Multiple Shallow Water Model Site Selection

To Improve the Assessment of Chesapeake Bay Water Clarity and Submerged Aquatic Vegetation

Water Quality Standards

Modeling Workgroup Conference Call

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Study Site Selection – From RFP

Applicants will apply their shallow-water models at study sites selected by the CBP Partnership's Modeling Workgroup, which will:

• Include the following contrasting types of areas:

- Shallow water habitats with present SAV abundance and known historical SAV abundance;

- Shallow water habitats without present SAV abundance but with known historical SAV abundance; and

- Shallow water habitats with no historical or present SAV abundance.

Site Selection will consider the following:

- Salinity – predominantly freshwater site vs. brackish site vs. high-salinity site

- Bottom type – sandy site vs. silt-covered or muddy site

- Wave influence – a site with moderate waves permitting SAV growth vs. a site dominated mainly by tides

- Input-forcing variables – a site influenced by locally forced conditions vs. a site influenced by mainly external factors

- Nutrient levels – a site with high levels of nutrients exhibiting eutrophic characteristics vs. a site with lower levels of nutrients exhibiting oligotrophic characteristics

• *CBP Partnership's Modeling Workgroup will select sites that have at least three to five years of data, including temperature, salinity, light/turbidity, chlorophyll a, bathymetry, wave height, wave period, open boundary conditions, freshwater flows and loads, and, where appropriate, SAV acres.*

# **Study Site Selection – Other Considerations**

- Interest in having a <u>range</u> of salinities from tidal fresh to meso- or polyhaline.
- Strong inclination toward sites that have extensive shallow water data available, particularly sites that were data-rich in continuous shallow water monitoring sites.
- Wanted a site that was "typical" of the Chesapeake shallow water environment.
- Wanted to avoid fall lines of major rivers and their associated continuous conveyer belt of large watershed loads.
- Wanted to cover as many TMDL segments as possible.
- Interest in a site that had particular management interests.
- Interest in a site with a boundary condition that was well simulated by the WQSTM and also covered by a long-term Bay monitoring site.
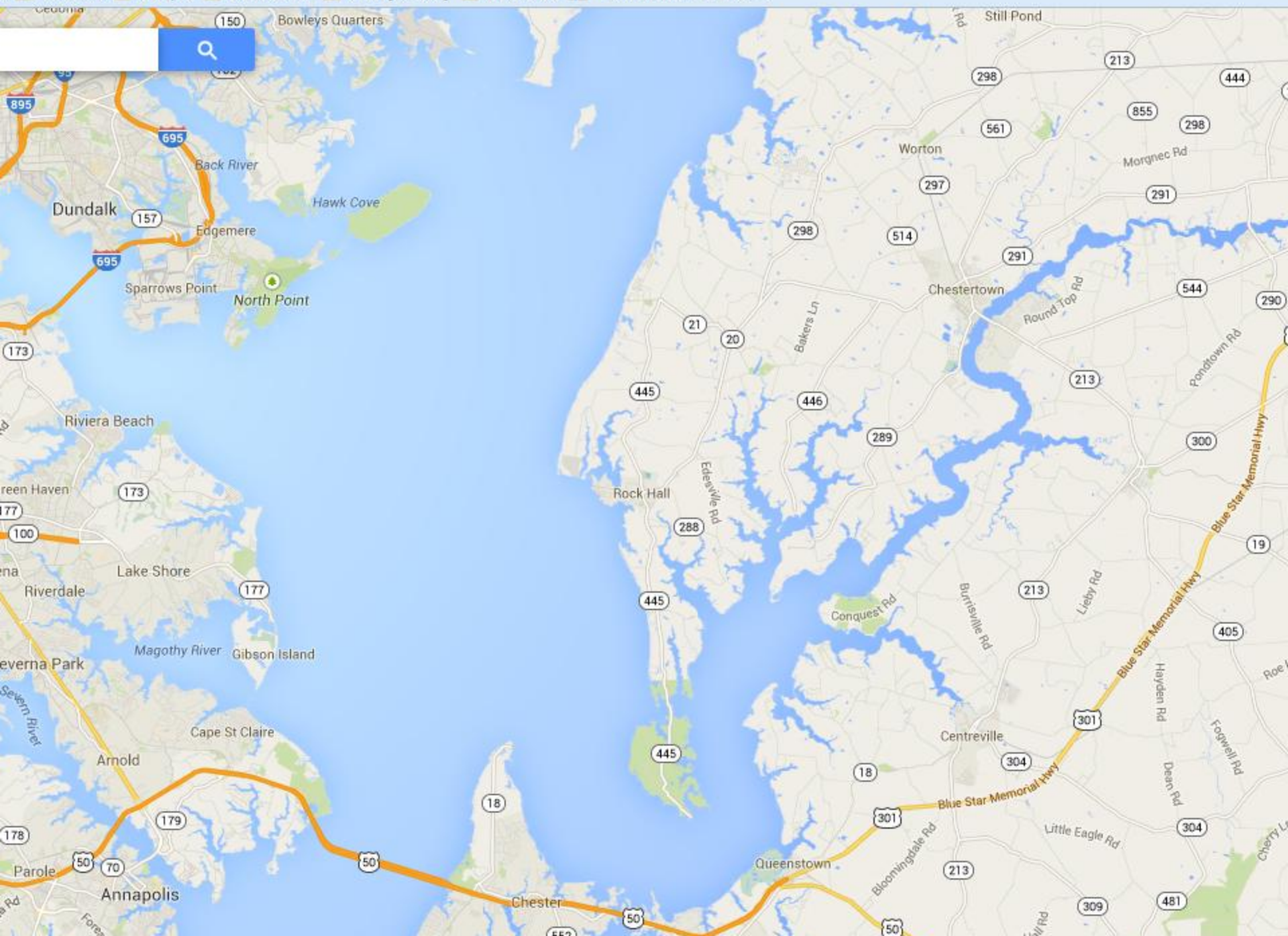
Study Site Selection

Many sites were considered, but the selection process evolved to focus on the Chester, Choptank, Bush, and Corsica.

Chester

Corsica

Basin	Watershed Area (acres)	Tidal Area (acres)	Shoreline (miles)
Choptank	379,859	24,252	309
Chester	263,660	34,141	337
Bush	82,982	7,547	65
Corsica	23,976	1,358	23

Bush

Choptank
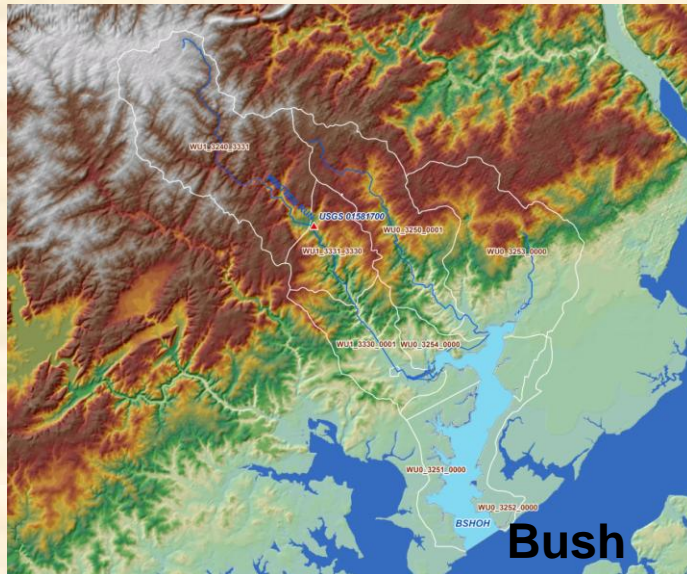
Chester River

Chester River

Shallow Water Stations: There are 22 monitoring stations in total in the Chester River including those in the Corsica River and 8 stations have CMON (continuous monitoring) data. Most of the data were collected after 2006, but 2 CMON stations were occupied only from 2003 to 2006, when most of the Dflo data were collected as well.

#N	Name	Description	Type	Collection period
1	COR0056	At bridge below boat ramp, Burrisville Rd bridge	Data flow (Dflo)	2006-2013
2	XHH3851	Sycamore Point	CMON+Dflo	2005-2013
3	XHH4528	100 yds from mouth of Tilghman Cove, depth 2 ft	Dflo	2006-2013
4	XHH4742	Trib project	Tributaries	
5	XHH4822	700 YDS E OF R N"2" 16 FT DEPTH, Corsica R.	Dflo	2003-2005
6	XHH4916	The Sill (cm sondes at 2 depths)	CMON+Dflo	2006-2011,2006-2013
7	XHH4931	Possum Point (cm sondes at 2 depths)	CMON+Dflo	2006-2013
8	XHH5046	Emory Creek	CMON	2005-2006;2006-2013
9	XGG8359	Kent Narrows Inside	CMON	2007-2009
10	XGG8458	Kent Narrows Outside	CMON	2007-2009
11	XIH0077	Rolphs Wharf	CMON	2003-2006
12	CHE0348	Deep Landing	CMON	2003-2006
13	ET4.2	Chester River	Dflo	2003-2006
14	GYI0001	Gray's Inn Creek	Dflo	2003-2006
15	XGG9992	Chester River	Dflo	2003-2006
16	XHG0859	Chester River	Dflo	2003-2006
17	XHG1579	Chester River	Dflo	2003-2006
18	XHG6496	Langford Creek	Dflo	2003-2006
18	XHH6419	Chester River	Dflo	2003-2006
19	CHE0348	Chester River	Dflo	2003-2006
20	ET4.1	Chester River	Dflo	2003-2006
21	XIH0077	Chester River	Dflo	2003-2006
22	XIH3581	Chester River	Dflo	2003-2006

# Chester River Boundary Conditions:

Proposed WQSTM Boundary: Just beyond the CB-segment boundary of the Chester Mesohaline (CHSMH) and the mainstem segment of CB3MH so as to have a good representation of the CB segment CHSMH and to include regions with some SAV area.

Proposed Wind Forcing: Thomas Point Light with BWI fill-in for significant data gaps.

Salinity (TF, OH, MH, PH): Salinity ranges from tidal fresh to Mesohaline.

CB Segments Covered: Chester Tidal Fresh (CHSTF), Chester Oligohaline (CHSOH), Chester Mesohaline (CHSMH).

**WQSTM Stations of Observed Data: CB3.2, CB 3.3C, CB3.3E ET4.1, ET4.2**
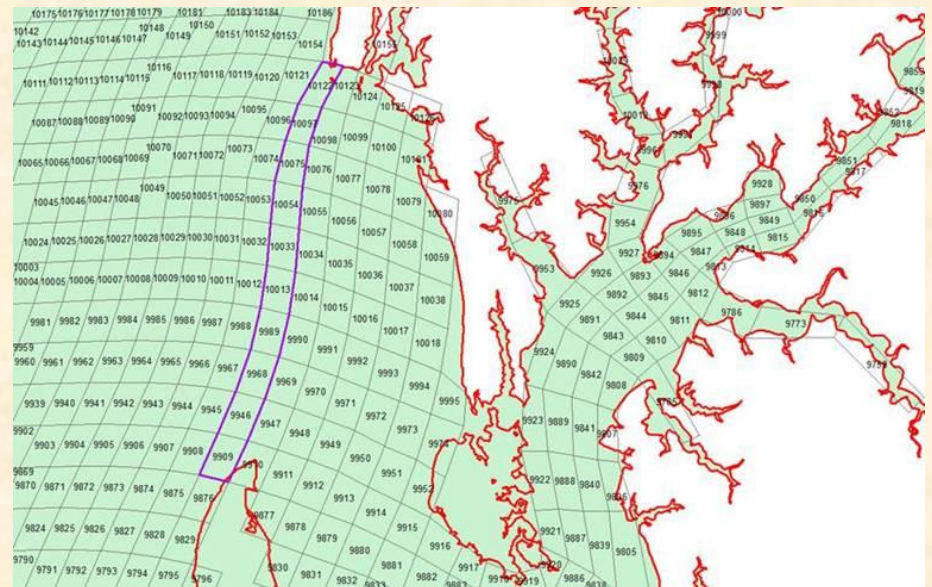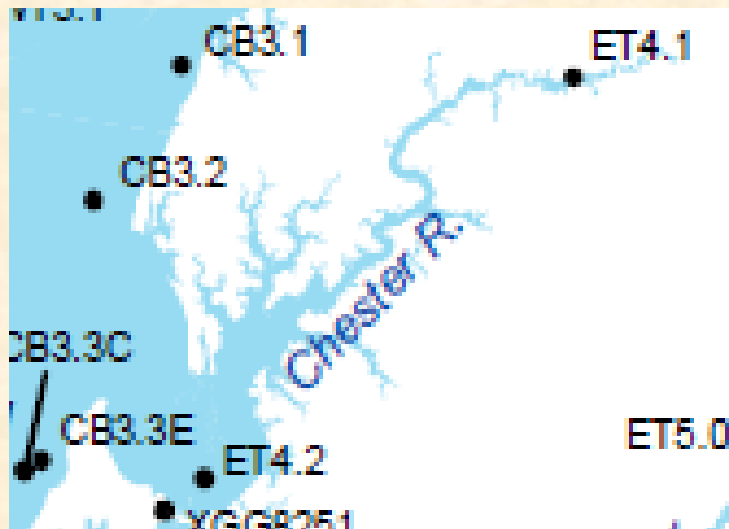
Chester River SAV Area:

SAV acreage in the Chester River showed a declining trend from the later 60s with episodic good years/recovery. In 2004, SAV acreage was about 300 hectares, but decreased to 280 hectares in 2005 and 70 hectare in 2006. In the oligohaline and tidal fresh reaches, SAV appeared only in 2005. The fluctuation in SAV acreage could provide an opportunity to study the mechanisms controlling SAV growth in this area.
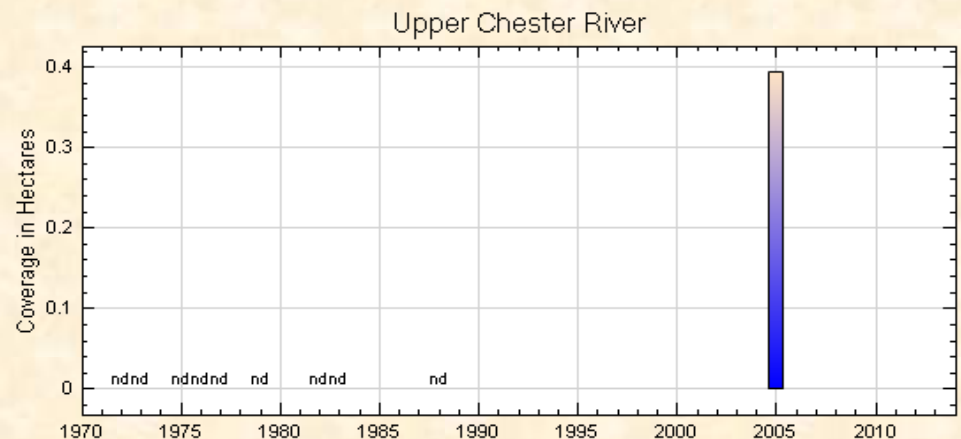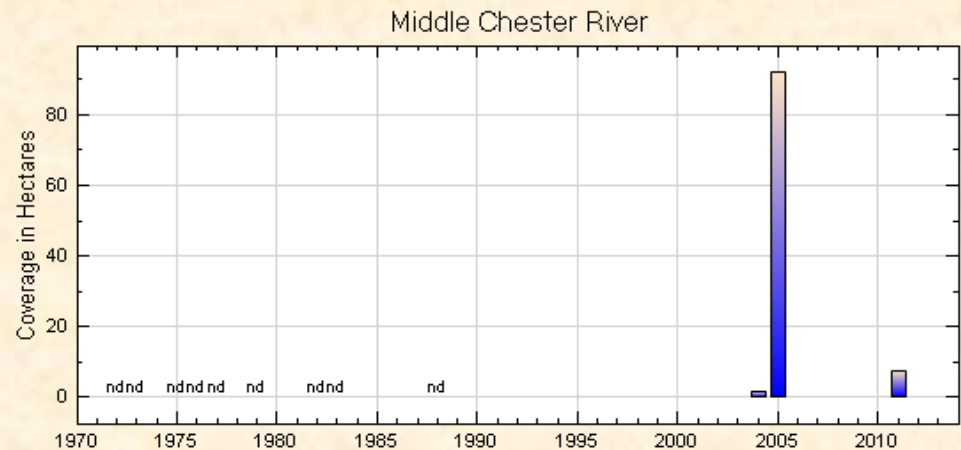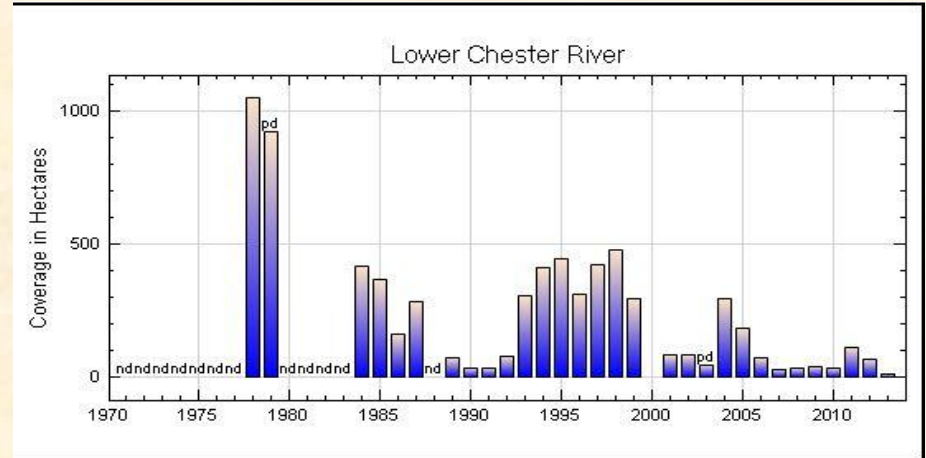
Management Area of Interest: Corsica River high intensity implementation program

50m resolution on coast, 100m open boundary: 993 nodes, 2870 cells
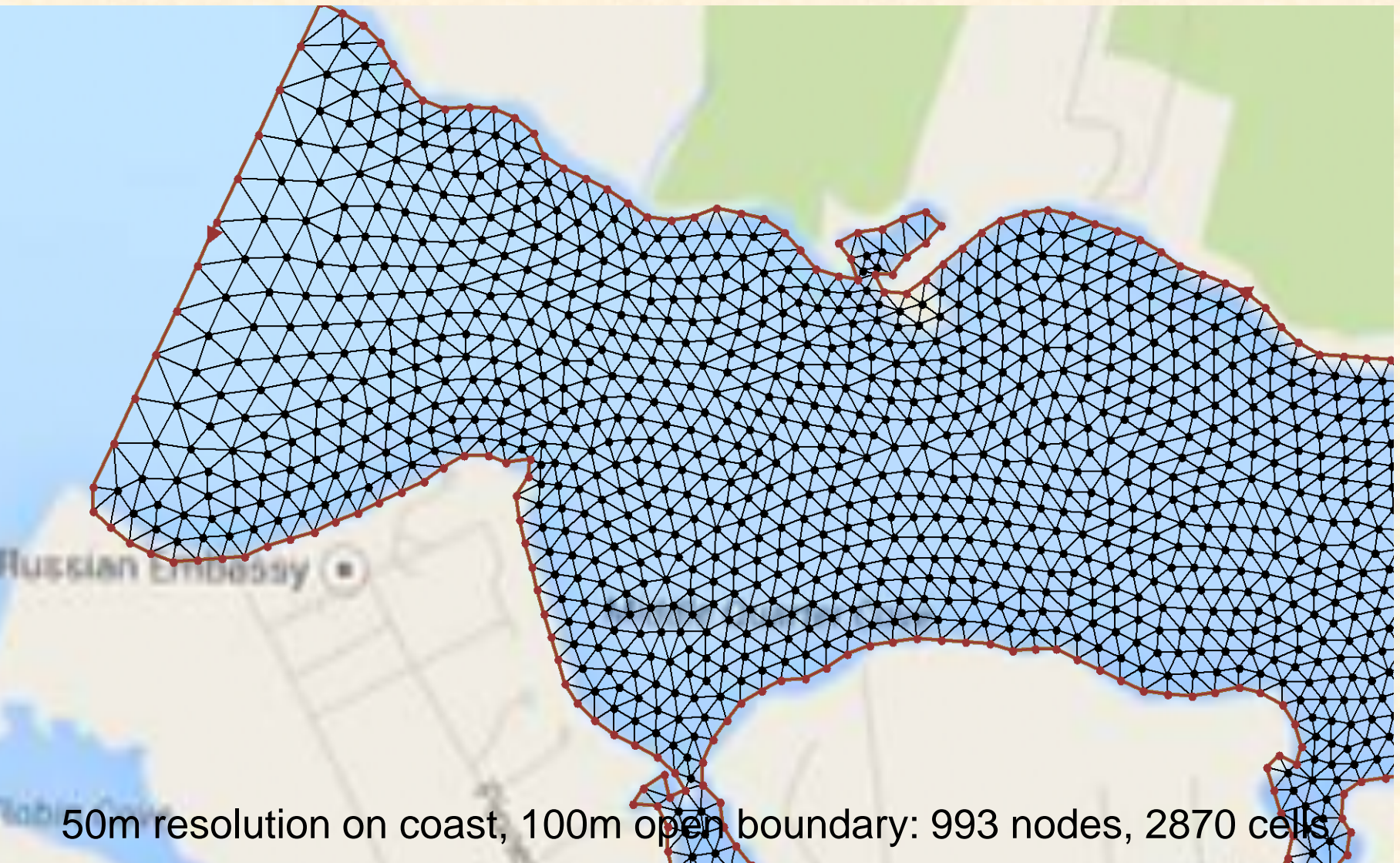
Status & Next Steps:

• Request Site Selection Approval

• CBPO Modeling Team prepares boundary conditions

• Activity 1 Study Teams begin work

• STAC WS late in 2014

• Quarterly Review in July and begin presentations by PIs.

• RFP and all work plans on Modeling WG website.

• All boundary conditions and input data on Modeling WG web site.

• All shallow water presentations on Modeling WG website.

Work Underway:

• University of Maryland Center for Environmental Science - Jeremy Testa (UMCES), Damian Brady (U. Maine) and Ming Li (UMCES): $73,333 for Activity 1.

• Virginia Institute of Marine Science, Center for Coastal Resources - Joseph Zhang (VIMS) and Harry Wang (VIMS): $73,333 for Activity 1.

• Old Dominion University Research Foundation - Richard Zimmerman (ODU), Victoria Hill (ODU), John Klinck (ODU), Michael Dinniman (ODU), and Chuck Gallegos (SERC): $73,333 for Activity 1.

• Virginia Institute of Marine Science, Biological Sciences - Marjorie Friedrichs (VIMS) and Raleigh Hood (UMCES) :$80,000 for Activity 2