King County
Protecting Our Waters
Doing our part on rainy days

Water Quality Assessment and Monitoring Study Update

July 2015

Lake Union/Ship Canal: A unique water body

King County scientists recently shared preliminary findings on Lake Union/Ship Canal with external experts on the Science and Technical Review Team. The findings are based on existing data. The experts were impressed by the complexity of the water body. It is influenced by commercial and recreational activity, numerous combined sewer overflows (CSOs) and stormwater outfalls, fresh water coming from Lake Washington, and saltwater intrusion from the Ballard Locks.

Why an assessment?

The assessment will inform King County's **Combined Sewer Overflow (CSO) Control Program**, now called **Protecting Our Waters.** The assessment will help ensure that investments in CSO control are well planned to optimize water quality improvements in Elliott Bay, Lake Union/Ship Canal, and the Duwamish River.

Good news for water quality

Lake Union is "mesotrophic." This means it has a moderate amount of plant growth and algal blooms are rare. There are no violations of Washington State water quality standards for ammonia, metals, or organic compounds. The experts said it had surprisingly good water quality, for such a busy water way. The large volume of high quality water entering from Lake Washington may contribute to the low levels of contaminants seen in Lake Union.

Water quality – there's still work to do

There are still frequent violations of standards for bacteria in Lake Union/Ship Canal. However, trends show that bacteria concentrations are decreasing. This is also true in the other two waterbodies that are part of the assessment (Elliott Bay and the Duwamish River). Potential sources for the bacteria will be explored in a Loadings Report being developed as part of the assessment.

Another problem is high summer temperature. Warm lake temperatures stress migrating salmon returning from the ocean. While there is cooler water at the bottom of the lake, the dissolved oxygen that salmon need to survive is limited there. This forces salmon to remain in warmer waters.

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Sediment data

The existing data show many contaminants (for example, PAHs, PCBs, silver, butyltins) in the underwater sediment in some areas of the waterbody. These pollutants can affect the tiny animals (such as insects, worms, clams, and crayfish) that live in the sediments. Some pollutants may move upward through the food web and impact larger animals. They can also get stirred up into the water column. Previous studies have shown that the sediment near Gas Works Park is highly polluted with contaminants released by the gasification plant that operated where the park now stands.

Saltwater intrusion

The intrusion of salt water is one of the things that make this freshwater lake unique. Typically, salt water is confined to Salmon Bay near the Ballard Locks. However, when additional salt water is allowed through the locks, it can travel through the ship canal and enter Lake Union. Salt water is denser than fresh water, so it sinks to the bottom of Lake Union. It can remain there for a long time and increase problems with low oxygen in the deep water. Water movement caused by wind at the surface may cause the salt water layer to rock back-and-forth, forming underwater waves. These are called “seiches.” They can stir up the polluted sediments in Lake Union. Additionally, the low dissolved oxygen and acidity of the saltwater layer may increase the solubility and toxicity of some contaminants present in the exposed sediment.

Project background

Under the Water Quality Assessment and Monitoring Study, King County scientists are compiling existing data and conducting additional studies. This work will address questions about impairments in the waterbodies where King County has uncontrolled combined sewer overflows (CSOs). The county’s science team is working with an independent Science and Technical Review Team. These reviewers help ensure the assessment’s methods and results are high quality, thorough, and objective.

The report documenting these findings will be published later. The presentation explaining the preliminary findings to the Science and Technical Review Team is available on the web now.

Find out more about the Water Quality Assessment and Monitoring Study on the web at or by contacting **Erika Peterson, at 206-477-5525 or Erika.peterson@kingcounty.gov**.