Comments from Public Consultation on ECV Requirements 13/01 – 13/03 2020 for:

# Marine Habitats

## ECV Product: Relevance to Deep-Sea Ecosystems

### Comment 1

|  |  |
| --- | --- |
| Author: Lisa Levin | Email: llevin@ucsd.edu |
| Relevance to Deep Ocean Ecosystems.  **Marine Habitats:** The only biological variable listed is marine habitats.  This is an excellent variable although here habitat is defined by the structure-forming taxon.   A large fraction of the ocean is deep ocean. This realm is without mangrove, seagrass and macroalgae.  Hard coral is present in some places - but only on the seafloor and only on hard substrates. Most of the deep ocean floor is covered with sediment that does not have coral or necessarily large structure-forming taxa. There are also key marine habitats that could be documented by indicator taxa such as sponge gardens (presence/density/diversity of sponges), hydrothermal vents (presence of mussels, tubeworms, vesicomyid clams, snails, shrimp), methane seeps (presence of mussels, tubeworms, vesicomyid clams, bacterial mats).   In sediments the fauna is dominated by microbes and meiofauna (diversity;no. species/unit area) or biomass:weight/unit area).   The pelagic realm  represents much of the habitable volume on this planet; it is also excluded here but could be characterized for microbes or for invertebrates (diversity: no. species per volume or density: counts per volume).  The hard coral metric proposed (percent cover) is difficult to apply in the deep sea and not relevant to most areas. Presence (size/density/diversity) combined with taxonomic information could be useful - water depth would be critical accompanying information.     **Other:**  Why is marine habitat the only biological ECV or ECV category? Why not for example key species of economic importance whose distributions are known to be sensitive to climate change?  (e.g., Tuna)  Why not something indicative of secondary productivity ? (biomass, density, O2 consumption)  or metabolism costs (respiration, calcification)?    I don’t think most of the biological community and very few members working on deep-ocean ecosystems have been exposed to the concept of Essential Climate Variables.    Please consider engaging the Deep Ocean Observing Strategy’s Biology and Ecology EOV panel. The panel chair is Henry Ruhl   <[hruhl@mbari.org](mailto:hruhl@mbari.org)>  Lisa Levin, Scripps Institution of Oceanography (Deep Ocean Stewardship Initiative and Deep Ocean Observing Strategy)  Kirk Sato (DOSI, Friday Harbor Labs, University of Washington)    **Data Sources:**  Ocean Biogeographic Information System (OBIS) [www.iobis.org](http://www.iobis.org/)–  deep sea node.  **Vents and Seeps**  OBIS - ChessBase   <https://obis.org/dataset/471a8de8-80f8-43f9-9443-88a45712feba>;  ChEssBase - <http://ipt.vliz.be/eurobis/resource?r=chessbase>;   Vents - <http://vents-data.interridge.org/>  **Coldwater Corals:**  Freiwald A, Rogers A, Hall-Spencer J, Guinotte JM, Davies AJ, Yesson C, Martin CS, Weatherdon LV (2017). Global distribution of cold-water corals (version 5.0). Fifth update to the dataset in Freiwald et al. (2004) by UNEP-WCMC, in collaboration with Andre Freiwald and John Guinotte. Cambridge (UK): UN Environment World Conservation Monitoring Centre. URL: <http://data.unep-wcmc.org/datasets/3>  <https://deepseacoraldata.noaa.gov/>  The HERMES cold-water coral database. *Stratigraphy, Paleontology and Marine Geosciences Department, Univ Barcelona*, *PANGAEA*, <https://doi.org/10.1594/PANGAEA.728313>    **Vulnerable Marine Ecosystems** - <https://www.ices.dk/marine-data/data-portals/Pages/vulnerable-marine-ecosystems.aspx>  **Seamounts** <https://www.soest.hawaii.edu/wessel/smts/> | |

## ECV Product: Mangrove cover and composition

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| --- | --- | --- | --- | --- | --- |
| **Name** | Mangrove cover and composition | | | | |
| **Definition** |  | | | | |
| **Unit** | Extent of mangroves and species types in coastal environments (percent or ha and number of species per area). Extent measured in quadrats (e.g. 10x10m), or by pixels (e.g. 30x30m) | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | m2 | Pixel/point in space | G | 30x30 |  |
| B |  |  |
| T | 50x50 |  |
| **Vertical Resolution** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** | Month | Point in time | G | 12 |  |
| B |  |  |
| T | 12 |  |
| **Timeliness** | Month | Point in time | G | 6 |  |
| B |  |  |
| T | 12 |  |
| **Required Measurement Uncertainty** | Areal extent | Percent | G | 10 |  |
| B |  |  |
| T | 20 |  |
| **Stability** | Percent cover |  | G | 10 |  |
| B |  |  |
| T | 50 |  |
| **Standards and References** | •      Requirements and approaches vary for field based and satellite mapping approaches. For in situ data collection for mangrove composition see <https://www.daf.qld.gov.au/__data/assets/pdf_file/0006/63339/Data-collection-protocol.pdf> and <https://www.cifor.org/publications/pdf_files/WPapers/WP86CIFOR.pdf>    See the EOV Specification Sheet for details and references <https://www.goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17514> | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | No | Carbon sequestration | | |
| **Extremes[3]** | Yes | No | Changes in ocean temperatures | | |

[1]Goal (G); Breakthrough (B)(not mandatory, more as one possible); Threshold (T), for definitions see [Guidelines](http://tiny.cc/ecv-review)

[2] Is the ECV Product directly relevant to support Climate Adaptation?

[3] Can the ECV Product be used to monitor climate extremes or aspects of extremes?

NO COMMENT

## ECV Product: Seagrass cover (areal extent)

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Seagrass cover (areal extent) | | | | |
| **Definition** | Areal extent of suitable physical habitat (shallow sediment shelf with adequate water quality) supporting seagrass. | | | | |
| **Unit** | km2 | | | | |
| **Note** | Seagrass areal extent is typically estimated by remote sensing, including satellite, photography from aircraft, and for smaller areas by Unoccupied Aerial vehicle (UAV), i.e., drone. Various methods of image post-processing have been used to convert imagery to seagrass habitat extent. | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | m |  | G | 30 | Muller-Karger et al. 2018 |
| B |  |  |
| T | 250 | Muller-Karger et al. 2018 |
| **Vertical Resolution** | NA |  | G |  |  |
| B |  |  |
| T |  |  |
| **Temporal Resolution** | year |  | G | 1 week | Muller-Karger et al. 2018 |
| B |  |  |
| T | 1 year |  |
| **Timeliness** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Required Measurement Uncertainty** | % |  | G |  |  |
| B |  |  |
| T | 10 | Duarte 2002 |
| **Stability** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Standards and References** | •      Requirements based on characteristic scales and magnitude of signal of phenomena to observe. See the EOV Specification Sheet for details and references (<http://goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17515>) | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | Yes | Seagrass and other coastal vegetation contributes to climate adaptation by storing carbon in biomass and underlying sediments. Active seagrass restoration can contribute to this storage. | | |
| **Extremes[3]** | Yes | Yes | Many seagrass species currently live near their upper thermal tolerance limits so modest increases in water temperature can cause large-scale die-offs and reduced areal extent of seagrass. | | |

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[3] Can the ECV Product be used to monitor climate extremes or aspects of extremes?

NO COMMENT

## ECV Product: Macroalgal canopy cover and composition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Macroalgal canopy cover and composition | | | | |
| **Definition** | Abundance of layered macroalgal stands in marine coastal environments | | | | |
| **Unit** | percent or number of individuals / area | | | | |
| **Note** | Percent cover measured within quadrats (e.g., 0.5 x 0.5 m) or transects (e.g., 50 x 5 m). For large macroalgae such as kelps, abundance can be measured as number of individuals per area. | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | m2 | point in space | G | 0.25 |  |
| B | 1 |  |
| T | 250 |  |
| **Vertical Resolution** | m | linear extent | G | 1 |  |
| B | 5 |  |
| T | 10 |  |
| **Temporal Resolution** | Month | point in time | G | 1 |  |
| B | 3 |  |
| T | 12 |  |
| **Timeliness** | Month | point in time | G | 4 |  |
| B | 6 |  |
| T | 12 |  |
| **Required Measurement Uncertainty** | Percent cover |  | G | 10 |  |
| B | 20 |  |
| T | 30 |  |
| **Stability** | Percent cover |  | G | 20 |  |
| B | 30 |  |
| T | 50 |  |
| **Standards and References** | •      Requirements based on characteristic scales and magnitude of signal of phenomena to observe. See the EOV Specification Sheet for details and references (<http://goosocean.org/index.php?option=com_oe&task=viewDocumentRecord&docID=17515>) | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | No | Carbon sequestration through reforestation and afforestation | | |
| **Extremes[3]** | Yes | Yes | Marine heatwaves, regime shifts | | |

[1]Goal (G); Breakthrough (B)(not mandatory, more as one possible); Threshold (T), for definitions see [Guidelines](http://tiny.cc/ecv-review)

[2] Is the ECV Product directly relevant to support Climate Adaptation?

[3] Can the ECV Product be used to monitor climate extremes or aspects of extremes?

NO COMMENT

## ECV Product: Hard coral cover and composition

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | Hard coral cover and composition | | | | |
| **Definition** | Percent cover of hard coral. For composition, this is broken down by taxonomic or functional groups. | | | | |
| **Unit** | % | | | | |
| **Note** |  | | | | |
| **Requirements** | | | | | |
| **Item needed** | **Unit** | **Metric** | **[1]** | **Value** | **Derivation and References and Standards** |
| **Horizontal Resolution** | km |  | G | 10-100 | For resolution of climate impacts, down to 10 km would be ideal; but will require development of remote sensing tools that can distinguish coral cover |
| B |  |  |
| T | 1000 | Currently global coral data is analyzed at country levels (100s to 1000s of km) |
| **Vertical Resolution** | m |  | G | 10 | or resolution of climate impacts, stratification in 10 m would be ideal |
| B |  |  |
| T | ≈ | single layer, global coral data is summarized in a single bin. |
| **Temporal Resolution** | Year |  | G | 1 | annual data ideal |
| B |  |  |
| T | 5-10 | data gaps results in 5-10 year gaps/bins for global analyses |
| **Timeliness** | Year |  | G | 0.25 | Establishment of open access integrated regional datasets would allow sub-annual access to data |
| B | 2 |  |
| T | 5 | Current practice requires high-effort compilations |
| **Required Measurement Uncertainty** | % |  | G |  |  |
| B |  |  |
| T | 5 | This value is estimated based on |
| **Stability** |  |  | G |  |  |
| B |  |  |
| T |  |  |
| **Standards and References** | •      English, S., Wilkinson, C., and Baker, V. (1997). Survey Manual for Tropical Marine Resources. Townsville, Australia. Australian Institute of Marine Science.  •      GCRMN (2018a). GCRMN Implementation and Governance Plan. International Coral Reef Initiative (ICRI).  •      GCRMN (2018b). GCRMN Technical Note. International Coral Reef Initiative (ICRI).  •      Obura DO, Aeby G, Amornthammarong N, Appeltans W, Bax N, Bishop J, Brainard RE, Chan S, Fletcher P, Gordon TAC, Gramer L, Gudka M, Halas J, Hendee J, Hodgson G, Huang D, Jankulak M, Jones A, Kimura T, Levy J, Miloslavich P, Chou LM, Muller-Karger F, Osuka K, Samoilys M, Simpson SD, Tun K and Wongbusarakum S (2019) Coral Reef Monitoring, Reef Assessment Technologies, and Ecosystem-Based  •      Management. Front. Mar. Sci. 6:580. doi: 10.3389/fmars.2019.00580 | | | | |
| **Adaptation and Extremes** | | | | | |
|  | Relevant? (Yes/No) | Sugg. Req. sufficient? (Yes/No) | Explanation | | |
| **Adaptation[2]** | Yes | No | At the moment coral cover is measured without sufficient spatial and temporal resolution, with taxonomic/trait information, to be sufficient for this. But it could be, with some additional variables as well. | | |
| **Extremes[3]** | Yes | No | More frequent measures before/after extreme events, and additional of some contextual variables would be needed. | | |

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