Study about atmospheric pollution and Puget Sound

Washington State is committed to cleaning up and restoring Puget Sound by 2020. The nation's second-largest estuary is home to millions of people, abundant natural resources, sensitive wildlife and plant life, recreation, and billions of dollars in annual economic activity.

The Washington Department of Ecology (Ecology), in collaboration with other partners, is conducting an investigation of toxic chemical loading into Puget Sound.

The investigation will provide the initial framework upon which the Puget Sound Partnership, Ecology, the U.S. Environmental Protection Agency (EPA), and other partners can base policy actions that will reduce and control releases of toxic chemicals.

The goal of the Puget Sound toxics loading study is to provide initial estimates of the amounts of contaminants released to the main pathways to the Sound.

These pathways are surface runoff, air deposition, oil spills, combined-sewer overflows, wastewater dischargers, groundwater discharges, contaminated sediments, exchange with ocean waters, and the migrations of contaminated biota.

Air deposition study

Ecology and EPA funded a two-year study of deposition of various air pollutants directly onto the Puget Sound water and beaches. The research was conducted by the U.S. Department of Energy's Pacific Northwest National Laboratory (PNNL) and Texas A&M University.

The study's aim was to revise and improve prior estimates of the rates of atmospheric deposition of polycyclic aromatic hydrocarbons (PAHs), polybrominated diphenyl ethers (PBDEs), and selected trace elements directly to the waters of Puget Sound.

The researchers collected atmospheric deposition samples during 2008 and 2009 at eight locations around Puget Sound from Padilla Bay to the Nisqually River delta and including Hood Canal and the Strait of Juan de Fuca.

About the study

Atmospheric deposition occurs when pollution falls from the sky and onto the surface of water or land.

To measure pollutants deposited directly onto Puget Sound, researchers collected data at eight sites between August 2008 and October 2009:

- West Point (Seattle)
- South end of Commencement Bay (Tacoma)
- Tyee Marina, north end of Commencement Bay (Tacoma)
- Nisqually River Delta (Thurston County)
- Hood Canal (Kitsap County)
- Sequim Bay (Clallam County)
- Padilla Bay (Skagit County)
- Sinclair-Dyes Inlet (Kitsap County)

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Special accommodations:

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Some key study findings

- Compared to our knowledge three years ago, we have improved our estimates of the amount toxic chemicals entering the waters of Puget Sound directly from the air.
    - Our current estimates of the loading rates for arsenic, cadmium, copper, lead, and PAHs (residue from burning wood or fossil fuels) are less than our previous estimates.
    - The loading rates for mercury and zinc are about the same as our previous estimates.
    - The loading rate of PBDEs (a type of flame retardant) is slightly greater than our previous estimates
- The industrialized area near the Tacoma waterfront showed a decline in the deposition rates of trace metals and PAHs over the last 20 years. This is an improvement.
- Highly developed industrial and residential areas in the Puget Sound basin likely have greater deposition rates than the undeveloped areas and open waters of Puget Sound. This is based on the greater pollutant deposition rates at the highly developed area near Commencement Bay than at the other sampling locations.
- Atmospheric deposition directly to Puget Sound appears to contribute a smaller amount of most pollutants than does surface runoff. More PBDEs, and possibly more PAHs, enter Puget Sound through the direct air deposition pathway than via surface runoff.
- The predominant source of atmospheric PAHs in the Puget Sound region is combustion of biomass (for example, wood) and fossil fuel (for example, petroleum).

What's next?

This information will inform the Puget Sound Partnership's Action Agenda. In the meantime, Ecology will continue efforts to reduce the amount of pollutants that reach Puget Sound waters. These efforts will include, but will not be limited to, new regulations to limit pollutants and programs focused on source reduction and consumer education.