Chesapeake Bay Preservation Act Guidance

Modeling and Guidance Process

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Modeling and Guidance

Modeling

- Modeling to assess effects of flood adaptation measures on water quality
  - Modeling underway
  - Scenario development
- Modeling to inform Guidance

Guidance

- Stakeholder process to begin in October
- Tech Team GIS combined with Stakeholders

NOAA grant: Project of Special Merit

- End date: March 2022
- Extension?

Modeling and Forecasts

Flood Protection Measures Effects on Water Quality

Steps:

- Develop projections for location and extent of 2050 Resource Protection Area Features and Buffer
- Analysis of modifications in current time on 2050 conditions

Modeling and Forecasts

Future location of Resource Protection Area Features

- Tidal wetlands
- Nontidal adjacent wetlands
- RPA 100 ft Buffer

Projection Date: 2050

Sea level rise curve: NOAA

Intermediate High

Model Steps

Two Future RPA Layers (Footprints)

- 1. All Tidal Marsh moves landward
- 2. Tidal Marsh migration limited by existing management

Start with the modeled location for Mean High Water

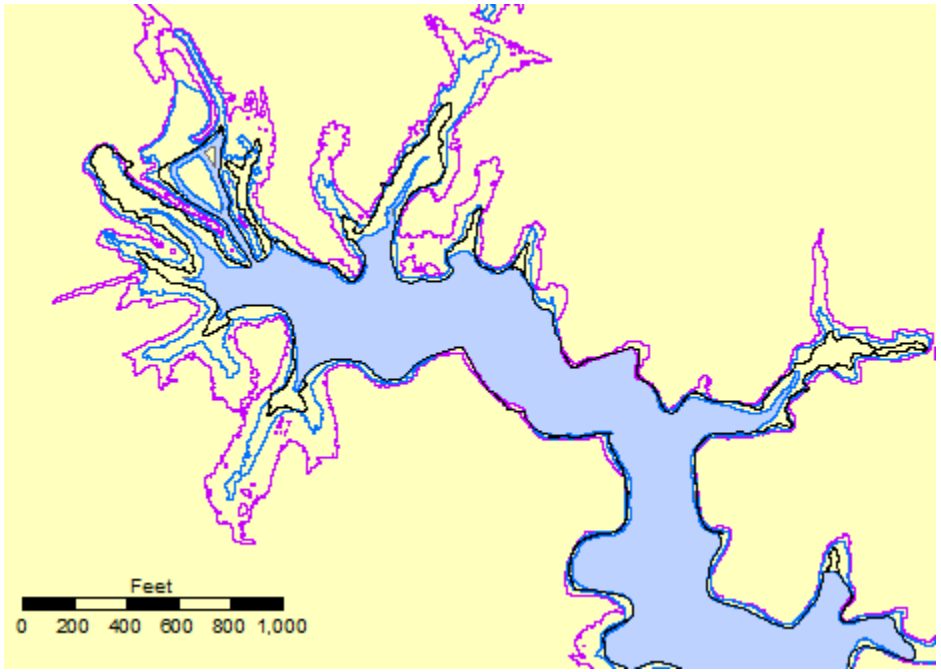
Adjust for 1.5 tide range to locate upper limit of tidal wetlands

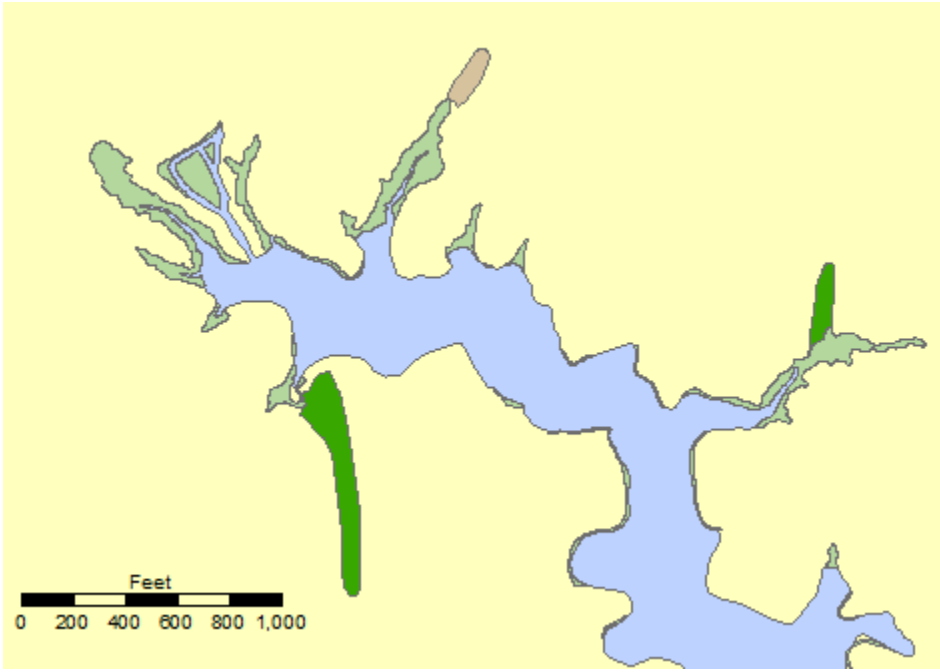
Add nontidal wetlands

Locate 100 foot RPA Buffer

Present and Future RPA Features and Buffer

Shoreline and wetland data layers, along with elevation data, are needed to develop current and future RPAs using a geographic information system (GIS).





- Black line is current shoreline
- Blue line is estimated 2050 shoreline (MHW)
- Purple line is estimated jurisdictional upland wetland boundary

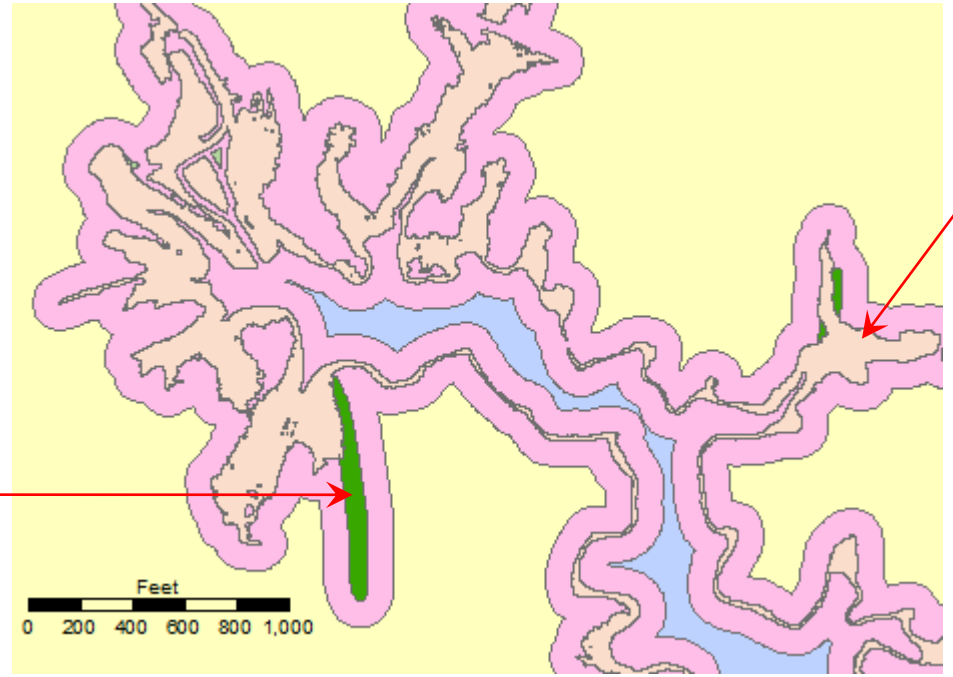
Forested Wetland
Scrub-Shrub Wetland
Tidal Marsh

GIS protocol for estimating 2050 RPA

Developing 2 different 'footprints' for possible 2050 RPAs using estimated 2050 MSL, MHW, and upper limit of tidal wetlands

Footprint 1

Assumes everything at an elevation below the upper limit of tidal wetlands is either inundated or has become wetlands. The estimated 2050 RPA buffer is 100 foot wide strip (pink) landward of the upper tidal wetland limit unless there are contiguous non-tidal wetlands, in which case the RPA goes around them.



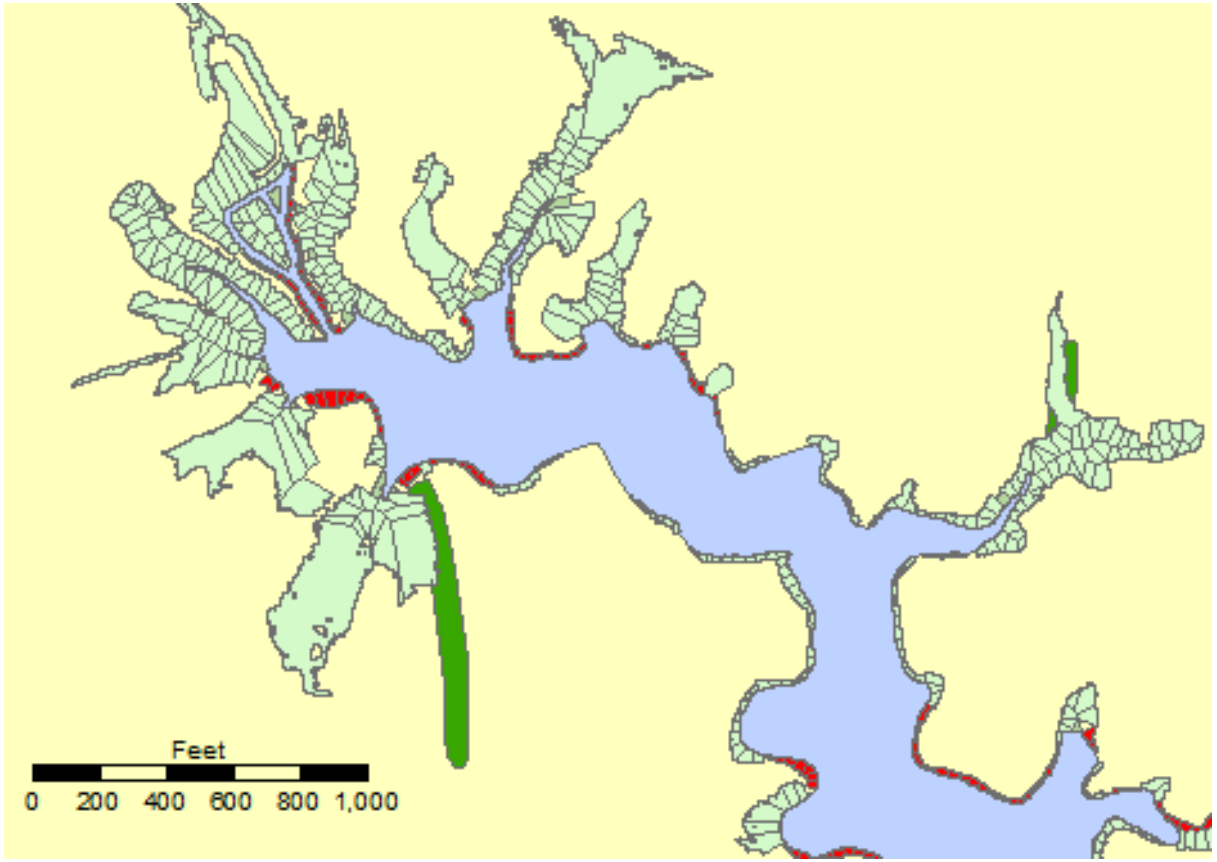
Orange polygon is land below the 2050 upland wetland boundary so buffer goes around it

Green polygon is contiguous wetland so buffer goes around it

Footprint 2

Multi-step approach based upon presence or absence of tidal wetlands along the shoreline.

A. Tidal wetlands not present along the estimated 2050 shoreline (red polygons), then the 100 ft RPA Buffer is drawn landward of there.
B. Tidal wetlands are present, then the 100 ft RPA is drawn inland of them
C. Contiguous non-tidal wetlands are present, in which case the RPA Buffer goes around them.

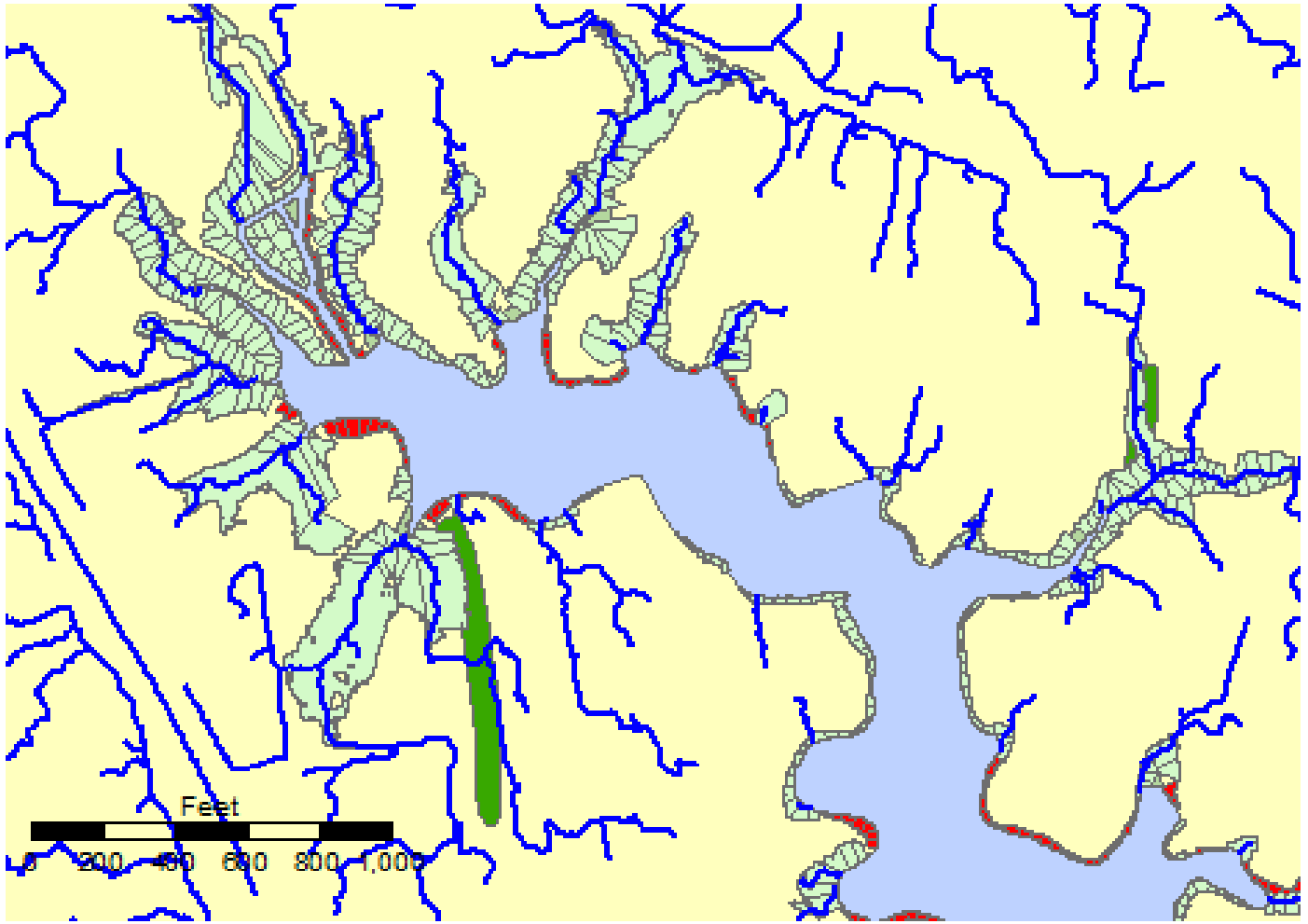


To determine how the tidal wetlands translate inland, Thiessen* polygons (light green polygons) and hydrographic flow lines (next slide) are used.

*Thiessen polygons are a method of equally dividing the shoreline and land associated with that shoreline reach.

Footprint 2 continued

Hydrographic flow lines are developed using an elevation surface and hydrographic flow functions in GIS. Flow lines (blue lines) along with the Thiessen polygons refine the estimate of potential future wetlands.



Footprint 1 complete
Footprint 2 nearly complete

Next Steps:

Stakeholders/ Technical Team review scenarios for management options.

- All lands below elevation X to be managed
- Certain land cover to be managed

Develop analyses based on scenarios

More on Guidance Development

Thanks to Julie Herman, Christine Tombleson and Jess Hendriks for GIS modeling