

WG 164 ConCENSUS

1. Brief summary with the main highlights (200-300 words)

The SCOR ConCENSUS working group made significant strides in advancing underwater fish observation methodologies and standardization. A key achievement was the compilation of a preliminary global dataset comprising 371,448 samples from 93 countries, spanning temperate, tropical, and polar regions. This dataset, integrating various methodologies, will form the foundation for three planned manuscripts addressing global indicator robustness, MPA effectiveness evaluation, and the impact of methodological choices on biodiversity assessments.

The group refined its approach to best practices, focusing on developing a decision-making roadmap for underwater fish observation methods, assessing the maturity of existing practices, and creating guidelines for managing methodological changes in long-term monitoring. Significant progress was made in data management, including the development of a schema for integrating fish observation data into OBIS and creating data schema cross-walks between global repositories.

Capacity development remained a priority, with the group hosting a regional network meeting and developing a comprehensive training course for the Ocean Teacher Global Academy. An epistemic analysis of the research landscape was completed, identifying growth areas and capacity development needs. Additionally, an online questionnaire was launched to gather insights from the global research community.

The group held a productive hybrid meeting in Margaret River, Australia, advancing multiple terms of reference. Plans are underway for the next in-person meeting in South Africa (7-11 October 2024) and a workshop at the International Marine Conservation Congress (14 October 2024). These activities collectively contribute to the group's goal of enhancing global marine biodiversity research through standardized methodologies and improved data interoperability.

2. Activities since previous report to SCOR (e.g., virtual or in-person meetings, email discussions, special sessions). Limit 1000 words

Research network meeting

- SAIAB hosted a network meeting (8-11 January) focused on BRUVs and stereo-BRUVs sampling methodologies. The meeting was attended by researchers, managers and technicians from South Africa, Namibia, Mozambique, Kenya and the Seychelles. The meeting focused on strengthening regional capacity and providing training on best-practices.

IMCC workshop proposal and planning

- Email correspondence with WG to draft a proposal to host a workshop at the IMCC conference.
- Correspondence via email and online meetings for planning the workshop content and logistics.

Recruitment of new team members

- Email correspondence with SCOR management on protocols, followed by emails to the original working group to identify people willing to stepdown.
- Email correspondence to identify and recruit new members.

Working group meeting, Margaret River, Australia

- The SCOR CoNCENSUS working group convened for a four-day meeting (20-24 May 2024) with a hybrid format, accommodating both in-person (6) and virtual attendees (11). Nine working members and associated members of the WG attended the meeting with an additional 8 expert and early career guests participating. The primary objectives of the meeting were to advance the ToRs 2 (best-practices) and 3 (data systems), draft a training course for the Ocean Teacher Global Academy and provide updates for the work carried out on ToRs 1 and 4.

Engagement with potential data providers for ToR1:

- Erica Towle, NOAA; National Coral Reef Monitoring Programme; Included numerous email conversations and an online meeting
- Alejandro Perez Matus, Estación Costera de Investigaciones Marinas (ECIM); Email correspondence about datasets
- Fernanda Rolim, Oceanographic Institute, University of São Paulo (USP); Email correspondence about datasets
- Alejo Joaquin Irigoyen, National Scientific and Technical Research Council; Email correspondence about datasets
- Anna Koster, Seychelles Island Foundation; Email correspondence about datasets.
- Demian Chapman, MOTE Marine Laboratory; Email correspondence about datasets.
- Michael Heithaus, Florida International University; Email correspondence about datasets.

ToR 1 Data meeting

- An online meeting was held to finalize plans for the ToR 1 manuscripts (global method comparisons) and data preparation required before the next in person working group meeting (7-11 October 2024). This meeting was attended by eight working group members and two guests.

Questionnaire development

- A questionnaire was developed to survey the research community. The questionnaire aims to collect data that can inform priority research areas, better understand the research community, and strengthen the global research network. Prior to release, members of the working group tested the systems and provided feedback on suitability and potential issue.

OTGA training course

- Course development sub-group had an online meeting to finalize the course structure and development plan.
- Email correspondence with the broader WG to introduce the plan and recruit people to develop the course content.

3. Documents published since previous report to SCOR (e.g., peer-reviewed journal articles, reports, Web pages) and should be limited to publications that resulted directly from WG activities and which acknowledge SCOR support

Published:

None

Submitted:

Van Wyk et al (submitted) Epistemic analysis of underwater fish observation research: 70 years of growth, collaboration, and persistent geographic biases. Fish and Fisheries.

In prep:

Bernard et al. Standardizing Underwater Fish Observation: A trait-based decision framework for method selection, best practices and sampling.

4. Progress toward achieving group's terms of reference. List each term of reference separately and describe progress on each one. Limit 1000 words

ToR 1: Methodological comparison and essential ocean variables

We have compiled a preliminary global dataset of 371,448 samples from 93 countries within the temperate (93,851 samples) and tropical (277,545 samples) regions, with a small number (52) from polar regions. The majority of data were collected by the REEF Roving Diver volunteer monitoring programme (271,469), followed by baited remote underwater video and stereo-video methodologies (53,041), point-intercept (34,541), and transect-based underwater visual census methodologies (11,147). Most data comes from working group members, with additional datasets obtained from researchers in under-sampled or important geographies.

We have agreed on three main manuscripts:

- 1) "Global Robustness of Reef Fish and Elasmobranch Assemblage Indicators Across Census Methods". This paper will examine how different sampling methods affect the response of various fish and shark assemblage indicators to environmental and anthropogenic pressure gradients. It aims to identify which indicators are most consistent across methods and scales, providing valuable insights for standardizing global marine monitoring efforts and informing essential ocean variables.
- 2) "Cross-Method Evaluation of Indicators for Marine Protected Area Ecological Effectiveness". This research will calculate effect sizes for no-take zones using various ecological indicators across multiple survey methods. The goal is to identify robust indicators that consistently show positive effects for effective-MPAs regardless of the monitoring method used, potentially standardizing MPA effectiveness assessment globally.
- 3) "Methodological Influences on Characterizing Fish Biodiversity Responses to Global Change Drivers". This paper will investigate how different survey methods capture various aspects of fish diversity and community composition. It aims to determine if certain methods provide

complementary or overlapping information, and how these differences affect our understanding of fish community responses to global change drivers. The findings will guide method selection for specific research questions in marine biodiversity studies.

Manuscripts 1 & 2 will fulfil the requirements and deliverables for ToR 1, while manuscript 3 will be an additional output to strengthen the working group's outcomes. Work on the manuscripts will begin during the CoNCENSUS Meeting from October 7-11 in De Hoop, South Africa.

ToR 2: Best Practices and community guidelines

During the Margaret River meeting (May 2024), the group agreed that developing or identifying actual best practice (BP) guidelines for different methods is beyond the scope of this WG. Many independent projects are already developing best practices, and we want to avoid duplication. Additionally, we aim to promote BPs that are broadly applicable to researchers from diverse economic, political, social, and technological contexts.

We decided to focus on three aspects that could promote the development and use of best practices:

- Publishing a roadmap to efficiently guide decision-making on underwater fish observation methods, metrics, and sampling approaches.
- Trial-running the new ocean practice maturity model (<https://doi.org/10.3389/fmars.2024.1415374>) on the main underwater fish observation practices to determine their maturity status and identify key areas to advance the protocols.
- Writing a best practice guideline for dealing with methodological changes in long-term, time series datasets for research or monitoring

Progress:

- Begun drafting the roadmap manuscript, expected completion by end of 2024.
- Started drafting the manuscript on changing methodologies for long-term monitoring, led by Dr. Jordan Goetze.
- Tested the Ocean Practice Maturity model on stereo-ROV, stereo-DOV, REEF, and RLS fish census methodologies during the Margaret River meeting.
- Communicating with maturity model authors for input and formulating an approach to have assessments vetted, with outcomes attached to BPs published on the Ocean Best Practice System.

ToR 3: Data management policy, workflows and infrastructure

- Developed a data schema for integrating underwater observation fish data and essential ocean variables into OBIS. A draft document has been prepared and distributed to the working group for feedback.
- Created a data schema cross-walk for mapping fish data from Global Archive and Reef Life Survey repositories to OBIS.
- Engaged with OBIS on concerns from the research community about open access data and minimum requirements for attribution and user statistics.

Next steps involve infrastructure design and development, pilot testing, collaboration with global platforms, and creating documentation and training materials.

ToR4: Determine priority areas for engagement, capacity development and research.

This ToR aims to provide direction for future research, determine the spatial extent of underwater fish observation data, identify emerging techniques, and identify priority gaps where capacity development can be implemented. Work carried out this year includes:

1. Completed an epistemic analysis of the underwater fish observation research landscape by PhD student Angus van Wyk. This analysis identifies growth in the field, highlights key knowledge areas, and demonstrates locations where capacity development is needed. The manuscript has been submitted for review.
2. Developed and launched an online questionnaire to identify key research areas, better understand the research community, and strengthen the global research network. The questionnaire went live in early September 2024 (https://form.jotform.com/CoNCENSUS/UFOBs_questionnaire) and is being distributed on relevant global and national mailing lists.
3. Hosting a workshop on Best Practices and Knowledge Mobilization at the International Marine Conservation Congress in Cape Town, October 14-18, 2024.

Capacity development:

We are developing a training course for the Ocean Teacher Global Academy covering the main underwater observation methodologies used to survey fishes (BRUVs and stereo-BRUVs, stereo-DOV and stereo-ROV, Reef Life Survey, REEF Roving Diver Technique). The course page has been created, and content development is in progress. Dr. Ana Carolina Mazzuco, now an IODE Training Coordinator with UNESCO, is leading the course development. Additional funds have been raised to support an ECR (Dr. Kaylee Smit, SAIAB) in developing the training material.

The course development is set to be completed by January 2025 and will go live in February.

5. WG activities planned for the coming year. Limit 500 words

October 2024

- 1) WG meeting. We are hosting an in person meeting in the De Hoop Nature Reserve, South Africa, between the 7th and 11th of October. Ten working group members and 6 guest's participants will be attending the meeting and the focus will be one running analyses for the ToR 1 research papers, finalizing the OTGA training course content and reviewing the progress and next steps for ToRs 2-4.
- 2) IMCC Workshop. We are running a workshop linked to the International Marine Conservation Congress. The focus is on Best practices and knowledge mobilization (ToR2) and will use preliminary information from the online questionnaire.

December 2024

- 3) 2-4/12: During the first week of December we will have a series on online meetings with sub-groups to review progress on the various deliverables.

January 2025

- 4) 13-16/01: Meetings to finilize of the Ocean Teacher Global Academy training course.

April 2025

- 5) 27-28/03: Series on online meetings with sub-groups to review progress on the various deliverables.

June-October 2025

- 6) We will host the final in person working group meeting between June and October 2025 to align with an International Marine Scientific Symposium or meeting. There are a number of options and we will make the decision before the end of 2024.
- 9-13 UN Ocean Conference (Nice, France)
 - 9-13 Indo-Pacific Fish Conference (Taipei, Taiwan)
 - 1-5 July ITRS (Brest, Brest)
 - October WIOMSA (Mombasa, Kenya)

6. Is the group having difficulties expected in achieving terms of reference or meeting original time schedule? If so, why, and what is being done to address the difficulties Limit 200 words

We now have a strong core of members, associate members and guests who are contributing to the groups ToR.

With help of the SCOR ED (Emily ...) and our WG reporter (Judith Gobin) we were able to recruit two new researchers (member: Jonathan Lefcheck (USA); associate member: Jillian Dunic (Canada)). This has provided much needed impetus as both researchers have been actively participating in the WG activities and will be attending the October meeting in De Hoop

I am hopeful that we will have achieved most, if not all of our objectives by October 2025.

7. Any special comments or requests to SCOR. Limit 100 words.

We appreciate the continued support and patience.

Additional information can be submitted and may be posted at the SCOR Annual Meeting webpage at the discretion of the SCOR Executive Committee Reporter for the WG and the SCOR Secretariat.