CREIOS Mapping & Monitoring

Water Quality | Land Based Sources of Pollution

Lisamarie Carrubba

NOAA Fisheries Service | Office of Protected Resources | Southeast Regional Office

Jim Hendee

NOAA Ocean and Atmospheric Research Service | Atlantic Oceanographic and Meteorologic Laboratory

Sean Griffin

NOAA Fisheries Service | Office of Habitat Conservation | Restoration Center

Tony Pait

NOAA Ocean Service | Center for Coastal Monitoring and Assessment

LAND BASED SOURCES of POLLUTION *(source: NOAA CRCP)*

Pollution from land-based sources such as development and construction activities, sewage treatment, agriculture, storm water, chemical and oil spills etc.

Coastal development in Isla Verde, Puerto Rico

Sewage outfall off Palm Beach, FL

Source: Palm Beach County Reef Rescue

Storm water runoff creating a sediment plume, USVI

Points of Intersection

Water Quality | Land Based Sources of Pollution

CORE CAPABILITIES: Integration of other Tech Panels

Monitoring and Assessment: Chemical, Nutrient, and Pathogen Contamination, Bioavailability, Ecotoxicology, Biological Effects, Disease

Ocean Remote Sensing: Temperature, Ocean Color, Turbidity, Currents, Waves, Rainfall, Frontal Boundaries, Climatological Anomalies

Watershed Modeling and Assessment: Source, Fate, and Transport; Management Impacts, watershed management strategies

Review, Mitigation and Restoration: EFH, ESA, Clean Water Act, Ex Order 13089, Ship Groundings, Habitat Equivalency, Watershed Restoration Planning/Implementation

NOAA Capabilities

National Status & Trends Program (NS&T)

PROGRAM OVERVIEW

- 280 sites nationwide monitored annually for 120 contaminants
- Nation's longest running coastal contaminant monitoring program
- Comprehensive assessments of environmental contamination, toxicity, & biological community condition in coastal, estuarine, and coral reef ecosystems

Map depicting NS&T monitoring and assessment locations. Orange denotes annual "Mussel Watch" contaminant monitoring, and Yellow denotes biological effects assessment sites

NOAA Capabilities

National Status & Trends Program (NS&T)

ANALYTICAL STANDARDS

- Heavy Metals
- Organics (PCBs, PAHs, DDT)
- Antifouling Agents
- Flame Retardants
- Energetic Compounds
- Radioactive Compounds
- Contemporary Pesticides
- *Clostridium prefringens* (pathogens)
- Shellfish pathologies
- Nutrients

  (nitrate, nitrite, ammonia, urea, total nitrogen, orthophosphate, total phosphorus, silica)

NS&T scientists assess contamination associated with military activities in Vieques Puerto Rico

CASE STUDY: Jobos Bay

Conservation Effectiveness Assessment Project

(NOAA | USDA | Puerto Rico)

Goal is to evaluate the effectiveness of Best Management Practices (BMPs) in an agricultural watershed, and to construct quantitative models for use by coastal managers

Partners are integrating sediment and water contamination (nutrients and agro-chemicals) with biological indicators of coral reef ecosystem health to determine impacts

NS&T scientists collaborate with NOAA CRCP, USDA, and Puerto Rico to evaluate watershed management BMPs

Capabilities

- Restoration Implementation
- Project Management
- Technical and Scientific Staff
- Field Operations Support
- Emergency Restoration
- Dedicated Contracting Officers
- Staff Engineering Support
- Federal Assistance Programs

NOAA Capabilities

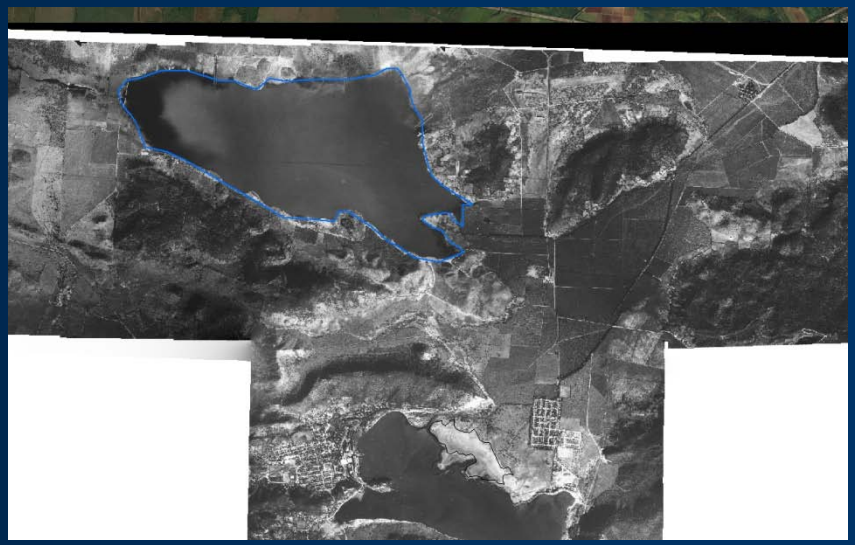
Restoration Center

- NOAA RC Coral Restoration Activities
  - Response and Restoration of Physical Impacts to Coral Reefs (DARRP and Non-DARRP)
  - Implementation of Projects Addressing CRCP Priorities Threats (Focus on LBSP)
  - Implement Endangered Species Act Recovery Plans (*Acropora*)
  - Control Overgrowth and Prevent Loss of Recruitment Habitat
  - Removal of Marine Debris

NOAA Capabilities

Restoration Center : Guanica Watershed Mgt. Plan Implementation

- 3-year project to evaluate, design, and implement a project to reduce LBSP
- Characterize stressors (chem/bio) to inform restoration project selection and design
- Detailed evaluation and feasibility analysis of the top tier projects identified in the WMP:
  - Guanica Lagoon Re-flooding and Restoration
  - Development of Treatment Wetlands at Sewage Treatment Plant
  - Stabilization of Sediment and Removal of Debris in the Rio Loco



Guanica Lagoon 1951

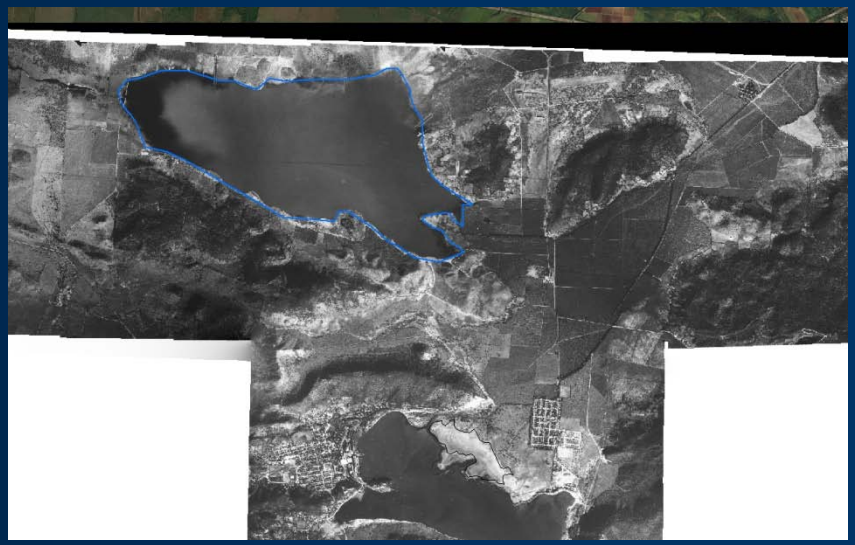
Drained Guanica Lagoon

NOAA Capabilities

Guanica Watershed Mgt. Plan Implementation

- Year 1 Goals
  - Assemble and collect initial baseline data
  - Seek stakeholder input
  - Develop a feasibility analysis and implementation plan
  - Make a restoration recommendation based on stressors and feasibility

- Year 2 and 3 Goals
  - Develop Detailed Design
  - Complete NEPA and Permitting
  - Implement Restoration Action
  - Continue Monitoring



Guanica Lagoon 1951

Drained Guanica Lagoon

NOAA Capabilities

AOML: WQ Monitoring - Shipboard Instrumentation

Wastewater outfalls, coastal inlets, atmospheric deposition, etc.

Acoustic Doppler Current Profiler

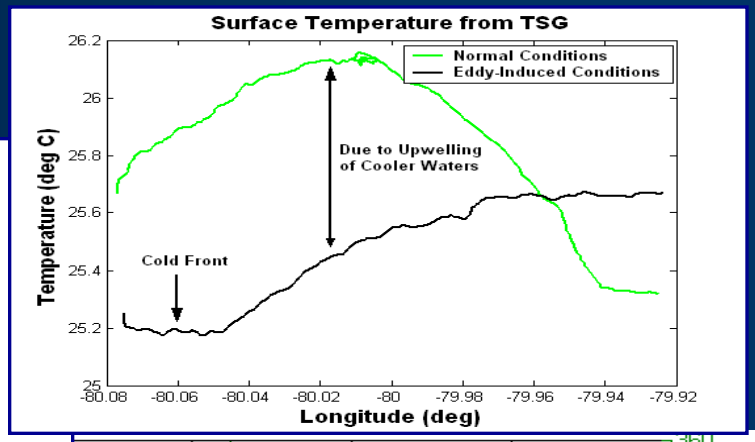
Water sampling with depth: nutrients, carbonates, and other chemistry.

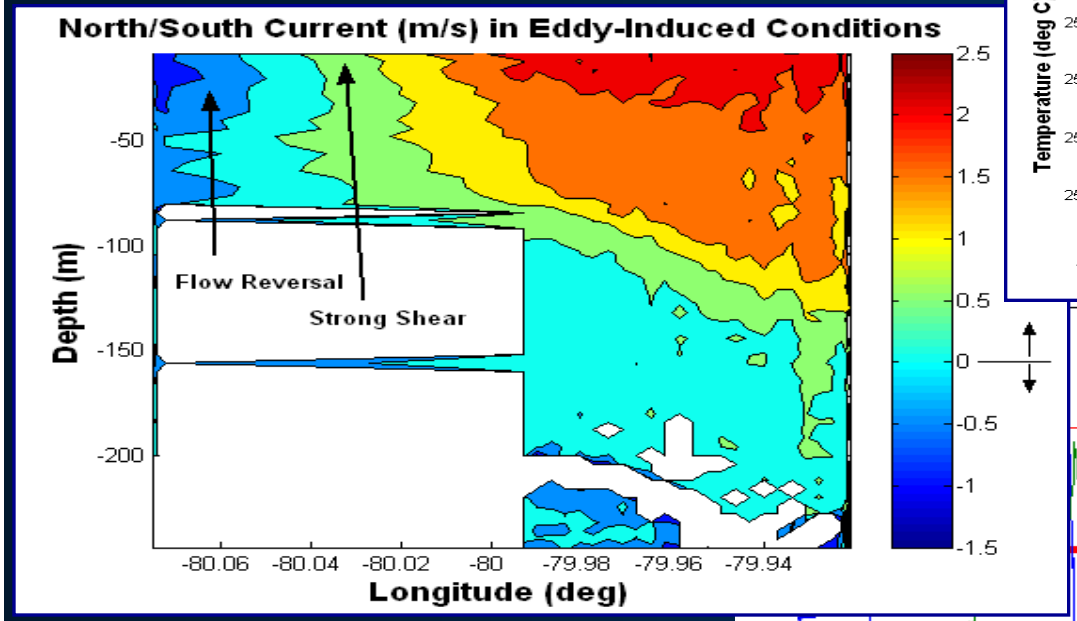
Thermosalinograph, bottom profiler, underway measurements, etc.

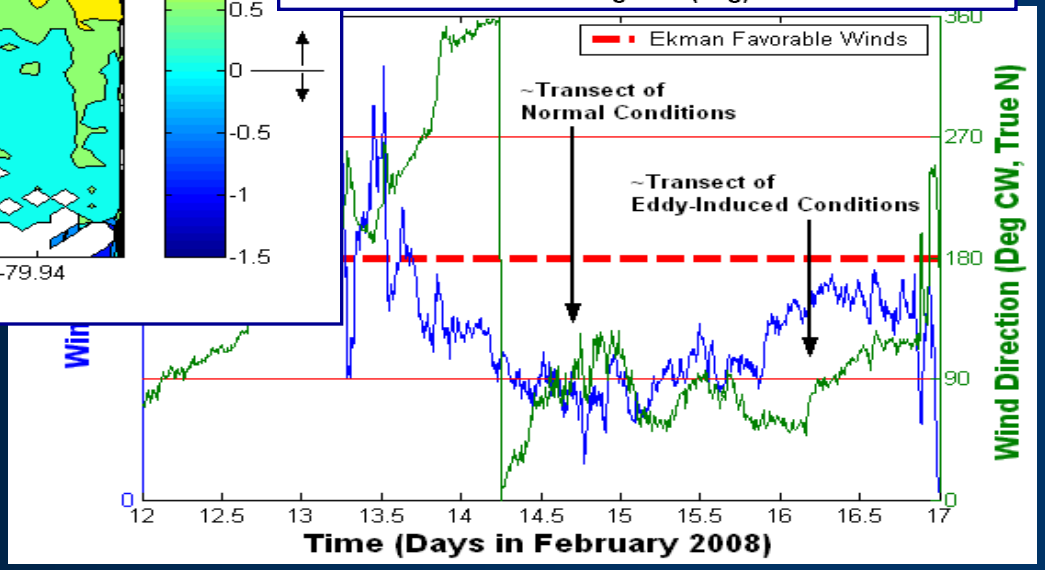
NOAA Capabilities

AOML: WQ Monitoring – Modeling and Analysis

Understanding plume dispersal and impact (biology, chemistry, hydrodynamics), as well as natural coastal oceanographic processes.



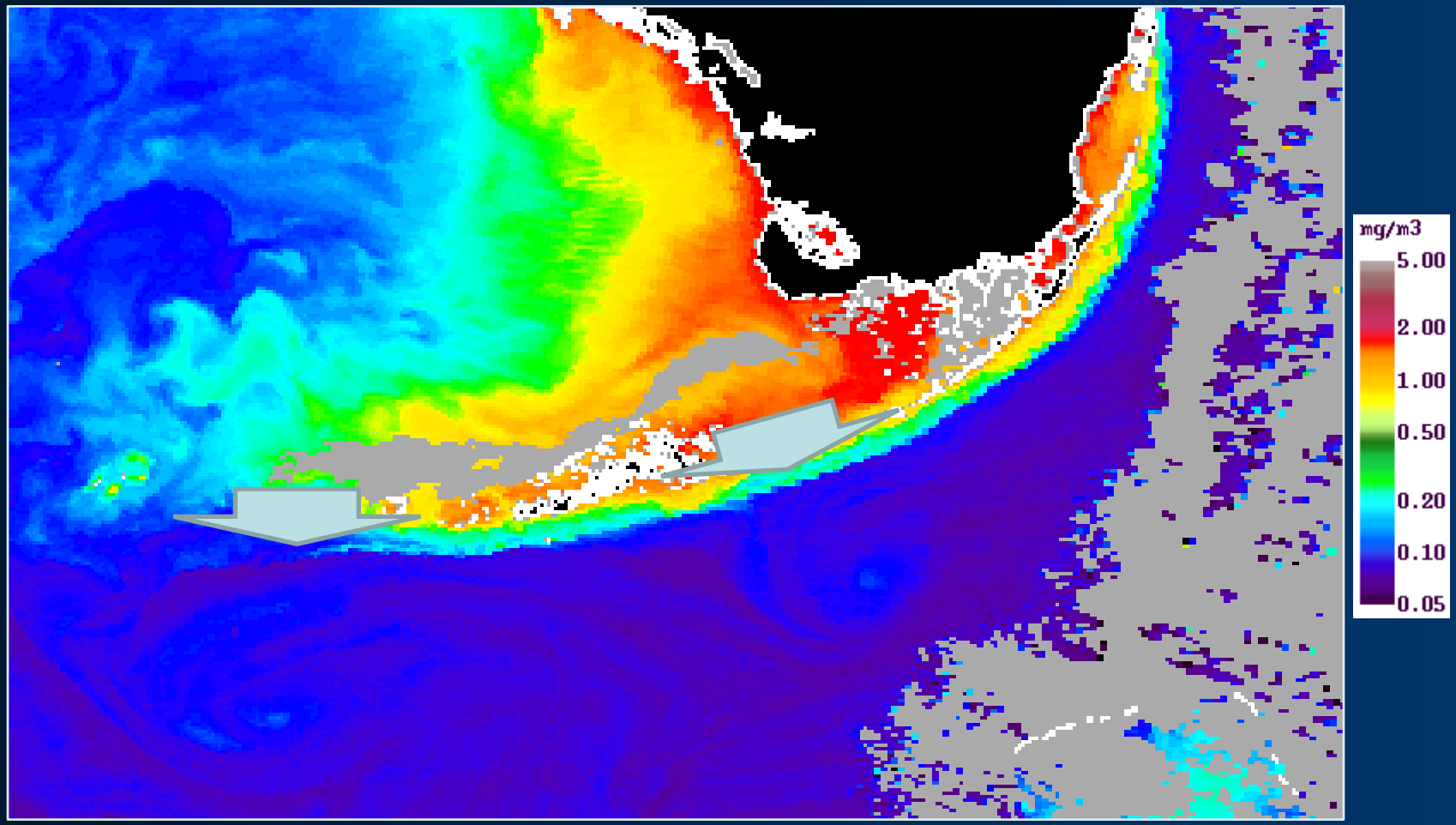




Extensive post-cruise analyses.

NOAA Capabilities

AOML: WQ Monitoring – Modeling and Analysis



- Satellite pass: 28 Jan – Chlorophyll *a* (biomass, nutrients) entrained by two eddies are being transported offshore; however, further analysis shows transport along-shore northward (Lew Gramer, dissertation work).

CRCP Participation by Habitat Conservation and Protected Resources

Projects related to:

Elkhorn and Staghorn Corals – Listing and Recovery Planning – lessor stressors for listing include sedimentation, excess nutrients, and contaminants from human uses

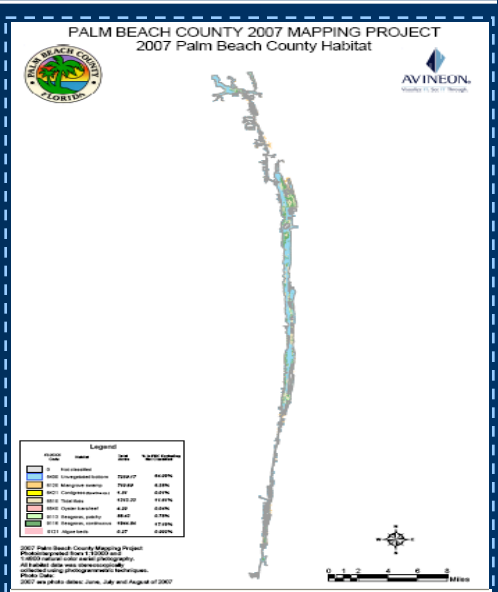
Education and Outreach – coastal municipalities; LAS for Puerto Rico, UVI, south FL; developers and permit applicants

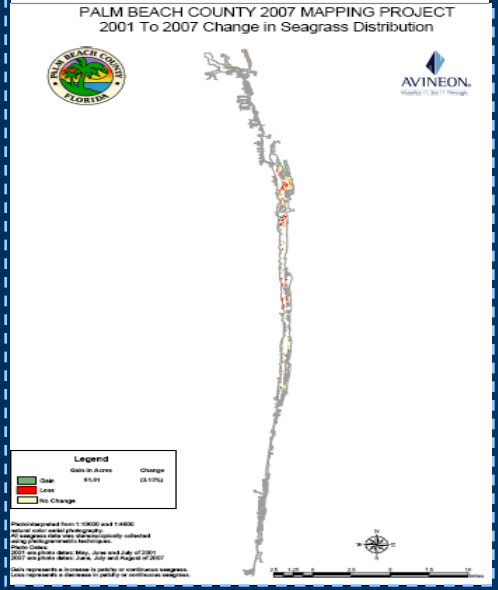
Local Action Strategies

Case Study:
Habitat Mapping Project, Palm Beach County, FL

Objective was to provide information to be used in reviews of coastal development projects to assess potential cumulative impacts

Created maps of seagrass, mangrove forest, Spartina marsh, and oyster beds in estuarine waters (i.e. Lake Worth Lagoon) and performed trends analysis (presence/absence) for seagrass between 2001-2007 and for mangroves between 1985-2001-2007





Local Action Strategies

Case Study:
Guide for Developers and Impacts of Coastal Construction, including testing dock construction guidelines

Overall objective is to develop guidelines for coastal construction in order to avoid and minimize impacts to the coral reef ecosystem associated with water resources development projects

Surveyed docks in areas of South Florida and Puerto Rico to determine whether they were constructed following the guidelines developed by NMFS, FWS, and COE, and assess the impacts of dock construction and use on seagrass beds

CREIOS Mapping & Monitoring

Water Quality | Land Based Sources of Pollution

Lisamarie Carrubba

Lisamarie.Carrubba@noaa.gov Phone: 787-851-3700

Jim Hendee

Jim.hendee@noaa.gov Phone: 305 361-4396

Sean Griffin

Sean.Griffin@noaa.gov Phone: 787-667-7750

Tony Pait

Tony.Pait@noaa.gov Phone: 301-713-3028