

Drivers of Marine Technology

The 'Push' and 'Pull'

Rick Spinrad, PhD, CMarSci

President

Marine Technology Society

NAML
October 2019
Newport

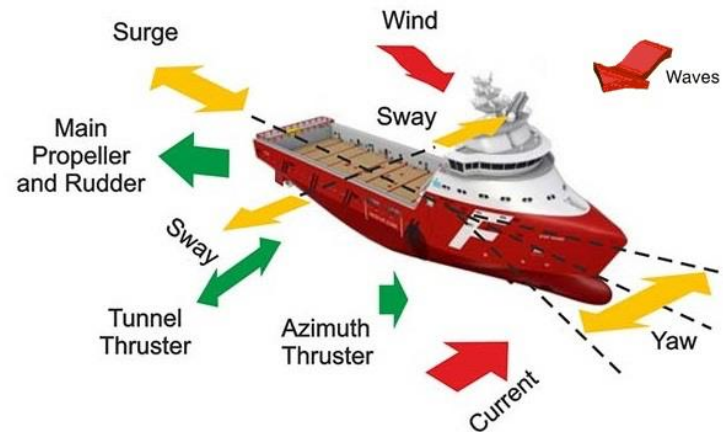
The “pull”

- Enhancing existing applications
 - Better
 - Cheaper
 - Faster
- Enabling new applications
 - The New Blue Economy

Oil and Gas

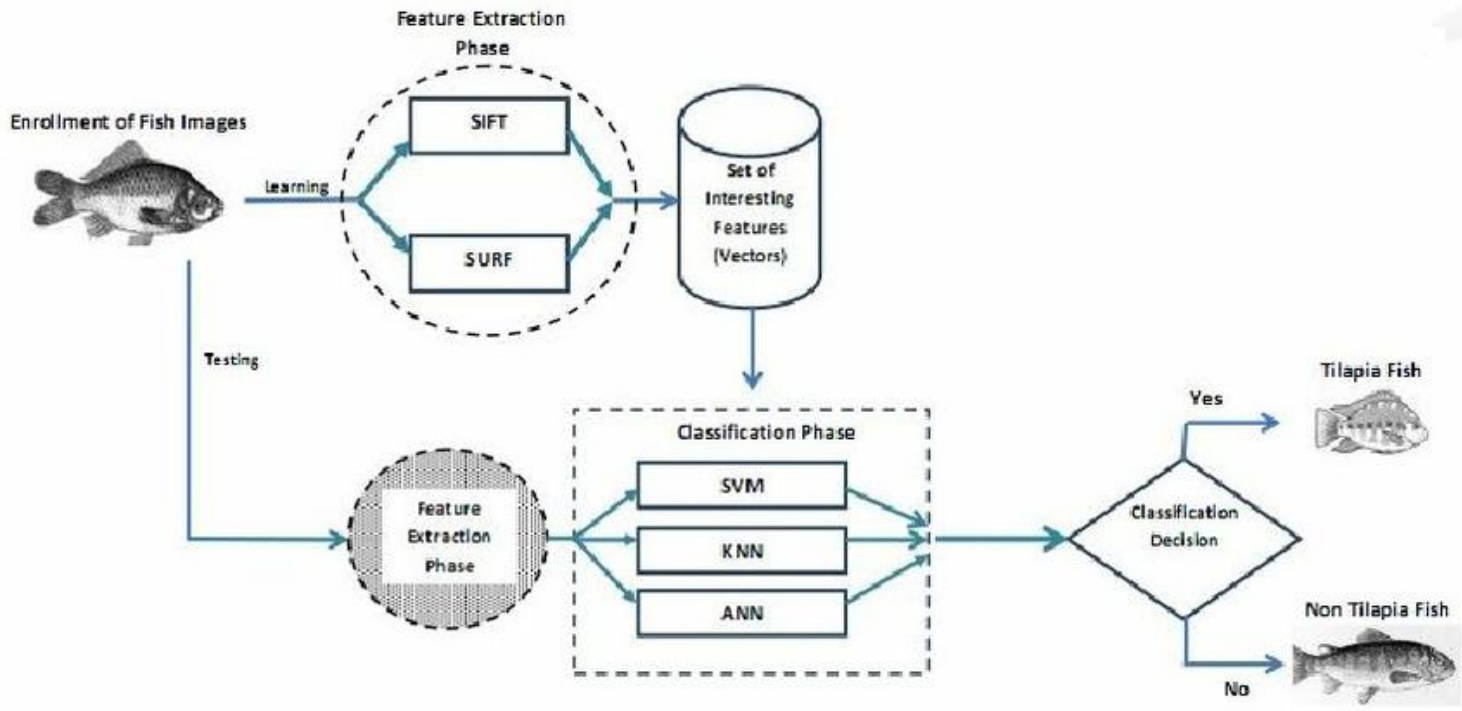
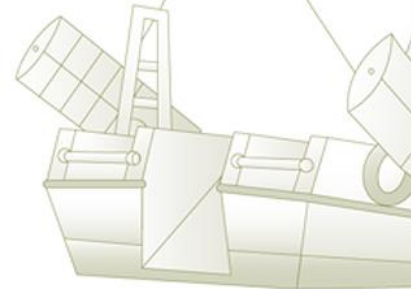
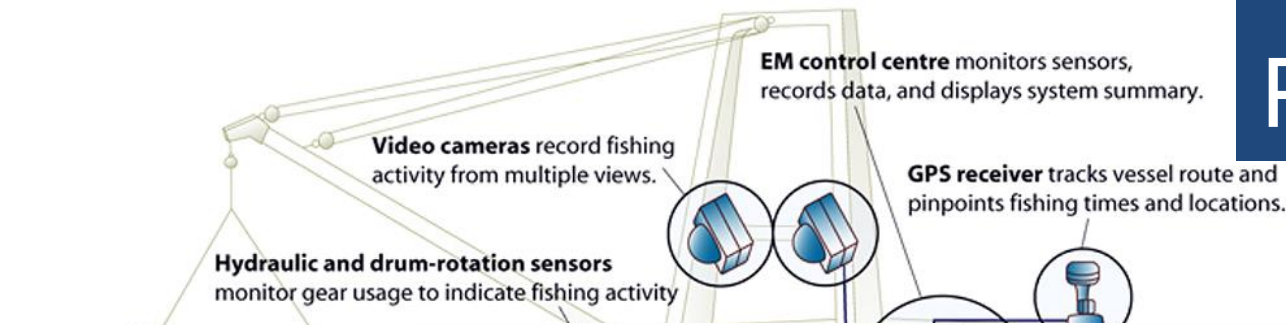


PLATFORMS



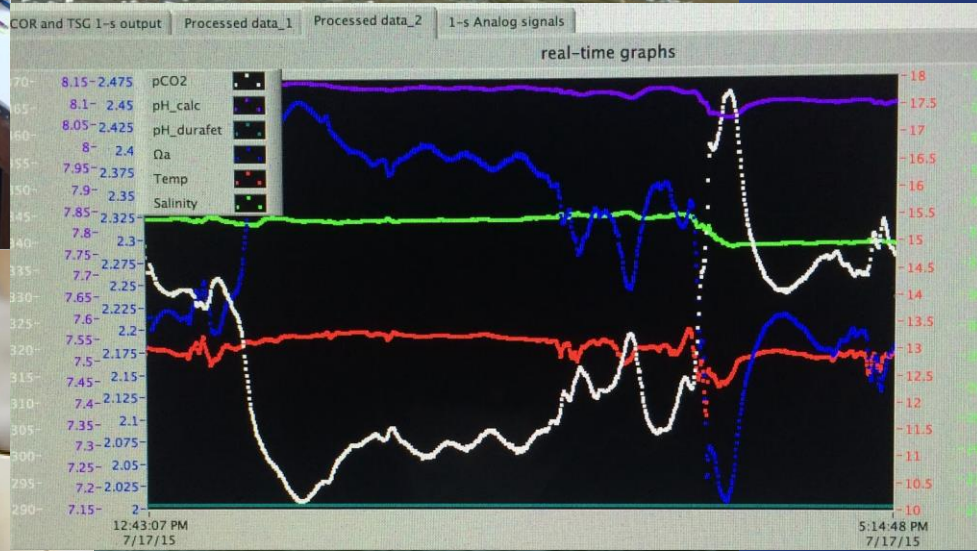
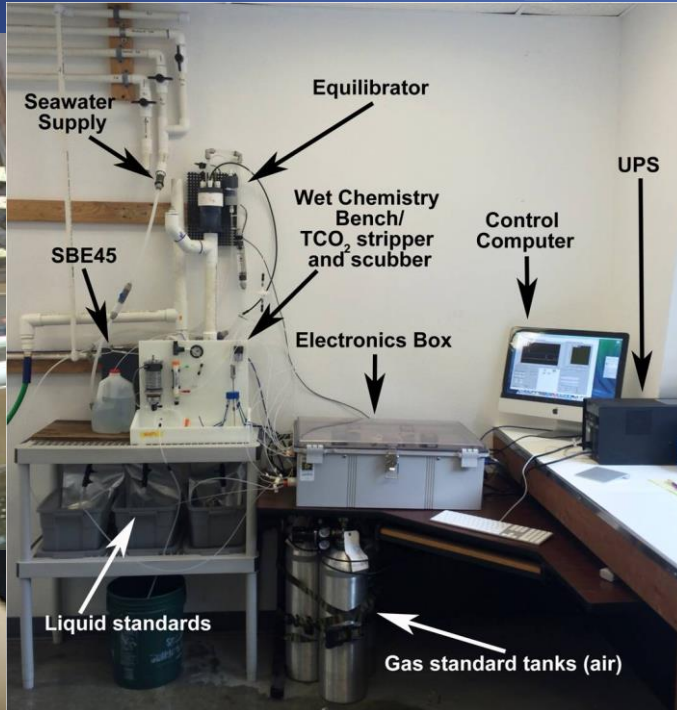
Fisheries

DATA PROCESSING



Aquaculture

SENSORS



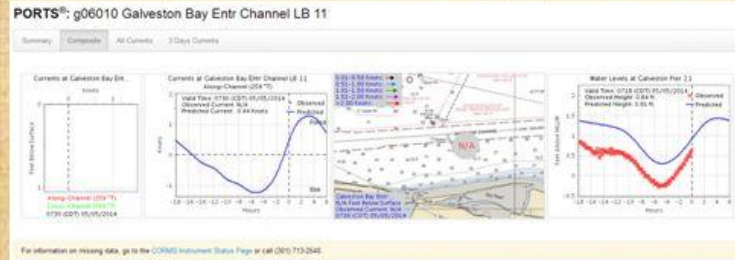
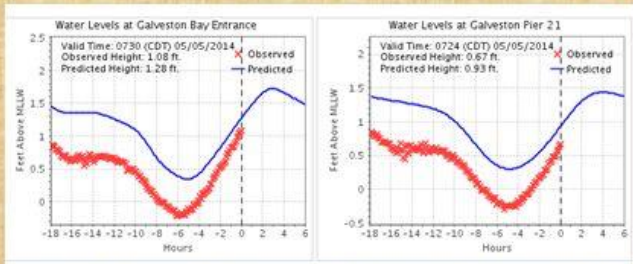
Commercial Shipping

Physical Oceanographic Real-Time System (PORTS)

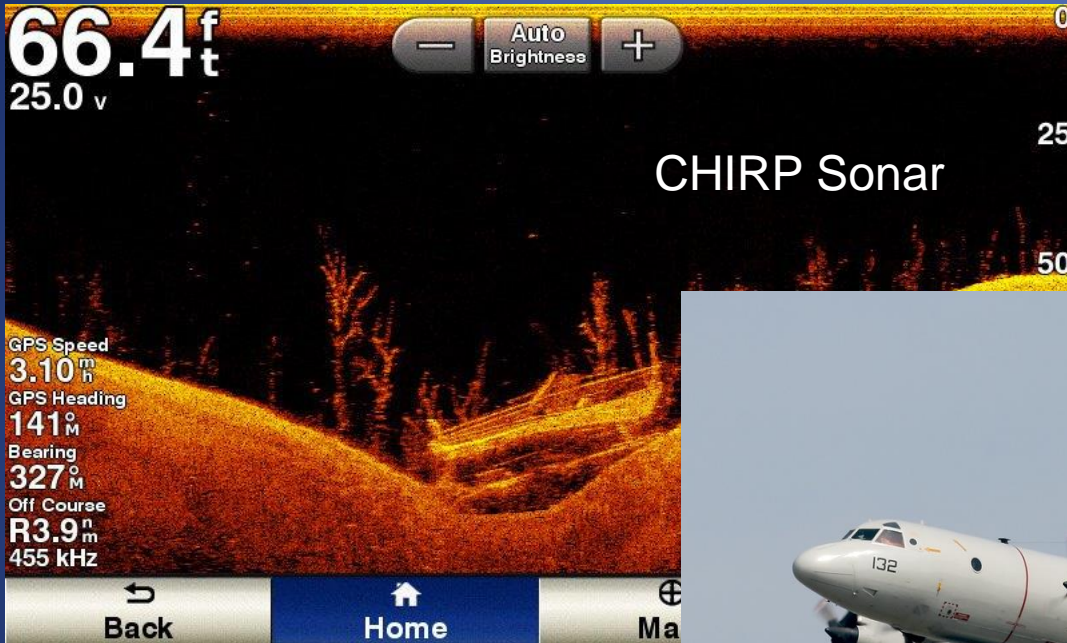
SYSTEMS of SYSTEMS



- Charleston Harbor
- Cherry Point
- Chesapeake Bay North
- Chesapeake Bay South
- Delaware River and Bay
- Houston/Galveston
- Humboldt Bay
- Jacksonville
- Lake Charles
- L.A./Long Beach
- Lower Columbia River
- Lower Mississippi River
- Mobile Bay
- Narragansett Bay
- New Haven
- New London
- NY/NJ Harbor
- Pascagoula
- Port of Anchorage
- Sabine Neches
- San Francisco Bay
- Soo Locks
- Tacoma
- Tampa Bay



Defense

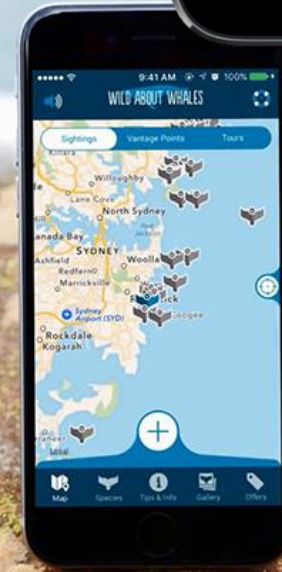
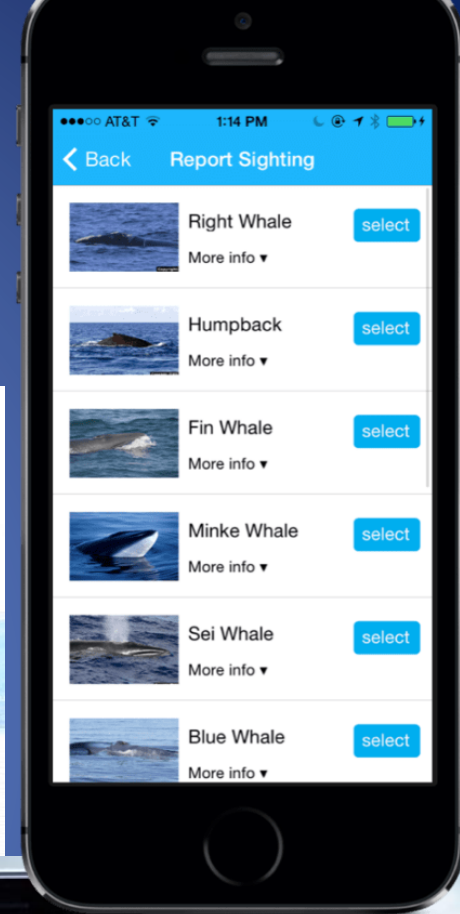
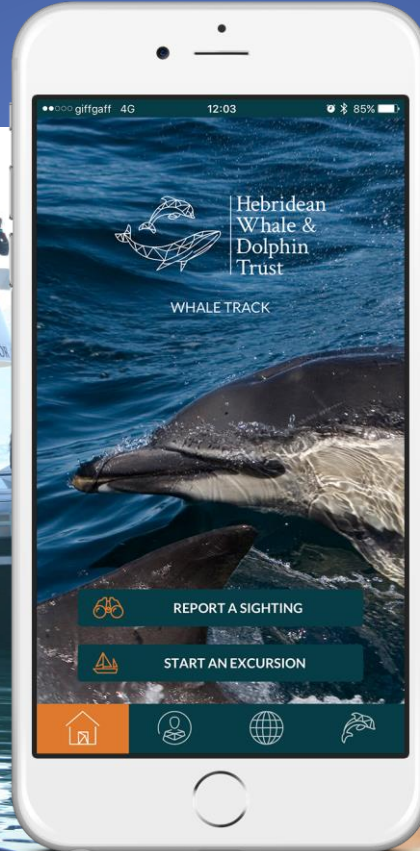
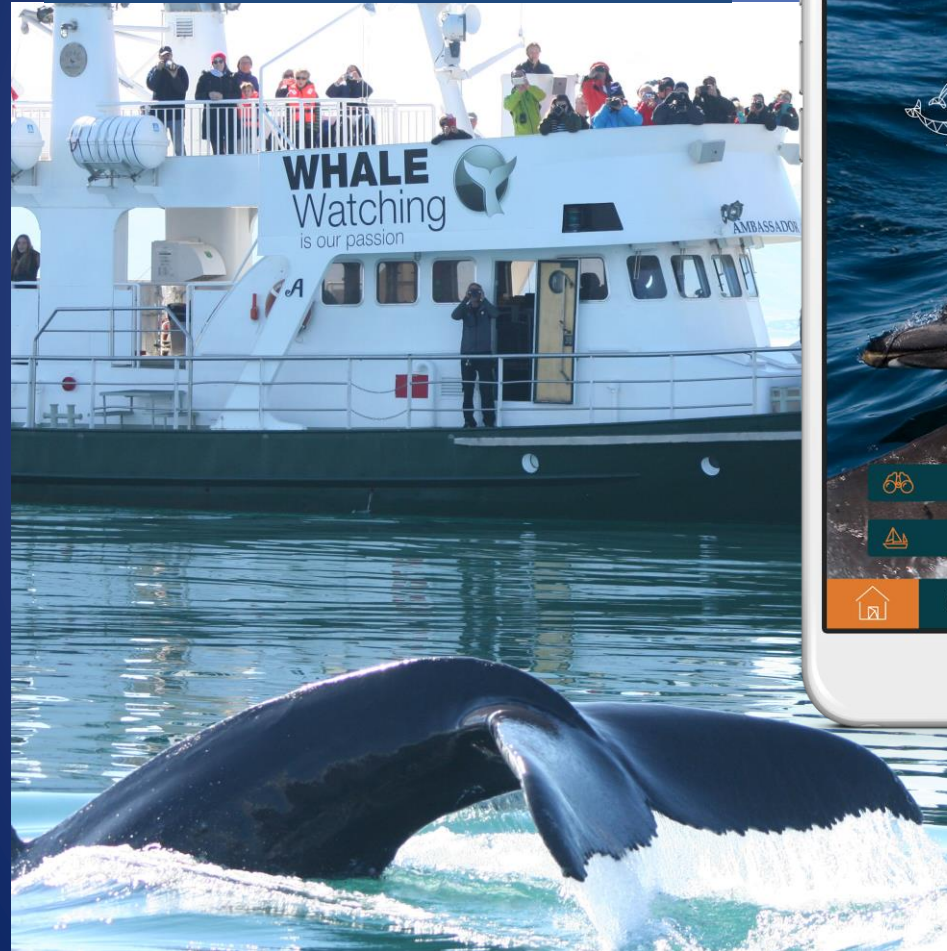


Copyright © gary1701

For more photos visit <http://www.plane-mad.com/gary1701/photos>

Ecotourism

APPS

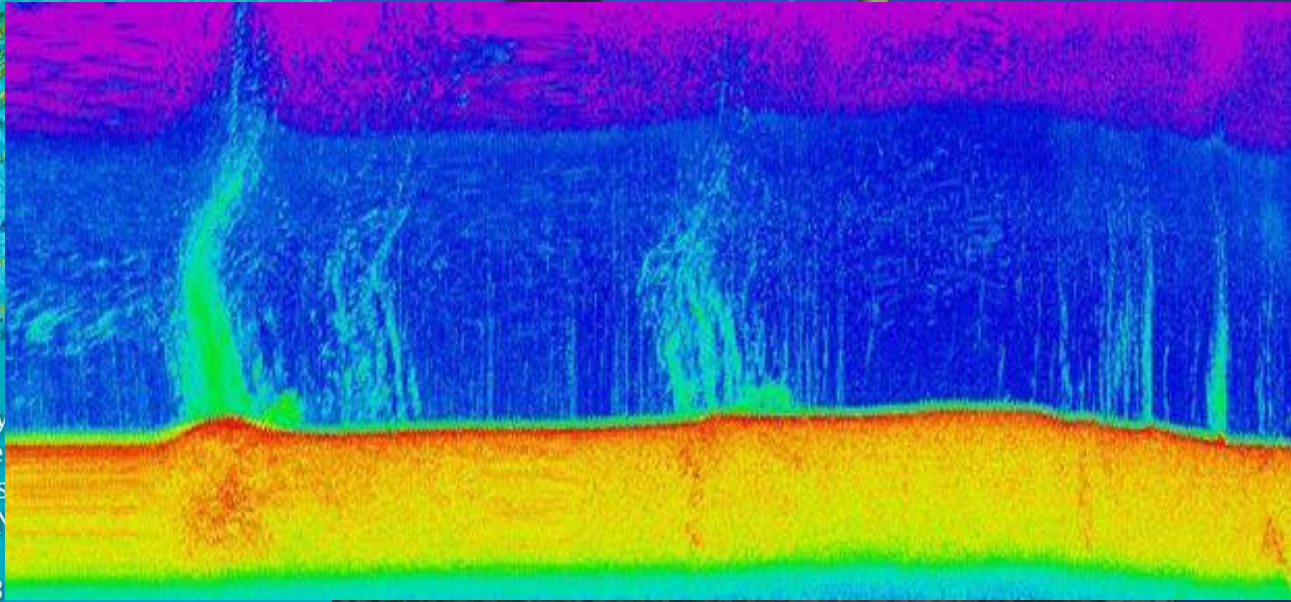
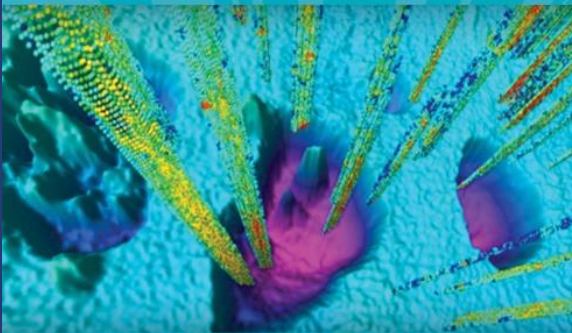


Undersea Mining

Center for Ocean and Coastal Mapping / Joint Hydrographic Center
Center for Ocean Engineering
SEMINAR SERIES

Imaging the Arctic Seafloor
to Examine Escape Routes of
the Greenhouse Gas Methane

IMAGING



Jürgen Mienert
Centre for Arctic Gas Hy
Environment and Climate
University of Tromsø
The Arctic University of N

Friday, May 4, 2018
3:10 p.m.
Jere A. Chase
Ocean Engineering Lab
Room 105

ALL ARE WELCOME!

NEW BLUE ECONOMY

The new blue economy is a knowledge-based economy, looking to the sea not just for extraction of material goods, but for data and information to address societal challenges and inspire their solutions.



Environmental Intelligence

Observations

Data

Modeling

Predictions

Forecasts

Projections

THE OCEAN ENTERPRISE

PROVIDERS

observations

INTERMEDIARIES

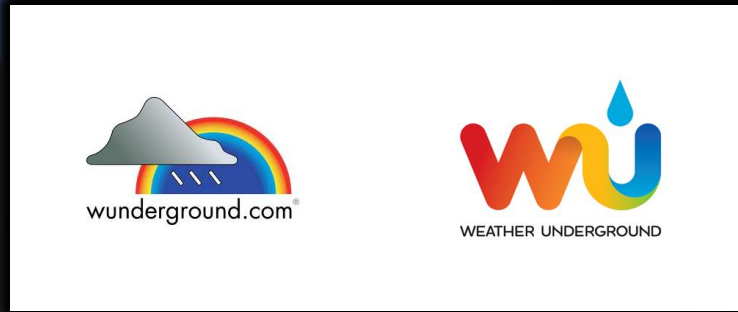
value-added
products

**END
USERS**

emergency managers,
developers, city planners,
private sector

Adapted from Ralph Rayner – IOOS Summit 2012 – white paper

PRIVATE WEATHER INDUSTRY



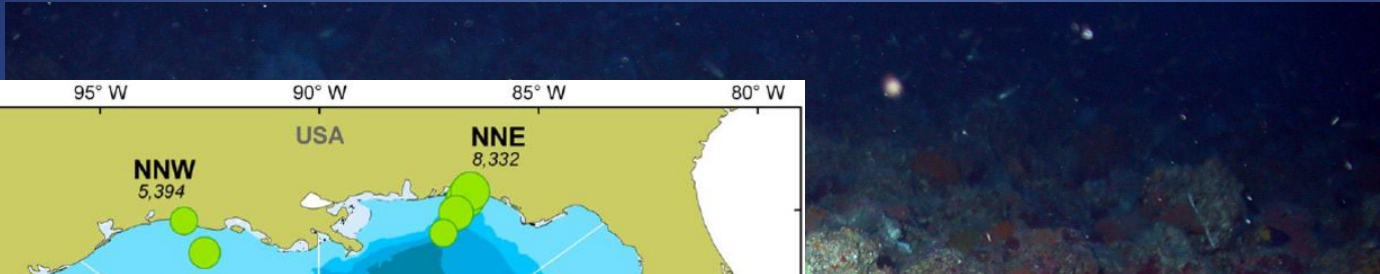
The World Leader in Yacht Forecasting

5 Case Studies

1. Deepwater Horizon oil spill
2. Portland grain shipping
3. Superstorm Sandy
4. Harmful algal blooms
5. Nuisance flooding

CASE STUDY	MARKET OPPORTUNITY	PRODUCT
DEEPWATER HORIZON	<ul style="list-style-type: none"> Regulatory compliance Response/Restoration service & support 	High-resolution, archived, & real-time OBSERVATIONAL DATA in KML formats
PORTLAND GRAIN SHIPPING	Commodity-specific load-out & transit intelligence	Short-term, COUPLED MODELS (ocean, river, hydrological)
SUPERSTORM SANDY	Natural infrastructure architecture	Site-specific ECOSYSTEM SERVICES VALUATION
HARMFUL ALGAL BLOOMS	Derivatives for public health, tourism, seafood safety, etc.	Coupled ecological & behavioral forecasts
SEA LEVEL RISE	Resilience planning & guidance	<ul style="list-style-type: none"> Down-scaled sea level rise projections Risk translation

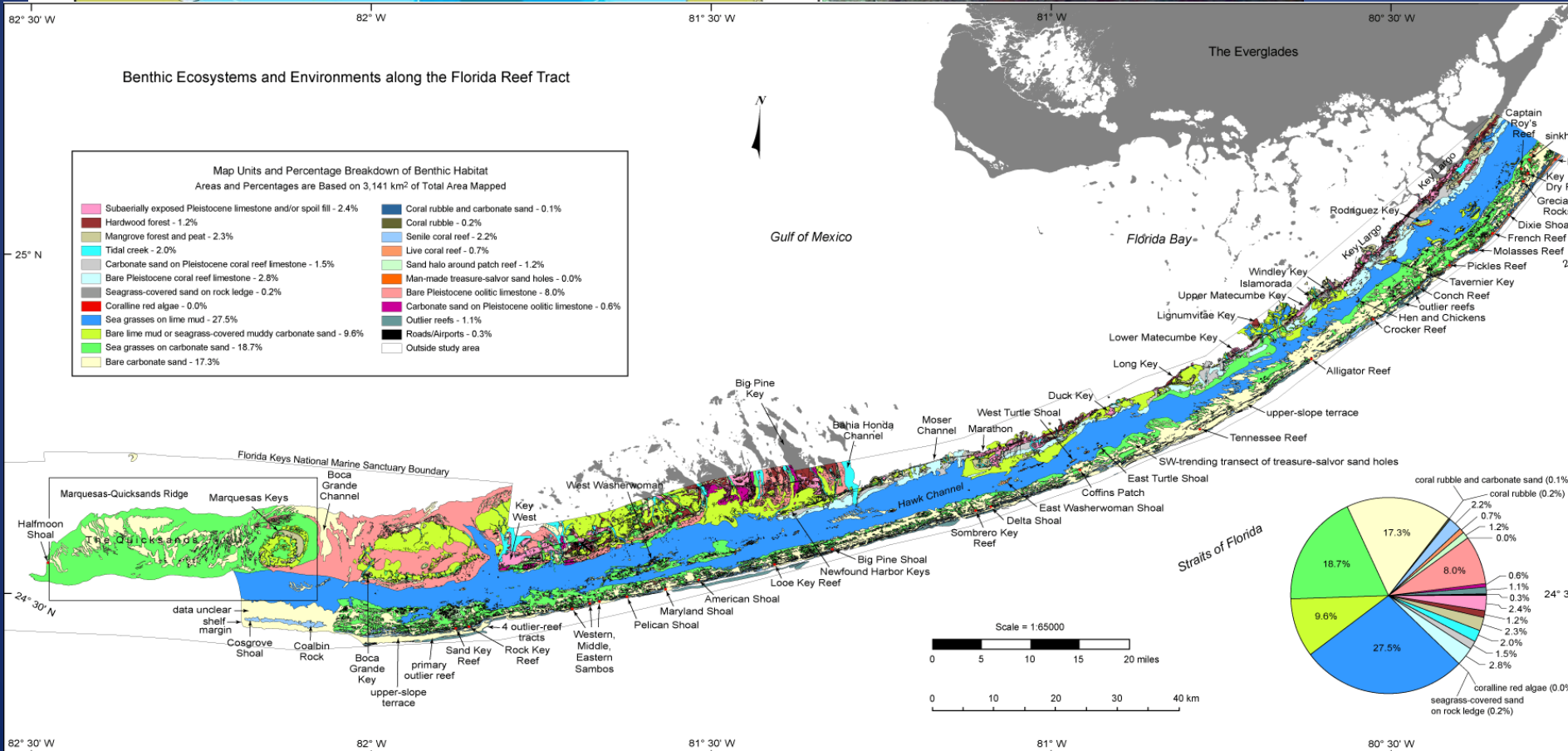
Deepwater Horizon



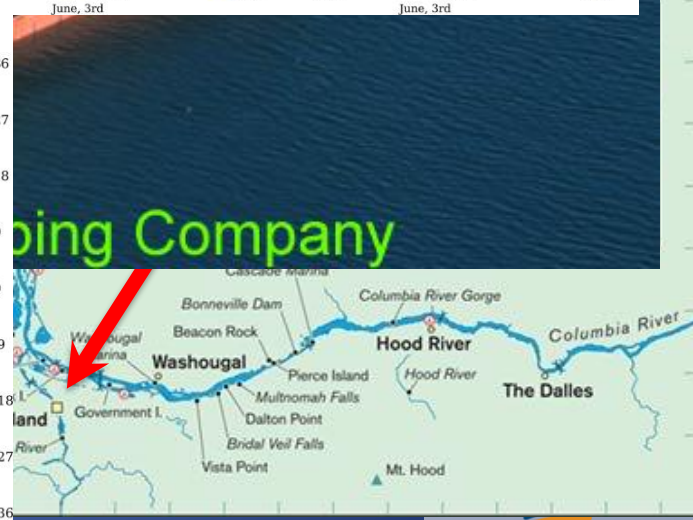
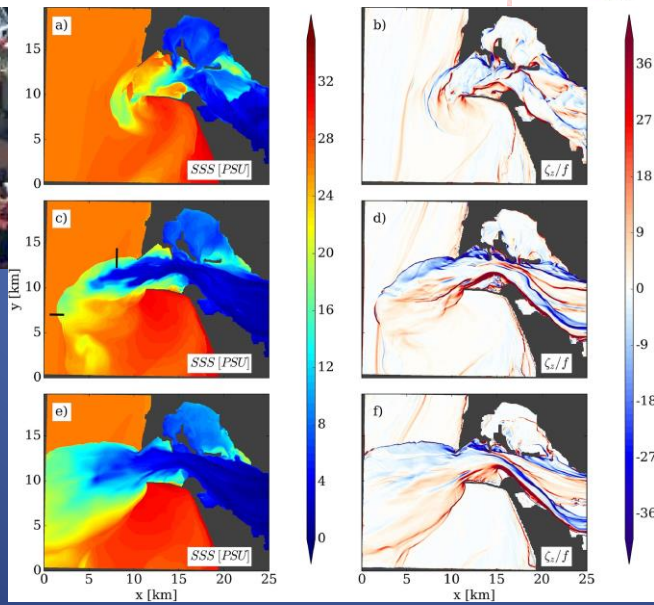
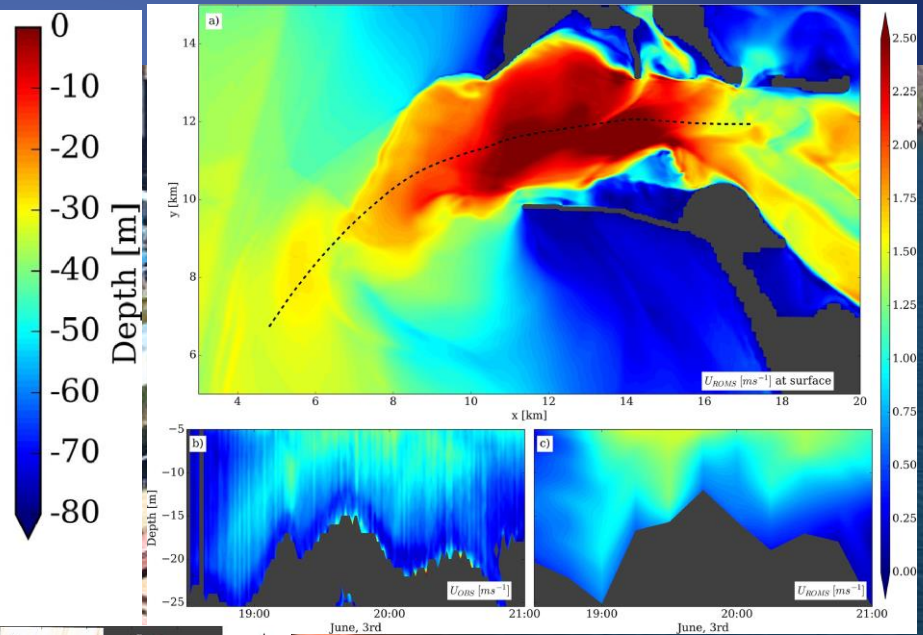
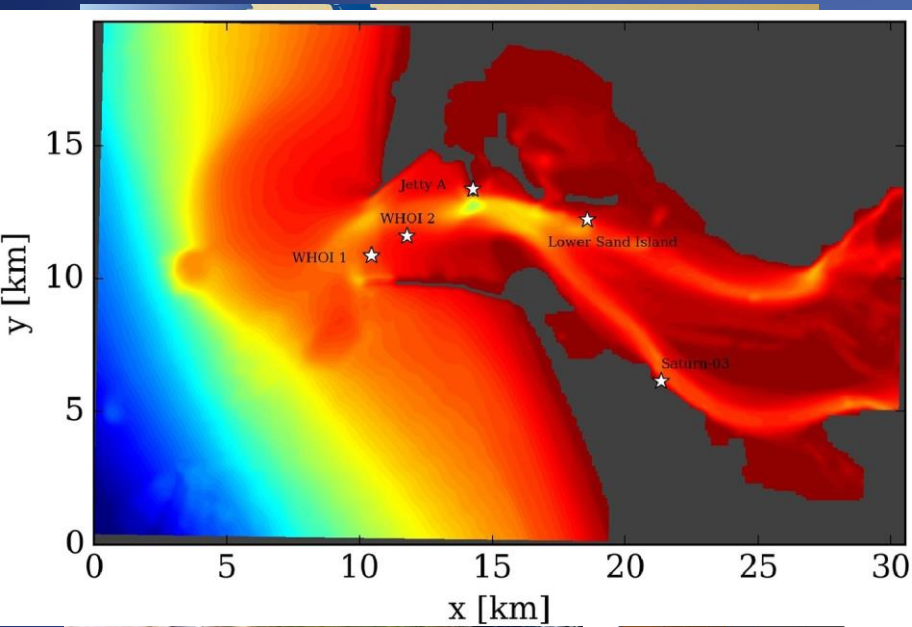
Benthic Ecosystems and Environments along the Florida Reef Tract

Map Units and Percentage Breakdown of Benthic Habitat
Areas and Percentages are Based on 3,141 km² of Total Area Mapped

Substantially exposed Pleistocene limestone and/or spoil fill - 2.4%	Coral rubble and carbonate sand - 0.1%
Hardwood forest - 1.2%	Coral rubble - 0.2%
Mangrove forest and peat - 2.3%	Senile coral reef - 2.2%
Tidal creek - 2.0%	Live coral reef - 0.7%
Carbonate sand on Pleistocene coral reef limestone - 1.5%	Sand halo around patch reef - 1.2%
Bare Pleistocene coral reef limestone - 2.8%	Man-made treasure-salvor sand holes - 0.0%
Seagrass-covered sand on rock ledge - 0.2%	Bare Pleistocene oolitic limestone - 8.0%
Coralline red algae - 0.0%	Carbonate sand on Pleistocene oolitic limestone - 0.6%
Sea grasses on lime mud - 27.5%	Outlier reefs - 1.1%
Bare lime mud or seagrass-covered muddy carbonate sand - 9.6%	Roads/Airports - 0.3%
Sea grasses on carbonate sand - 18.7%	Outside study area
Bare carbonate sand - 17.3%	



Portland Grain Shipping

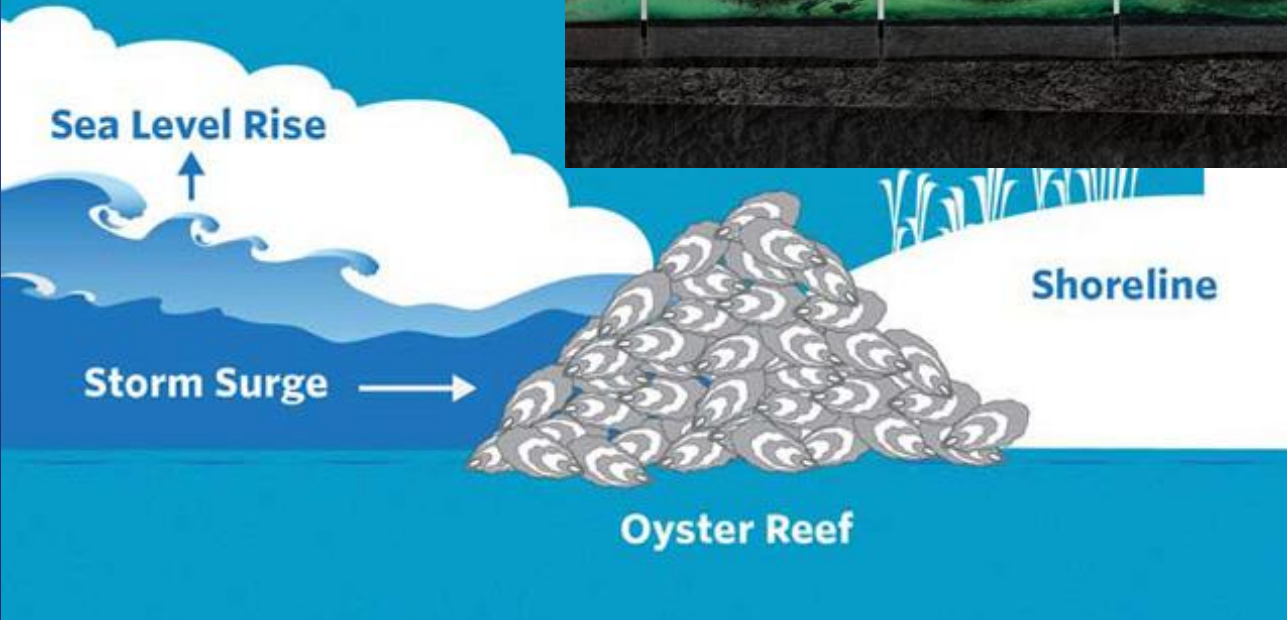


Superstorm Sandy

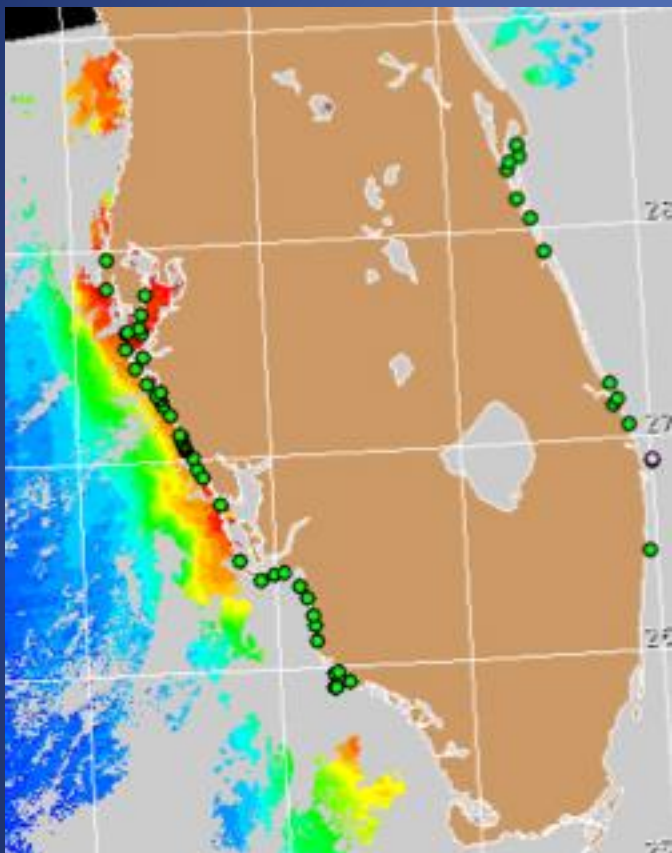


Healthy Oyster Safer Shoreline

Oysters serve as natural buffers against erosion and hurricanes by forming breakwaters, shorelines and wetlands from erosion.



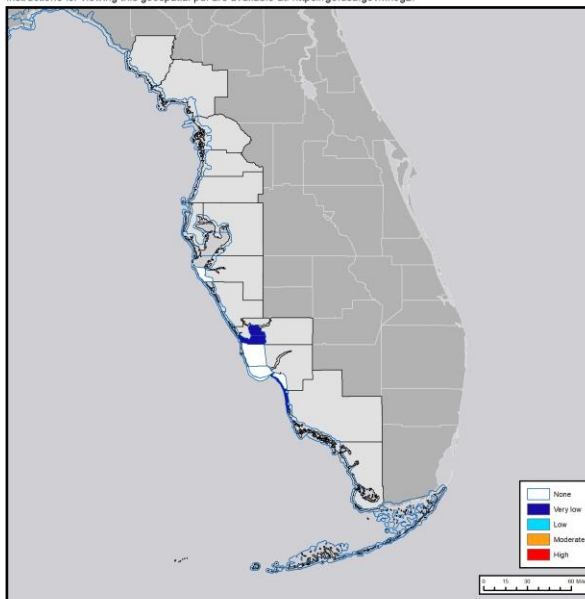
Harmful Algal Blooms



Gulf of Mexico Harmful Algal Bloom Bulletin

Thursday, May 17, 2018
 NOAA National Ocean Service
 NOAA Satellite and Information Service
 NOAA National Weather Service

Instructions for viewing this geospatial pdf are available at: <https://go.usa.gov/xn9g2>.



In the map above, the highest level of potential respiratory irritation forecast is displayed as a layer for each day from 05-17-18 to 05-21-18. See next page for a table of the respiratory irritation forecasts.

Region: Southwest Florida



Conditions Report

Not present to low concentrations of *Karenia brevis* (commonly known as red tide) are present along- and offshore portions of southwest Florida, and not present in the Florida Keys. *K. brevis* concentrations are patchy in nature and levels of respiratory irritation will vary locally based upon nearby bloom concentrations, ocean currents, and wind speed and direction.

Health information, from the Florida Department of Health and other agencies, is available at https://tidesandcurrents.noaa.gov/hab/gomx_health.html. For recent, local observations and data check Mote Marine Laboratory Daily Beach Conditions (<http://visitbeaches.org>) and the Florida Fish and Wildlife Conservation Commission Red Tide Status (<http://myfwc.com/redtidestatus>).

Recently Reported Impacts (Listed by County):

Respiratory irritation: None
Dead fish: Lee and Collier
Discolored water: None

Definition of respiratory irritation levels.

RESPIRATORY IRRITATION LEVEL	AFFECTED POPULATION				
	NONE	CHRONIC RESPIRATORY CONDITION	SENSITIVE TO RED TIDE	GENERAL PUBLIC (MILD SYMPTOMS)	GENERAL PUBLIC (INTENSE SYMPTOMS)
None					
Very low	X	X			
Low		X	X		
Moderate		X	X	X	
High		X	X	X	X

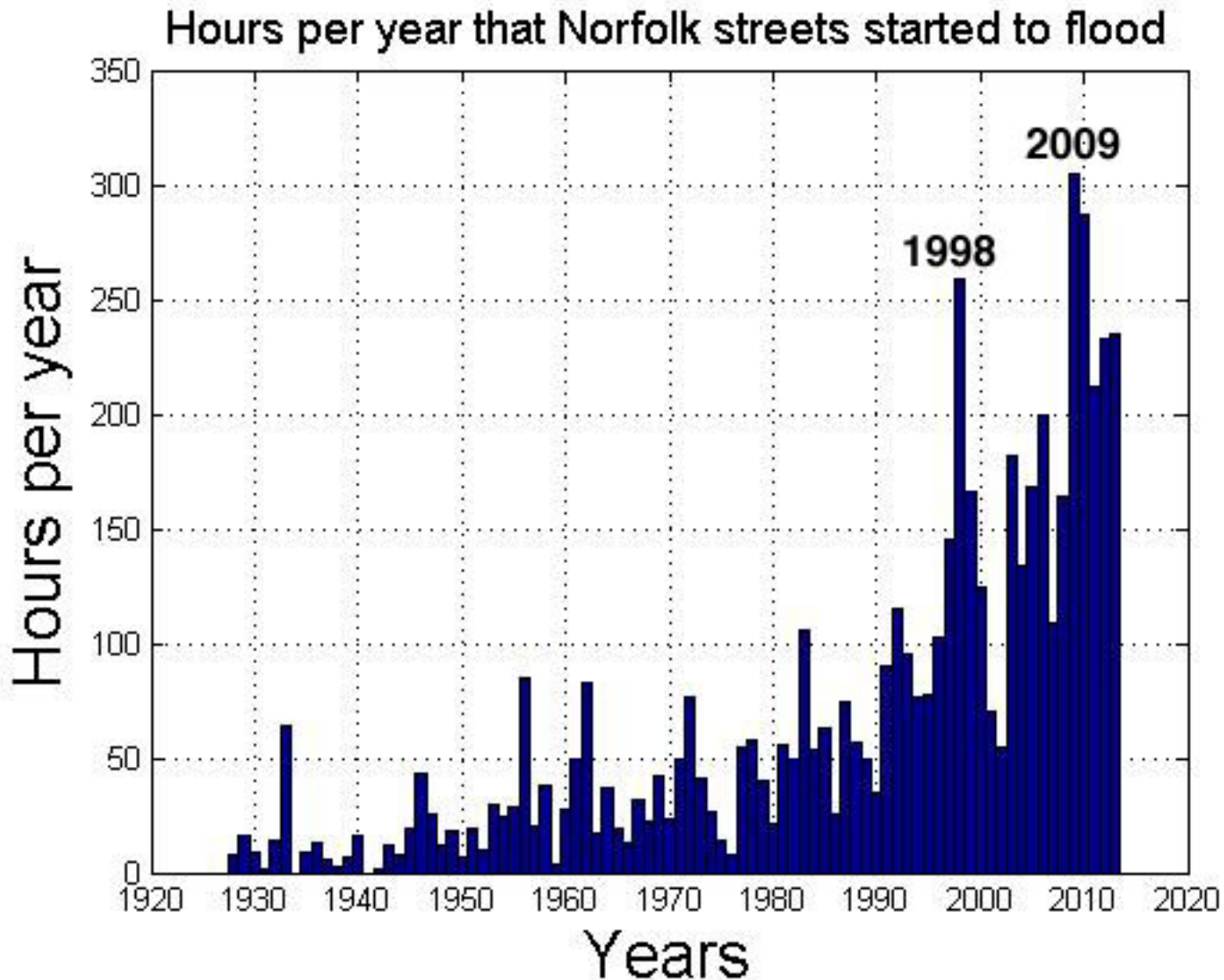
Sea Level Rise

Rising
Sea levels
panel forec

Largest citi
Most vulnera
by projected

Millions

- New York 2.9
- Miami 4.8



- 0.5 - 1.5
- less than 0.5

9.2

10.3



NEWS FLASH

Daily Times

THE MARKET
IS ALREADY
HERE !!

ROFFS™

ROFFER'S OCEAN FISHING FORECASTING SERVICE, INC.



SAMPLE ANALYSIS

2017 HIGHLIGHTS:

- 425 WINNING EFFORTS IN 10 MAJOR TOURNAMENTS
- 27 YEAR TOTAL NOW 8339

- WOMEN'S WORLD RECORD MAKI
- MID-ATLANTIC TOURN.
- OCEAN CITY WHITE MARLIN OPE
- SOUTH JERSEY SHARK TOURN.
- STAR ISLAND SHARK TOURN.
- BLOCK ISLAND GIANT SHARK TO
- TRI-STATE CANYON SHOOTOUT
- NORTH CAROLINA GOVERNOR'S
- SOUTH CAROLINA GOVERNOR'S
- BIG ROCK BLUE MARLIN
- PIRATE'S COVE BILLFISH TOURN
- EMERALD COAST BLUE MARLIN
- PENSACOLA INTL BILLFISH TOU
- TEXAS INTL FISHING TOURN.
- BLUE MARLIN GRAND CHAMPION
- ABACO BEACH BLUE MARLIN TO

PINPOINTS HOT SPOTS

Tells how many days the ocean conditions have been favorable

CATCH REPORTS

FREE UPDATES WHILE FISHING

Currents and Frontal Edges
Shows Water Color, Clarity
Water Temperature,
Bottom Topography,
Navigational Coordinates

COMPREHENSIVE ANALYSIS

Map and Text Description

WHY GUESS WITH INTERNET IMAGES OR OTHER IMITATIONS?

Kochi / Muroto Shi / Japan

Tokushima Regional Surf Forecast

17 DAY FORECAST PREMIUM ANALYSIS Buoys Charts Cams & Reports



GRAPH VIEW TABLE VIEW 1-5 6-10 11-15 16-17

Friday 5/18

AM	PM
1-2# ankle to knee high	1-2# ankle to knee high

Very small short period waves from the ESE. Light WSW winds with semi clean to slightly sideshore textured conditions.

Saturday 5/19

AM	PM
1-2# ankle to knee high	FLAT flat

Very small very short period waves from the SW. Light NNE winds with clean conditions.

Sunday 5/20

AM	PM
FLAT flat	FLAT flat

Very small short period waves from the NNW. Moderate S winds with bumpy conditions.

Home

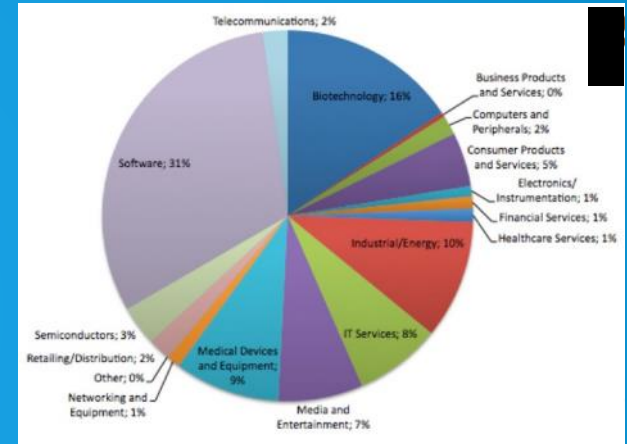
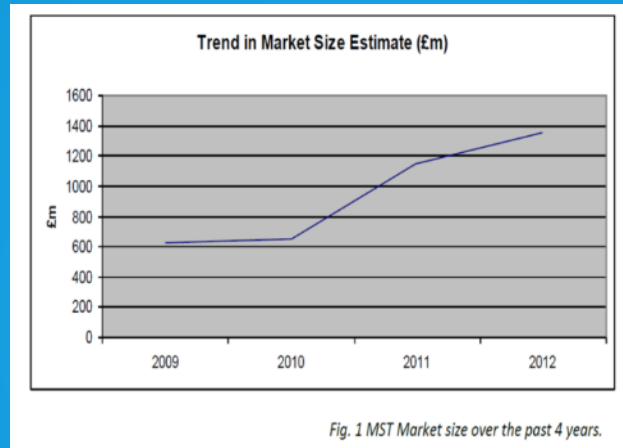
**Ocean
Fisheries
Futures****Ocean
Catastrophe
Bonds****Ocean
Energy
Products****Ocean
Forecast
Derivatives****Natural
Infrastructure
Management**

SEAFOOD FUTURES

Symbol	Price	Change	%Change	Volume
* SALMON	166.90	▼ -0.15	-0.09%	1512
* POLLOCK	89.80	▲ 0.95	1.07%	2900
* CRABS	230.15	▲ 0.35	0.15%	352

THE NEW BLUE FUTURE

WHAT'S NEEDED



**OBSERVATIONS
& TOOLS**

**MARKET &
RISK
ANALYSIS**

**CAPITAL
INVESTMENT**

MARKET ANALYSIS



THE OCEAN ENTERPRISE

A study of US business activity in ocean measurement, observation and forecasting

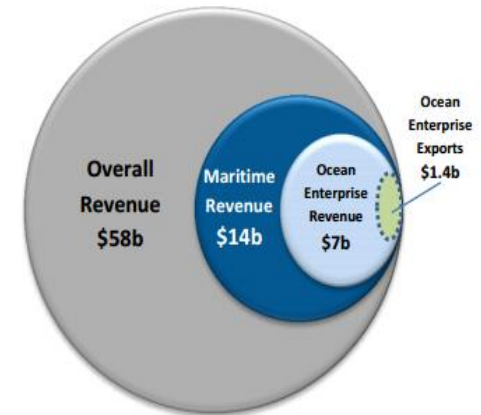


Figure ES- 3. Revenue projections

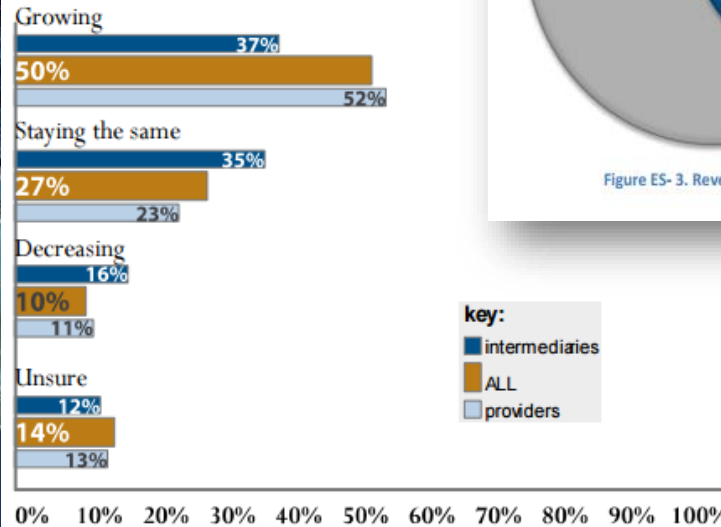


Figure ES- 4. Business expectations for the next 12 months for Ocean Enterprise-related business



Prepared by
ERISS Corporation
The Maritime Alliance
February, 2016

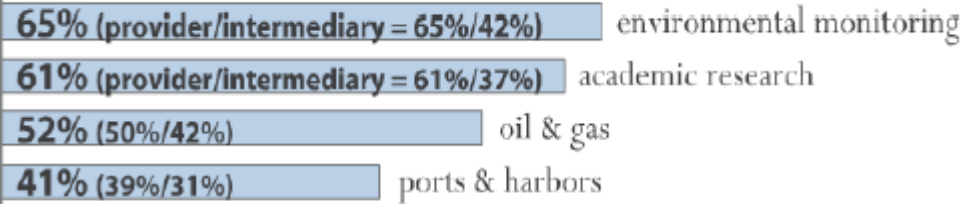


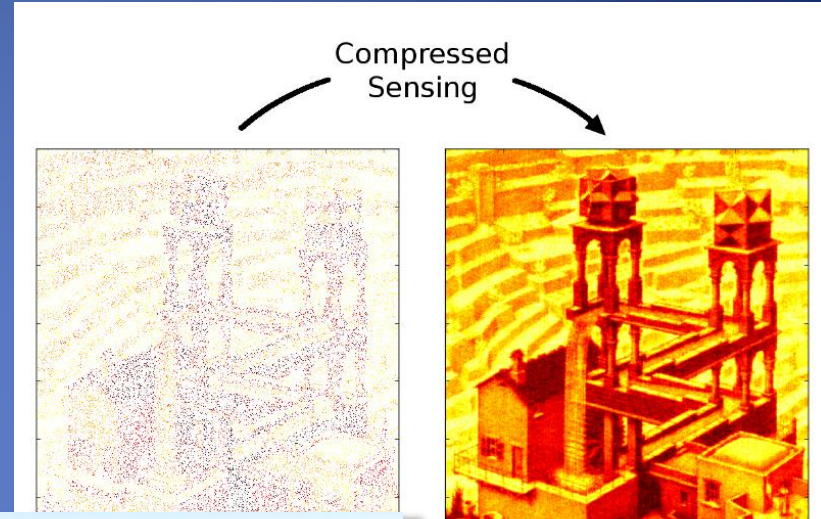
Figure ES- 5. Top market sectors

loos.noaa.gov/project/ocean-enterprise-study

The 'Push' (Technological Opportunity)



Autonomy

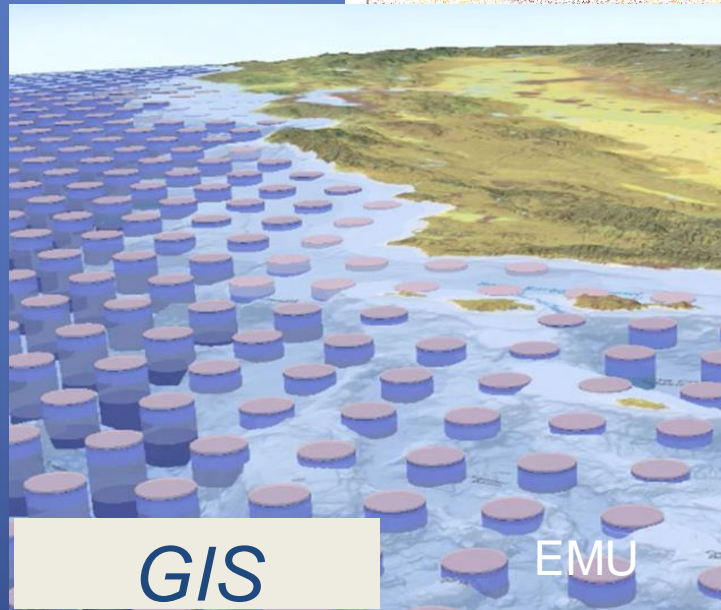


Processing



eDNA

Sensors



GIS

EMU

The 'Push' (Technological Opportunity)

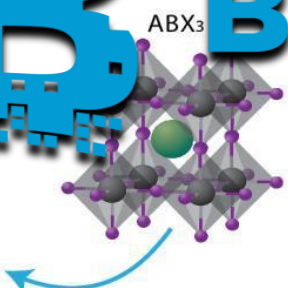
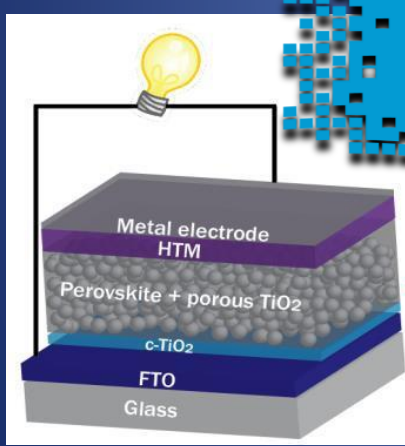
Simulation

● Ca, Nd
● F
● Fe⁴⁺
● As



BLOCKCHAIN

Finance

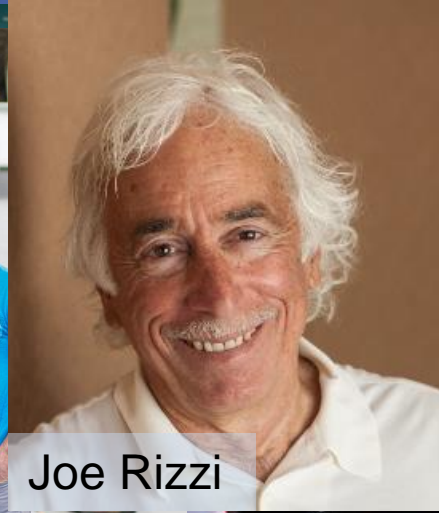


Advanced Materials

Rolls-Royce and Svitzer's **remote-controlled tug** heralds the **beginning** of the **age of autonomous shipping**
Jennifer Johnson reports

Disruptors

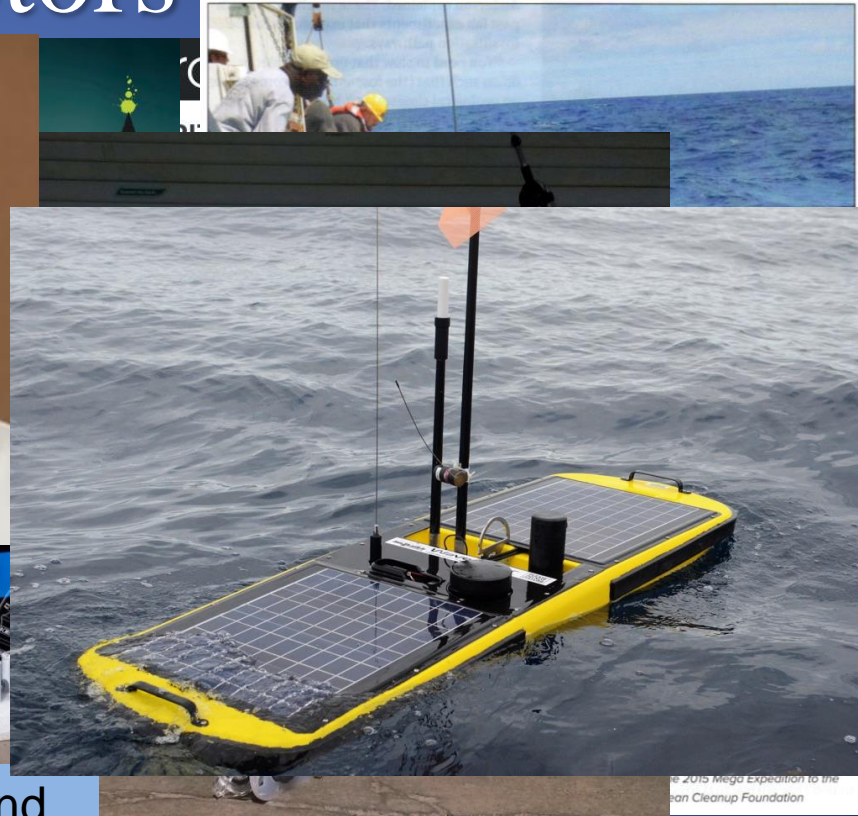
Pacific's Garbage Hot Spot Holds More Plastic Debris Than Was Thought



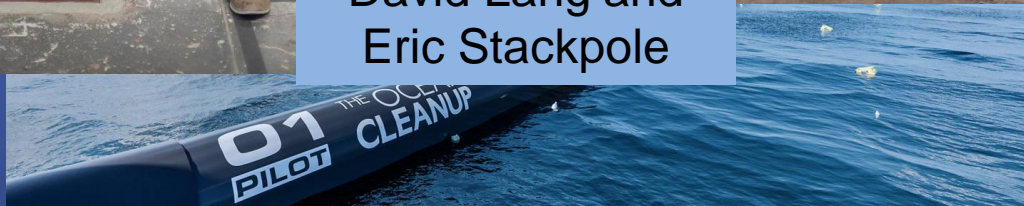
Joe Rizzi



David Lang and Eric Stackpole



© 2016 Mergo Expedition to the Ocean Cleanup Foundation



Announcing the winners of the XPRIZE Ocean Initiative's challenge to turn data into much-needed ocean services

Who's next?



World Health Organization



Society of
Manufacturing
Engineers



ACS
Chemistry for Life®

AMERICAN CHEMICAL SOCIETY



Protein
Industries
Canada



Role of NAML

From NAML FY 2020 Public Policy Agenda:

“...Marine laboratories operate at this interface of human socioeconomic and the natural aquatic world...”

Moving Forward

THE REAL WAY TO DO IT!



Epilogue

The screenshot shows a web browser window with the URL mtsociety.org. The page title is "Vice President of Government and Public Affairs". The left sidebar contains the Marine Technology Society logo and navigation links: Membership, Professional Development, Sections, Committees, Events, News, Publications, Awards & Honors, Students, and About. A search bar is located below the navigation links. The main content area includes the following text:

Vice President of Government and Public Affairs

Term: Three years and not to exceed two consecutive terms beginning January 1, 2020.

Position Description:

1. Ensures that the Society develops and maintains positive and productive relationships with Federal Agencies (civil and defense), State, Local, Tribal governments, legislatures and the media in the U.S. and internationally. Pursues opportunities to advocate on behalf of the MTS membership.
2. Oversees policy and reviews public releases by Society officers and spokespersons as related to government and public affairs
3. With the president, represents the organization to the media and with governmental or nongovernmental organizations and committees
4. Co-chairs the Professional Committee Board
5. Serves on the Publications and Finance Committees
6. Has direct responsibility for designated Professional Committees

Candidates

Jerry Miller, PhD [View Bio](#)

Joel Widder [View Bio](#)

At the bottom of the page, there is a social sharing section with the text "Share This Page With Your Peers!" and icons for Facebook, LinkedIn, and Twitter. Below that is a banner with the Marine Technology Society logo and the text "Reach the members of MTS by placing your message here!" with a "Learn More" button.

Notes from NAML Meeting, 3-5 OCT 2007

“...The report also called for a “Research Czar” (at NOAA) to be appointed, but that still has not been put in place. Rick noted that the Chief Scientist position is for PR only ...”

A scenic sunset over a beach. The sun is low on the horizon, casting a warm orange and yellow glow across the sky and reflecting on the water. Several large, dark rock formations are silhouetted against the bright sky. The waves are breaking gently on the shore, and the overall atmosphere is peaceful and serene.

Thank you