



Ecosystems

Objective:

Protect and restore water quality, biodiversity, open space, and ecosystems

What is happening in King County?

Water quality is fair to moderate in King County, although the number of returning Chinook salmon has been on a decreasing trend since about 2000.

King County's Streams Water Quality Index scores for 2010-2011 indicated that 75 percent of the 24 sampling sites were of moderate or high water quality concern (poor to moderate water quality) and 25 percent were rated of low concern (good water quality). All five sites rated "high concern" were affected by very high fecal coliform bacteria following record breaking rains in early November 2010. Stream water quality is improving however, even given the 2010 event.

Lake water quality results vary annually, depending on the climate effects and biological interactions that combine to create unique conditions in each lake annually. For example, the 1994-2011 results for Lake Sammamish show phosphorus concentrations fluctuated between low to moderate productivity from year to year, indicating water quality varies from good to moderate with low potential for nuisance algal blooms. For the past 12 years phosphorus concentrations in Lake Washington have remained low indicating a low potential for nuisance algal blooms. Lake Union typically has phosphorus concentrations within the moderate water quality range, with the exception of 2007. In 2007 high phosphorus levels put Lake Union in the poor water quality range. Overall the Total Phosphorus - Trophic State Index scores for Lakes Washington and Sammamish, appear to be somewhat lower in recent years.

In general, the quality of open waters in Puget Sound is fair. However, marine water quality conditions in certain areas of King County show evidence of degradation. Marine waters that are in protected areas without much current are of greatest concern.

Water Resource Inventory Areas (WRIA) delineate watersheds for administrative and management purposes. Four such WRIAs exist in King County. Natural Chinook salmon escapement--the number of mature, adult Chinook salmon that escape fisheries and return to their stream of origin to spawn naturally--is monitored in each WRIA. It is an indicator of the abundance of Chinook salmon and can be used, along with other population indicators, to evaluate the overall health of marine and freshwater ecosystems.

The fish counts for WRIAs 7, 8 and 9 have been on a decreasing trend since about 2000-2004. Natural variations are expected due to a wide variety of influencing factors. Overall, the natural Chinook salmon escapement results in 2010 for each WRIA were far below the respective adjusted annual recovery goal and comprised of only 7 percent of the recovery target.

What role does King County play?

King County works with regional partners to preserve water quality and prevent and repair damage to its waterways and water bodies. Attention is given to high concern sites to improve water quality. This can involve properly maintaining facilities, constructing or engineering solutions, identifying where or how pollutants are entering the stream, and/or educating adjacent property owners about the impacts of pesticides and fertilizers on streams.

King County will continue to operate its wastewater treatment plants and conveyance system effectively to maintain low levels of nutrients discharged into marine waters. The new Brightwater Treatment System uses state of the art technology to reduce nutrients and other pollutants.

Although King County does not manage fish populations directly, it does have jurisdictional responsibility for many activities, including land-use regulation, which greatly influences the quantity, quality and distribution of salmon habitats.

King County will work with the Puget Sound Partnership to advocate a coordinated effort in the planning for improved water quality at a regional scale.

What else influences these indicators?

Overall stream water quality in King County is impacted by increased urbanization in our region -- primarily storm water runoff. Storm water, combined sewer overflows (CSO's), waterfowl and pet wastes are the most likely sources of bacteria in urban streams. Poor livestock manure management and failing septic systems can be a potential source of bacteria in agricultural and suburban areas. In wetlands, wildlife excrement and stagnant water conditions can lead to elevated bacteria counts. High phosphorus concentrations are found in fecal material and elevated concentrations are often linked to similar sources as bacteria. In addition, elevated phosphorus concentrations are linked to areas undergoing development primarily due to erosion.

In marine waters, low oxygen conditions may occur as a result of the natural flow of low oxygenated Pacific Ocean water into the deep main basin of Puget Sound, in addition to processes such as eutrophication. Persistently low nitrate concentrations in surface water can indicate a potential sensitivity to nutrient-rich input such as storm water runoff, industrial waste discharges, septic systems, and flow from rivers. Ammonia can be found at elevated concentrations as a byproduct of sewage, agricultural practices, and fertilizer use in urban areas.

Natural Chinook salmon escapement is related to the habitat and water quality of the County's rivers and streams, along with several other factors such as temperature, precipitation, hatcheries, biology, harvest, and flow management. Some annual variation in salmon returns is to be expected and is unrelated to local human influences. For example, natural cycles of ocean warming and cooling and longer term trends in climate can also greatly affect local salmonid productivity.

What can you do?

- Properly dispose of unused pharmaceuticals, harmful chemicals and paints, instead of pouring them down the drain or allowing them to run off on the ground.
- Minimize the use of fertilizers and pesticides by practicing natural yard care.

- Reduce use of vehicles and other devices with combustive engines.
- Wash your car on the grass or gravel instead of on the street.
- Properly dispose of or manage pet and livestock wastes.
- Expand and enhance Green Stormwater Infrastructure where you live, work and play.
- Volunteer to improve salmon spawning habitat in your local stream, river, or water body.

Related Links

Marine Water Quality

King County KingStat Aquatic Environment Indicators

Technical Notes

1. WRIA stands for Watershed Resource Inventory Areas. They are the following: Snohomish (WRIA 7), Cedar/Lake Washington (WRIA 8), Green/Duwamish (WRIA 9) and Puyallup/White (WRIA 10).
2. Estimates presented here of the number of natural Chinook returning to spawn each year were obtained from the Washington Department of Fish and Wildlife for Chinook in each major King County watershed. Chinook population targets derived from co-managers and Technical Review Team for WRIA 7, Washington Department of Fish and Wildlife and Ecosystem Diagnosis and Treatment analysis for WRIA 8, and Washington Department of Fish and Wildlife for WRIA 9.
3. King County's Streams Water Quality Index (WQI) integrates key factors into a single number that can be compared over time and across locations. This index compares monthly temperature, pH, fecal coliform bacteria, dissolved oxygen, turbidity, total suspended solids, and nutrients (phosphorus and nitrogen) relative to state standards and guidelines. This index was originally based on the Oregon Water Quality Index and work by the Washington Department of Ecology. In 2009, Ecology modified the WQI to reflect revised state water quality rules for the protection of native fish and aquatic resources. In addition to modifications for revised state criteria, the WQI was further modified in 2009 by Ecology to more directly reflect conditions in Puget Sound lowland streams. For purposes of year-to-year comparison, results from previous years were recalculated using the new Puget Sound Lowland Stream WQI.

King County conducts monthly water quality monitoring at 14 offshore locations in Puget Sound, which includes 7 stations located at wastewater treatment plant and combined sewer overflow (CSO) outfall pipes. Four indicators are integrated into a modified version of the water quality index developed by the Washington State Department of Ecology to assess overall water quality. The determination of water quality concern is based upon dissolved oxygen, dissolved inorganic nitrogen, ammonia, and stratification strength and persistence.

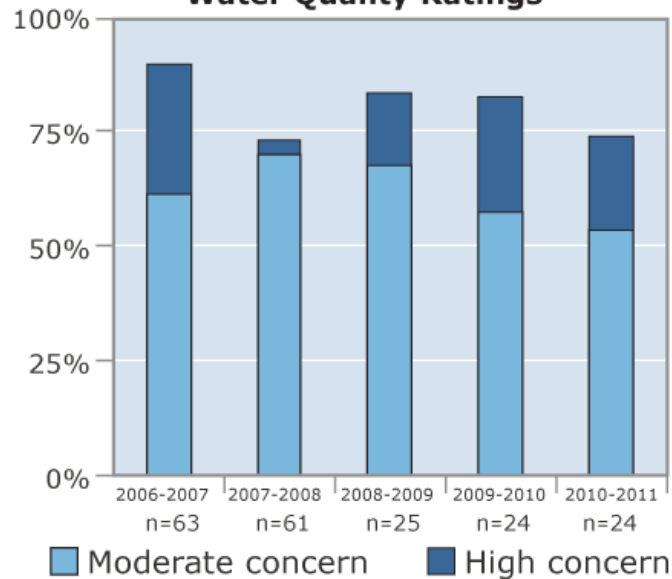
Charts and Maps

2011 Acres and Parcels of Open Space in Rural King County

	Acres	Number of Parcels	Proportion of Rural Acres
All Rural parcels	1,065,718	106,381	100%
All Publicly-owned	624,961	5,420	59%
King County-owned in Fee	25,659	1,108	2%
King County Easement	159,843	1,094	15%
King County-protected by Fee or Easement*	184,204	2,137	17%

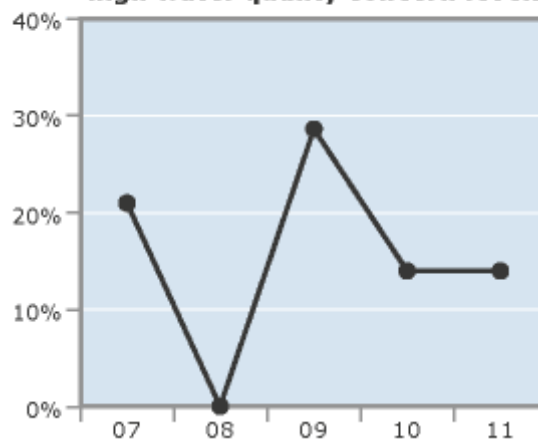
*Discrepancy between this percentage and sum of KC-Fee+KC Easements relates to overlap in cases where easements were acquired first, then land later purchased in fee.

King County Streams with Moderate to High Concern Water Quality Ratings



Rating from the King County Streams Water Quality Index for Water Resource Areas 8 & 9.

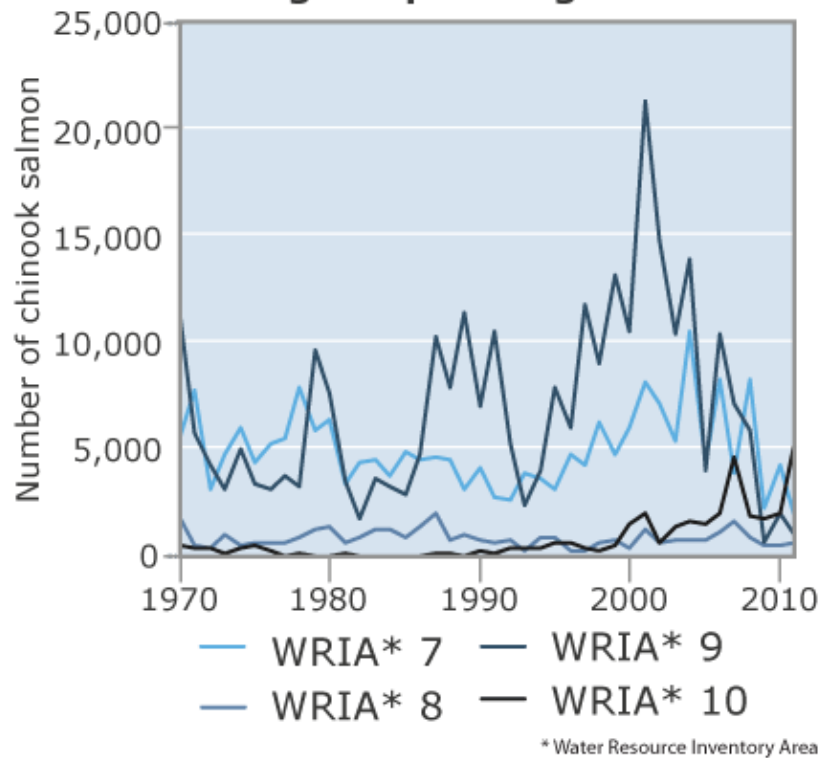
Percent marine offshore monitoring sites at moderate or high water quality concern levels



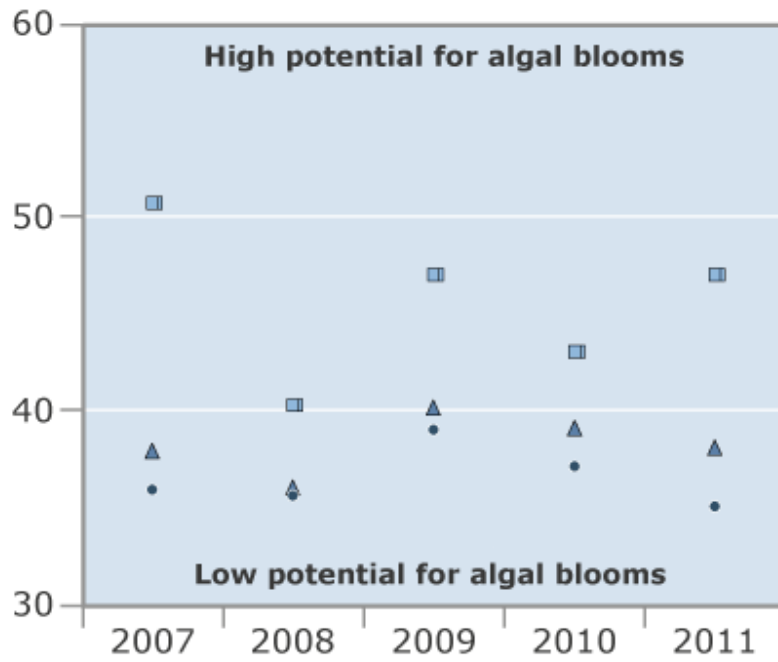
2011 Marine Water Quality Findings



Estimated Number of Chinook Salmon Returning to Spawning Grounds



Major Lake Phosphorus Index Ratings Potential for nuisance algal blooms marked



- ▲ Lake Sammamish
- Lake Washington
- Lake Union

King County's Open Space System 2012

