

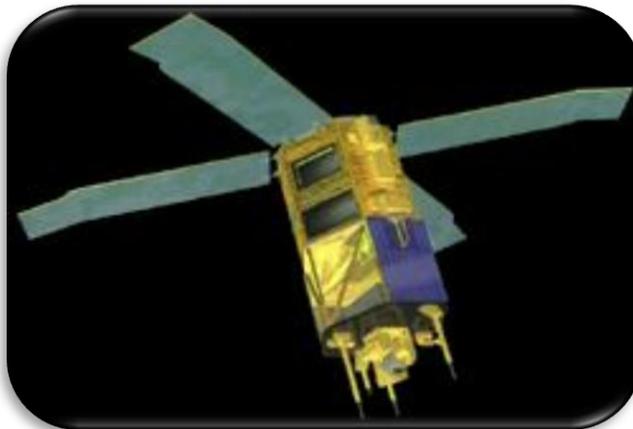
# Chapter 4: Numeric Criteria Development for Florida Coastal Waters



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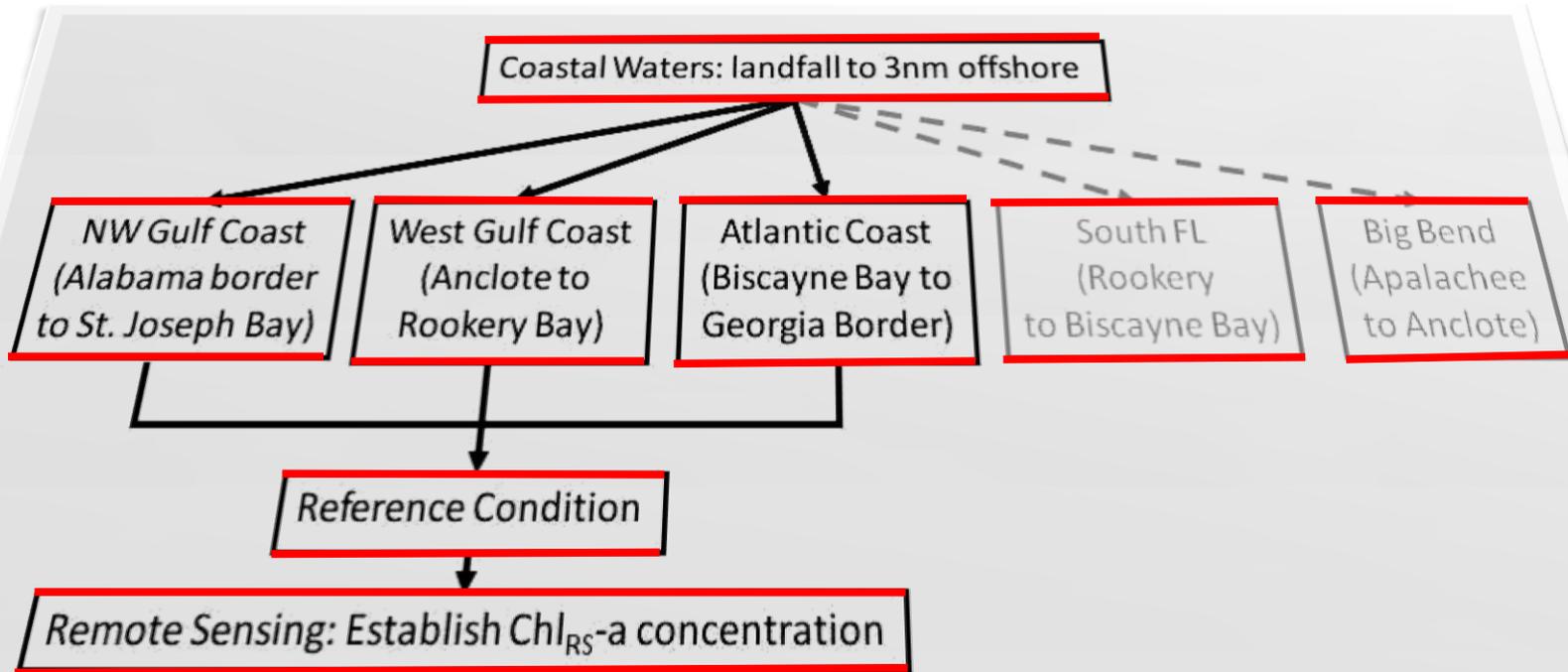
**EPA Science Advisory Board  
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Washington, D.C.**



# Outline

- Conceptual Approach
- Delineation of Coastal Areas
- Remote Sensing Data
- Deriving Criteria
- Technical Issues

# Conceptual Approach

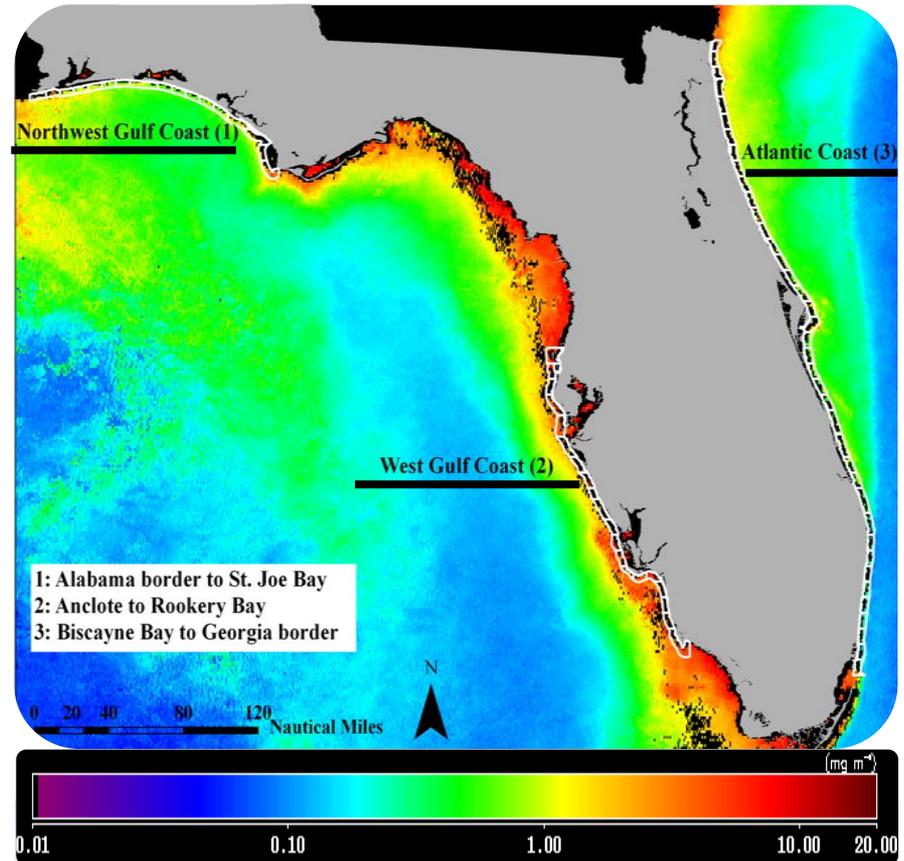


# Conceptual Approach

- Reference condition
  - Water body currently minimally impacted by nutrients and supporting natural populations
- Coastal chlorophyll
  - Independent means to assess coastal waters maintain water quality
  - Segments adjacent to estuary pass typically higher chlorophyll than segments further from pass
- Limited data availability on TN and TP in coastal waters
  - Numeric criteria from estuarine waters will protect coastal waters from anthropogenic TN and TP

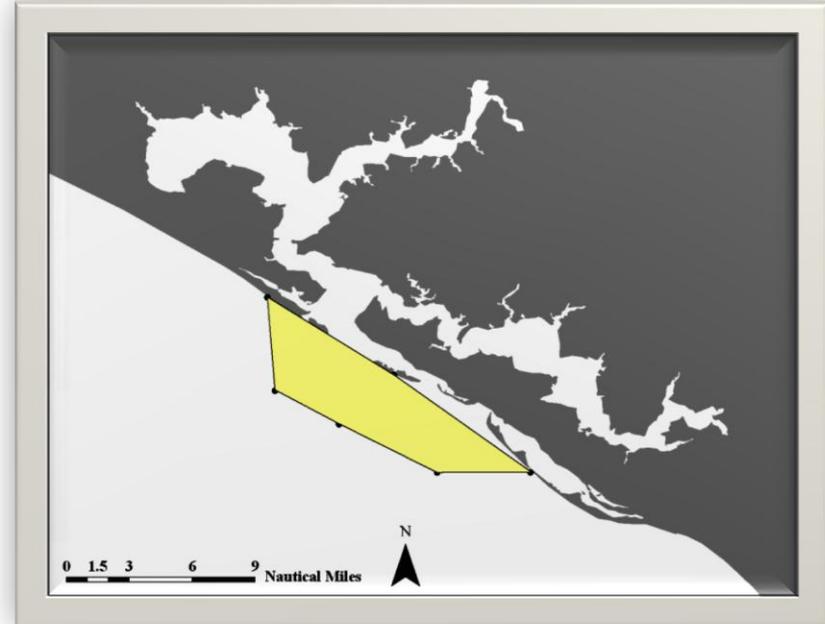
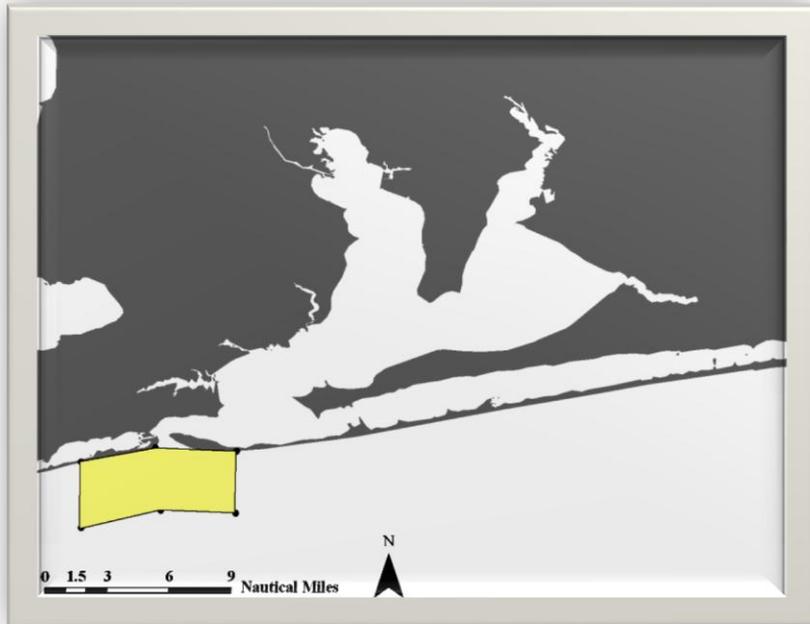
# Delineation of Coastal Areas

- Numeric Chlorophyll Criteria
  - Northwest Gulf Coast
  - West Gulf Coast
  - Atlantic Coast
- FDEP's Water Body Identification Numbers (WBIDs)
  - Start at land
  - Extend seaward 3nm
  - Typically centered at estuary pass
  - Coastal segments



## Delineation of Coastal Areas

- Pensacola Bay
- St. Andrew Bay
- Nassau River

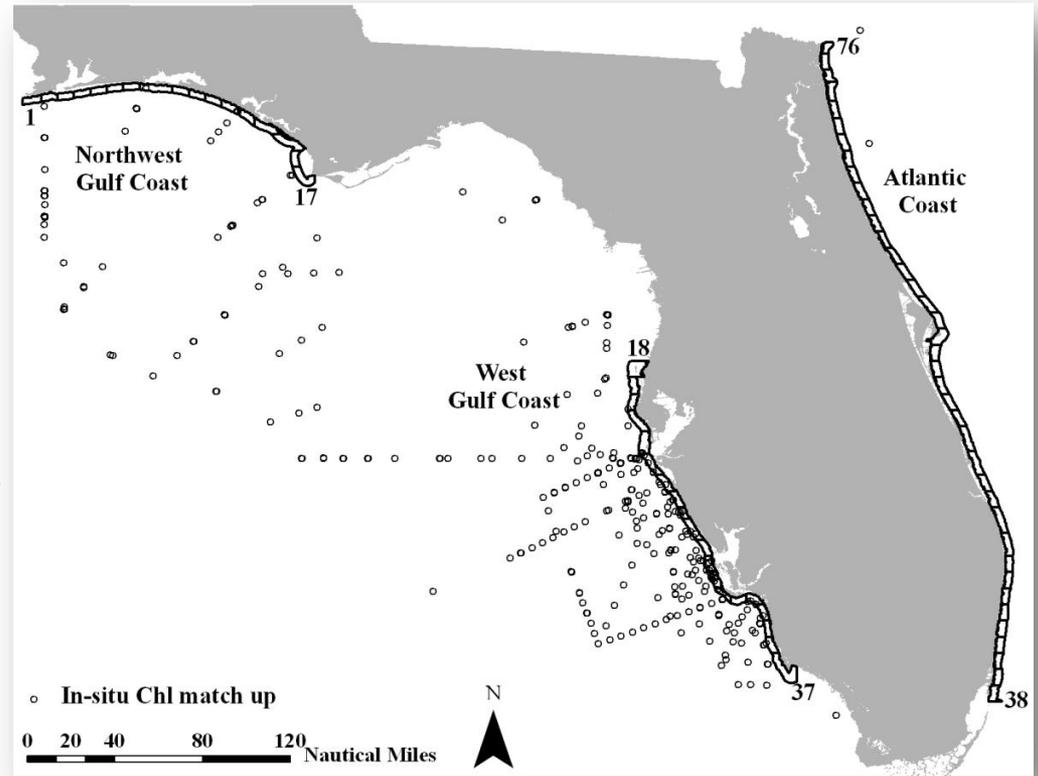


# Remote Sensing Data

- **SeaWiFS**
  - Sept. 1997 through Jan. 1, 2010
- **MODIS**
  - June 2002 through Jan. 1, 2010
- **8-day averages**
  - 40 of the 76 coastal segments each week
- **Data publicly available at NASA Ocean Color Web**
  - <http://oceancolor.gsfc.nasa.gov/>

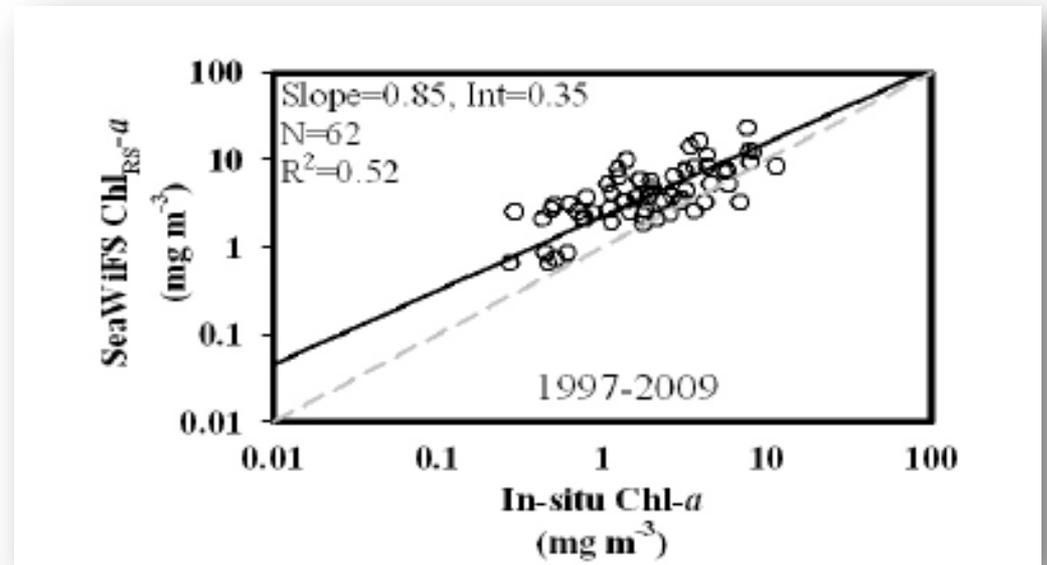
# Deriving Criteria: Satellite Chlorophyll Data Evaluation

- Field observation data
  - NEGOM
  - ECOHAB
  - FWRI
  - Mote Marine Aquarium
  - SeaWiFS SeaBASS
- >5,500 Total field chl-a samples
- ~1,900 QA/QC'd samples
- 692 total match-ups
- 62 match-ups in 3nm



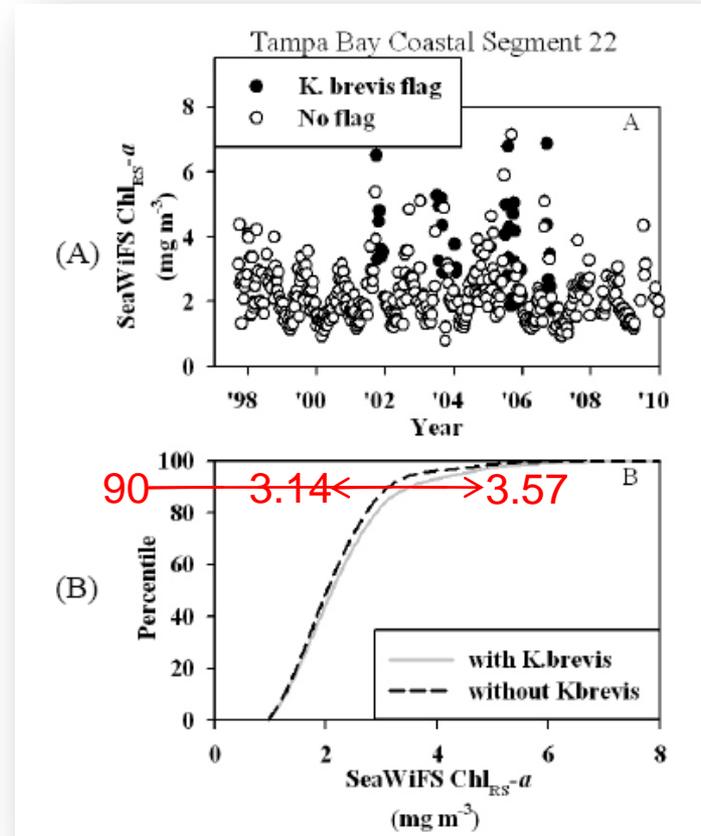
# Deriving Criteria: Satellite Chlorophyll Data Evaluation

- The  $\text{Chl}_{\text{RS-a}}$  data
  - Paired with 62 field observations
  - 3 nm boundary
- Equation applied as a correction



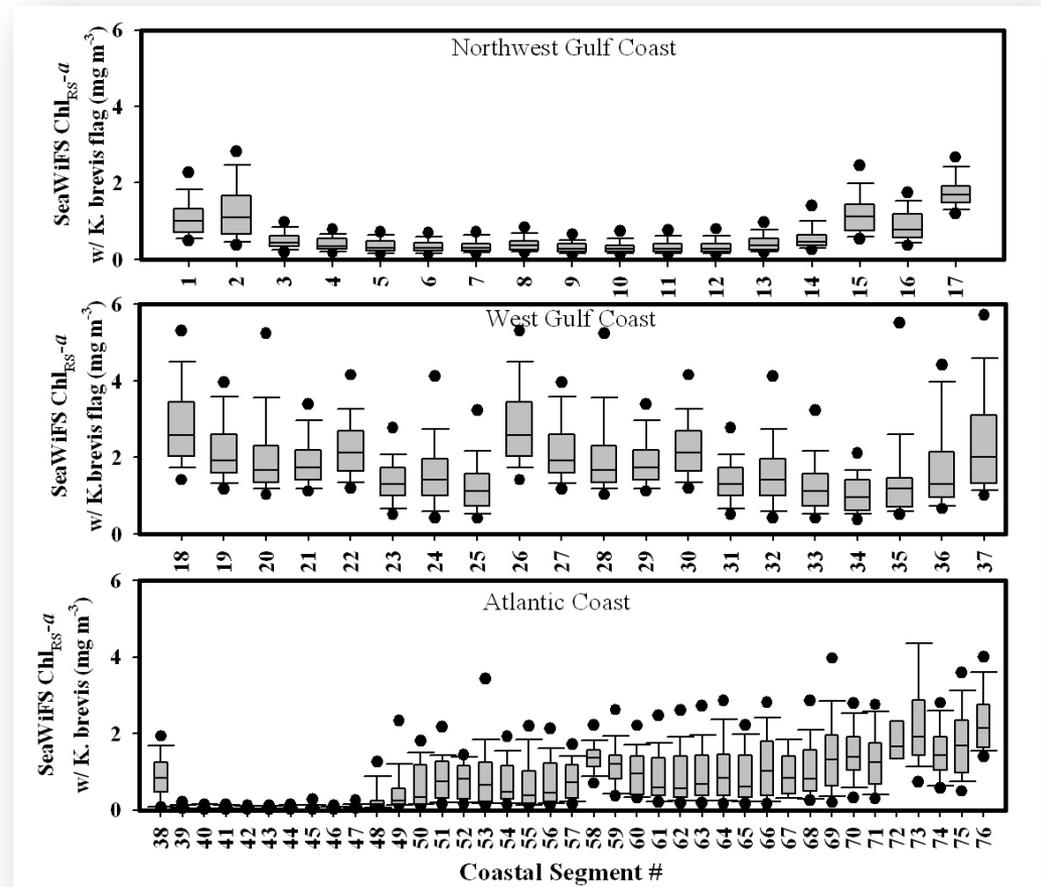
# Deriving Criteria: Satellite Chlorophyll Data Evaluation

- Exclusion of *Karenia brevis*
- Florida Fish and Wildlife Research Institute
- Satellites detect *K. brevis* cell counts above 50,000 cells/L



# Deriving Criteria: Statistical Distributions

- Field adjusted  $\text{Chl}_{\text{RS}-a}$  distributions for each coastal segment
  - SeaWiFS: September 1997 through January 1, 2010
- *K. brevis* signature removed



# Technical Issues

- Possible Interferences with satellite measurements
  - Colored Dissolved Organic Matter (CDOM)
    - Big Bend (St. Joseph Bay to Anclote Bay)
  - Bottom reflectance
    - Stray light flag
    - Southwest Florida
  - Seagrass
    - Not present in coastal waters of Northwest Gulf Coast, Atlantic Coast, and most of West Gulf Coast.
    - West Gulf Coast seagrass coverage north of Anclote Bay and south of Gullivan Bay
- Satellite imagery not suggested in
  - Big Bend, Southwest Florida, and coastal locations with seagrass coverage

# Charge Questions

- Are the data sources identified in Sections 2.4, 4.1.1 and 4.2 appropriate for use in deriving numeric criteria in Florida's coastal waters? Is the SAB aware of additional available, reliable data that EPA should consider in delineating coastal waters or deriving criteria for coastal waters? Please identify the additional data sources.
- Does the approach EPA describes in Section 4.2 appropriately apply remote sensing data to derive numeric criteria in Florida's coastal waters? If not, please provide an alternate methodology utilizing available reliable data and tools, and describe the corresponding advantages and disadvantages.
- Is the assessment endpoint identified in Section 4.2 (chlorophyll-a to measure balanced phytoplankton biomass and production) appropriate to translate Florida's narrative nutrient criteria (described above) into numeric criteria for Florida's coastal waters, given currently available data? Does the SAB suggest modification or addition to this assessment endpoint?