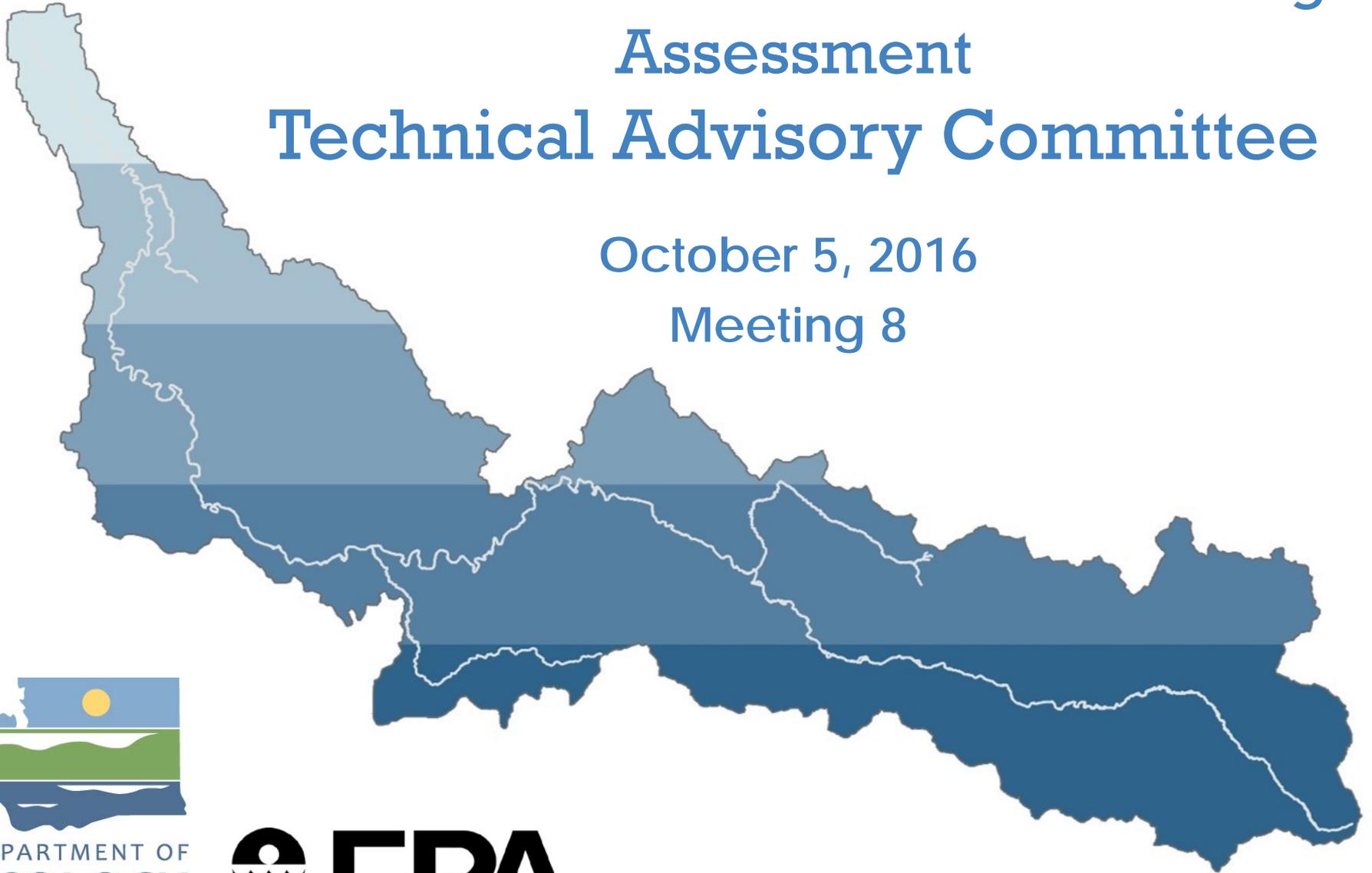


Green-Duwamish Pollutant Loading Assessment Technical Advisory Committee

October 5, 2016
Meeting 8



DEPARTMENT OF
ECOLOGY
State of Washington



TAC Meeting #8 Introduction

PLA Roles, Goals and Objectives, and
Schedule Overview

TAC Meeting #7 – Quick Recap - QAPP
Review

Today's Meeting #8 - New work:
Setup and Development of LSPC
Model for Hydrology



Meeting Schedule

April 6th
TAC Meeting #7



October 5,
2016
TAC Meeting #8

- **Hydrodynamic Model**



February/March
2017
TAC/Interested
Parties Meeting

- **Hydrodynamic Model Draft Report/Update Interested Parties**

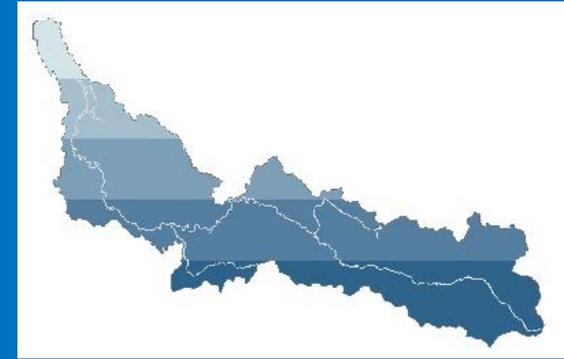


TAC Meeting Agenda

Time	Topic
9:00 am	Welcome & Introductions
9:15 am	Project Updates
10:00 am	Setup and Development of LSPC Model for Hydrology – Part 1
10:20 am	Break
10:35 am	Setup and Development of LSPC Model for Hydrology – Part 2
11:15 am	Comments from Audience
11:45 am	Next Steps
11:55 am	Wrap-up
12:00 pm	Adjourn



Project Updates



Final QAPP

- Comments rec'd from WSDOT and King County
 - Special thanks to King County for detailed comments from modelers.
- Improvements
 - Changed upstream boundary of food web model
 - Removed PAHs from food web model parameters
 - Adopted several suggestions for organizing the calibration of LSPC
 - Reorganized and added language on model uncertainty and acceptance
 - Clarified language in numerous areas



Looking Ahead

- We have a plan and are starting to implement it.
- When we get to toxics, particularly PCBs, we'll have a mini-QAPP process around the info base and modeling options.
- There may be other QAPP check-ins if there are unforeseen circumstances.
- And,
- It's a long term project. The QAPP is a good introduction for project newcomers.



PCB Congener Assessment

- PLA Objective: Assess PCB congener data to recommend one or more PCB congeners, suites of congeners, homologs or select Aroclors to be modeled.
- Phase 1 Completed April 2016
 - Compiled available PCB congener data:
 - 1,400 samples total
 - Tissue, sediment, surface water, stormwater, storm drain solids, air deposition



PCB Congener Assessment

- Phase 2 Underway
 - Funded with Ecology PLA and Duwamish Source Control budgets
 - Prime contractor: Leidos
Sub-contractor Doctor Lisa Rodenburg
 - Work must be completed before July '17
- Tentatively planning a presentation to the TAC in March 2017



PCB Congener Assessment Phase 2

Initial Data Assessment

- Determine if existing data in each media are appropriate for PCB fingerprinting analysis

No

Data Usability Memo to include a recommendations for: PCBs to model in the PLA, future data collection & management (Nov. '16)

Yes

Conduct multivariate statistical analysis to identify PCB fingerprints by media, relative contribution in the watershed, PCBs to model in PLA, Lower Duwamish source control spatial patterns (Mar. '17)



Green River Study Update

Mahbub Alam, PhD, PE
Environmental Engineer
Toxics Cleanup Program

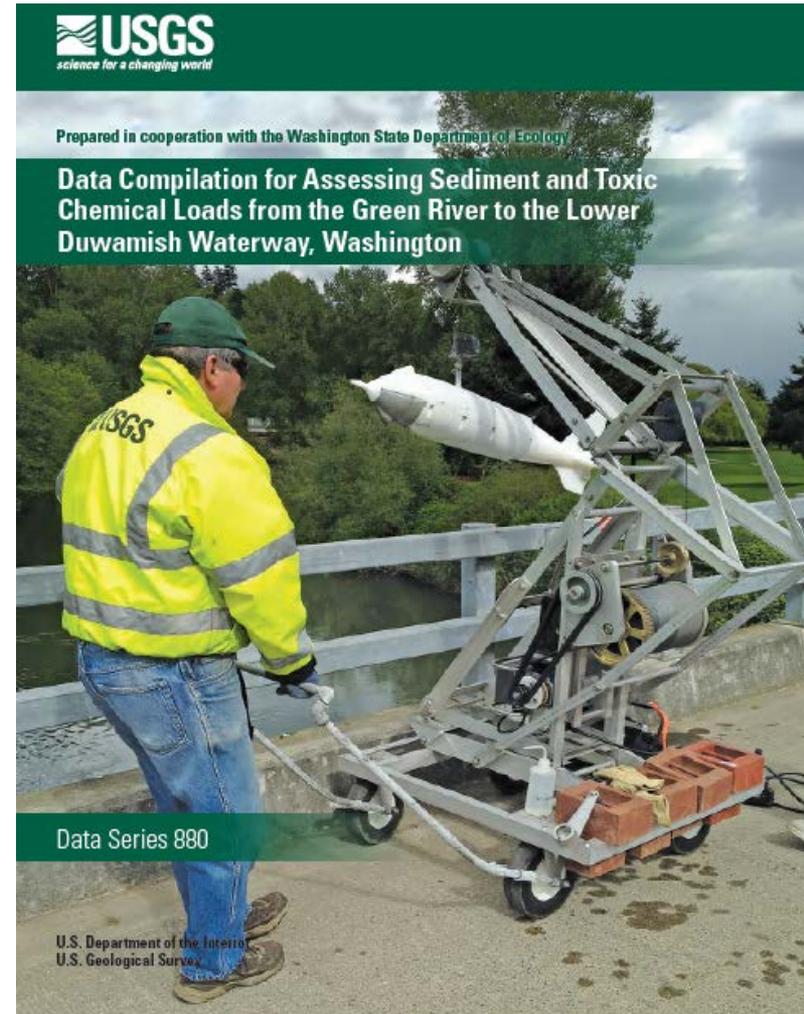
Study Background & Objective

- Estimate sediment loads and toxic chemical loads from upstream sources in the watershed that are transported by the Green-Duwamish River to the LDW



Study Progress – Phase 1

- Jan – June 2013
 - Method testing
 - 7 samples
 - Discharge, field parameters, suspended sediment concentration (SSC)
 - whole water chemistry
 - suspended sediment chemistry
 - instantaneous loading estimates
 - Data Report



Study Progress – Phase 2

- Jan 2014 – June 2015
 - Continuation of Phase 1 & addition of two continuous gaging stations
 - 20 discrete samples
 - Data report
- Regression models
 - SSC Vs turbidity
 - SSC Vs discharge
- Loading estimates



Prepared in cooperation with the Washington State Department of Ecology

**Chemical Concentrations and Instantaneous Loads,
Green River to the Lower Duwamish Waterway near
Seattle, Washington, 2013–15**



Data Series 973

U.S. Department of the Interior
U.S. Geological Survey

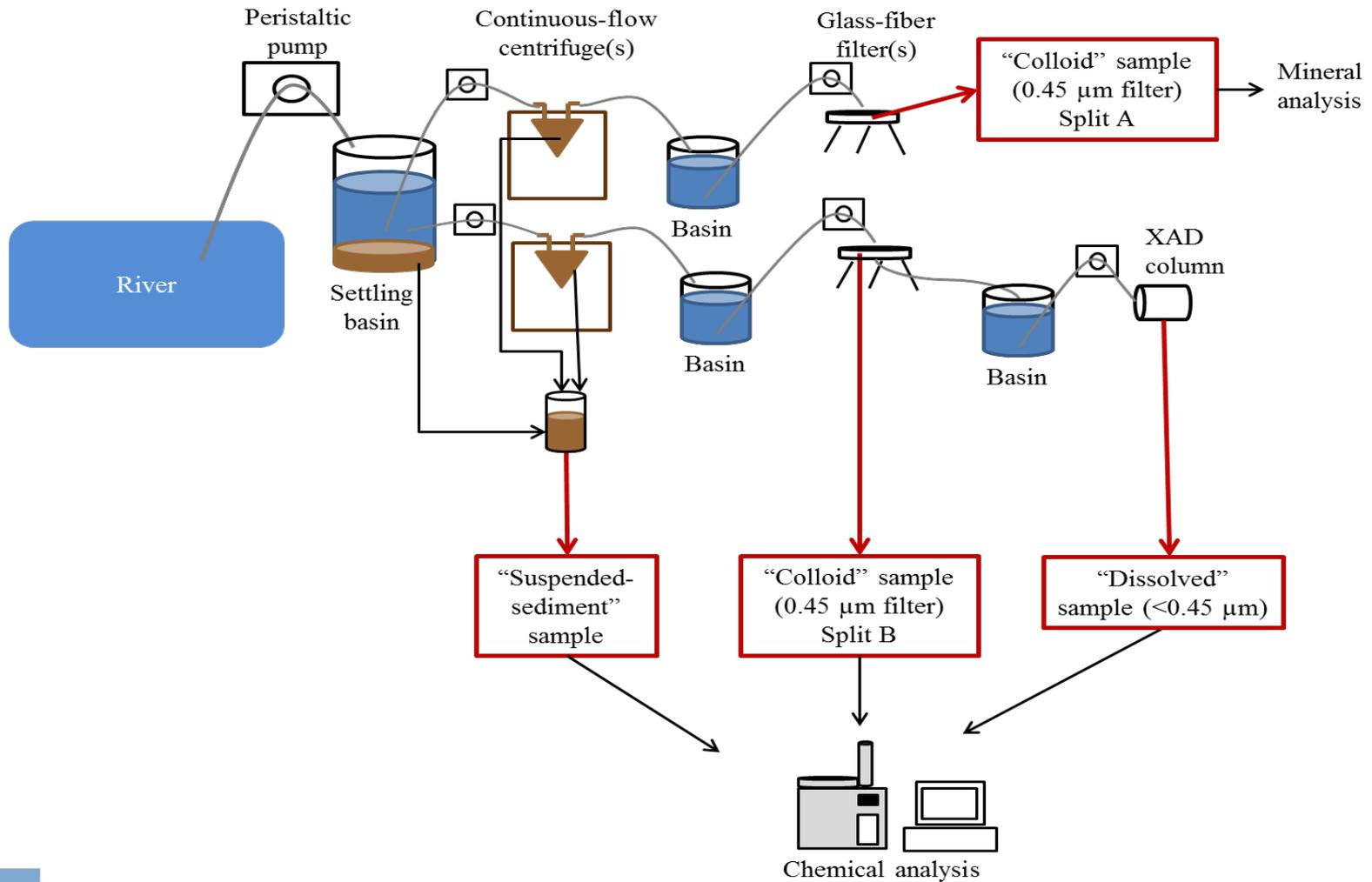


Phase 3

- Started July 2016
- Continuation of Phase 2 plus new tasks
 - Dissolved PCB sampling to support partition and loading estimates
 - Assess tidal dynamics



Sampling & Processing Schematic





Suspended Sediment Estimates

- SSC (discrete sampling): 6 to 555 mg/L
 - Median 41 mg/L
- 15-min SSC (estimated): -11.4 to 2,263 mg/L
 - Median 10.8 mg/L
- SS Load (net): 110,000 tons/yr. (2 yr. avg.)
 - 71% Load comes from fines < 62.5 μm
 - LDW RI STM estimate: 207,000 tons/yr.
 - SS Load does not include bedload transport



Suspended Sediment-Bound Chemical Load

Statistic Used to Calculate Chemical Load	Arsenic	cPAHs	Dioxins/ Furans	PCBs
	(kg)	(g TEQ)	(mg TEQ)	(g)
Median (SSC _{FINES})	874	3,411	218	335
Median (SSC)	1,231	4,807	307	473
90% (SSC)	2,464	17,892	1,213	2,691

- Chemical load estimates would likely be improved with Phase 3 sampling



Suspended Sediment-Bound Chemical Concentration

Estimate From Phase 1 & 2

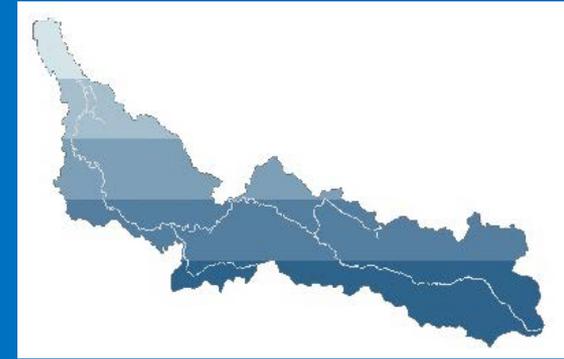
BCM Model Input

Statistic	Arsenic	cPAHs	Dioxins / Furans	PCBs
	(mg/kg)	(ug TEQ/kg)	(ng TEQ/kg)	(ug/kg)
10%	8	11	1	1
Mean	14	80	5	12
90%	25	180	12	27

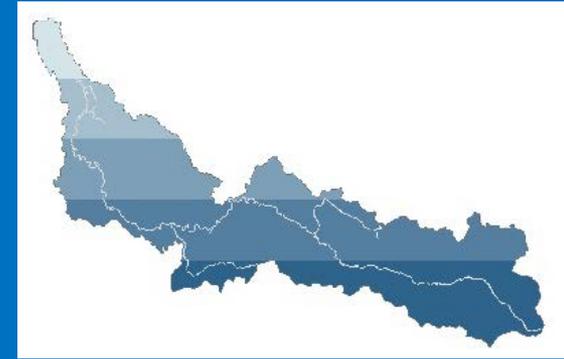
Statistic	Arsenic	cPAHs	Dioxins / Furans	PCBs
	(mg/kg)	(ug TEQ/kg)	(ng TEQ/kg)	(ug/kg)
Low	7	40	2	5
Mean	9	70	4	35
High	10	270	8	80



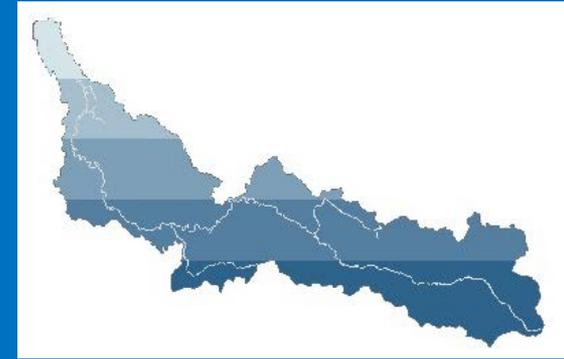
Setup and Development of LSPC Model for Hydrology Slides



Comments from the audience



Next Steps



Next Steps for the PLA Development Process

- TAC
 - Send written comments by October 31st (Monday)
 - Will be collected and incorporated into a future Memo update.
- Posted memo on website for public feedback



Next Steps for the TAC and Interested Parties Meetings

- Scheduled for February or March 2017. TAC Meeting in morning; IP in afternoon.
- TAC Meeting will cover draft LSPC hydrology report
- IP meeting to brief and take comment on project QAPP, and hydrology memo and report.
- TAC invited to participate in IP meeting.



Wrap Up



Presentations and Meeting Notes and other project information may be found on website:

<http://www.ecy.wa.gov/geographic/GreenDuwamish/pla.html>

