



GREEN-DUWAMISH POLLUTANT LOADING ASSESSMENT TECHNICAL ADVISORY COMMITTEE

TECHNICAL ADVISORY COMMITTEE MEETING #3

4408 Delridge Way SW, Seattle, WA 98106

March 19, 2015

TAC PARTICIPANTS

- Chris Andersen, City of Auburn
- Kym Anderson, Port of Seattle
- Kevin Buckley, Seattle Public Utilities
- Marilyn Guthrie, Port of Seattle
- Ryan Larson, City of Tukwila
- Mike Mactutis, City of Kent
- Dale Norton, Ecology Environmental Assessment Program
- James Rasmussen, Duwamish River Cleanup Coalition
- Pete Rude, Seattle Public Utilities
- Jeff Stern, King County DNR/WTD
- Ron Straka, City of Renton
- Heather Trim, Duwamish River Cleanup Coalition

ADDITIONAL MEETING PARTICIPANTS

- Mahbub Alam, Ecology Toxics Cleanup Program
- Chance Asher, Ecology Toxics Cleanup Program
- Sen Bai, Tetra Tech
- Jon Butcher, Tetra Tech (via phone)
- Becky Chu, USEPA CERCLA
- Bruce Cleland, Tetra Tech
- Jenée Colton, King County
- Kathy Conn, USGS
- Ben Cope, EPA
- Mark Dagel, Hart Crowser
- Rick Dinicola, USGS
- Mike Ehlebracht, Hart Crowser
- Kelly Foley, EnviroIssues
- Dave Garland, Ecology Water Quality Program
- Todd Kennedy, Tetra Tech (via phone)
- Bo Li, Ecology Water Quality Program
- Laurie Mann, USEPA Office of Water
- Dino Marshalonis, EPA
- Teresa Michelsen, Avocet Consulting
- Mike Milne, Brown and Caldwell

- Joan Nolan, Ecology Water Quality Program
- Angie Thomson, EnviroIssues
- Iris Winstanley, Leidos

WELCOME AND INTRODUCTIONS

Angie Thomson, facilitator, welcomed everyone and led the group in a round of introductions. She provided a brief overview of the agenda for the day, noting that the focus of the meeting would be to refine the data and model evaluation memo and identify preliminary parameters for the Pollutant Loading Assessment (PLA).

REFINE DATA AND MODEL EVALUATION MEMO

Bo Li, Ecology Water Quality Program, [presented](#) on the [data and model evaluation memo](#). She provided an overview of the conceptual model of the PLA, highlighting the watershed model, receiving water model, and food web model. She posed five questions to the Technical Advisory Committee (TAC) to help refine the data and model evaluation memo:

1. Should the Green River to Black River confluence be included in the receiving water model, which is based on the Environmental Fluid Dynamics Code (EFDC)? Could the simpler Loading Simulation Program in C++ (LSPC) model be used instead?
2. Where should the up-gradient spatial extent of the receiving water model be?
3. Where should the down-gradient spatial extent of the receiving water model be?
4. If the FWM focuses only on the 5-mile stretch of the Lower Duwamish Waterway (LDW), will there be enough information to understand fresh water bioaccumulation processes that are occurring upstream?
5. Should conventional parameter impairments be included as well as toxics in the model?

TAC members asked clarifying questions and made comments about each question posed by Bo. A summary of the discussion associated with each question is provided below:

1. Should the Green River to Black River confluence be included in the receiving water model, which is based on the EFDC? Could the simpler LSPC model be used instead?
 - Question: How far up the watershed does the current EFDC model go and what would it take to extend the model beyond this extent?
 - The model currently extends a little farther than the Foster Golf Course, near I-405. Ecology and EPA noted that there is a balance between including a larger domain and model cost.
 - Comment: Based on existing data, pollutant loading is not significantly different between the upper and lower mainstem. There are however, some significant pollutants coming from the tributaries into the mainstem. The LSPC model may be sufficient because there are not complex sediment transport processes occurring.
 - Question: To what level do you want to be able to identify potential pollutant sources in a given tributary? Would LSPC capture this information?
 - TAC members noted the LSPC would not capture this information because the model generates information based on hydrologic response units (HRUs). If a source is known, parameters based on that source can be used as inputs, but sources cannot be identified based on model output.

- Ecology explained that the focus of the model is to represent existing sources, it would not identify any new sources.
- Question: Would outfalls be modeled differently in the LSPC and the EFDC models?
 - Tetra Tech explained that LSPC and EFDC would treat outfalls similarly in the mainstem because the river is shallow. Each model would cut the water body into smaller segments and associate loading levels with each segment. EFDC allows outfalls to be represented at certain depths for deep water.
- Question: Can the EFDC provide more detail further upstream and is this needed?
 - TAC members discussed that by extending the geographic coverage of the model, the number of cells would increase and so would run times.
 - TAC members noted that the level of detail generated by the EFDC might not be necessary, making the LSPC model sufficient.
- Question: Will the same model (e.g. EFDC, LSPC) need to be applied to the food web model (FWM)?
 - Tetra Tech explained that the food web model will require a different model than EFDC or LSPC. The current proposal suggests the food web model would cover the same spatial domain as EFDC in the LDW. Tetra Tech further explained that water quality information can be extracted from LSPC and could be fed into a food web model if desired.

Initial Recommendation from Ecology and EPA: *The LSPC model should be used rather than the EFDC for the receiving water model upstream of the existing EFDC extent.*

TAC Recommendation: *The LSPC model is adequate for the receiving water model covering the streams upstream of the existing EFDC extent.*

2. Where should the up-gradient spatial extent of the receiving water model be?

- Question: Why is the up-gradient spatial extent important?
 - Ecology and EPA explained that the spatial extent influences which sampling points are included and impacts whether tidal influence is captured in the model.
- Comment: The current King County model boundary could be used because it represents the extent of tidal influence. This boundary goes just past “the rapids” feature, near I-405.
- Comment: Tidal influence has been observed at the USGS gauging station at 200th Street.
- Comment: The up-gradient extent could be expanded farther, beyond the current King County model boundary. USGS mentioned that the tidal influence can reach RKM 27 (RM 17) under low flow condition.

TAC Recommendation: *The up-gradient spatial extent of the receiving water model should be at least as far up-gradient as the current King County model to include tidal influence, with the potential to expand it further as the model is further developed.*

3. Where should the down-gradient spatial extent of the receiving water model be?

- Comment: All of the existing models extend into Elliott Bay, but differ in their cell sizes. The King County model is the lowest resolution of the existing models.

TAC Recommendation: *The down-gradient spatial extent of the receiving water model should match the current King County model.*

4. If the food web model (FWM) focuses only on the 5-mile stretch of the Lower Duwamish Waterway (LDW), will there be enough information to understand fresh water bioaccumulation processes that are occurring upstream?
 - Comment: The purpose of the FWM is to look at tissue concentrations associated with watershed listings. If there are listings above the 5-mile stretch of the LDW, then this information should be included in the model.
 - Comment: The existing model may only work in an estuary. Can it be used in freshwater?
 - Ecology and Tetra Tech noted that the FWM has been applied to freshwater in other studies, though not specifically to the LDW.
 - Comment: The FWM should take into account not only what species currently use the waterway, but what species should be in the waterway.
 - Comment: There is a lot of habitat restoration work underway and planned in the upper portion of the LDW. Restoration work in this area will improve estuary conditions further upstream. When opportunities are considered for expanding the FWM, we should consider the restoration work that is occurring.

TAC Recommendation: *The FWM should focus on the LDW for now, but opportunities for expansion should be considered in the future.*

5. Should conventional parameter impairments be included as well as toxics in the model?
 - Comment: It would be useful to understand how conventional parameters could be applied to other efforts (e.g. WRIA 9).
 - Comment: It would be helpful to understand how conventional parameters could potentially be used in the PLA model.
 - Question: Should pH be included in the modeled parameters?
 - Tetra Tech explained that it could be used as an external input, rather than a model parameter.
 - Question: Should temperature be added to the list of conventional parameters?
 - TAC members discussed the temperature TMDL for the Green River and that it is difficult to install new riparian habitat to shade the waterway in this reach. It was noted that it would be even harder downstream, where the land use is more industrial.
 - Tetra Tech added that thermal dynamics is included in the hydrodynamic part of the EFDC and it would be included within the model.
 - Comment: There will be other contaminants coming in with the conventional pollutants in addition to toxics (e.g. pharmaceuticals).

Initial Recommendation from Ecology and EPA: *The model should focus on toxic parameters rather than conventional parameters.*

TAC Recommendation: *The model could start with toxics and incorporate conventional parameters in the future.*

After discussing these five questions, the TAC members posed additional questions and comments about the data and model evaluation memo. A summary of this discussion is provided below:

- Comment: The LDW is a unique estuary because it has been largely modified. There is an opportunity to reestablish estuary function in different places within the watershed. The degree to which these areas could influence the LSPC and EFDC models should be considered as the PLA is developed. It might also be possible to use the model to inform high potential restoration areas.
- Question: It is important to understand the context in which data has been gathered and the quality of this data before including it in the PLA model. Will quality assessment and quality control (QAQC) efforts be included in the development of the Quality Assurance Project Plan (QAPP)?
 - Ecology and EPA explained that this is an important component of the QAPP. Detailed information about QAQC efforts will be discussed at the TAC meeting in May.
- Comment: There was concern that the QAQC process will be a serious time commitment and that some TAC member organizations do not have the budget to take on this workload. It was requested that resources be allocated to fund this effort.
- Comment: It is important that objectives and uncertainties associated with the model are tracked carefully so that the model is used as it is intended.
- Comment: Existing models for the LDW have similar inputs, but may have different predictions for pollutant loading. There was concern that these models and the PLA model results could contradict each other and this may cause problems for water resource managers and users trying to improve sediment quality.
 - Ecology and EPA noted that the model prediction capability will not be available for many years and that the models may end up complementing each other. However, there is quite a bit of time to find a solution for this potential issue. Still, it is important to keep this potential conflict in mind as the model is developed.

GREEN RIVER DATA

Kathleen Conn, United States Geological Survey, gave a presentation on a recent study of sediment and chemical loading from the Green-Duwamish River watershed to the Lower Duwamish Waterway. She explained that the objective of the study was to estimate sediment loads and chemical loads from upstream sources that are transported downstream to the LDW. She emphasized that the data collection efforts were preliminary and that more data needs to be collected to ensure conclusions are statistically significant. TAC members asked the following questions to Kathleen following her presentation:

- Did you see a consistent pattern between suspended and bed sediments?
 - Typically, the suspended sediment concentrations were higher than the bulk sediment. This conclusion is based on detections and does not include non-detection data.
- Does discrete sampling in the future include chemical contaminants?
 - Yes, we are proposing that this be included in future efforts.
- Why is a second location proposed for future data collection?
 - The additional location will allow for a more robust statistical analysis.
- Were these load estimates be compared to the estimates from the USGS sampling location in Auburn?
 - No, but we are proposing in the final report that this comparison be made.

- Is there any rainfall-runoff combination that you haven't sampled yet but would like to sample?
 - We have done a good job capturing diverse events, however, it would be nice to have more summer and early fall events. It might also be helpful to have a higher resolution of the samples such that the sediment loading changes over a storm event could be captured.

IDENTIFY PRELIMINARY PARAMETERS

Dale Norton, Ecology Environmental Assessment Program, [presented](#) on preliminary parameters for the PLA and led a discussion to begin identifying which parameters should be the focus of the PLA. He reviewed the regulatory drivers of the PLA objectives and explained the need to reduce the list of chemicals to model. He provided an overview of a [matrix](#) that provided a preliminary recommendation of chemicals that could be used for the model. TAC members asked questions and provided feedback to the preliminary list of parameters. A brief overview of this discussion is provided below:

- Question: Are the dioxins a singular compound, or should it include more than just 2, 3, 7 and 8?
 - The 303d listings from the Clean Water Act (CWA) only use dioxins 2, 3, 7 and 8. However, Ecology and EPA are open to using other compounds as well.
- Comment: Lead should be included if arsenic and mercury are being modelled.
- Comment: Data availability could be a limiting factor for modeling dioxins/furans.
 - Ecology and EPA's data collection efforts could focus on this area in the future.
 - A TAC member noted that important parameters should not be eliminated from the list because of a lack of data.
- There was both support and lack of support among TAC members for including phthalates in the list of parameters.

It was decided that TAC members would review the pollutant matrix in detail and revisit the parameter discussion at the April meeting. TAC members will base their recommendations for parameter inclusion on the desired outcomes of the PLA, not necessarily data availability.

COMMENTS FROM THE AUDIENCE

- USGS considers 200th Street in Kent (river mile 17) to be the spatial extent of the tidal influence, noting that observations from recent Green River studies show that the tidal influence extends as far as river mile 12 for parts of the year.

NEXT STEPS

At the next TAC meeting, TAC members will discuss further refinement of preliminary parameters based on a review of the pollutant loading matrix. These parameters will be considered within the context of overarching PLA objectives. Data availability and data gaps will be a secondary consideration for this discussion.

Action items:

- Send out the pollutant matrix spreadsheet to the TAC.

- Send out the data and model evaluation memo presentation and the preliminary parameter presentation to the TAC.
- Consider another data presentation at the next meeting.
- Discuss QAQC for the model at the May meeting.

TAC homework:

- Use the pollutant matrix to develop recommendations on which parameters should be included in the model.
- Review the meeting #3 summary before April 16, 2015.