4-dimensional (4-D) interpolator development overview

Bay Oxygen Research Large Group

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CBP team and developers:
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Bay Oxygen Research Group (BORG)

This group's purpose:

Develop a new water quality interpolation tool to generate dissolved oxygen estimates across space and through time.

Meeting schedule:

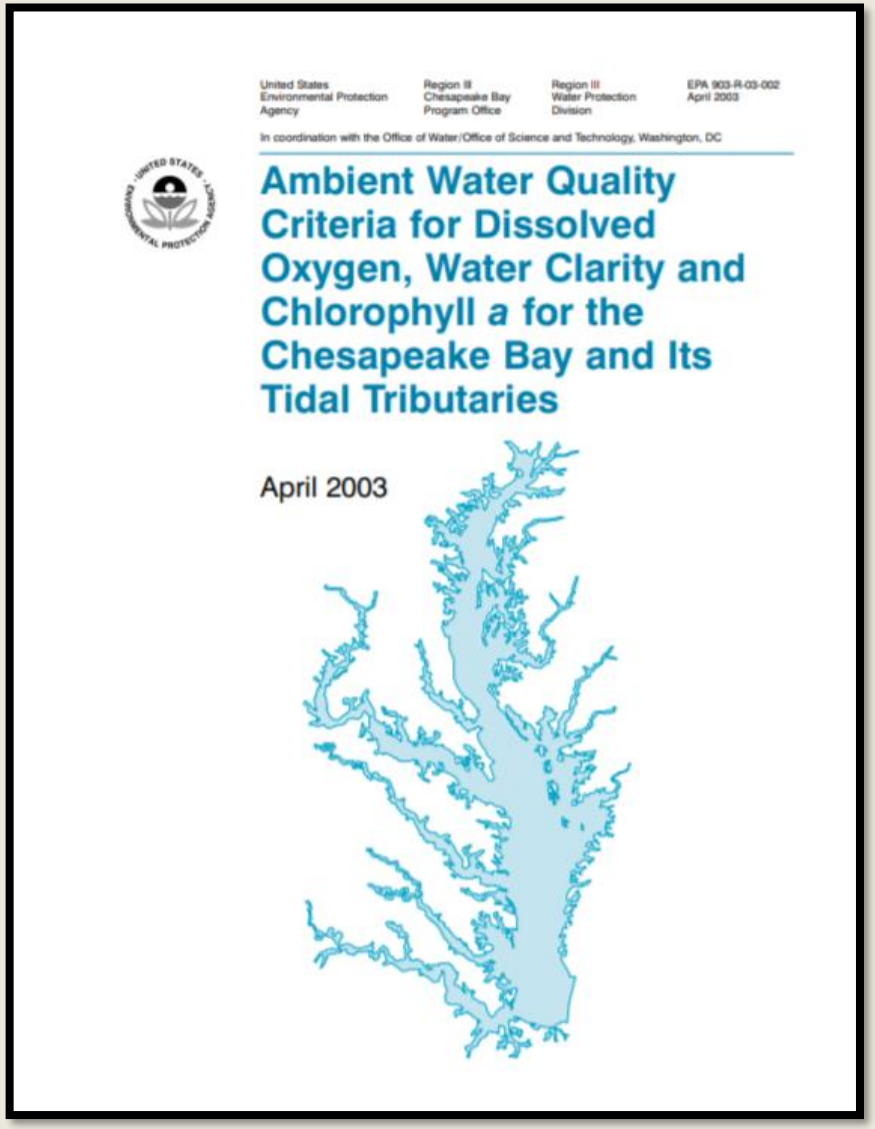
Every three months: 3rd Monday from 12:00-1:30

In-between, the development team occasionally schedules small groups meetings as needed for technical feedback.

https://www.chesapeakebay.net/who/group/bay-oxygen-research-group

Interpolation

- Within the framework established for assessing the tidal water quality criteria, interpolation is one part of the analysis.
- Interpolation is done to avoid bias due to the sampling location distribution not always being spatially representative of the full segment's conditions.
- Current interpolation feeds into results for:
  - *Both MD and VA Integrated Reports,*
  - *CBP water quality criteria indicator,*
  - *Post-processing CBP estuary modeling output to evaluate TMDL load scenarios,*
  - *Several research applications.*



Why do we need a new method?

- The current interpolator (developed 20+ years ago) was not designed to interpolate through time and was not developed for use in assessment of shorter-term tidal WQ criteria.

- There is more high frequency data now to fill in temporal gaps.
  - *There would still be spatial and/or temporal bias if the data was used without interpolation because it is impossible to get equally distributed representation of DO everywhere.*

- A new interpolation will use all the data to fill in the gaps between data based on observed patterns to help accurately assess high frequency DO criteria.

4-D Interpolator Design

Input all types of DO data

Fixed station, Dataflow, ConMon, Vertical array, Participatory science

Interpolate data

Large scale data structure[1] + daily and tidal cycles + space and time correlation structure

Output hourly DO Bay-wide

Multiple simulations: Can be aggregated or parsed to evaluate a variety of criteria

[1]New development based on feedback: This piece of the tool will soon use all data at high frequency, not at daily subset

4-D interpolator development timeline

This year:

- Still developing
- Documenting
- Linking to criteria assessment