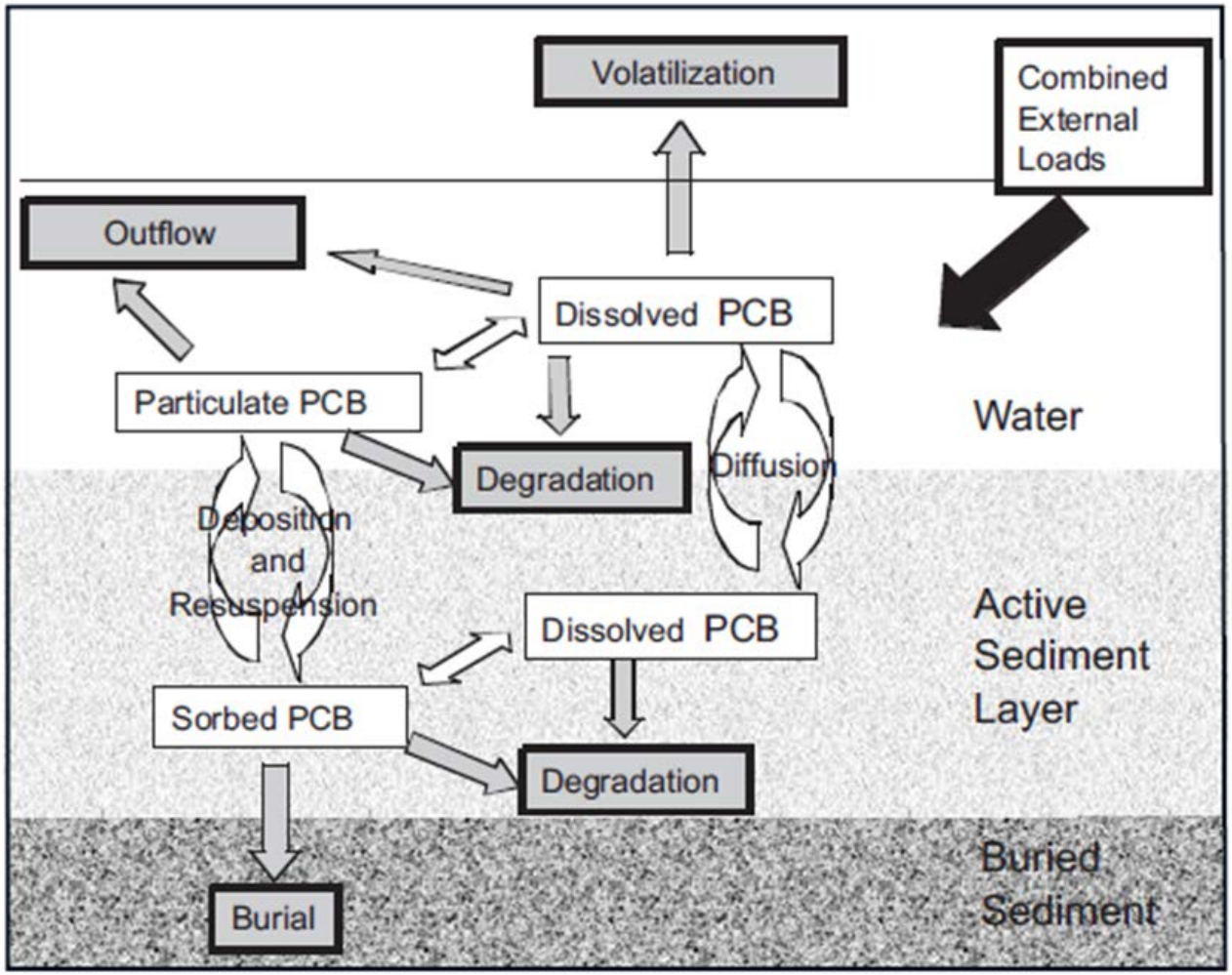
Lake Washington PCB/PBDE Study Development and testing of a PCB fate model

Curtis DeGasperi and Greg Pelletier
King County Water and Land Resources Division
and Washington Department of Ecology

2014 Salish Sea Ecosystem Conference
May 1, 2014

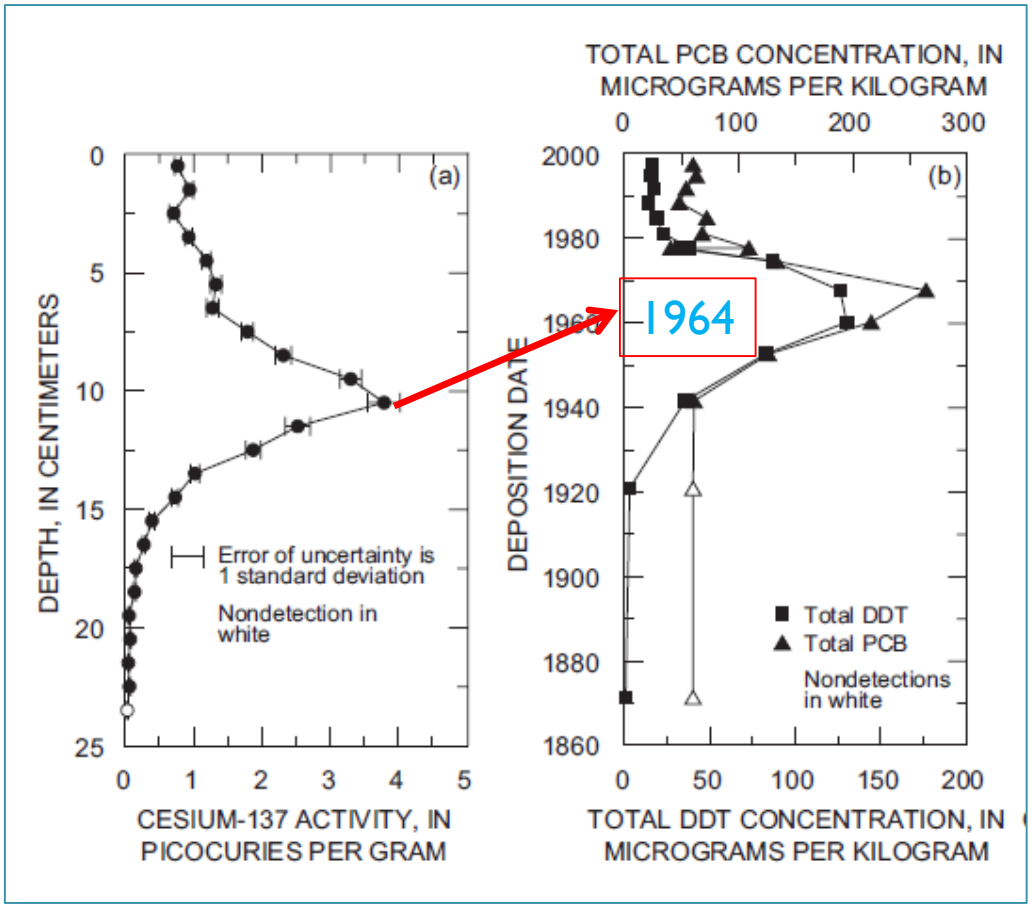
King County

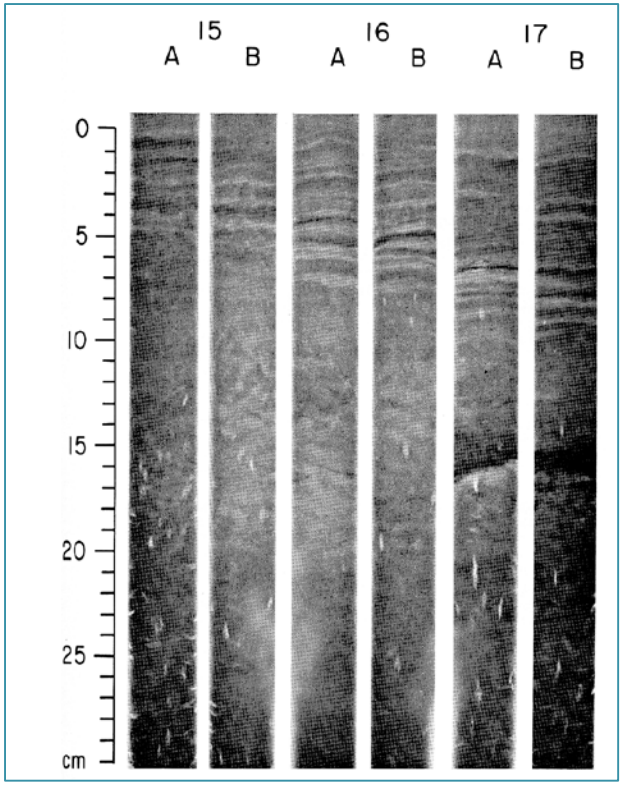
Fate Model Conceptual Diagram



Source: Davis (2004)

Active Sediment Layer

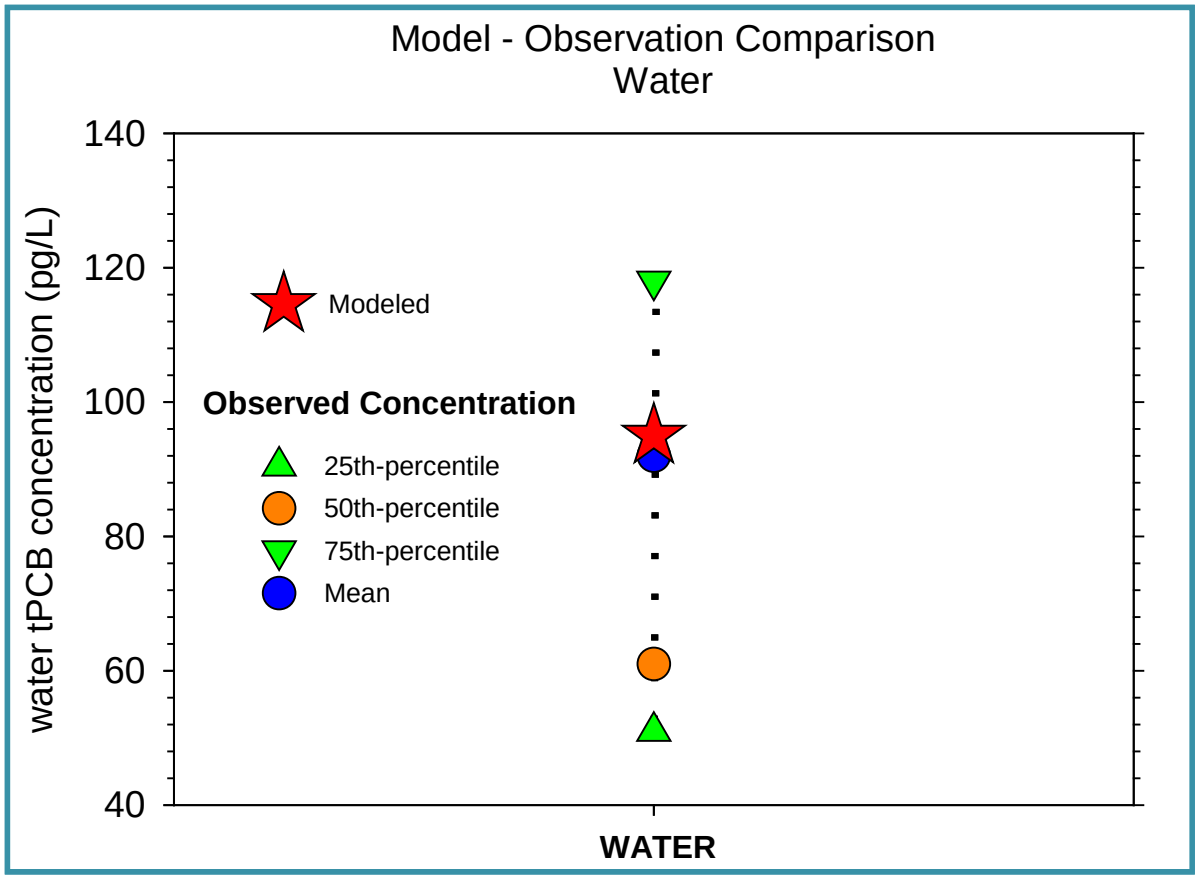




Fate Model Hindcast

Hindcast Model Performance
(tPCB loading = 672 g/yr)

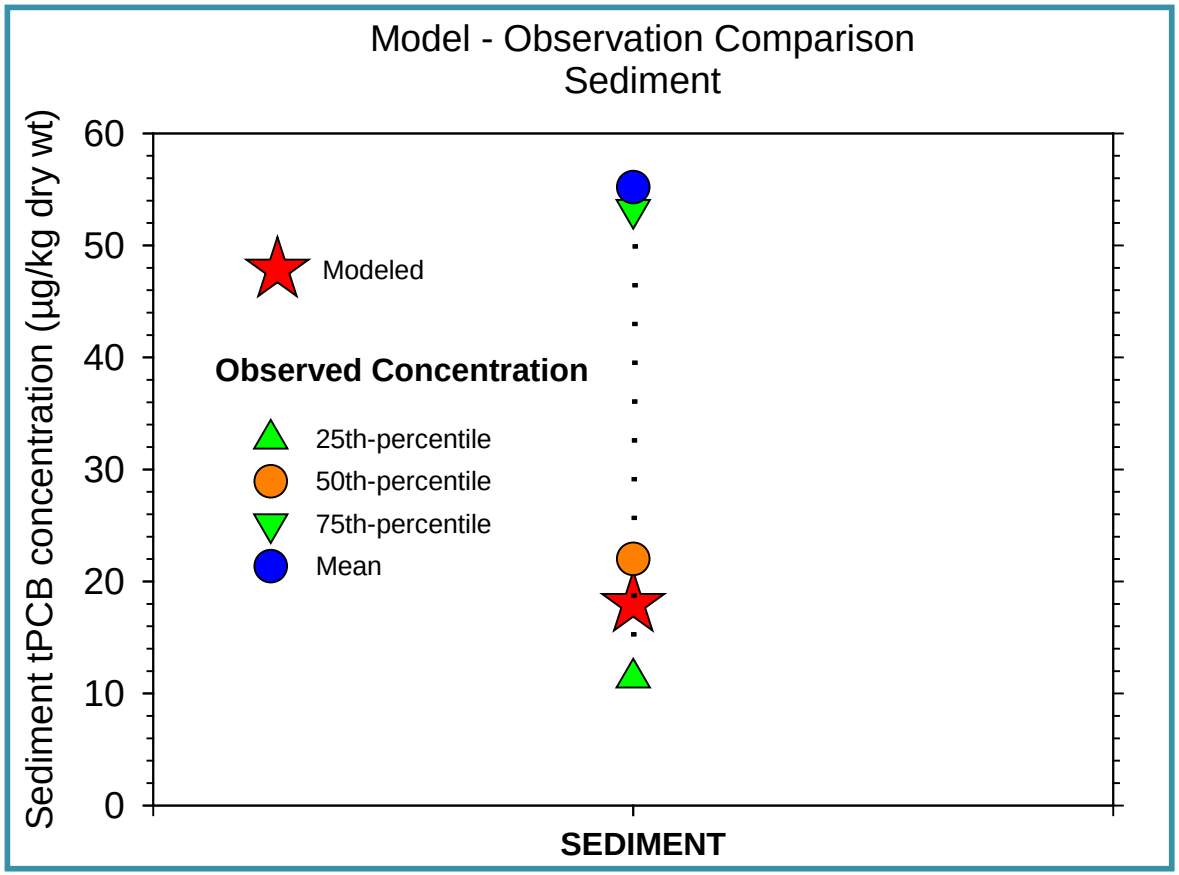
Concentration in Lake Water



Fate Model Hindcast

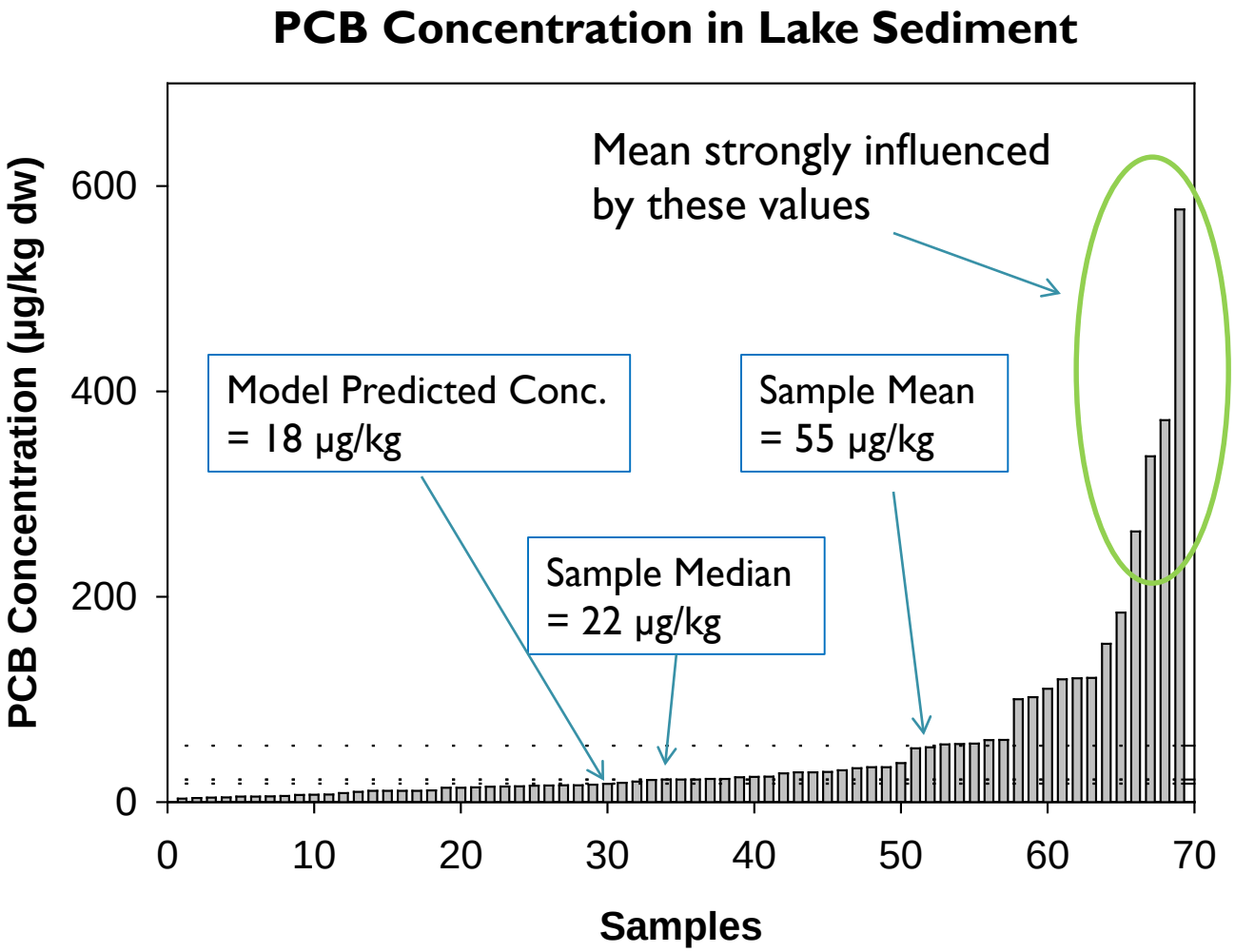
Hindcast Model Performance
(tPCB loading = 672 g/yr)

Concentration in Lake Sediment



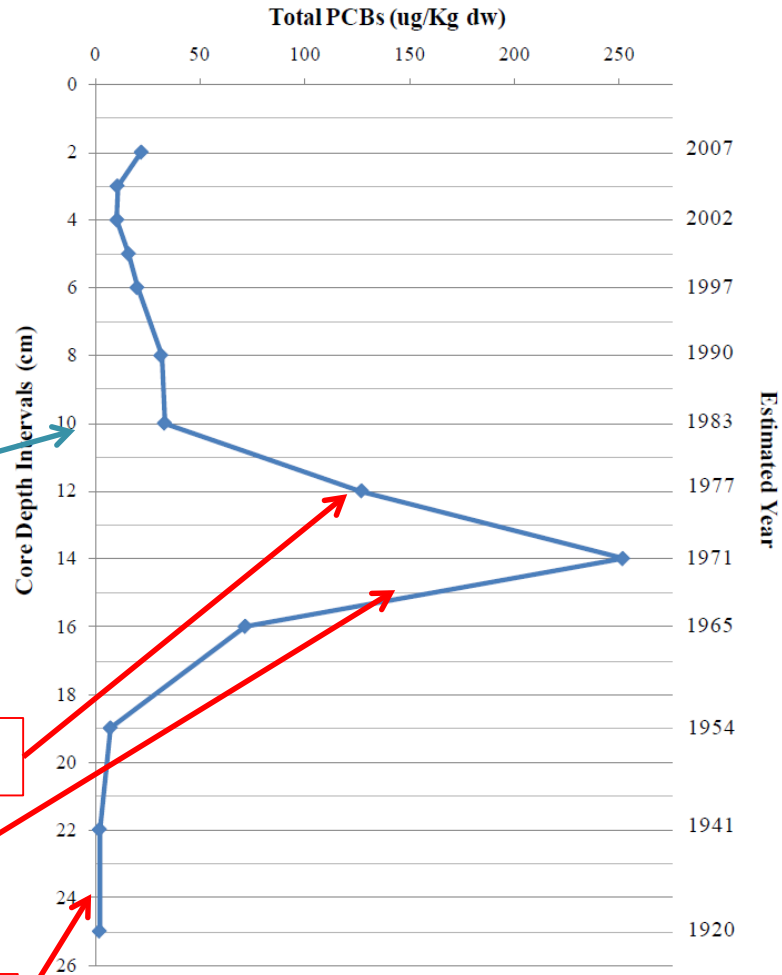
Fate Model Hindcast

Hindcast Model Performance
(tPCB loading = 672 g/yr)



Historical Sediment Concentrations

- Most 0-10 cm, some 0-2 cm sample depth
- Mean = 55 ug/kg dry weight
- 2008 core shows rapid increase around10 cm



Production and use of PCBs restricted by EPA (1977)

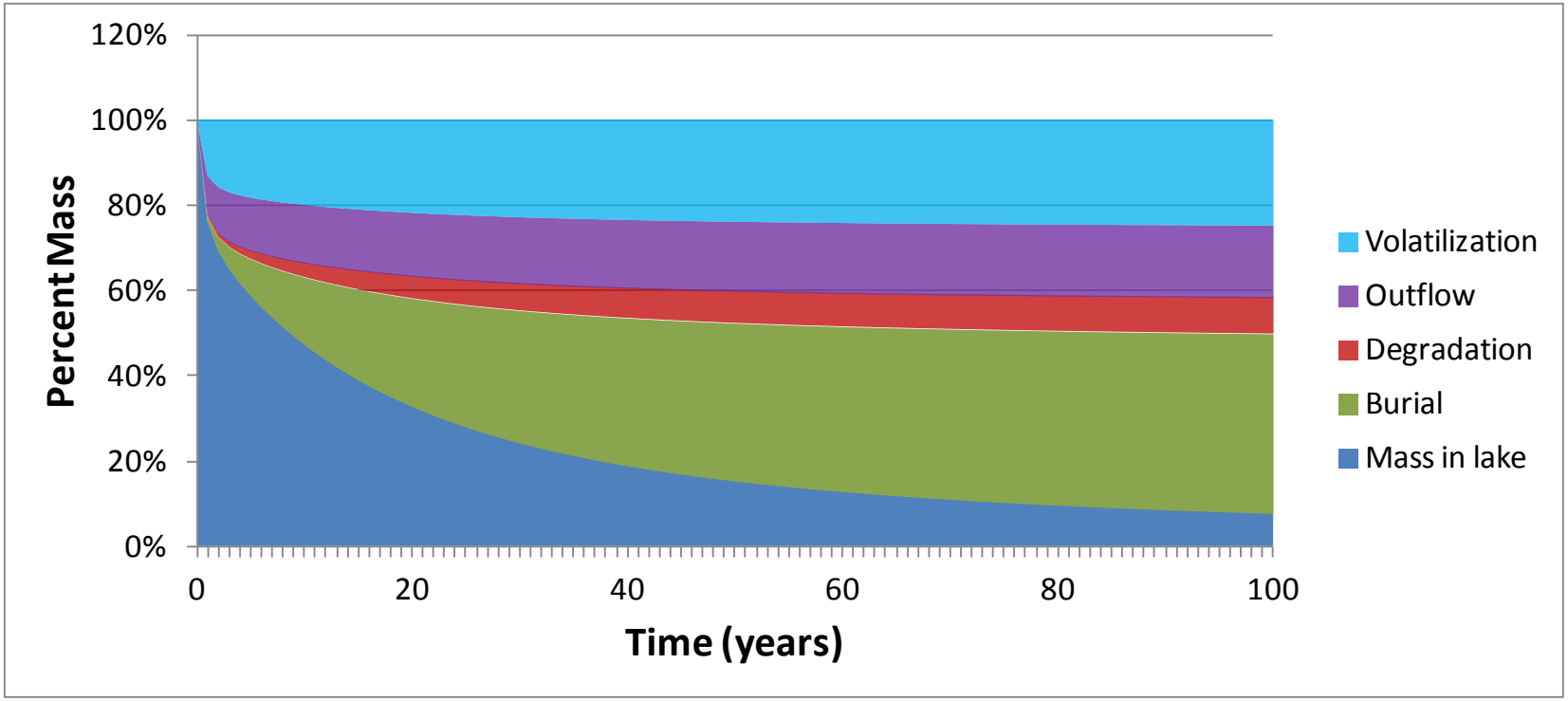
Diversion of Secondary Wastewater Discharges

Commercial Production of PCBs begins in US (1929)

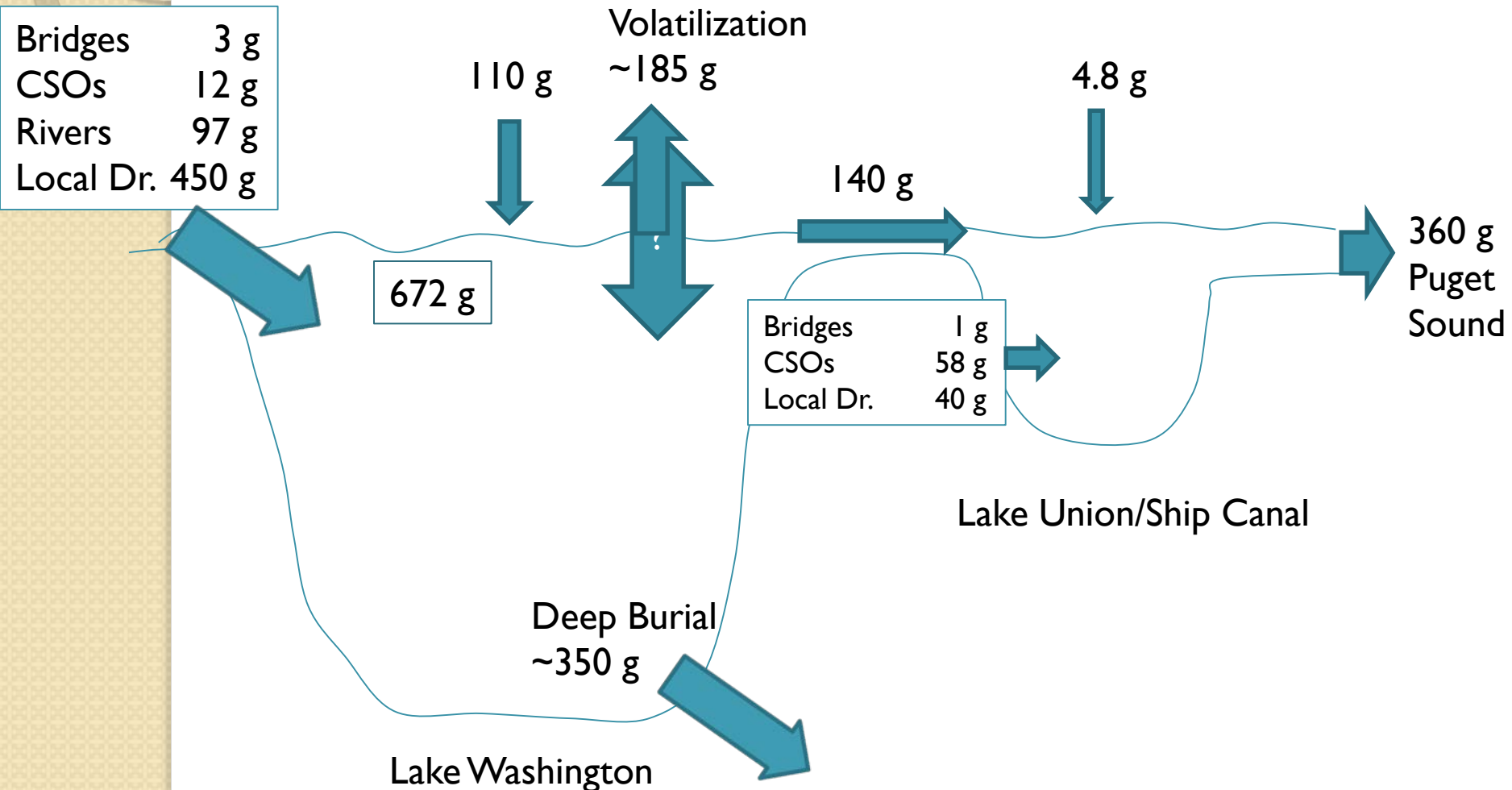
Fate Model Hindcast

Hindcast Model Performance
(tPCB loading = 672 g/yr)

Fate Pathways



PCB Loading Summary



Fate Model Sensitivity Analysis

- Sensitivity Analysis
  - Overall, model most sensitive to octanol-water partition coefficient (Kow)
  - Water column concentration/mass most sensitive to PCB loading rate
  - Water column concentrations also sensitive to a number of other variables – e.g., concentration of solids in water and sediment

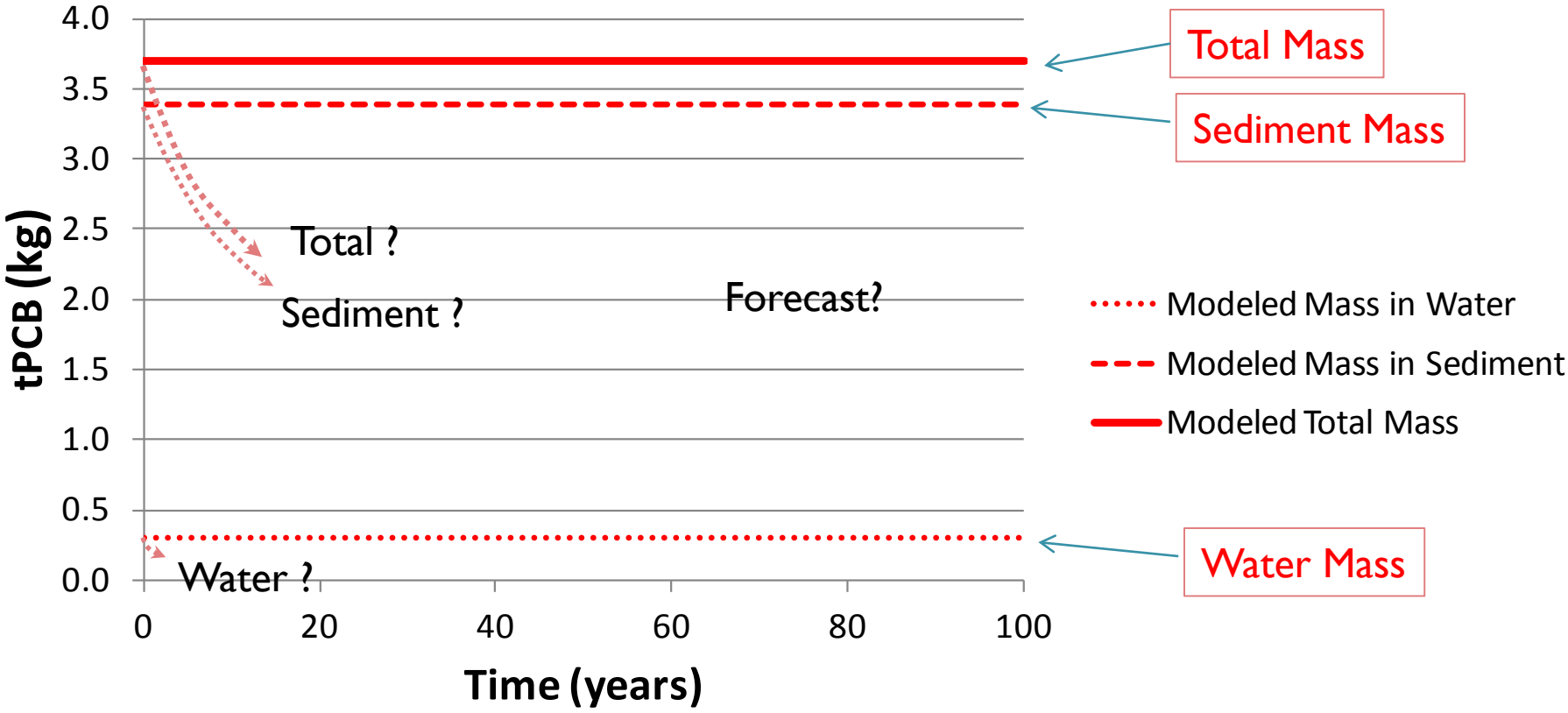
Fate Model Uncertainty Analysis

- Uncertainty Analysis
  - Low and high $log_{10}(K_{ow})$ – 6.01 and 6.86 (PCB-66 and PCB-153)
  - Low and high tPCB loading rate – 0.333 and 0.889 kg yr^{-1}
  - Model relatively more sensitive to tPCB loading uncertainty

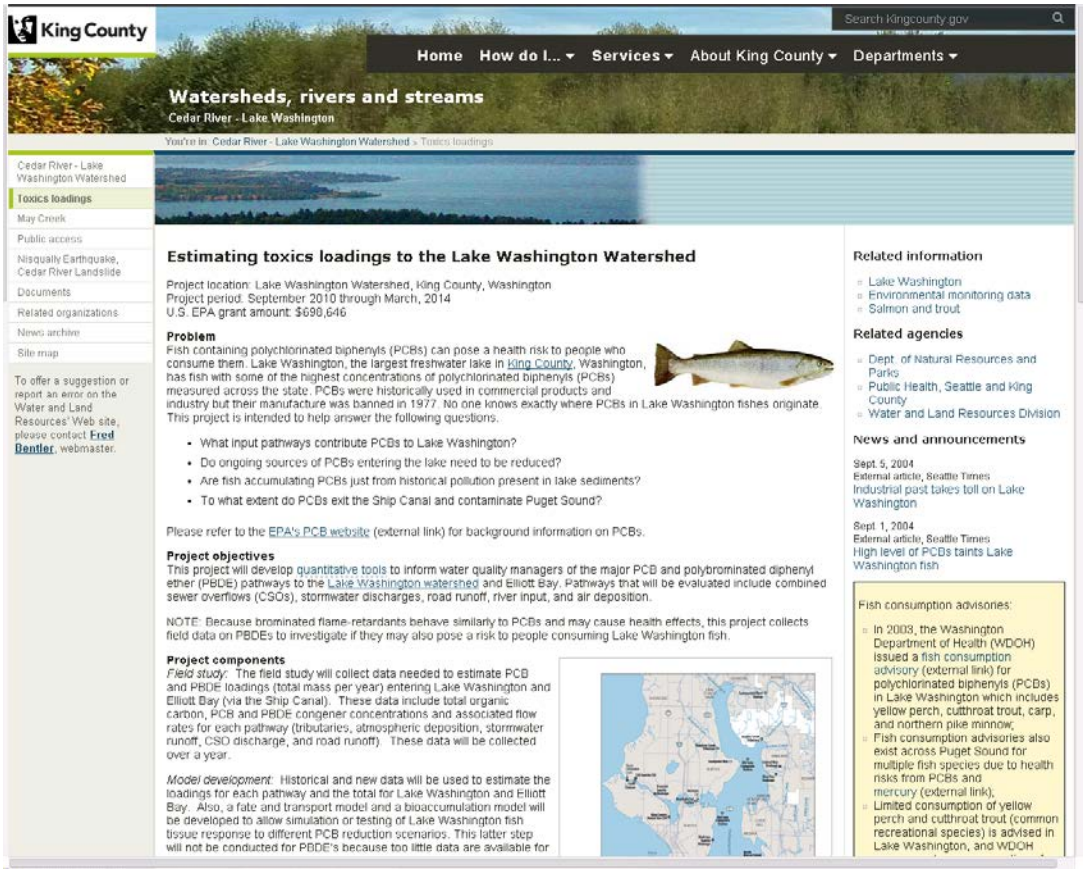
Fate Model Forecast

Forecast Model Performance
(tPCB loading reduction
From 672 g/yr to ????)

tPCB mass in lake into future?



QUESTIONS?



Search: lake washington pcb study

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