$71,120	\$101,600	Lake experienced algal blooms, dense beds of macrophytes, high pH and low DO. Restoration plan recommended maintaining lake level and selected dredging, weed harvesting and use of aquascreen to provide for recreational use.
Fern Ridge Res (Willamette)	1	1980-82	\$70,612	\$101,088	Reservoir experienced seasonally high turbidity, bacteria, and algal blooms. Study recommended alum application to precipitate phosphorus, dredging, sand dispersal to cover clay bottom, delayed drawdown and addressing sources of bacteria in watershed.
Devils Lake (Mid Coast)	1 2	1980-82 1985-94	\$99,670 \$311,170	\$143,643 \$510,830	Lake experienced excessive algae and macrophyte growth that interfered with uses. Study recommended weed harvesting or herbicides to control plant growth and sewerage. A Water Improvement District was formed to promote watershed and lake management and Grass Carp were introduced to control macrophyte growth. Educational and monitoring programs have been implemented.
Sturgeon Lake (Willamette)	1 2	1980-82 1984-94	\$58,224 \$376,767	\$83,220 \$4983,534	Lake was filling in with sediment due to flood control dikes which reduced its natural flushing and was affecting water fowl habitat. Dredging of Dairy Creek to reestablish its connection with the Columbia River was carried out. Further maintenance work is needed.
Blue Lake (Willamette)	1	1981-83	\$97,042	\$145,543	Algae blooms and Eurasian Milfoil were interfering with recreational uses. Study recommended herbicide use, alum to precipitate phosphorus, dilution from Portland's water supply, and lake drawdown to kill weeds. Drawdown was unsuccessful but herbicide use and dilution have been used.
Garrison Lake (South Coast)	1	1987-90	\$74,900	\$107,000	Algal blooms forced Port Orford to abandon its water supply from the lake and macrophytes interfered with recreation. Study recommended diverting sewage effluent from the lake, forming a lake management district, addressing any failing septic systems, selective harvesting and improving wetland biofiltration of Mill Creek. Outfall has been relocated from the lake.
Lake Notasha (Klamath)	1	1991-94	\$38,765	\$54,520	Lake Notasha is a small, extremely pure wilderness lake that would be sensitive to anthropogenic change. Study determined that it has remained relatively unchanged and recommended various practices to protect it including not stocking fish into the lake.
Lake Lytle (North Coast)	1	1992-94	\$100,000	\$142,664	Lake is heavily infested with Eurasian milfoil. The study determined that nutrient control would not address the milfoil concern (loadings were not excessive or linked to nutrients to the lake) and recommended control of the invasive species through herbicides. A management plan was developed.
Smith & Bybee Lakes (Willamette)	1	1993-95	\$46,000	\$70,740	The lakes have experienced infestation of Reed Canary Grass and loss of other natural vegetation since a water-level control was installed to address avian botulism concerns in 1982. The study recommended removal of the structure and to manage the lakes to mimic natural hydrologic conditions.

The Clean Lakes Program was successful at getting a better understanding of lake water quality problems and lake restoration techniques, both nationally and within the state. As an early program, it understood that both the lake and its watershed needed to be understood in order to address problems that occurred in the lake. It was, however, somewhat limited in scope due to funding and programmatic limitations. For example, Oregon was trying to shift the focus of the program to address regional lake problems (rather than one lake at a time) and to address protection of high quality lakes (rather than waiting for a water quality limiting condition) with limited success when funding of the program was discontinued. Work on Lake Notasha was an attempt to better understand and develop measures to protect pristine lakes and work on a regional lake study in the North Coast area had been proposed at the time of the budget cut.

DEQ had a staff person who, as part of their job duties, oversaw administration of the Clean Lakes program and was available to provide technical assistance to lake associations. This position was phased out in 1997 as a result of state budget shortfalls and lack of Clean Lake funding to administer.

So What is Happening Now? While it would be easy to say that all is lost without a dedicated Clean Lake program, I believe that it is fair to say that more is now going on to address lake water quality. Lake work has been better integrated with other on-going or recently developed programs. While there is more that is needed to have a strong lake program within Oregon, which will be discussed shortly, the following will describe some major areas where lake water quality is being addressed since the mid-1990's.

If one goes to EPA's Clean Lakes website (<http://www.epa.gov/owow/lakes/index.html>), you will find a number of guidance and other articles that discuss using other programs authorized under the Clean Water Act and other funding to support lake studies and lake restoration. Some of the key programs that are being used to address lake water quality include:

- Total Maximum Daily Load (TMDL) Program;
- 319 Nonpoint Source Grant Program;
- 401 Hydroelectric Recertification Program;
- Safe Drinking Water Program;

Total Maximum Daily Load (TMDL) Program: Section 303(d) of the Clean Water Act has received increased attention since the late 1980's and throughout the 1990's, partially as a result of shifting program emphasis, guidance and lawsuits. Basically, this program requires that:

- States identify waters (lakes, rivers, and estuaries) that do not meet water quality standards – this is often called the 303(d) list;
- States rank these waters and develop total maximum daily loads for pollutants that cause the water quality standard violation. A Water Quality Management Plan is to be submitted to give assurance that pollutant loads will be addressed;
- EPA must approve or disapprove the TMDL, if they disapprove, EPA must establish the TMDL.

What does all of this mean for lakes in Oregon? It is a way to identify lakes that experience water quality problems and sets a timeframe to address them. A summary of lakes that have been addressed or that are on the current 303(d) list is given in Tables 2 and 3.

Table 2 Lakes that have been addressed under a TMDL or equivalent (as of 1/2003)

Lake (Basin)	Parameter	EPA Approval Date	Status
Clear Lake (Mid Coast)	Phosphorus	12/8/1992	
Lake Oswego (Lower Willamette)	Phosphorus	1/27/1994, updated 8/7/2001	Management Plan that includes: nutrient management, aeration, non-phosphorus fertilizer use in watershed, harvesting and herbicide use
Garrison Lake (South Coast)	Phosphorus	12/8/1992	Port Orford WWTP outfall relocated from Lake
Agency Lake (Klamath)	Phosphorus	8/7/2002	
Upper Klamath Lake (Klamath)	Phosphorus	8/7/2002	
Columbia R Res	Total Dis Gas	11/18/2002	Corp Management Plan
Lytle (North Coast)	Aquatic Weeds	Delisted in 2002 as pollutant was not associated with the Aquatic Nuisance Weeds	Aquatic Nuisance Weeds to be addressed under an Aquatic Vegetation Management Plan – herbicide use suspended pending NPDES permit development

Table 3 Lakes that are currently on the 2002 Oregon 303(d) list

Lake (Basin)	Parameter	Target Date	Status/Related Work
Cullaby (N. Coast)	Aquatic Weeds or Algae	2001	TMDL Study in Progress
Smith (N. Coast)	Aquatic Weeds or Algae	2001	TMDL Study in Progress
Sunset (N. Coast)	Aquatic Weeds or Algae	2001	TMDL Study in Progress
Lake Billy Chinook (Deschutes)	Chlorophyll a, pH	2002	401 Hydro Cert (6/19/2002)
Lake Simtustus (Deschutes)	Chlorophyll a, pH	2002	401 Hydro Cert (6/19/2002)
Odell (Deschutes)	pH	2002	
Lava (Deschutes)	DO	2002	
J.C. Boyle (Klamath)	Chlorophyll a, pH, DO	2002	401 Study in Progress
Lost River Res (Klamath)	Chlorophyll a, pH, DO	2002	
Diamond Lake (Umpqua)	pH, Aquatic Weeds and Algae	2002	TMDL Study in Progress
Lemolo Lake (Umpqua)	pH, Aquatic Weeds and Algae	2002	401 Hydro Cert (3/8/2002)

Plat I Res (Umpqua)	Mercury	2002	
Cooper Ck Res (Umpqua)	Mercury, Iron	2002	
Blue Lake (Willamette)	Aquatic Weeds or Algae, pH	2003	TMDL Study in Progress
Bybee Lake (Willamette)	Weeds, pH	2003	Proposed for Delisting based on Metro Plan
Smith Lake (Willamette)	Weeds, pH	2003	Proposed for Delisting based on Metro Plan
Cottage Grove (Will.)	Mercury	2003	TMDL Study in Progress
Dorena Res (Willamette)	Mercury	2003	TMDL Study in Progress
Fern Ridge Res (Will)	Turbidity, Bacteria	2003	TMDL Study in Progress
Floras (S Coast)	Aquatic Weeds or Algae	2003	
Reeder Res (Rogue)	Sedimentation	2004	
Fish Lake (Rogue)	Chlorophyll a, pH	2004	TMDL Study in Progress
Eel Lake (S Coast)	pH	2005	
Tenmile Lake (S Coast)	Aquatic Weeds or Algae	2005	TMDL Study in Progress
N. Tenmile Lk (S Coast)	Aquatic Weeds or Algae	2005	TMDL Study in Progress
Devils Lk (M Coast)	Chlorophyll a, pH	2006	Management plan
Mercer Lk (M Coast)	Aquatic Weeds or Algae	2006	
Siltcoos Lk (M Coast)	Aquatic Weeds or Algae	2006	
Tahkenitch (M Coast)	Aquatic Weeds or Algae	2006	
Antelope Res (Owyhee)	Mercury	2006	
Snake R Reservoirs	Mercury, Temperature	2007	Temp TMDL Drafted
Columbia R Res.	PCBs, Temperature	2001	

303(d) Listing Process: One of the keys to addressing lake water quality problems is to get it on to the 303(d) list. This list is developed every two years (due to EPA by April of even numbered years). DEQ puts out a call for new information, typically in the Spring prior to when the list is due, but will accept data anytime (although it might not be used in the next listing if there is not sufficient time to review it). There are many more lakes in Oregon which have suspected problems (than those listed on Table 3) but the agency does not have sufficient or suitable data for listing them. Getting data remains an on-going challenge for lakes, especially in the face of declining budgets; there are limited on-going surveys of lakes. For more information on the 303(d) list, please contact Marilyn Fonseca by email at fonseca.marilyn@deq.state.or.us or by phone at (503) 229-6804 or visit the DEQ website: (<http://www.deq.state.or.us/wq/303dlist/303dpage.htm>).

TMDL Development Oregon developed an aggressive 10-year schedule for completing a first round of TMDLs for waters listed on the 1998 303(d) list. TMDLs had been done prior to this time for Clear Lake, Lake Oswego, and Garrison Lake. Upper Klamath Lake and Agency Lake TMDLs were recently completed with field and/or

TMDL development work underway on Tenmile Lake (including North Tenmile Lake); Diamond Lake; Cullaby, Smith and Sunset Lakes on the North Coast; and lakes listed in the Willamette (Dorena, Cottage Grove, Fern Ridge, Blue, Smith/Bybee).

The focus of the Department's efforts over the next several years will be to complete the TMDLs along with management plans (or develop just a management plan for lakes where a TMDL may not be appropriate) for listed lakes in the North Coast, South Coast, Willamette, Umpqua, Rogue, Klamath and Deschutes Basins. Work on lakes in the Mid Coast and Owyhee Basins will be done following this work but may extend out after 2007 pending staff resources. Recent budget cuts have affected the rate at which this work is being done and the original scheduled target dates have slipped somewhat.

A good way to be involved, either in getting a lake considered for listing or involved in a TMDL is to contact the appropriate DEQ Water Quality Basin Coordinator. A list can be found on the DEQ website at <http://www.deq.state.or.us/wq/TMDLs/WQBasinCoord.pdf>

319 Grant Program EPA has identified this grant program – which was established in 1987, among others, as a potential source of funding for studies or for implementation of practices to address nonpoint sources of pollution. Nonpoint sources of pollution have been identified as the major contributor of pollution to most lakes. The Department has supported the Citizen Lake Watch, portions of studies on Klamath, Diamond, Tenmile and Blue Lakes and implementation in the Tenmile Lake Watershed with 319 Grant Funds.

Calls for 319 Grant Proposals occur on an annual basis. If you have interest in applying for a grant, more detail of grants available through DEQ can be found on its website: <http://www.deq.state.or.us/wq/wqgrant/wqgrant.htm>. It is highly recommended that you work with the appropriate Water Quality Basin Coordinator earlier in the process.

401 Hydroelectric Certification Section 401 of the federal Clean Water Act authorizes state water quality programs to certify that federal actions involving the award of licenses or permits will not violate applicable state water quality requirements. In the case of hydroelectric projects, the Federal Energy Regulatory Commission (FERC) administers the licensing program, and the DEQ certifies the project's application for licensing or relicensing. Quite a few projects in Oregon have recently been relicensed or are coming up for relicensing including projects on the Deschutes, North Umpqua, Klamath, Snake, Sandy and Clackamas Rivers. This is a major opportunity to get data on these reservoir systems and to address water quality problems that are attributable to the hydroelectric project.

Source Water Assessments The 1996 Amendments to the federal Safe Drinking Water Act (SDWA) provided new resources to DEQ and Oregon Health Division to provide drinking water protection assistance to public water systems and communities. While developing a management plan to protect a public water system will remain voluntary in Oregon, the 1996 SDWA Amendments mandated that state agencies conduct "source water assessments" for every public water system. This means that DEQ and OHD must delineate the groundwater and surface water sources

which supply public water systems, inventory each of those areas to determine potential sources of contamination, and determine the most susceptible areas at risk for contamination. Drinking Water Protection plans are encouraged and can be a great way to address lake water quality concerns which, in turn, can affect water supplies that are drawn from lakes. For more information, see the DEQ website: <http://www.deq.state.or.us/wq/dwp/dwphome.htm> or contact Sheree Stewart, Drinking Water Protection Program Coordinator, Oregon DEQ, 503-229-5413.

MORE TO DO Hopefully, this short summary gives you the impression that work to address water quality concerns in lakes has not stopped with the loss of the Clean Lake Program funding. However, I don't want to leave you with the impression that everything needed for good statewide management program is getting done. There are a number of areas that need further work. Two areas that readily come to mind as needing further work include the development of a program to monitor long-term status and trends in lake water quality and protection of high quality waters.

There has not been a good monitoring program to determine trends in lakes in Oregon. The Department had worked with the Center for Lakes and Reservoirs at Portland State University to develop a Citizen Lake Watch Program. This program was designed to have volunteers do periodic observations on a lake (e.g. secchi depth, weed distribution, invasive species watch, note watershed activity and limited chemical measurements) and was periodically supplemented with more detailed study by scientists to help identify trends and problems. This program has not continued in recent years due to lack of on-going funding. It was set up with Clean Lakes Funds, continued on 319 Grant Funds and shifted to State funding but it was inadequate to keep the trend monitoring going and to do all that was required out of the PSU CLR.

The Clean Water Act and Oregon water quality standards (340-41-026) recognize the need to give higher protection to waters that constitute an outstanding state or national resource. These waters, such as waters designated as extraordinary resource waters or critical habitat areas, are to be classified as "Outstanding Resource Waters." If so designated by the Environmental Quality Commission, a plan is to be put together to protect the water quality parameters that affect the ecological integrity of critical habitat or special water quality values that are vital to the unique character of those water bodies. Crater Lake and Waldo Lake have been suggested as two such waters. The Department has not had sufficient resources to work on these nominations given the need for developing or modifying other water quality standards, doing consultation with federal agencies on these standards and responding to lawsuits on those standards.