



More than a Mollusk: Using GIS to Effectively Repopulate Oyster Habitats in the South River, MD (A Tributary of the Chesapeake Bay)

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It all started with a question:





What are those cages?

Discussion Points

- Background/Oyster Impacts
- Oyster Habitats
- Study Area
- Oyster Restoration Workflow Process
 - Phase Workflow
 - Phase Results
- Next Steps
- Acknowledgements and Resources

Oyster Impacts

Environmental







Vitality Factors

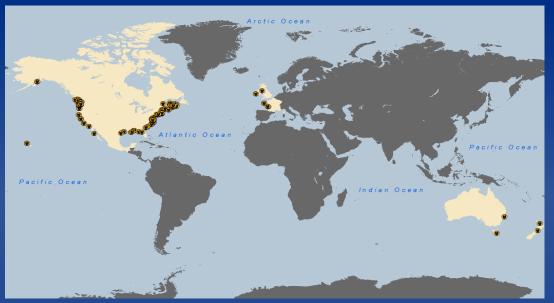
Restoration Efforts

Ecosystem benefits provided by Oysters



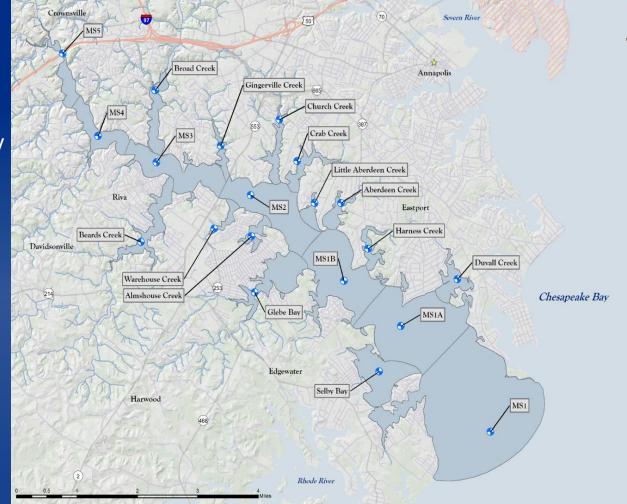
To Oyster Habitats

- Over 150 Varieties of Oysters Worldwide
- Majority of Oysters from Nova Scotia to Gulf of Mexico
- Locations within the Maryland Area of the Chesapeake Bay and Tributaries
- Focus on South River, MD



Study Area

- South River, Maryland
 - 86 miles of Shoreline
 - 10 miles Marsh to Bay
 - ~ 10 Square Miles of water surface
- South River Federation (SRF) Focus
 - Stream and Wetlands
 - Living Shorelines
 - Rain Gardens
 - Oyster Restoration





PHASE I: Identification of Suitable Oyster Husbandry Candidates along the South River

PHASE II: Identification of Suitable Oyster Reef Siting Candidates within the South River

PHASE III: Monitoring efforts of existing reef sites and those created from Phase II efforts.

Methodology

- Research & Collaboration
- Data Collection
- Data Preparation
- Phased Production and Analysis Efforts
- Deliverables



- Telephone and Email Interviews
- Meetings with the SRF mission managers

• Search for available data sources

• Review similar previous project findings

Data Collection

Federal Data

 NOAA , NGA, USGS, NASA, US Army Corps of Engineers

State/Local Data

• Maryland GIS, Anne Arundel Co. GIS, Maryland Department of Natural Resources

Organizational Data

 Chesapeake Bay Conservancy, South River Federation

Commercial Data

• Navionics, Garmin





South River Sounding Points



South River Bottom Surface







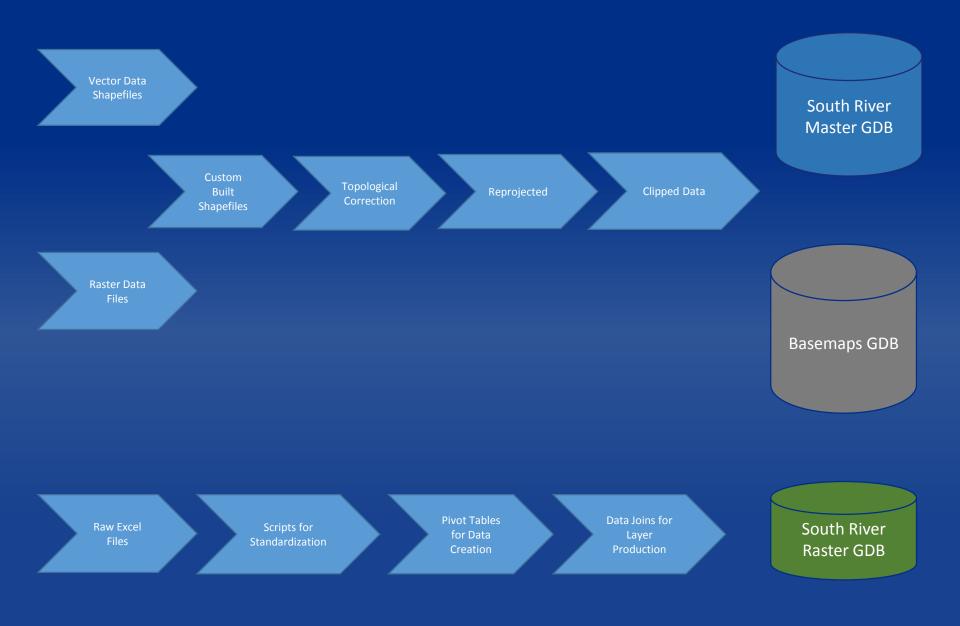
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South River Basemap

South River Raw Water Data

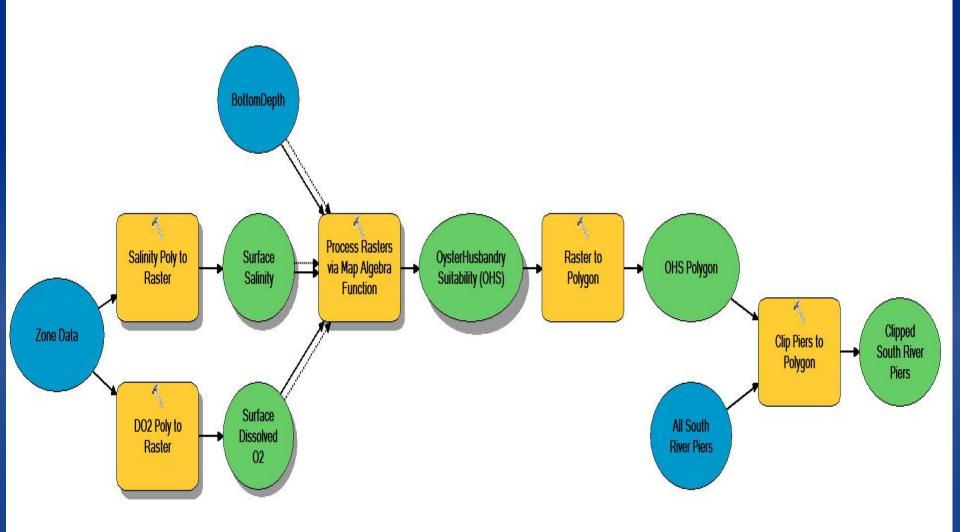
Data Preparation



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Bay Ridge

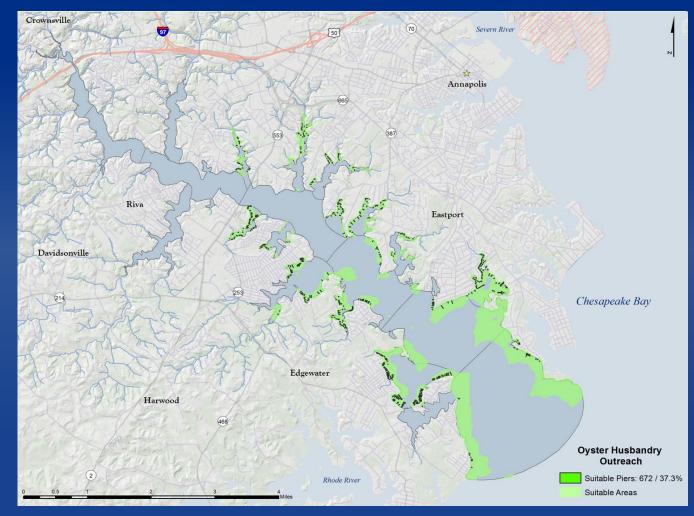
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🏝 Phase I

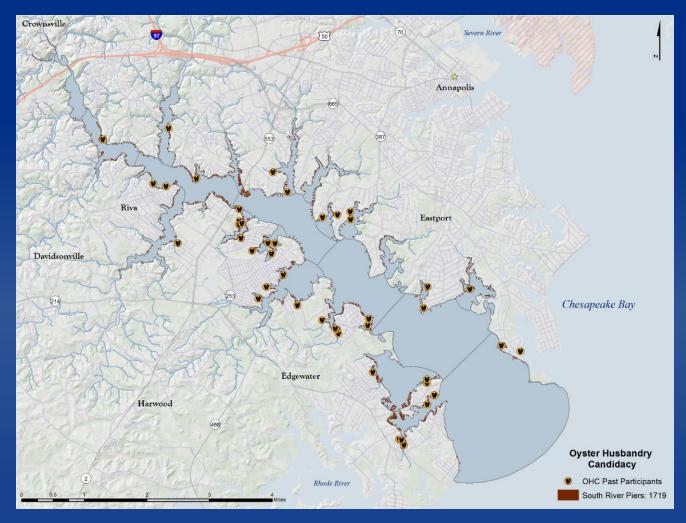
Process Step Through

- Water Zone Zones
- Dissolved O2
- Salinity
- Bathymetric Layer
- Map Algebra
- Raster to Polygon
- Add South River Piers
- Clip Piers to Vector for Oyster Husbandry Suitable Candidates

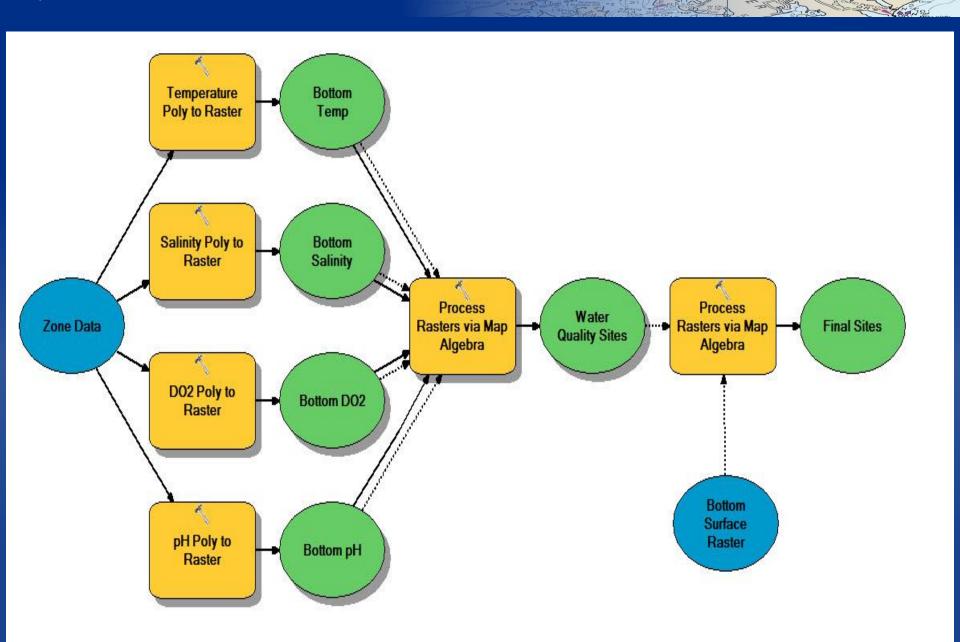


Phase | Results

- Past participation shows efforts spread out along entirety of the river regardless of the quality of water in each area
- Match address points to pier data to provide focused outreach to those property owners with piers that match suitable water quality areas based on the data.
- This focused effort assures that areas which can provide the greatest oyster growth has the opportunity to yield more oysters for reef building in Phase II.





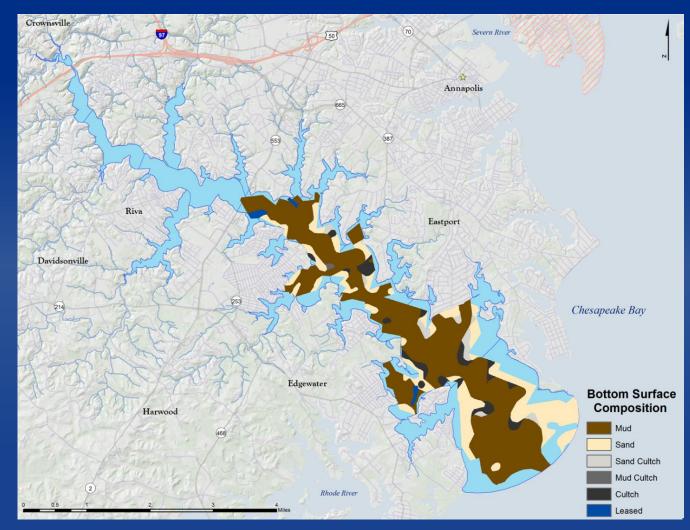


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🆱 Phase II

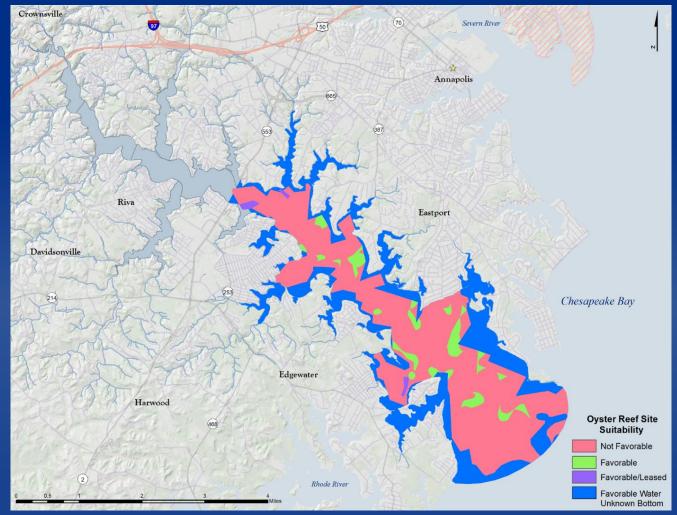
Process Step Through

- Water Zones
- Temperature
- Salinity
- Dissolved Oxygen
- pH
- Map Algebra 1
- Water Quality Sites
- Bottom Surface Composition
- Map Algebra 2



Phase II Results

- The workflow provides a means for testing combined layer suitability
- Model allows for easy reprocessing of data if criteria changes or different criteria is desired
- Can produce additional questions of oyster reef siting or possibly reveal other factors that cause possible favorable areas to be unfavorable





Traditional Monitoring Techniques





Water Collection



Oyster Health Monitoring

Drone/Aerial/Satellite Monitoring

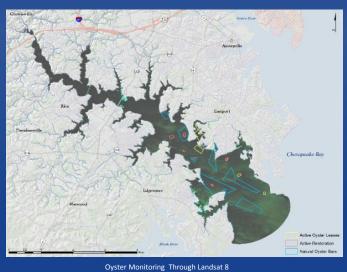
Sonar Monitoring

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Standard Deviation of Oyster Reef



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Next Steps

South River Federation Deliverables

- Finalized process chart and full documentation of methodology
- Development of an Oyster Siting Tool Toolbox
- All processed files (Raster, SHP, etc.) in GDB and Shapefile formats
- Soft and hard copies of all requested maps
- Incorporation of data collection through use of Arc Collector with Portal
- Future briefs of this workflow to interested members in the scientific community requested on behalf of the South River Federation

Acknowledgements

- PSU Advisors Fritz Kessler and Justine Blanford
- Chesapeake Bay Foundation Jackie Shannon
- South River Federations Kirk Mantay, Jesse Illiff, Nancy Merrill, Sarah Giordano

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QUESTIONS?



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