THANKS !!!
Then & Now

A Decade of Growth Towards a Sustained and Integrated Ocean Observing System

Chapter 2
User Requirements
Chapter 3

Recommendations

• Organize information about users, their requirements and available products into a “marketplace”. An IOOS “match.com”.

• Develop an “Action Agenda” for U.S. IOOS that prioritizes near-term investments and steps along the path to a fully operational system.

• Organize existing IOOS user engagement efforts into an ad hoc User engagement Council.

Draft of Summit Report available at www.iooc.us/summit/report
Comments due November 26
Visionary Vignette
Sandy: landfall
MARACOOS HFR Back!!!
Day 3 – Integration and Vision

- Synthesis of Breakout Session 1
- Evaluate the Risk: Dail Rowe
- Integration Challenges and Opportunities: Michael Bruno
- Break Out Session 2: Addressing User Needs
- Visionary Vignette: Animal Tagging: Barbara Block
- The Way Forward: High Level Recommendations for the Next Decade: Rick Spinrad
Day 3 – Changes to schedule

2:45  Independent Cost Estimate:  
**Bob Houtman**

3:00  Break

3:15  Break-out session 3: Cross-Cutting Themes

5:00  Adjourn

*No reception but shuttles to Reston!*
Break-Out Session 1

Products to Fulfill Future User Needs
10-year Vision: Robust, Geographically Widespread, 4-D Observations and Forecasts for vessel traffic (commercial and recreational), search and rescue, spill planning and response, and offshore energy. This includes a special focus on enhancing sub-surface/deep water observations and forecasts.

Majors issues, challenges, gaps:
- Community of users isn’t optimally involved or aware of IOOS capabilities, benefits, opportunities
- Private sector not optimally involved in service/product development
- National plans (HFR, wave) aren’t easily tied to higher level themes
- Danger of creating community expectation of free products
- Certain suites of observations (sub-surface, ice-related) are inadequate
- Outsourcing of data collection jeopardizes long-term operational capabilities
- Spatial resolution and timeframes are not always adequate
Vessel Traffic (Commercial and Recreational)
• Reach out to specifics orgs to ID needs (HSRP, AAPA, Boat.US, professional societies, Ports SIN/ROT, World Ocean Council, also Industry Workshop) → IOOS PO/IOOS Assoc(IA)/RAs
• Engage private sector intermediaries about customer needs → RAs
• Create all-in visualization products to include nowcasts/forecasts → RAs (priv.sec)

Search and Rescue
• Improve resolution of data products → Relevant Agencies, RAs
• Engage state, local, fire depts, police and marine units → RAs

Spills
• Enhance sub-surface data collection and plume modeling → Agencies, RAs

Offshore Energy
• Engage Industry (incl. NOIA) about needs and IOOS capabilities/value → RA’s, I.A.
• Expand NOAA/PORTS-type products & services → Agencies, RAs (priv.sec)

IN GENERAL
• Improve access, visualization & user-friendliness of products (phone apps, click-and-see, etc.); improve training for improved use of products → RA’s (priv sec)
• Enhance data collection / modeling (ice*, bathymetry, surface drift, seafloor/lake floor change, winter navigation, weather, wind, waves, subsurface & deepwater variables → Agencies, RAs)
The Needs - User requirements

- **Global**: Physical variables: well organized requirements development and vetting process. Most reqmts well known; new reqmts (e.g. deep ocean) under development. Biogeochemical and biological reqmts: GOOS catalyzing efforts

- **Coastal**: not as clearly defined except by various specific user groups – like OA, hypoxia, HAB communities

Critical gaps

- Most of our discussion centered around the gap between what we known at global versus regional scale (especially coasts) for climate related observing and products.

- Many decision-makers and users require local information (e.g. OA and shellfish industry), yet it is not clear what time scales they are interested in, nor their specific interests for global climate variability information.

- There are many gaps in observing and product development. Much needs to be sustained to continue climate records as well as production of climate drivers/forecasts
Plans for Post Summit Activities

There is much to be gained by increased interactions between global and coastal communities:

• Need to identify “modes” of variability that are important at local/coastal scale and extent to which this variability can also be explained by/tied to global scale variability.
  – Regions could identify/develop indices (measures of change), which could serve as important indicators of change and potential ties to global info

• Encourage RA’s to adopt climate observing “best practices” (e.g. calibration, QA/QC) to increase the usefulness of regional observations for climate needs; encourage all systems to work together on data quality practices to meet all needs

• Connect relevant global (remotely sensed) to regional data through vocabulary of Essential Ocean Variables
  – Surface currents and winds are some specific examples where interest was sparked

• Need to identify climate-relevant products which could drive observing needed. (ie: OA maps of coastal waters, early warning)

• Validation by regions of global ocean models/products/reanalyses
Plans for Post Summit Activities

• Observing communities should consider opportunities to equip commercial fleets with instrumentation (e.g. Oceanscope CWP)
• Observing communities should consider how to characterize observing requirements. One approach could be the use of intensive, time-limited climate relevant sampling within a specific region. Such an Observational Test Bed effort could rotate region to region.
• Probabilistic forecasts of the ocean require validation
Break-out Session 1: 3 – Ecosystems

• The Needs - Users and their requirements
  - Operational
  - Policy
  - Public / Education
  - Science users was not discussed

• Critical gaps in between where we are and where we need to be
  – Will be discussed in ‘Expanding the biological component of IOOS’

• What are the majors issues or challenges for achieving the goal
  – Will be discussed in ‘Expanding the biological component of IOOS’
Ecosystems – Public / Education User

• User communities
  **Policy makers and government agencies (incl. the Hill),**  Formal Education, **Informal Education,** Recreational Users, Private Industry

• IOOS 2022 Products
  **Theme:** Use IOOS to define and educate about the importance of ecosystems
  - The public will understand the ecosystem and their impact as they do with the carbon footprint
  - Personalized report card indicating your impact on the ecosystem
  - Socio-economic analyses at the macro and micro scale.
  - IOOS should work with private industry to identify the most sustainable specific products
Ecosystems – Policy User

• User communities
  Fisheries management councils, State councils, Policy makers (State and Federal), Developers and implementers of EBM, Ocean planners, State DEPs, NGOs, and International Conventions

• IOOS 2022 Products
  Theme: Use IOOS to inform user specific decision making within the framework of their planning tools
  - Fishery independent measurements of survival and movement of marine mammals, top predators, prey species, protected species, others.
  - Regionalized climate indices relevant to movement of managed species.
  - Models that turn data into an information product useful to the policy end user.
Ecosystems – Operational User

• User communities
  Fishery managers and fisherman, managers of MPAs, tourist industry

• IOOS 2022 Products
  Theme: Operational user communities will be working with the same set of products
  - Nowcast and forecast the location and movements of ‘Hot spots’, HABs, protected, endangered species and by-catch species
  - System where fishermen in real time are sending data and they all have access to the data.
  - MPA monitoring to assess the effectiveness of MPAs – distribution and condition of key habitats and abundance of LMRs
• User Requirements, Needs, Drivers and Expectations

- Need to engage at the local level and begin with user needs; if we don’t begin w/ user needs we never engage with users
- Must understand regulatory / permitting requirements
- Need sustained observations, background data against which to detect change and impairment, and forecast
- Synthesized data into products and services
- Stakeholder advisors, liaisons
- User friendly and easy access = enabling access
- If a user uses the product routinely the user expects it to be operational!
Critical Gaps:

- Forecasting
- Connecting nearshore to offshore
- Ability to integrate watershed water quality with coastal water quality
- Understanding of baseline trends, cycles, processes that drive them
- Technological development
- Appropriate partnerships and collaborations

Majors Issues or Challenges:

- Coordination among agencies
- Lack of common parameters or definitions
- Translating data into products that people understand and trust
- Operationalizing products
- Integrated data management
- Participation of agencies
Break-Out Session 1: Water Quality

- Priority (not prioritized) focus activities:
  - Assessment of water quality data, models and products that are currently being delivered, including agency activities and related economic benefits, while preparing for emerging issues. [Regionally led efforts, RAs]
  - Identify roles and responsibilities of the participating agencies and ensure participation. [IOOC]
  - Coupled circulation and water quality models (3-D, dynamic) [Many including funding agencies]
  - Standardization of data collection, analytical methods, and management protocols as possible [Monitoring programs and DMAC]
  - Technological development of water quality sensors and platforms [NOPP, ACT]
• **Vision for 2022**
  – IOOS will have community endorsed ocean modeling ensembles running 24x7 to seamlessly feed NWS forecasts/warnings and provide information on the personal decision scale.
  – Products will predict off-shore and inland hazards as well as biological hazards (HABs), and will communicate uncertainty to the average person
  – observations will be increased and outages will be shortened; ocean-atmosphere-ice will be coupled, inundation will include the coast and inland (including fresh water), total sea level will be available, communication will continue despite power outages (etc)

• **Critical gaps**
  – Coupling of ocean-atmosphere-ice; directional waves at intermediate depths; biological sensors; connection/integration with NWS (etc); not all relevant agencies are at the table, bathymetry at scales of IOOS needs, lack of validation datasets, no formal testbeds, need synthesis / assimilation of data, assessments, effective communication with users/public

• **What are the majors issues or challenges**
  – The "Wild West" of ocean modeling must be tamed with IOOS leading the development of trusted sources
  – Clarity of roles and overcoming "us" vs "them" mentality. (IOOS "I" = INCLUSIVE)
  – Creating a seamless system focused on the ultimate goal: life and property
Plans for Post Summit Activities

• Professional Advocacy for Mission & Resources
  – How: IOOS Association Hires a professional lobbyist
  – Champions: Scott Rayder & Hank, Jon
  – Timeline: Within a year of decision

• Address Priority Hazards in Testbeds
  – How: Evaluate how models and observation systems perform in extreme events
  – Champions: Rick Signell, Chris Mooers, & Ming Ji
  – Timeline: By 2015

• Develop Validation Datasets for Extreme Events
  – How: team meets with users/industry to determine validation plan; develops a hardened sensor package for deployment; deploys test; assesses plan & implementation; revises plan and package
  – Champions: Dail
  – Timeline: By 2015

• Improve integration between RAs and Agencies
  – How: team meets with NCEP and NOS and develops a roadmap for connecting trusted models and tools into operational systems
  – Champions: Ming Ji & Peter Sheng
  – Timeline: By 2018
Next Steps

- We need your comments by the end of lunch. If no substantial comments by then we will start the signature process.
- To sign you can
  - E-mail to: declaration@iooc.us by 30 Nov
  - Initial sign-up sheet
  - You, not your organization
Today is about Action

Yesterday was topical about vision

Today is functional to craft actions
- If something needs to be done better, then tell us how to do it.
- Be specific, not “Need to better integrate across global, national regional …”

Think about who should carry out the actionable items
- GOOS Steering Committee and other global entities
- IOOS FAC
- IOOC
- IOOS Program office
- IOOS Association
Today is about Integration

- Integrate across
  - Technological (observational, modeling, DMAC, product development)
  - Local / Regional / National / Global
  - Sectors

- To provide information to address issues

One System, multiple uses!
“KEEP MOVING FORWARD” – Rich Signell

“If you think your family’s different, wait ‘til you meet the family of the future”

“If you think your observing system’s great, wait ‘til you meet the observing system of the future”
“Around here, however, we don’t look backwards for very long. We keep moving forward, opening new doors and doing new things … and curiosity keeps leading us down new paths.”

-Walt Disney