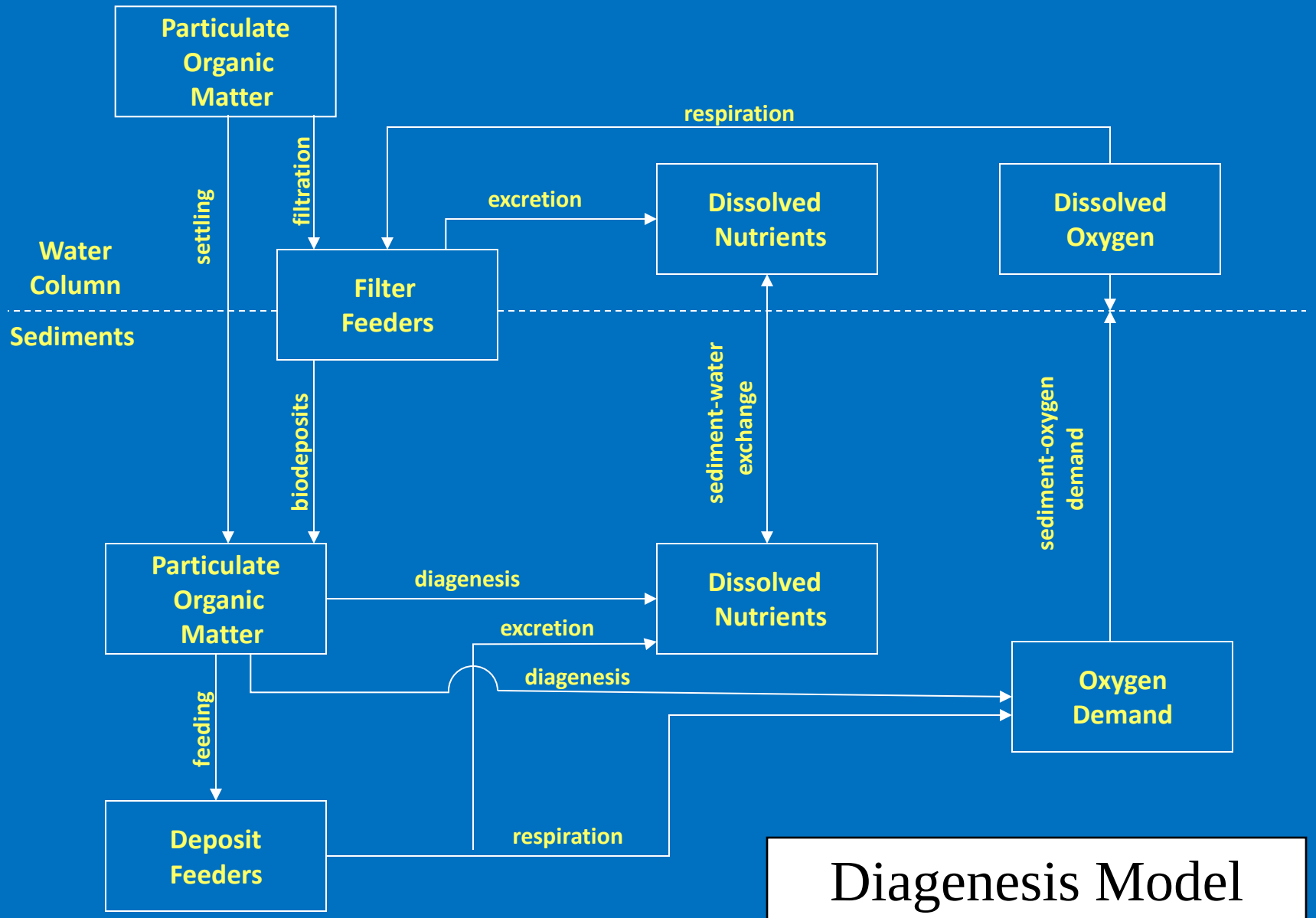
Fundamental Equation

$$\frac{dFF}{dt} = \alpha \cdot Fr \cdot POC \cdot FF - r \cdot FF - \beta \cdot FF^2 - hmr \cdot FF$$

FF = filter feeder biomass (mg C m^{-2})
α = assimilation efficiency ($0 < \alpha < 1$)
Fr = filtration rate (m^3 mg^{-1} filter feeder carbon d^{-1})
POC = particulate organic carbon in overlying water (mg m^{-3})
r = specific respiration rate (d^{-1})
β = predation rate (m^2 mg^{-1} filter feeder C d^{-1})
hmr = mortality rate due to hypoxia (d^{-1})
t = time (d)

- Continuous approach
- No individuals, population dynamics
- Oysters quantified as dry tissue (carbon)

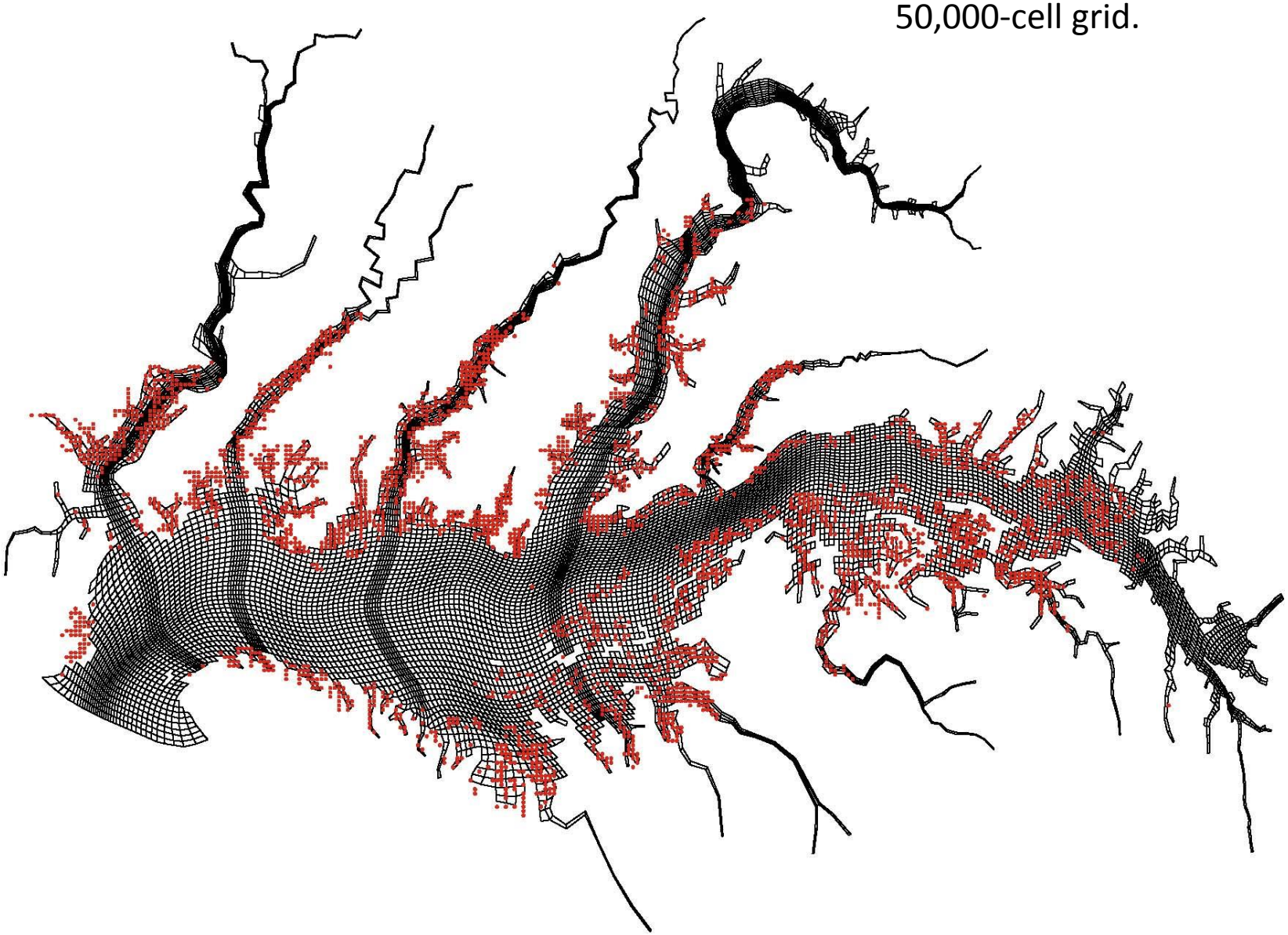


Diagenesis Model with Benthos

For the 50,000-cell Grid

- Information on oyster distribution and biomass came from the *ariakensis* study.
- Oyster bars were mapped to grid by CBP GIS team.
- I am not certain how biomass was obtained or for what period.
- Much of this information is lost due to personnel changes, equipment updates, and passage of time.

Locations of oyster bars superimposed on 50,000-cell grid.



For the 50,000-cell Grid

- Oysters are operational on the 50,000-cell grid.
- Prior to 2010, oysters were reasonably calibrated based on information at hand.
- Oysters played no role in the TMDL.
- It's not clear how location and biomass would compare to latest information, if any.

Looking Ahead

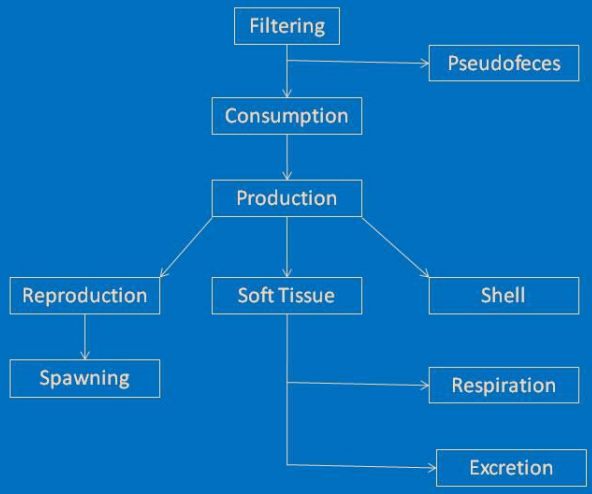
- Aquaculture has a much larger role now than in the past. And the role is increasing all the time.
- Oyster sanctuaries have been established.
- The biomass and location are likely different than determined for the 2005 and 2010 studies.

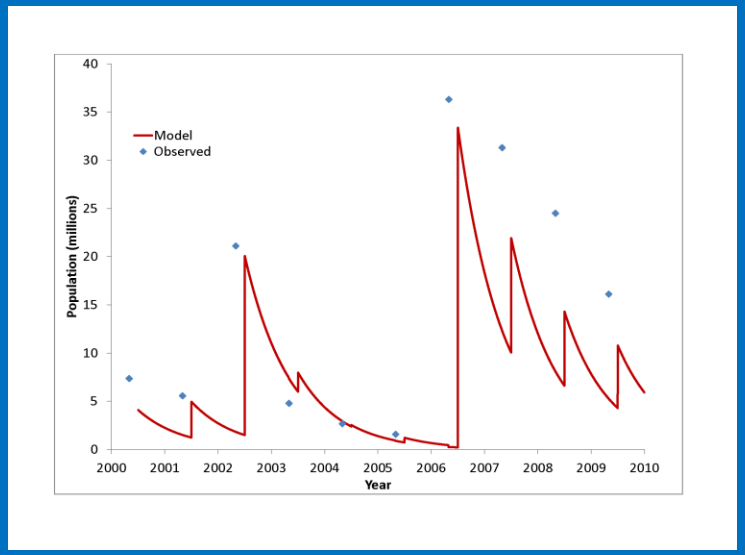
What do We Need?

- Current information on active reef locations.
- Location of designated oyster sanctuaries.
- Biomass estimates, reefs and sanctuaries.
- Aquaculture
  - Location and extent of aquaculture facilities.
  - Information on aquaculture practices.
  - Data on biomass and harvest.

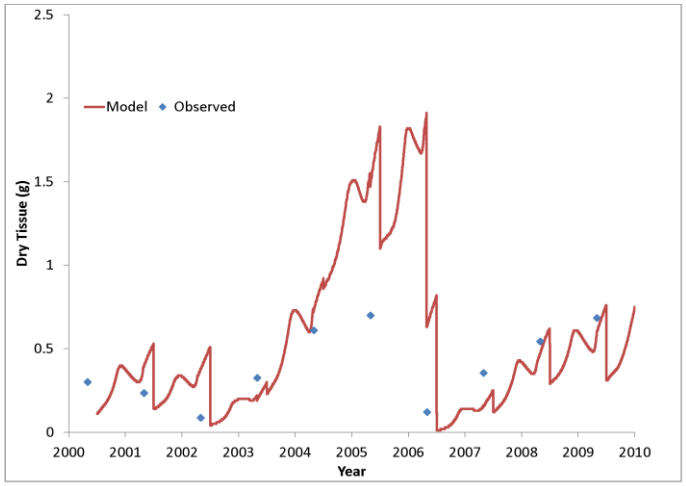
Model Revisions

- Are any necessary to account for aquaculture practices?
- Are any desirable to account for improvements since initial development?





Population



Individual Weight

Oyster Bioenergetics Model of Great Wicomico River