Salish Sea Model

Potential Tool for the Duwamish PLA?
Salish Sea Model Features

• Coupling of FVCOM hydrodynamic model (with unstructured grid) and CE-QUAL-ICM water quality model (e.g., Chesapeake Bay)
  • Coupling of the two models was completed by PNNL
  • Calibrated hydrodynamics and conventional water quality across entire Puget Sound domain
  • Extensive, peer-reviewed documentation

• Unstructured grid supports nesting of finer grids
  • Ideal for handling complexity of Puget Sound inlets, basins, canals, and bays

• SSM does not currently include code for toxics simulation
  • Requires new coupling with ICM-TOXI and/or WASP-TOXI codes
Why consider SSM for Duwamish PLA?

LSPC → SSM → Food Web
Benefits for PLA

Technical

• Straightforward boundary condition assignment in Elliott Bay
• Unstructured grid
  • nesting of fine grids (bays, confluences, outfalls) within Salish Sea grid
  • reduces bathymetry-related modeling challenges

Local Capacity

• Existing team of Ecology modelers familiar with SSM
• Existing PNNL team that can be tapped by Ecology via intergovt agreement

Computing

• WQ/Toxics decoupled from hydrodynamics – efficient calibration runs
• Parallelized code – faster computing
• Access to PNNL super computer for long-running simulations
Big Picture

• Mutual benefits to PLA and Puget Sound program

  • PLA provides impetus and key test bed for adding an SSM toxics module
  • Builds single Duwamish/Elliott Bay tool with temperature, salinity, nutrients, DO, pH and toxics
  • Opens possibilities for climate change, sea level rise, and acidification assessment in Duwamish and Elliott Bay
  • SSM toxics module allows assessment of other toxics concerns around PS
  • Optional direct participation of modelers from other agencies in SSM modeling
Challenges

• Acquiring funding to incorporate toxics code into SSM
• Attaining sufficient in-house capacity and/or funding for PNNL for site-specific application to Duwamish
• Managing a course change with TAC: Revising QAPP
• More transaction cost in transfer to outside consultants
  • SSM is a custom model – not widely used like EFDC
Next steps

• Check-in with EPA Puget Sound program on prospects and timing for funding the code work
• Written proposal for Puget Sound program and TAC
• Present to TAC
• Revise QAPP