Biology & Ecosystem Panel

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GEO Blue Planet Symposium, Cairns, 27 May 2015
Outline

1. Why do we need monitoring
2. Building on existing initiatives
3. Adding value to develop a GOOS network
Framework for Ocean Observing

A simple system

Input (Requirements)

Output (Data & Products)

Process (Observations)
Framework for Ocean Observing

GOOS Biology and Ecosystem network

Driver: International needs

Supporting Response (Data & Products)

Human Pressures
Existing State measures
Impacts & Gaps
Driver: International needs

Supporting Response (Data & Products)

Human Pressures
Existing State measures
Impacts & Gaps

Framework for Ocean Observing
GOOS Biology and Ecosystem network
DPSIR Organizing Framework

**Driving Forces**
Needs of human society (food, water, fuel, shelter)

**Pressures**
Human activities that stress the environment (pollutants)

**Responses**
Response of society to losses of Ecosystem Services (policies, decisions)

**States**
Changes in condition of the environment (composition, distribution, quality)

**Impacts**
Effects of a change in State on Ecosystem Services

**Decision-Making**
Benefits of DPSIR

- Transparency & simplicity
- Enhances communication
- Isolate concepts within the larger system
- Human-centric
- Implies causal relationships
### Achieving DPSIR: Filters 1 and 2

<table>
<thead>
<tr>
<th>Sustainable Development Goals</th>
<th>Primary Productivity</th>
<th>Zooplankton</th>
<th>Apex Predators</th>
<th>Shallow reef</th>
<th>Coastal habitat</th>
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<tbody>
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<td>Resilience and adaptive capacity</td>
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<td>Conservation and Sustainable use</td>
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<td>Improve N-S, S-S, etc collaboration</td>
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Filter 3: Readiness

**Concept**
- Attributes: Peer review of ideas and studies at science, engineering, and data management community level.

**Pilot**
- Attributes: Planning, negotiating, testing, and approval within appropriate local, regional, global arenas.

**Mature**
- Attributes: Products of the global ocean observing system are well understood, documented, consistently available, and of societal benefit.
DPSIR Framework example

Hayes et al. in press
Statistical analysis
Value adding

- Macroalgae
- Bacterial mats
- Worms
- Bioturbation
- Przeslawski et al. DSR I, 65, 2012
- Seagrasses
- Brachiopods
- Bacteria mats
- Bryozoa
- Sponges
- Schoenberg & Fromont (in prep)
- Crustacea
- Molluscs
- Echinoderms
- Fishes
- Seaspiders
- Ascidia
- Cnidaria
- Jellies

At each branch:
- Descriptive label
- CAAB numeric code for data-base centrally archived and maintained

‘Living classification’
- sub-division of branches can be added on request

Agree on standards
Biotic community
Outcropping rock and sediment pockets with sparse sponge and octocoral cover

**SUBSTRATE:** Consolidate (hard): Rock (82 001002)

**BIOTA:** Sponge: Massive forms: Simple (10 000904)

**BIOTA:** Cnidaria: Black & Octocoral: Branching 3D: bushy (11 16898)

**BIOTA:** Sponge: Hollow forms: Cups & alike: Cup/goblet (10 000919)

**SUBSTRATE:** Uncosolidated (soft): sand/mud: Coarse sand (82 001014)

**BIOTA:** Fishes: bony fishes (37 990083)
Supporting new technology uptake

Pint-sized DNA sequencer impresses first users

Portable device offers on-the-spot data to fight disease, catalogue species and more.

Erika Check Hayden

05 May 2015

The MinION device can sequence small genomes, such as those of bacteria and viruses, displaying the results as they are generated.
Supporting global networks
Reef Life Survey – Edgar and Stuart-Smith 2014

134,759 abundance records, of 2,367 fish taxa, from 1,879 sites in coral and rocky reefs
Supporting transfer across the science policy interface

Turnhout et al. 2007
Summary

• Assess statistical properties of existing data series
• Assess successful long-term series against FOO using the DPSIR framework
  – Rationale, impact
  – What is minimum essential set
  – Are there cheaper ways to get the same information
• Supporting existing programs to become global (GOOS networks)
• Identify gaps
• Maintain high value of GOOS network
How, When and Who

• What/why
  – Decadal goal and Ocean Obs ‘19 targets

• How/when
  – Draft work plan

• Who
  – Proposed panel members
• Decadal vision
  – All biology observing initiatives are aligned with FOO, data are centrally accessible and being collected and shared in standardized ways

• Ocean Obs ‘19
  – A clear framework to identify and support GOOS Vs has been defined and is supported by existing initiatives.
  – At least one (set of) GOOS Vs change indicator has been identified, globally coordinated with a clear pathway to global coverage, including open access data, and reporting to support international reporting needs (including SDGs, CBD reporting needs, a future WOA, international coral reef network, etc.) – ie. a mature programme
  – A further 3 (sets of) GOOS Vs have been identified as pilot EBVs with a clear pathway to progress them to mature V
How and When – draft work plan

• Conduct a review of the selected observing initiatives - June 2015

• Constitute the panel –
  – Invite participants June 2015 (includes development of background materials)
  – Confirm panel membership and schedule 1st teleconference of the full panel (July 2015)

• Conduct a review of the major conventions and international bodies/pressures (e.g. UN, WOA, CBD) that people are looking to inform with biological data (Marine Policy paper Dec 2015)

• Design/draft survey to go to the selected, existing observing initiatives (beta-test, revise, complete by December 2015)
Draft work plan (cont…)

- First in-person meeting of the GOOS BEP (Early 2016 – Jan/Feb, Ocean Sciences?). Analyze survey data, draft paper, discuss execution of DPSIR framework
- DPSIR analyses (March – Aug 2016). Focused on the ‘mature’ EOVs identified in the survey results
- Workshop (late 2016) Full panel and
  - Bring together representatives from observing initiatives for which survey and DPSIR results indicate they hold time series data of variables that are highly feasible and high impact i.e. those that are “mature” EOVs
  - Discuss how to establish these EOVs as part of a “mature” GOOS network (output will be identification of next steps to get there)
  - How to advance pilot and concept EOVs within the GOOS framework
Draft work plan (cont...)

• Panel will also then need to follow through on:
  • Establishing and selling these identified EOVs (website, meetings, etc.) (including facilitating completion of the EOV templates)
  • Gap filling/gap analyses. The initial observing initiatives surveyed are not exhaustive of all biological data time series collected globally. So some effort will need to be made to identify and survey additional time series including any that will fill geographic gaps in coverage, e.g, from GRAs. This step could be prioritized by searching for time series data on the recently identified EOVs first.

• Outstanding questions or ongoing action items:
  • Communication and outreach strategy – development of brochure/flyer, web content
    • Idea of a mini symposium (late 2016/early 2017)
    • Attendance of scientific meetings (June 2015 – 2017)
  • Frequency of meetings and funding
THANK YOU

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