

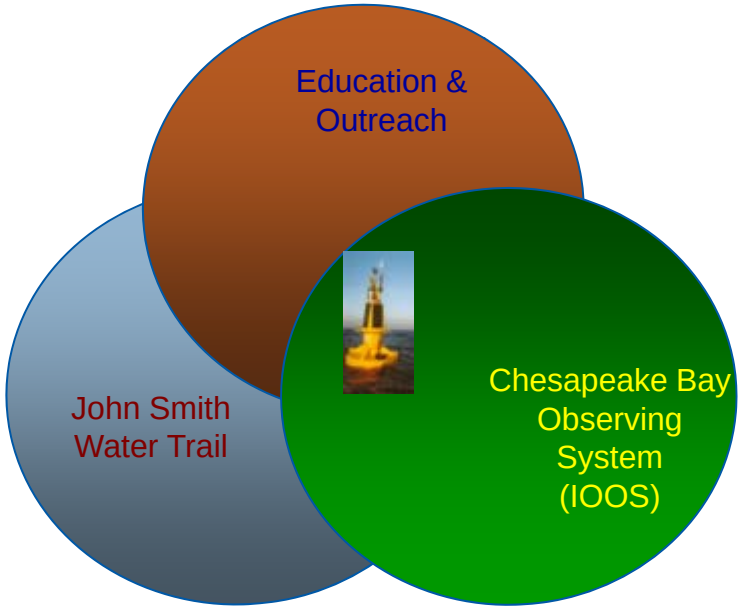

NOAA CHESAPEAKE BAY INTERPRETIVE BUOY SYSTEM SCIENCE USERS' FORUM

NOAA CHESAPEAKE BAY OFFICE

28 February 2012

CBIBS: Objectives

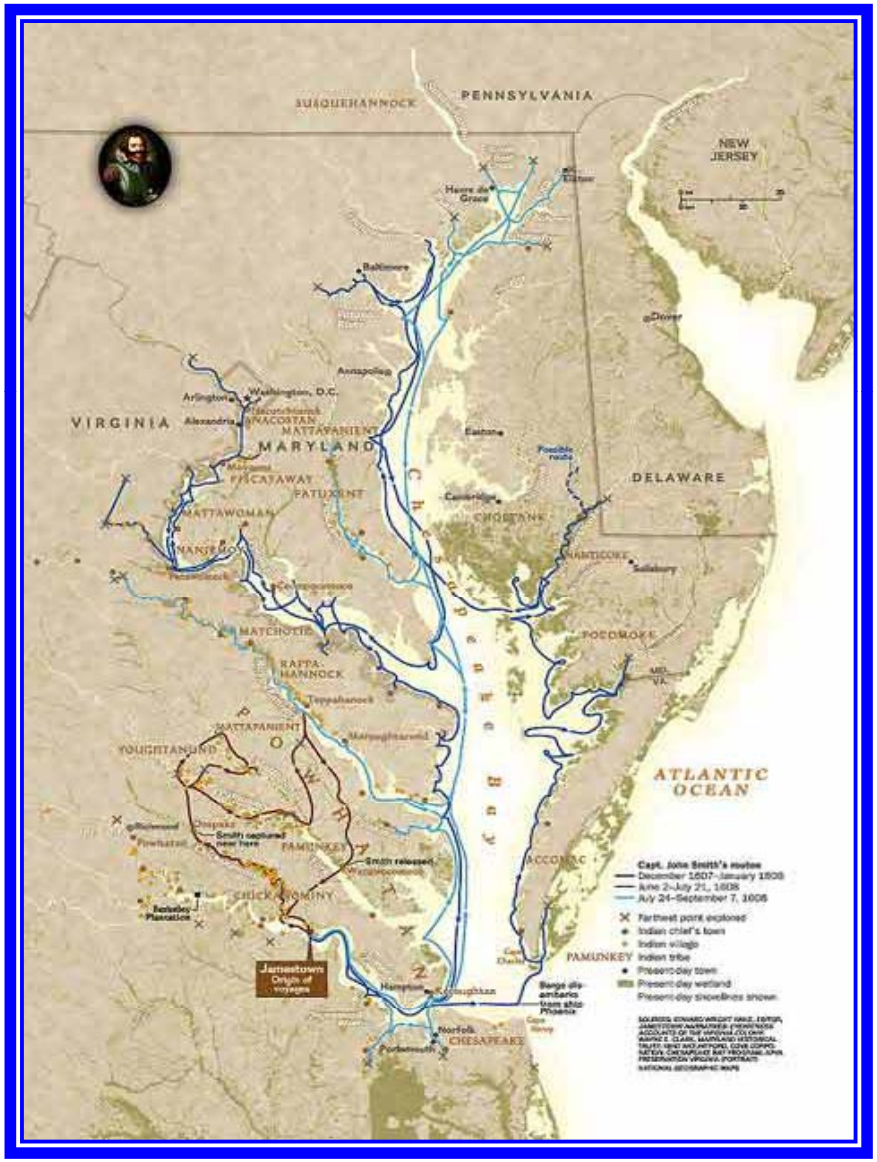
The Chesapeake Bay Interpretive Buoy System (CBIBS) is a system to collect, transmit and interpret real-time environmental data from the Chesapeake Bay to a wide variety of constituents – including scientists, on-the-water users, educators, and natural resource decision-makers – and to fill critical observational gaps in the Chesapeake Bay.



- Buoys are markers for the National Park Service's Captain John Smith Chesapeake National Historic Trail; they convey local and historic references.
- Buoys are versatile coastal observing platforms collecting a broad suite of measurements
- Buoys are Education cornerstones – buoy information is used in classrooms

- System is built around an Integrated information network - connects buoys, data, web, education, information resources – embracing IOOS concepts and standards.

CBIBS: Target audience



Groups engaged in marine activities, with a special mission to support the National Park Service's Captain John Smith Chesapeake National Historic Trail.

Present buoys are located at historically significant locations along the Trail, and the System supports educational and informational tools to interpret the Captain John Smith Chesapeake National Historic Trail.

CBIBS: Target audience

Education and Outreach interests.

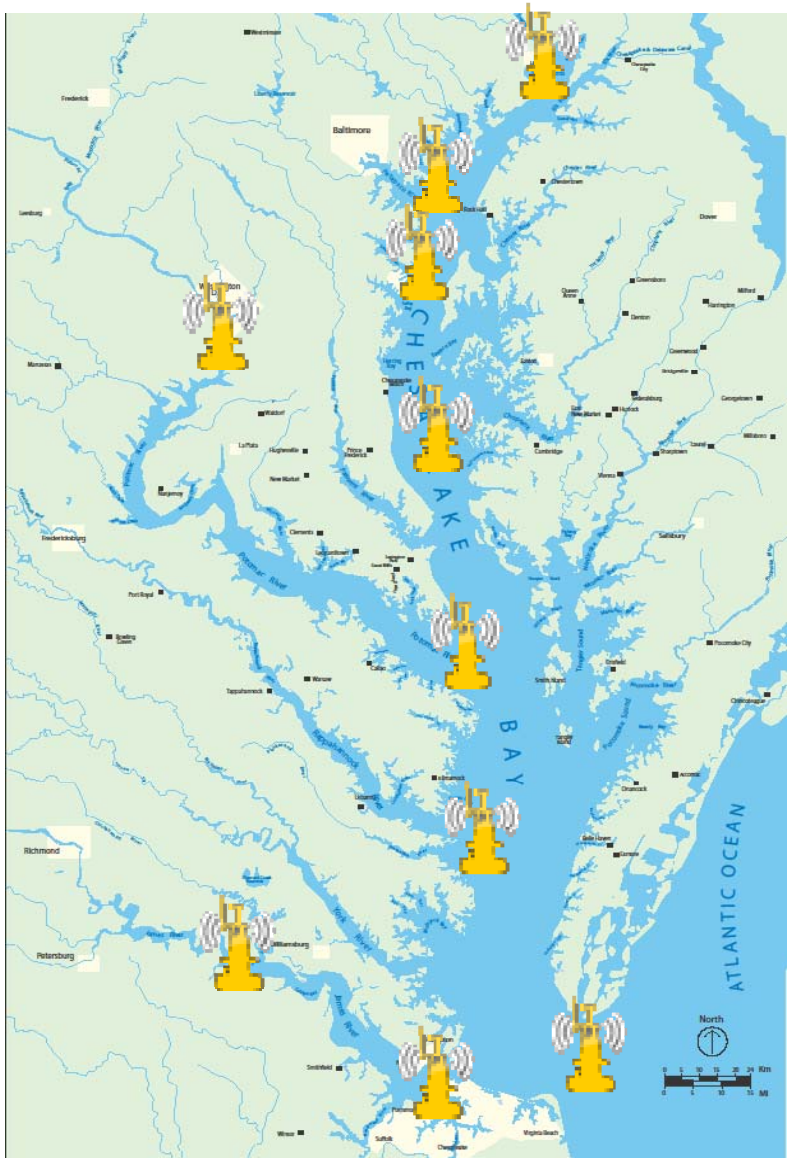
Recognizing that efficient use of environmental information requires an environmentally literate audience, a major focus of CBIBS is developing educational and interpretive context for the information provided by the observing system. Users include educators and their students, and environmental, historical, geographical, and cultural interpreters and their interest base.

CBIBS: Target audience

Environmental and natural resource planners and decision makers, and the scientists, analysts, and applications developers who support them.

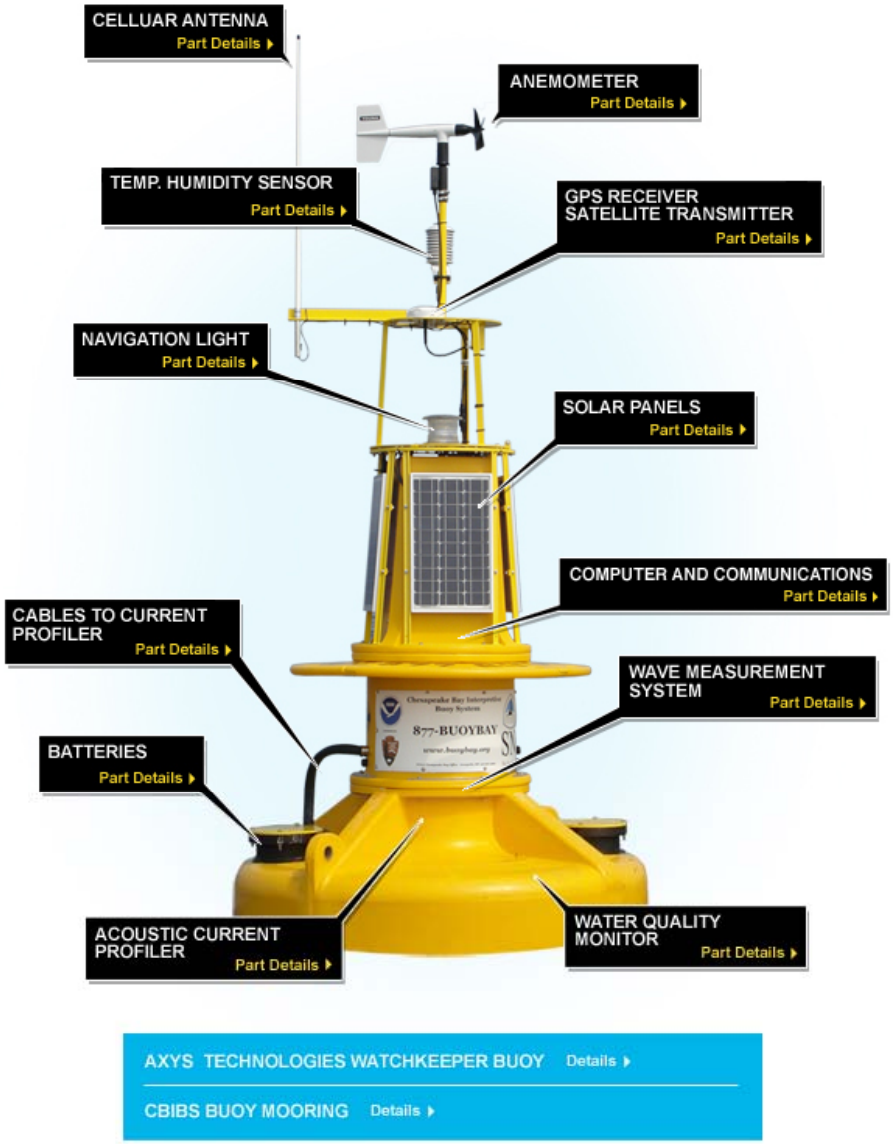
CBIBS employs integrated ocean observing system methods and technology to meet the needs of Chesapeake Bay users. CBIBS is a component of the U.S. Integrated Ocean Observing System, supported by the NOAA Chesapeake Bay Office (NCBO) and Chesapeake Bay Observing System (CBOS) partners. CBIBS provides an unparalleled opportunity to demonstrate the broad utility and versatility of observing systems. CBIBS has been designated a significant component of the Monitoring and Observing System being proposed in response to the recent Chesapeake Bay Executive Order.

Buoy Locations



S	Susquehanna	44057
SN	Six Ft Knoll (Patapsco)	44053
AN	Annapolis	44063
UP	Upper Potomac	44061
GR	Gooses Reef	44062
PL	Point Lookout (Potomac)	44042
SR	Stingray Point	44058
J	Jamestown	44041
N	Nauticus (Norfolk)	44059
FL	First Landing	44064

Anatomy of a Buoy



Presently CBIBS buoys based on the Tideland Signal SB138P, modified by AXYS Technologies as their WATCHKEEPER Buoy.

14’ tall (~10’ above WL)	1300 lb
400 A-h batteries	80 W solar panels
2500 lb anchor	Rotomolded polyethylene
1” Mooring Chain w/2.5:1 Scope	

Present sensors measure :

- Wind Speed and Direction (R.M. Young 5103)
- Air Temperature and Relative Humidity (Rotronics MP101A)
- Barometric Pressure (Vaisala PTB101)
- Water Quality (WETLabs / Seabird WQM)
  (Temp, Salinity, Dissolved Oxygen, ChlA, Turbidity)
- Current Profiles (Nortek 1 mHz AquaDopp)
- Wave Parameters (AXYS TriAXIYS wave sensor),
  (Height, Direction, Period, etc)

Data Transmission via Cellular Network

Flexible DCP allows addition of ANY sensors

“Moon Pool” wells allow access to instruments from surface

Other / possible sensors include Nitrate, Phosphate, Water Level (GPS), Camera, Acoustic Fish Detection, AIS …

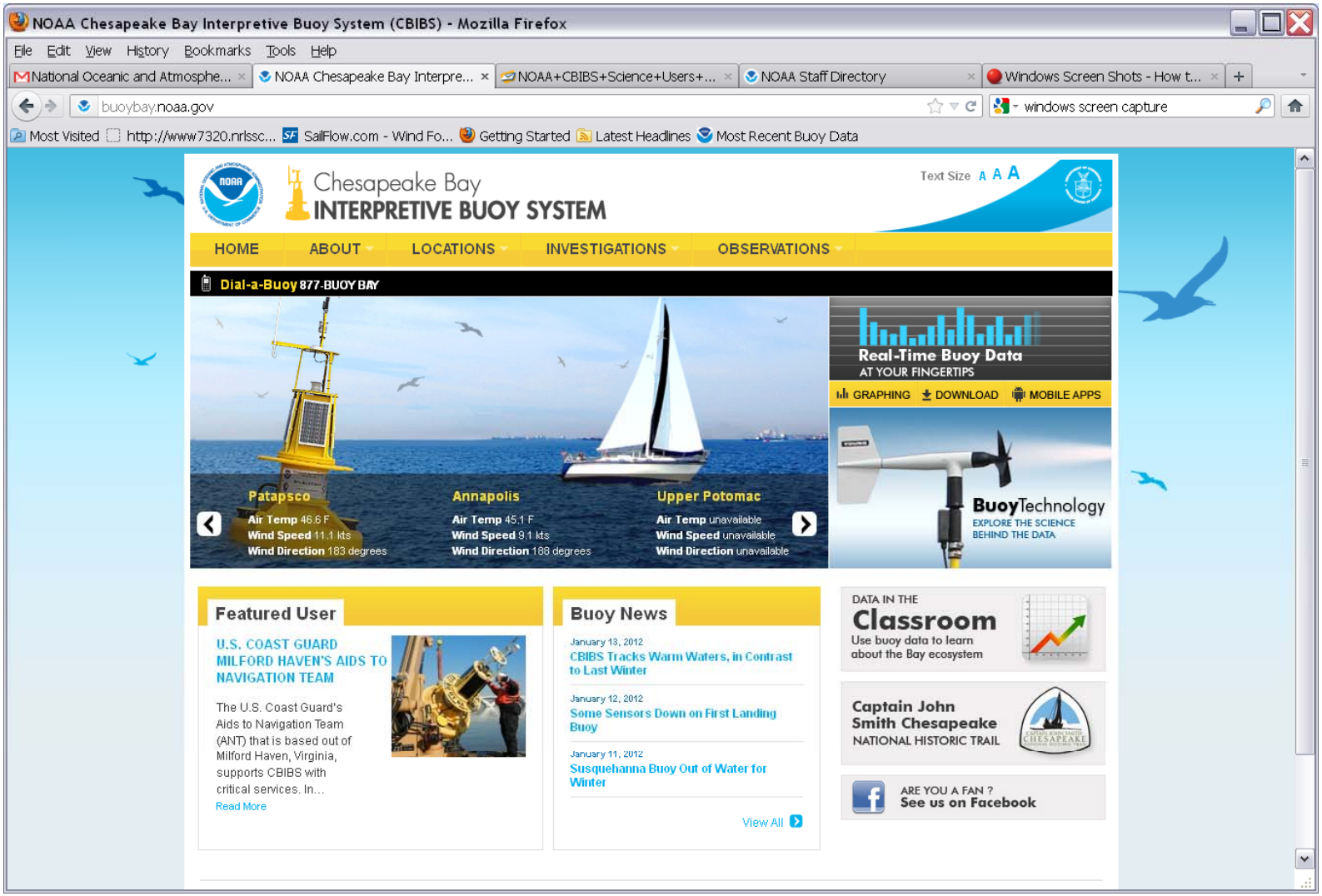
Sensors / Calibration

Initially funded primarily as an ‘interpretive’ system, CBIBS has continued to make strides towards improving data quality, continuity, and ease of delivery to science and applications users.

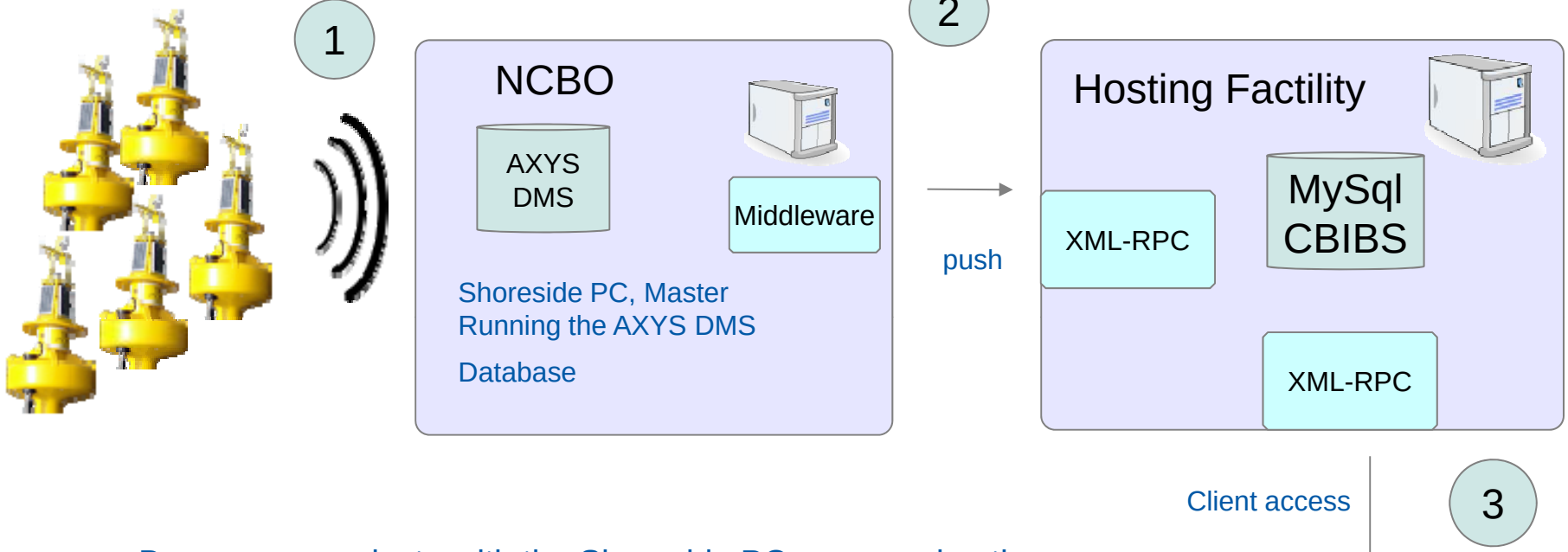
- Ongoing validation work (Bergstrom on Water Quality, Wilson & Seigel (2011) on Waves and Currents, MD DNR water sampling;
- Documented and Updated Calibration methods;
- Increased spares inventory, including two complete spare buoys;
- Implementing proactive field maintenance for WQMs
- Implementing US Coast Guard standard mooring equipment to facilitate CG maintenance support;
- Developing enhanced QA/QC procedures and metadata archives;
- Improving access to real time data and data archives;
- All data collection and management moved to off-site servers.

CBIBS Access: *buoybay.noaa.gov*

The primary web site for CBIBS is BUOYBAY.NOAA.GOV



Data Overview



1. Buoys communicate with the Shoreside PC server using the AXYS DMS Application over the cellular network. Communications occur every 10 minutes and transmit ASCII data.

2. A PERL script runs every three minutes which pushes information to the central distribution database. This resides at a hosting facility to ensure system up-time.

3. Clients access the data through a variety of methods.

Presentations

Examples of CBIBS Data for Science and Applications

- Using CBIBS Data in Fisheries / Ecosystem Modeling
  Howard Townsend / Mejs Hasan (NCBO)
- Data Quality Evaluation by Comparison with *in situ* Measurements
  Peter Bergstrom (NCBO)
- Remote Sensing Algorithm Development and Validation
  Salinity – Chris Kinkade / Ron Vogel (NESDIS)
  Total Suspended material – Eric Stengel / Mike Ondrusek (NESDIS)
- NWS Sterling WFO SWAN Wave Model
  Carrie Suffern (NWS)

Roundtable Discussion

How do you use CBIBS data?

Data Delivery How are the data available to users?

Browser or Application based methods:

- CBIBS Web Site (buoybay.noaa.gov)
- Mobile Apps (Iphone, Android, /m)
- 877-BUOYBAY
- Fish Tag Web Site

Direct from CBIBS

- middleware DB - > XML layer API
- middleware DB - > Smartphone API
- middleware DB - > JSON layer API
- Flat (CSV) Files
- RSS feeds
- SOS (Sensor Observation Service)

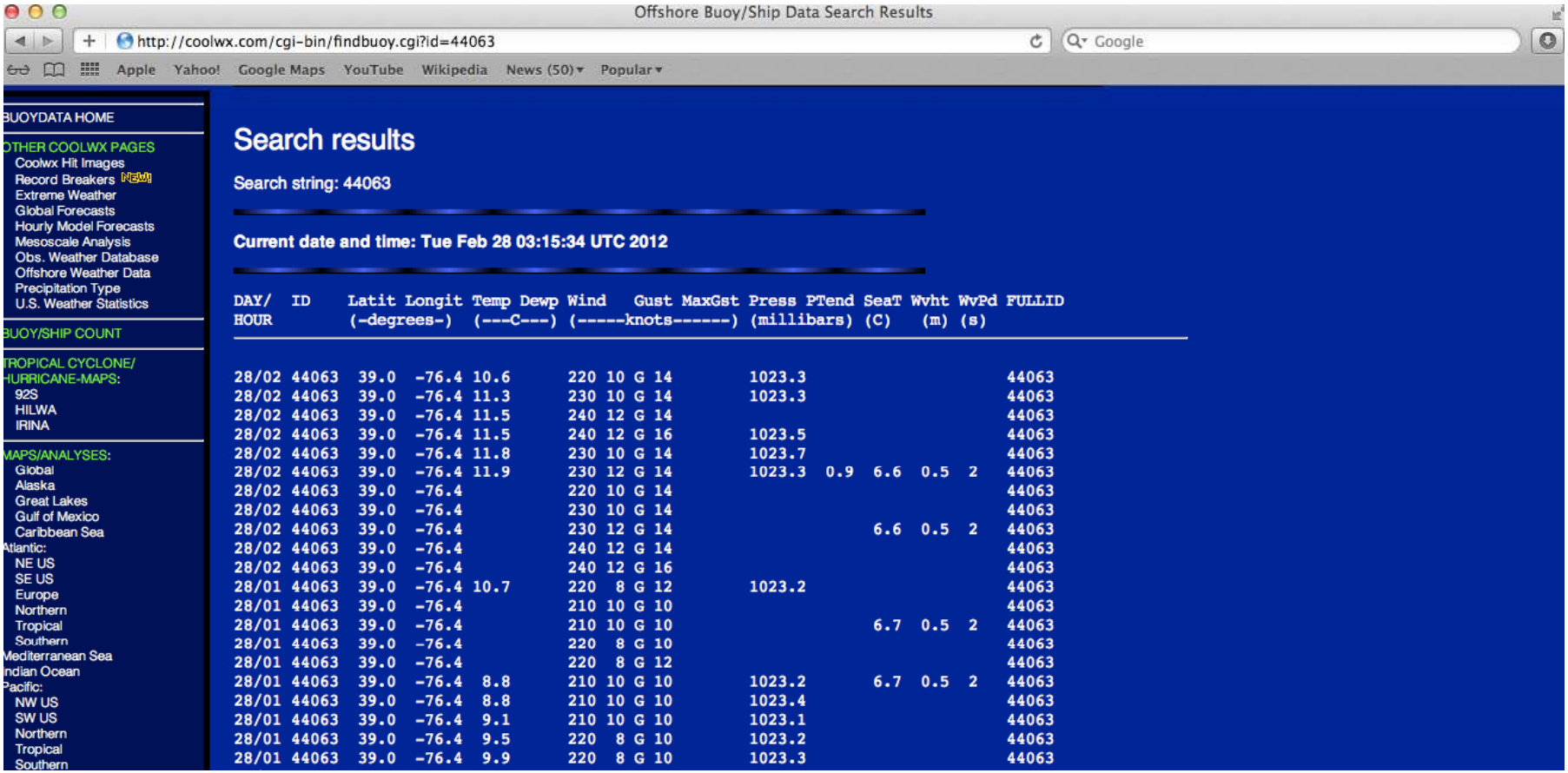
GTS via NDBC

Re-Servers

- NDBC
- Fieldscope
- Chesapeake Explorations
- CBOS

Data Delivery

Data (Met, Waves, WQ) are presently delivered to the Global Telecommunications Service at 10 minute intervals via NDBC.



DAY/ HOUR	ID	Latit (-degrees-)	Longit	Temp (---C---)	Dewp	Wind (-----knots------)	Gust	MaxGst	Press (millibars)	PTend	SeaT (C)	Wvht (m)	WvPd (s)	FULLID
28/02	44063	39.0	-76.4	10.6		220 10 G 14			1023.3					44063
28/02	44063	39.0	-76.4	11.3		230 10 G 14			1023.3					44063
28/02	44063	39.0	-76.4	11.5		240 12 G 14								44063
28/02	44063	39.0	-76.4	11.5		240 12 G 16			1023.5					44063
28/02	44063	39.0	-76.4	11.8		230 10 G 14			1023.7					44063
28/02	44063	39.0	-76.4	11.9		230 12 G 14			1023.3	0.9	6.6	0.5	2	44063
28/02	44063	39.0	-76.4			220 10 G 14								44063
28/02	44063	39.0	-76.4			230 10 G 14								44063
28/02	44063	39.0	-76.4			230 12 G 14					6.6	0.5	2	44063
28/02	44063	39.0	-76.4			240 12 G 14								44063
28/02	44063	39.0	-76.4			240 12 G 16								44063
28/01	44063	39.0	-76.4	10.7		220 8 G 12			1023.2					44063
28/01	44063	39.0	-76.4			210 10 G 10								44063
28/01	44063	39.0	-76.4			210 10 G 10					6.7	0.5	2	44063
28/01	44063	39.0	-76.4			220 8 G 10								44063
28/01	44063	39.0	-76.4			220 8 G 12								44063
28/01	44063	39.0	-76.4	8.8		210 10 G 10			1023.2		6.7	0.5	2	44063
28/01	44063	39.0	-76.4	8.8		210 10 G 10			1023.4					44063
28/01	44063	39.0	-76.4	9.1		210 10 G 10			1023.1					44063
28/01	44063	39.0	-76.4	9.5		220 8 G 10			1023.2					44063
28/01	44063	39.0	-76.4	9.9		220 8 G 10			1023.3					44063

Data Quality

Continued proactive O&M, in situ sampling, and pre- and post-calibration

Range Checks

Developing QC procedures and codes

Available Data and Metadata Archives

Adopting Community Standards

- QARTOD (Quality Assurance of Real-Time Ocean Data)
- MMI (Marine Metadata Interoperability)
- Climate & Forecast (CF) standards
- SWE (Sensor Web Enablement)
- IOOS / OOI

What do you need from CBIBS?

Data accessibility and delivery formats

- Are you interested in using near-real-time or archived data?
- Do the existing formats and mechanisms work for you?

QA/QC issues

- What level of QA/QC do you require? (In real time and/or archived data)
- How would you like to see that represented in the data set
- What details of metadata do you require?

Suitability of present locations

- Present locations have been determined based on various factors; where in particular would you like to see CBIBS buoys?

New sensors

- What additional or new sensors would you like to see on CBIBS buoys?
- Would you like changes in the existing sampling methodology or schedule?

Potential for collaboration

- How can you use CBIBS data in your research or applications?
- What support from NCBO CBIBS would this require?