



Florida International University

November 6, 2008

**Florida Area Coastal Environment Project
(FACE)**

Ecosystem Research Program

Dr. John Proni, Director

Ocean Chemistry Division

Atlantic Oceanographic and Meteorological Laboratory

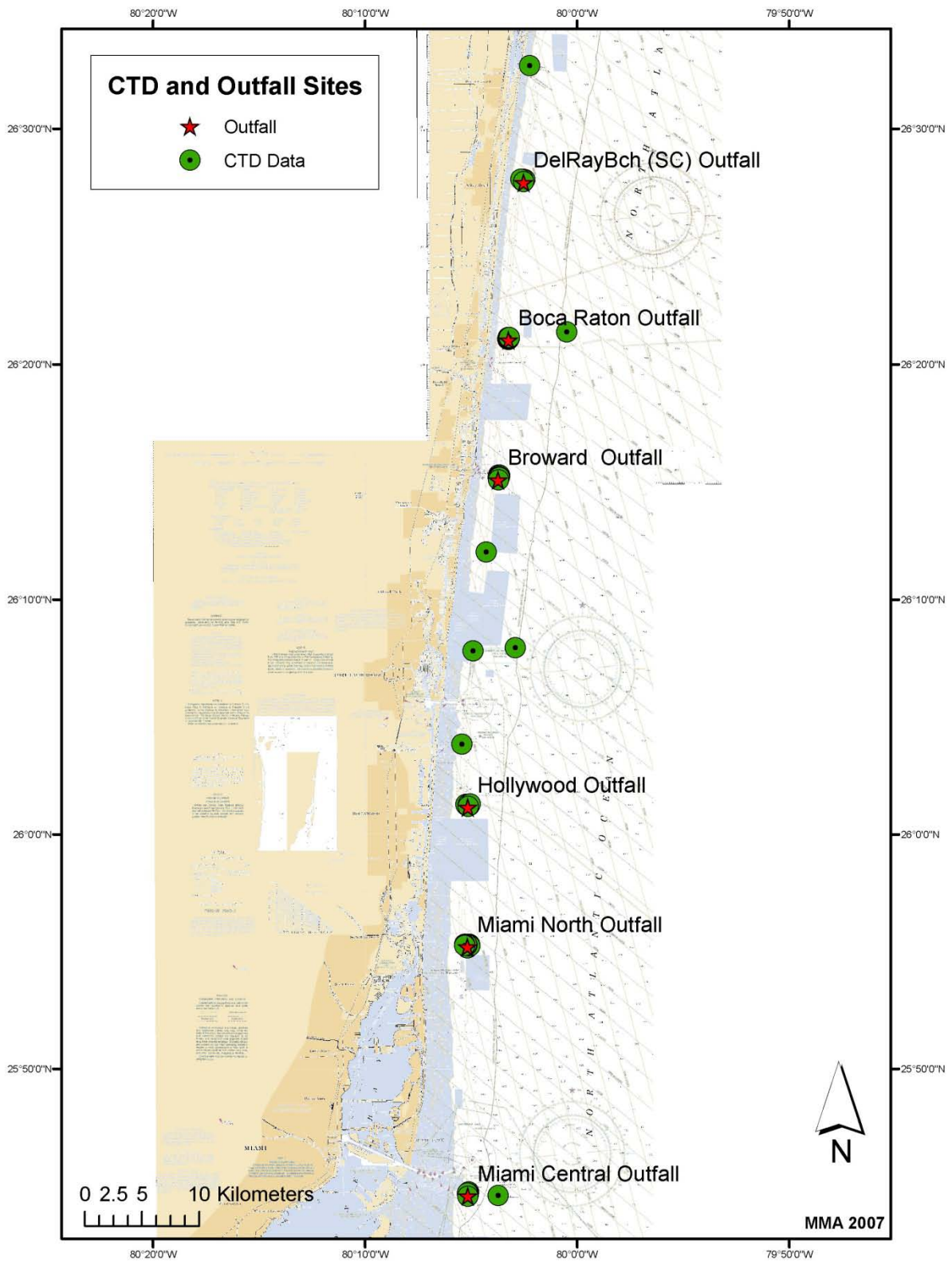
Miami, Florida

Florida Area Coastal Environment Project (FACE)

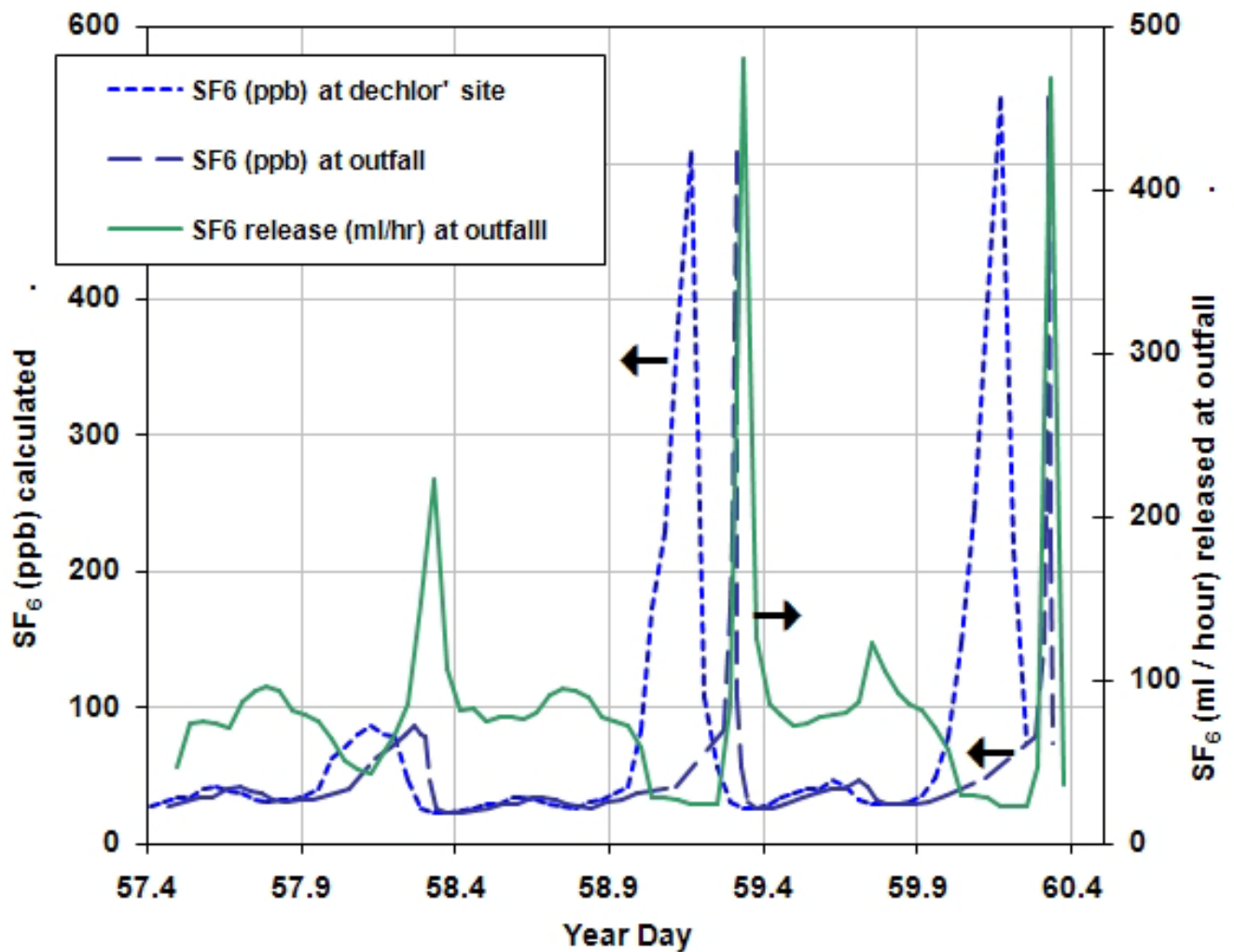
Ecosystem Research Program

This report presents recent data on certain nutrient sources to the coastal ocean off southeast Florida including ocean outfalls, inlets, oceanic upwelling and submerged groundwater springs. Where the data allow, the sources are characterized as to strength (flow), nutrient concentrations, selected biological quantities and prospective exposure at selected sites. In addition isotopic ratio analysis (nitrogen, carbon) is presented for data so far processed.

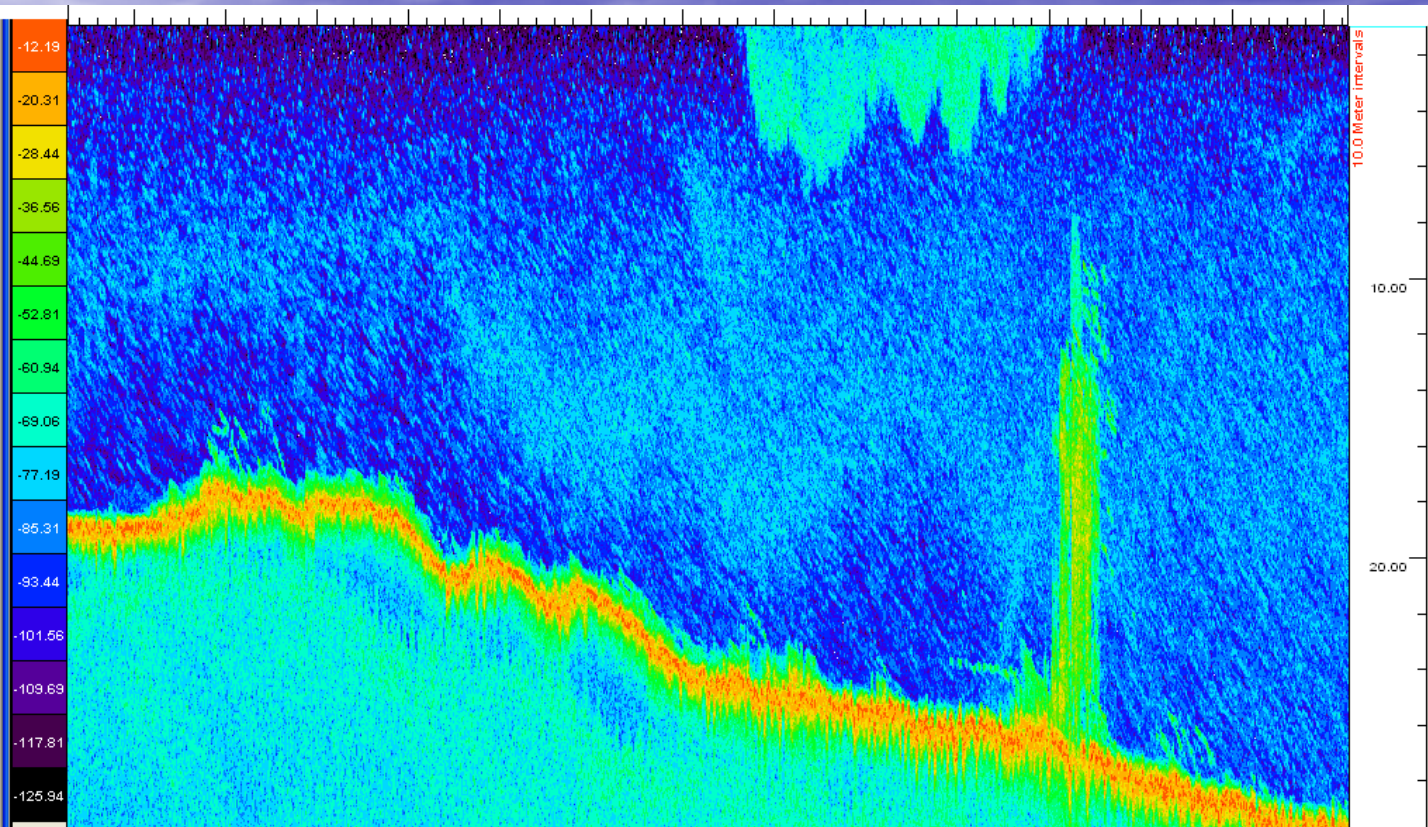
It is of significant value to gain an understanding of the relative magnitude of contributions to the coastal environment of the above sources. To provide a starting point for relative comparisons recent data from ocean outfalls are presented.



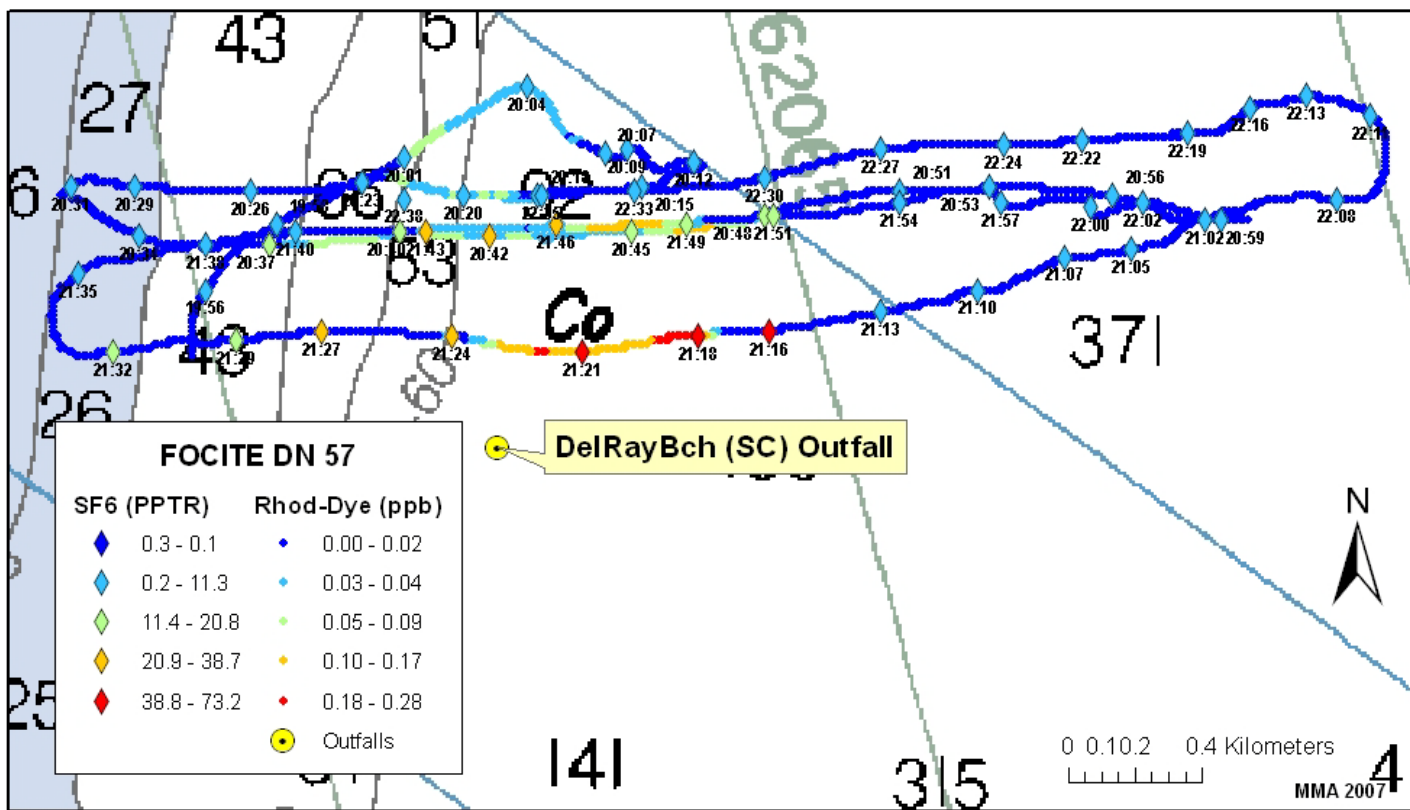
Locations of Conductivity, Temperature, and Depth (CTD) casts, and Outfall Positions



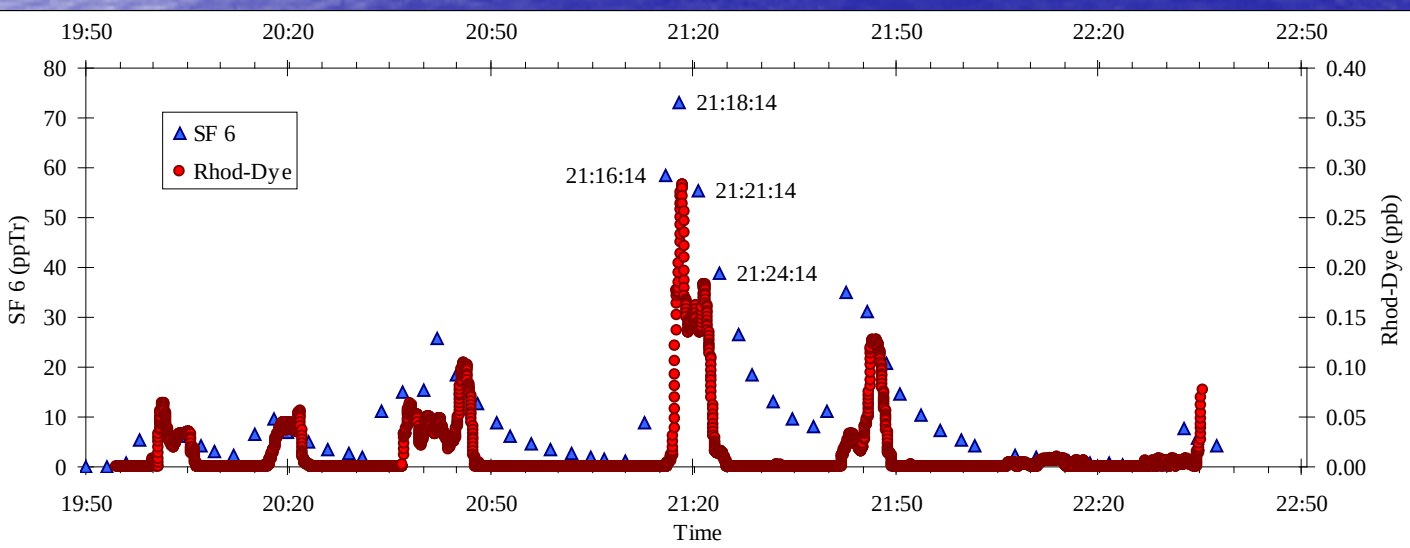
Graph of SF_6 injected at Dechlorination Facility and estimated for Delray Outfall.



Acoustic Image of Delray Outfall Plume.
Vertical column is rising wastewater.
Plume cross-section is seen as green
cloud to upper left of vertical column.
Orange line across bottom is seafloor.

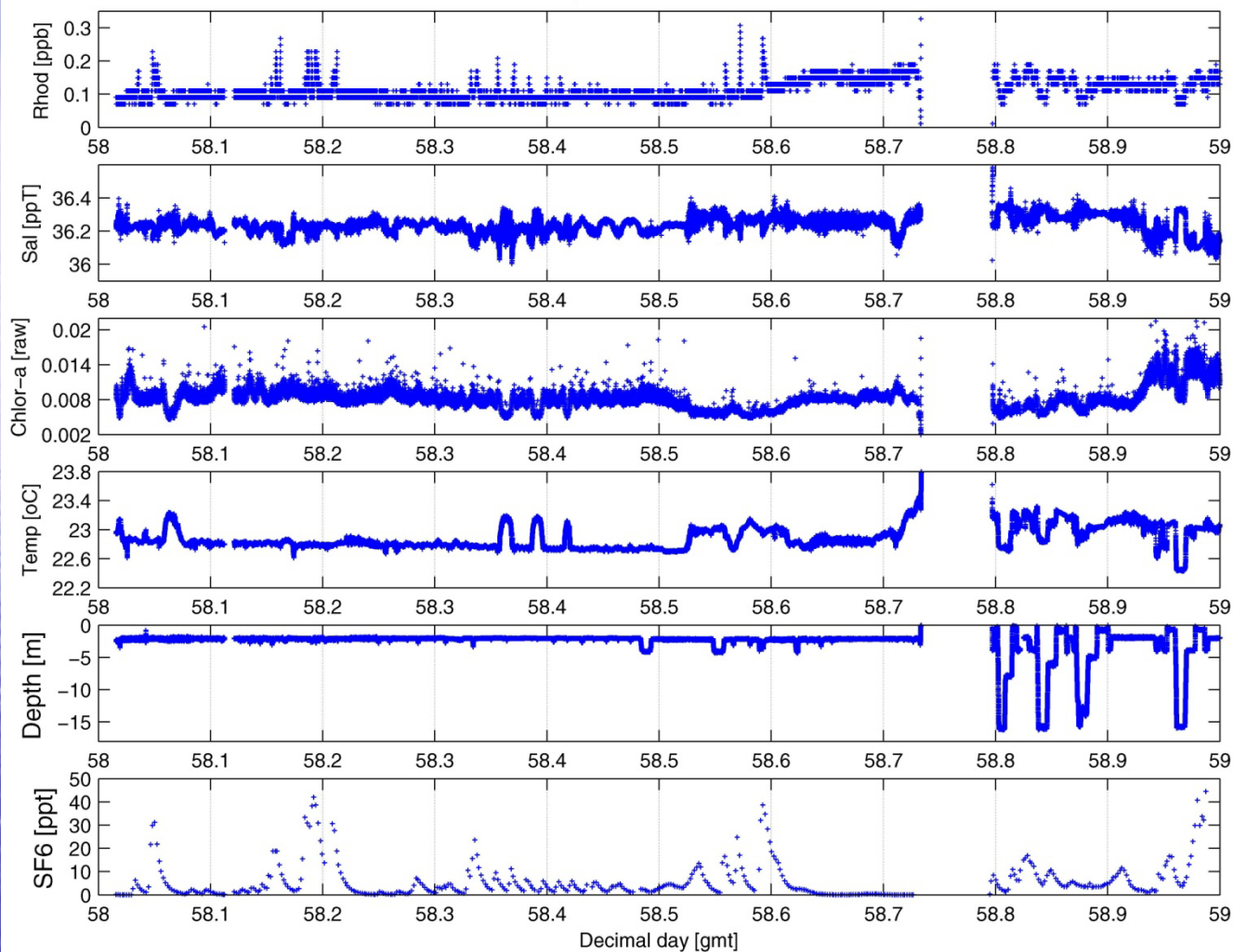


Ship's Track Feb. 26, 2007 plus SF6 and Rhodamine Dye



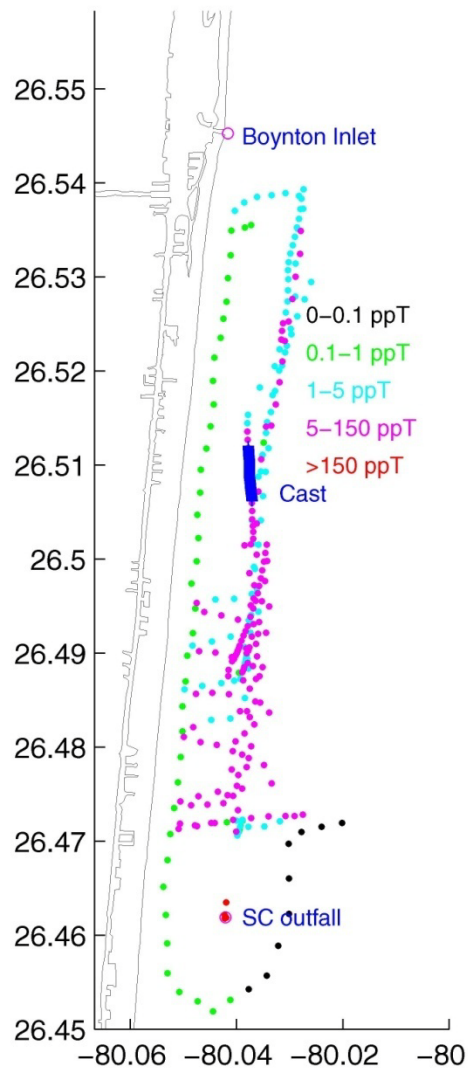
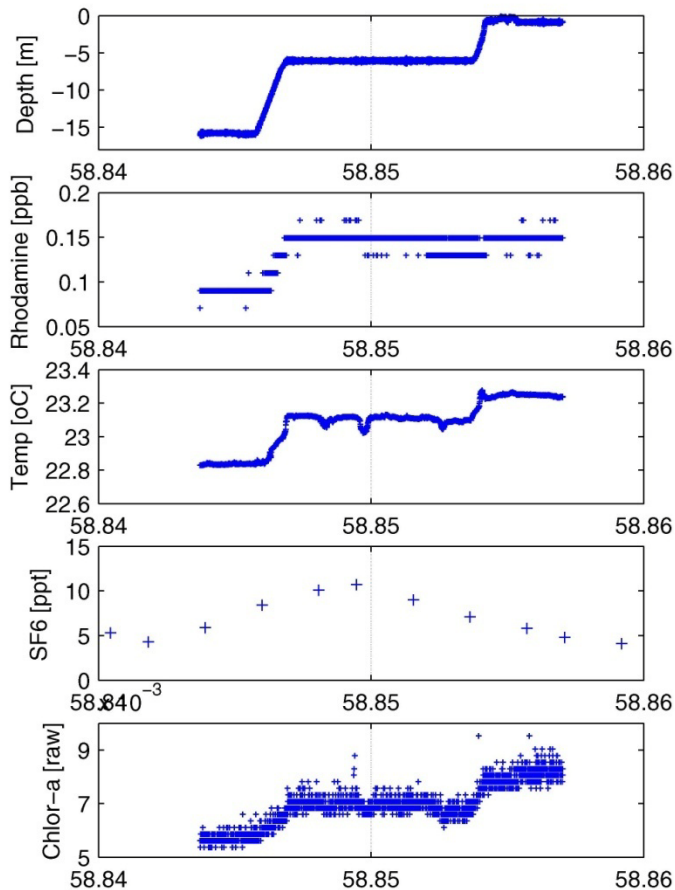
Plot of SF6 and Rhodamine Dye for Feb 26, 2007

FOCITE Outfall experiment: Towfish data 27-Feb-2007



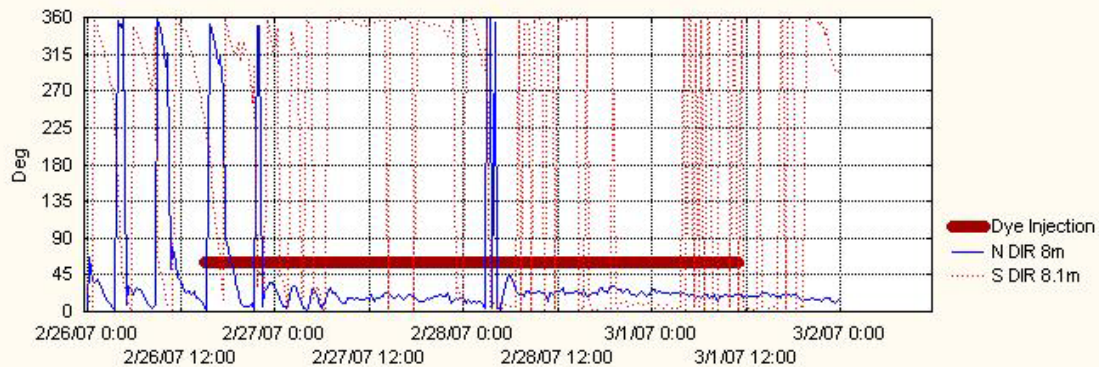
Time-Series of Towbody data from Feb. 27, 2007

FOCITE Towfish data 27-Feb-2007

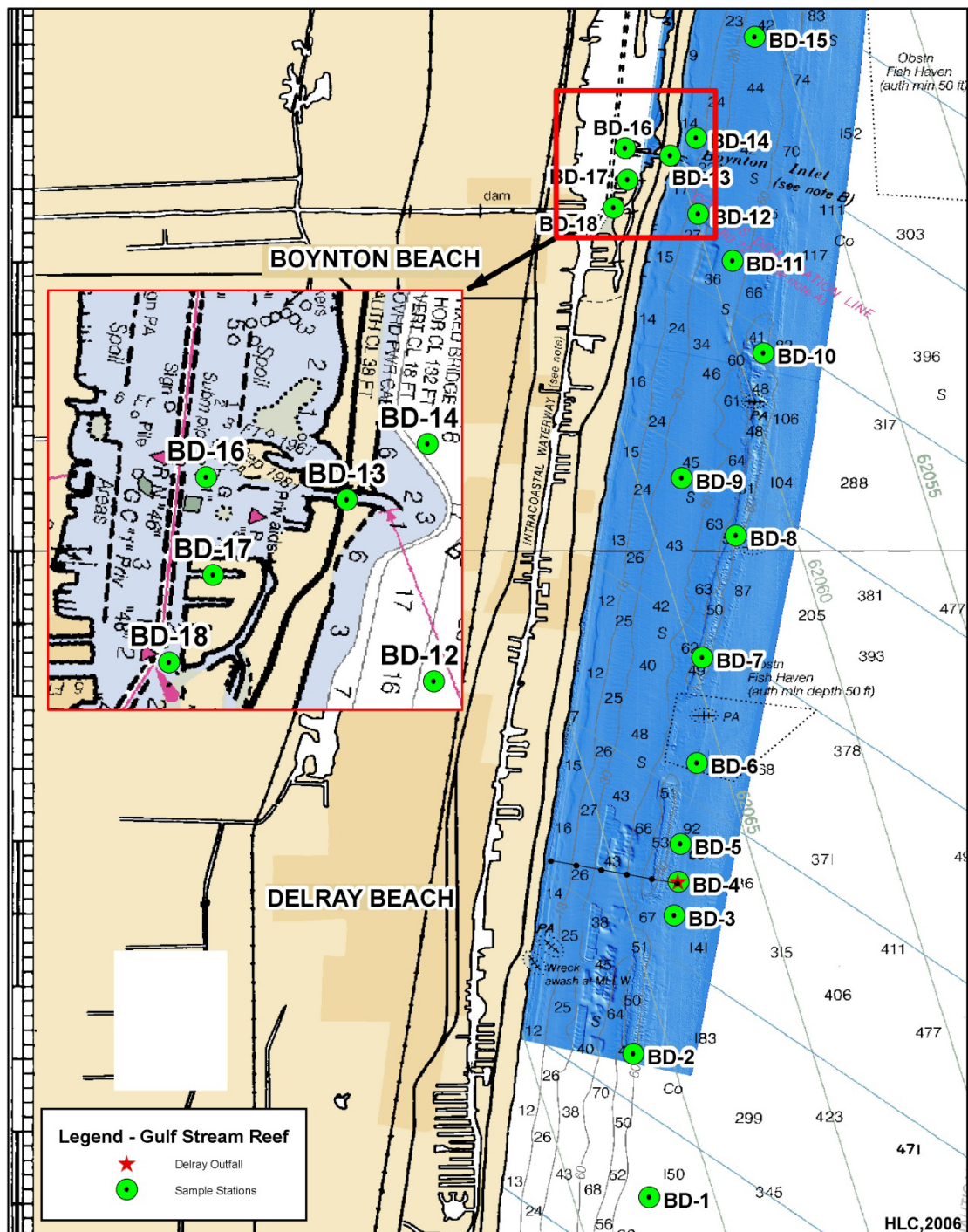


Towfish Cast, February 27, 2007.
Left: Parameters measured during cast.
Right: Track of towfish with
SF6 concentrations shown as color dots.
Cast location denoted by blue strip.

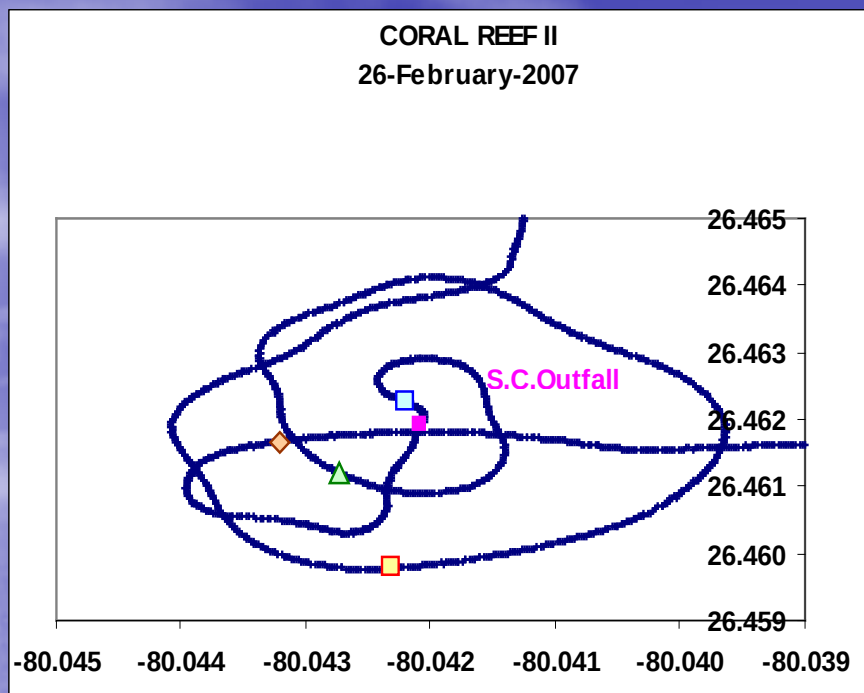
Currents at 8m from Gulfstream Reef North and South ADCP



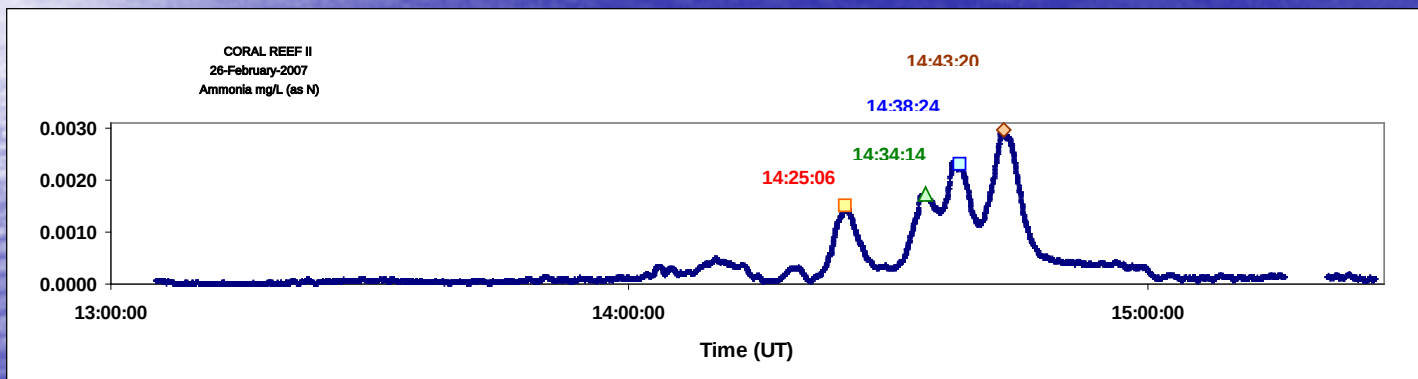
**Plot of ADCP data during dye injection.
ADCP is located at north end of reef
nearest the Boynton Inlet.**



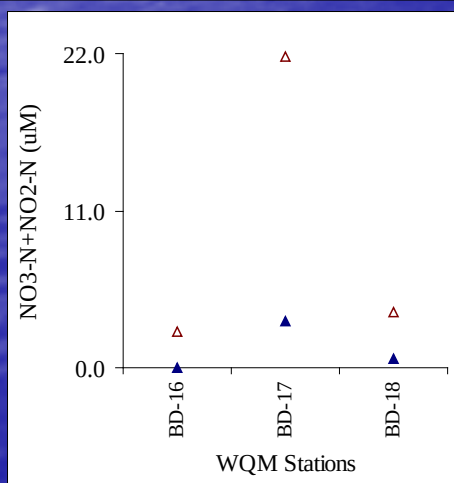
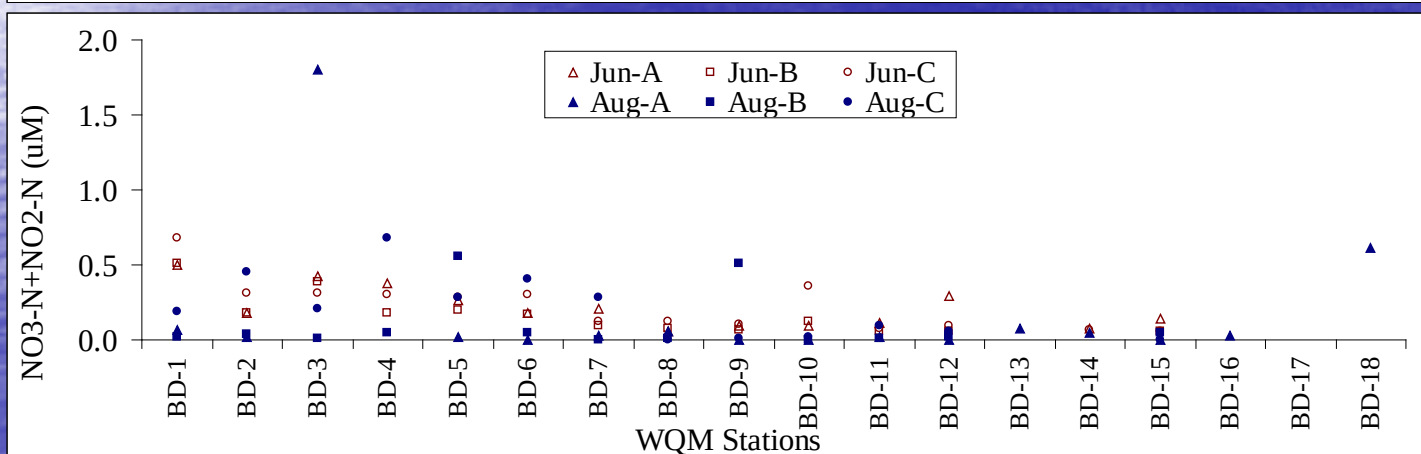
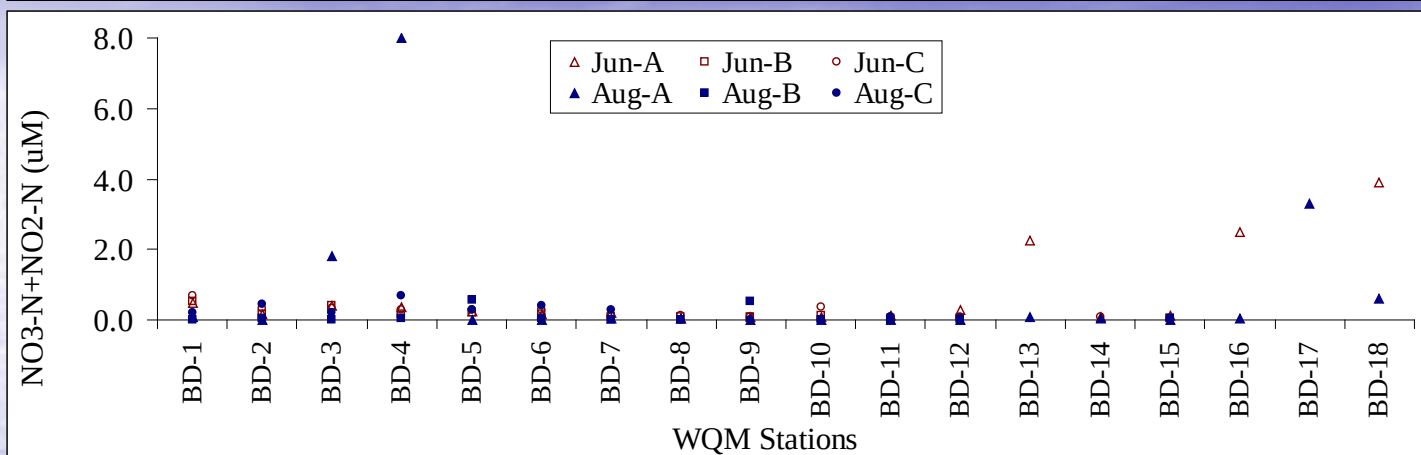
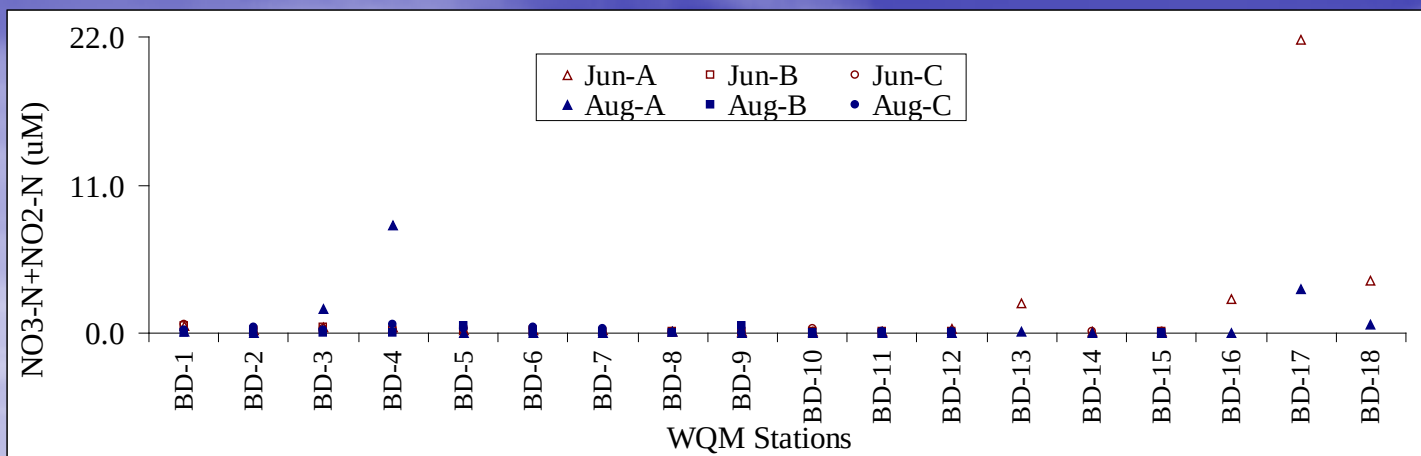
Boca/Delray Coastal Water Quality Monitoring Sites



Feb 26, 2007: Ship Track with Ammonia Peaks.



High Frequency Ammonia, February 26, 2007.



South Central Water Quality Monitoring Data. Surface samples denoted "A", mid-water "B", bottom "C". Samples 11-18 are either near-shore waters or within the Lake Worth Lagoon.

Brevard County Near Shore Ocean Nitrification Analysis

Provided by the

Near Shore Nitrification Brevard County Science Panel

(T.P. Carsey, R. Ferry, K.D. Goodwin, P.B. Ortner, J.R. Proni, P.K. Swart, J.-Z. Zhang)

to

Brevard County, Florida



Dr. John R. Proni, Project Director

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Atlantic Oceanographic and Meteorological Laboratory
Ocean Chemistry Division
4301 Rickenbacker Causeway
Miami, Florida 33149

18-July-2005

**Brevard County Near Shore Nitrification Study
Front Cover.**

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Interim Report

FACE Isotope Sampling Interim Report

Sampling of Nitrogen Compounds for Determination of Isotopic Values in Benthic
Macroalgae, Sediment Organics, and Seawater

July 30, 2007

Amended September 21st, 2007

P.K. Swart
C. Drayer

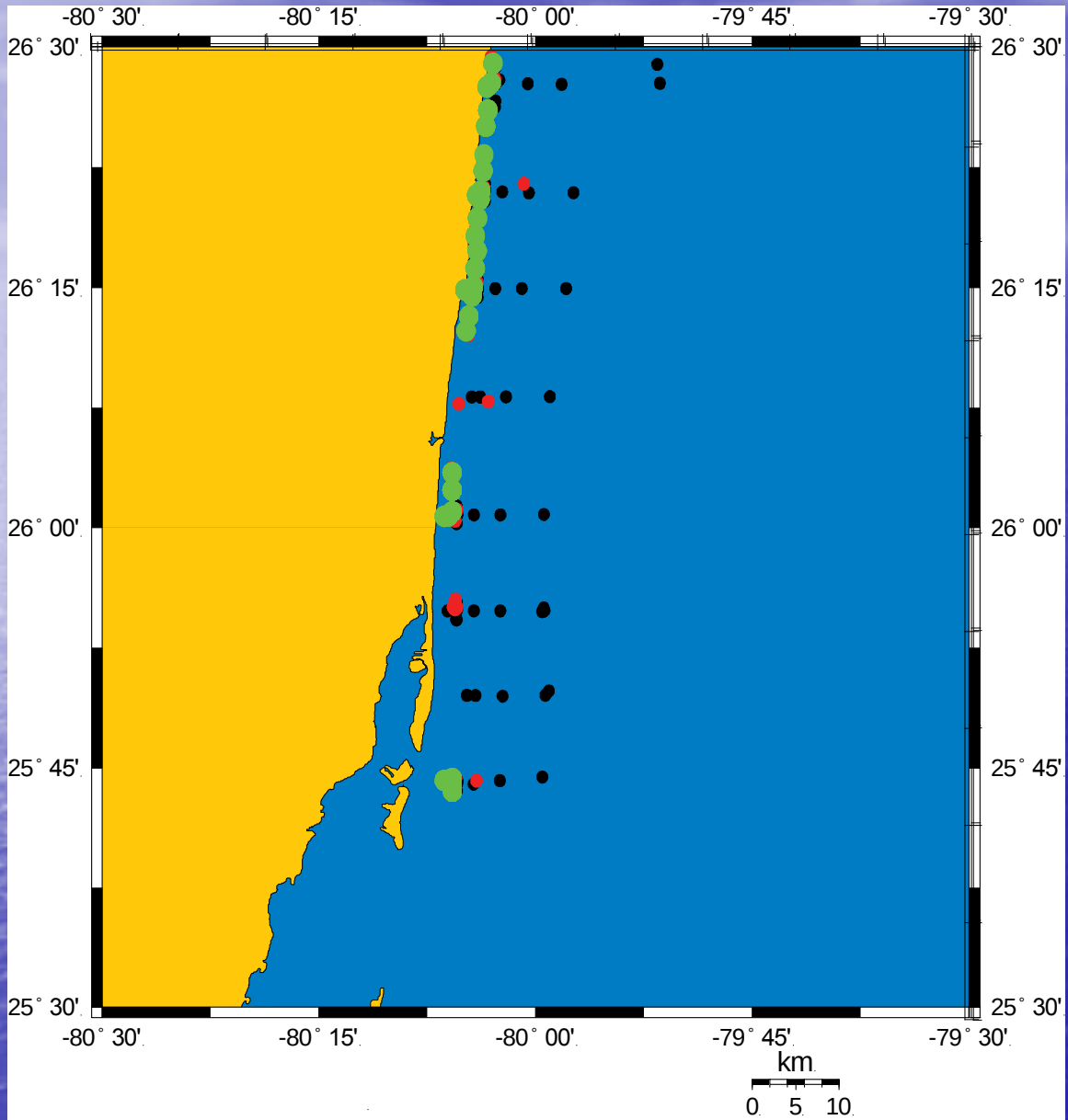
Division of Marine Geology and Geophysics
University of Miami/RSMAS
4600 Rickenbacker Causeway
Miami FL 33149



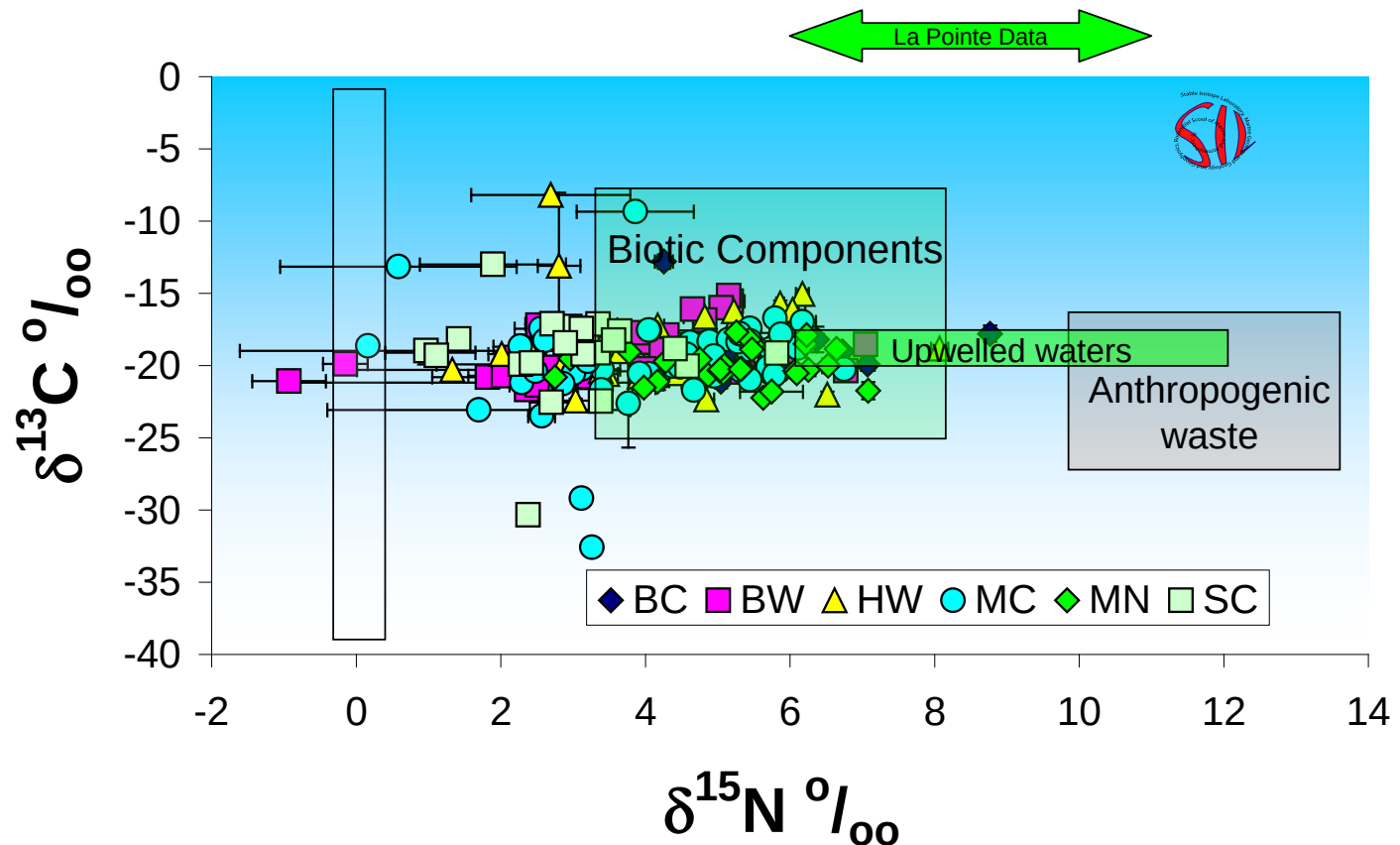
Stable Isotope Laboratory, Division of Marine Geology and Geophysics,
Rosenstiel School of Marine and Atmospheric Science, University of Miami

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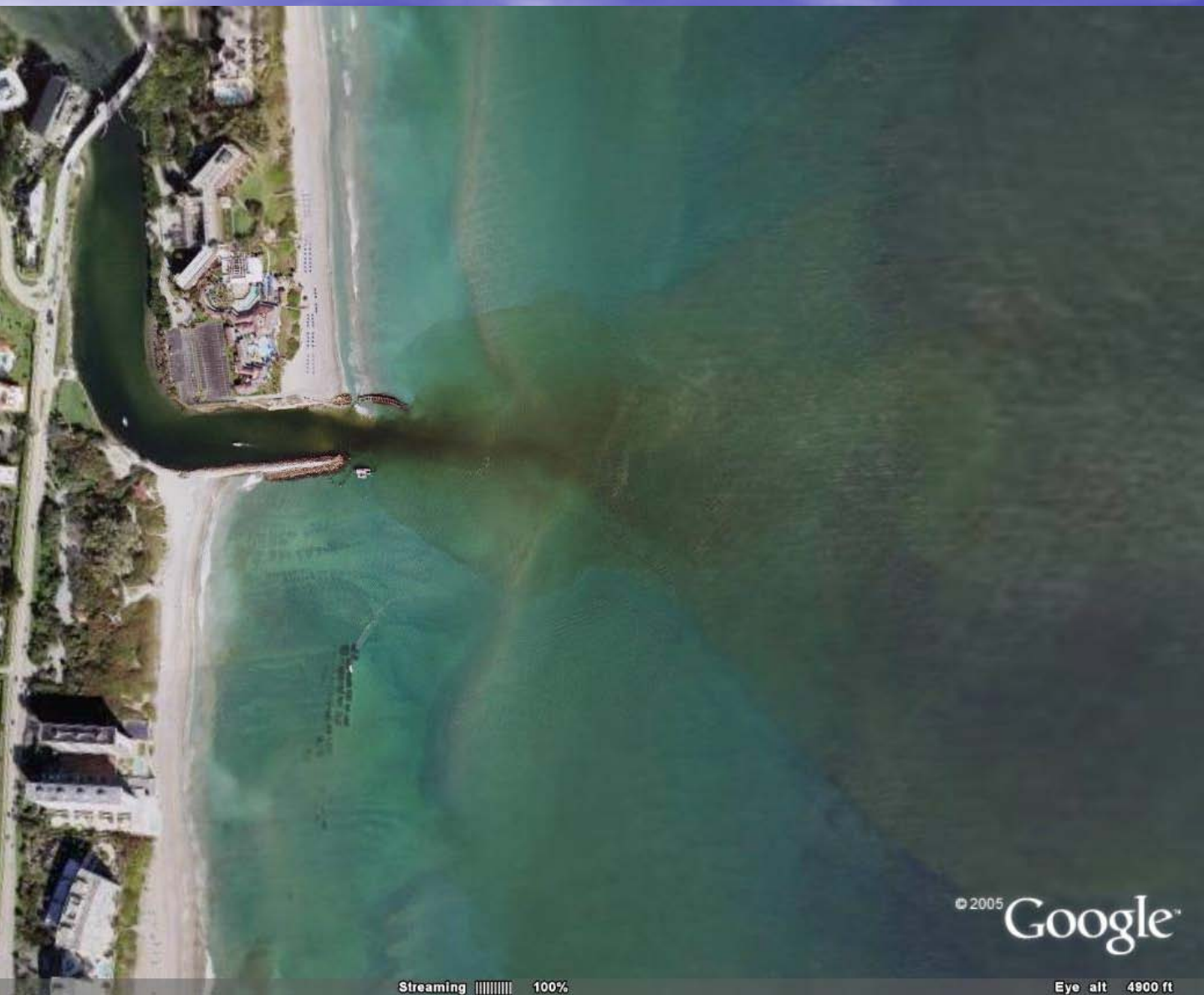
**FACE Isotopic Ratio Interim Report,
Front Cover.**



Location of sediment sample grabs (black dots), water column samples (red dots), and algal samples (green dots), collected during the October 2006 FACE campaign. (Swart, et. al. 2007)



Comparison of the algal data collected near the outfalls (BC= Boca Raton, BW= Broward, HW= Hollywood, MC= Miami central, MN= Miami North, SC= South Central). There appear to be no significant difference between any of the data. Also shown on this figure for reference and approximate regions in which anthropogenic waste, biogenic components, and nitrogen derived from fixation might plot (boxes). Left-most box denotes values resulting from atmospheric deposition. May be compared to the approximate range of data from LaPointe (1997). From Swart, et. al. (2007).



Satellite Photo Boca Raton Inlet. Receiving water appears to have no significant northward or southward current.

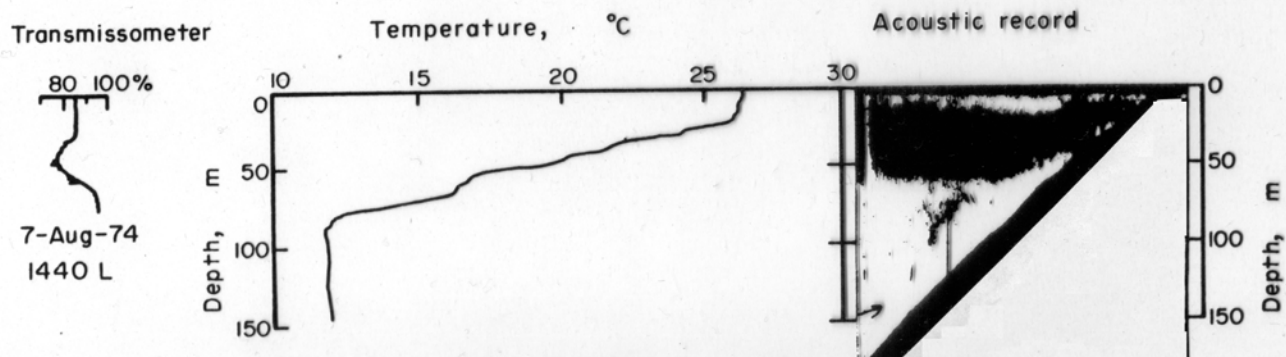
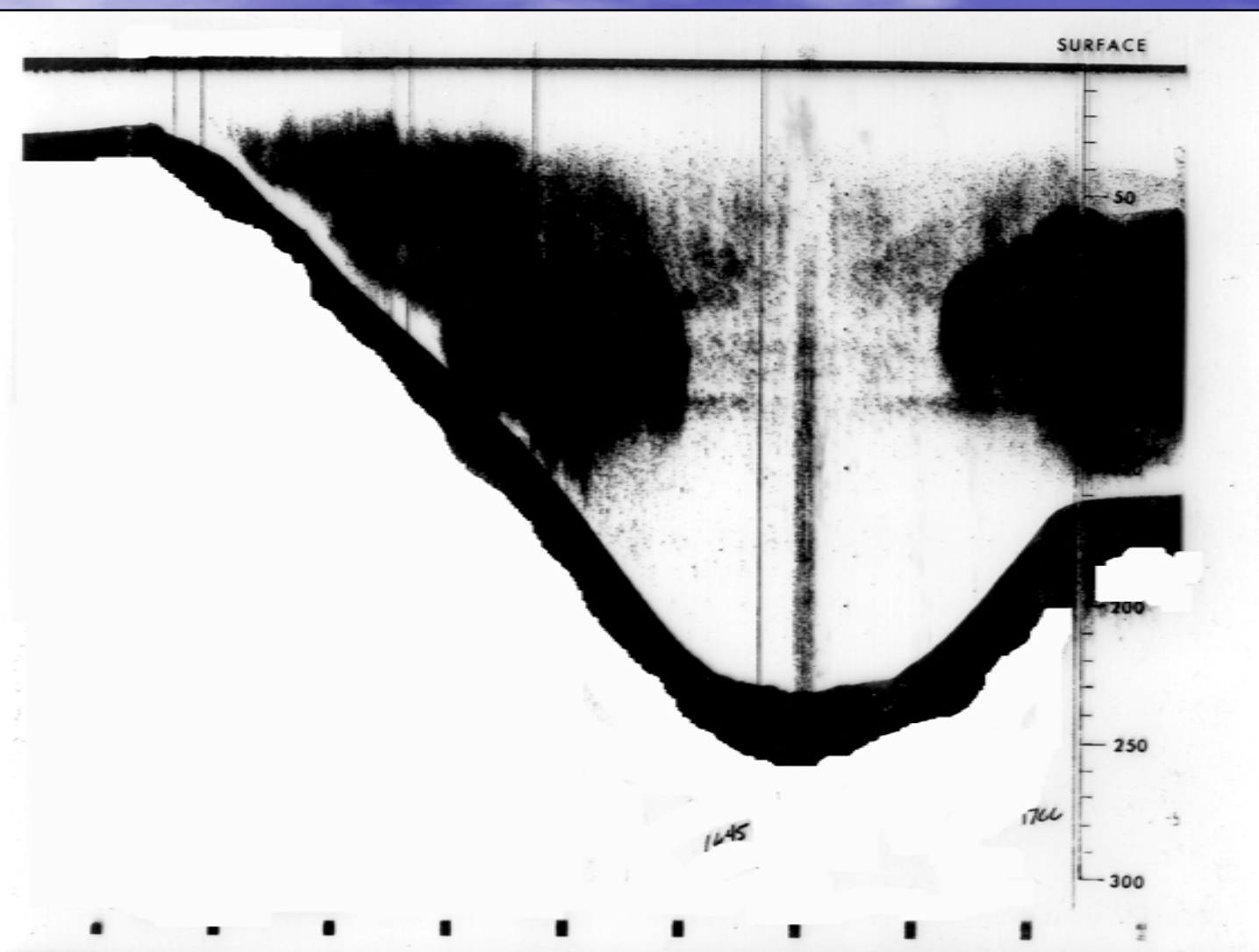
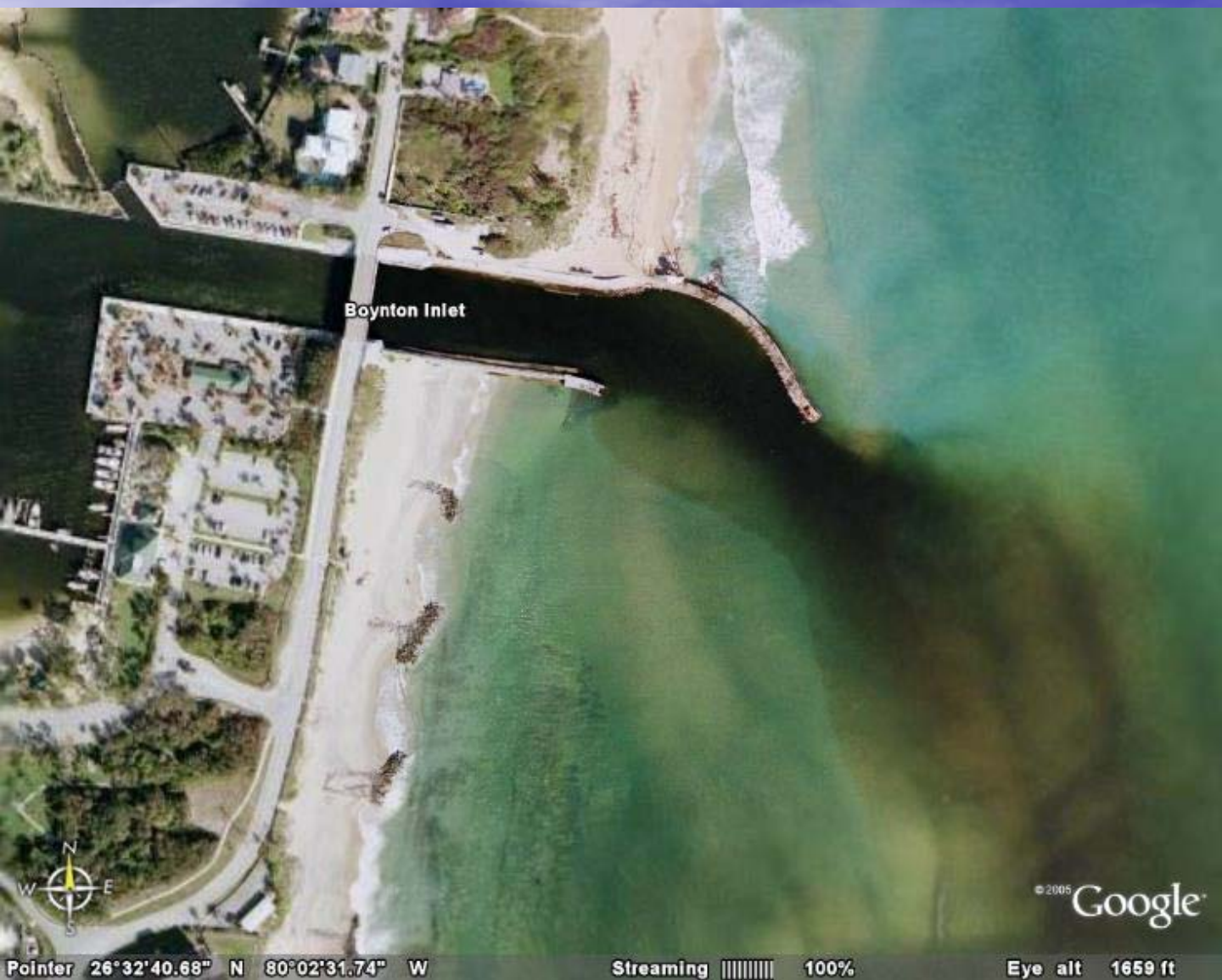


Fig. 6. Acoustic, XBT, and transmissometer records from August 7, 1974.

Acoustic Image of dredge material off of Miami,
August 1974.
Material is trapped above bottom of thermocline
and transported seaward.



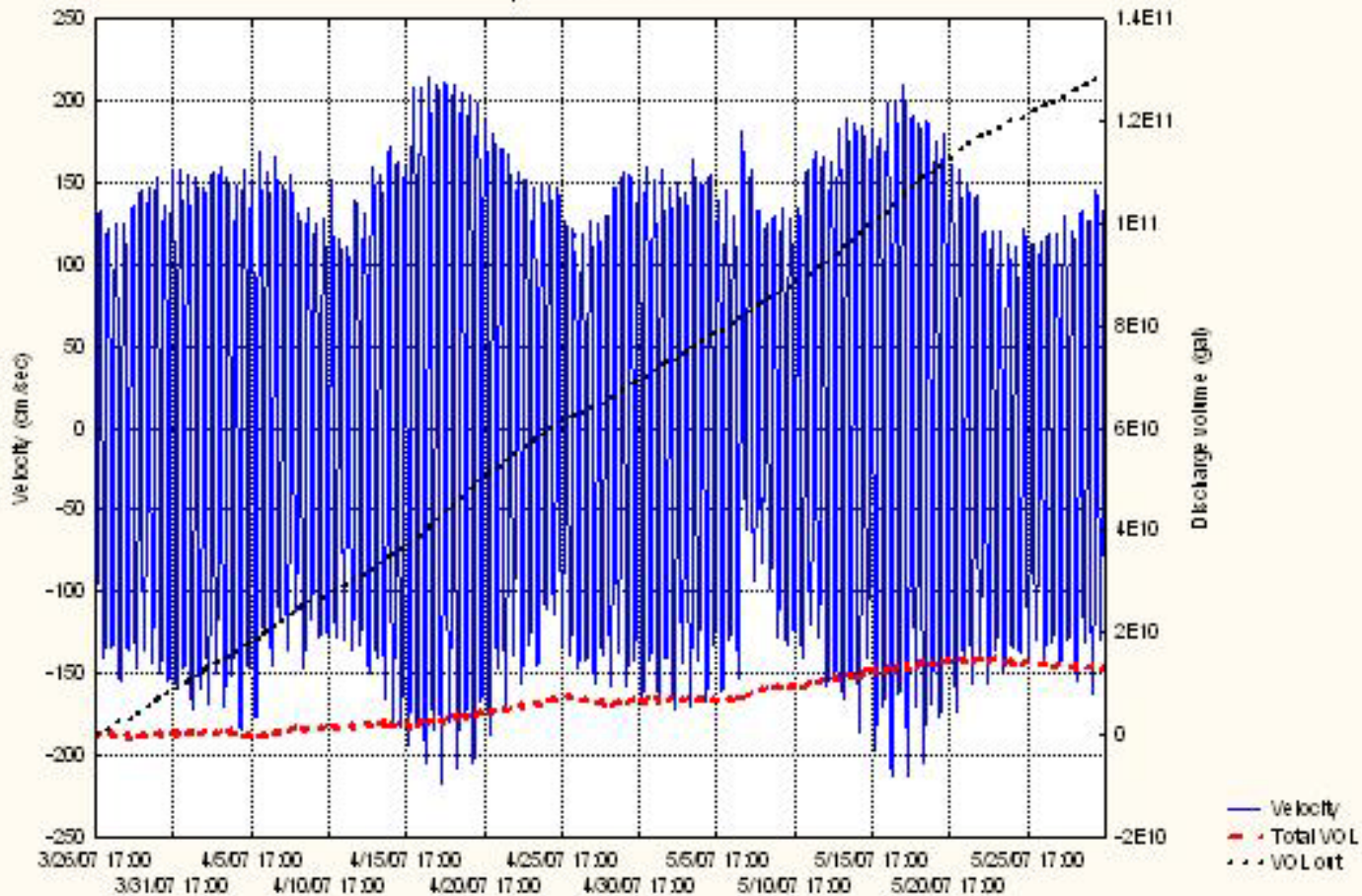
Acoustic image of dredge discharge material showing well mixed plume dispersing offshore. Ship reverses course after exiting plume and re-enters. Ship then holds position or drifts along slope with plume.



Satellite photo of the Boynton Inlet.
Notice visible plume exiting into
southward flowing receiving waters.

Boynton inlet Side looking ADCP

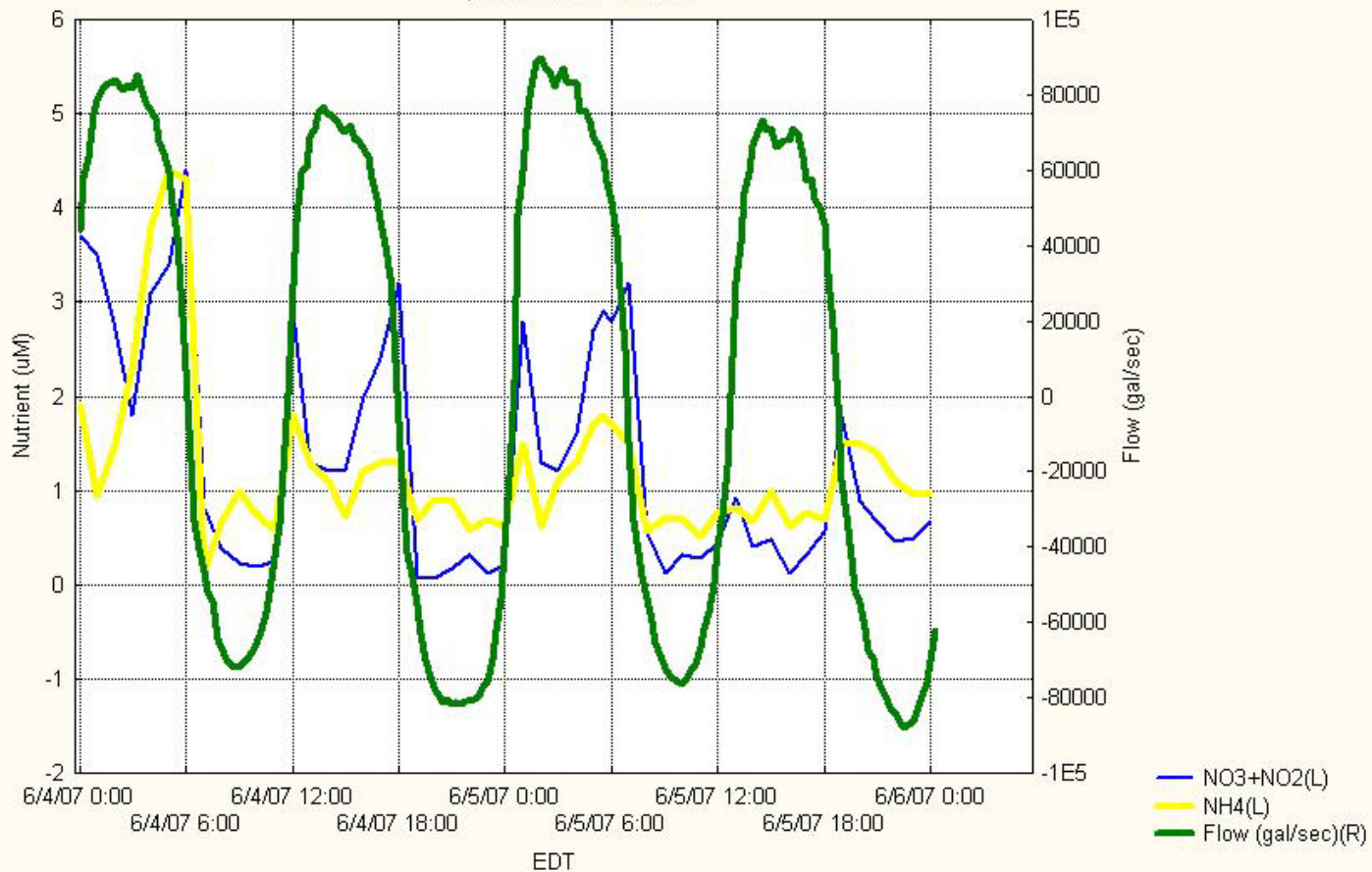
positive flow is seaward



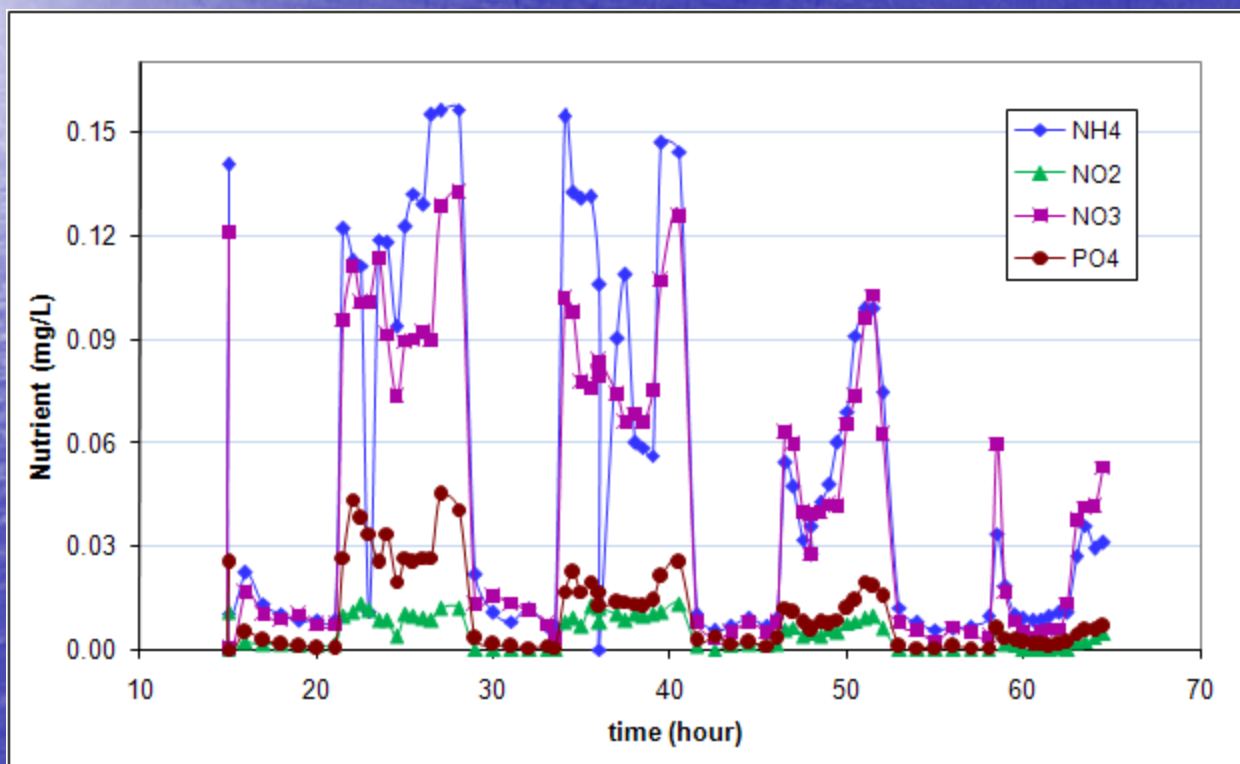
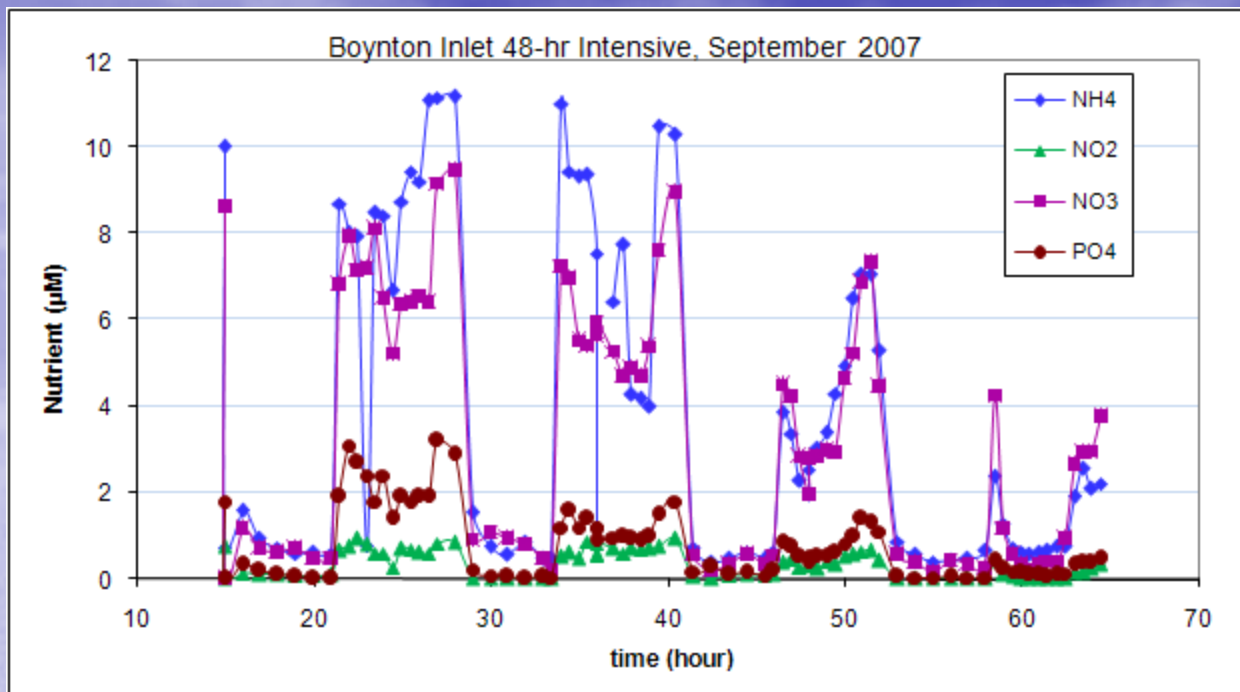
Boynton inlet flow data, measured using a horizontally-directed acoustic Doppler current profiler. Net flow out of the Inlet is about 200 Mgal/day.

Boynton Inlet Nutrient study Jun 4-6 2007

positive flow is seaward



Boynton Inlet flow and nutrient concentrations from samples taken on the southern bank of the Inlet (June 2007). Flood tide (negative flow) concentrations are quite low compared to that from ebb tide flow.



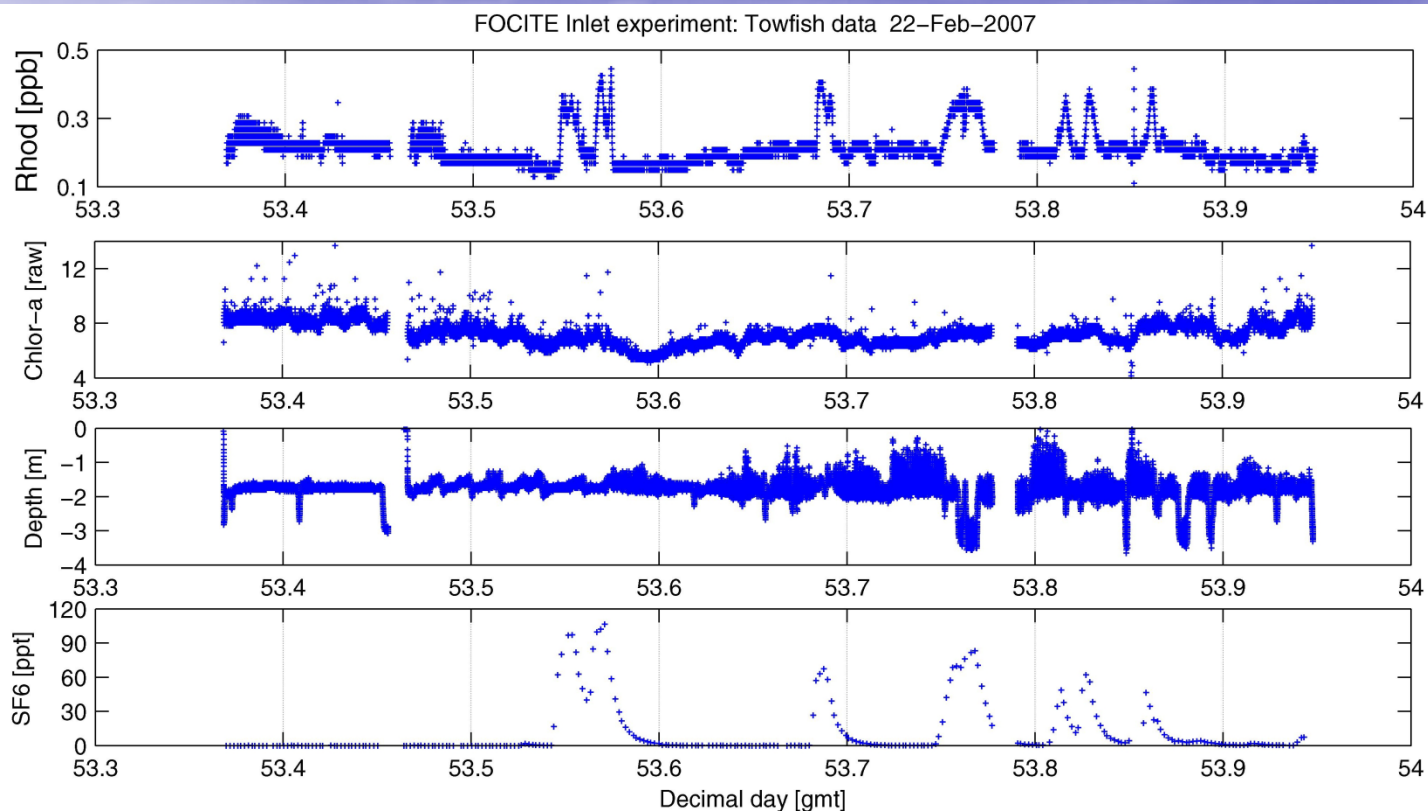
Boynton Inlet flow and nutrient concentrations from samples taken from the center the Inlet (September 2007).

Boynton Inlet Comparison of Microbial Water Quality of Incoming and Outgoing Tides

	Assay	6/4/2007				6/5/2007				8/27/2007
		0400 hr	1000 hr	1600 hr	2200 hr	0400 hr	1000 hr	1600 hr	2200 hr	1400 hr
Fecal Indicator Bacteria	viable enterococci by IDEXX Enterolert, MPN/100 mL	10	<1	10	<1	20	<1	10	<1	52
	Presence of Human-source Enterococci by PCR (esp gene marker)	+	-	-	-	+	-	-	-	+
	Presence of Human-source Bacteroides by PCR (HuBac or HF8 gene cluster marker)	+	-	-	-	+	-	+	+	+
Presence of Pathogenic Bacteria (by PCR)	Salmonella sp. (IpaB gene)	-	-	-	-	-	-	-	-	-
	E. coli O157:H7 (rfb gene)	-	-	-	-	-	-	-	-	-
	Campylobacter jejuni (HspO gene)	-	-	-	-	-	-	-	-	-
	Staphylococcus aureus (clfA gene)	+	-	-	-	+	-	-	-	+
Pathogenic Protozoans (by IMS/IMF)	Cryptosporidium oocysts (per 100 L)	nd	nd	6.3	<1	2.4	nd	nd	nd	24.9
	Giardia cysts (per 100 L)	nd	nd	4.2	<1	1.2	nd	nd	nd	19.4
Presence of Human viruses (by PCR)	Human Adenovirus	+	-	-	+	-	-	+	-	+
	Noroviruses	+	-	-	-	-	nd	nd	nd	+
	Enteroviruses	-	-	-	-	+	nd	nd	nd	+

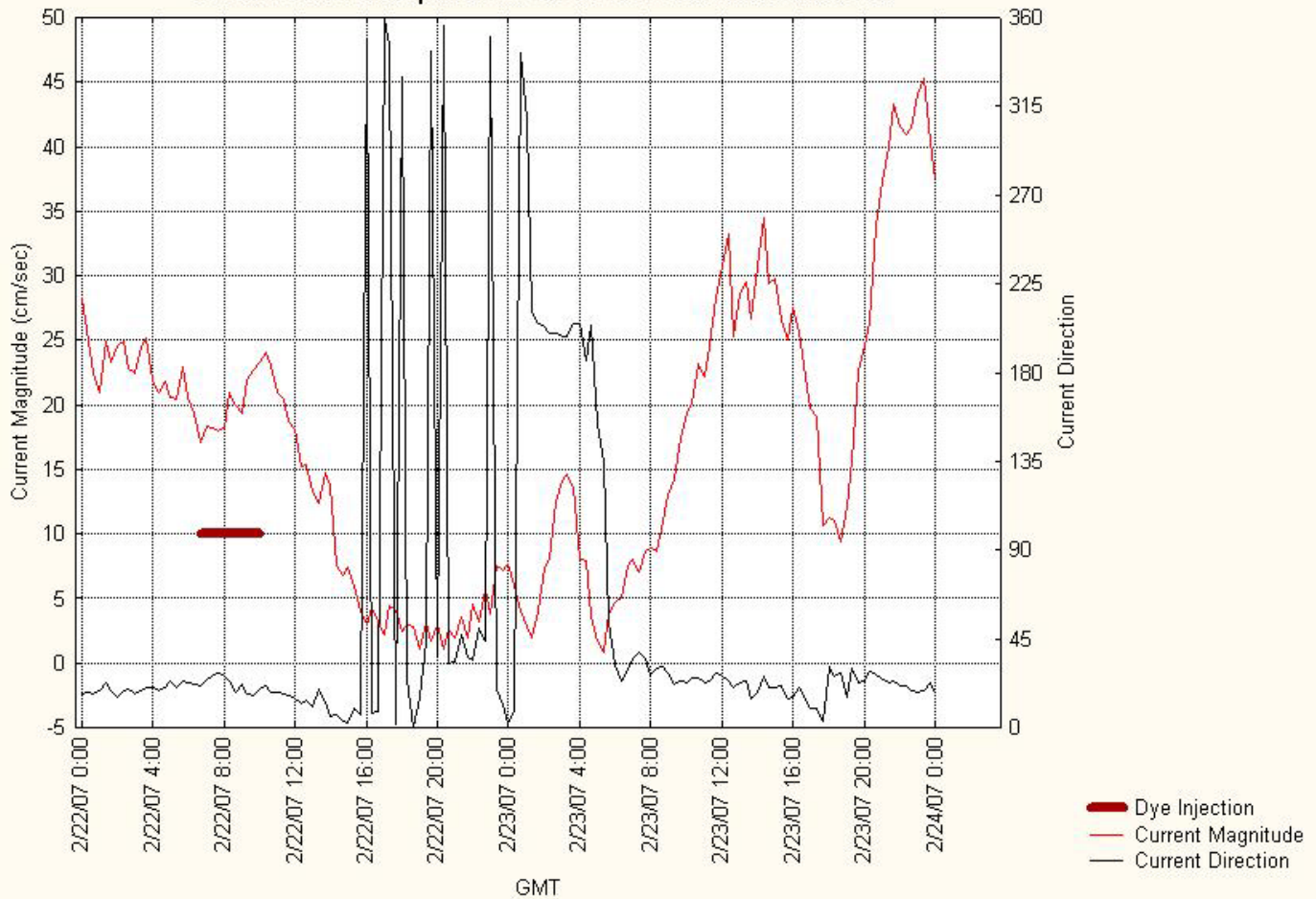
= outgoing tide
 = incoming tide

nd = "not determined"

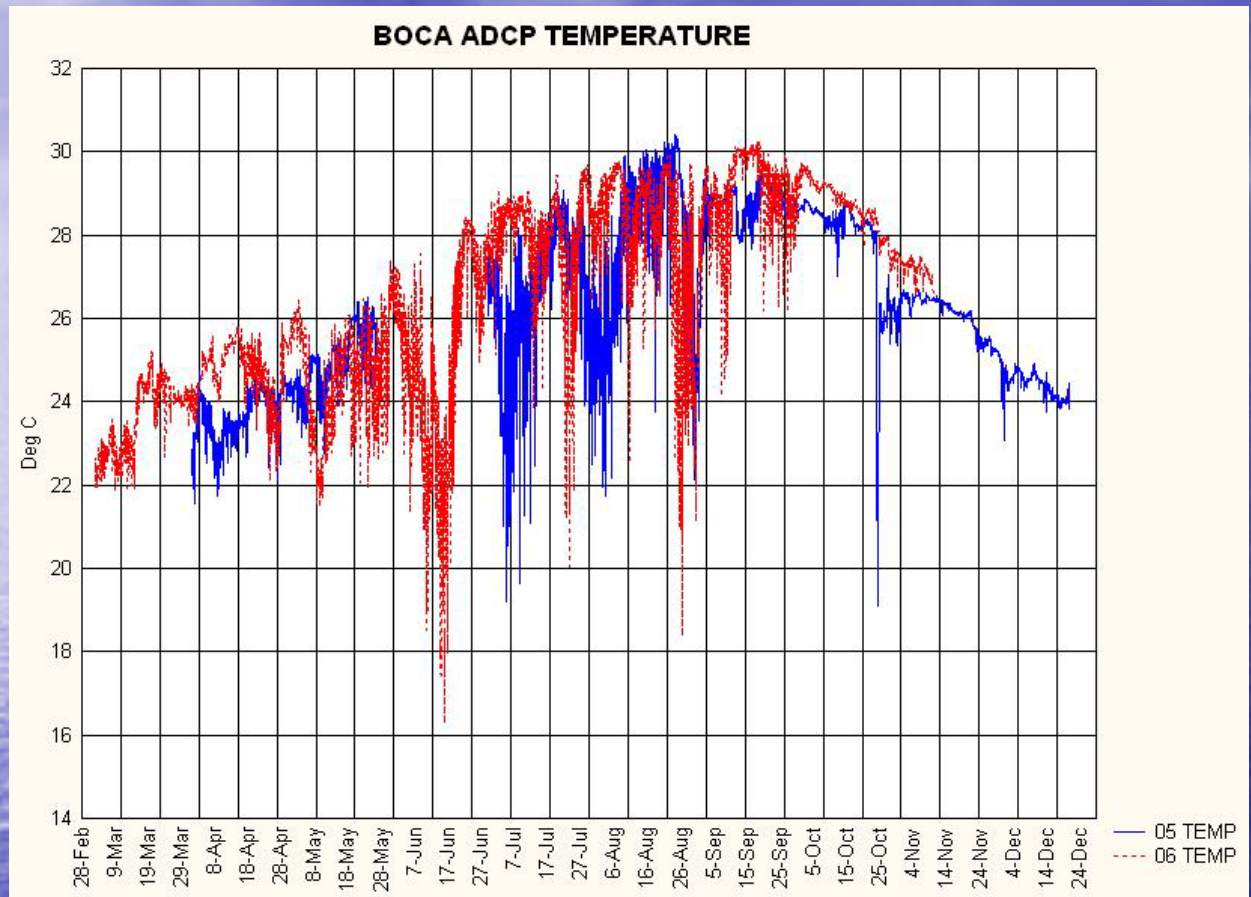


Measurements from a towed sampler, showing detections of the inlet plume, in waters north of the the Boynton Inlet, February 22, 2007.

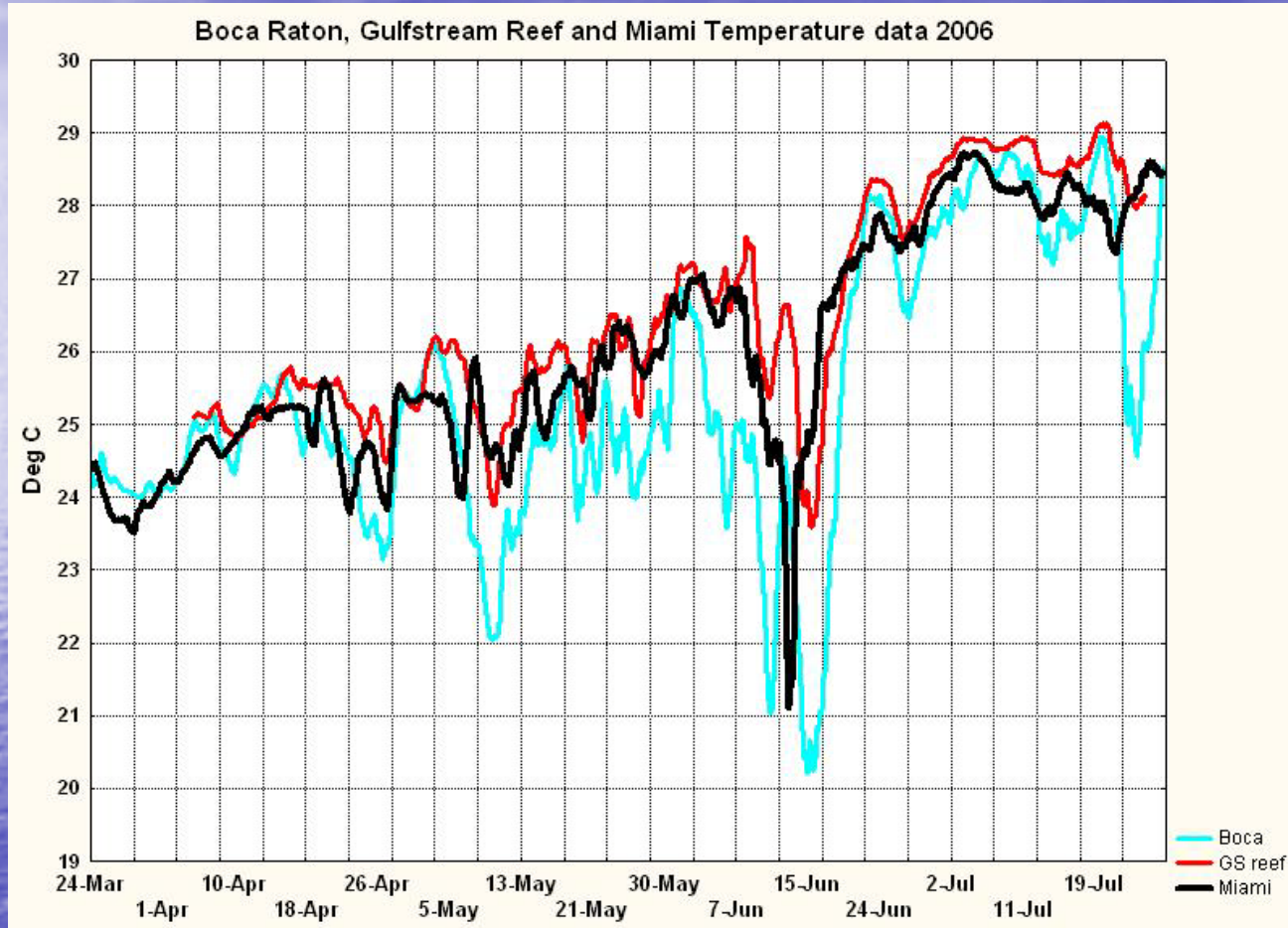
Currents at 8m depth from Gulfstream Reef North ADCP



Ocean current at 8 meters depth as measured by ADCP, north end of Gulfstream Reef.

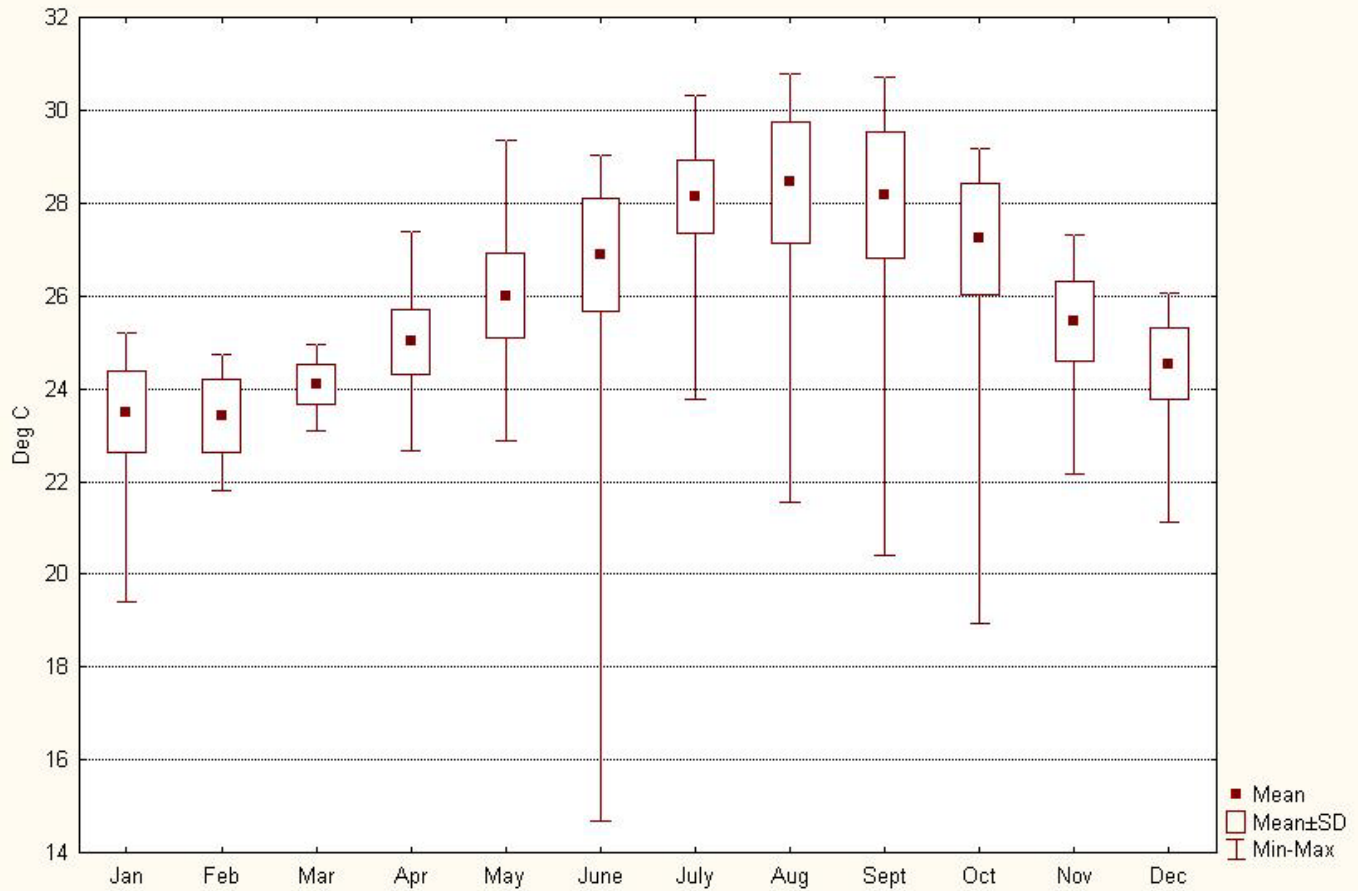


Temperatures Measured at the sea floor off Boca Raton in 2005 (blue) and 2006 (red) from ADCP instruments. Temperature drops are due to passing fronts, hurricanes, or oceanographic phenomena (possible upwelling).

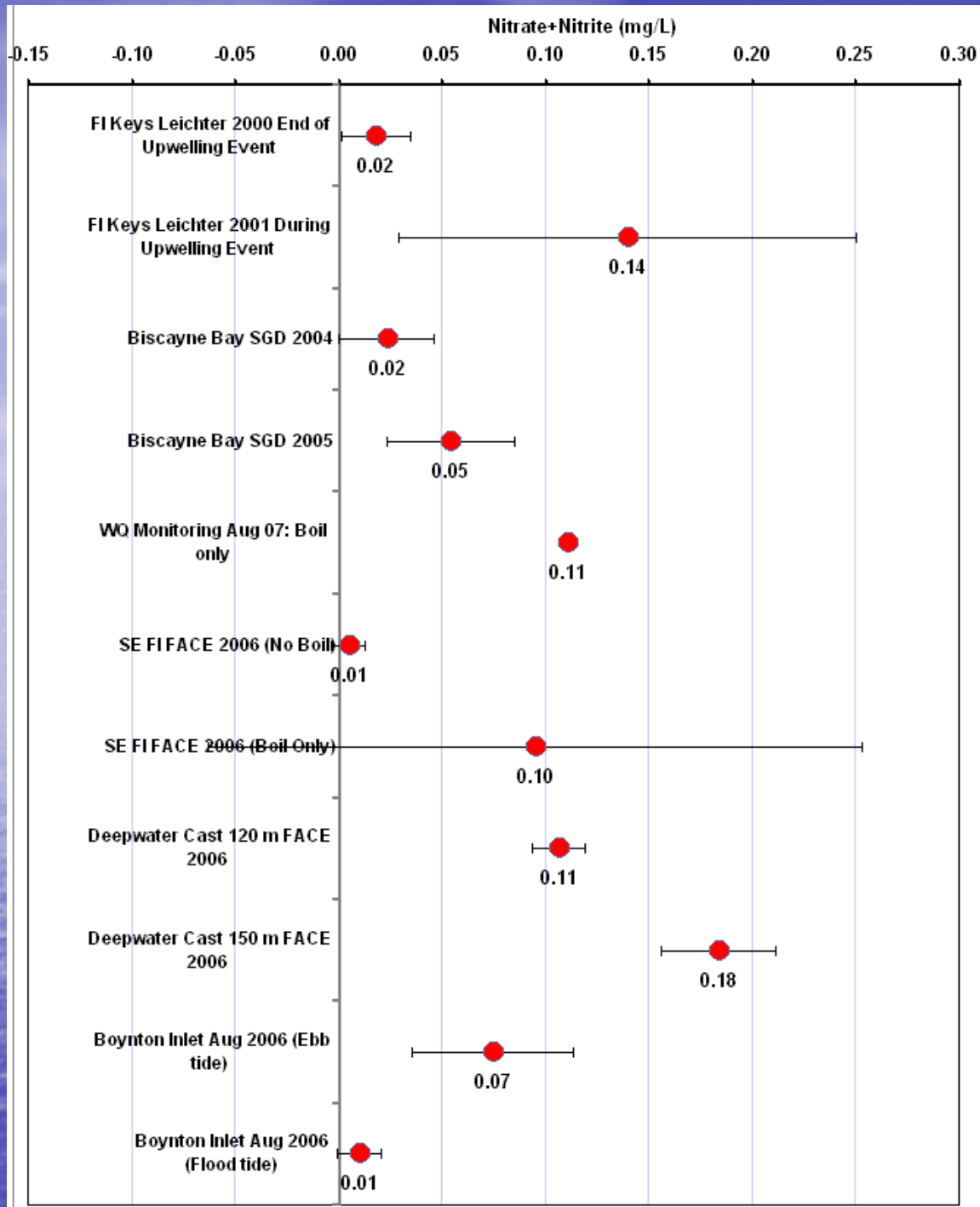


Sea floor temperature measurements from Gulfstream Reef (red), Boca Raton (blue), and Miami (black) in 2006. Large drops in temperature may be from upwelling events.

MOMS Site 1 ADCP Data
10/1998 - 8/2006



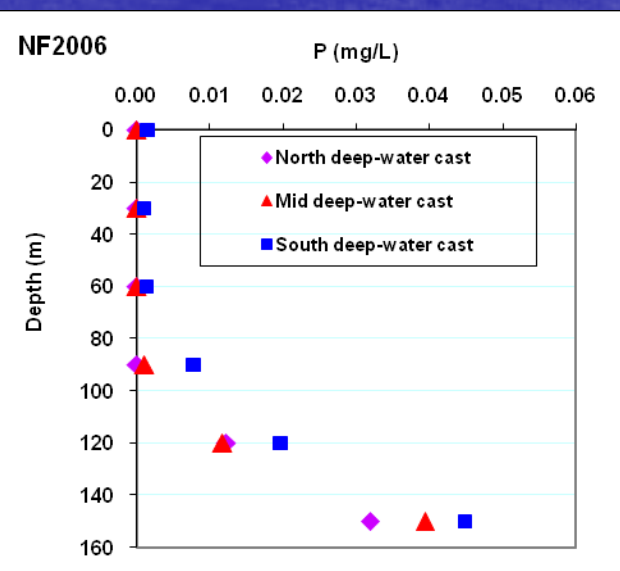
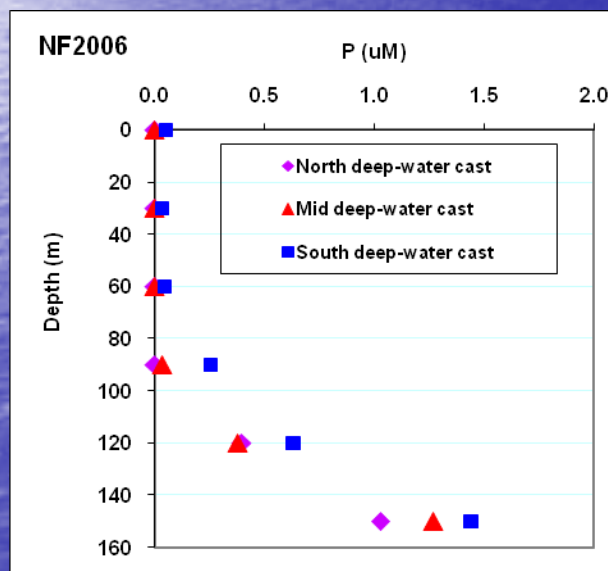
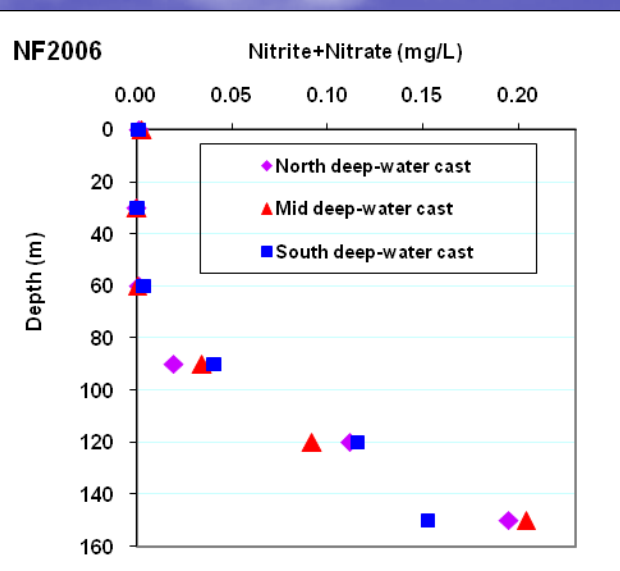
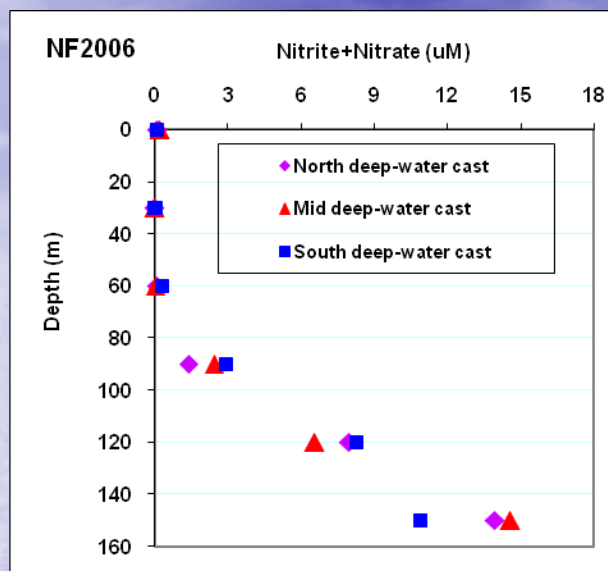
Miami Offshore Monitoring Site (MOMS)
temperature measurements, 1998-2006.



Comparison of nutrient (nitrate+nitrite) measurements from S and SE Florida coastal waters.

Deep-Water Casts

Nancy Foster Cruise, October 2006



CAST	Latitude	Longitude
North deep-water cast	26.3561	-80.0081
Mid deep-water cast	26.1323	-80.0488
South deep-water cast	25.7432	-80.062

Nutrient (nitrate+nitrite, phosphate) measurements from three deep casts off SE Florida. Nutrient concentrations increase significantly with depth.

SUMMARY

1. The Florida Area Coastal Environment (FACE) Program is in operation and has successfully undertaken the following:

- October 2006 Cruise aboard the NOAA R/V NANCY FOSTER
- February 2007 Cruise aboard the CORAL REEF II
- Monitoring Program in and around the Boynton Inlet (ongoing)
- Installation of various ambient ocean current instruments

2. Environmental data obtained include

- Outfall nutrient and isotopic ratio data
- Outfall plume vertical mixing
- Inlet flow and nutrient data
- Inlet microbiological data
- Sediment, water column and algal isotopic ratios
- Ambient ocean currents measurements at multiple sites

3. Future directions for FACE

- Cooperation between FDEP and NOAA expected to increase
- to additional Inlets and Outfalls
- Sediment, water column and algal isotopic ratios
- Incorporation of CREWS/ICON coral reef monitoring stations
- in Biscayne Bay and Florida Bay
- Monitoring Program to include Port Everglades Inlet,
- Hillsboro Inlet, and Government Cut
- Future cruise on the NOAA R/V NANCY FOSTER
- scheduled for February 2008.



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Thank You