



ENVIRONMENT INDICATORS

Outcome: Protect Wetlands

INDICATOR 16: Change in wetland acreage and functions.

There is no new data to show changes in wetland acreage beyond what was presented in the 2000 Benchmark Report. New information related to this Indicator will be published as it becomes available.

Outcome: Protect the Diversity of Plants and Wildlife

INDICATOR 17: Continuity of terrestrial and aquatic habitat networks.

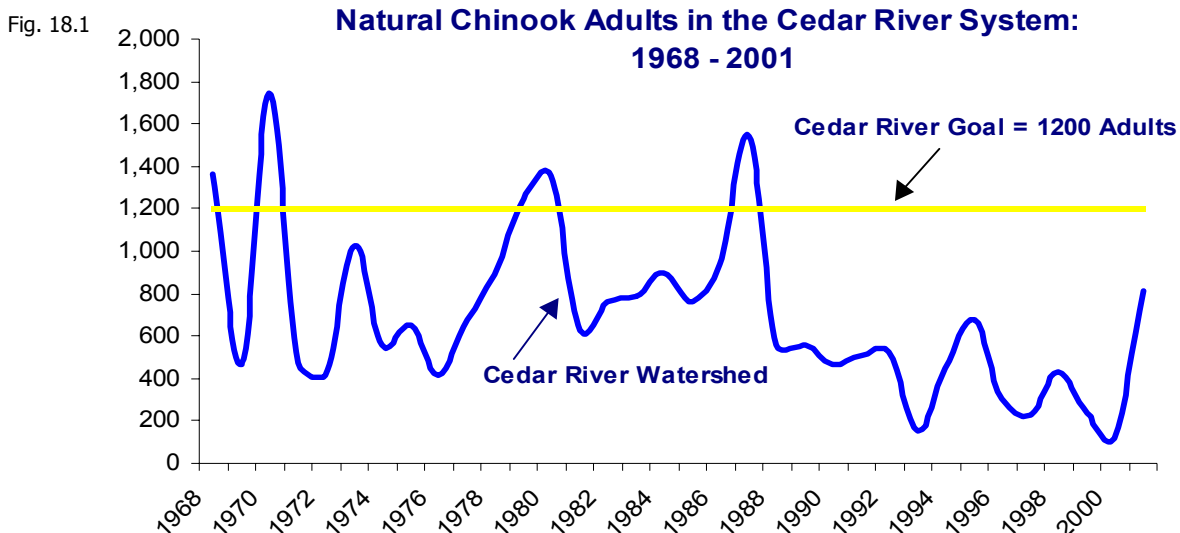
There is no new data to show changes in the continuity of terrestrial or aquatic habitat beyond what was presented in the 2000 Benchmark Report. New information related to this Indicator will be published as it becomes available.

Outcome: Increase Salmon Stock



INDICATOR 18: Change in the Number of Salmon

Salmon in Puget Sound have diverse life histories and rely upon different habitats at various points in their life history for spawning, rearing, feeding, and migrating. They can be an important source of information about the health of those habitats. The abundance, geographic distribution, genetic diversity and productivity of salmon can be indicative of the overall health of both their marine and freshwater ecosystems. This indicator focuses only on information related to changes in the quantity of salmon returning to spawn in the freshwater lakes and streams of King County.

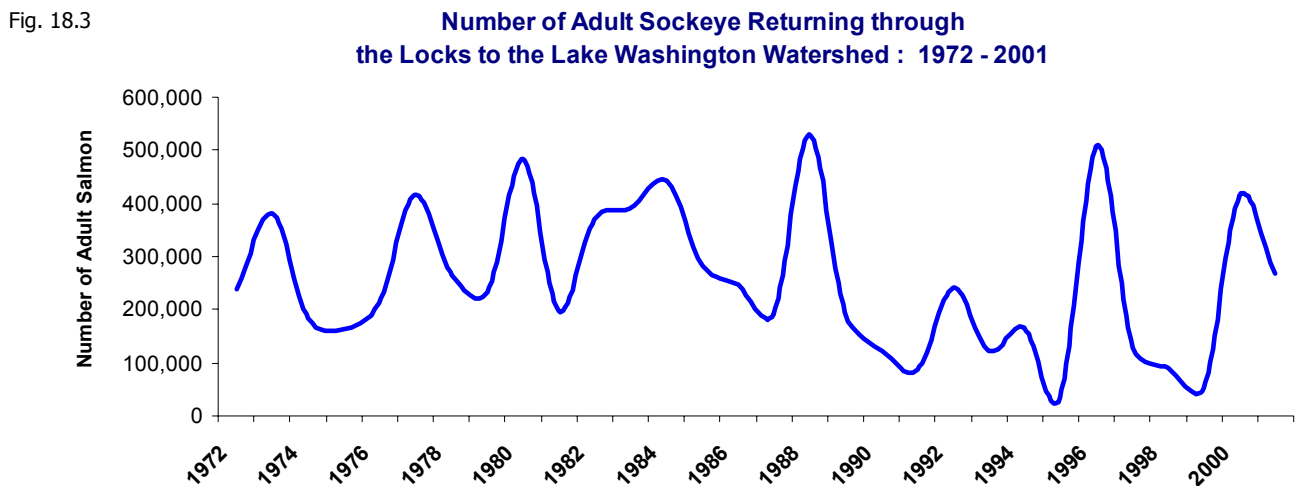
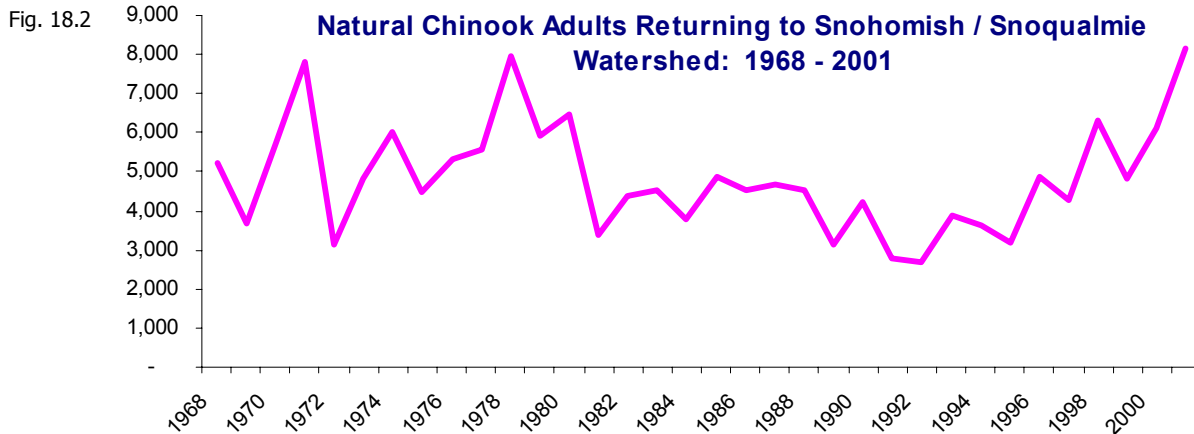


Background and Definitions

1. For salmon and steelhead stocks, the term **escapement** refers to those mature fish that have returned to freshwater, have survived all fisheries and constitute the spawning population for a given stock. All data presented in the graphs are escapement data.
2. The term **natural fish** refers to those fish that spawn naturally whether or not they originated in a hatchery or in the wild.
3. The Lake Washington System is comprised of the Cedar River and its tributaries; Lake Washington and its northern tributaries, the Sammamish River and Lake Sammamish and their tributaries (including Issaquah Creek). See Indicator #13 above for a map of King County watersheds.
4. The Green River Watershed includes the Duwamish River and the Green River and its tributaries. The Snoqualmie-Snohomish Watershed includes the Skykomish, Snoqualmie, and Snohomish sub-basins and their tributaries. Over one-half of this watershed lies in King County.



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About This Indicator

General

- The Puget Sound Basin provides habitat for a total of 209 salmon and steelhead stocks.
- Qualitative and quantitative data from over the last century indicate a precipitous and continuous decline in the abundance of native, naturally spawning salmon in Puget Sound watersheds, and in watersheds up and down the west coast generally. For some stocks their has been a reduction to barely 10% of their historic numbers of returning fish (e.g. from 10,000 to 1,000.)
- The gravity of this decline has been confirmed by the listing of chinook salmon and bull trout under the Endangered Species Act.
- Tribal treaty rights to salmon are part of the Steven’s Treaties negotiated by the United States with the Indians. Salmon are an

important economic and cultural resource to the tribes.

- Much of the variation in salmon returns is due to natural variability unrelated to human influences. However, the decline in natural-spawning Chinook, Coho, and Sockeye stocks in King County basins is considerably more enduring than would be expected from natural fluctuations. The impacts of habitat degradation, harvest management and climatic factors contribute to this fluctuation.
- The number of adults salmon returning to spawn in a given year is in part dependent on the number of young fish that were spawned, and survived to return to the marine environment, about 2 – 4 years previously. High and low adult escapement numbers can reflect spawning conditions in streams during that earlier period. Marine conditions and the number of fish taken in the marine fisheries also impact the number of returning adult returns.



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- Habitat degradation caused by urban and industrial growth, forest practices, agricultural practices, municipal, industrial and agricultural water diversions, and hydropower have all contributed to diminishing the abundance and diversity of salmon.
- On the positive side, change in Canadian law affecting salmon fisheries may be contributing to higher adult escapement over the last couple of years, particularly in Central Puget Sound.
- It is often very difficult to determine the relative importance of any single factor that can influence the status of a particular stock. This analysis highlights observations regarding certain salmon species in watersheds within King County without attempting to link them to specific factors.

Chinook

Cedar River Watershed

- As Figure 18.1 shows, the total number of natural-spawning adult Chinook in the Cedar River watershed rebounded significantly in 2001, reaching 810, its highest number since 1987. Last year, only 120 adults returned to spawn in the Cedar. The number fluctuated between a low of about 450 and a high of over 2000 through the 1970s and 1980s. Overall, the average of runs in the 1990s are about one-half the average during the 1980s.

Snohomish / Snoqualmie Watershed

- Fig. 18.2 shows the number of Chinook in the Snohomish/Snoqualmie watershed. There was an overall declining trend from the late 1970s to the mid-1990s. In 1998, however, adult Chinook returned to this watershed in the highest number since 1980. This trend has continued with 6,095 adults returning to spawn in 2000, and 8,164 in 2001.

Sockeye

Lake Washington / Cedar River Watershed

- Fig. 18.3 shows the returns of adult Sockeye through the locks to the Lake Washington/Cedar River watershed from 1968 - 2001.
- In 2000, 415,000 sockeye returned to Lake Washington through the locks, followed by 268,000 in 2001. However in 1995 just 34,000 returned, and in 1999, only 51,000. This

illustrates the volatility of the Sockeye population in this watershed.

- The combination of ideal spawning conditions in 1996 and a favorable marine climate during the next few years, favored the survival of the 2000 and 2001 cohorts. However, historically, good years, such as 2000 and 2001, often alternate with very poor years.
- Even accounting for "good years", the 1990s showed a lower average return of Sockeye than previous decades. It is premature to determine a long-term trend for Lake Washington Sockeye returns.

Coho

- In 1995, the National Marine Fisheries Service designated Coho in the Puget Sound/Strait of Georgia as a candidate for listing due to concerns over specific risk factors, including extensive habitat degradation.

Lake Washington Watershed

- In 2000 about 1,950 Coho adults returned to Lake Washington, after several years of very low returns. For instance, in 1994, a low of 200 Coho adults returned to the Lake Washington system, compared to a high of 30,000 returns in 1970. The average return in the 1990s was much lower than in the 1970s and 1980s.

Green River Watershed

- The Green River watershed had a return of 5,340 Coho in 2001, well above the average over the last 35 years. Although there are large yearly fluctuations, Coho in the Green River appear to maintaining a healthy level of survival.

What We Are Doing

- Leading the Tri-County Salmon Conservation Coalition together with Pierce and Snohomish Counties and various stakeholders to develop local responses to ESA listings that protect habitat and restore salmon populations. The Coalition completed the Tri-County Model 4 (d) Rule Response Proposal in May 2001 and contracted a third party biological review of the model. It was completed in April 2002.
- Leading or participating in various research initiatives through watershed planning, fish studies, water quality assessments, monitoring, and other research programs.



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- Leading or participating in regional watershed planning processes to accomplish early action habitat improvements and to develop long-term salmon habitat conservation plans.
- Improving regulations, enforcement, and programs in all county activities including land use permitting, road maintenance, park maintenance, stormwater management, flood control, and wastewater treatment. Securing federal and state money for habitat acquisition and restoration. King County worked with the Tri-County Salmon Conservation Coalition to secure over \$70 million for Washington and an additional \$120 million for local salmon conservation.

- Dedicating King County capital funds to habitat improvements. In the past two years, the Department of Natural Resources and Parks dedicated \$7.3 million to habitat improvements, and the Department of Transportation dedicated more than \$6.6 million to habitat improvements.
- Along with federal and state agencies, tribal governments, and Kitsap County, providing leadership in the development and implementation of the Shared Strategy for the recovery of salmon in Puget Sound.

More information is available in a report called *Conserving Salmon: King County Accomplishments and Action Plan* at www.metrokc.gov/exec/esa/conservingsalmon02.htm.

Outcome: Decrease Noise Levels

INDICATOR 19: Rate of change in noise from vehicles, planes, and yard equipment.

There is very little annual change in this data. New information will be reported in 2003.

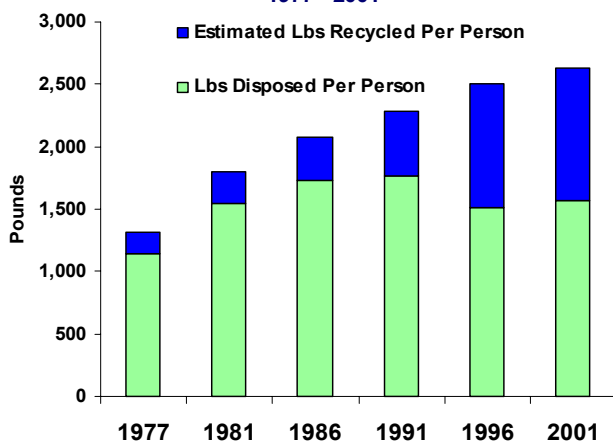
Outcome: Decrease Waste Disposal and Increase Recycling

INDICATOR 20: Pounds of waste disposed and recycled per capita.



Fig. 20.1

Pounds of Waste Per Capita Disposed and Recycled in King County Outside of Seattle: 1977 - 2001



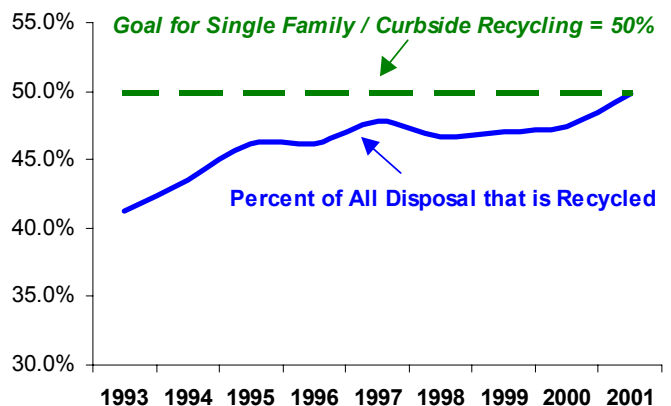
Definitions and Notes:

1. Waste disposed includes residential and commercial waste, but excludes construction and land clearing debris. Special waste figures are also excluded.
2. Fig. 20.1 and 20.2 show the historical trends for all of King County outside of Seattle. Seattle did not supply data for 2000 or 2001.

3. All figures are estimates: disposal data from King County Solid Waste Division's tonnage records; recycling figures obtained from state surveys or model-derived.
4. Recycling figures include yard waste but exclude ferrous metals.
5. Fig.20.2 includes curbside recycling by residents of single-family dwellings or buildings with four units or less.

Fig. 20.2

Single Family Curbside Disposal: Percent of Total Disposal that is Recycled





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INDICATOR 20:

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About This Indicator

- King County continues to do well in its recycling efforts. In 2001, about 1,060 lbs. per person were recycled in King County outside of Seattle. This is six times the amount recycled in 1977, and more than twice what was recycled in 1991. Data for the City of Seattle are not included here.
- Of the total waste generated in King County, outside Seattle, about 40% is being recycled. This proportion has remained about the same since the mid-1990s. It is considerably better than 1991, when just 22% was recycled, or 1981 when only 14% was recycled.
- This indicator measures both the amount of materials recycled per person each year and the amount of waste disposed of (and thus, not recycled or reused). Ideally, the total amount of waste generated would be declining, while the amount recycled would rise, or remain the same.
- In 2001, it appears that there was a slight decline in total waste generated (i.e. waste recycled + waste disposed) compared to the previous few years. This is probably not indicative of a long-term trend towards less waste generation. Seattle and King County serve as employment and population centers for the region. With an economic downturn in 2001, commercial waste, generated by business activity, has slowed down.

- Fig. 20.2 deals with residential curbside disposal. Since 1993 there has been a gradual increase in the proportion of residential waste that has been recycled. It remained around 47% from 1998 – 2000, but jumped to nearly 50% in 2001. The goal has been to reach 50% recycling by 2006. If the model estimates are correct, that goal has already been reached.
- About 77% of residents living in single family homes or buildings with four units or less participate in curbside recycling.

What We Are Doing

- Continuing to recycle a significant part of our waste, both residentially and commercially.
- Seeking ways to recycle and reduce more of the waste stream not currently included in curbside recycle programs, such as food waste recycling.
- Examining “new wastes” such as used computer equipment, and devising ways to reduce and reuse this waste stream.
- Encouraging King County manufacturers to practice environmental stewardship by considering, at the product design stage, how to reduce toxic materials, conserve energy, reuse materials, and recycle.
- Educating and encouraging builders and residents to consider sustainable or “green” building practices, such as the use of recycled construction materials, and structure design which minimizes resource use.

Environmental Indicators: Data Sources and Policy Rationale

Indicator 9: Percent of Land Developed

Data Sources: King County Surface Water Management Department, 1996; *Remote Sensing Project Land Cover and Change Detection*, Puget Sound Regional Council, April 1994. 1998 Landsat data was obtained from the interdepartmental PRISM project at the University of Washington, and processed under its direction.

Policy Rationale: The policy rationale stems from Countywide Planning Policies FW-4, FW-5, CA-4, CA-7, CA-8 and CA-9.

Indicator 10: Air Quality

Data Source: Puget Sound Air Pollution Control Agency (Mary Hoffman, Naydene Maykut); Jane Koenig, Ph.D., U. W. Dept. of Environmental Health; Seattle-King County Dept. of Public Health; American Lung Association; Seattle Times. The Puget Sound Air Pollution Control Agency's website www.pscleanair.org has in-depth information on the region's air quality.

Policy Rationale: The policy rationale stems from Countywide Planning Policies FW-4 and CA-14. This Indicator focuses on maintaining air quality sufficient for public health.

Indicator 11: Energy Consumption

Data Sources: Seattle City Light; Puget Sound Energy (formerly Puget Power); Washington Natural Gas; and Washington State Department of Transportation.

Policy Rationale: The policy rationale stems from Countywide Planning Policies ED-11, CO-2, CO-3 and CO-6. Most uses of energy have direct and indirect environmental impacts, which can include deterioration of air quality, water quality and natural resources. Public health can also be negatively impacted as a result of energy production and use. Energy conservation is critical for the protection of the region's environment and to postpone the need for the construction of new and expensive energy-producing facilities.



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Indicator 12: Vehicle Miles Traveled

Data Source: *Highway Performance Monitoring Reports 1981-2001*, Washington State Department of Transportation. Vehicle Miles Traveled per Year is based on approximate total miles traveled as reported in the "Highway Performance Monitoring Report", (HPMS) Washington State Department of Transportation. HPMS is not designed for use at the local jurisdictional level, but rather for use in determining the needs for roadways at the State level. When aggregated at the county level, the figures may overstate the increase in VMT.

Policy Rationale: The policy rationale stems from Countywide Planning Policies T-8, CA-14 and CA-15. VMT is a general measure of travel demand that is used for both air quality management and Transportation Demand Management.

Indicator 13: Surface Water Quality

Data Source: King County Department of Natural Resources, Water and Land Resources Division. An Atlas of the Watersheds of King County, Washington, 1995.

Policy Rationale: The policy rationale stems from Countywide Planning Policies CA-5 and CA-6. The preservation of surface water quality is critical, because approximately 80% of the drinking water supplying this region comes from rivers such as the Tolt and the Cedar. Salmon and other aquatic life also require high quality water for their healthy development and survival.

Indicator 14: Water Consumption

Data Source: Seattle Public Utilities (SPU), 1999. SPU supplies water, primarily from the Tolt and Cedar River watersheds, to about 76% of King County residents. This includes water that is sold wholesale to hundreds of smaller water purveyors that serve outlying areas of the County. Edmonds and Olympic View receive some of their water directly from SPU, although they are both outside King County. Water District 83, Redmond and Highline are also within the SPU service area, but have other sources of supply. Water from other sources amounts to about 7 million gallons per day which are not included in Fig. 14.1 or 14.2.

Policy Rationale: The policy rationale stems from Countywide Planning Policies CO-4, CO-5, CO-6 and CO-7. Adequate long- and short-term water supplies are critical for our region's residential, commercial and industrial uses. The protection of watersheds are essential elements in enhancing the environmental integrity of the area.

Indicator 15: Groundwater Quality and Quantity

Data Sources: King County Department of Natural Resources and Parks, Water and Land Resources Division. One limitation of the existing data is that the sampling in 2001-2002 did not take place at the same times of year for each source during those two years, nor at the same time as the sampling during 1989-1995. There may be seasonal changes in water quality and quantity that could not be taken into consideration.

Non-King County data: There exist other water quality databases managed generally by other governmental entities. Of particular potential value to King County is the database maintained by the Washington Department of Health from the routine water quality testing done by several hundred of the largest water systems in King County. This database should enable tracking trend information for groundwater contaminants of public health concern, such as arsenic. Over the next year, King County anticipates incorporating this data into its groundwater analytical capabilities. For more information about the King County Groundwater Protection Program Call 206-263-6159

Policy Rationale: The policy rationale stems from Countywide Planning Policies CA-5 and CA-15. This Indicator alerts officials and citizens of the need to monitor groundwater quantity to assure sustainability and prevent depletion.

Indicator 16: Change in Wetland Acreage and Function. No new data published this year.

Indicator 17: Continuity of Terrestrial and Aquatic Habitat. No new data published this year.

Indicator 18: Increase Salmon Stock

Data Sources: Washington Department of Fisheries, Washington Department of Wildlife, and Western Washington Treaty Indian Tribes.

Policy Rationale: The policy rationale stems from Countywide Planning Policies FW-4, FW-5, CA-8, CA-9, CA-10, CA-11 and CA-15. Salmon are a symbol of the Pacific Northwest. They have important recreational, economic, cultural and environmental values for residents of King County. The health of salmon populations is an Indicator of environmental quality because these populations are affected by land use policies and actions within the watershed. The status of salmon populations indicate the overall health of rivers, lakes and streams, because salmon are very sensitive to deterioration in water quality, sediment and temperature changes and changes in the flow regime.

Indicator 19: Change in Noise Levels. No new data published this year.

Indicator 20: Recycling

Data Sources: King County Department of Natural Resources: Solid Waste Division, Planning and Communications Section.

Policy Rationale: Although the Countywide Planning Policies do not include policy direction for reducing solid waste or promoting recycling programs, the Benchmark Task Force added this Indicator, because recycling and reductions in solid waste save resources, save landfill space and reduce the potential for soil and water contamination due to leakage from landfills.