



Saving Puget Sound from Eutrophication (SPSE):
Coupling River Basin Export Reduction Optimization
Support Tool (RBEROST) with Dynamic SPARROW model

Naomi Detenbeck (EPA-ORD)

Steven Rego (EPA-ORD)

Stephanie Anderson (EPA-ORD)

Avery Tatters (EPA-ORD)

Craig Connolly (EPA-ORD)

Sydney Clark (R10)

Rochelle Labiosa (R10)

Rory O'Rourke (R10)

Goals/Approach/Scope

- Goal 1: Update River Basin Export Reduction Optimization Support Tool (RBEROST) for Puget Sound Basin to work with new dynamic SPARROW model to evaluate changes in least-cost solutions* to meet nutrient loading targets under changing climate
 - RBEROSTv2-Pacific linked with static SPARROW currently under review
- Goal 2: Evaluate hot-spots and drivers of cyanobacteria HABs in Puget Sound using Sentinel-2 derived time series of chlorophyll a, N/P loadings from dynamic SPARROW, discharge, salinity, temperature, and retention time
 - Chlorophyll algorithms being assessed for estuaries and tidal freshwater rivers using extensive paired dataset of chlorophyll and remote sensing observations

* Considering spatially-explicit costs/efficiencies of WWTP upgrades, urban stormwater BMPs, agricultural BMPs, riparian restoration practices

Initial Results

- RBEROSTv2_{s(tatic)} – Pacific recently completed with user guide, presented to stakeholders, and under technical review
- Example output, 3 small coastal watersheds

The model did not implement any WWTP retrofits.

The model chose to implement the total area of the following rowcrop BMPs:

Conservation (ac)

124.9

[Download Agricultural \(Rowcrop\) BMPs by COMID](#)

The model did not implement any grazing BMPs.

The model chose to implement the total area of the following urban BMPs.

'GreenRoof' (ac)	'InfiltrationBasin' (ac)	'PorousPavementwUD' (ac)	'SandFilterwUD' (ac)
689.0	195.9	9,947.8	292.2

[Download Urban BMPs by COMID](#)

The model did not implement any road BMPs.

The model did not implement any riparian buffer BMPs.



Article

EstuarySAT Database Development of Harmonized Remote Sensing and Water Quality Data for Tidal and Estuarine Systems

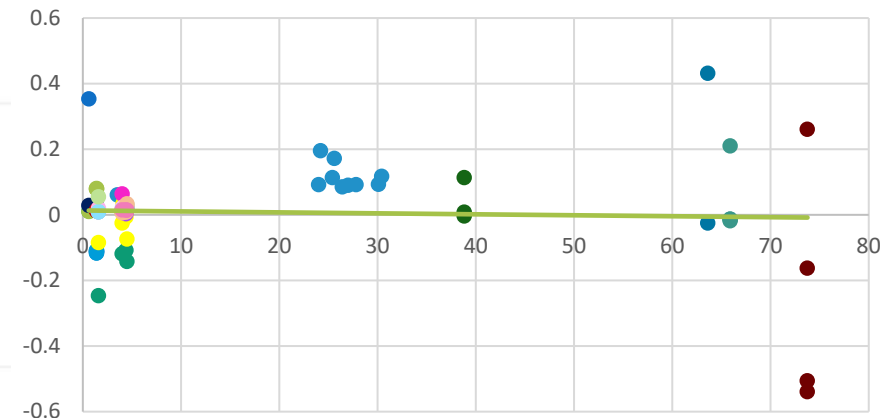
Steven A. Rego ^{1,*}, Naomi E. Detenbeck ¹ and Xiao Shen ²

¹ Office of Research and Development, U.S. Environmental Protection Agency, Narragansett, RI 02882, USA; detenbeck.naomi@epa.gov

² College of Engineering, Computing and Cybernetics, The Australian National University, Canberra, ACT 2601, Australia; xiao.shen@anu.edu.au

* Correspondence: rego.steven@epa.gov; Tel: +1-401-782-3177

NDCI - CV 0.4 - Acolite

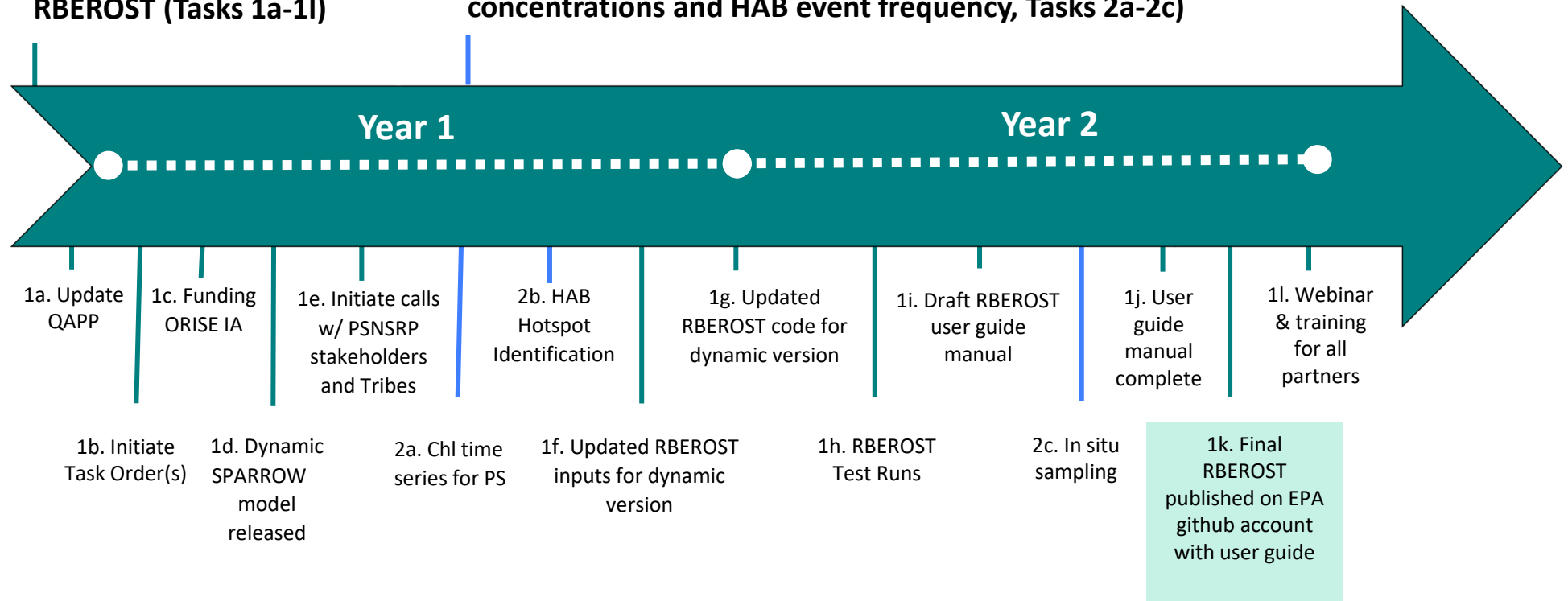


- Acolite outperforms Polymer for atmospheric corrections
- Spectral shape indices such as NDCI don't perform well in estuaries
- Gons-740 and MDN with Acolite for atmospheric corrections are best performing algorithms so far (working on updating MDN w our improved dataset)

Next Steps/Transferability

Objective I: Develop Dynamic RBEROST (Tasks 1a-1l)

Objective II: Evaluate linkages (nutrient loads, chlorophyll concentrations and HAB event frequency, Tasks 2a-2c)



- Transferability of RBEROSTv2s,d-Pacific
 - Could be used in other Basins in R10 states if underlying datasets were updated (esp. stormwater BMP efficiencies and costs)
 - RBEROST under development for Illinois R Basin will have a more generic approach to stormwater BMP efficiencies and costs and could be adapted to US version of dynamic SPARROW under development pending resources