

**NUTRIENT AND CHLOROPHYLL  
PATTERNS IN RIVER-INFLUENCED LONG  
BAY VERSUS NON RIVER-INFLUENCED  
ONSLOW BAY OCEAN WATERS**

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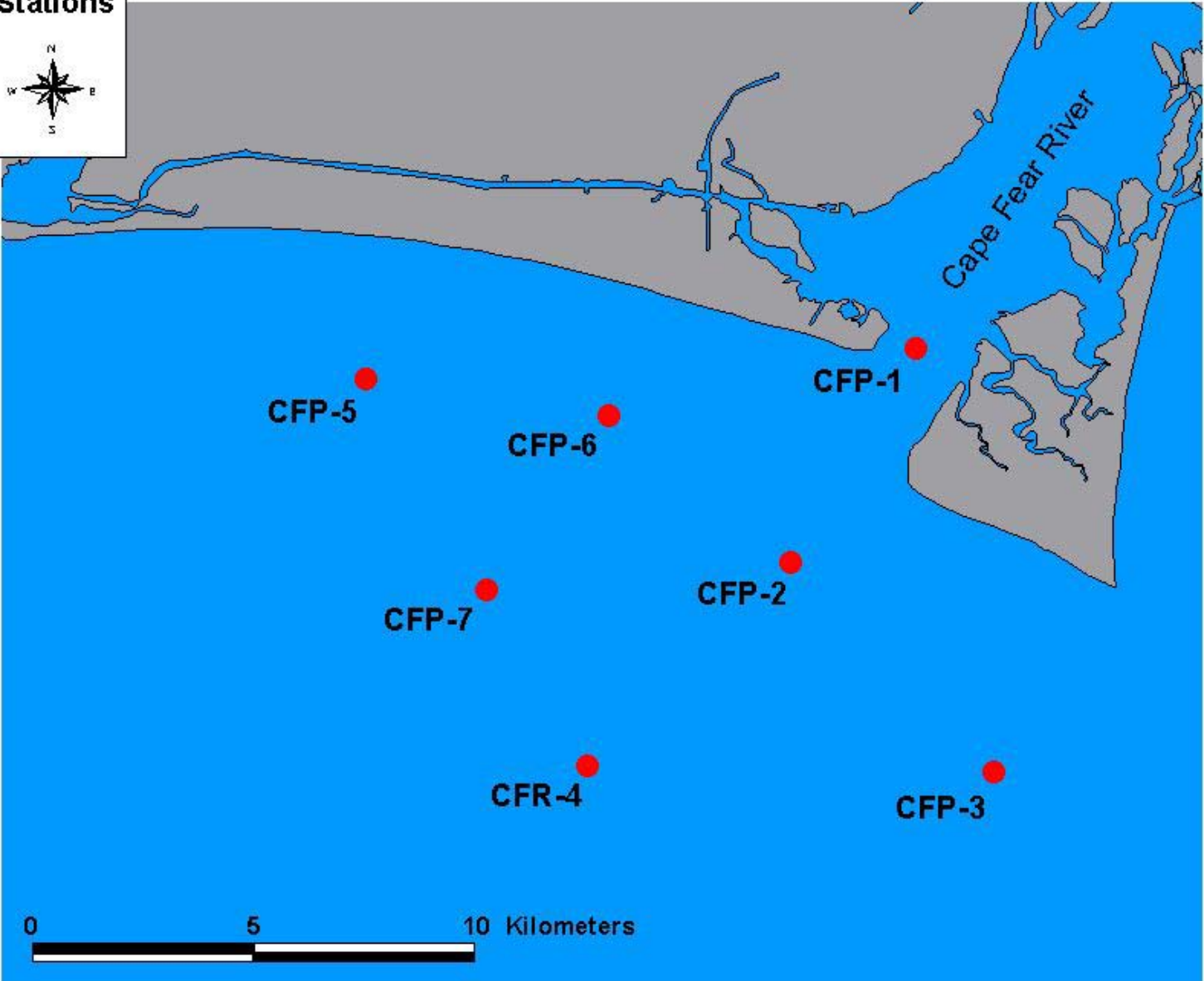



# **OVERALL PROJECT APPROACH – WATER QUALITY PORTION OF THE UNC WILMINGTON COASTAL OCEAN RESEARCH AND MONITORING PROGRAM (CORMP)**

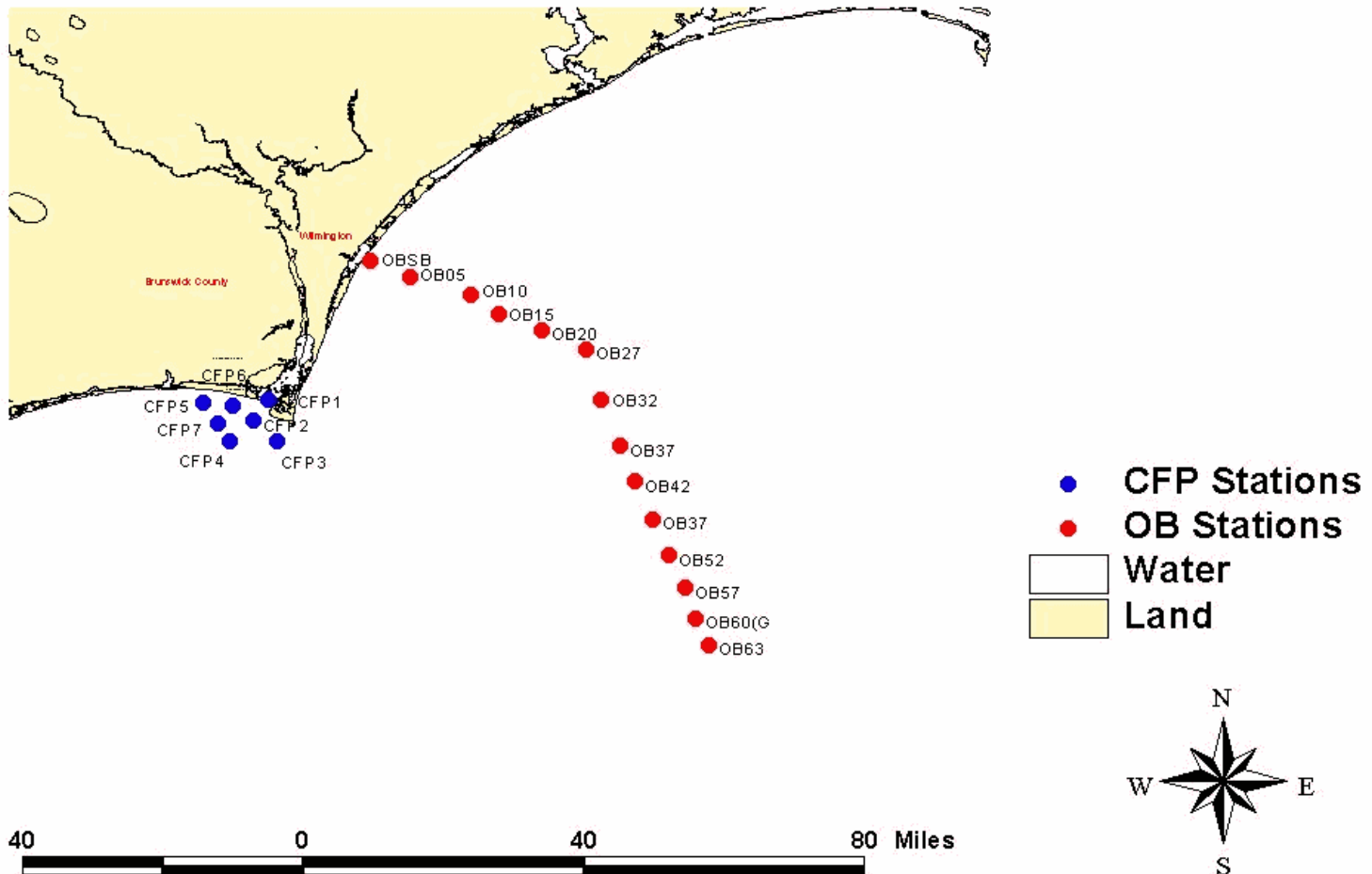
- Conduct monthly biological/chemical/physical sampling cruises to seven stations located in the lower Cape Fear estuary and coastal ocean within and outside of the plume**
- Conduct bimonthly sampling of nutrients, chlorophyll, and irradiance characteristics along a 100 km transect in Onslow Bay, including surface, mid-depth, and bottom**
- Perform regression/correlation analyses to determine meteorological and hydrological influences on the CFR plume and its ecology, and phytoplankton production in Onslow Bay**

# UNCW-COMP Plume Sampling Stations

● **Sampling Stations**

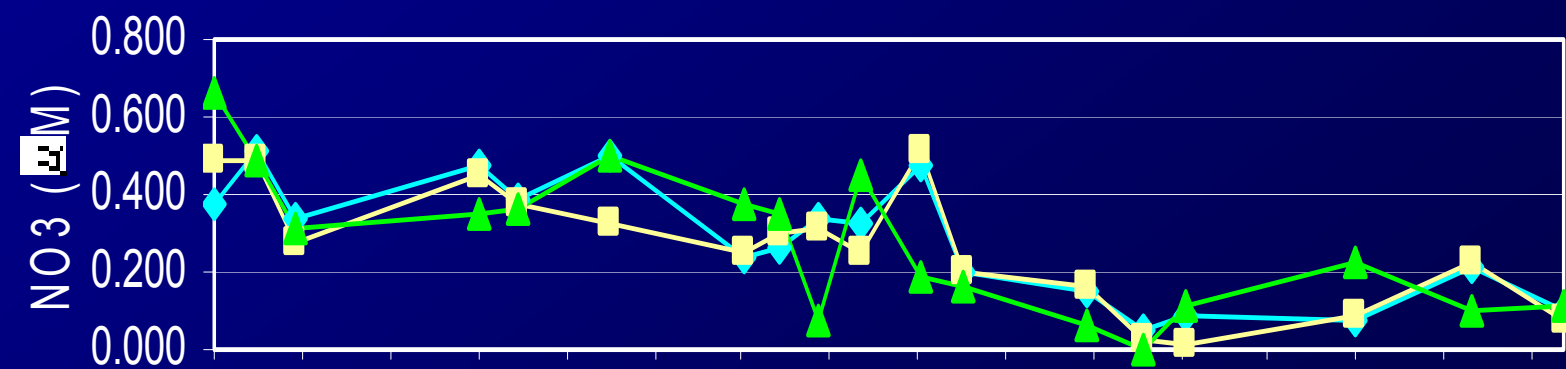
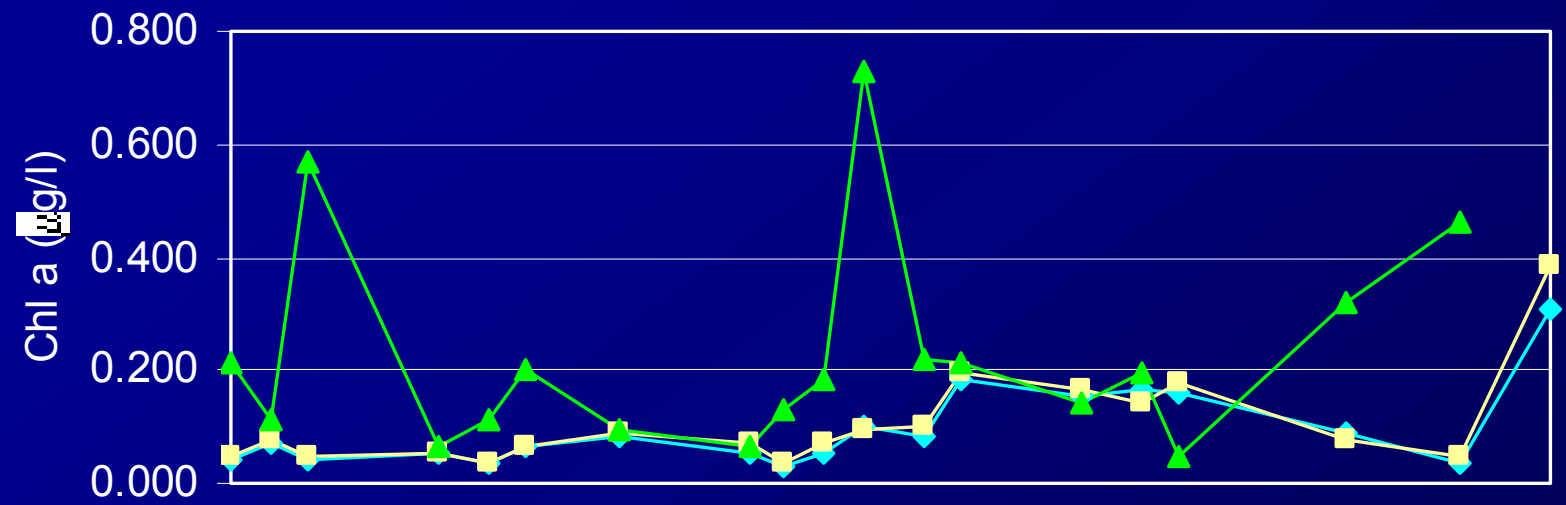


# UNCW/NOAA Coastal Monitoring Program

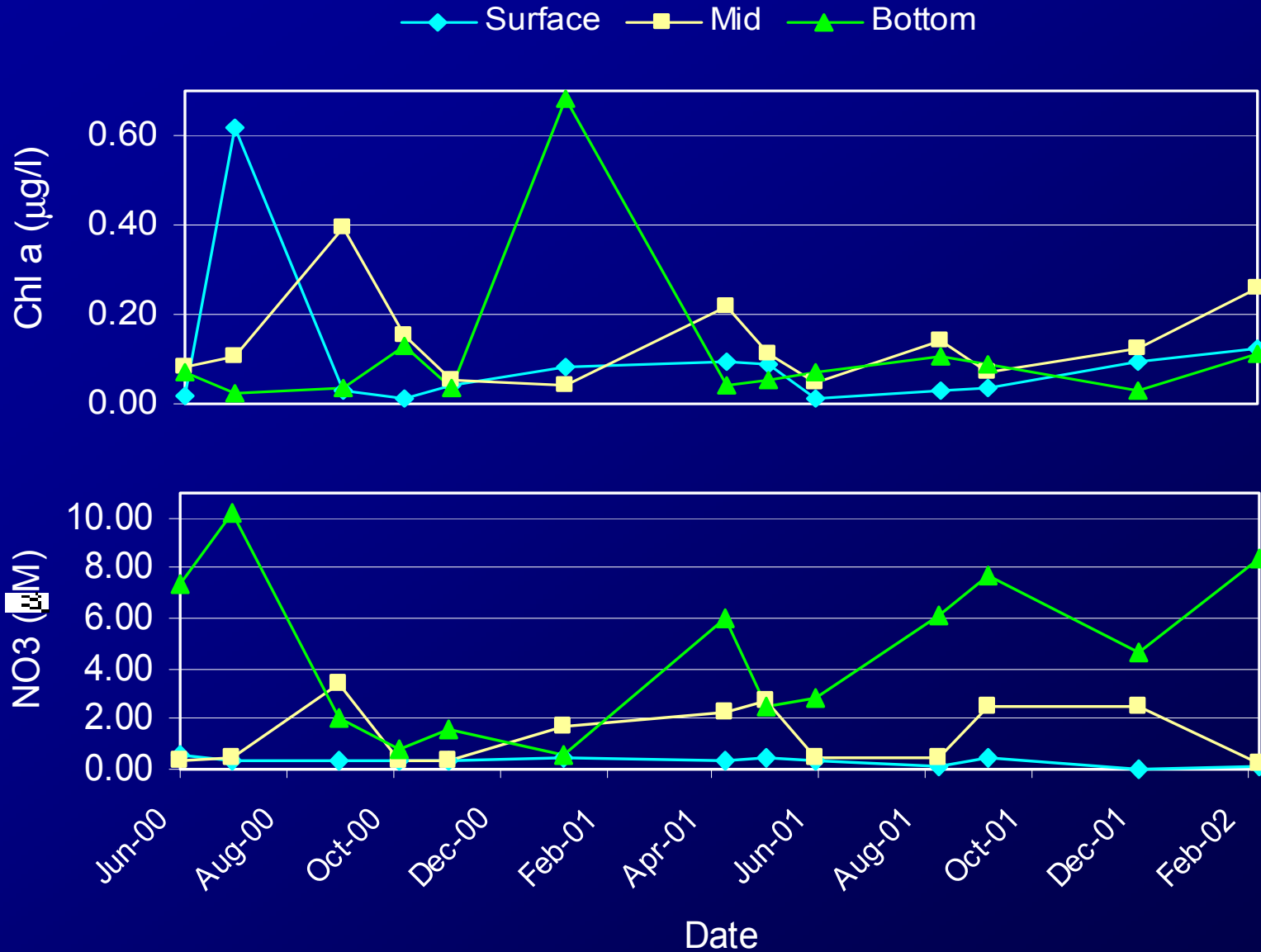


# Chlorophyll *a* and Nitrate Data for OB27

◆ Surface    ■ Mid    ▲ Bottom



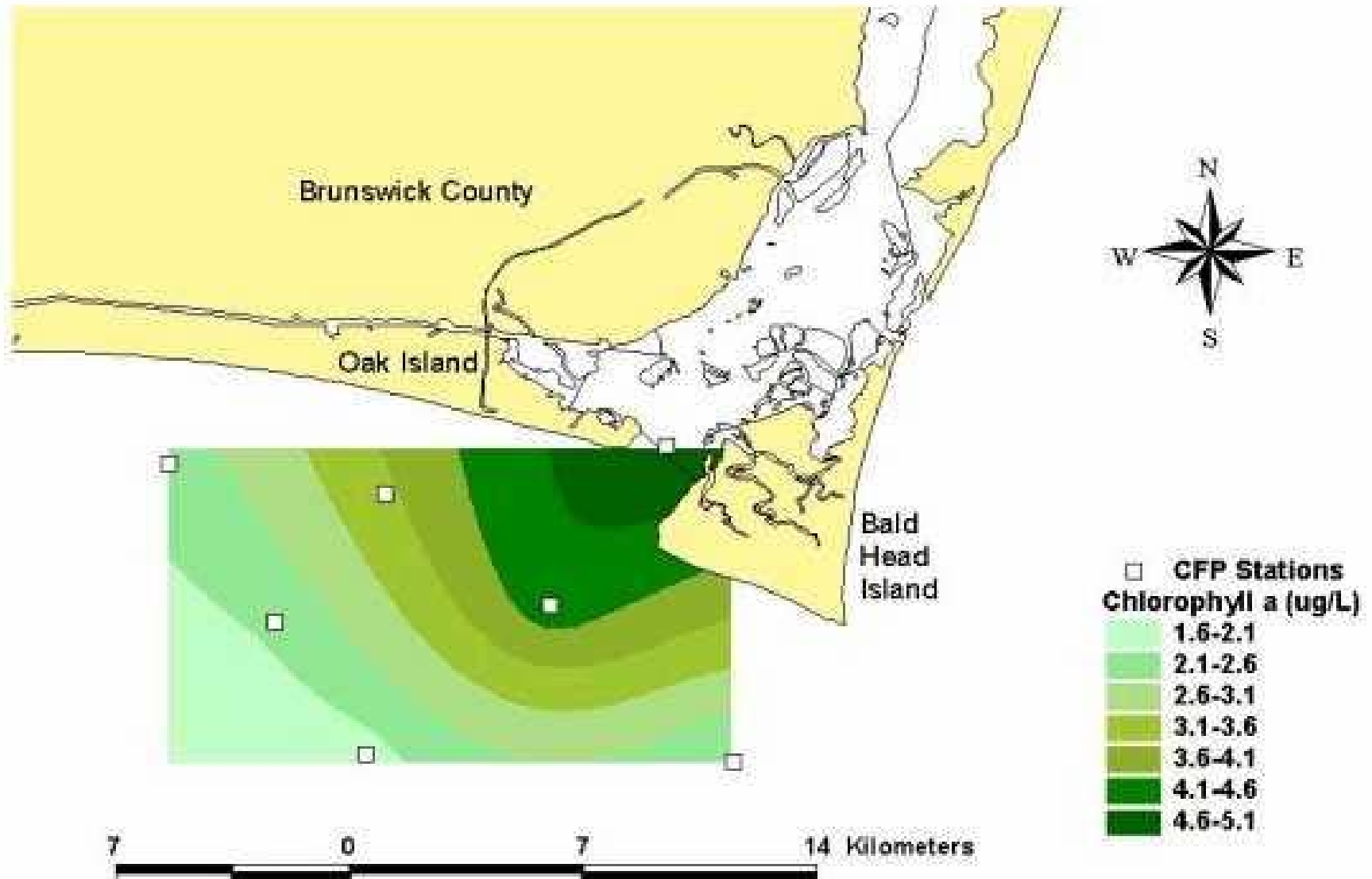
# Chlorophyll *a* and Nitrate Data for OB63



# ONslow BAY NUTRIENTS AND CHLOROPHYLL – PRELIMINARY RESULTS

- **Ammonium is the dominant inorganic nitrogen component at OB27– nitrate concentrations low ( $<0.6 \mu\text{M}$ ) at all three depths**
- **Nitrate in bottom and mid-depth at OB63 is 10X that of OB27 (Gulf Stream intrusions?)**
- **Water column chlorophyll *a* is greatest near the bottom at OB27 (probably resuspension), but similar among depths at OB63 – light limitation likely retards phytoplankton production at 50-100 m depth ( $<0.01 \% I_0$ )**
- **No seasonal signal detected in either nutrients or chlorophyll concentrations**

# UNCW/NOAA Coastal Monitoring Program





# AVERAGE SURFACE PARAMETER LEVELS LONG BAY versus ONSLOW BAY

	LB plume	LB control	OB5	OB27	OB63
Nitrate ( $\mu\text{M}$ )	1.41	0.72	0.22	0.26	0.41
Chlor <i>a</i> ( $\mu\text{g/L}$ )	3.2	1.9	0.44	0.11	0.12
Kd / m	0.70	0.67	0.23	0.14	0.13
Depth	10 m	10 m	15 m	27 m	110 m
Iz as % Io	0.10%	0.12%	3.17%	2.28%	<0.01%
Distance	7 km	7 km	8 km	45 km	100 km

# **Onslow Bay – Long Bay Nearshore Comparisons**

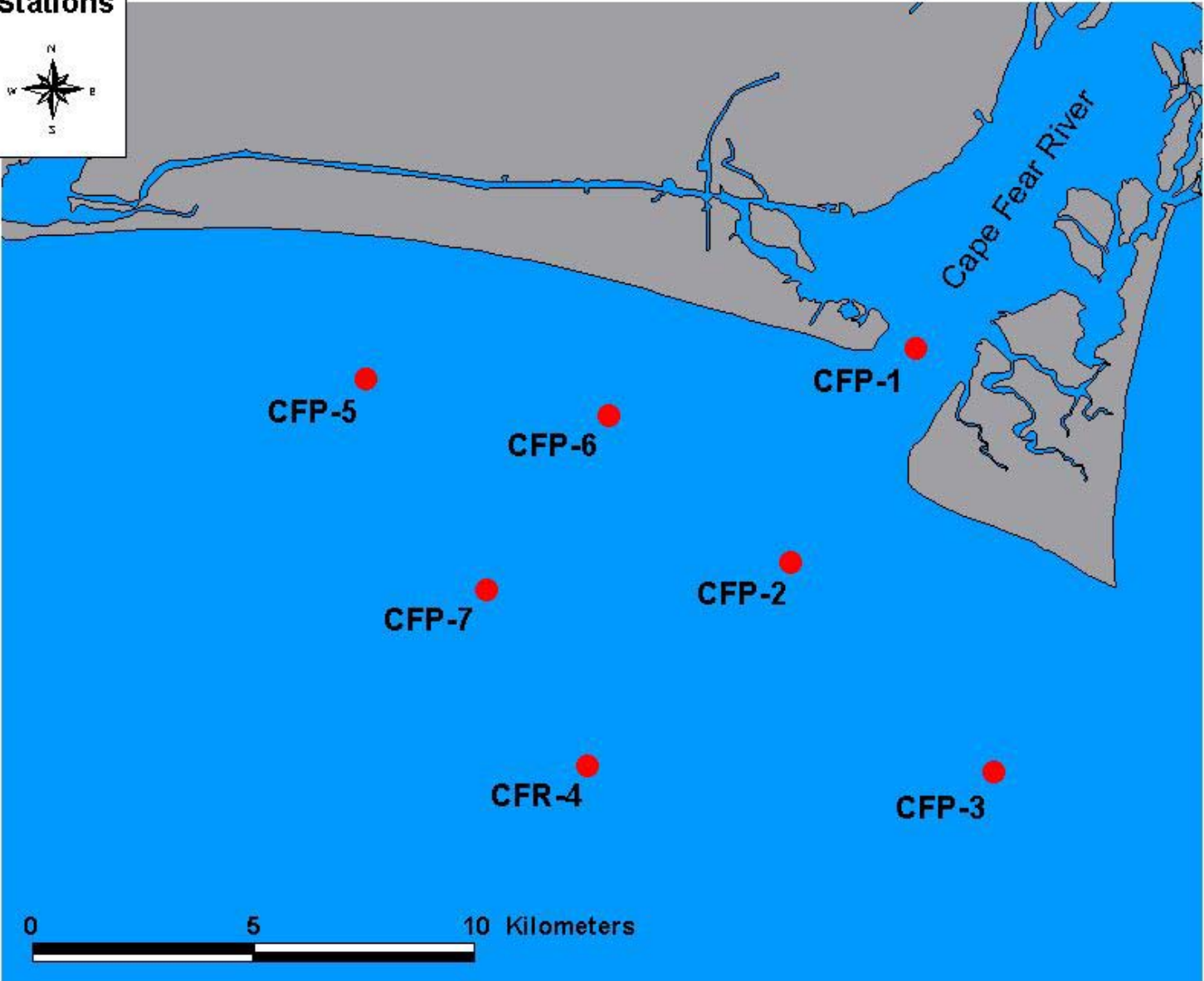

- The Cape Fear plume station yielded greater nitrate and chlorophyll concentrations than a control station outside the plume in Long Bay**
- Both Long Bay stations yielded chlorophyll 4-8X that of an Onslow Bay station of similar distance from shore, and nitrate 3-7X higher**
- The influence of the Cape Fear River is thus evident outside of the plume in Long Bay**
- The Cape Fear River typifies many rivers entering the South Atlantic bight from N.C. to North Florida**

## **More...**

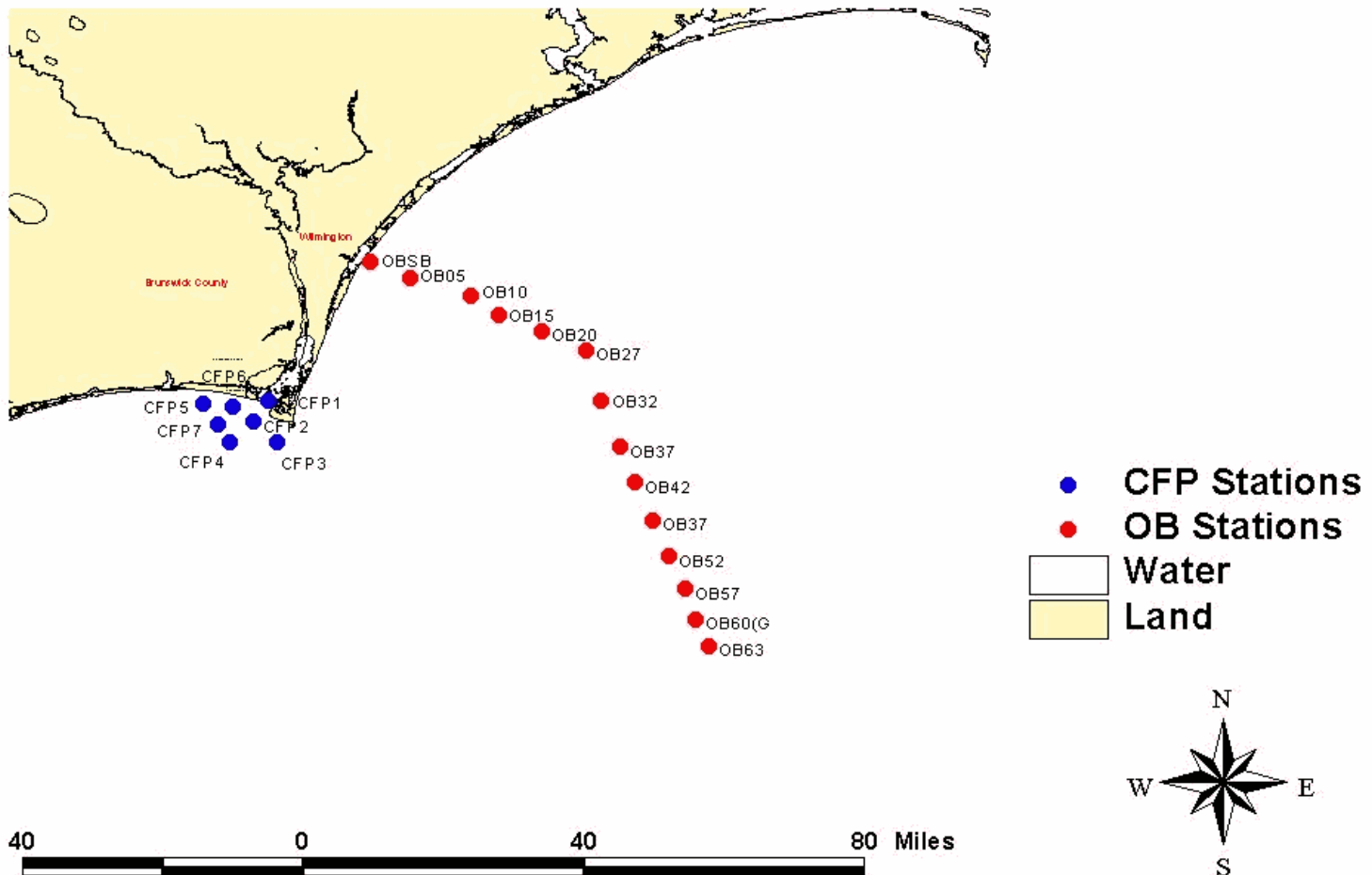
- **There is sufficient PAR (>2.3% of surface irradiance) to the bottom up to 40 km offshore in Onslow Bay, whereas PAR is <0.2% of surface irradiance in and near the CFR plume in Long Bay**
- **Much of the food web base is thus likely benthic microalgae-based in nearshore Onslow Bay, but phytoplankton-based in nearshore Long Bay**

# UNCW-COMP Plume Sampling Stations

● **Sampling Stations**



# UNCW/NOAA Coastal Monitoring Program



# **OTHER ONGOING CORMP EFFORTS AND FUTURE NEEDS AND GOALS**

- **Continue field collections in plume and further offshore to obtain signals during normal to high flow conditions – data thus far are largely from drought conditions**
- **Continue bioassay experiments to detect seasonal changes in limiting nutrients in the CFR plume**
- **Need physical/geological data in Long Bay to further assess inshore-offshore plume effects**
- **Look at plume data in terms of food chain stimulation, i.e. develop statistical approach to assess relationships among chlorophyll, benthos, fish**
- **Assess offshore water column nutrient concentrations and chlorophyll in terms of wind/weather events**

