

FINAL REPORT
REGIONAL WORKSHOP ON INDEX OF COASTAL
EUTROPHICATION AND HARMFUL ALGAL BLOOMS
25-26th JULY 2022



SUBMITTED BY

INSTITUTE OF MARINE AFFAIRS

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1. INTRODUCTION

The regional workshop entitled “Index of Coastal Eutrophication & Harmful Algal Blooms (ICEP HABs)” was organized and hosted by the Institute of Marine Affairs (IMA), one of the two Regional Activity Centres (RAC) for the Cartagena Convention on the Protocol concerning Land Based Sources of Pollution in the Marine Environment (LBS Protocol) of the Wider Caribbean Region (WCR). The workshop was one of the nine activities held as part of an ongoing Small Scale Funding Agreement (SSFA) between United Nations Environment Programme (UNEP) and the IMA funded through multiple projects GEF CReW+, ACP MEAs III and a SIDA GRANT (UNEP HQ). The SSFA began in May 2022 and this workshop was funded by UNEP through the Swedish International Development Cooperation Agency (SIDA) under the Cartagena Convention Secretariat.

The workshop together with other activities under the SSFA aim to improve capacities for the management of coasts and oceans in line with the related Regional Seas Conventions. In addition, it targets the implementation of innovative, technical small-scale solutions in the Wider Caribbean Region (WCR). The SSFA also reinforces cooperation between IMA and the Cartagena Convention Secretariat to prevent, reduce and control marine pollution and to assist countries in the implementation of the LBS Protocol.

The workshop was held on 25 – 26, July 2022 at the Institute of Marine Affairs in Trinidad with simultaneous interpretation in English and Spanish. It was a hybrid event with some participants onsite at IMA, while others contributed virtually (Appendix I- Workshop Agenda). The workshop participants included representatives from the Cartagena Convention Secretariat, the Centre of Research and Environmental Management of Transport (RAC CIMAB Cuba), the RAC for Specially Protected Areas and Wildlife Protocol (SPAW RAC Guadeloupe), OSPAR Commission (Europe), Marine and Coastal Research Institute Jose Benito Vives de Andreis (INVEMAR Colombia) and the Integrated Water Land and Ecosystems Management in Caribbean Small Island Developing States (GEF-IWECO Project) (Appendix II). The workshop was attended by national, technical and LBS Protocol focal points of the Cartagena Convention of the WCR (Appendix III).

2. WORKSHOP SUMMARY - DAY 1, MONDAY 25 JULY 2022

2.1 OPENING SESSION

The Acting Coordinator of the Cartagena Convention Secretariat, Mr. Christopher Corbin, gave welcoming remarks recognizing The Deputy Permanent Secretary of the Ministry of Planning and Development, Ms. Meera Ramesar, and thanked Dr. Rahanna Juman, Acting Director IMA and staff for arranging the workshop. He recognized the collaboration from SPAW RAC and RAC CIMAB and noted it would be the first occasion all RACs are present together for a meeting. Mr. Corbin also recognized representatives of the Regional Activity Network (RAN) of the Cartagena Convention including INVEMAR and OSPAR. He then noted the Cartagena Convention and OSPAR had developed a Memorandum of Understanding (MOU) to promote transboundary and transatlantic cooperation. He then explained how the issue of nutrient pollution is significant in the WCR and highlighted how vulnerable the region is to nutrient pollution, stating the situation must be addressed with consideration of the Blue Economy and nutrient efficiency in mind. Mr. Corbin expressed the importance of building capacity to understand major sources and impacts of nutrient contamination and to learn how the region can improve SDG 14 reporting on ICEP. He thanked focal points and attendees of the workshop, and looked forward to receiving feedback. He reiterated the need to prioritize nutrient contamination issues as there is a thrust towards adopting Blue Economy approaches.

Ms. Ramesar delivered opening remarks on behalf of the Ministry of Planning and Development (MPD), Trinidad and Tobago, the political focal point for the Cartagena Convention. She highlighted a number of the environmental challenges posed to the marine environment that are attributed to nutrient pollution. The importance of the workshop was underscored by her references to the IMA's State of the Marine Environment Report and the State of the Cartagena Convention Area Report, which both identified land-based sources of pollution as a major cause of negative effects on the coastal water quality. She mentioned the importance of IMA's role as Regional Activity Centre to build capacity for monitoring ICEP and HABs as it relates to the implementation of the LBS Protocol in the English-Speaking Caribbean. Ms. Ramesar highlighted the steps taken by the MPD to develop a sustainable blue economy as part of the 2030 National Development Strategy and declared the workshop open.

Dr Darryl Banjoo, Deputy Director IMA (Ag), gave an overview of the workshop and identified the goals and objectives.

Goal

To provide training, capacity building and greater sensitization in the region for the assessment of Eutrophication and Harmful Algal Blooms toward strategic actions leading to protection of marine habitats against nutrient pollution.

Objectives

To bring together policy makers and scientists in the region for consultation towards mitigating the impacts of nutrient pollution, and implementing the regional nutrient pollution reduction strategy.

- i. To provide insights and share experiences into recent research on eutrophication and harmful algal blooms in Europe and the Caribbean region.
- ii. To understand the basics of ICEP and HAB indicators and reporting requirements toward the UN SDG 14.1.1a.
- iii. To develop framework for implementation of regular monitoring with respect to ICEP and HABs.
- iv. To provide basic training in methods of detection and monitoring of ICEP and HABs from laboratory testing, remote sensing and other technology.
- v. To develop collaborative linkages in securing new investment opportunities for reducing the risk to human health and coastal and marine ecosystems.

Mr. Andre Hanief, Manager Information Technology IMA, briefed online participants on the functionality of the webinar platform.

2.2 SESSION I: ICEP THE BASICS AND THE EUROPEAN EXPERIENCE: HARMONIZING THE EUTROPHICATION'S ASSESSMENT APPROACH ACROSS THE NORTH EAST ATLANTIC

Chairperson: Dr Maurice Narcis, Nutrient Chemist IMA.

Video Presentation – What is Eutrophication? National Oceanic and Atmospheric Administration.

- i. Eutrophication occurs when nutrients get into rivers and coastal waters, causing extreme growth of algae, diminishing sunlight for other aquatic plants.
- ii. Decomposition of plants further diminish oxygen, negatively affecting fish and other aquatic species.

Video Presentation – Two Minutes on Oceans with Jim Toomey: Nutrient Runoff (UNEP)

- i. Nutrient runoff occurs when excess fertilizer, a major source of nitrogen and phosphorus, from agricultural use is washed into rivers and coastal waters.
- ii. Fertilizer in water bodies results in excess algae growth that blocks sunlight for aquatic life and/or releases toxins that affect human health.
- iii. The decomposition of excess algae results in fish kills and dead zones that severely affect fishing industries.
- iv. Possible solutions are using fertilizers in moderation, seeking alternative to N and P based fertilizers, using cover crops to reduce nutrient runoff.
- v. Decision makers can work towards policies that require improved nutrient management solutions.

Presentation by Marlen Hernandez, Senior Researcher Contamination Division from Centre for Research and Environmental Management of Transport (RAC CIMAB) – ICEP Basics, Target 14.1.1a Reporting levels and Required Data

- i. Objective of Sustainable Development Goals (SDG) Indicator 14.1.1a to measure countries contribution to coastal eutrophication and monitor status of coastal eutrophication.
- ii. There are three levels of reporting SDG 14.1.1a and each level has proposed indicators. Level 1 global, level 2 national and level 3 supplementary.
- iii. The ICEP indicator is based on the loads and proportions of nitrogen, phosphorous and silicon delivered by rivers to coastal waters and is calculated by an equation.
- iv. The indicator is expressed as an excess of nitrogen and phosphorus in the form of algae biomass on a risk category scale of lowest to highest.
- v. Data types such as climate and hydrography, socio-economic and nutrient management are also required for the ICEP report.
- vi. ICEP modelling can be to investigate nutrient transport and other trends to facilitate better understanding of ICEP and enhance decision making.

2.3 SESSION II: OVERVIEW ON TRANSBOUNDARY COOPERATION, STATE OF ENVIRONMENT, CONSERVATION OF MARINE PROTECTED AREAS, STRATEGY AND ACTION PLAN

Chairperson: Dr Darryl Banjoo, Acting Deputy Director IMA

Presentation by Mr. Christopher Corbin, Acting Coordinator Cartagena Convention Secretariat – Transboundary cooperation and integration across sectors that contribute to and/or are impacted by Nutrient Pollution.

- i. Nutrient pollution poses a significant risk to the marine environment particularly for Small Island Developing States (SIDS)
- ii. There is an existing need for transboundary cooperating between islands in the WCR to mitigate the effects of Sargassum, Plastics and Nutrient pollution
- iii. Caribbean economies continue to be impacted as the fisheries and tourism sectors are negatively affected, as well as numerous risks to human health.
- iv. The World Bank estimated US billion dollar losses directly from the pollution of coastal waters due to sewage.
- v. A blue economy is heavily dependent on a clean environment and healthy and productive marine ecosystems.
- vi. The Cartagena Convention remains the only legally binding agreement across 28 governments for the protection and development of the Caribbean Sea.
- vii. There are many sources of nutrient pollution to consider under the LBS Protocol. In addition, fragile ecosystems and habitats of endangered species are impacted by nutrient pollution.
- viii. The main objectives of the LBS Protocol are to reduce impacts by establishment of limits and best management practices and regional cooperation to exchange scientific and technical information based on research and monitoring.
- ix. The main sources of nutrient pollution are fertilizers, storm water, municipal, agricultural and aquaculture sewage
- x. Regional Nutrient Pollution Reduction Strategy aims to facilitate capacity building, stakeholder engagement and monitoring assessment and evaluation required to be effective through implementation by RACs and RANs.

Presentation by Marlen Hernandez, Senior Researcher RAC CIMAB – State of the Environment/Results of State of Convention Area Report (SOCAR) related to contamination by nutrients: sources and impacts

- i. For the SOCAR report the DPSIR (Drivers Pressures State Impact Response) framework is used with the countries grouped into 5 sub-regions.
- ii. Agriculture was found to be the main source of nutrients (N and P) in ground and coastal waters.
- iii. Largest loads of domestic wastewater and nutrients discharge occurred in the northern Gulf of Mexico and south western Caribbean areas.
- iv. High levels of faecal contamination and harmful bacteria from untreated sewage and domestic wastewater were observed throughout analysis sites. Contamination by these and other water quality indicators was higher in the rainy season.
- v. The resulting marine pollution impacts human health, national economies and ecological changes.
- vi. There is an increased risk of eutrophication and HABs.

Presentation by Christophe Blazy, Ecosystems Programme Officer SPAW RAC - An overview of nutrient pollution impact on coastal and marine biodiversity, marine protected areas and sensitive sites in the Wider Caribbean.

- i. The SPAW Protocol was adopted in 1990 and entered into force in 2000 and has three Annexes outlining the protection of Flora and/or Fauna.
- ii. SPAW-RAC focuses on regional cooperation between its 18 contracting parties and has 36 protected areas and over 200 protected species under the SPAW Annexes
- iii. Eutrophication events occur most often near high population density areas and river estuaries and in shallow coastal waters during warm periods.
- iv. A lack of sewer collection and treatment systems in Caribbean households led to approximately 85% of wastewater entering the ocean untreated.
- v. There is a global platform for recording Harmful Algal Bloom events on an open database (HAEDAT).
- vi. Eutrophication and HABs negatively impact sensitive ecosystems (coral reef, seagrass beds, mangrove), marine biodiversity (reduced population) and marine protected areas.
- vii. Eutrophication is considered to play a role in sargassum influx, which causes major issues with ecosystems, biodiversity and local economies.

Presentation by Dr Darryl Banjoo, Acting Deputy Director IMA – Nutrient Pollution Reduction Strategy/Summary of action towards reduction

- i. The LBS Protocol, by way of its Annexes, aims to reduce pollution through establishment of effluent and emission limitations and/or best management practices.
- ii. UNEP CEP adopted the Wider Caribbean Regional Nutrient Pollution Reduction Strategy and Action Plan in June 2021.
- iii. The goal of the strategy is to establish a regional framework for reduction of nutrient pollution.
- iv. Sustainable nutrient management, compliance of domestic wastewater effluent standards and protection of coastal water pollution are essential parts of the nutrient reduction strategy.
- v. Nutrient pollution in the WCR should be addressed through an integrated approach of enhanced institutional framework, science-based policy, stakeholder involvement and sustainable financing mechanisms.
- vi. RACs and RANs have important role of strategy implementation in Contracting Parties via projects and technical assistance in support of Cartagena Convention and its protocols.
- vii. RAC IMA recently began implementing activities focused on the LBS protocol in WCR supported by multiple projects.

Presentation by Dr Luisa Espinosa, Research Coordinator INVEMAR – REMARCO network, a regional cooperation strategy to report the SDG 14.1 indicators

- i. REMARCO is a voluntary, non-profit interdisciplinary research network for improvement of the marine environment by facilitating policy and decision making through scientific research and information transfer.
- ii. The body was formed through IAEA technical cooperation projects between Latin American and Caribbean countries over the last 14 years.
- iii. Main areas of work are chemical pollution, ocean acidification, HABs and microplastics.
- iv. The network assists in capacity building and monitoring of marine stressors, coordinated action plans, enhancing analytical capacities and informant exchange with decision makers to achieve the overall objectives of SDG 14.
- v. REMARCO generates evidence-based knowledge through its work in 18 LA and Caribbean countries, which is used as a contribution to the UN Decade of Ocean Science for Sustainable Development.

Panellist Discussion

The development of a framework for implementation of regional monitoring with respect to ICEP HAB

- i. Lack of data availability/quality/sharing and lack of capacity for acquiring and monitoring
- ii. ICEP monitoring requires significant data for reporting
- iii. Lack of national data and information systems to bridge science-policy gap.
- iv. Long term baseline data monitoring of nutrients should be used to investigate effects on sustainability of marine ecosystems
- v. Opportunity to improve water quality monitoring of Contracting Parties
- vi. Lack of standards/criteria for laboratory monitoring of ICEP and maintenance of lab equipment by governments
- vii. Minimal networking between labs in English Speaking Caribbean

Link to securing new investment opportunities by reducing risks to Human Health and Coastal & Marine Ecosystem Services

- i. Need for focus on attracting more investment opportunities into the region
- ii. Data is required to inform what investment types are most appropriate

3. WORKSHOP SUMMARY - DAY 2, TUESDAY 26 JULY 2022

3.1 SESSION I: TESTING METHODOLOGIES FOR ICEP HABS MONITORING. DETECTION AND REPORTING ICEP AND HABS

Chairperson: Dr Darryl Banjoo

Presentation by Hans Ruiter, Rijkswaterstaat, OSPAR – Protecting and Conserving the North-East Atlantic and its resources.

- i. OSPAR is a cooperation of 15 governments and the EU to protect the marine environment of the North East Atlantic. In 1992, the OSPAR commission was formed as a successor to the Oslo and Paris commissions.
- ii. It is categorized into five regions, Arctic waters, Greater North Sea, Celtic Seas, Bay of Biscay and Iberian coast and wider Atlantic.
- iii. Across countries, 62 observer organizations play an essential role in general work and policy development of OSPAR.
- iv. The OSPAR convention consists of five Annexes for prevention of pollution and environmental protection.
- v. Hazardous Substances and Eutrophication is one of OSPAR's six main work areas.
- vi. OSPAR Eutrophication Strategy aims toward a substantial reduction at source in inputs of N and P where they are likely to result in pollution.
- vii. Eutrophication assessments made in winter and growing seasons and now based on coherent threshold values across region.

Presentation by Hans Ruiter, OSPAR – Comprehensive Procedure Common Indicators (on behalf of Michelle Devlin, Centre for Environment, Fisheries, and Aquaculture Science (CEFAS) United Kingdom)

- i. OSPAR resolutions now result in harmonized Eutrophication assessment where there were limited agreements previously.
- ii. Assessment areas now updated to ensure ecological relevance and include ecological boundaries rather than geographical.
- iii. Data modelling an important part of Eutrophication assessment for OSPAR
- iv. OSPARs revised eutrophication assessment methods include thresholds devised with data models and historical data, remote sensing and integrating areas across national borders.
- v. A combination of common and additional indicators were used to determine nutrients, chlorophyll and dissolved oxygen to produce a full thematic assessment.

Presentation by Janet Vivas, Researcher INVEMAR - Progress in the assessment of trophic status to coastal water bodies in Colombia

- i. INVEMAR currently working on the implementation of SDG 14.1.1a in Colombia, which includes quality index of marine and coastal waters ICAM.
- ii. Comprehensive methodological development is employed to measure ICEP – systematic review, selection of index, data query and data analysis.
- iii. With the use of REDCAM, the marine and coastal surveillance network, monitoring was expanded to include Silicon and Total phosphorus in selected areas.
- iv. The ICEP analysis model can be used to investigate areas based on the trophic state and/or other indices.

Presentation by Hans Ruiter, OSPAR – Experience from OSPAR concerning HABs and monitoring phytoplankton

- i. Earlier indicators of phytoplankton were toxic algae blooms and phaeocystis (a class of algae).
- ii. Experience has shown that toxic algae can bloom in nutrient poor systems (e.g., cyanobacteria are nitrogen producing) but more research is needed in this area of types of algae.
- iii. Phaeocystis has seasonal spring blooms resulting in oxygen depletion.
- iv. Research in the Netherlands has shown there is no direct relationship between nutrients and phaeocystis.
- v. Data leads to phaeocystis blooms not being useful as an indicator for eutrophication.

Presentation by Hans Ruiter, OSPAR – Remote Sensing

- i. Remote sensing is used for monitoring of Chlorophyll A and enables extensive area coverage of marine areas over many countries.
- ii. It is also a solution to challenges faced with monitoring algae that can have a large variance over time and distance and satisfies data needs for assessment.
- iii. To be effective, remote sensing has high level technical and scientific requirements.
- iv. While there are benefits (daily results, large area coverage) of remote sensing, limitations exist with the depth of measurements possible.

Presentation by Julian Franco, Marine Biologist INVEMAR – Harmful Algal Blooms – Detection, Monitoring, Sampling, Laboratory Analysis, Forecasting, Event Response and Biotoxins

- i. HABs are caused by a variety of factors including nutrients, dispersion, microorganisms or climate and coastal changes.
- ii. Blooms can affect shellfish with varying toxins, bring forth red tides, sargassum influx and cause poisoning in humans (ciguatera etc).
- iii. The environmental emergency response group of INVEMAR monitors and reports HABs events in Colombia, Caribbean and Pacific coasts to HAEDAT.
- iv. Cyanobacterial blooms cause oxygen depletion and fish kills while red tides were seen to cause colour changes in the water without harmful effects or fish kills.
- v. Capacity building to effectively monitor and report HABs include lab equipment, national level involvement in HAB Plan and scientific collaboration and publication.
- vi. Current challenges include remote sensing, molecular and toxin identification and finance.

3.2 SESSION II: OVERVIEW ON REGIONAL LABORATORY CAPACITY AND CASE STUDY OF LABORATORY RESULTS IN DETERMINATION OF ICEP HABs

Presentation by Allison Astwood, GEF-IWEco Project – Status of Region Laboratory Capacity for Analysis of Nutrients towards Determination of ICEP and HABs

- i. GEF-IWEco aims to strengthen capacity for environmental monitoring through building laboratory capacity in the WCR
- ii. Laboratory strengthening occurs in phases beginning with inventory and recommendations then procurement of necessary equipment and information exchange through meetings for creation of lab network
- iii. Training is delivered in several areas including sampling, current methods, quantification and quality control. Available training webinar access - <https://chemicalsandwaste.wixsite.com/env-monitoring/training-modules>
- iv. Water Analysis course focused on nutrients, chlorophyll A and other parameters of importance as stated in SOCAR report.
- v. More labs need to build capacity to perform nutrient testing for ICEP and HABs.

Presentation by Cesar Bernal, LABCAM Laboratory Head INVEMAR – Laboratory Analysis of Nutrients and Chlorophyll A – Comparable and Reliable Results. Colombia and REMARCO Case Studies.

- i. There are several steps in the process between receiving a customer request and reporting results.
- ii. With respect to eutrophication indicators, the parameters, expected values, analytical methods and other items are considered before reporting.
- iii. REDCAM provides comparable results – standardization of analytical methods, lab training and indicator reporting, inter-lab tests and meetings.
- iv. Countries in the REMARCO network commit to infrastructure, sampling, personnel rotation, equipment maintenance and SDG 14.1.1a reporting to further ensure comparable results.

Panellist Discussion

Technical issues - Determination, Monitoring Implementation of ICEP HAB in Caribbean Region.

- i. Colombia through the work of INVEMAR, is more advanced in ICEP indicator monitoring in the region.
- ii. Blooms have occurred in Europe with low chlorophyll and nutrient concentrations; algal competition and other factors that require more research are involved.
- iii. Data modelling is strengthened by using of multiple models to correction for any errors.
- iv. Spatial analysis intended for oil spills can possibly be applied as a means of tracking sargassum.
- v. Training opportunities available to Contracting Parties to the Cartagena Convention and its Protocols should be documented by the Cartagena Convention Secretariat and RACs/RANs and showcased for example through the GEF CREW+ academy etc.
- vi. Online training modules offered through GEF-IWEco project are available online and process has begun to translate them into Spanish.

Action Plan

- i. Clearly identify specific parameters required for development of reporting framework for ICEP monitoring.
- ii. Building capacity incrementally with focus on valuable parameters that will contribute to ICEP monitoring
- iii. Certain parameters exclusive of ICEP are still important and should be included as part of the monitoring program, based on OSPAR experience.

4. THE WAY FORWARD

- i. Clearly identify capacity building needs and support government in developing national systems
- ii. Cartagena Convention is working with University of Geneva to develop a regional platform to access global datasets.
- iii. Explore outreach and education support tools and knowledge management products to bridge the science-policy gap.
- iv. Integrated approach to share data and collaborate with RACs and RANs to better utilize regional agencies and existing networks.
- v. Cartagena Convention to explore creation of a laboratory network for English speaking countries.
- vi. Look at broader data sets (social, socioeconomic) to better understand drivers, review effectiveness of current policy regarding improvement nutrient pollution
- vii. Development of regional standards for additional water quality monitoring parameters regarding nutrient pollution.

The Cartagena Convention secretariat, RACs and RANs must utilize an incremental and systematic approach in order to build capacity in the region for ICEP and HAB monitoring throughout Contracting Parties.

5. ANNEXES

5.1 ANNEX I - WORKSHOP AGENDA

DAY 1 – Monday 25th July, 2022

Time	Topic	Facilitated by
9:00 – 9:15	Welcome Addresses and Opening remarks Opening of workshop by Rep. of Ministry of planning and Development	CEP Secretariat RAC –IMA MoPD
9:15 – 9:30	Overview of workshop, organization, objectives, Introduction of workshop participants, group photo (or at the end for photo- optional).	RAC-IMA ITD IMA Staff. CEP Secretariat
Session I: ICEP the Basics and The European experience: harmonizing the eutrophication’s assessment approach across the North East Atlantic		
9:30 – 9:40	Video presentation on Eutrophication/HABs	CEP Secretariat RAC -IMA
9:40 – 9:50	ICEP Basics, Presentation on ICEP 14.1.1a , Levels of Reporting and Data Requirement.	RAC CIMAB Marlen Perez
9:50 – 10:05	OSPAR- Eutrophication protocol. The European experience.	OSPAR Hans Ruiter
<i>Feedback and questions (10 minutes)</i>		
<i>Health Break (5 minutes)</i>		
Session II: Overview on transboundary cooperation, state of environment, conservation of marine protected areas, strategy and action plan.		
10:20 – 10:35	Transboundary cooperation and integration across sectors that contribute to and/or are impacted by Nutrients Pollution. LBS Protocol.	CEP Secretariat Christopher Corbin
10:35 – 10:50	State of the environment /results of SOCAR focus on nutrient pollution sources, hotspots and negative impacts.	RAC CIMAB Marlen Perez
10:50 – 11:05	Need for conservation. Overview of marine	SPAW RAC
	protected areas/sensitive sites, nutrient pollution impact on coastal and marine biodiversity, links to Sargassum.	Christophe BLAZY

DAY 1 – Monday 25th July, 2022 (cont'd)

Time	Topic	Facilitated by
<i>Feedback and questions (20 minutes) Poll Question</i>		
<i>Health Break (5 minutes)</i>		
11:30 – 11:45	REMARCO network, a regional cooperation strategy to report the SDG 14.1 indicators	RAN INVEMAR Luisa Espinosa
11:45 – 12:00	Nutrient pollution reduction strategy / Summary of action towards reduction.	RAC IMA Darryl Banjoo
<i>Feedback and questions (10 minutes)</i>		
12:10 – 12:30	<i>Panelist discussion (2-3 min for each 6 panelist), topic for discussion below followed by open discussion</i> Feedback on questions from invitees. The development of a framework for implementation of regional monitoring with respect to ICEP HAB Link to securing new investment opportunities by reducing risks to Human Health and Coastal and Marine Ecosystem Services	RAC IMA
12:30 – 12:55	Open Discussion by Participants	All
12:55 – 1:00	Closing Remarks	RAC IMA

DAY 2 – Tuesday 26th July, 2022

Time	Topic	Facilitated by
9:00 – 9:10	Brief Summary of Day 1	RAC-IMA
Session I: Testing methodologies for ICEP HABs Monitoring. Detection and reporting ICEP and HABs		
9:10 – 9:25	Experience from OSPAR with N, P, Chl and Oxygen, in situ data, measures and reporting.	OSPAR Michelle Devlin
9:25 – 9:40	Progress in the assessment of trophic status to coastal water bodies in Colombia	INVEMAR Janet Vivas
<i>Health Break (5 minutes)</i>		
9:45 – 10:00	Experience from OSPAR concerning HABs and monitoring phytoplankton.	OSPAR Hans Ruiters
10:00– 10:15	Application of Remote Sensing- Assessment of Eutrophication and HABs.	OSPAR Hans Ruiters
<i>Feedback and Questions (20minutes)</i> Poll Questions		
<i>Health Break (10 minutes)</i>		
Session II: Overview on Regional Laboratory Capacity and Case study of Laboratory Results in determination of ICEP HABs		
11:00– 11:15	Status of Regional Laboratory Capacity in Nutrients Analysis towards determination of ICEP HABs	IWECO Allison Astwood
11:15– 11:30	Laboratory analysis of nutrients and chlorophyll a - Comparable and reliable results. Colombia and REMARCO case studies	INVEMAR Cesar Bernal

DAY 2 – Tuesday 26th July, 2022 (cont'd)

Time	Topic	Facilitated by
<i>Feedback and Questions (20 minutes)</i>		
Poll Questions		
<i>Health Break (5 minutes)</i>		
Open Discussion		
11:50– 12.10	<i>Panelist discussion (2-3 min for each 5 panelist), topic for discussion below followed by open discussion</i> Technical issues -Determination, Monitoring Implementation of ICEP HAB in Caribbean Region.	CEP Secretariat RAC IMA
12.10– 12.40	Open Discussion on Technical issues - Determination, Monitoring Implementation of ICEP HAB in Caribbean Region. Action plan for implementation.	CEP Secretariat RAC IMA
12:40 – 12.50	Closing Remarks	RAC IMA

5.2 ANNEX II - LIST OF PARTICIPANTS

#	Name	Agency	Email Contact
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