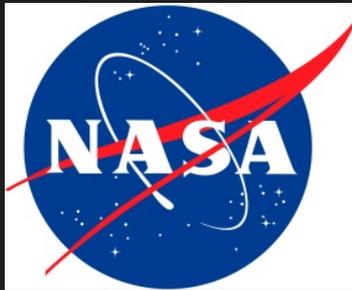


TESTING THE WATERS: REMOTE SENSING APPLICATIONS TO WATER QUALITY MANAGEMENT IN FLORIDA

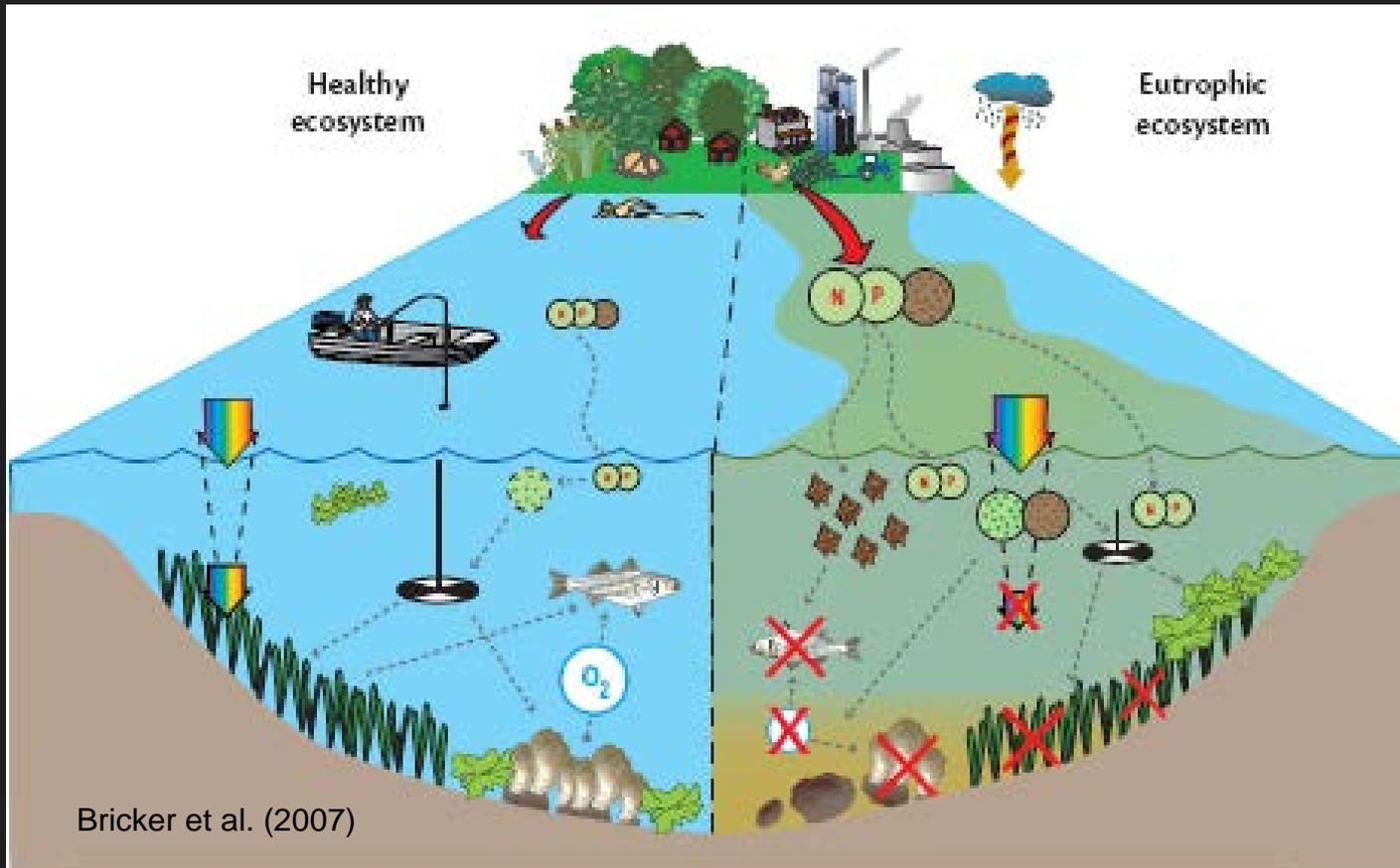
John Lehrter

NASA Water Resources Meeting, Mar 3-4, 2015



Conceptual Model

How can NASA remote sensing imagery be used to inform water quality decisions?



Two Decision-Making Activities

1. Nutrient Criteria Development in Florida under the Clean Water Act
2. Marine Spatial Planning
 - Rezoning of the Florida Keys National Marine Sanctuary (FKNMS)
 - Decision-making entity and end-user
 - FKNMS

Project Approach

- Geographic scope
 - Florida Coastal Waters
- Earth observations
 - Satellites: MODIS, Landsat, SeaWiFS, MERIS
 - Field observations (IOPs/AOPs)

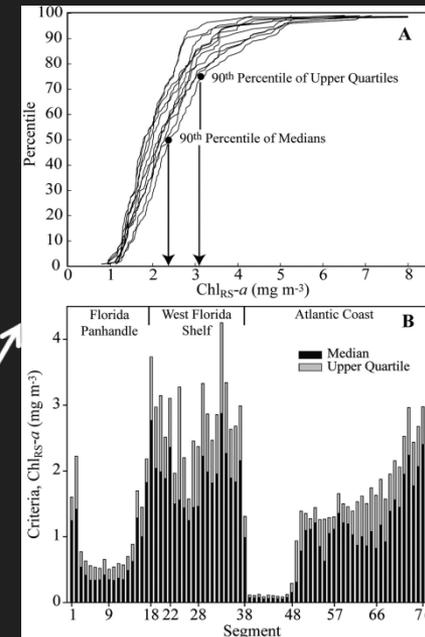
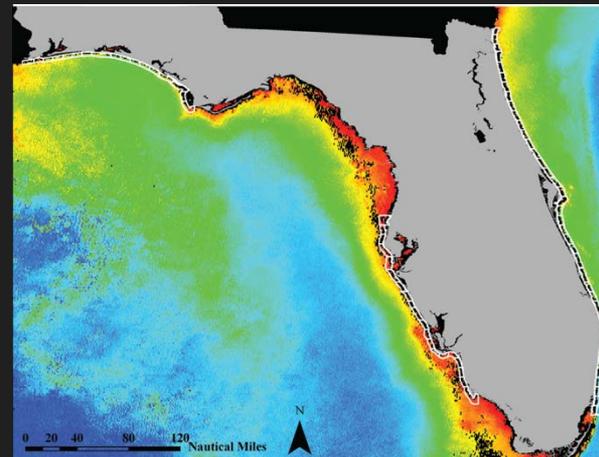
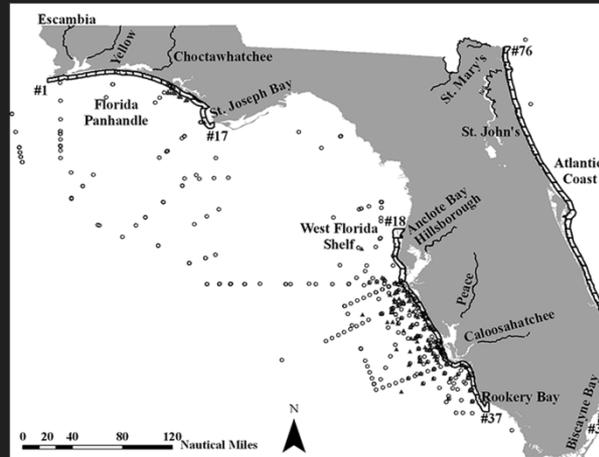
Goal: Develop remotely sensed water quality products and have them be used in the two decision-making activities



Nutrient Criteria Development

Based on our work, Florida implemented nutrient criteria derived using satellite data products

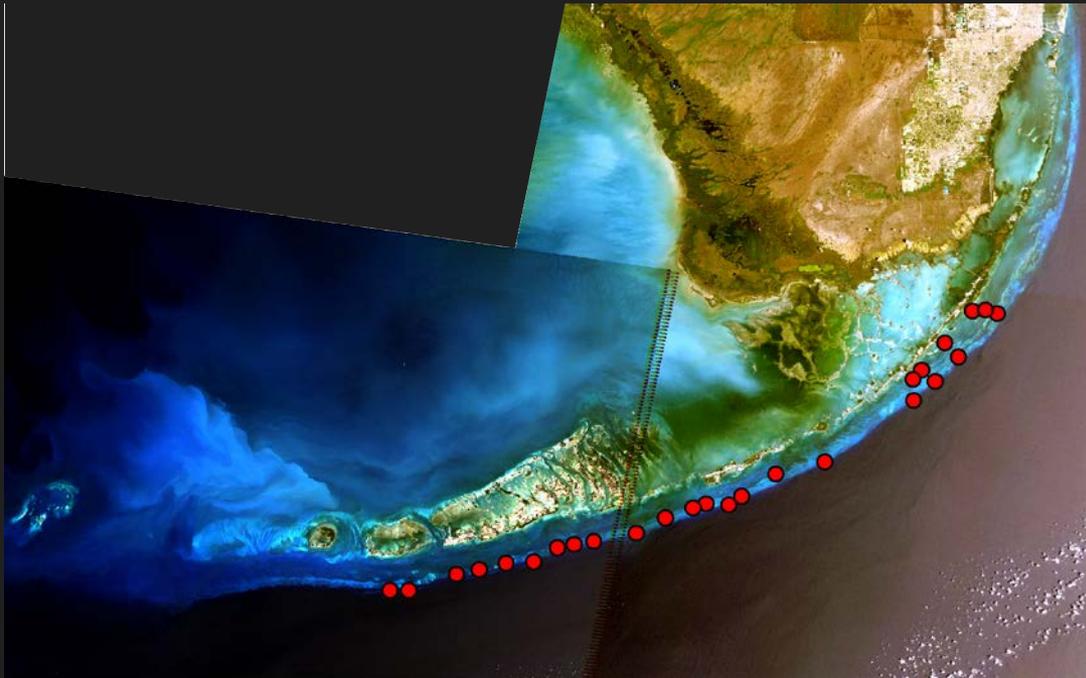
- Nutrient criteria were developed for all of Florida's coastal waters using the satellite data records
- The methods were vetted by the EPA Science Advisory Board and could be used by other coastal states and states with large inland waters where remote sensing can be used reliably.



(Schaeffer et al. 2012; 2013)

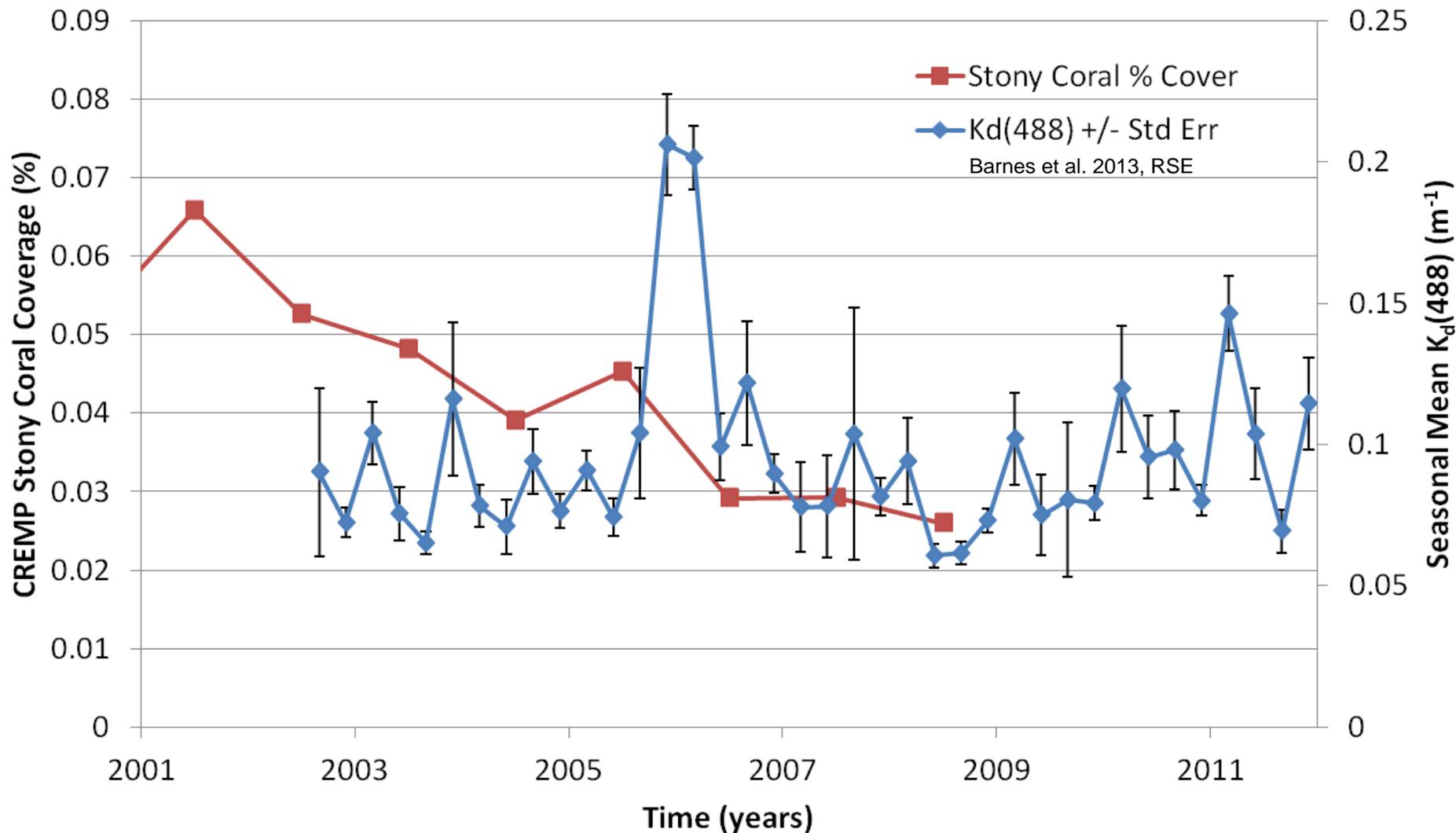
Marine Spatial Planning

- Identified needs by the Florida Keys National Marine Sanctuary (FKNMS)
 - Status, Trends, Episodic Events
 - Florida Bay influences



FKNMS Planning: New Status and Trends Information

Looe Key CREMP Station



Transition Strategy

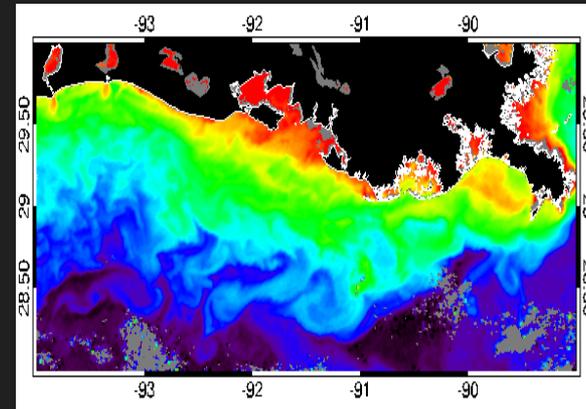
- Defined remote sensing methodologies and processing steps for transitioning to decision-making entities
- Developed tools to reduce software and hardware barriers to the use of remote sensing data
- Identified issues with transitioning to new satellite platforms
- Manuscripts and outreach

Water Quality Analysis Tool (WQAT)

Problem: Water quality decision-making could be improved with ready access to the 30-year satellite data time-series for lakes, reservoirs, and coastal systems

Approach:

- Developed WQAT for simplified access to remote sensing imagery of indicators of nutrient pollution
- Targeted as a niche tool for water quality management of nutrient pollution, water clarity, and suspended sediments



Chlorophyll-a ($\mu\text{g/l}$)

Satellite retrieved phytoplankton biomass (chlorophyll-a) for the Louisiana shelf in the area affected by the Mississippi River

Impact: WQAT is being evaluated as a tool by OW, OST for inclusion in NSTEPS. Pilot efforts are underway to demonstrate the tool at the state level (SC and OR) and nationally using National Lake Assessment data.

Lessons Learned

- The structured rule-making activities under the Clean Water Act provided guidance for the types of data and analyses needed
- The rezoning of the Florida Keys National Marine Sanctuary (FKNMS) is less structured; more nebulous in terms of what is needed

Questions?

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