



May 1st, 1:30 PM - 3:00 PM

The Lake Washington PCB/PBDE Study: Estimates of loading from major pathways

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Lake Washington PCB/PBDE Study

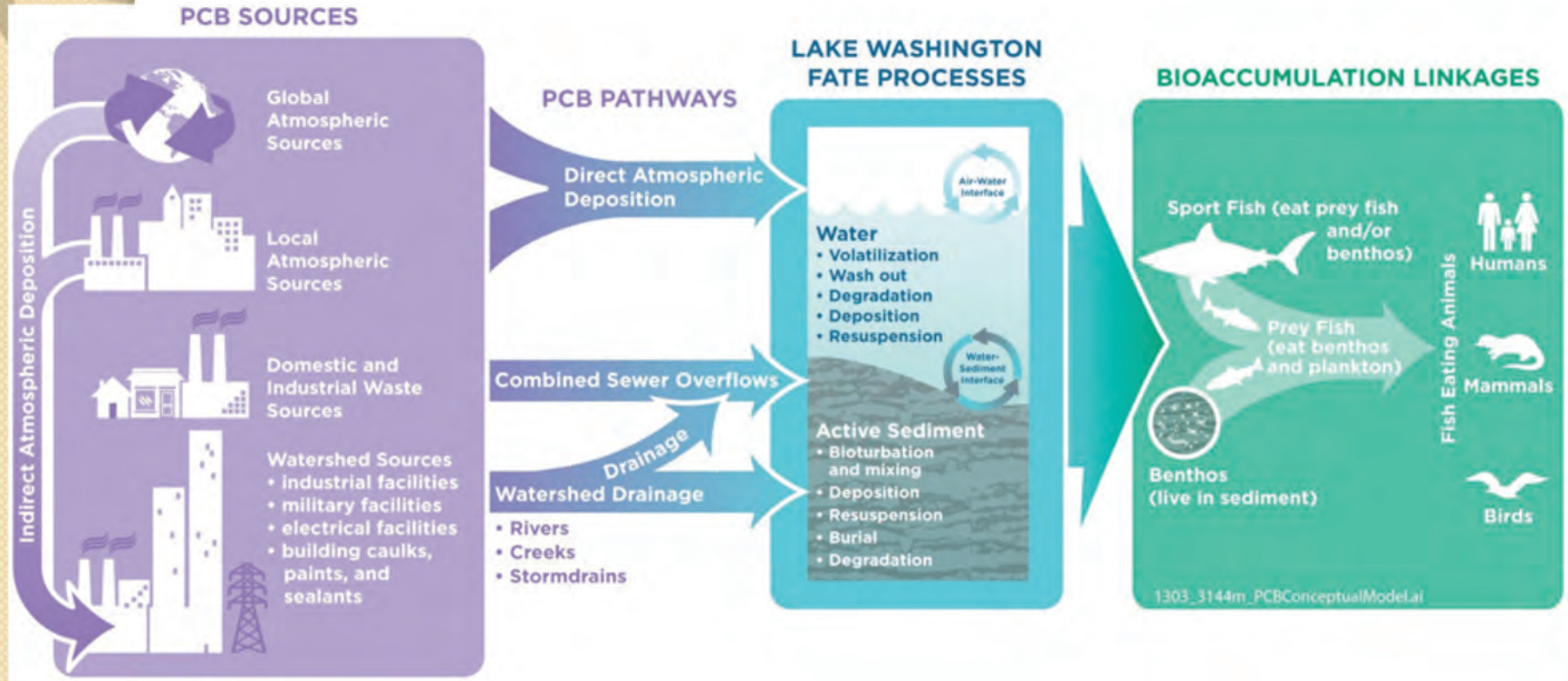
Estimates of loading from major pathways

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Science Section

King County Water and Land Resources Division, Department
of Natural Resources and Parks

2014 Salish Sea Ecosystem Conference
May 1, 2014

Conceptual Model for PCBs



Major Pathways

- Rivers (Cedar and Sammamish)
- Local Drainages
 - Monitored tributaries
 - Thornton Creek
 - Juanita Creek
 - May Creek
 - Remaining unmonitored lake drainage
- CSOs
- Floating bridges (stormwater runoff)
- Direct atmospheric deposition

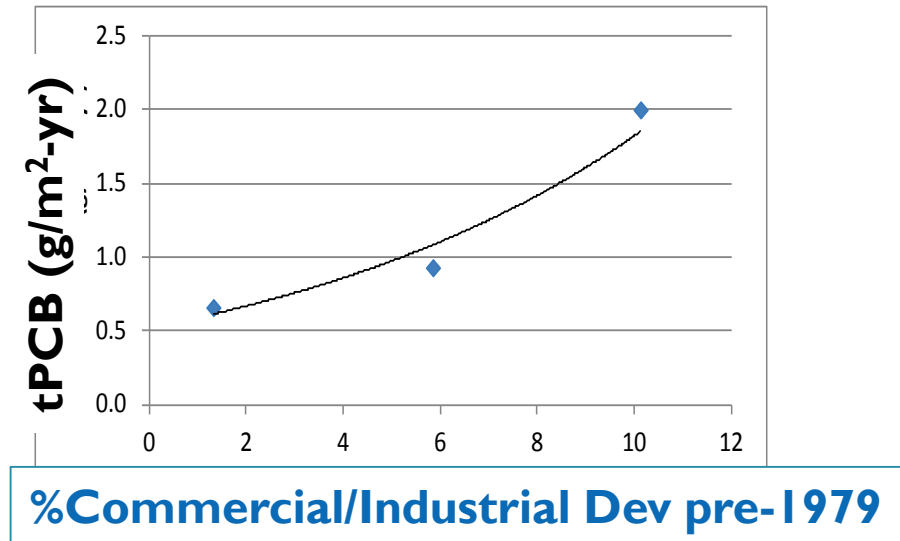
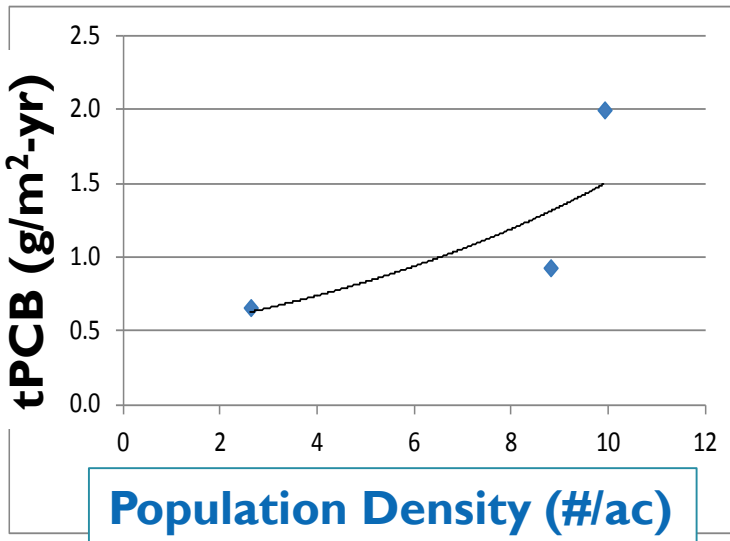
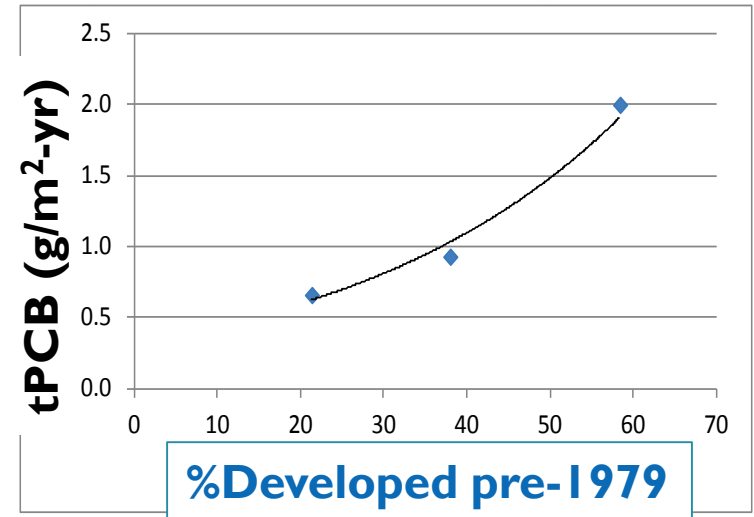
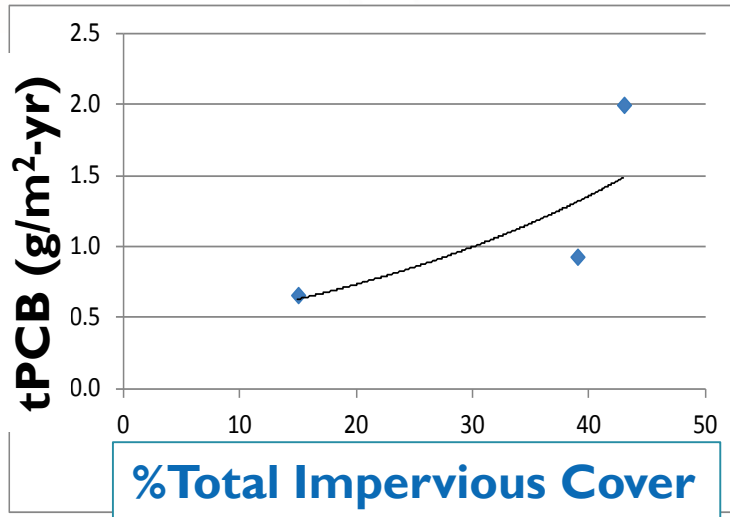
Loadings Estimates

Concentration X Flow = Loading

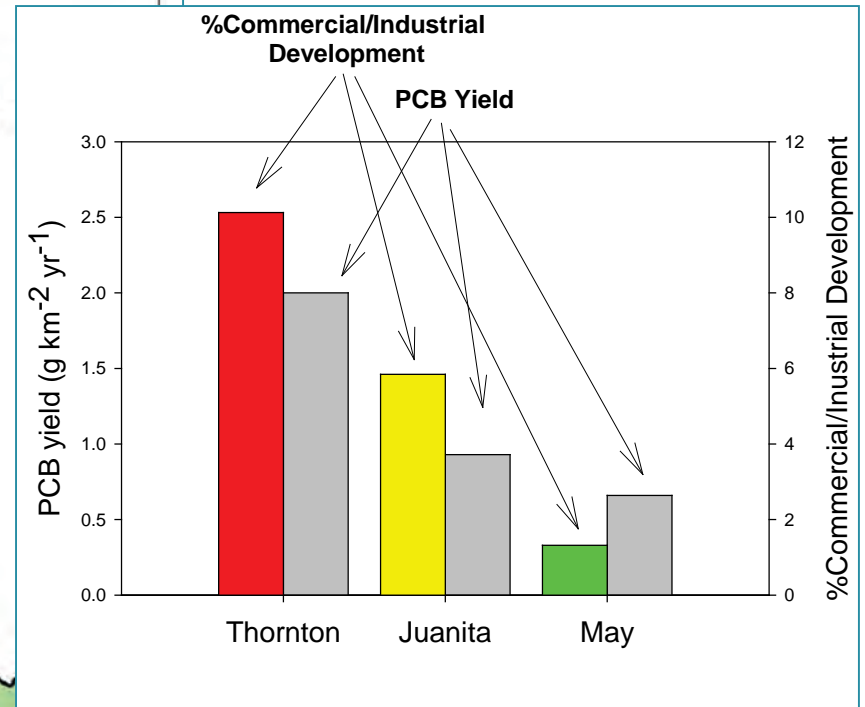
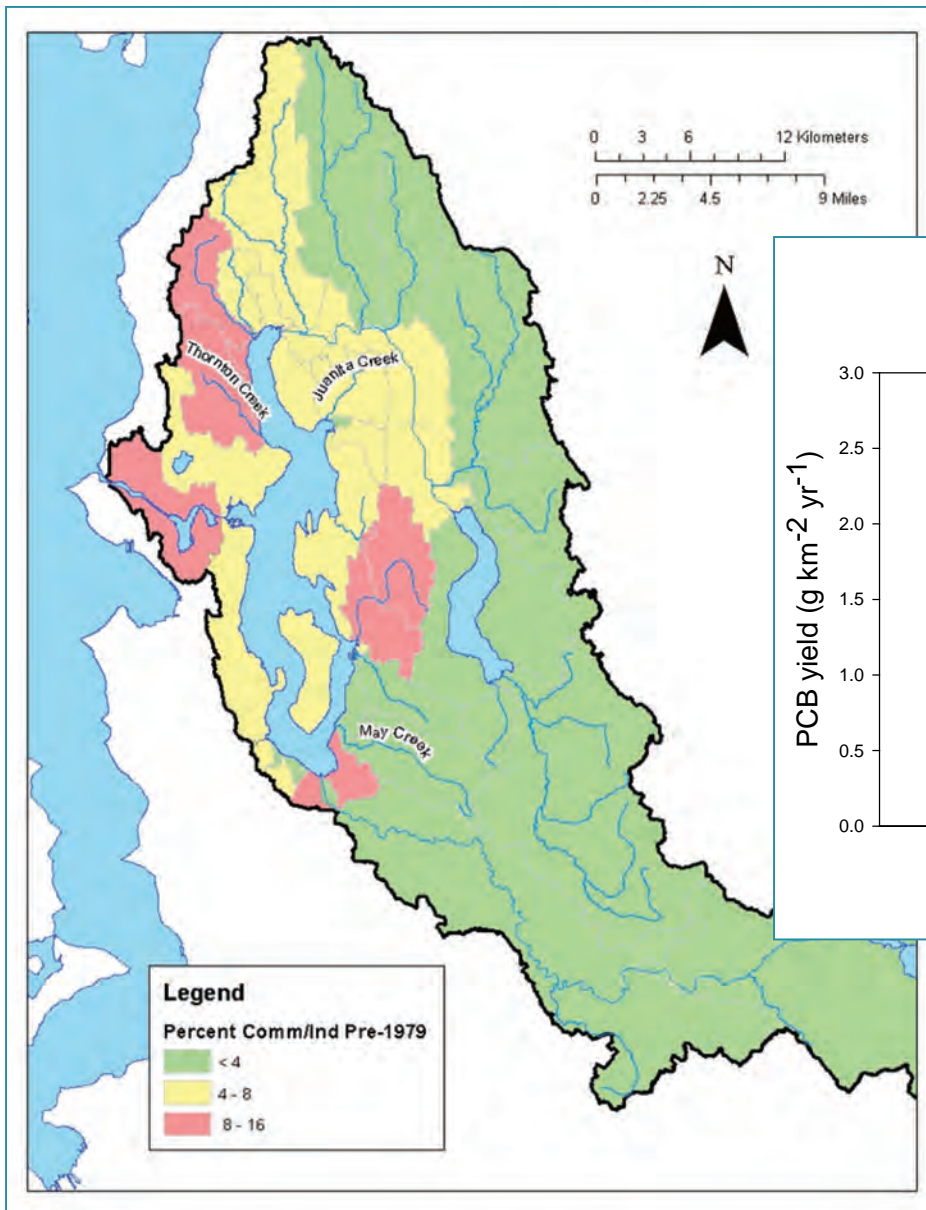
Field study mean concentration used,
except

- Extrapolation approach for unmonitored tributaries
 - Enhanced CSO data with historical data
- Flow
- Gauged flow data OR
 - Estimated

Correlations with Land Use/Population

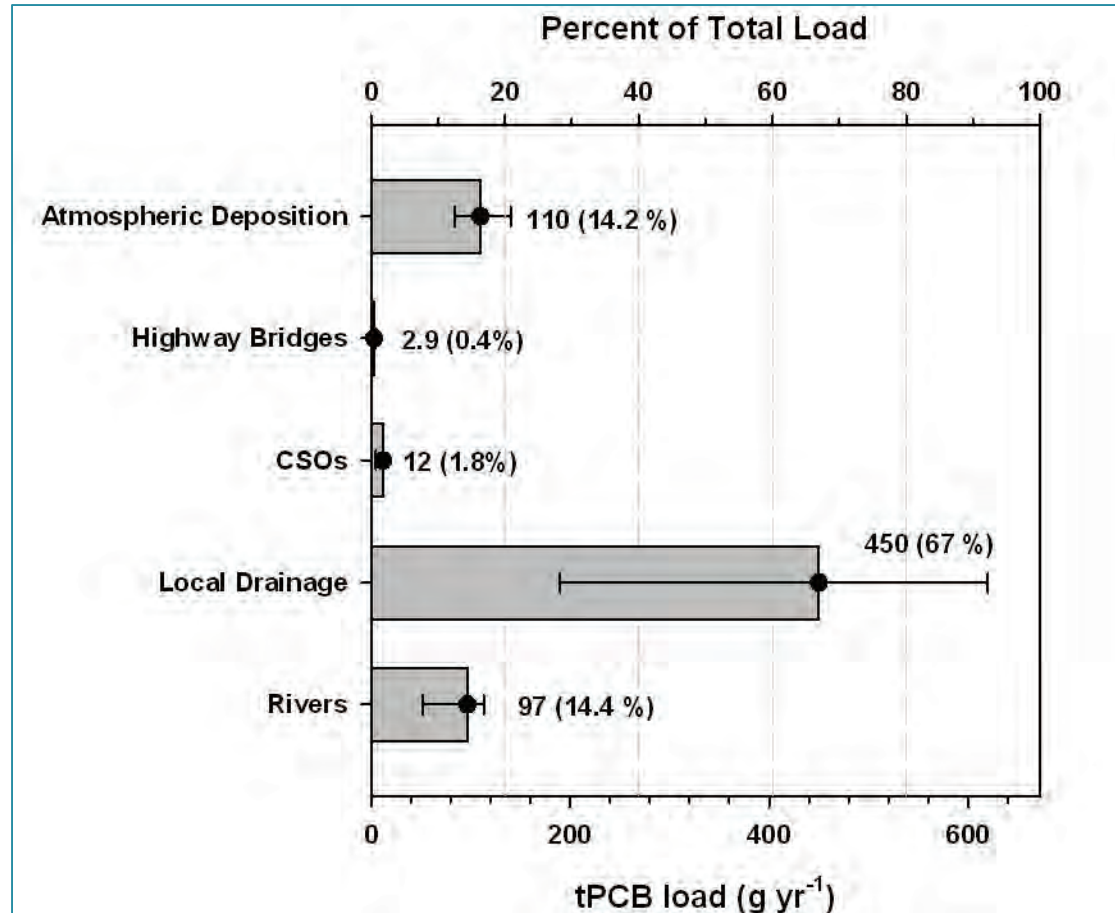


Relationship with Historical LandUse?

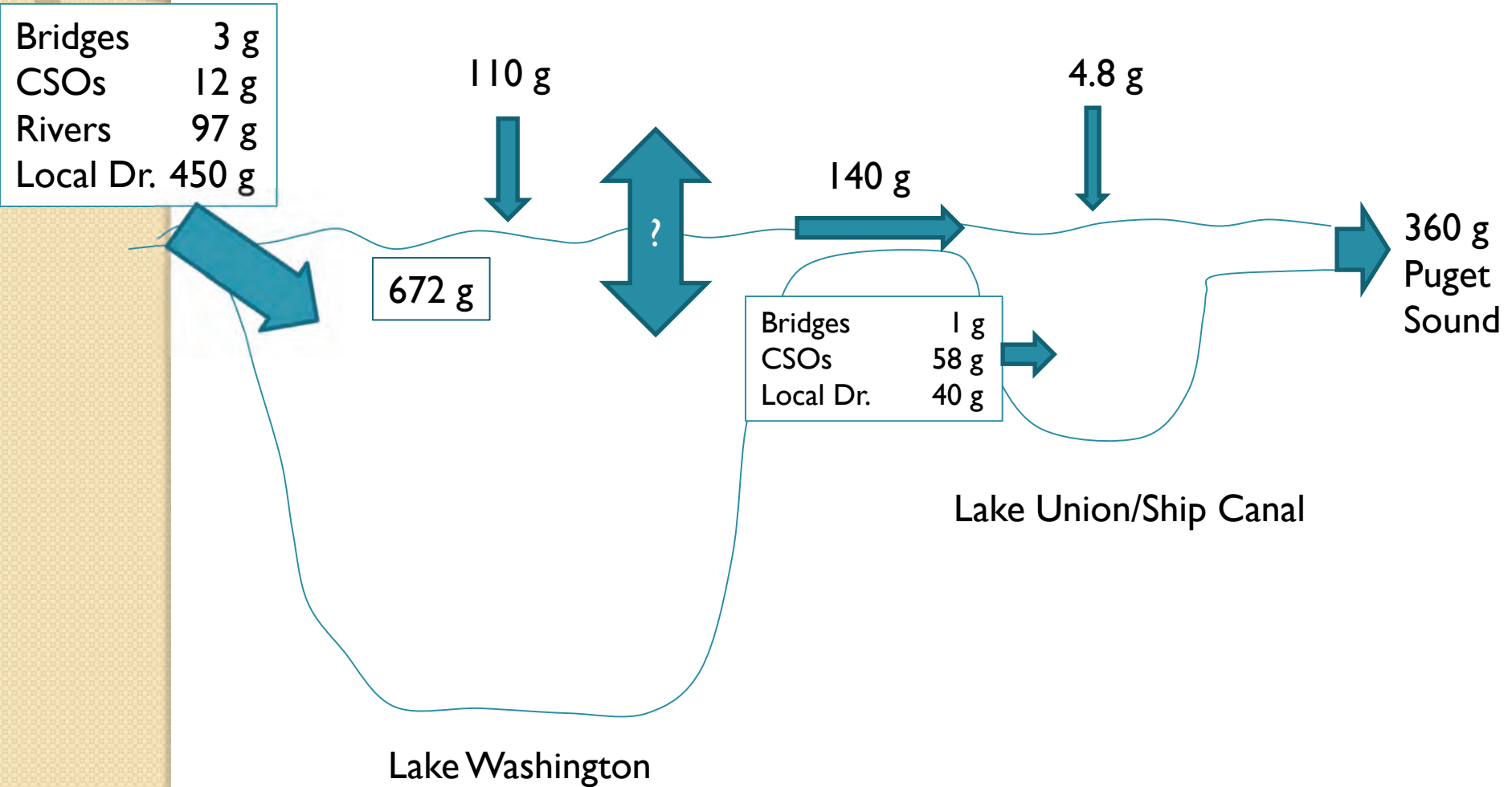


Current PCB Loading Estimates

672 g yr⁻¹ to Lake Washington
140 g yr⁻¹ exits Lake Washington
360 g yr⁻¹ to Puget Sound

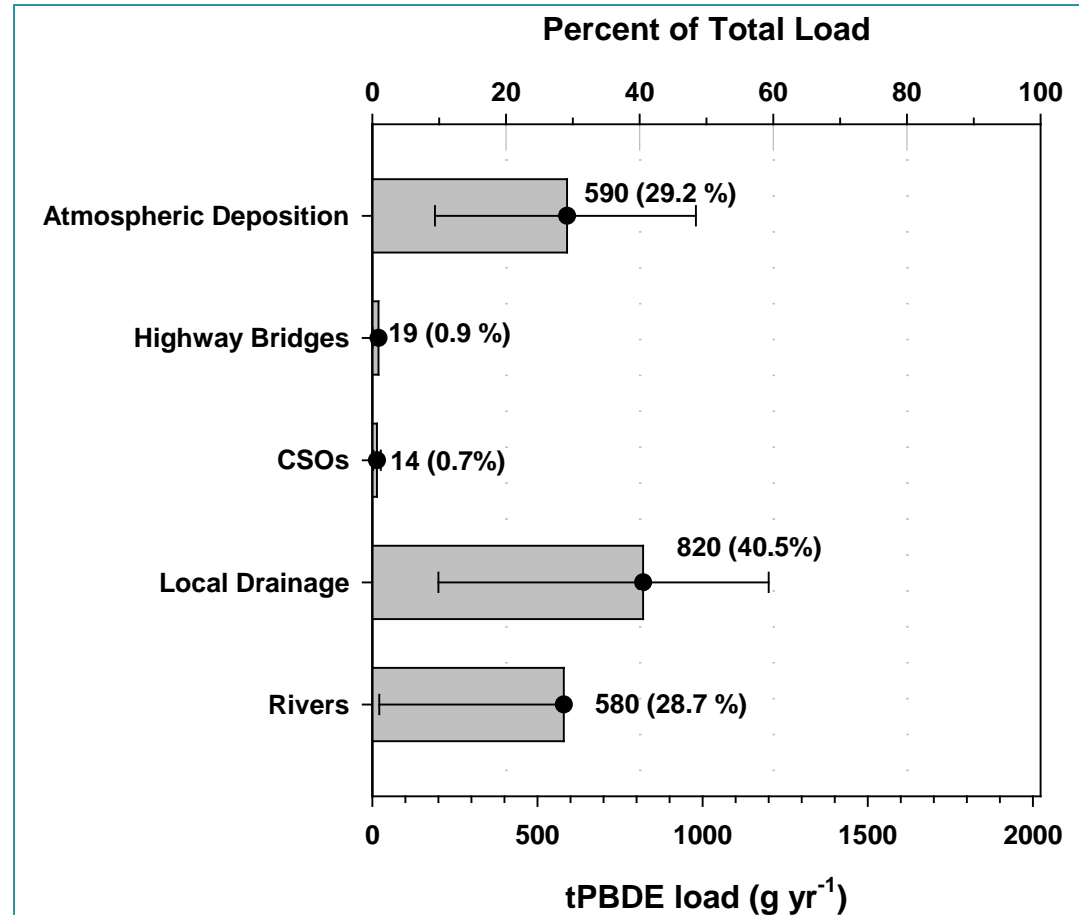


PCB Loading Summary



Current PBDE Loading Estimates

2,023 g yr⁻¹ to Lake Washington
968 g yr⁻¹ exits Lake Washington
990 g yr⁻¹ to Puget Sound



Load from Local Drainage Driven by Stormwater

- Stormwater is <30% of annual flow in streams BUT
- Accounts for 80-90% of annual PCB load from local drainage

Loadings Conclusions

- Appears to be relationship between local tributary PCB areal loading and age and/or type of development
- As much as 70% of lake PCB load comes from local tributaries
- As much as 80% of local tributary PCB load delivered in stormwater
- Lake Washington is a sink for PCB and PBDE

QUESTIONS?

The screenshot shows a web page from King County's environmental website. The page title is "Estimating toxics loadings to the Lake Washington Watershed". It includes a navigation menu with "Home", "How do I...", "Services", "About King County", and "Departments". The main content area features a large image of a lake and a fish. The text describes a project to estimate PCB and PBDE loadings to Lake Washington and Elliott Bay. It lists project objectives, components (field study and model development), and related information. A sidebar on the left contains navigation links like "Toxics loadings", "May Creek", and "Public access". A sidebar on the right lists "Related information" and "News and announcements". A yellow box at the bottom right contains "Fish consumption advisories" for Lake Washington.

King County Search king-county.gov

Home How do I... Services About King County Departments

Watersheds, rivers and streams

Cedar River - Lake Washington

You're in: Cedar River - Lake Washington Watershed » Toxics loadings

Cedar River - Lake Washington Watershed

Toxics loadings

May Creek

Public access

Unusually Earthquake, Cedar River Landslide

Documents

Related organizations

News archive

Site map

To offer a suggestion or report an error on the Water and Land Resources' Web site, please contact [Ed Banfer](mailto:Ed.Banfer@washnet.edu), webmaster.

Estimating toxics loadings to the Lake Washington Watershed

Project location: Lake Washington Watershed, King County, Washington
Project period: September 2010 through March, 2014
U.S. EPA grant amount: \$698,646

Problem
Fish containing polychlorinated biphenyls (PCBs) can pose a health risk to people who consume them. Lake Washington, the largest freshwater lake in King County, Washington, has fish with some of the highest concentrations of polychlorinated biphenyls (PCBs) measured across the state. PCBs were historically used in commercial products and industry but their manufacture was banned in 1977. No one knows exactly where PCBs in Lake Washington fishes originate. This project is intended to help answer the following questions:

- What input pathways contribute PCBs to Lake Washington?
- Do ongoing sources of PCBs entering the lake need to be reduced?
- Are fish accumulating PCBs just from historical pollution present in lake sediments?
- To what extent do PCBs exit the Ship Canal and contaminate Puget Sound?

Please refer to the [EPA's PCB website](#) (external link) for background information on PCBs.

Project objectives
This project will develop quantitative tools to inform water quality managers of the major PCB and polybrominated diphenyl ether (PBDE) pathways to the Lake Washington watershed and Elliott Bay. Pathways that will be evaluated include combined sewer overflows (CSOs), stormwater discharges, road runoff, river input, and air deposition.

NOTE: Because brominated flame-retardants behave similarly to PCBs and may cause health effects, this project collects field data on PBDEs to investigate if they may also pose a risk to people consuming Lake Washington fish.

Project components

Field study: The field study will collect data needed to estimate PCB and PBDE loadings (total mass per year) entering Lake Washington and Elliott Bay (via the Ship Canal). These data include total organic carbon, PCB and PBDE congener concentrations and associated flow rates for each pathway (tributaries, atmospheric deposition, stormwater runoff, CSO discharge, and road runoff). These data will be collected over a year.

Model development: Historical and new data will be used to estimate the loadings for each pathway and the total for Lake Washington and Elliott Bay. Also, a fate and transport model and a bioaccumulation model will be developed to allow simulation or testing of Lake Washington fish tissue response to different PCB reduction scenarios. This latter step will not be conducted for PBDE's because too little data are available for

Related information

- Lake Washington
- Environmental monitoring data
- Salmon and trout

Related agencies

- Dept. of Natural Resources and Parks
- Public Health, Seattle and King County
- Water and Land Resources Division

News and announcements

Sept 5, 2004
External article, Seattle Times
Industrial past takes toll on Lake Washington

Sept 1, 2004
External article, Seattle Times
High level of PCBs taints Lake Washington fish

Fish consumption advisories:

- In 2003, the Washington Department of Health (WDOH) issued a fish consumption advisory (external link) for polychlorinated biphenyls (PCBs) in Lake Washington which includes yellow perch, cutthroat trout, carp, and northern pike minnow. Fish consumption advisories also exist across Puget Sound for multiple fish species due to health risks from PCBs and mercury (external link). Limited consumption of yellow perch and cutthroat trout (common recreational species) is advised in Lake Washington, and WDOH

Search: lake washington pcb study

<http://www.kingcounty.gov/environment/watersheds/cedar-river-lake-wa/pcb-pbde-loadings.aspx>