Linking IOOS and Marine Transportation System

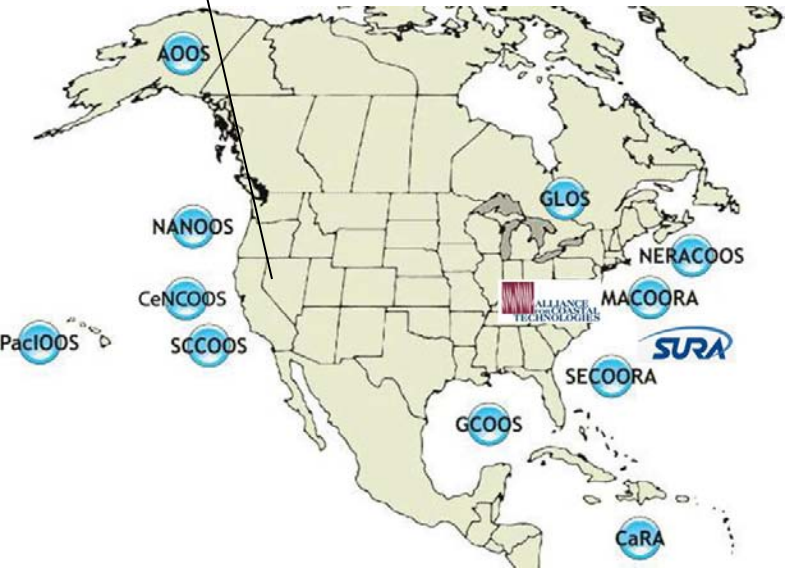
Josie Quintrell

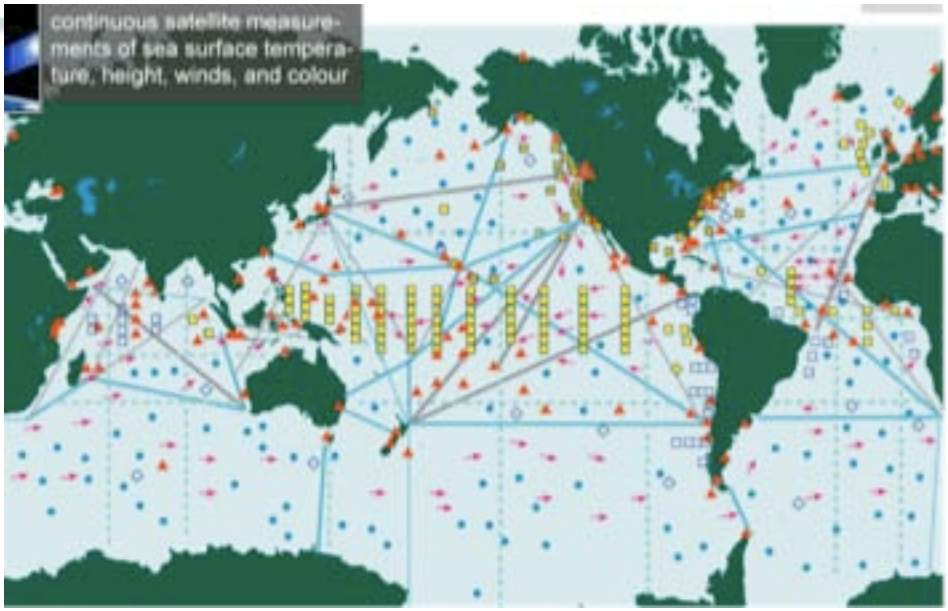
NFRA National Federation of Regional Associations for Coastal and Ocean Observing

U.S. Integrated Ocean Observing System

Two interlinked components:

Coastal ——— **Global**





7 Goals - 1 System

- Improve predictions of climate change and weather
- **Improve the safety and efficiency of maritime operations**
- Improve forecasts of natural hazards
- Improve homeland security
- Minimize public health risks
- Protect and restore healthy coastal ecosystems
- Sustain living marine resources

Coastal Component

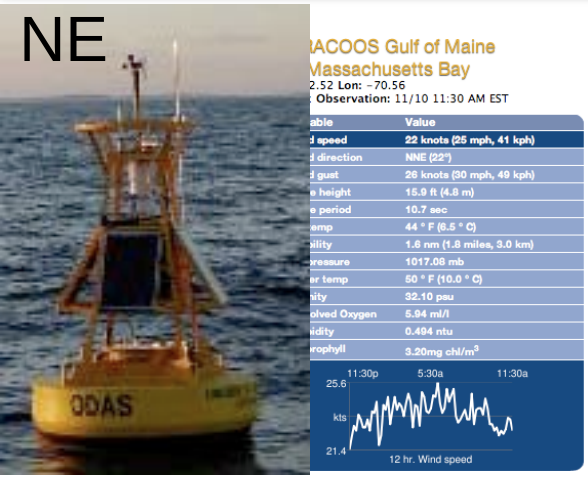
IOOS
INTEGRATED OCEAN OBSERVING SYSTEM

- Geographic extent: EEZ to the head of the tide
- Regional/Federal Partnership
- Data Management and Communications (DMAC) connects regional and national scales

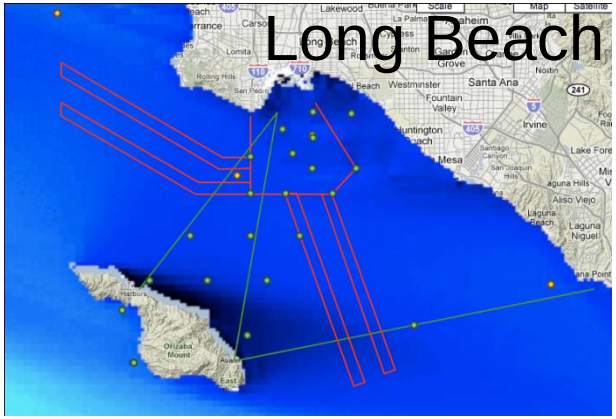
Why Regional Approach?

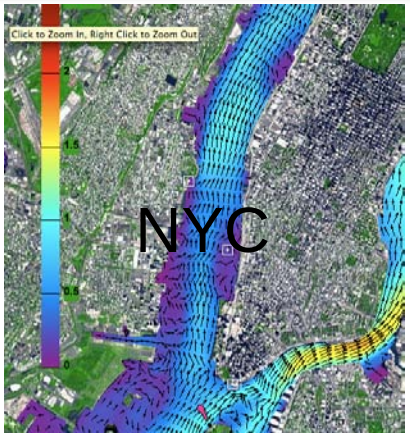
Connection to users
Tailored products
Ties to regional experts
Facilitate regional needs
Testbeds for new technologies
Flexibility

Regional Association Activities Supporting Marine Operations: Multiple Responses - Navigation, Safety and Efficiency



Real Time Sea State Conditions

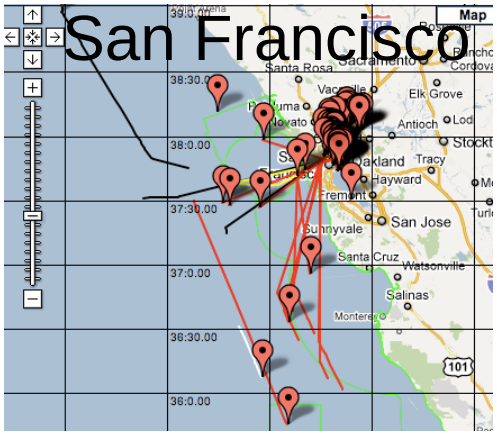




Customized Products
Integrating observations and model forecasts

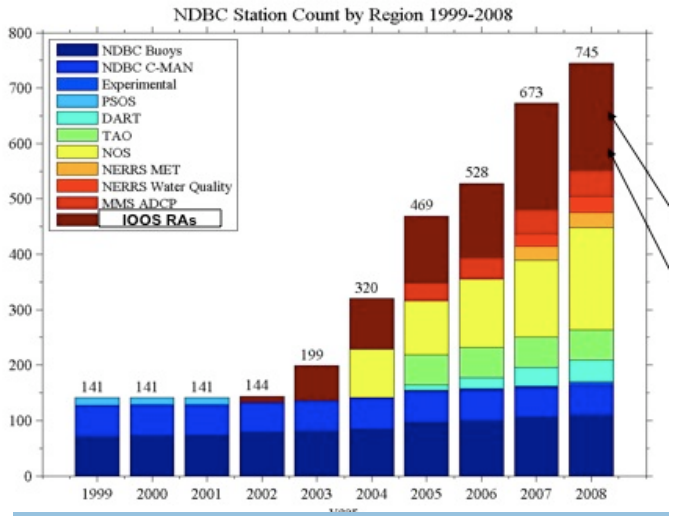
Emergency Response

Beach Safety



Ship Tracking

Operational Partnerships Integrating IOOS Data: Multiple Delivery Methods



NDBC Station Count by Region

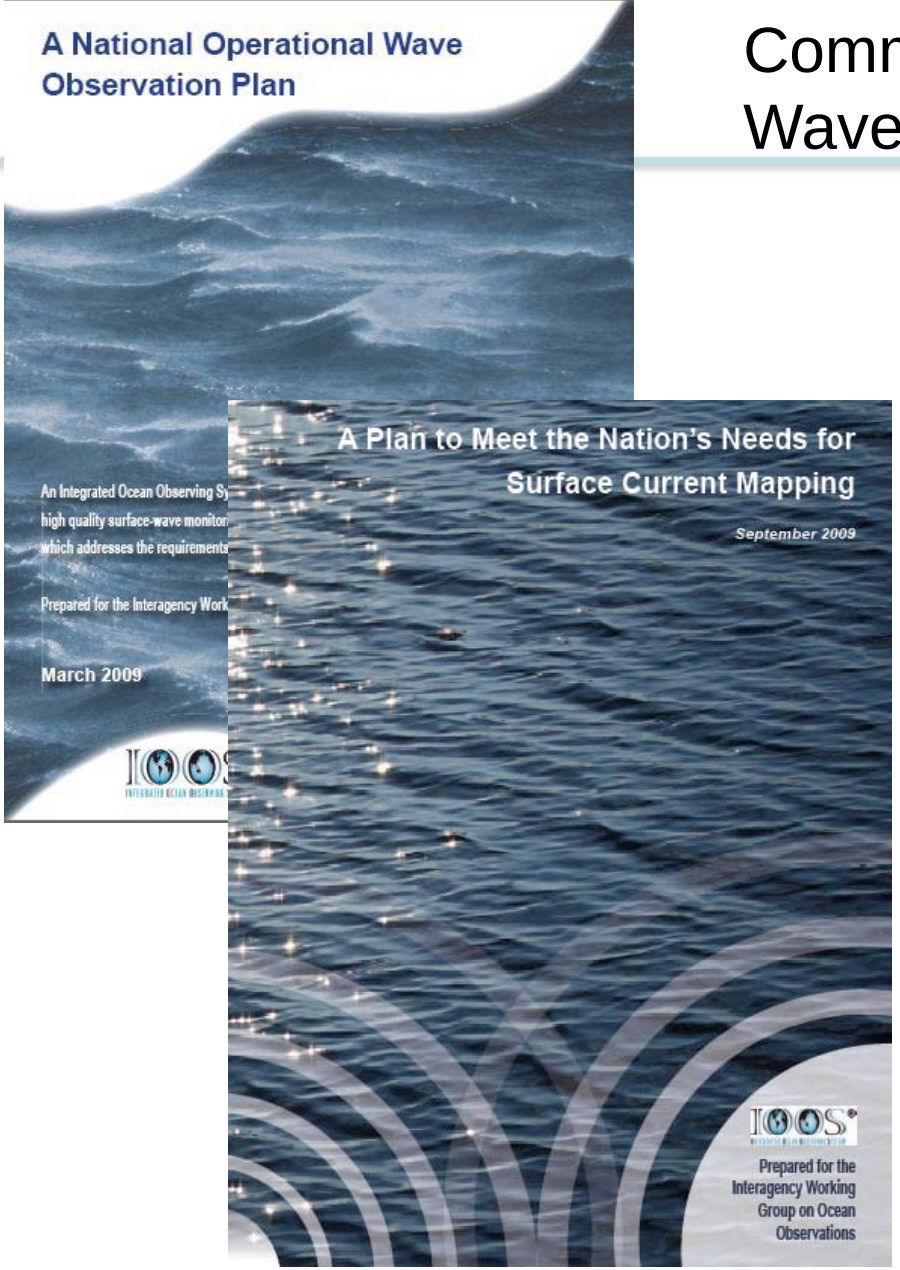
National Data Buoy Center

- Serving non-federal data from RAs
- Over 50% of data served by NDBC is from external partners, enabled by IOOS DMAC

Integrating IOOS data into NOAA's PORTS

- Waves: Chesapeake, San Francisco, Long Beach/Los Angeles and Mouth of Columbia River (through MOU with USACE/CDIP & PORTS)
- Currents: underway for NY/NJ Harbor
- Methodology established that allows for other sites to be incorporated

Commonalities Across Regions: Waves and Surface Currents



- Developed with community support from academia, regions, and federal agencies (ACT facilitated plans)
- Identified critical gaps, technical needs and data management requirements
- Includes estimated cost based on decades of experience
- Framework to facilitate leveraging

Regional Build Out Plans: Common Marine Op Products

Safe and efficient operations

- Wind, wave, current conditions, nowcasts and forecasts
- Integrated visualizations
- High resolution observations and models for ports, harbors, passages

Search and Rescue

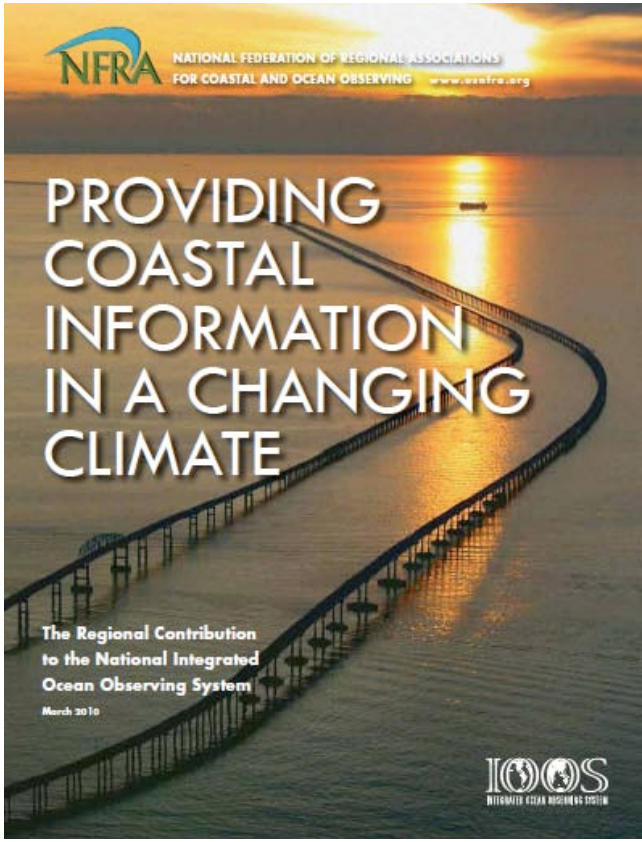
- Wind, wave, current nowcasts and forecasts for SAR

Spill Response

- RT winds, waves, currents and forecasts/hindcasts for responders
- Surface and subsurface conditions

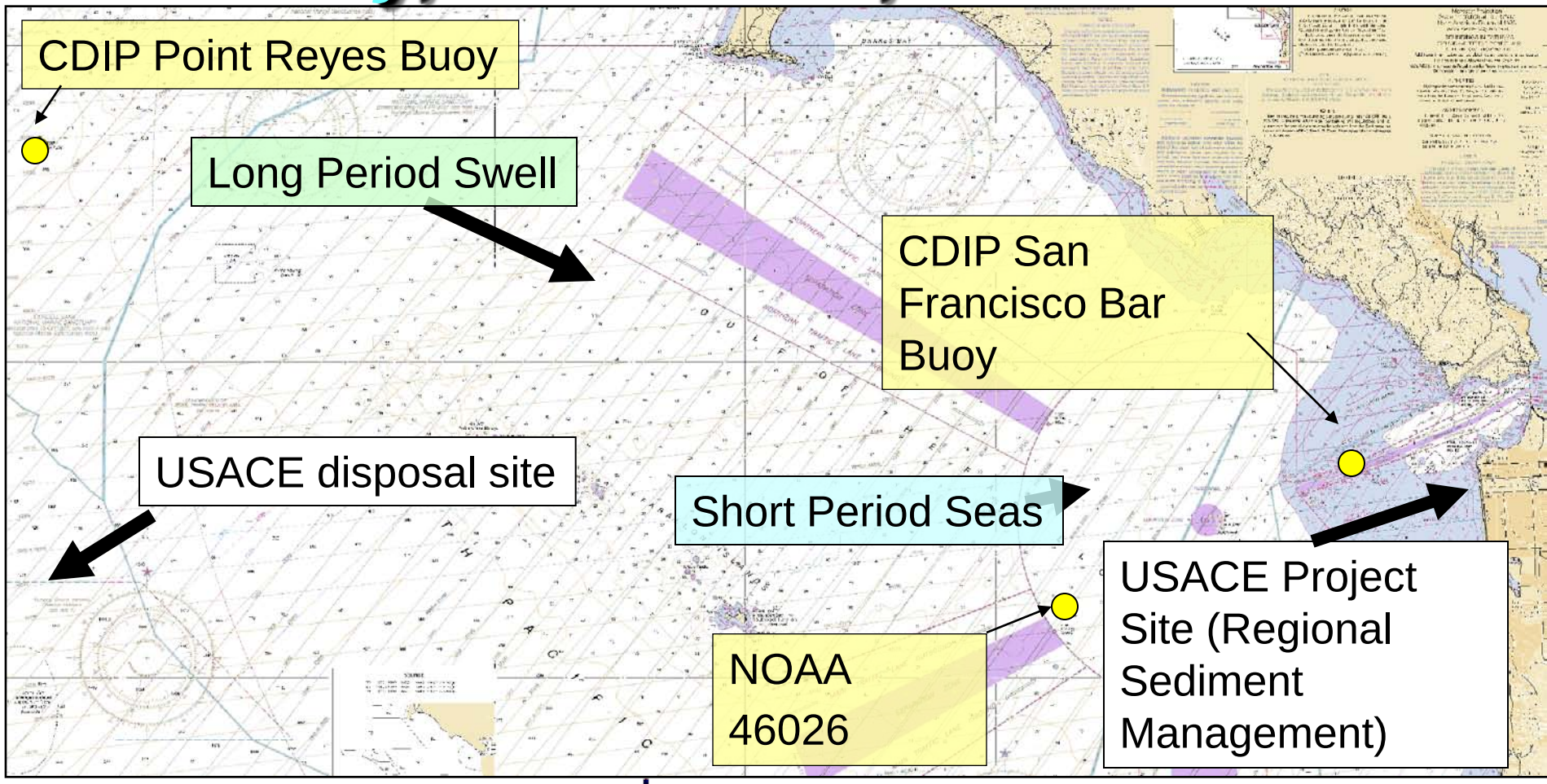
Offshore energy

- Wind, wave, and current climatologies
- Maximize efficiency and safety of energy operations
- Real time and forecast winds, waves, currents



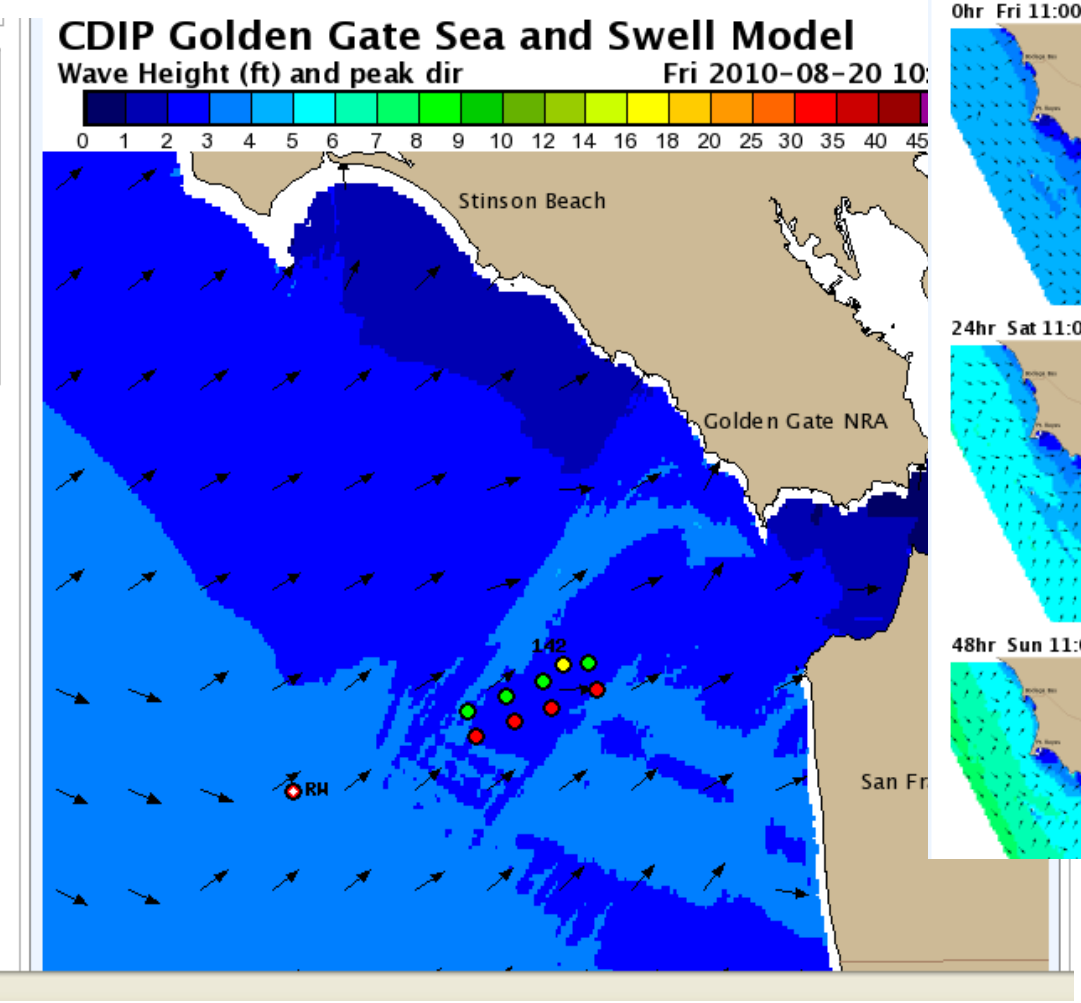
San Francisco

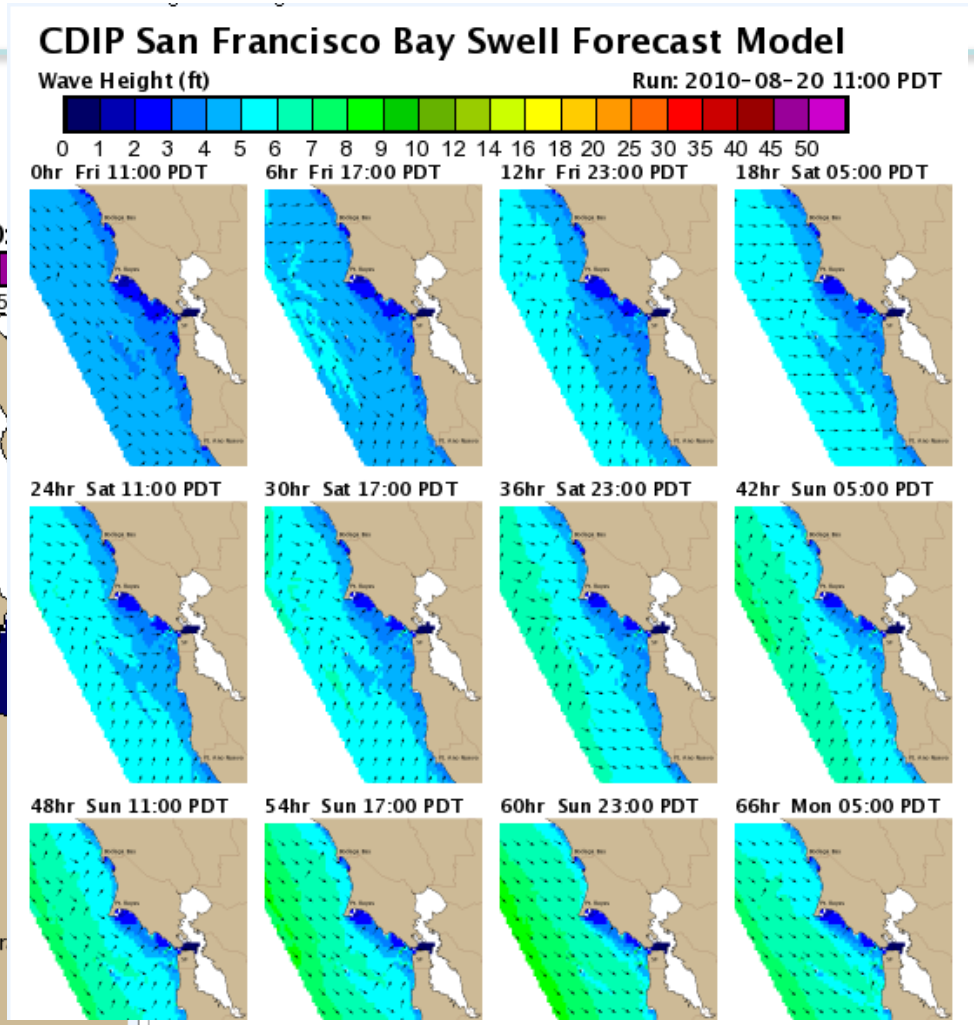
Safety, Economics, Environment



IOOS®

San Francisco
Wave Map Browser
Safety, Efficiency





Understanding of Management Issues

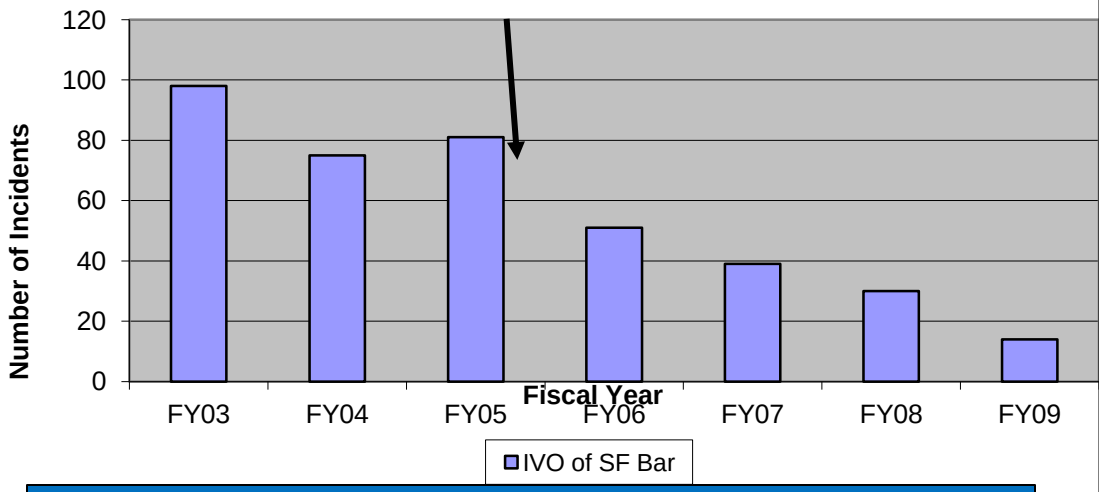
San Francisco - SAFETY

Fiscal Year (FY)	Surf Cases	IVO of SF Bar	Total
FY03	32	98	130
FY04	28	75	103
FY05	29	81	110
FY06	18	51	69
FY07	20	39	59
FY08	19	30	49
FY09	11	14	25

Marine Incidents (rescues) near SF Bar

Data supplied by the Coast Guard. Assimilated and Disseminated by the SF NWS Office.

Bar Forecast Begun by MTR



Incidents in the Vicinity of SF Bar (IVO)

Making a Difference

Safety & Efficiency

SF NWS

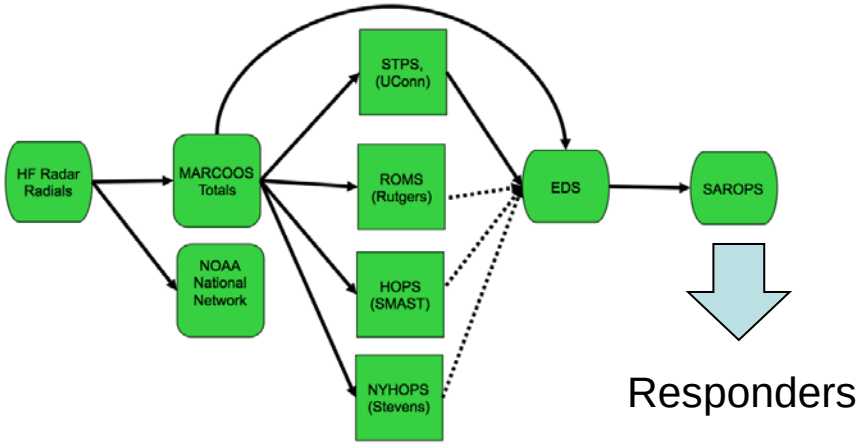
"This buoy allows for safer transits, safer pilot boat operations, and efficiency for the shippers that call at San Francisco Bay."
Captain Bill Greig

"The valuable information available from this weather buoy plays a very crucial roll in my decision that relates to safe navigation of ships across the bar." Captain Carl Martin, Jr.

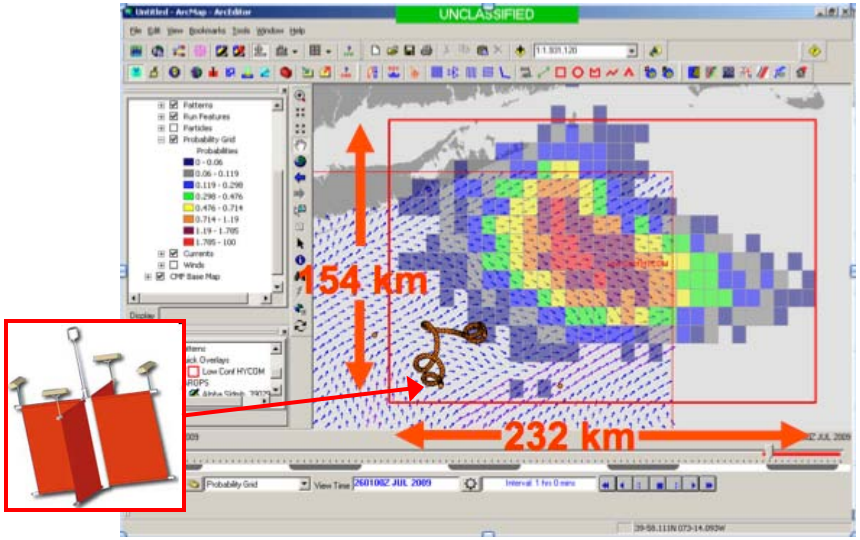
"This station has been a great benefit to me as a San Francisco Bar Pilot in route planning and risk assessment." Captain H.W. Kenyon

U.S. Coast Guard: *Search And Rescue Optimal Planning System*

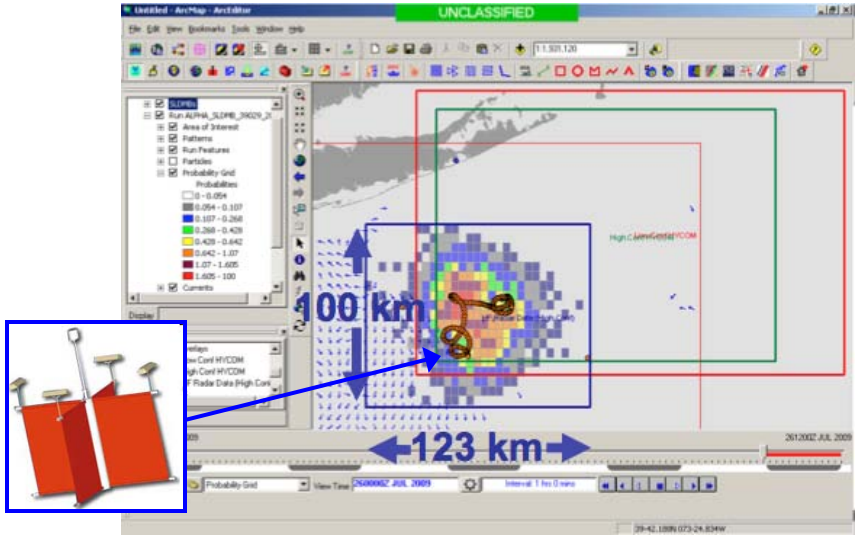
National HF Radar Network – 151 Sites



Mid-Atlantic Operational Data Flow to SAROPS

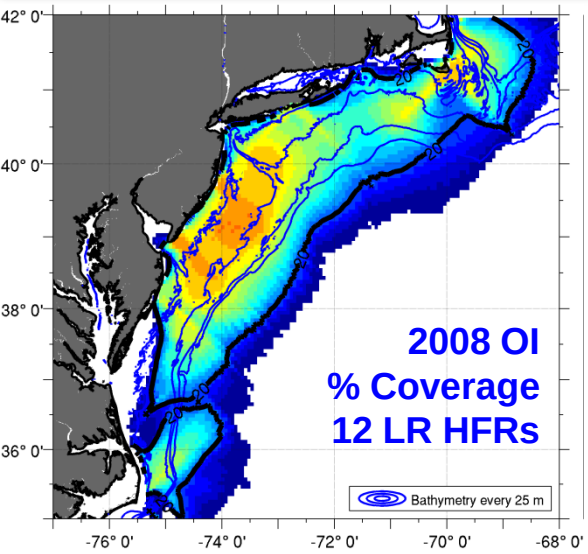


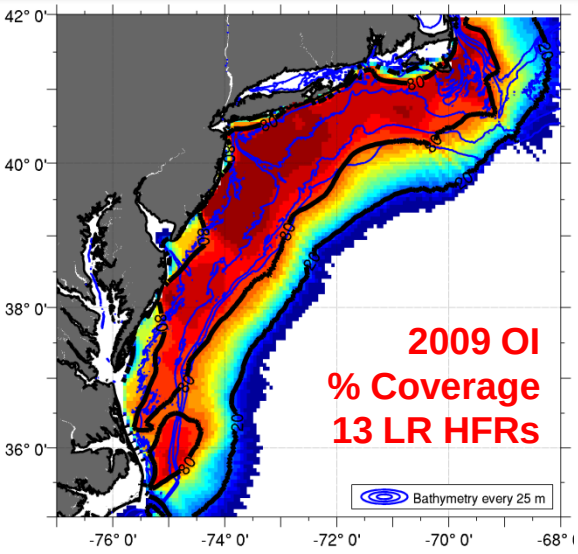
SAROPS 96-Hour Search Area: **HYCOM = 36,000 km²**

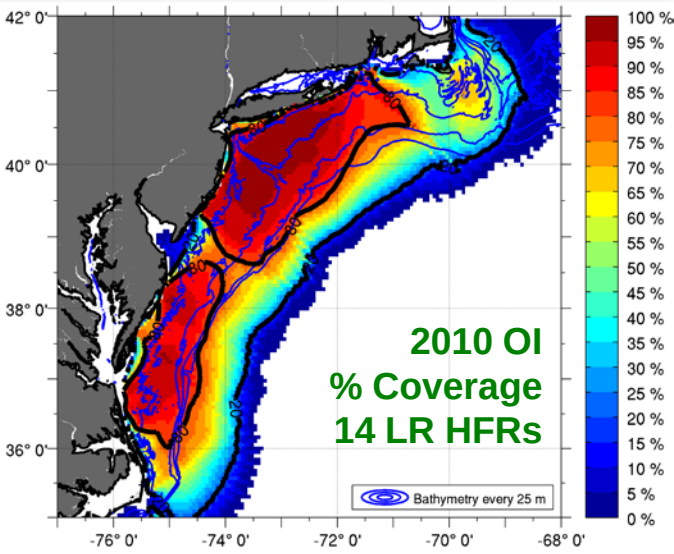


SAROPS 96-Hour Search Area: **HF Radar = 12,000 km²**

IOOS Mid-Atlantic Bight: *High Frequency Radar (HFR) Coverage*







Annual Coverage Changes:

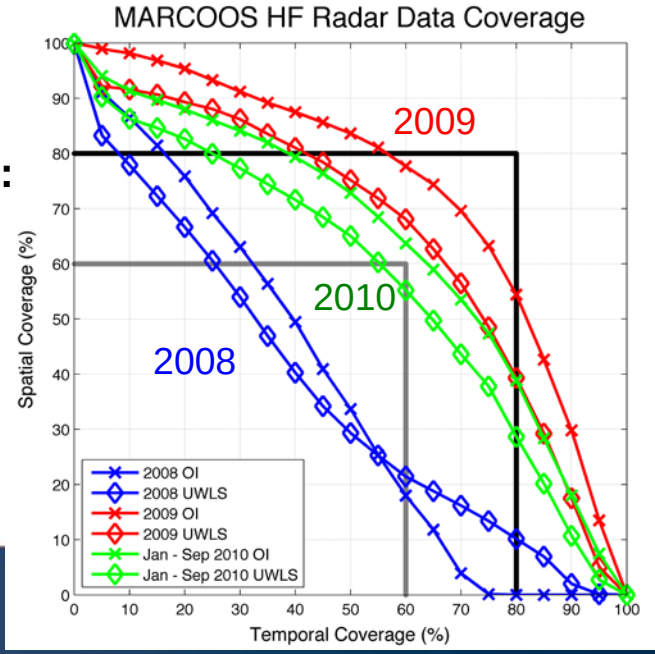
2008 to 2009 – Increase due to a focus on resiliency

2009 to 2010 – Decrease due to a lack of spares

USCG Coverage Target:

80% Spatial Coverage

80% of the Time



Staffing Requirements:

MAB HFR Network = 14 LR HFRs + 14 SR HFRs.

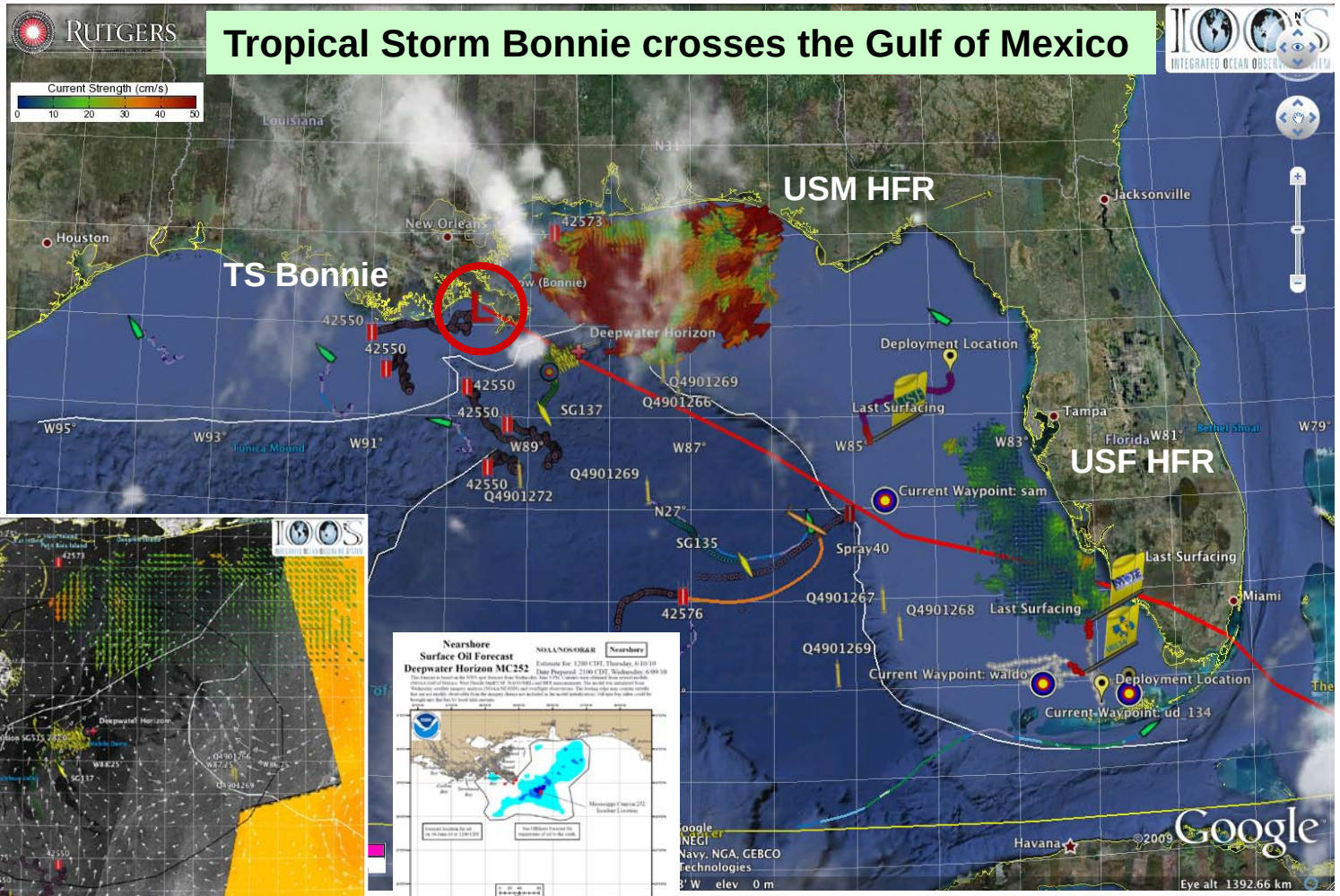
National HFR Plan Recommends 8 Technicians.

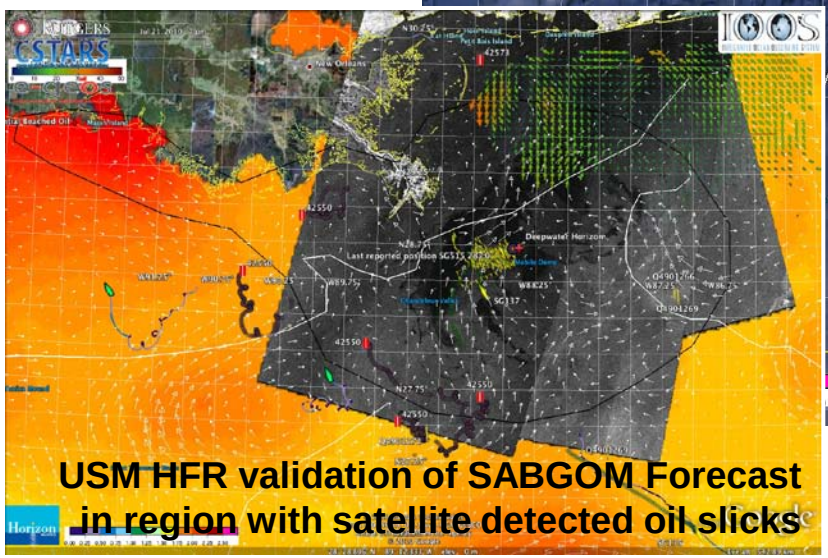
IOOS Currently Supports 3 Technicians.

IOOS Coordinated Rapid Response: *Deepwater Horizon Oil Spill*

Contributed Assets:

HF Radar Networks
USF, USM
Gliders
iRobot, Mote, Rutgers, SIO/WHOI, UDel, USF
Drifters & Profilers
Horizon Marine, Navy
Satellite Imagery
CSTARS, UDel
Ocean Forecasts
Navy, NCSU
Data/Web Services
ASA, Rutgers, SIO



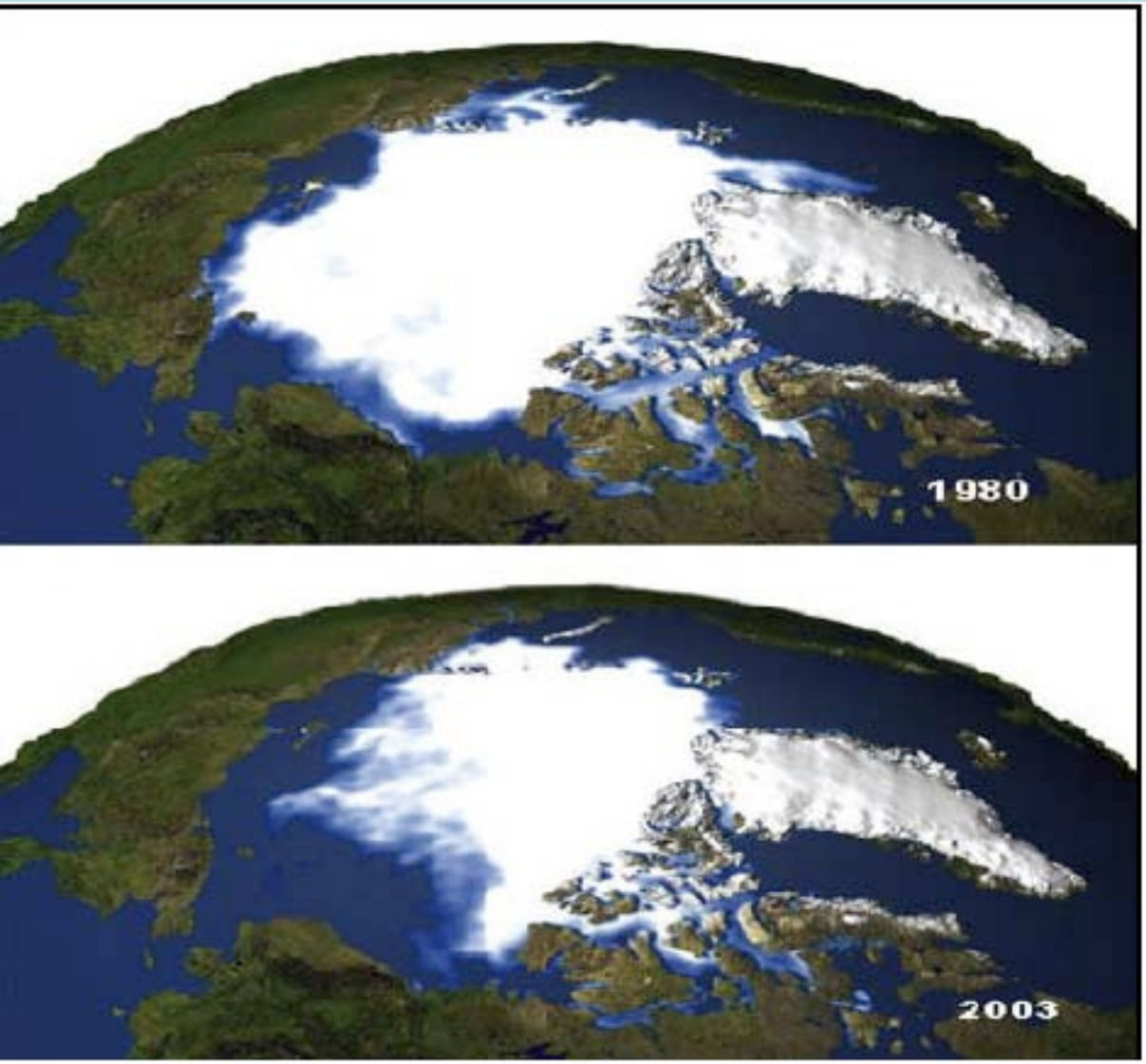


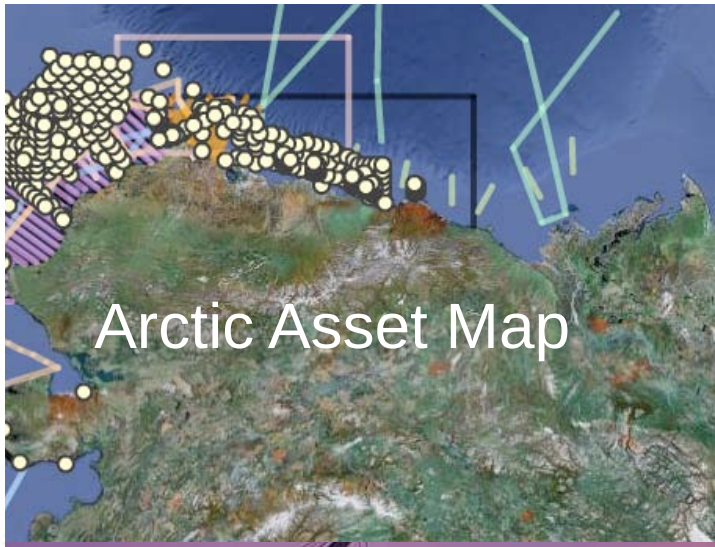
USM HFR validation of SABGOM Forecast in region with satellite detected oil slicks

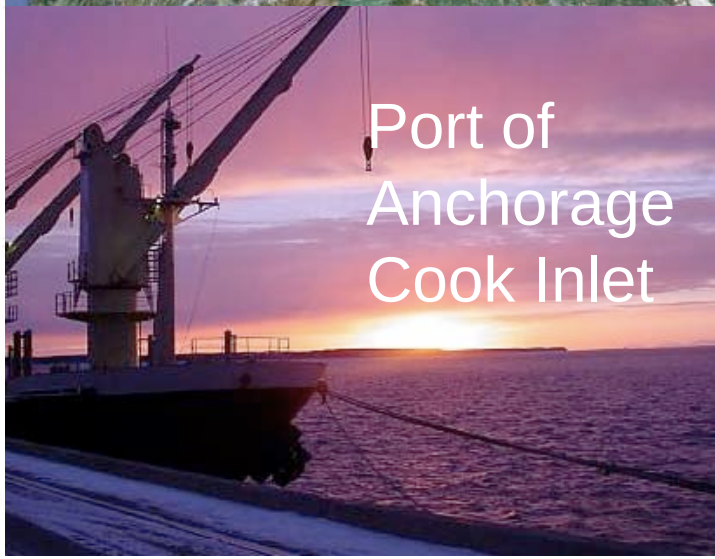
HFR used for Oil Slick Forecasts by NOAA/NOS/OR&R

Changing Arctic Conditions

AOOS
Alaska Ocean Observing System

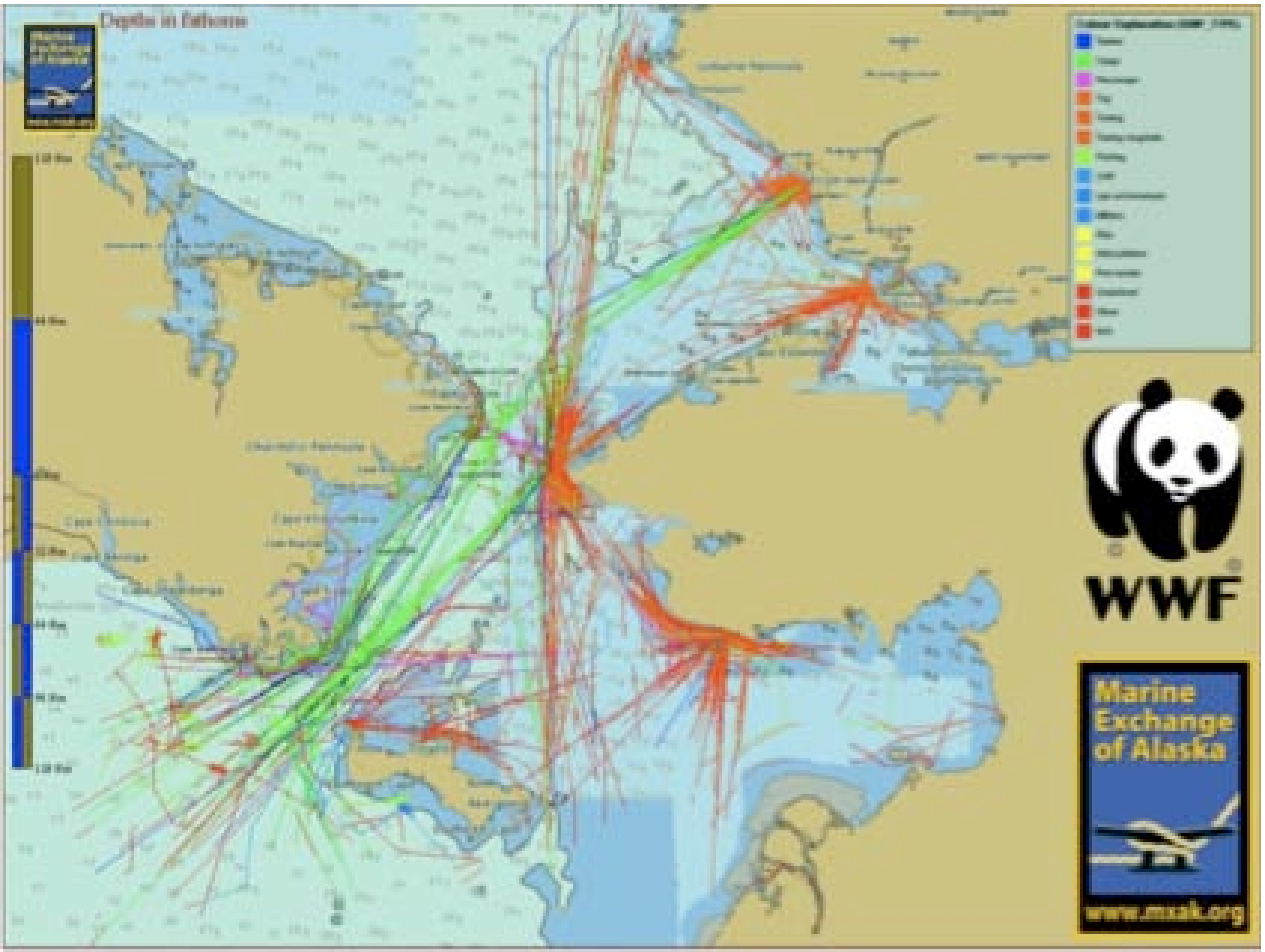






IOOS®

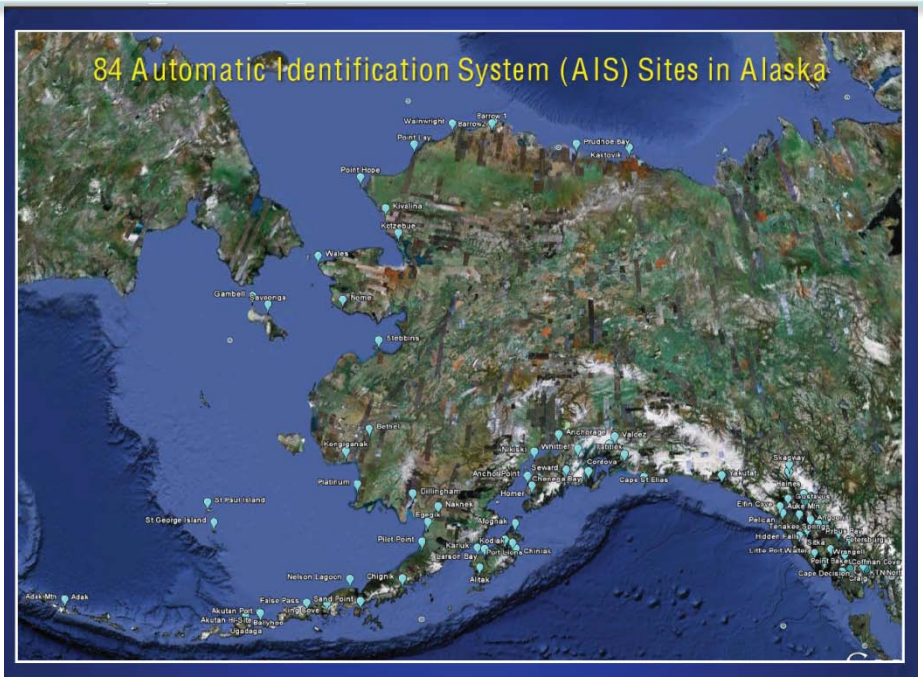
Bering Strait



- Marine Exchange and WWF using AIS to track vessels in Bering Strait

- AOOS received ocean planning funding from NOAA to develop data integration and visualization tool for shipping, oil and gas and commercial fisheries

Disseminating Weather Info over AIS



Current Situation

- Most vessels in AK receive real time weather data over VHF radio but coverage is limited and inefficient.
- AK has an existing network of 80+ AIS receiving stations.
- Many vessels have AIS transceivers already connected to this network.

AOOS Plan:

- Develop pilot program to enhance existing AIS receiving stations to collect and broadcast real-time weather conditions and forecasts.
- Allow captains to see real-time ocean conditions on their AIS screens.
- Incrementally expand the number of AIS broadcast/WX stations.

Next Steps

- Regional Build Out Plans
  - 10 Year Vision and Needs
- IOOS Blue Print and Cost Estimate
- Build federal/regional partnerships
  - Build on relationships developed at regional level
  - Complete National Surface Current Mapping Plan
  - Continue to link and leverage assets