



Briefsheet

Lake Sawyer water cleanup plan (TMDL) for phosphorus

What is a TMDL?

Federal law requires states to identify sources of pollution in waters not meeting water quality standards, and to determine how much pollution the waters can receive and still remain healthy. This limit is called its "loading capacity."

A set of pollutant limits for that waterbody, based on sampling data and computer modeling, is called a Total Maximum Daily Load (TMDL) - or water cleanup plan. The U.S. Environmental Protection Agency (EPA) issued regulations and guidance on preparing TMDLs and approves them as they are developed.

Lake Sawyer, in the Green River drainage of Western Washington, has an area of 280 acres with a watershed that covers 13 square miles. It lies primarily in glacial drift with peat and muck areas. The two major inflow streams, Rock Creek and Ravensdale Creek, enter the lake through an extensive wetland area.



This pump station sends raw sewage from Black Diamond to the Metro treatment plant in Renton, 16 miles away. The discharge once went into a wetland above Lake Sawyer for treatment, but the "innovative" method didn't work.

What's unusual about Lake Sawyer?

In the early 1980s, EPA funded the City of Black Diamond to build a wastewater treatment facility that used a natural wetland, part of the Rock Creek drainage, for treatment. But the wetland portion of the treatment facility failed soon after installation, and phosphorus concentrations in the lake markedly increased.

In 1989, Ecology completed a water quality assessment of the lake. The intensive study evaluated the nutrient loads to the lake and predicted changes in water quality that would result from effluent changes or from moving the discharge out of Rock Creek.

In 1993, EPA approved the TMDL for Lake Sawyer. This is a good example of how the TMDL process can be used to fix water quality problems associated with domestic waste.



What did the TMDL find?

The water quality assessment found that prior to start-up of the treatment facility, Lake Sawyer was on the threshold of becoming eutrophic. Following start-up, the lake jumped into the eutrophic range (from 20 to 31 parts of phosphorus per billion). By the year 2010, at the same rate of phosphorus loading, Lake Sawyer would have become hyper-eutrophic (51 parts per billion). Ecology also determined that requiring homes with individual septic systems to connect to the new sewage system would have no effect on the phosphorous level in the lake.

What were the recommendations?

In the TMDL, Ecology recommended sending the sewage, through a new interceptor line, to the regional Metro system facility in Renton. In 1992, the City of Black Diamond eliminated its discharge to Rock Creek. All wastewater from the Black Diamond area is now treated at the regional secondary treatment facility. This transfer action formed the basis for the TMDL which EPA approved.

*Below:
Lake Sawyer,
near the
City of
Black*

The **nutrient status** of lakes is often described in terms of enrichment or “trophic” state. Eutrophic lakes are overly rich in phosphorus, characterized by frequent algal scums, excessive aquatic weeds, and occasional fish kills. A healthy lake in the Puget Sound lowlands should have phosphorus levels no higher than 20 parts per billion.

How do we know it’s working?

TMDLs require monitoring to test and assure their effectiveness. King County conducts routine monitoring of phosphorus in Lake Sawyer. In 1993, after the diversion of wastewater from Rock Creek, the mean phosphorus concentration in Lake Sawyer dropped to 18 parts per billion. Samples collected in 1995 and 1996 showed mean phosphorus of 16 parts per billion. These data show that moving the outfall was effective in surpassing the TMDL goal.

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