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English only

**Seventeenth Session of the IOC-FAO Intergovernmental Panel**

**on Harmful Algal Blooms**

Paris, 18-20 March 2025

Item 4.4.2 of the Provisional Agenda

**REPORT OF THE TASK TEAM ON THE DEVELOPMENT OF THE HARMFUL ALGAL INFORMATION SYSTEM AND A PERIODIC GLOBAL HARMFUL ALGAL BLOOM STATUS REPORT**

**Recalling** Decision IPHAB-IV.3 on ‘The Development of a Periodic Global HAB Status Report’,Decision IPHAB-XI.2 on the ‘Development of a Global HAB Status Report’, Resolution IPHAB-IX.2 on the ‘Development of the Harmful Algal Information System’ as a joint IPHAB-IODE activity, and Decisions IPHAB-XII.3, IPHAB-XIII.3, IPHAB-XIV.3 and IPHAB-XV.3 on an IPHAB Task Team on the Development of a Global HAB Status Report,

**Recognizing** the continued and long-term benefits to policy administrators, managers of regulatory monitoring programmes and scientists of a series of syntheses of high-quality information and future scenarios on the biogeography of harmful species and occurrence of harmful algal events, including their economic and societal impacts,

**Notes with satisfaction** the launch of the first Global HAB Status Report (GHSR) and its relevance for current and developing global assessments, such as the United Nations World Ocean Assessment, the UNEP Global Environmental Outlook, the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) global assessment on biodiversity and ecosystem services, the International Panel on Climate Change (IPCC) reporting, as well as for the United Nations Decade of Ocean Science for Sustainable Development (2021–2030);

**Notes also with satisfaction** the establishment of the ‘Harmful Algal Information System’ (HAIS) as an element of the GHSR and as a data portal integrating the data in IOC/IODE's Ocean Biodiversity Information System (OBIS) and Harmful Algal Event Database (HAEDAT);

**Notes further with satisfaction** the progress in data compilation in the intersessional period and the cooperation with ICES, PICES, the IAEA,and the IOCregional HAB groups and networks IOCARIBE/ANCA, FANSA, HANA, and WESTPAC/HAB, in this respect;

**Expresses its appreciation** for the support provided by the IODE programme in general, and by the technical OBIS staff in particular, for the development, hosting and technical maintenance of the HAIS and HAEDAT data systems;

**Noting further** that OBIS continues to provide the world's largest open access database on the diversity, distribution and abundance of marine species, including harmful algae, and that OBIS will contribute to HAIS through OBIS/HABMAP, and that it provides a main component of future editions of the GHSR;

**Decides** to continue the series of Task Teams on HAIS and GHSR as an editorial advisory group for HAIS/GHSR with the following terms of reference:

1. Advise the FAO and IOC secretariat/IODE Project Office and HAIS partners and define amendments required to update HAEDAT to facilitate proper data entry, extraction and quality control as well as improving recording criteria for HAB events such as ‘high biomass blooms’, ‘cyanobacteria events’, ‘ciguatera events’ and others raised by IOC regional groups. Identify areas for HAIS adjustments, geographical data gaps and website edits. Ensure standardization between HAIS and initiatives undertaken by TTs on Taxonomy and Biotoxins,
2. Advise and encourage regional groups and editors on data compilation, quality control and submission of HAB data to OBIS/HABMAP and HAEDAT and production of associated metadata documents,
3. Advise on and stimulate the use of HAIS data and data products, encourage the production of summary articles in Harmful Algae News and act proactively if GHSR/HAIS conclusions or data are misinterpreted or incorrectly referred to;
4. Develop a template, for FAO approval before the end of 2023, for a short and concise annual summary of HAEDAT with the view to submit such summaries annually to the FAO Committee on Fisheries (COFI) and the Subcommittee on Fish Trade (COFI-FT) and starting in 2024 covering the year 2023,
5. Identify the focus of the second Global HAB Status Report, identify priority drivers and associated relevant global datasets. Engage with working groups, groups of experts within and outside IOC (including IOC IGMETS, IOC TrendsPO, ICES WGPME, the marine sites of the International network on Long Term Ecological Research (I-LTER), EMODNET-Biology, and ICES-IOC WGHABD, GOOS/EuroGOOS), and individual scientists to identify time series of phytoplankton data including information on HAB species,
6. Investigate with GlobalHAB possibilities of organizing initiatives (such as workshops, interactive data analysis, courses) on HAB time series analysis in the context of environmental variability,
7. Work with IOC FAO IPHAB Task Teams to develop UN Decade Action – HAB solutions, identify partners for co-design initiatives and funding opportunities;

**Decides also** that the Task Team is chaired by Eileen Bresnan (UK) and comprises A. Zingone (Italy), Bengt Karlson (Sweden), the Chair of the IPHAB Task Team on Biotoxins, the Chair of the IPHAB Task Team on Taxonomy, the Chair IODE GE-BICH, and may invite representatives of the GlobalHAB SSC, the regional IOC groups ANCA, FANSA, HANA and WESTPAC/HAB, the ICES-IOC WGHABD, the PICES HAB Section, WoRMS, IAEA, FAO and ISSHA. The Task Team is supplemented by international advisors and experts G. Hallegraeff (AU) and may be expanded as required to fulfill the terms of reference;

# Invites the IODE Programme and OBIS technical staff to continue its active role in HAIS incl. HAEDAT through its Ocean Biodiversity Information System (OBIS);

# Notes that the task team will continue its work until otherwise decided by the Panel, and that it will work by correspondence and/or meet upon request by the joint IOC-FAO IPHAB Secretariat, and provide a progress report for the intersessional period to the Chairs of IPHAB and IODE prior to IPHAB-XVII and IODE-XXVII, XXVIII and XXIX.

**PROGRESS DURING THE LAST SESSION**

The chair of the Task Team stepped down during 2024 owing to changing work priorities and work on this TT has stalled. Efforts to find a replacement have yet to be successful. Discussion on how best to populate the leadership of this Task Team is needed at IPHAB XVII due to the requirement for global input into HAIS and the GHSR.

**HARMFUL ALGAL INFORMATION SYSTEM (HAIS)**

**HAIS STATUS**

A review of the IOC-ICES-PICES Harmful Algal Event database and OBIS/HABMAP has shown that data entry has declined, with a clear drop off since the cut off for the first Global HAB Status Report (GHSR),published in 2021 (Figure 1). A number of regional gaps remain. There is a need for a thorough quality check of HAIS and identification of regional champions to encourage countries to keep data entries up to date. The IOC HAB office has created a survey to send to country editors to identify barriers and any assistance required e.g. training courses, one to one support, to ensure that data entry continues.



**Figure 1: Number of events currently in the IOC-ICES-PICES Harmful Algal Event Database (HAEDAT). The peak in events in 2000 is due to a very high number (375) events entered for Ciguatera Poisoning from the Pacific Region. GHSR was published in 2021.**

The major challenge facing HAIS is the lack of dedicated funding, in particular to support IOC-ICES-PICES HAEDAT which needs significant work to update, improve data entry and QC, and correct a number of glitches. The TT acknowledges support from IOC- IODE to correct minor issues with HAEDAT that arose over the last year to keep it functional and available for use by the public. A document detailing the issues in HAEDAT has been drafted to facilitate an estimate of funds required to update the database. Issues identified include; improving stability of HAEDAT, ability to upload datasets (eg after QC) via CSV files, identifying no events/no monitoring/no data entry, improving data extraction, improving data entry to reduce errors and more.

In line with the IOC data policy and requirement for metadata, the TT is working with ICES-IOC WG Harmful Algal Bloom Dynamics to produce a metadata report for the HAIS contribution from the North Atlantic area. This report will begin the process of standardising terminologies for some harmful algal events (high biomass bloom events, cyanobacterial events) which will need global agreement. Standardisation of Ciguatera Poisoning events will need discussion with the Task Team on Global Ciguatera Strategy.

**USE OF HAIS**

Since the publication of the GHSR in 2021, HAEDAT is being increasingly used by the scientific and policy community. The synthesis paper Hallegraeff et al., 2021, *Communications Earth & Environment*, *2*(1), p.117. has been cited over 300 times. Figure 2 shows the number of outputs per year using ‘HAEDAT’ as a search term in Google Scholar. These outputs include peer reviewed papers, reports, conference presentations and proceedings. Examples of notable outputs stimulated by the GHSR are listed in Annex I. In addition, HAEDAT was a significant resource used by the Task Team on Taxonomy to generate a ‘[Harmful; Non Toxic’](https://www.marinespecies.org/hab/nontoxic.php) category in the IOC Taxonomic Reference List on Harmful Microalgae.



**Figure 2: Number of outputs per year from Google Scholar using the search term ‘HAEDAT’.**

**TASK TEAM ACTIVITIES**

The 20th International Conference on Harmful Algae held in Hiroshima, Japan in Nov 2023 was used as a forum to promote HAIS and build contacts. A workshop “Harmful Algal Information System (HAIS): The Power of Big Data for HAB Risk assessment and predicting HAB futures” was held during the conference with useful contacts made. Potential editors were identified to fill gaps in some countries that are missing entries. A poster promoting HAIS was presented at the 2nd UN Ocean Decade Regional Conference & 11th WESTPAC International Marine Science Conference held in Bangkok, Thailand in April 2024. An update on the GHSR “Harmful algal bloom impacts increase amid rising sea food demand and coastal development”was published in the 2nd IOC State of the Ocean report published in June 2024. Contact was also made with the IOC Group on Climate Change and Global Trends of Phytoplankton in the Ocean (TrendsPO).

Outputs:

Bresnan E., Clarke D. and Hallegraeff G. 2023. “Harmful Algal Information System (HAIS): The Power of Big Data for HAB Risk assessment and predicting HAB futures” Workshop held at the 20th International Conference on Harmful Algae, Hiroshima, Japan 2023.

Bresnan E., Clarke D., Hallegraeff G., Zingone A., Sun Y. and Enevoldsen H. 2024. The IOC UNESCO Harmful Algal Information System (HAIS). 2nd UN Ocean Decade Regional Conference & 11th WESTPAC International Marine Science Conference, Bangkok, Thailand, April 2024

Hallegraeff, G., Zingone, A., Bresnan, E. and Enevoldsen, H., 2024. Harmful algal bloom impacts increase amid rising sea food demand and coastal development. 2nd IOC State of the Ocean Report, p.63.

**THE NEXT GLOBAL HAB STATUS REPORT**

Focus for the next GHSR has yet to be discussed. There has been a UN Decade Action on Eutrophication (Nutrient Pollution – Global Action Network) endorsed and initial contact has been made with the Action lead.

**Annex I**

**Publications using or inspired by 2021 Global HAB Status Report**

**2022**

Rolton , A, Rhodes ,L, Hutson, K.S. Biessy, L., Bui, T,. MacKenzie, L., Symonds, J.E., Smith, K.F. (**2022**). Effects of Harmful Algal Blooms on Fish and Shellfish Species: A Case Study of **New Zealand** in a Changing Environment. *Toxins* (Basel). 14, 14(5):341. doi: 10.3390/toxins14050341

# Yan, T. (2022). The “harmful algae and algal toxins in coastal waters of China: investigation and database” project. *Journal of Oceanology and Limnology* 40, 2081-2093

**2023**

Dai, Y., Yang, S., Zhao, D. , Hu, C., Xu,W., Anderson, D.M., Li, Y., Song, X-P., Boyce, D.G., Gibson, L., Zheng, C., Feng, L. (**2023**). Coastal phytoplankton blooms expand and intensify in the 21st century. *Nature* 615, 280–284. <https://doi.org/10.1038/s41586-023-05760-y>

# [Mitra](https://onlinelibrary.wiley.com/authored-by/Mitra/Aditee), M., [Caron](https://onlinelibrary.wiley.com/authored-by/Caron/David+A.), D.A., [Faure](https://onlinelibrary.wiley.com/authored-by/Faure/Emile), E., [Flynn](https://onlinelibrary.wiley.com/authored-by/Flynn/Kevin+J.), K.J., [Leles](https://onlinelibrary.wiley.com/authored-by/Leles/Suzana+Gon%C3%A7alves), S.G., [Hansen](https://onlinelibrary.wiley.com/authored-by/Hansen/Per+J.), P.J., [McManus](https://onlinelibrary.wiley.com/authored-by/McManus/George+B.), G.B., [Not](https://onlinelibrary.wiley.com/authored-by/Not/Fabrice), F., [Rosario Gomes](https://onlinelibrary.wiley.com/authored-by/Rosario%C2%A0Gomes/Helga), H., [Santoferrara](https://onlinelibrary.wiley.com/authored-by/Santoferrara/Luciana+F.), L.F., [Stoecker](https://onlinelibrary.wiley.com/authored-by/Stoecker/Diane+K.), D. K., [Tillmann](https://onlinelibrary.wiley.com/authored-by/Tillmann/Urban)[,](https://onlinelibrary.wiley.com/doi/full/10.1111/jeu.12972) U., (2023). The Mixoplankton Database (MDB): Diversity of photo-phago-trophic plankton in form, function, and distribution across the global ocean. *Eukaryotic Microbiology* 70, e12972.

[Rodríguez F.](https://pubs.rsc.org/en/results?searchtext=Author%3ARodr%C3%ADguez%20F.),  [Escalera L.](https://pubs.rsc.org/en/results?searchtext=Author%3AEscalera%20L.),  [Reguera B.](https://pubs.rsc.org/en/results?searchtext=Author%3AReguera%20B.),  [Nogueira E.](https://pubs.rsc.org/en/results?searchtext=Author%3ANogueira%20E.),  [Bode A.](https://pubs.rsc.org/en/results?searchtext=Author%3ABode%20A.),  [Ruiz-Villarreal M.](https://pubs.rsc.org/en/results?searchtext=Author%3ARuiz-Villarreal%20M.),  [Rossignoli A. E.](https://pubs.rsc.org/en/results?searchtext=Author%3ARossignoli%20A.%20E.),  [Ben-Gigirey B.](https://pubs.rsc.org/en/results?searchtext=Author%3ABen-Gigirey%20B.),  [Rey V.](https://pubs.rsc.org/en/results?searchtext=Author%3ARey%20V.) , [Fraga S.](https://pubs.rsc.org/en/results?searchtext=Author%3AFraga%20S.) (2023). Red tides in the **Galician rías**: historical overview, ecological impact, and future monitoring strategies. ***Environ. Sci.: Processes Impacts*, 26,** 16-34

Yu, Z., Tang, Y., Gobler , C.J. (2023). Harmful algal blooms in **China**: History, recent expansion, current status, and future prospects. *Harmful Algae* 129,102499

**2024**

Accoroni, S., Cangini, M., Angeletti, R., Losasso, C., Bacchiocchi, S., Costa, A., ADi Taranto, A., Escalera, L., Fedrizzi, G., Garzia, A., Longo, F., Macaluso, A., Melchiorre, N., Milandri, A., Milandri, S., Montresor, M., Neri, F., Piersanti, A., Rubini, S., Suraci, C., Susini, F., Vadrucci, M.R., Mudadu, A.G., Vivaldi, B., Soro, B., Totti, C., Zingone , A. (**2024**). Marine phycotoxin levels in shellfish—14 years of data gathered along the **Italian** coast. *Harmful Algae* 131,102560, https://doi.org/10.1016/j.hal.2023.102560.

San Diego-McGlone, M.L.; Yñiguez, A.T.; Benico, G.; Lum, W.M.; Hii, K.S.; Leong, S.C.Y.; Leaw, C.P.; Iwataki, M.; Lim, P.T. (2024) Fish Kills Related to Harmful Algal Bloom Events in **Southeast Asia.**Sustainability 16, 10521. <https://doi.org/10.3390/su162310521>

**2025**

Nayak, A.R., SKolluru, S., AKumar, A., Punyasloke Bhadury, P. (**2025).** Revisiting harmful algal blooms in **India** through a global lens: An integrated framework for enhanced research and monitoring, *iScience* 28, 111916, https://doi.org/10.1016/j.isci.2025.111916.