

# Modeling Eastern Oyster Growth, Condition, and Ecosystem Services with *EcoOyster*

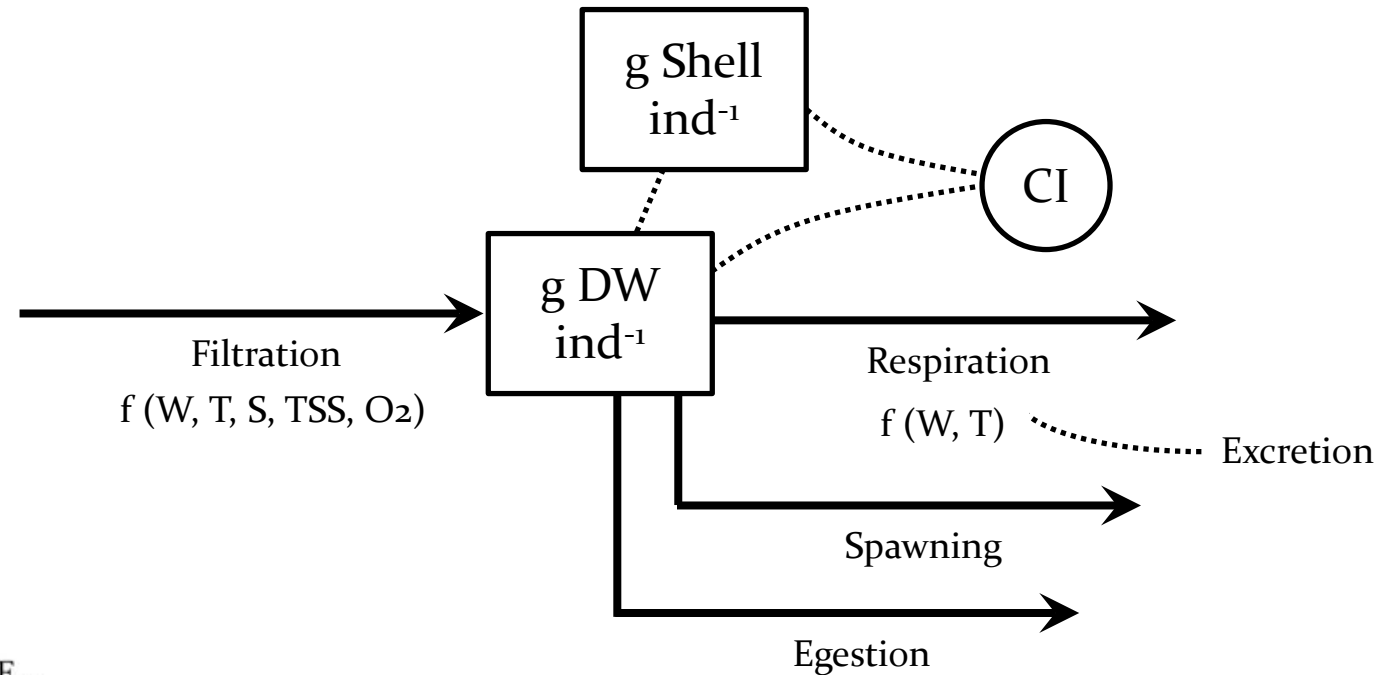
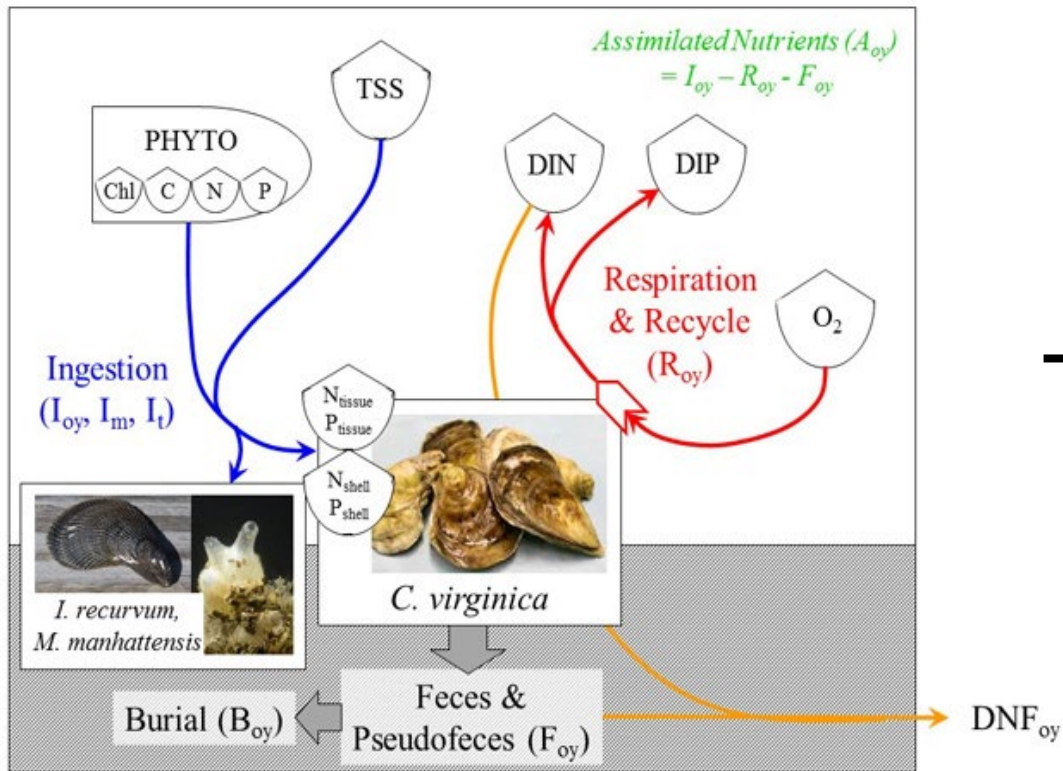
Mark J. Brush  
Virginia Institute of Marine Science

Sustainable Fisheries Summer Goal Team Meeting -  
Winter 2022



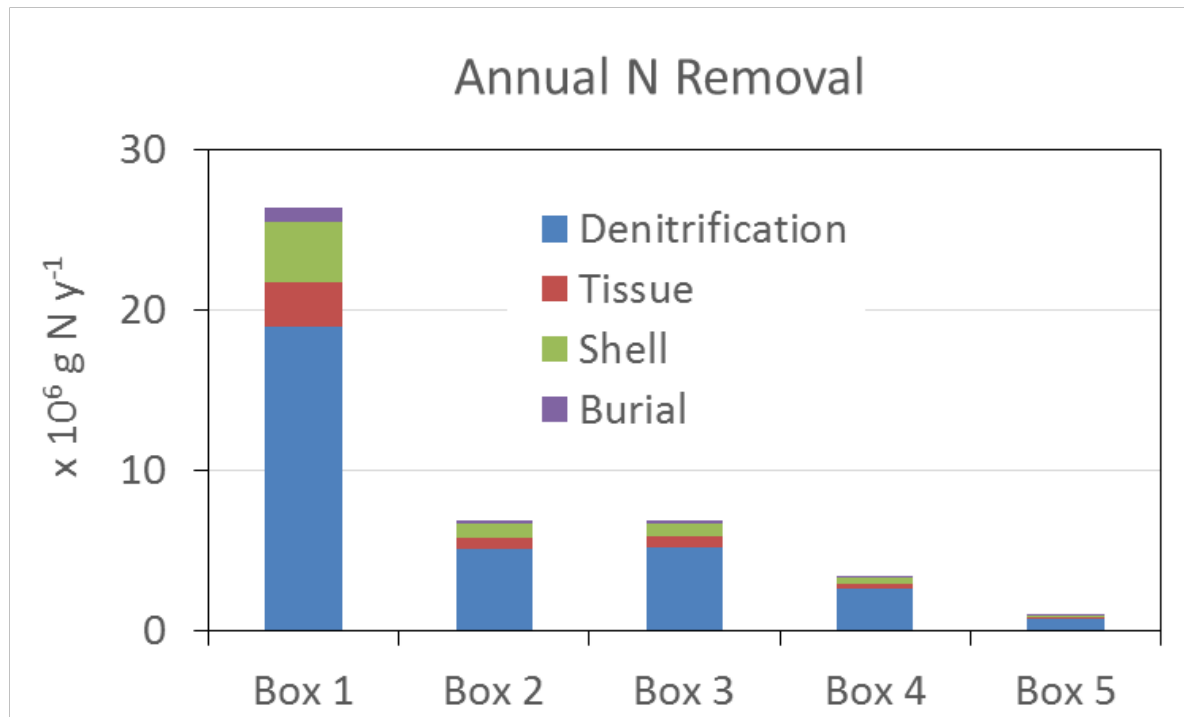
- NOAA OA Thresholds Project
- NOAA Regional Vulnerability Assessment Project

## EcoOyster: A model of individual oyster growth ...



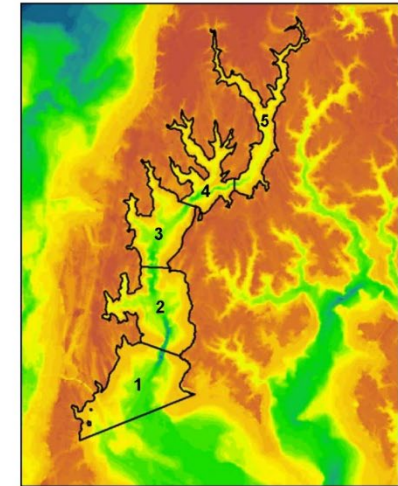
Kellogg et al. (2018); Brush & Kellogg (2018)

## *EcoOyster*: ... Coupled to an estuarine ecosystem model



Kellogg et al. (2018); Brush & Kellogg (2018)

## AN UPDATED MODEL FOR ESTIMATING THE TMDL-RELATED BENEFITS OF OYSTER REEF RESTORATION



6/29/2018

Harris Creek, Maryland, USA

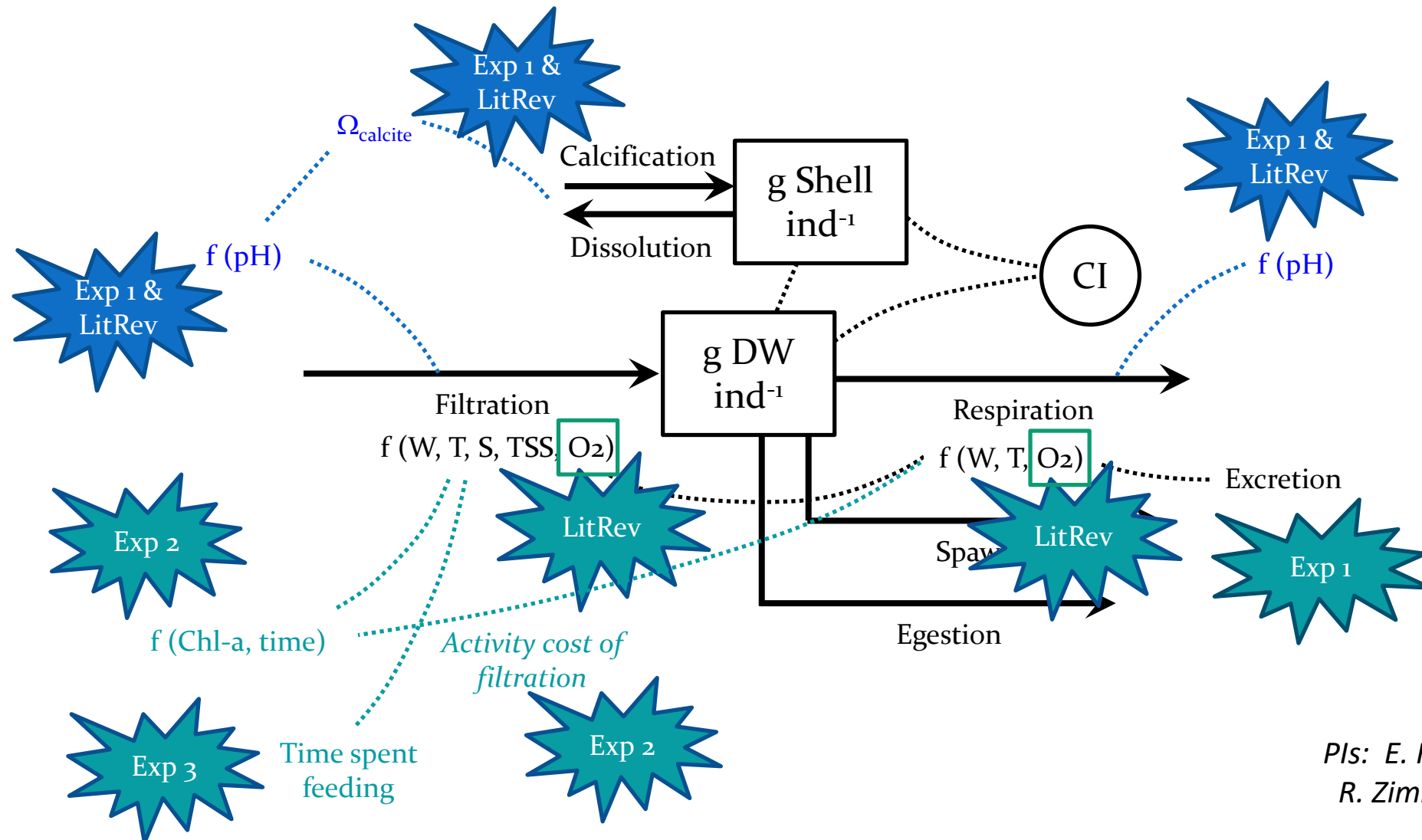
A final report to:  
The Nature Conservancy  
and  
Oyster Recovery Partnership

Prepared by:  
M. Lisa Kellogg, Mark J. Brush, Jeff C. Cornwell

**VIMS** | **WILLIAM & MARY**  
VIRGINIA INSTITUTE OF MARINE SCIENCE

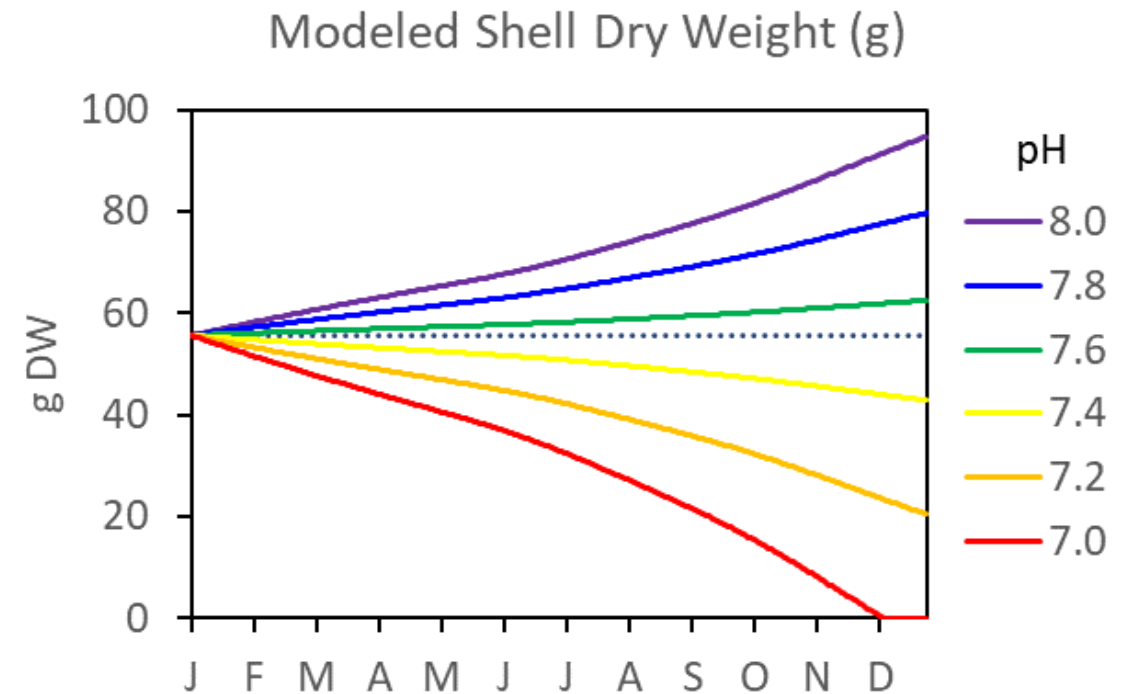
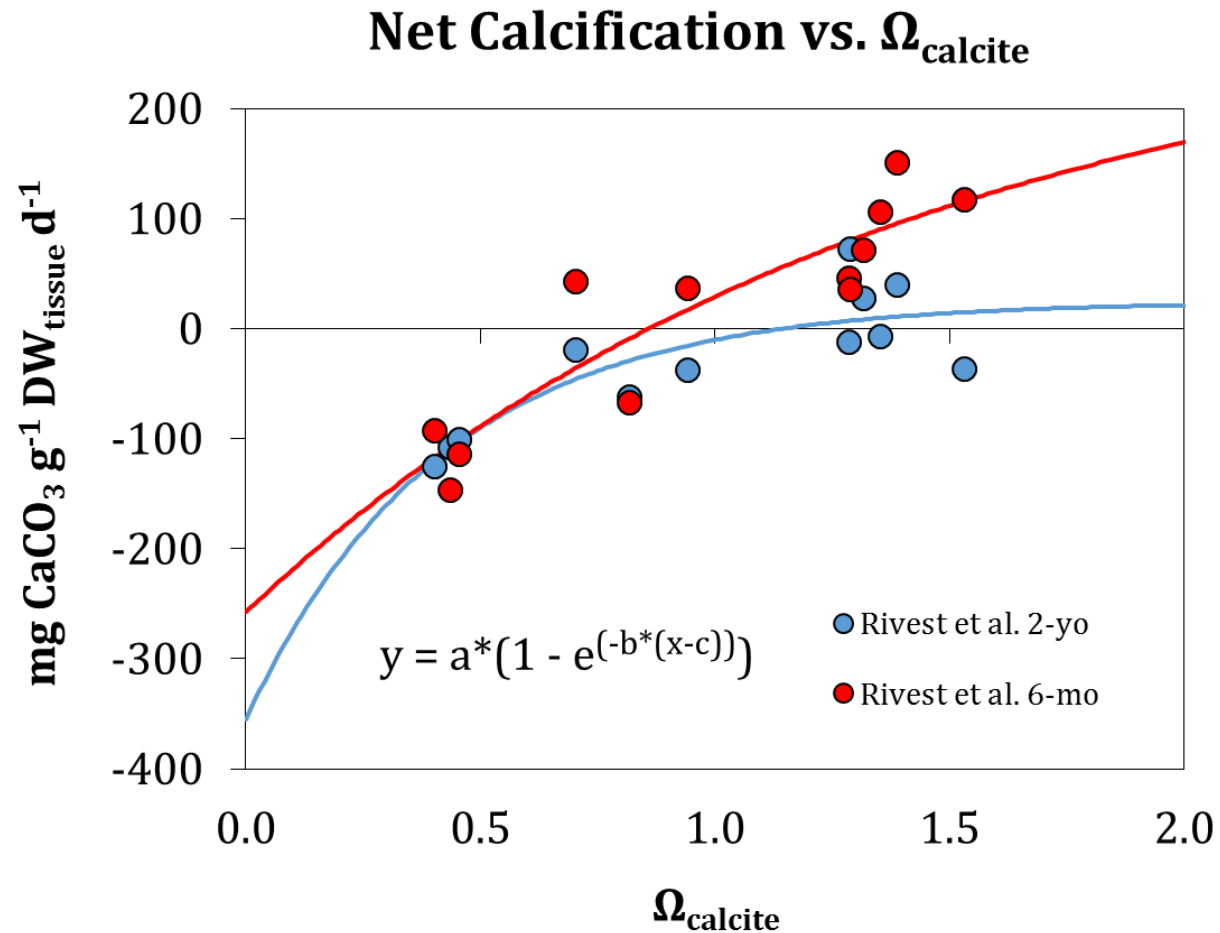
  
University of Maryland  
CENTER FOR ENVIRONMENTAL SCIENCE

# EcoOyster Expansion: NOAA OA Thresholds Project



Pls: E. Rivest, M. Brush,  
R. Zimmerman, V. Hill

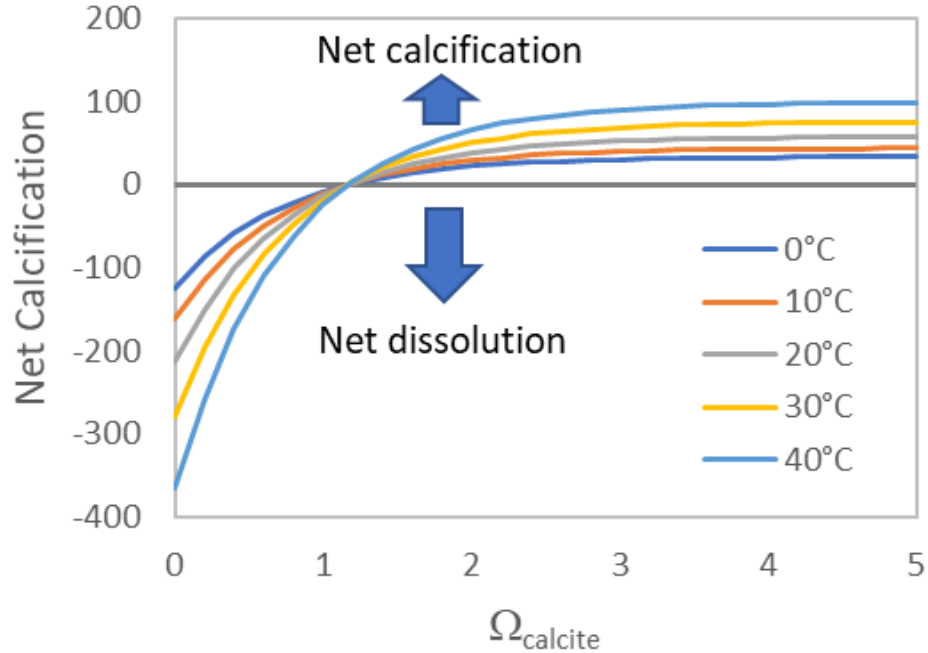
# EcoOyster Expansion: Calcification



*S. Blachman;  
Rivest data*

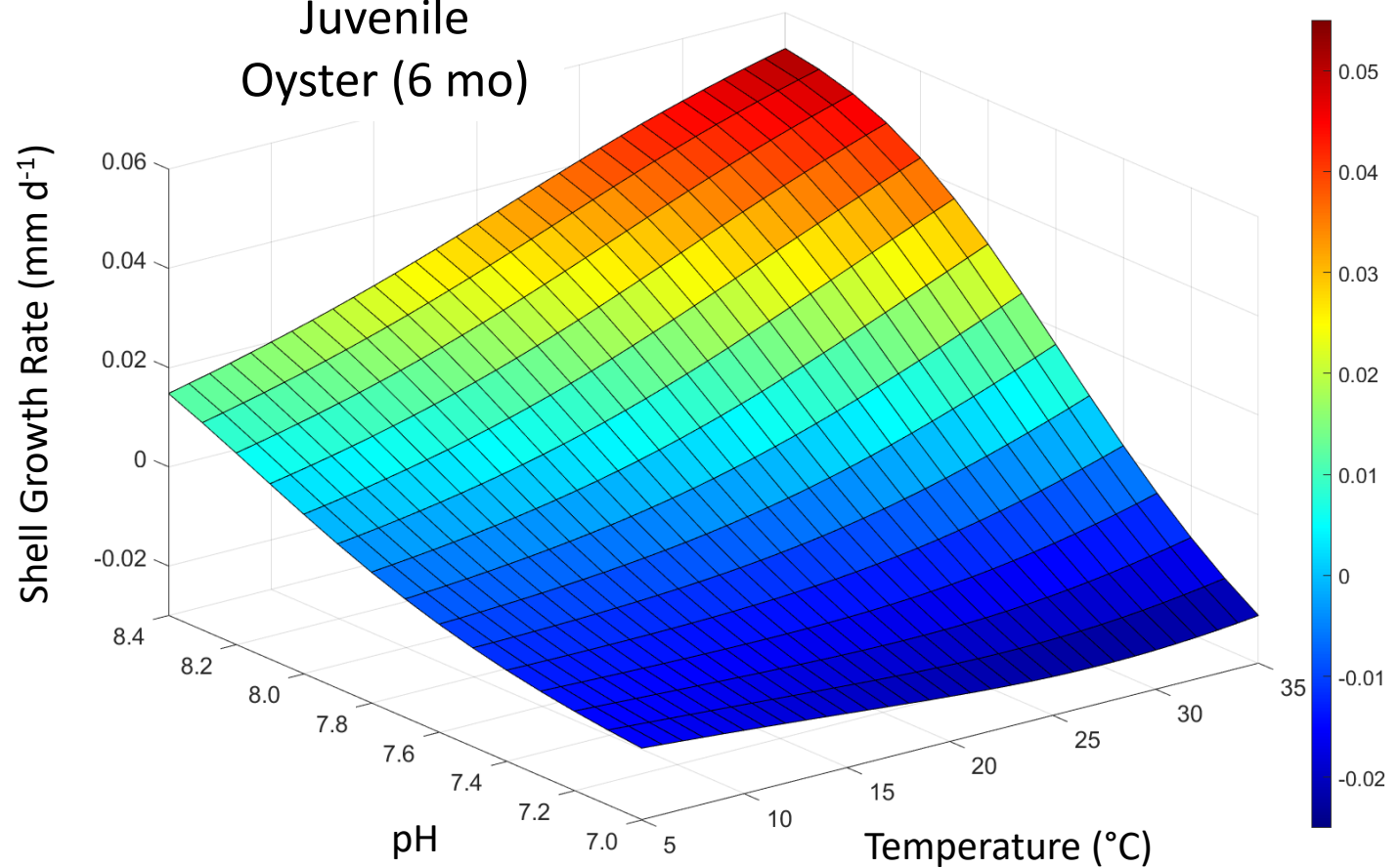
## *EcoOyster* Expansion: Calcification

Adding a Temperature Function



## *EcoOyster* Simulation of Thresholds

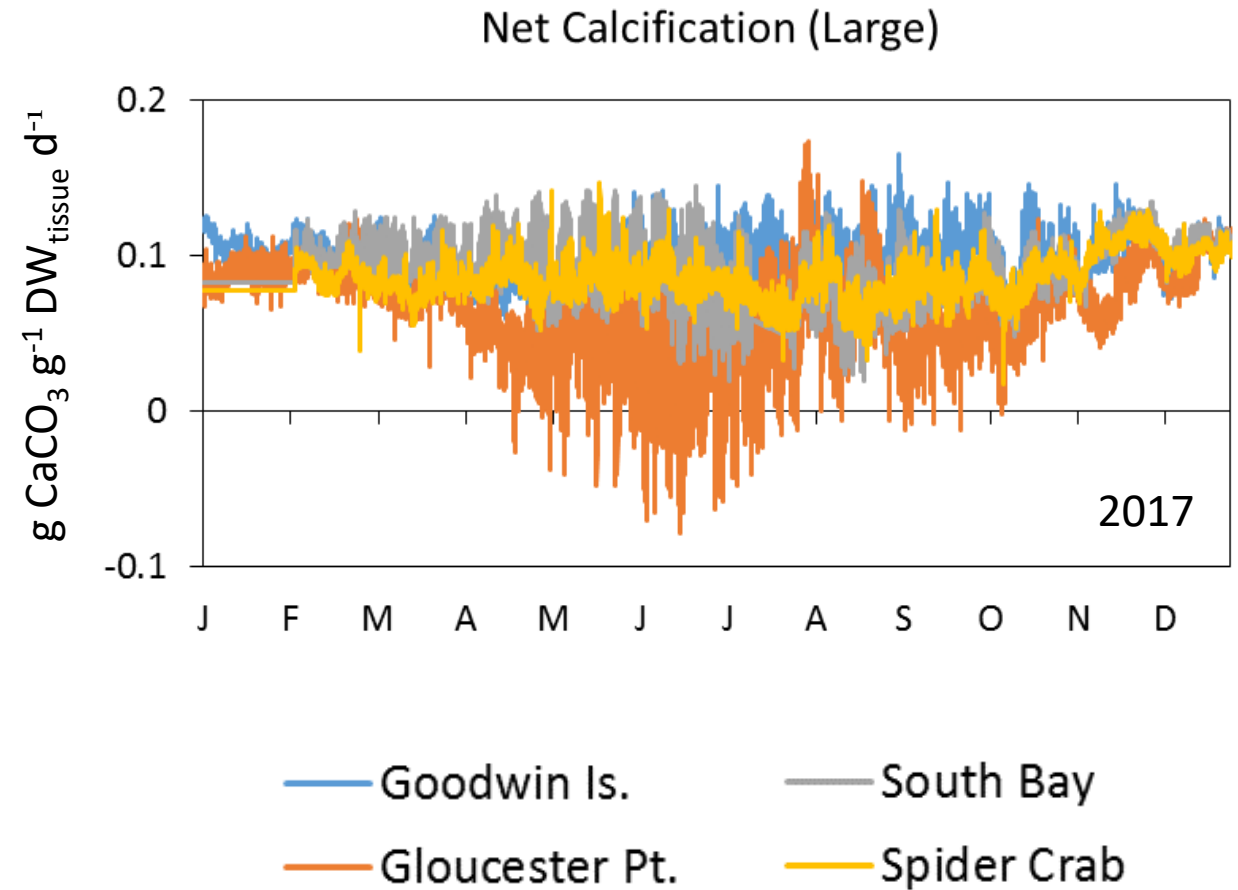
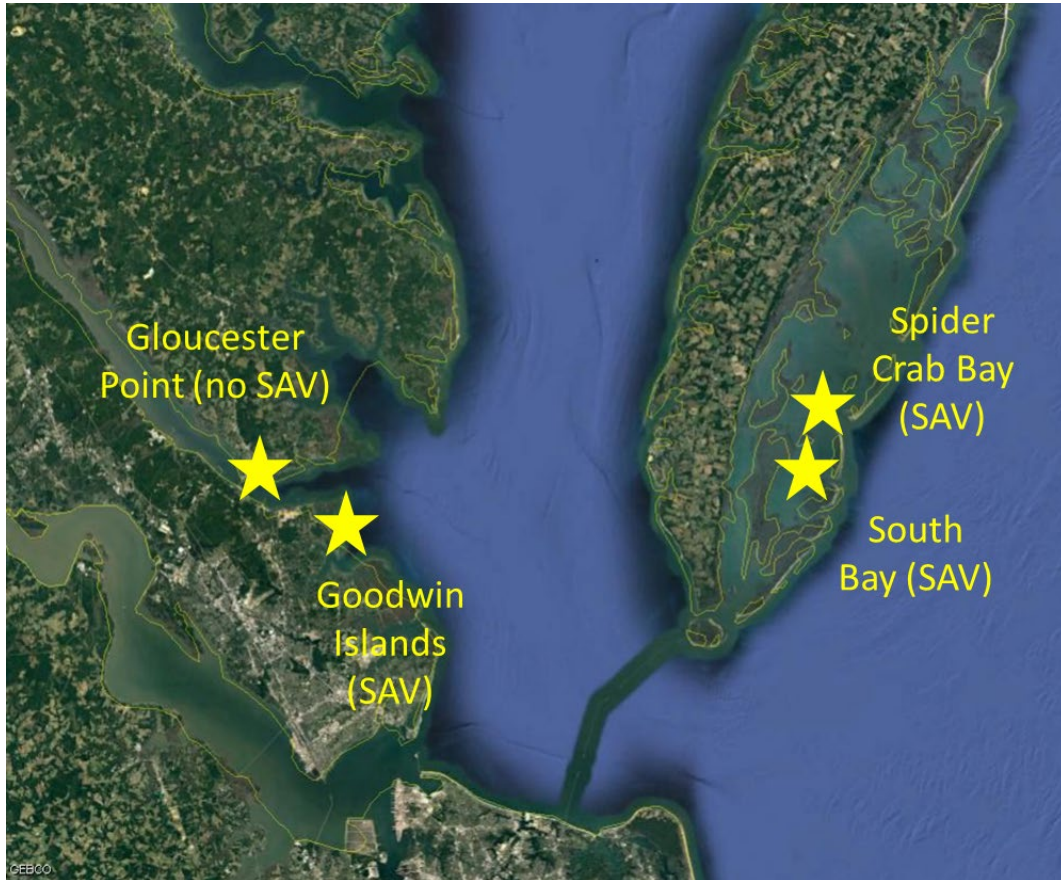
Juvenile  
Oyster (6 mo)



*S. Blachman*

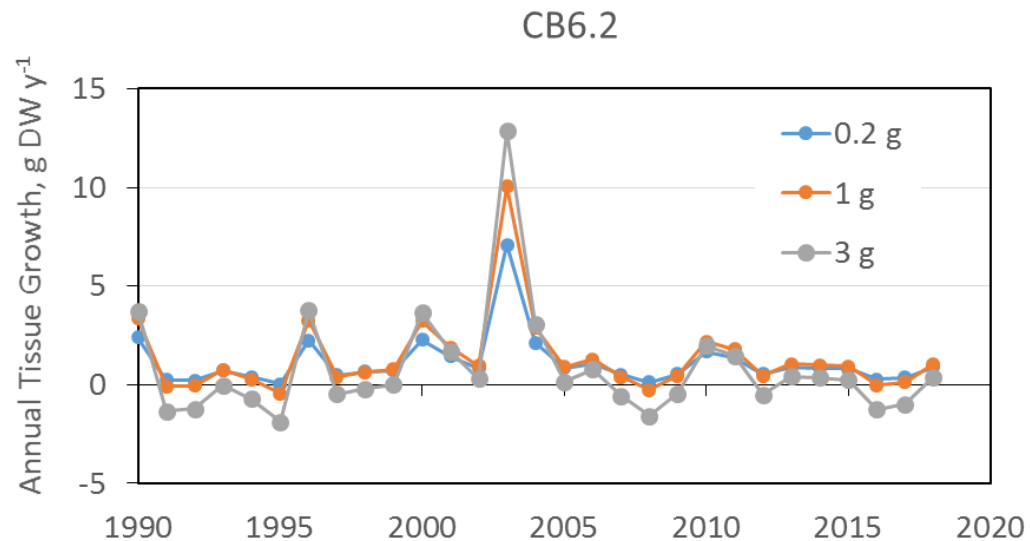


## *EcoOyster* Application to Bay Time Series



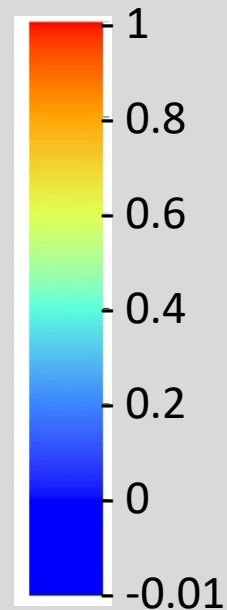
# EcoOyster Application: Baywide Analysis

- 96 CBP monitoring stations
- *EcoOyster* forced with:
  - Annual average cycles
  - 1990-2018 time series

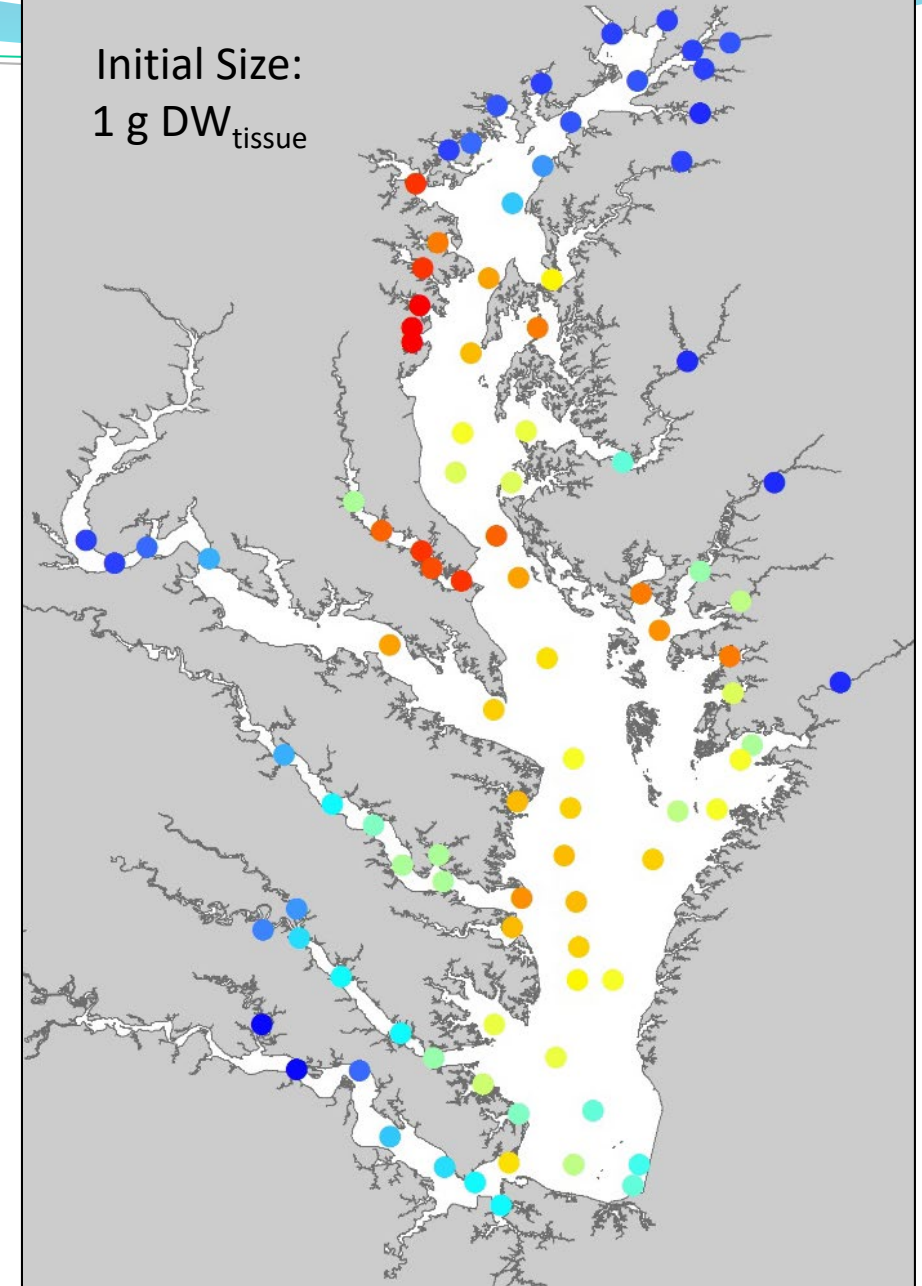


W&M Students:  
S. Chirico, M.  
Polito, & K. Sears

Relative  
Annual Tissue  
Growth Rates



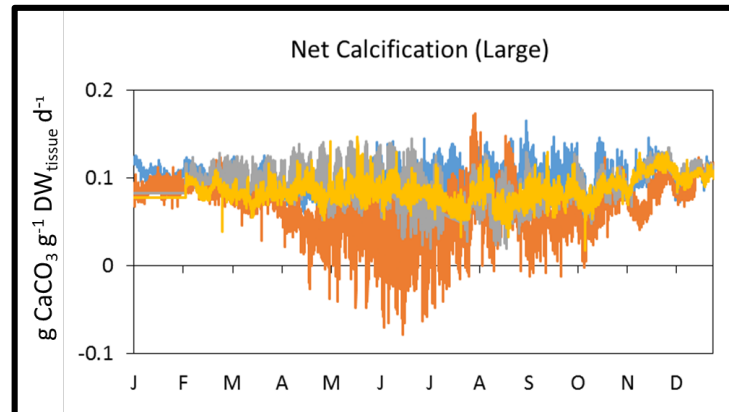
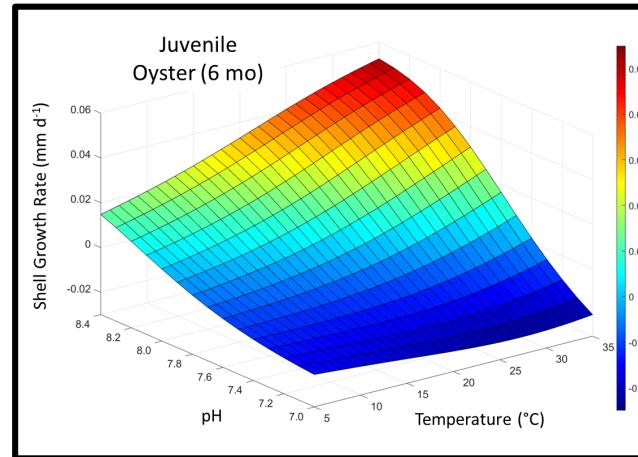
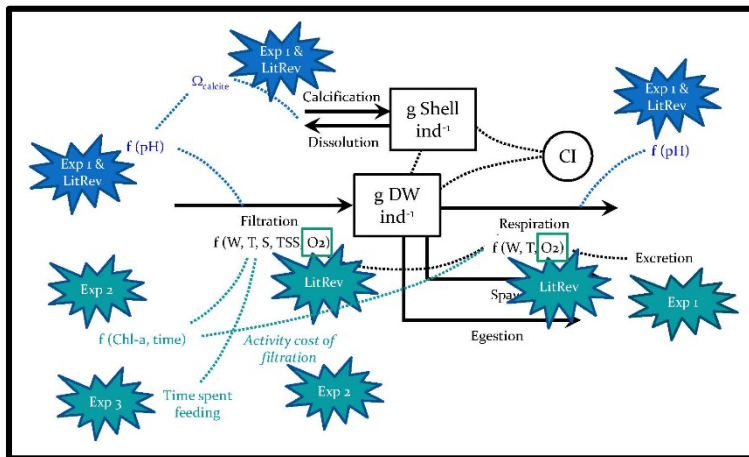
Initial Size:  
1 g DW<sub>tissue</sub>



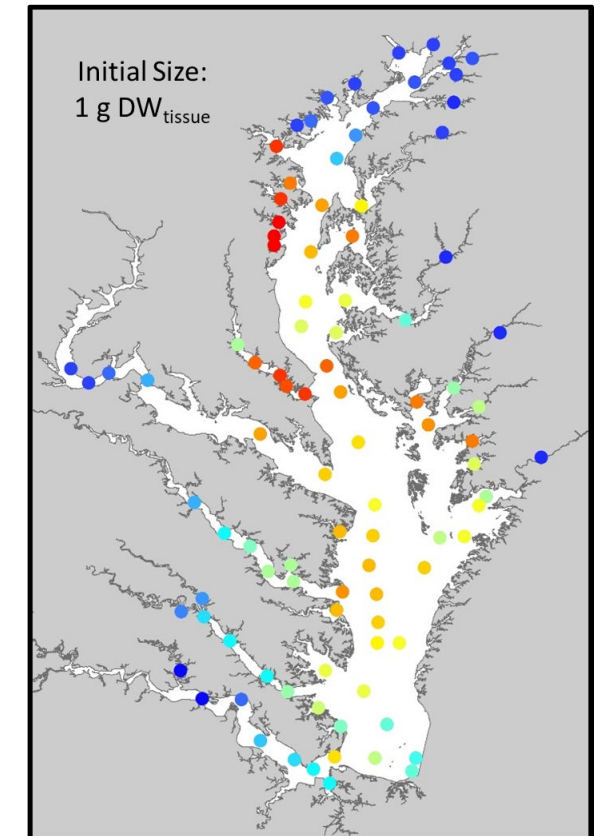


# EcoOyster Ongoing and Future Directions

## 1. Simulation of Multiple Stressors and Identification of OA Thresholds

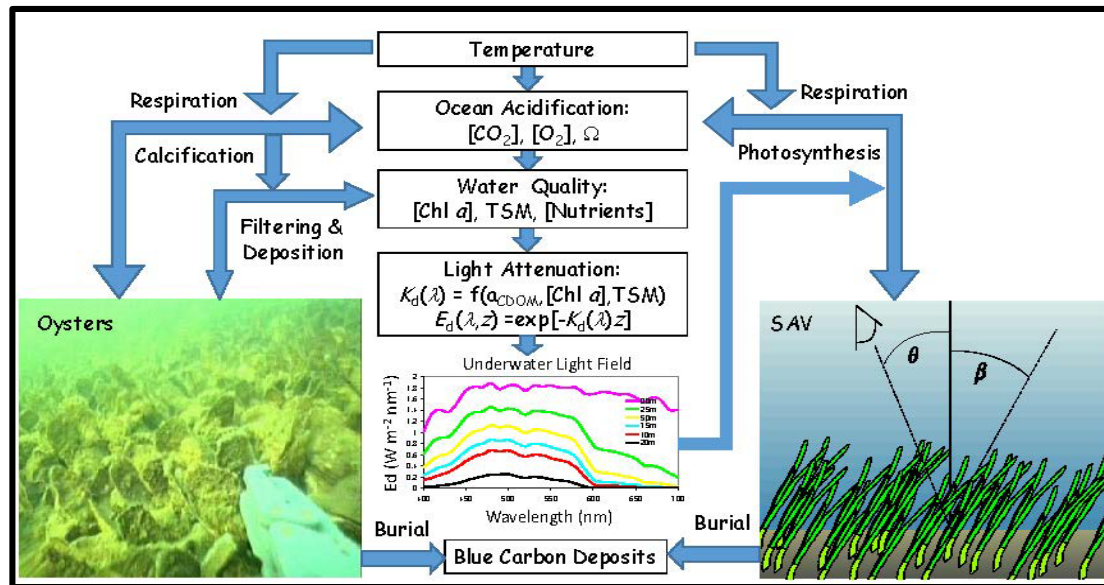


## 2. Calibration of Baywide Rates to Literature Data

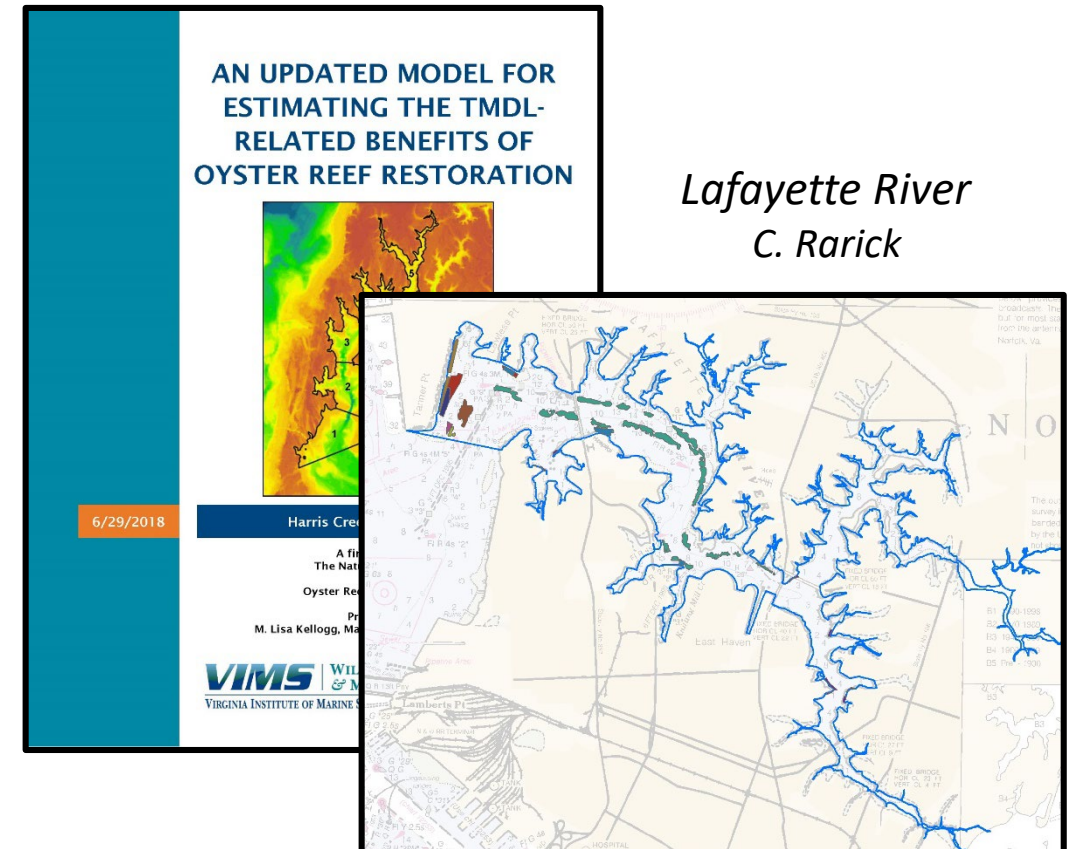


# EcoOyster Ongoing and Future Directions

## 3. Coupling *EcoOyster* to the SAV Model *GrassLight* Potential for Co-Restoration?



## 4. Simulation of Tributary-Scale Restoration Benefits



*Lafayette River*  
C. Rarick