

# EXTENSION OF THE WQSTM TO 2011 AND SHALLOW WATER ASSESSMENT PLANS

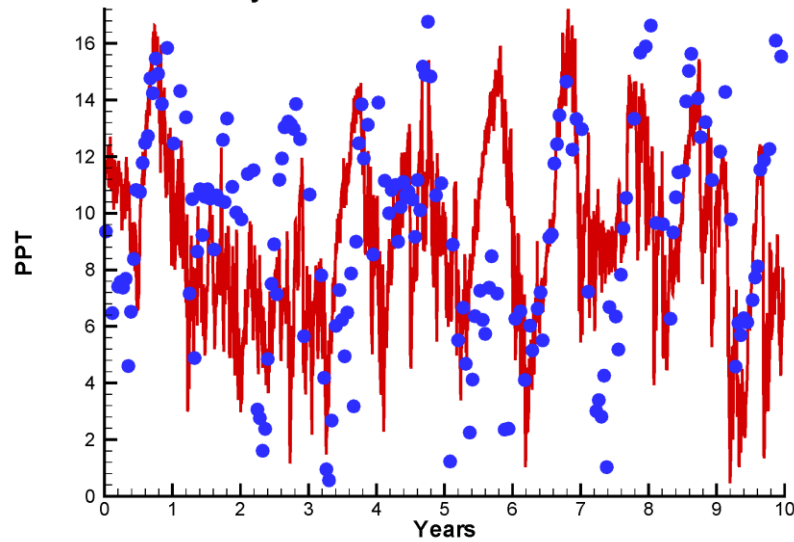
# Planned Activities

	FY 2013 Calendar 2013	FY 2014 Calendar 2014	FY 2015 Calendar 2015	FY 2016 Calendar 2016
1. Extend Present Simulation through 2011 EPA completes hydrodynamics and watershed modeling Estimate shoreline erosion Create model input decks ERDC conducts water quality modeling Resuspension of POC, PON, POP. Requires modification of sediment diagenesis model. Model validation and comparison to previous results				
	Calendar 2013	Calendar 2014	Calendar 2015	Calendar 2016
5. Wetlands and Shallow Water Component Reconsider SAV model Compare shallow-water data with WQSTM through 2011 Empirical or simplified models of wetland processes Beach and shoreline Processes Shoreline erosion Revisit waves in small creeks? Interface with LRR model, bay model				
	Calendar 2013	Calendar 2014	Calendar 2015	Calendar 2016
6. Mid-Point 2017 Assessment Delivery of Phase 6 WSM				

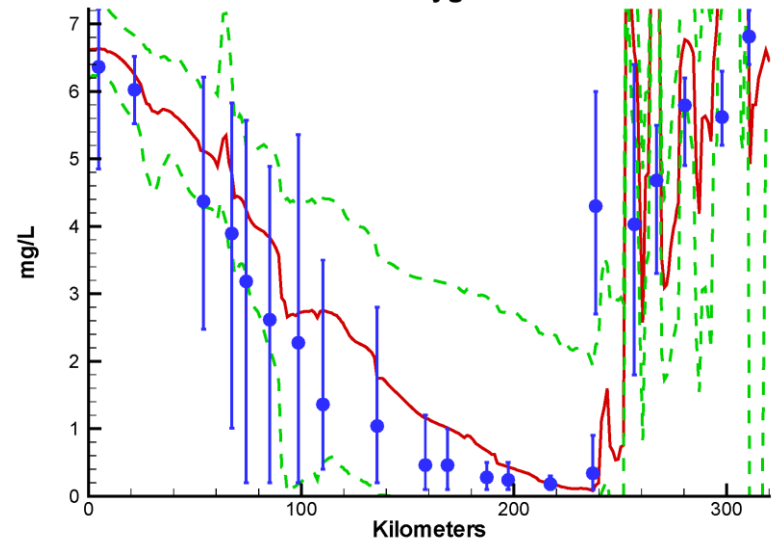
# CBP Activities

- Hydrodynamics
  - Hydrodynamics completed for 2002 – 2011 based on new Watershed Model application
  - Accompanying bottom-shear stress file
  - Received and tested by ERDC

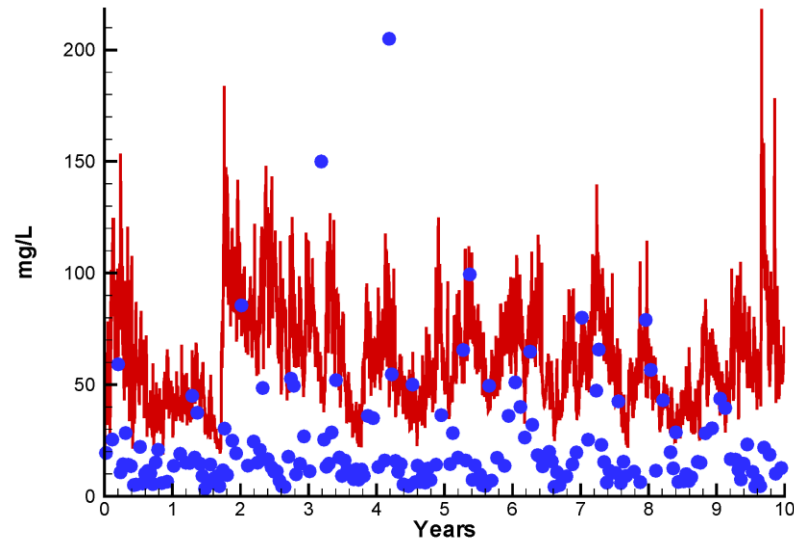
**R426 2002-2011  
Salinity CB3.3C Surface**



**Mainstem Bay R426 2002-2011  
Bottom Dissolved Oxygen Summer 1999**



**R426 2002-2011  
Total Solids CB3.3C Bottom**



- Quick check on hydrodynamics
- Substitute new files into existing 1991 – 2000 simulation.
- They work, reproduce bottom-water hypoxia.
- Need to check shear-stress files.

# CBP Activities

- Watershed Model
  - 2002 – 2011 watershed loads provided to ERDC.
  - 2002 – 2011 point-source loads provided to ERDC.
- Atmospheric Deposition
  - Annual total nitrogen, total phosphorus loads to water surface provided to ERDC.
  - Need to be partitioned into fractions, time sequence.

# CBP Activities

- Meteorological Files
  - WQM met files for 2006 – 2012 provided to ERDC.
  - Based on same information as met files for hydrodynamic model.

# ERDC Responsibilities

- Shoreline Erosion
  - Need to compute daily bank erosion based on wave energy, water level.
  - We haven't done this in a long time.
  - Will require info on wind-waves created for bottom shear-stress computation.
- Process WSM outputs in WQM input files
  - Should be a routine process.

# ERDC Responsibilities

- Open-Mouth Boundary Conditions
  - Haven't done this in a while but should present no problems.
- Prepare Data for Calibration and Verification
  - We have downloaded data through 2011 from CBP.
  - Laborious process.
- Other Data e.g. SAV, SONE, PriPro
  - We have assembled the data but not processed for model employment.

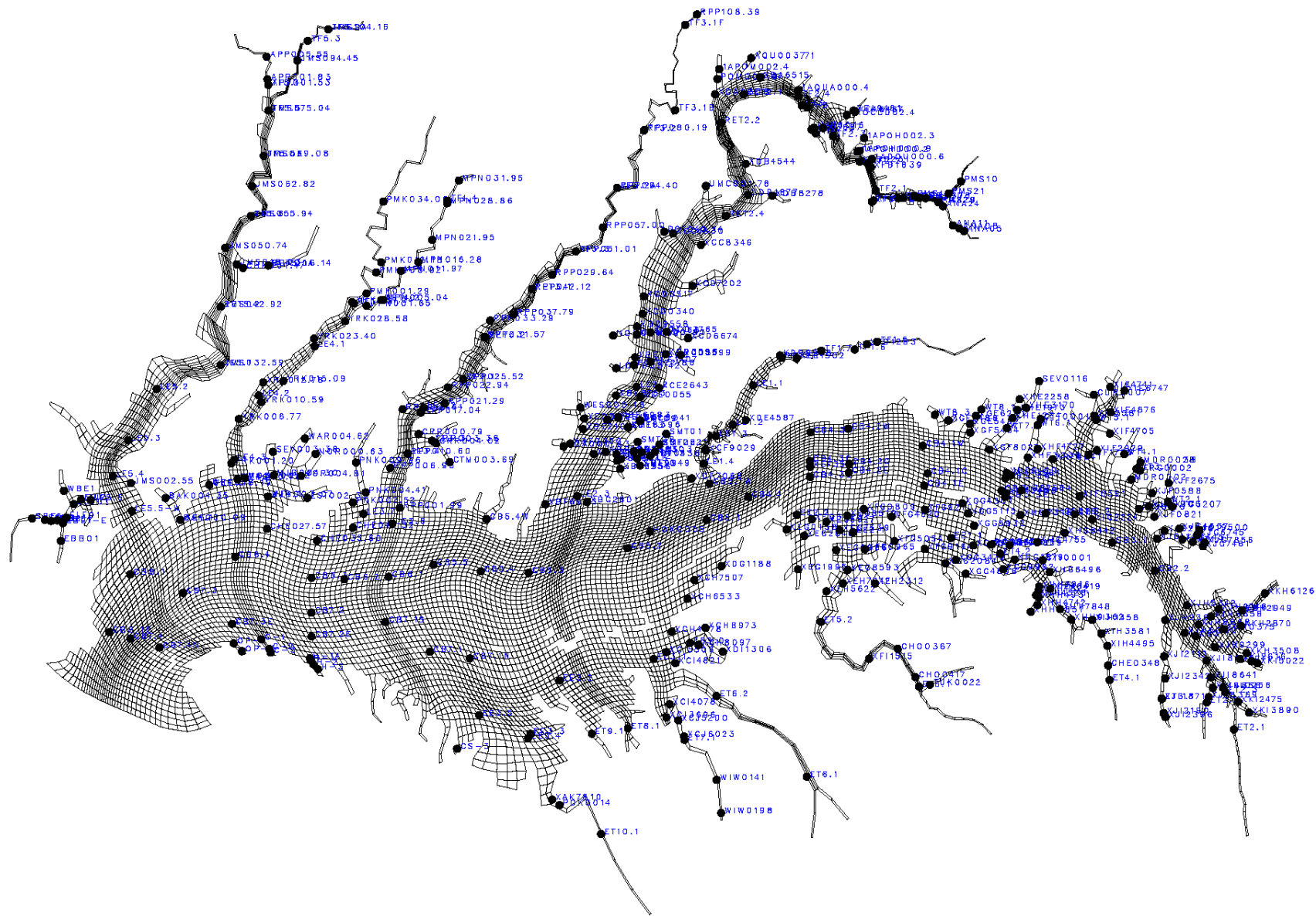


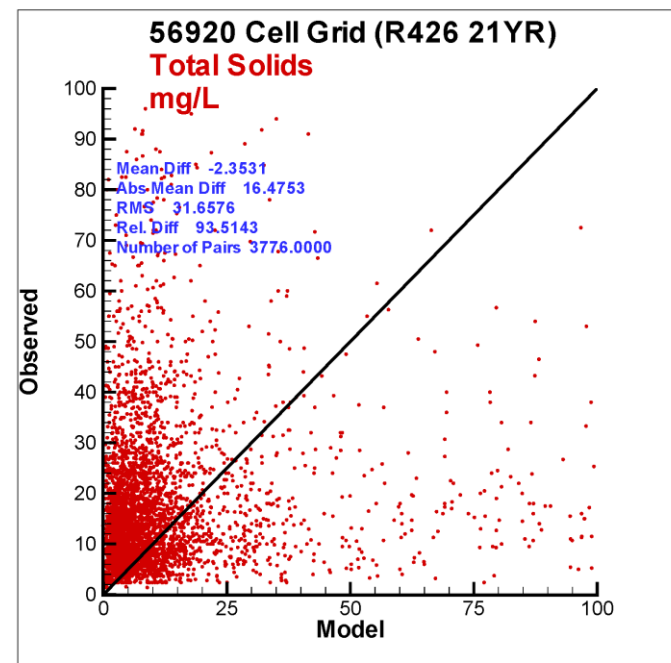
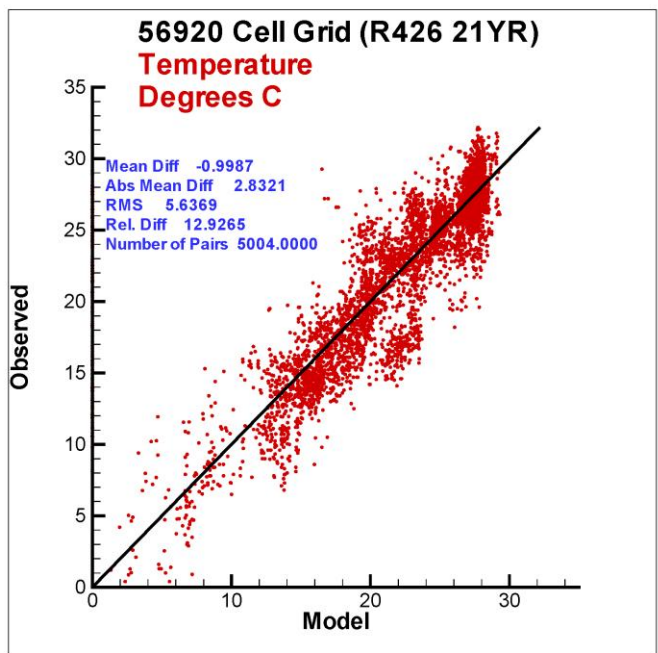
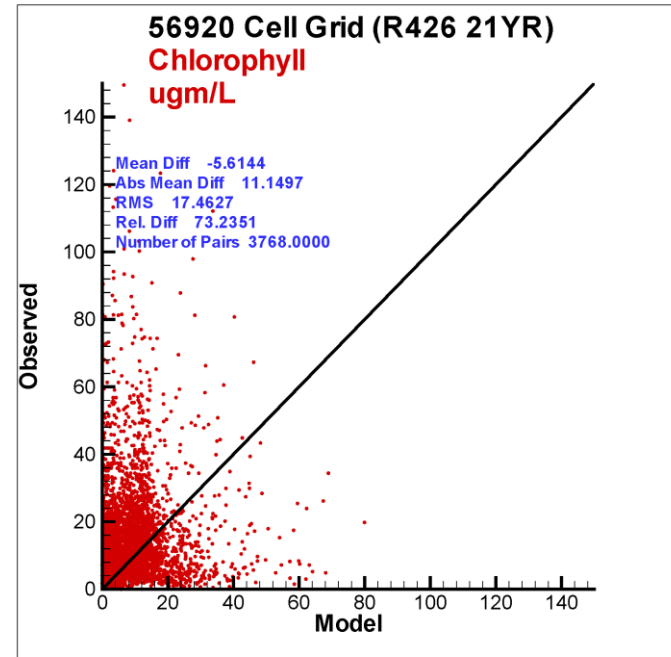
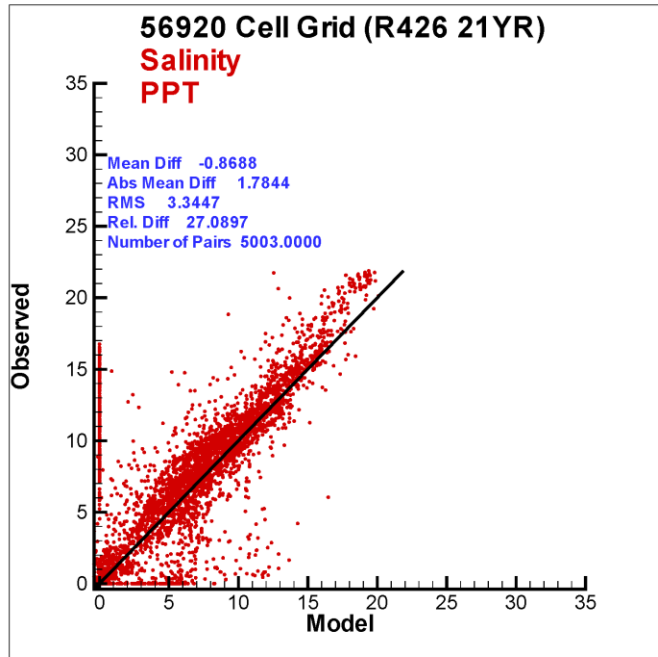
# Shallow-Water Monitoring Program

- Program commenced circa 2001.
- Most observations post 2005.
- The shallow-water data found limited use in the previous phase of Chesapeake Bay modeling.
- This phase plans full examination of the data and employment to the greatest extent possible.

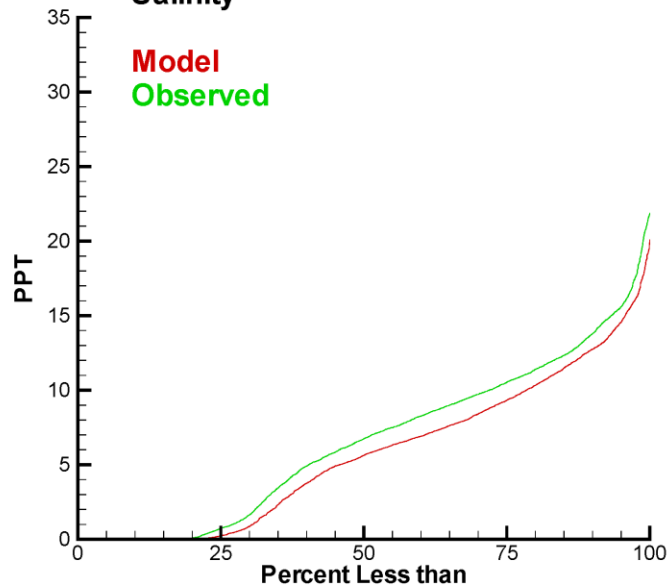
# Shallow-Water Monitoring Program

- Three classes of observations
  - Grab samples.
  - Continuous monitoring at fixed station.
  - Continuous monitoring from moving vessel.
- The database of grab samples provided by CBP to ERDC
  - Cleaned up and mapped to model grid.
  - Observations extend from 2003 to 2011.
  - Initial comparison to our 1985 – 2005 simulation.

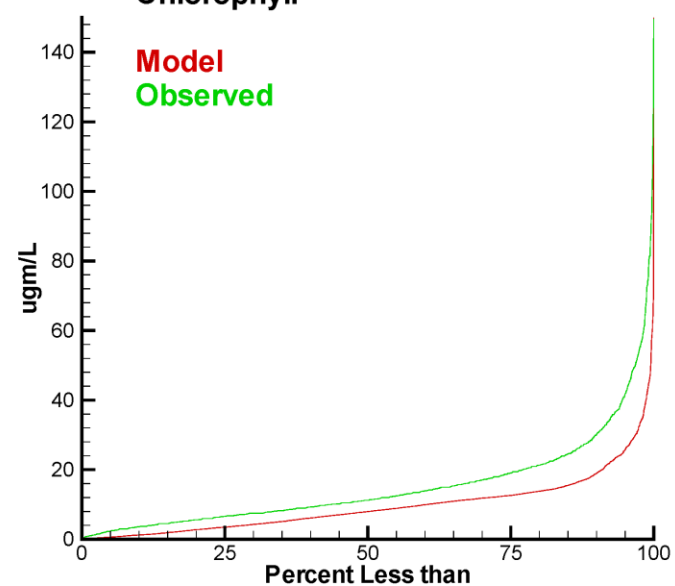




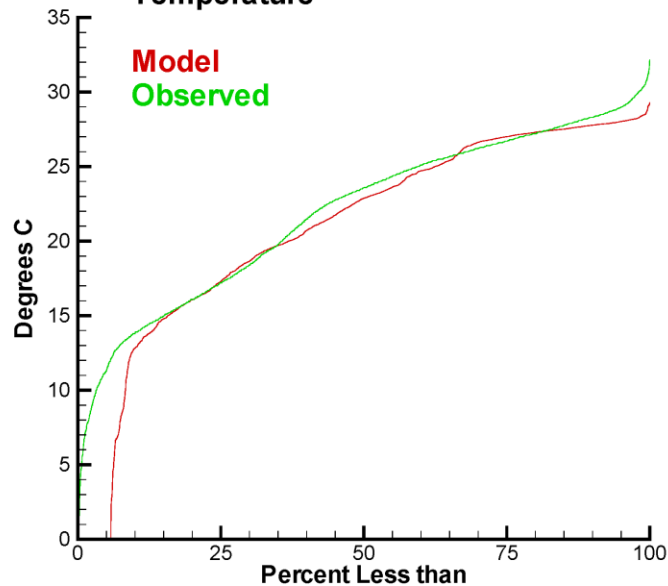
56920 Cell Grid (R426 21YR)  
Salinity



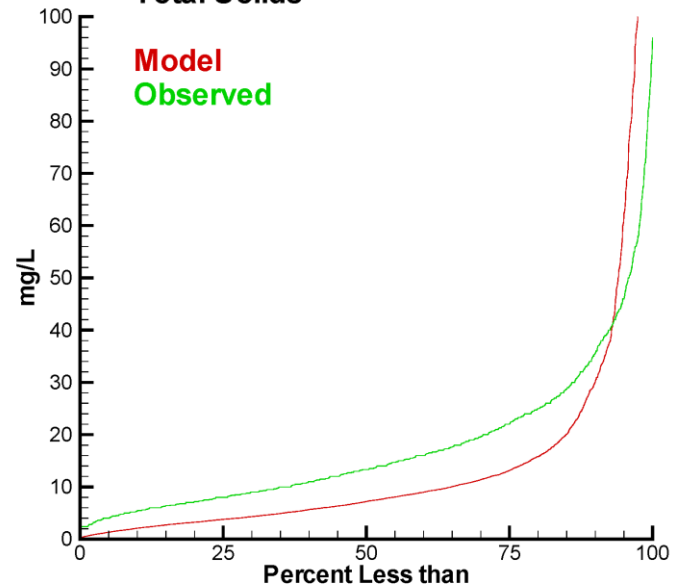
56920 Cell Grid (R426 21YR)  
Chlorophyll



56920 Cell Grid (R426 21YR)  
Temperature



56920 Cell Grid (R426 21YR)  
Total Solids



# Future Activities

- Improving Understanding and Simulation of Shallow Water Processes in Chesapeake Bay
  - Larry Sanford, UMCES.
  - Improved estimates of shoreline erosion loads.
  - Physical processes in Susquehanna Flats.
  - Towards development of a shallow-water ribbon model
    - One or two workshops on modeling shallow-water processes