



Planning the implementation of a global long-term observing and data sharing strategy for macroalgal communities

September 24-26, 2018

Institute for Marine and Antarctic Studies, Hobart, Australia

Goals of the Workshop

1. To identify globally representative data sets on macroalgal ecosystems at all geographic scales
2. To recommend approaches to consolidate existing data and associated metadata in a data system under the principles of FAIR data (Findable, Accessible, Interoperable, and Re-useable)
3. To develop the technological and methodological strategy to build and implement an observing system of macroalgal ecosystems consistent with the new POGO Strategic Plan and with the GOOS Strategy
4. To draft the implementation plan for global macroalgal observations based on the workshop discussions and considering the:
 - (i) scientific and societal requirements and impacts,
 - (ii) current capabilities including methods, technologies, data management, institutional and funding partners, and
 - (iii) required actions to achieve the plan.
5. To draft training schedules for each technology level in the approach based on Standard Operating Procedures (SOPs)
6. To identify funding sources and strategies to facilitate a global approach to observation of macroalgae
7. To draft the outline of a paper describing the strategy and providing recommendations on protocols considering local/regional capacity, infrastructure and needs

Monday, September 24

8:30 – 9:30 am: Introductory presentations

- Welcome and round of introductions – institutions and expertise – **Craig Johnson and Nic Bax**
- Introduction to the workshop – goals and expected outcomes...**Craig Johnson**
- Introduction to GOOS BioEco EOv implementation plans / “Macroalgal canopy cover” as a GOOS EOv...**Patricia Miloslavich**

9:30 – 12:30 am: Regional presentations showing current monitoring efforts / technologies – Q&A

- Australia
- Europe and the UK
- Asia
- North America
- South America
- Global programs (Reef Life Survey, KEEN, any others?)
- Options and assessment of options for a data repository

[10:30 – 11:00 am: Coffee break / morning tea]

[12:30 – 1:30 pm: Lunch break (provided at venue)]

1:30 – 5:30 pm: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 1

Goal 1. Identifying globally representative data sets on macroalgal ecosystems at all geographic scales, from local to regional to global: e.g. across existing international databases of marine macroalgae such as Reef Life Survey (RLS), the Kelp Ecosystem Ecology Network (KEEN) initiative, Temperate Reef Base, OBIS, and others.

[3:30 – 4:00 pm: Coffee break / afternoon tea]

5:30 pm ADJOURN FOR THE DAY

6:00 – 8:00 pm: Hosted Dinner at *The Brick Factory*

Salamanca Square (across the IMAS building / close to Katmandu store). Phone: 03-62243667

(Drinks on your own)

Tuesday, September 25

8:30 – 10:30 am: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 2

Goal 2. To recommend approaches to consolidate existing data and associated metadata in a data system to ensure their discovery, accessibility, interoperability and re-use, and identify future priorities for management of data on macroalgal abundance under the principles of FAIR data (Findable, Accessible, Interoperable, and Re-useable).

10:30 – 11:00 am: Coffee break / morning tea

11:00 – 12:30 pm: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 3. (Breakout groups for each technology)

Goal 3. To develop the technological and methodological strategy to build and implement an observing system of macroalgal ecosystems consistent with the new POGO Strategic Plan. Discussions will include:

- Assessing the strengths and weaknesses involved with data/methods/standardization and what should be done by future observational programs.
- Assess innovative and cost-effective protocols/techniques to support the global scientific community and inform policy on these ecosystems affected by urban development and other human and climatic impacts (based on the comparative analysis of the methods that have been used and on the questions for future sustained observations).

The workshop will consider a range of technologies that can be applied globally to assessing macroalgae in intertidal and subtidal habitats. In considering trade-offs in the resolution of data and cost of obtaining them, the workshop will identify a hierarchy of approaches to assessing macroalgal cover depending on capacity and resources, and develop the framework to define a suite of Standard Operating Procedures (SOPs) for each approach. Given the time available, it is likely to be overly ambitious that we can expect to draft fully developed SOPs in the workshop. Thus, the goal will be to agree on and sketch an outline approach for each technology which can be completed out of session soon after the workshop. These SOPs could potentially be shared through the Global Ocean Teaching Academy (OTGA) platform (<http://classroom.oceanteacher.org/>).

12:30 – 1:30 pm: Lunch break (provided at venue)

1:30 – 5:30 pm: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 4

Goal 4. To discuss the implementation plan for global macroalgal considering the: (1) scientific and societal requirements and impacts, (2) current capabilities including methods, technologies, data management, institutional and funding partners, (3) required actions to achieve the plan.

[3:30 – 4:00 pm: Coffee break / afternoon tea]

5:30 pm ADJOURN FOR THE DAY

Dinner: you are free to make your own plans

Wednesday, September 26

8:30 – 10:30 am: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 5. (Breakout groups for each technology)

Goal 5. To draft outline training schedules for each technology level in the approach based on the draft outline SOPs. Again, it is likely that these will need to be completed out of session after the workshop. We will define the necessary key features of a website to provide training across the range of SOPs for the full range of techniques, with pointers to data bases and resources for producing metadata. We need to identify a suitable host website, and define the workflows to populate it. We will plan how to provide training workshops associated with international conferences and other meetings.

This element of the work is designed to address Priorities 2 & 3 of the POGO Strategic Plan, namely to:

- Develop world-wide capacity and nurture new generations of scientists (Priority 2), and
- Promote the importance of sustained systematic observing and evidence-based policy and management of the ocean (Priority 3).

10:30 – 11:00 am: Coffee break / morning tea

11:00 – 12:30 pm: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 6

Goal 6. To identify funding sources and strategies to facilitate a global approach to observation of macroalgae. Discussions will include possible funding sources to:

- enable a globally integrated data system (e.g. through remote harvesting of records) and outline a strategy towards achieving global integration of data on macroalgal cover
- (a) establish a website to provide training across the range of SOPs for the full range of techniques, with pointers to data bases and resources for producing metadata, (b) and provide training workshops associated with international conferences and other meetings.

12:30 – 1:30 pm: Lunch break (provided at venue)

1:30-3:30 pm: Discussions and brainstorming - Developing the global implementation plan for macroalgal monitoring – Goal 7

Goal 7. To discuss and draft the outline of a paper to submit to a peer-reviewed / high visibility journal describing the strategy and providing recommendations on protocols considering local / regional capacity, infrastructure and needs. Define the target journal and workflow to complete the paper out of session. **(Discussion to begin in plenary, but then move to breakout groups)**

3:30 – 4:00 pm: Coffee break / afternoon tea

4:00 – 5:30 pm: Final remarks

Workshop wrap-up: summary of actions, assigning tasks and follow up commitments and schedule

5:30 pm ADJOURN

Dinner: you are free to make your own plans

BACKGROUND FOR THE WORKSHOP

A globally coordinated and sustained ocean observing system is urgently needed to systematically assess the state of the ocean's biodiversity including biological resources and ecosystems.

Macroalgal forests (dominated by kelp and fucoid brown algae) are iconic on rocky reefs around the world's temperate coasts. These highly productive and diverse ecosystems provide many important functions and services including provision of nursery areas, human food resources, and protection from coastal erosion. Macroalgal forests are vulnerable to global threats such as ocean warming and acidification, and to regional anthropogenically-mediated stressors including habitat degradation, eutrophication, other pollution, over fishing, and invasive species. The compound effects of multiple stressors are eroding the resilience of these systems, making regime shifts and population collapse more likely. Regime shifts such as the replacement of canopies of large brown macroalgae by less productive, low-diversity assemblages of small turf-forming algae or sea urchin 'barrens' habitat are increasingly observed, particularly in temperate regions. In the tropics, many coral reefs are becoming dominated by macroalgal assemblages (Arias-González et al., 2017). Vulnerability begets sensitivity and macroalgal forests respond quickly to deteriorating environmental conditions, potentially allowing the early detection of impending regime shifts (Krumhansl et al., 2017). Furthermore, their broad distribution from boreal to temperate regions allows for tracking of geographic shifts in species ranges. Macroalgal forests provide a sensitive and well understood indicator of changing coastal marine environments and are also models for understanding more complex interactions influencing marine communities.

"Macroalgal canopy cover" was identified as one of the Essential Ocean Variables (EOVs) by the GOOS Biology and Ecosystems Panel (www.goosocean.org/eov). The process to identify these EOVs considered: (1) the societal needs according to more than 20 international conventions and/or multilateral agreements relevant to marine life, (2) the current state of ocean observations by evaluating the temporal and spatial scales of variables measured by 100+ observing programs, and (3) the impact and scalability of these variables and how they contribute to address societal and scientific issues.

Expected deliverables of the Macroalgal WG:

- A multidisciplinary global network of researchers in macroalgal ecosystems.
- An implementation plan for managing global macroalgal observations under the principles of FAIR data to feed into the GOOS and POGO strategies that will contribute to expand the global ocean observing system.
- A suite of SOPs for approaches to obtaining consistent and robust data on marine macroalgae, and training packages associated with each SOP.
- A strategy to fund ongoing observations of macroalgae and build capacity in obtaining these data.
- A peer-reviewed journal or a paper in a high-visibility journal describing the strategy and providing recommendations on protocols considering local/regional capacity, infrastructure and needs.

Participants:

Conveners: Craig Johnson (UTAS/IMAS), Patricia Miloslavich (GOOS), Nic Bax (GOOS/ CSIRO), and Lisandro Benedetti-Cecchi (University of Pisa)

POGO WG Attendee	Country	Institution
Neville Barrett	Australia	IMAS / Marine Biodiversity Hub
Inka Bartsch*	Germany	AWI
Nic Bax	Australia	IMAS / CSIRO / GOOS BioEco
Laura Blamey (TBC)	Seychelles	University of Seychelles
Lisandro Benedetti Cecchi	Italy	University of Pisa / GOOS BioEco
Alejandro Buschmann	Chile	Universidad de Los Lagos
Claire Butler	Australia	IMAS
Jarrett Byrnes	USA	UMB
Melinda Coleman	Australia	Dept Primary Industries, NSW
Guillermo Díaz-Pulido	Australia	Griffiths
Rodrigo Garza Pérez	Mexico	UNAM
Graham Edgar	Australia	IMAS / Reef Life Survey
Emma Flukes	Australia	IMAS / Marine Biodiversity Hub
Catriona Hurd	Australia	IMAS
Daniel Ierodiaconou	Australia	Deakin University
Craig Johnson	Australia	IMAS
Eduardo Klein	Australia	Aust. Institute of Marine Science
Brenda Konar	USA	University of Alaska at Fairbanks
Kira Krumhansl	Canada	Fisheries and Oceans Canada
Vanessa Lucieer	Australia	IMAS
Nova Mieszkowska	UK	MBA
Patricia Miloslavich	Australia	UTAS / GOOS BioEco
Nick Murray*	Australia	University of New South Wales
Kjell Magnus Norderhaug	Norway	IMR
Shaojun Pang	China	IOCAS
Ester Serrao	Portugal	Universidade do Algarve
Peter Steinberg	Australia	UNSW
Rick Stuart-Smith	Australia	IMAS
Peter Walsh	Australia	IMAS
Thomas Wernberg	Australia	UWA
*connecting remotely		
Nick Murray on Day 1		
Inka Bartsch at 3-5 pm (TBD)		

Funding for the workshop:

The workshop is supported by the Partnership for Observation of the Global Oceans (POGO), the Intergovernmental Oceanographic Commission – Global Ocean Observing System Program (IOC/GOOS), the Institute for Marine and Antarctic Studies of the University of Tasmania (IMAS/UTAS), the NESP Marine Biodiversity Hub of Australia and the individual contributions from the participants institutions.

LOGISTICS**Meeting venue:**

Institute for Marine and Antarctic Studies
IMAS Board Room
Second Floor
20 Castray Esplanade, Battery Point TAS 7004

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<http://www.imas.utas.edu.au/>

In case of problems where you may need assistance, call Craig on +61 (0) 418 535 443 or Patricia on +61(421) 322083

WORKSHOP WEBSITE:

http://goosocean.org/index.php?option=com_oe&task=viewEventParticipants&eventID=2327