Global Reporting and Assessment of the State of the Marine Environment (World Ocean Assessment)

Outline of the First Integrated Assessment Report

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Outline of the First Report of the Regular Process

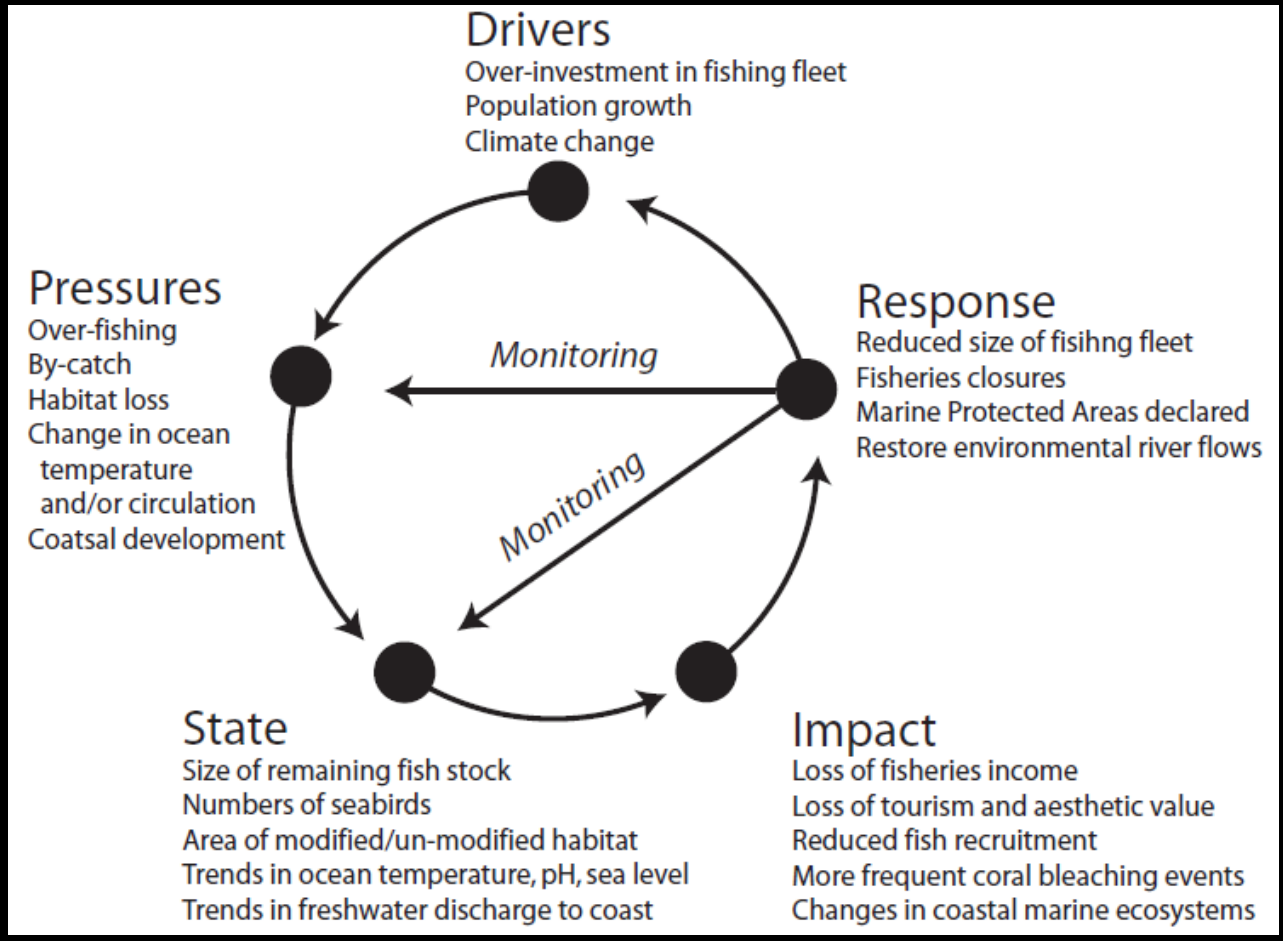
- Draft prepared in late 2010
- Discussed/revised at three meetings of the AHWGW in Feb and June 2011, April 2012
- Approved version now available
- Comments from regional workshops

Outline of the First Integrated Assessment Report

UN General Assembly endorsed the recommendations of the AHWGW that the output of the first cycle of the Regular Process (by 2014) should :

- be an integrated assessment of the oceans
- include cross-cutting thematic issues (food security)
- provide a baseline for future global assessments

How to structure an integrated global marine assessment?



Drivers-Pressures-State-Impacts-Response (DPSIR) framework suggests at least three possible approaches for structuring the Assessment: 1) Pressures; 2) Habitats; and 3) Ecosystem Services.

Organize the work by Pressures, Habitats or Ecosystem Services?

- Pressures - linked with independent environmental data collection and reporting institutions established for regulatory compliance purposes (eg. permits for offshore oil and gas; data to regulate and monitor commercial fisheries).

- Habitat - implicitly integrates ecosystem features, including higher and lower trophic level species, water quality, oceanographic conditions and many types of anthropogenic pressures. The cumulative effect of multiple pressures is captured by using habitats as reporting units.

- Ecosystem services - follows the Millennium Ecosystem Assessment enjoys broad acceptance in environmental reporting. Includes provisioning services (food, construction materials, renewable energy, coastal protection) plus regulating services (climate change, pollution, nutrient recycling) and quality-of-life services not captured using pressures or habitats.

Solution – provide a structure that integrate the three approaches!

Seven Parts

I. Summary for decision-makers

II. The Context of the Assessment

III. Ecosystem Services

IV. Cross-cutting issue – food security

V. Other human activities

VI. Biodiversity and habitats

VII. Overall evaluations

Part II. Context of the Assessment

- **Chapter 1. Planet, oceans and life -** *an introductory description of the role played by the oceans and seas in the life of the planet, the way in which they function, and humans' relationships to them.*

- **Chapter 2. Mandate, information sources, and method of work –** *Mandate from the United Nations, existing assessments (AoA report), DPSIR, procedures for data integration, approach to the science/policy interface, selection of contributors, establishment of baselines, dealing with uncertainties, quality assurance of data*

Part III. Ocean ecosystem services (Ch. 3-9)

- **Provisioning services** – food, construction materials, renewable energy, coastal protection
- **Hydrological cycle** - sea level, salinity, nutrients, heat transport
- **Sea/air interaction -** air quality, meteorological events, acidification, coal mining
- **Primary production -** distribution, trends, causes and effects, surface layer, carbon biological pump
- **Ocean-sourced carbonate production –** sediment supply to atolls
- **Aesthetic, religious and spiritual ecosystem services**
- **Scientific understanding (knowledge gaps, uncertainties) and conclusion**

Part IV. Cross-cutting theme - food security (Ch. 10-16)

- **Oceans and seas as source of food -** *living marine resources implications for food security*
  - **Capture fisheries -** *commercial fish and shellfish stocks, artisanal or subsistence fishing, IUU fishing, projections of fish stocks*
  - **Aquaculture -** *Scale and distribution of aquaculture, fish ranching and stock rebuilding, projections*
  - **Seaweeds and other sea-based food -** *Scale and distribution, projections*

Part IV. Cross-cutting theme - food security, continued

- **Economic aspects of fisheries** – value, cost of fishing, trade, importance to national economies
- **Social aspects of fisheries** – employment, well being of coastal communities, seafood content of diet
- **Environmental aspects -** overfishing, natural processes, bycatch, foodweb and habitat alterations
- **Capacity building needs**
- **Conclusions**

Part V. Human Activities (Ch. 17-31)

Which activities to examine?

1. Is the activity economically important or significant to human society?
2. Does the activity threaten marine ecosystems?

Shipping
Ports
Submarine cables & pipelines
Land-based inputs
Offshore hydrocarbon industries
Other marine-based energy
Offshore mining
Use of Genetic resources

Solid waste disposal
Marine debris
Physical changes
Tourism & recreation

Defence
Desalinization
Scientific research

Each activity to be a separate chapter

For each activity (chapter), consider:

- location and scale of activity
- economic benefits
- employment and social role
- environmental consequences
- links to other activities
- capacity-building needs
- *extent of description/discussion of regulatory frameworks (policy aspects) and management still to be settled*

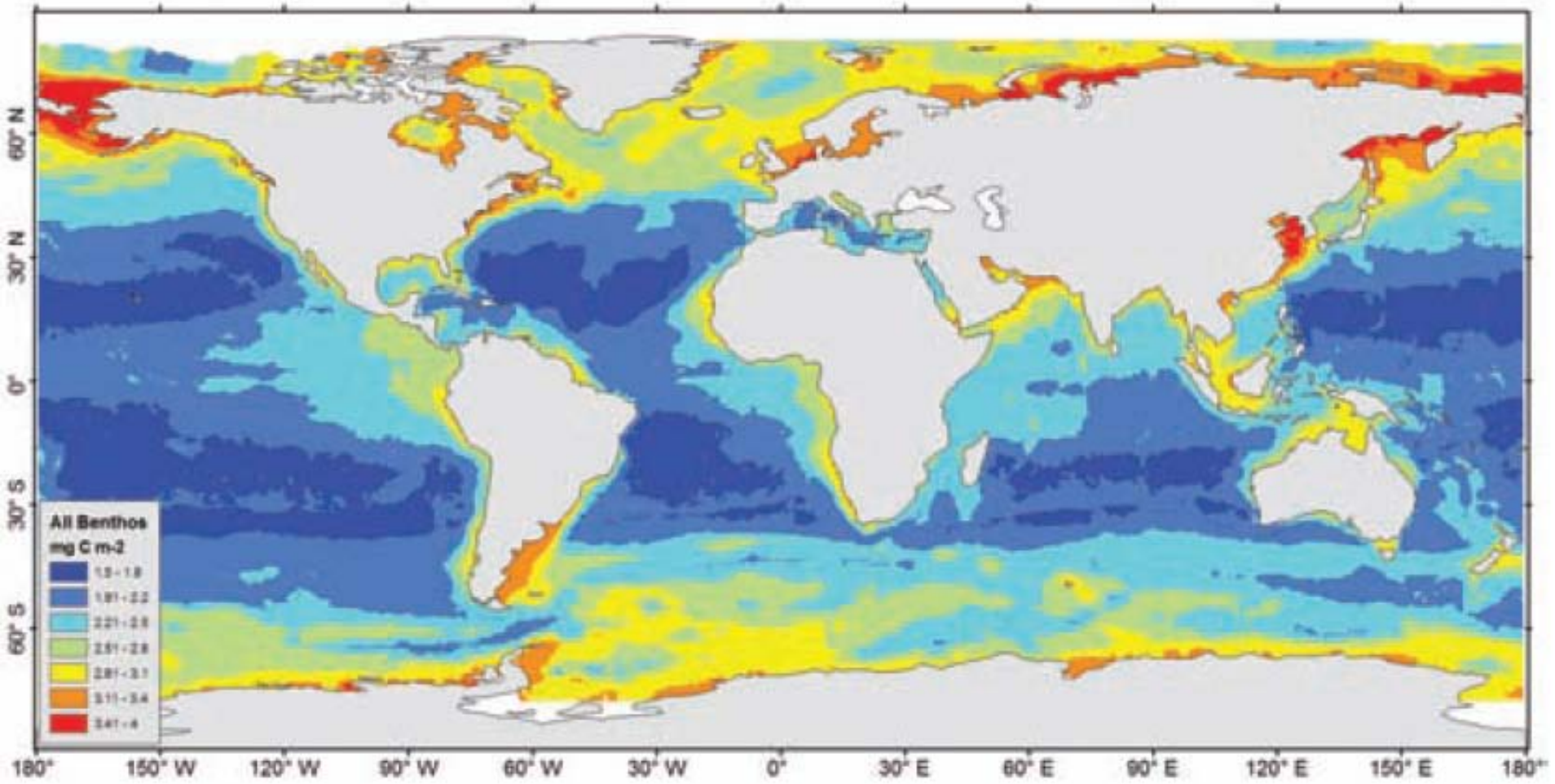
Part VI. Biodiversity and Habitats

- Not feasible to look at everything
- Overall assessment of biodiversity
- Survey of issues identified by competent authorities

Section VI-A: Overall assessment of biodiversity

- **Chapter 34. Main gradients of diversity -** *for species, communities and habitats (coastal to abyssal, equatorial to polar, substrate type, salinity).*

Estimated seafloor biomass



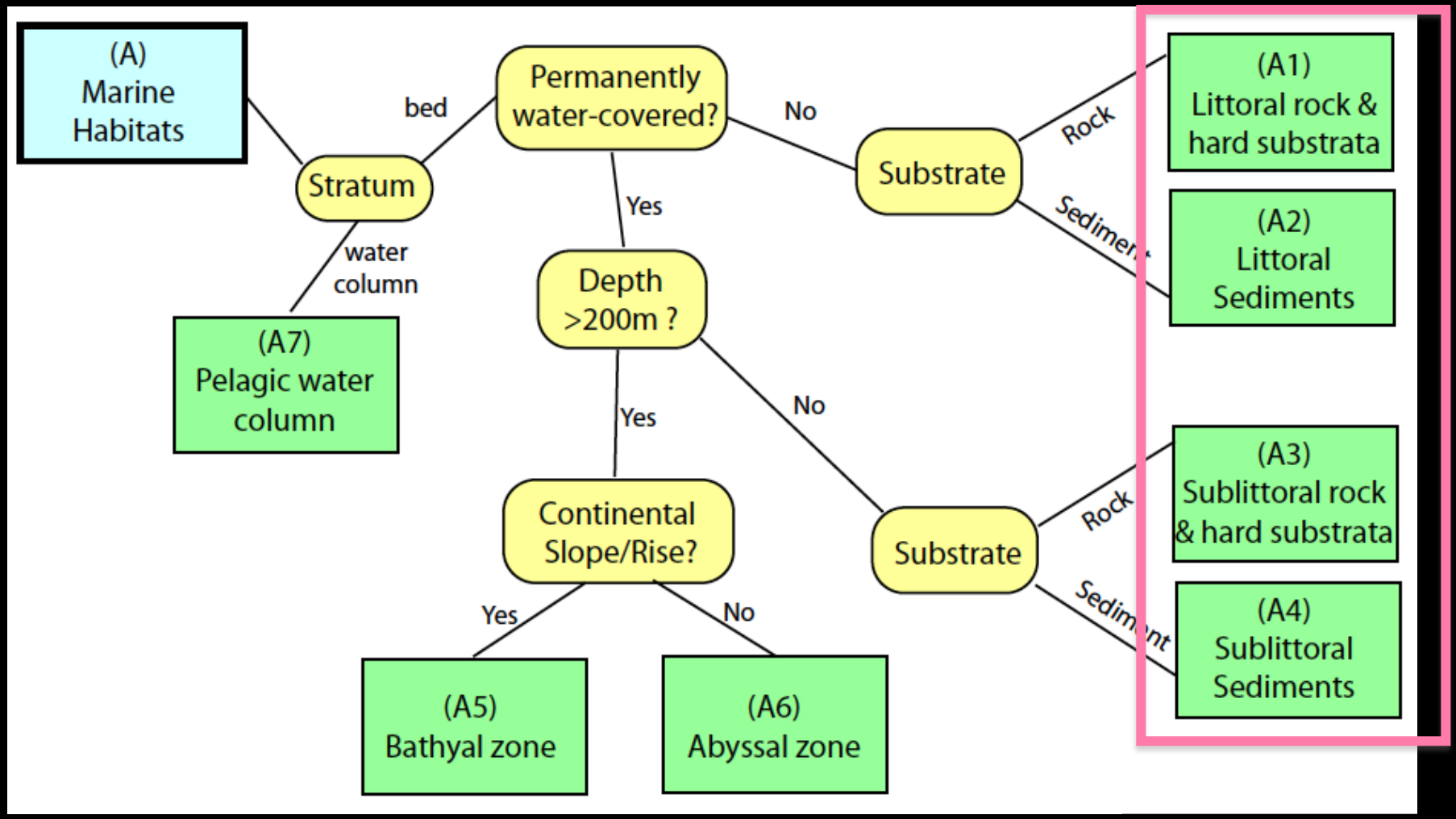
Global marine biodiversity – Census of Marine Life: http://www.coml.org/

Section VI-A: Overall assessment of biodiversity

- **Chapter 35. Extent of assessment of marine biological diversity**
- **Chapter 36. Overall status of major groups of species and habitats -** *Summary, by **major group and marine region**, of the status, trends and threats, including the cumulative effects of pressures*

EUNIS European Nature Information System scheme

European Nature Information System (EUNIS)



Level 1 marine –vs- terrestrial environments.

Level 2 marine habitat types: (A1) littoral rock; (A2) littoral sediments; (A3) sublittoral rock; (A4) sublittoral sediments; (A5) slope benthic habitats; (A6) abyssal benthic habitats; and (A7) pelagic water column.

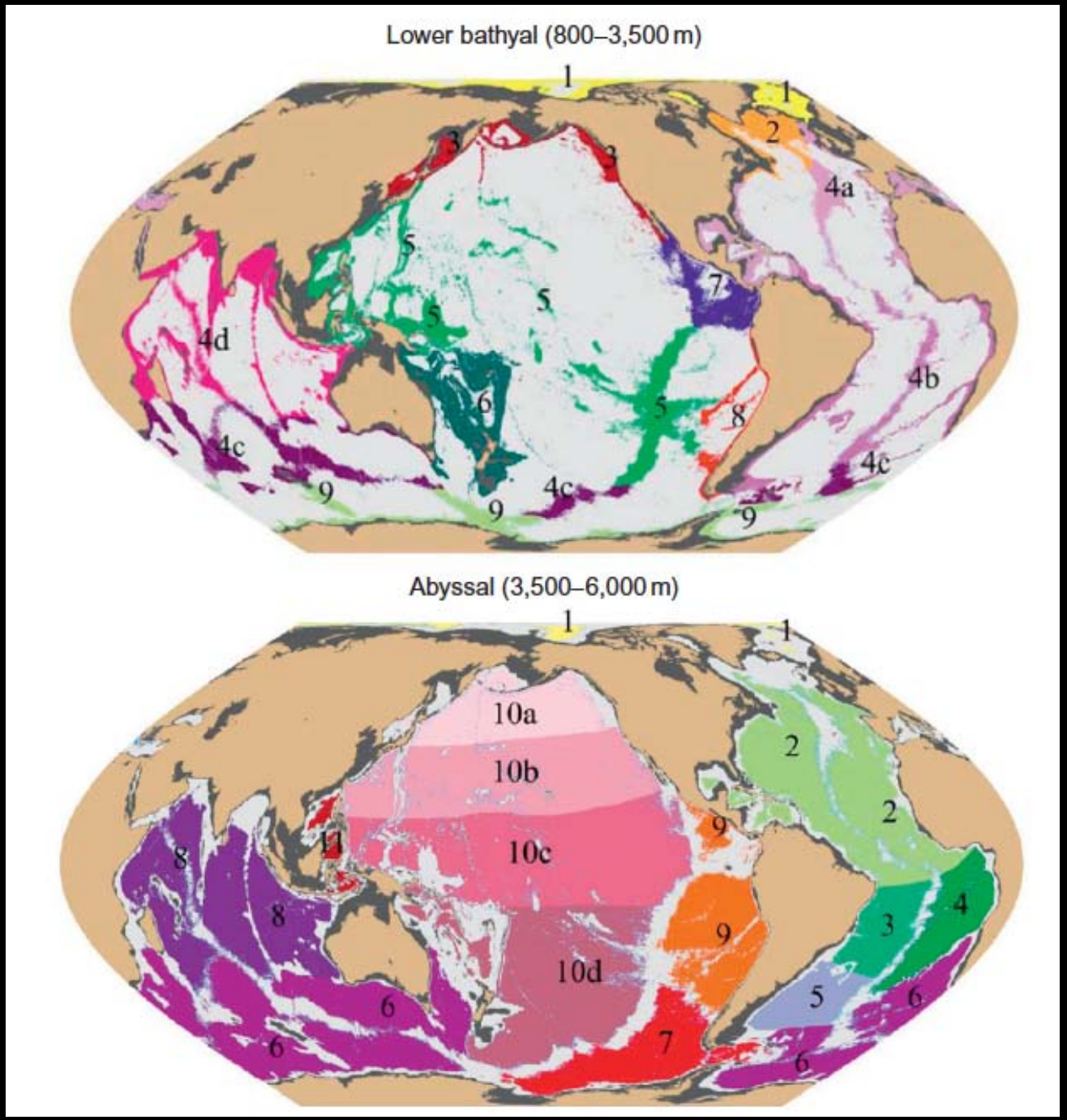
Most data available

(EUNIS) not the only classification scheme available!

Increasing length scale

Roff et al. (2003)	EUNIS Davies and Moss (1999) Connor et al. (2004)	Greene et al. (1999)	CMECS Madden and Grossman (2007)	Australian scheme Last et al. (2002)	Dethier (1992)
Marine versus Terrestrial	Marine versus Terrestrial		Ecological Region		
Ocean basin			Regime: Fresh versus marine		
Atmospheric climate			System	Province	
Sea ice cover			Geoform hydroform (zone)	Bathome	*System* — (marine versus estuarine)
Benthic versus pelagic		*Physiographic regions* — shelf, slope, abyssal		Sub-bathome	*Subsystem* — (subtidal versus intertidal)
Light penetration bottom temperature	*Habitat types* — littoral, sublittoral, slope, abyssal		Macrohabitat	Geomorphological units	*Class* — substrate
Physiography, waves, bed roughness	*Habitat complexes* — waves, sediment type	*Megahabitats*	Habitat	Biotope	Energy/enclosure
Sediment type	*Biotope complexes*	*Mesohabitats*	Biotope	Sub-biotope	Modifiers
	Biotopes	*Macrohabitats*		Biological facies	Characteristic species
	Sub-biotopes	*Microhabitats*		Microcommunities	

Harris (2012) Ch. 5 In: “Seafloor geomorphology as benthic habitat” Elsevier.

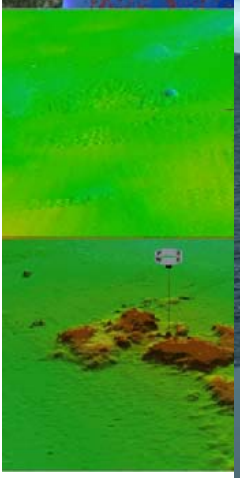


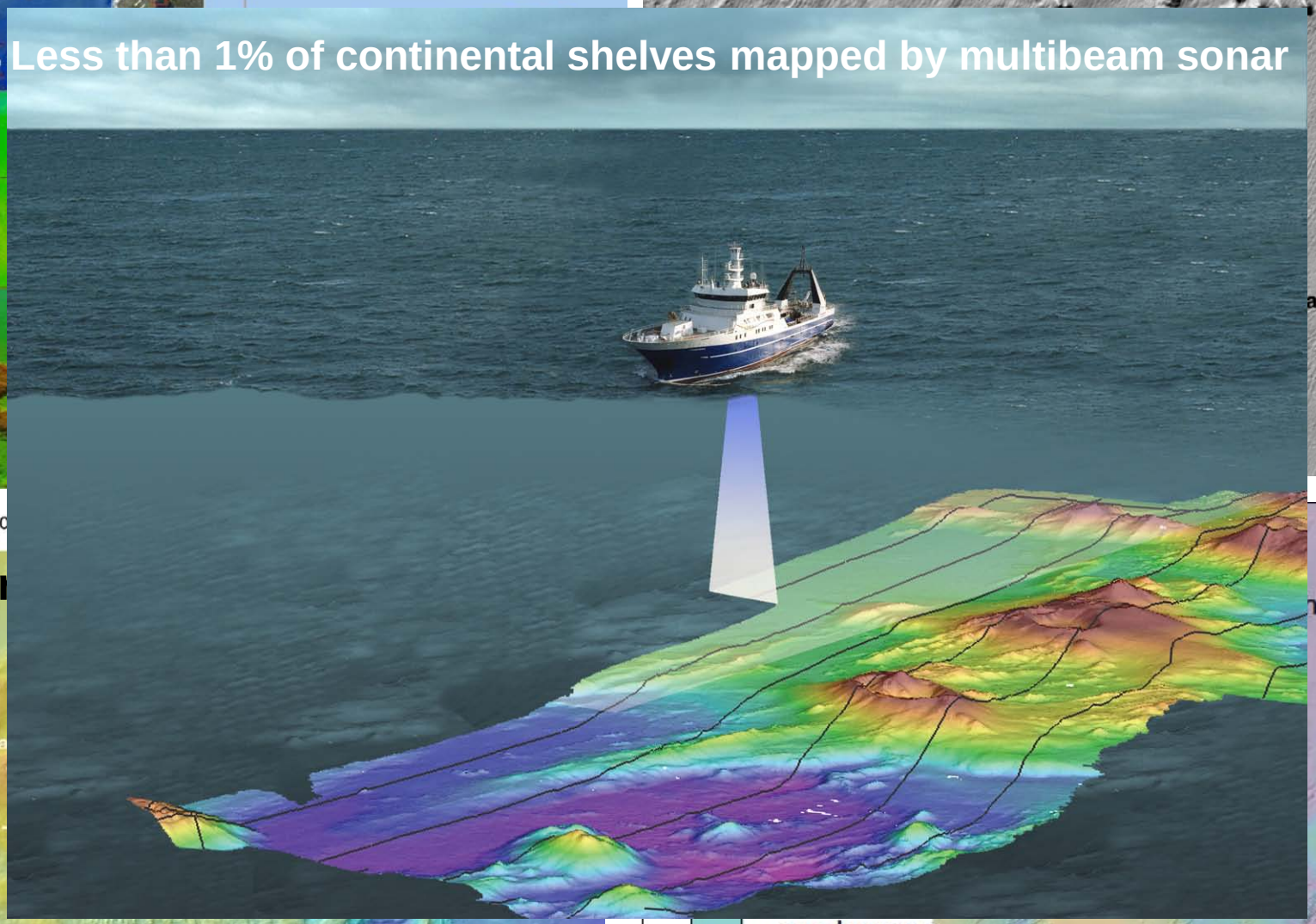
Agnostini V*, et al.* (2008) Global Open Oceans and Deep Sea-habitats (GOODS) bioregional classification. eds Vierros M, Cresswell I, Escobar-Briones E, Rice J, & Ardron J (United Nations Conference of the Parties to the Convention on Biological Diversity (CBD)), p 94.

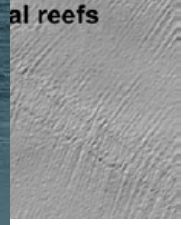

Trieste Gulf
San Pietro
Venezia


S
Adriatic Sea


N
Sand waves



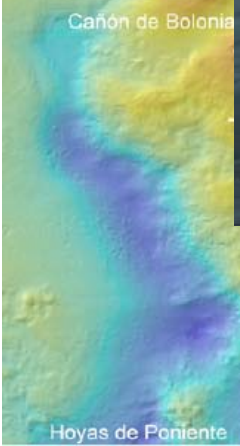

Less than 1% of continental shelves mapped by multibeam sonar


al reefs

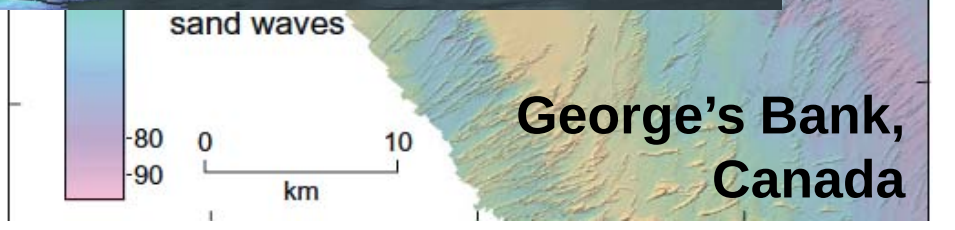
0
2.000
4.00


Gibralter


nan

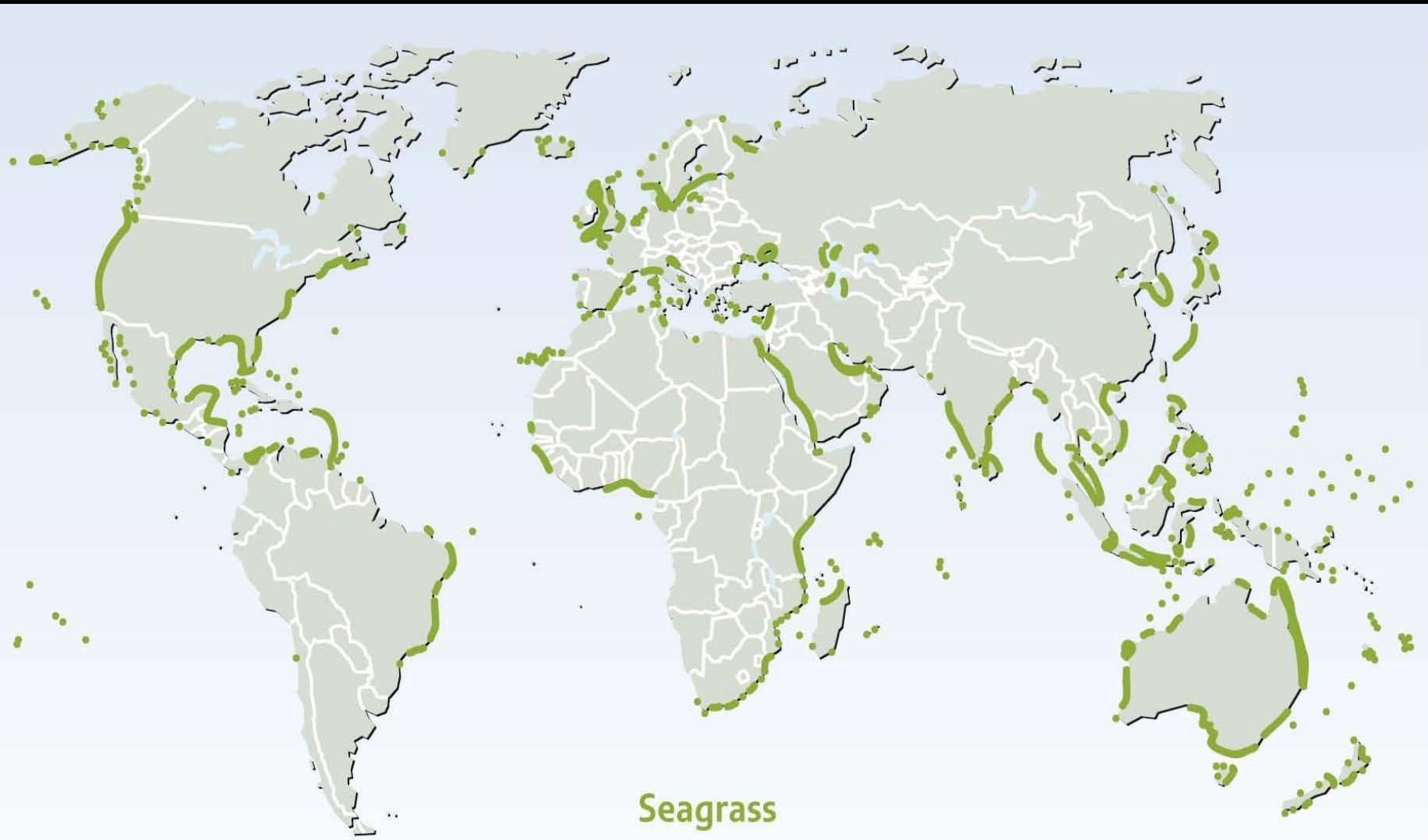

Cañon de Bolonia

Hoyas de Levante
Crestas de Hispalis
Monte Tartesos
Canal Sur
Hoyas de Poniente
Cresta Kmara

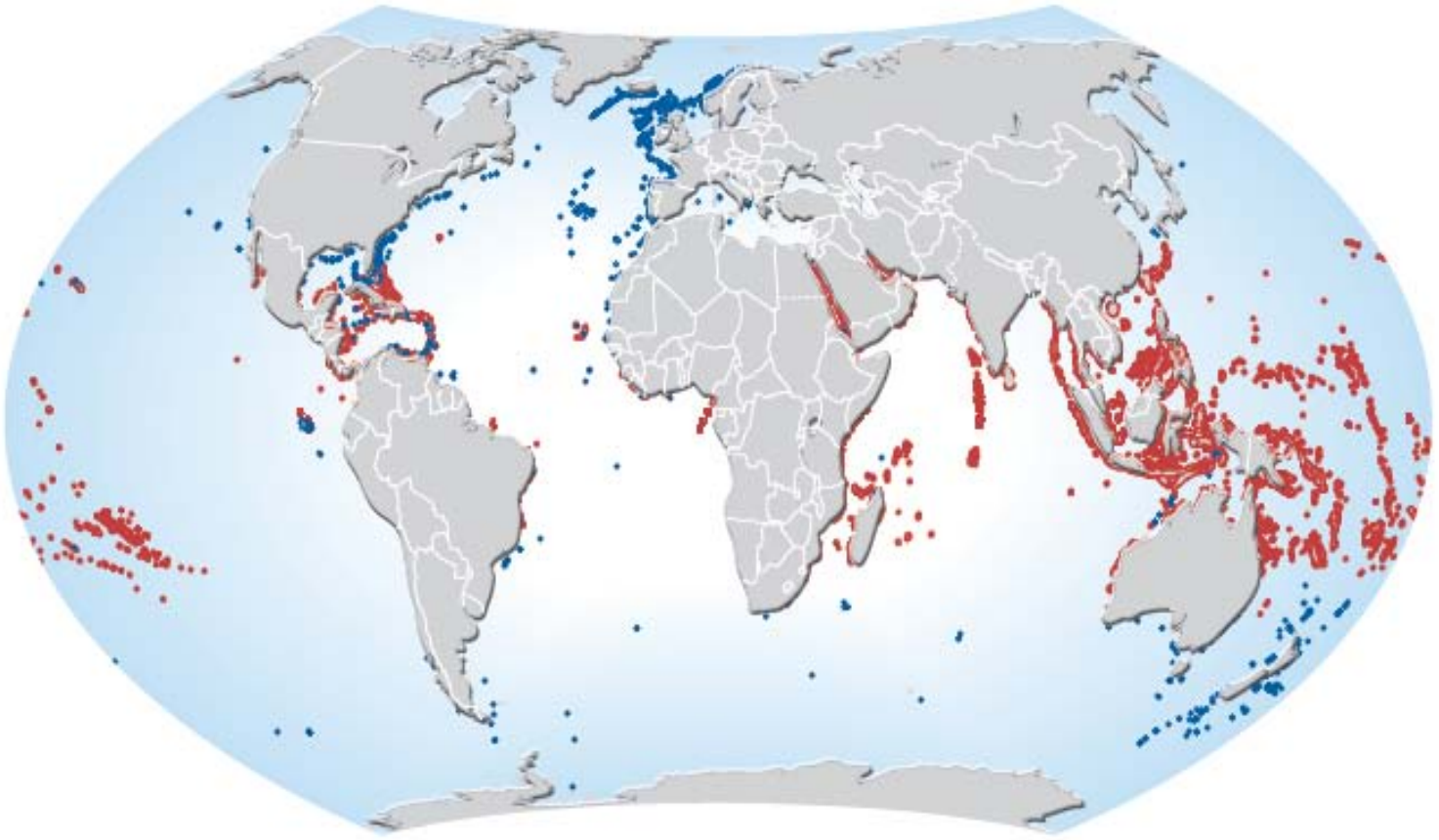

sand waves
-80
-90
0
10
km
George's Bank, Canada

Section VI B. Aspects identified for special protection (Chapters 37-42)

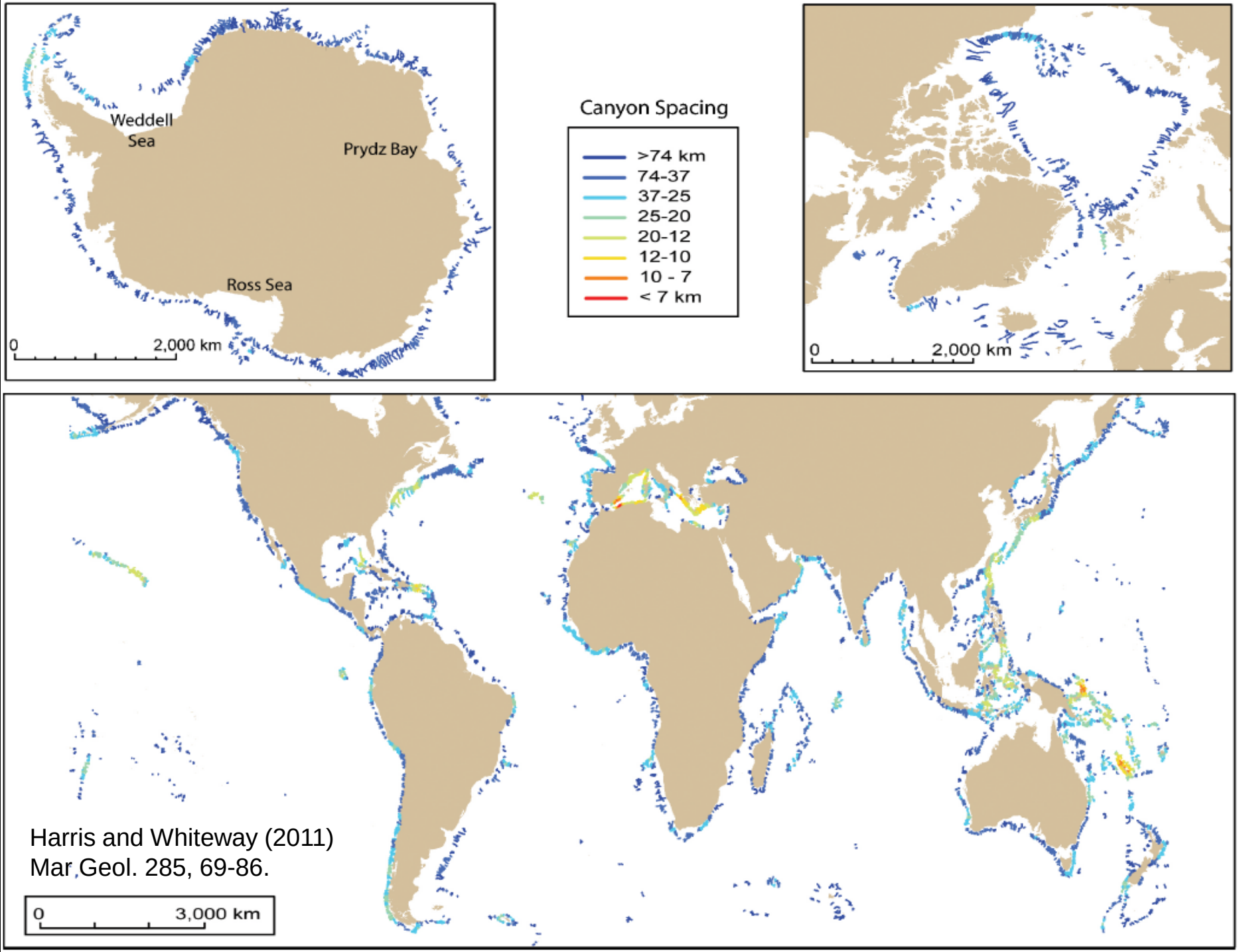
- Ecologically and Biologically Sensitive Areas (EBSAs) and Vulnerable Marine Ecosystems (VMEs)
- Other species and habitats identified by a competent authority as needing protection (*Bonn Convention*, etc.)
- Chapters structured using the EUNIS Scheme:
  - Chapter 37 - Coastal rock and biogenic habitats
  - Chapter 38 - Coastal sediment habitats
  - Chapter 39 - Shelf rock and biogenic reef habitats
  - Chapter 40 - Shelf sediment habitats
  - Chapter 41 - Deep sea (bathyal and abyssal) habitats
  - Chapter 42 – Pelagic habitats



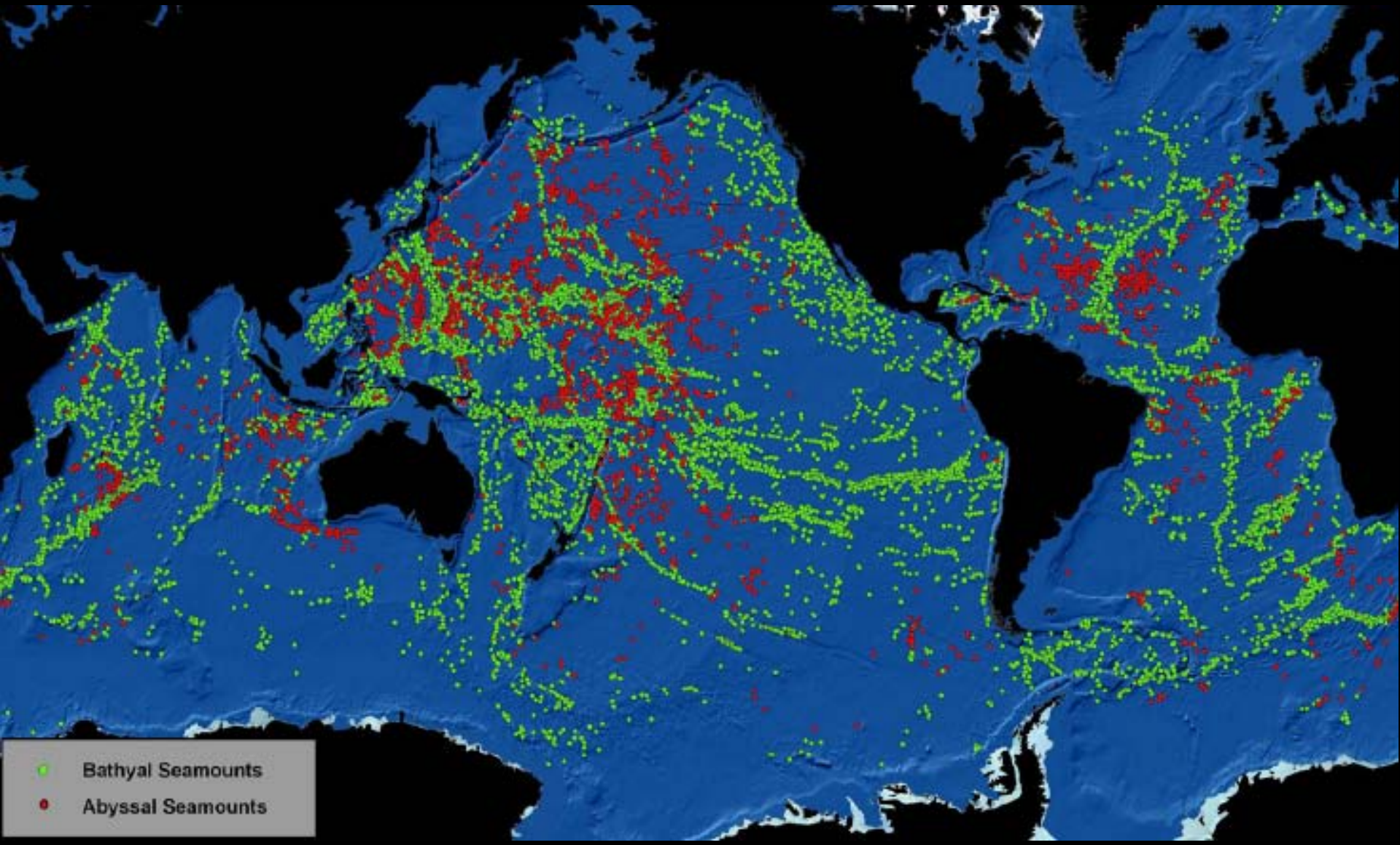
Source: UNEP-WCMC



Source: UNEP/GRID Arendal


Weddell Sea
Prydz Bay
Ross Sea
0
2,000 km
Canyon Spacing
>74 km
74-37
37-25
25-20
20-12
12-10
10 - 7
< 7 km
0
2,000 km
Harris and Whiteway (2011)
Mar Geol. 285, 69-86.
0
3,000 km

Specific Habitats - Seamounts



Clark et al. (2011) Ocean and Coastal Management, 54 (1), 19-36

Part VI C. Environmental, Economic and/or Social Aspects of the Conservation of Marine Species and Habitats and Capacity-Building Needs

Chapter 44. Capacity-building needs

Identification of gaps in capacity to identify marine species and habitats that are identified as threatened, declining or otherwise in need of special attention or protection

Part VII. Overall evaluations

- Ch. 46 What can we say about the overall human impact on the seas?
  - baseline for comparison in future Assessments
- Ch. 47 How do we value the benefits from the oceans and seas for humans?
  - baseline for comparison in future Assessments


The ocean will continue to exist without humans…
But humans cannot continue without the ocean…

The EUNIS scheme comprises six levels distinguished by a univariate assessment:

Level 1 places the area in either the marine or terrestrial environment.

Level 2 defines seven major broad marine habitat types: (A1-A7). This is the level that has been adopted for the structure of our report.

Level 3 are “habitat complexes,” mosaics of individual habitat types identified based on (for example) sediment type (gravel, sand, mud, etc.), different degrees of wave exposure along the coast, and different depths of light penetration. Connor et al. (1995) list 89 possible habitat complexes in littoral and sublittoral (A1–A4) habitats alone.

Level 4 are biotope complexes, which are inferred to have the same physical information as for habitat complexes, but are subdivided based on community structure information.

Level 5 are biotopes (habitats) having finer details of species and community structure within a similar physical environment.

Level 6 are sub-biotopes (microhabitats).

DRAFT FLOW-CHART OF WORLD OCEANS ASSESSMENT I PROCESS

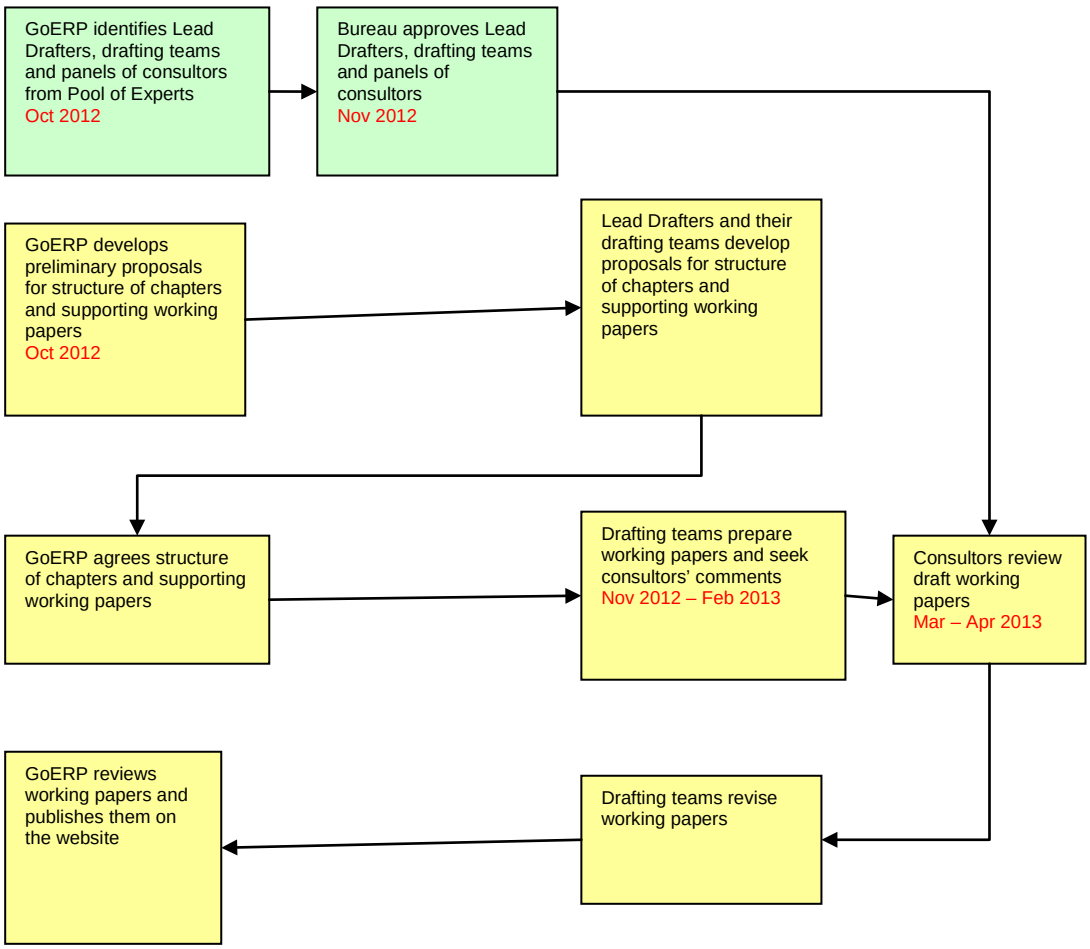
Event relating to development of World Oceans Assessment I

Designation of personnel

Review of finalized text

GoERP | Bureau/AHWGW | Drafting Teams | Reviewers | States

Part I – October 2012 – October 2013



Part II – October 2013 onwards