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منظمة  
الغذية والزراعة  
للأمم المتحدة

# COMMITTEE ON FISHERIES

## SUB-COMMITTEE ON FISH TRADE

### Nineteenth Session

11-15 September 2023

**EXECUTIVE SUMMARY, DECISIONS AND RECOMMENDATIONS  
OF THE 16TH SESSION OF THE FAO/INTERGOVERNMENTAL  
OCEANOGRAPHIC COMMISSION (IOC) INTERNATIONAL PANEL  
ON HARMFUL ALGAL BLOOMS**

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**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION**  
(of UNESCO)

**FOOD AND AGRICULTURE ORGANIZATION**

**SIXTEENTH SESSION OF THE IOC-FAO INTERGOVERNMENTAL PANEL  
ON HARMFUL ALGAL BLOOMS**

FAO Headquarters, Rome, 27–29 March 2023

(i)

**EXECUTIVE SUMMARY**

(ii) In accordance with Rule of Procedure 48.3, IPHAB, as a primary Subsidiary Body of IOC, is required to report to a governing body on its sessions.

(iii) The IOC Assembly at its thirty-second session is invited to consider this Executive Summary.

(iv) For more detailed information on this session, please refer to <https://oceanexpert.org/doclist/230>.

1. The Sixteenth Session of the IOC-FAO Intergovernmental Panel on Harmful Algal Blooms (IPHAB-XVI) was held at FAO Headquarters, Rome, from 27 to 29 March 2023. With reference to IOC Assembly Resolution XVI-4, this was the first session of IPHAB since IPHAB-III in 1995 with FAO back as co-sponsor of the Panel;
2. The Panel reviewed the actions completed during the intersessional period, noted the progress made and found that the programme is addressing several challenges of the United Nations Decade of Ocean Science for Sustainable Development (2021–2030). The Panel noted further that

the Decisions and Recommendations of the Fifteenth session (March 2021) had been implemented highly satisfactorily within the available resources. The major achievements reported during the intersessional period, some of which are still ongoing, include:

- (i) the results from the ICES-IOC Working Group on Harmful Algal Bloom Dynamics and ICES-IOC-IMO Working Group on Ballast and other Ship Vectors;
- (ii) the continued publication of the IOC *Harmful Algae News*;
- (iii) the implementation of three international training courses and several regional and in-country courses;
- (iv) the continued development of the regional activities in Western Pacific (IOC/WESTPAC/HAB), and the Caribbean (IOC/IOCARIBE/ANCA), the commitment in South America (IOC/IPHAB/FANSA) and North Africa (IOC/IPHAB/HANA) despite a lack of resources;
- (v) the advances of the PICES HAB-Section;
- (vi) the publication of the GlobalHAB *Guidelines for the study of climate change effects on HABs* as IOC Manuals and Guides, [88](#);
- (vii) the joint FAO-IOC-IAEA publication *Technical Guidance for the Implementation of Early Warning Systems for Harmful Algal Blooms*, as an FAO Fisheries and Aquaculture Technical Paper, [690](#);
- (viii) the continued compilation of data at all levels for the IPHAB-IODE Harmful Algae Information System with HAEDAT and OBIS databases as providers of high quality information on HAB events, status and trends of HAB occurrence and assessment of climate change impacts, and a toxin database linked to the taxonomic reference list via WoRMS;
- (ix) the advances achieved by the strategy for Ciguatera;
- (x) the developments under the joint IOC-SCOR GlobalHAB science programme such as the advanced modelling and automated *in situ* observations workshops; (xi) the opportunities offered to IPHAB by the UN Ocean Decade to find transformative scientific solutions for the sustainable development of the ocean with respect to HABs; and
- (xii) the development of activities and partnerships carried out by the International Society for the Study of Harmful Algae (ISSHA) to promote and foster research and training on HAB.

3. The Panel adopted 11 decisions and submitted two recommendations for consideration of the IOC Assembly at its thirty-second session and FAO Committee on Fisheries (COFI). The decisions concern:

Decision [IPHAB-XVI.1](#): Regional HAB Programme Development taking into account the difference of support for the various groups and networks depending on whether they are affiliated to a regional IOC subsidiary body or not;

Decision [IPHAB-XVI.2](#): the continuation of the Task Team on the Early Detection, Warning and Forecasting of HAB Events; with new terms of reference;

Decision [IPHAB-XVI.3](#): the continuation of the Task Team on the development of the Harmful algal Information System and a periodic Global Harmful Algal Bloom Status Report with new terms of reference;

- Decision [IPHAB-XVI.4](#): the continuation of the Task Team on a Global Ciguatera Strategy for Improved Research and Management with updated terms of references;
- Decision [IPHAB-XVI.5](#): the continuation of the Task Team on Harmful Algae and Desalination of Seawater to formulate a proposal for a joint FAO WHO water safety risk assessment for drinking water coming from desalination plants;
- Decision [IPHAB-XVI.6](#): the continuation of the Task Team on Biotxin Monitoring, Management and Regulations with new terms of reference;
- Decision [IPHAB-XVI.7](#): the continuation of the Task Team on Algal Taxonomy with new terms of reference;
- Decision [IPHAB-XVI.8](#): the continuation of the Task Team on Fish Killing Microalgae and Ecosystem Effects with new terms of reference;
- Decision [IPHAB-XVI.9](#): establishment of a Task Team on HAB Communication;
- Decision [IPHAB-XVI.10](#): IOC-SCOR GlobalHAB beyond 2025; and
- Decision [IPHAB-XVI.11](#): the development of HAB Solutions (HAB-S) an UN Ocean Decade Programme Proposal.

4. The Recommendations to the IOC Assembly include: (i) the intersessional activities in a workplan and budget for the IOC HAB Programme for the period 2024–2025 ([Rec. IPHAB-XVI-1](#)); and (ii) the continuation of IPHAB with unchanged terms of reference ([Rec. IPHAB-XVI-2](#)). The recommendations are reflected in the draft decision IOC-32/3.4.3 included in the Action Paper for the Assembly (IOC-32/AP Prov.)
5. Dr Philipp Hess (France) was elected as Chair and Dr Maggie Broadwater (USA) was elected as Vice-Chair by acclamation by the panel members.

## Résumé exécutif

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1. La 16<sup>e</sup> session du Groupe intergouvernemental de la COI-FAO chargé d'étudier les efflorescences algales nuisibles (IPHAB-XVI) s'est tenue au Siège de la FAO, à Rome, du 27 au 29 mars 2023. En référence à la résolution XVI-4 de l'Assemblée de la COI, il s'agissait de la première session de l'IPHAB, depuis IPHAB-III en 1995, à recevoir le soutien de la FAO en tant que coparrain du Groupe.
2. Le Groupe a passé en revue les activités menées au cours de la période intersessions, pris note des progrès accomplis et conclu que le programme contribuait à relever plusieurs défis de la Décennie des Nations Unies pour les sciences océaniques au service du développement durable (2021-2030). Le Groupe a également noté que les décisions et recommandations de la 15<sup>e</sup> session (mars 2021) avaient été mises en œuvre de manière très satisfaisante dans le cadre des ressources disponibles. Parmi les principales réalisations mentionnées, dont certaines sont toujours en cours, figurent notamment :
  - (ii) les résultats du Groupe de travail CIEM-COI sur la dynamique des efflorescences algales nuisibles (WGHABD) et du Groupe de travail CIEM-COI-OMI sur les eaux de ballast et autres vecteurs à bord des navires (WGBOSV) ;
  - (iii) la poursuite de la publication du bulletin *Harmful Algae News* de la COI ;
  - (iv) la mise en œuvre de trois cours de formation internationaux et de plusieurs cours régionaux et nationaux ;
  - (v) la poursuite du développement des activités régionales dans le Pacifique occidental (IOC/WESTPAC/HAB) et les Caraïbes (IOC/IOCARIBE/ANCA), ainsi que des activités en Amérique du Sud (IOC/IPHAB/FANSA) et en Afrique du Nord (IOC/IPHAB/HANA), malgré un manque de ressources ;
  - (vi) les avancées de la Section HAB de l'Organisation des sciences de la mer pour le Pacifique Nord (PICES) ;
  - (vii) la publication des « *Guidelines for the study of climate change effects on HABs* » (Directives pour l'étude des effets du changement climatique sur les HAB) de GlobalHAB (Manuels et guides de la COI, n° [88](#)) ;
  - (viii) la publication conjointe FAO-COI-AIEA intitulée « *Joint FAO-IOC-IAEA technical guidance for the implementation of early warning systems for harmful algal blooms* » (Orientations techniques pour la mise en œuvre de systèmes d'alerte rapide sur les efflorescences algales nuisibles) (Document technique de la FAO sur les pêches et l'aquaculture, n° [690](#)) ;
  - (ix) la poursuite de la compilation de données à tous les niveaux pour le système d'information IPHAB-IODE sur les algues nuisibles, les bases de données HAEDAT et OBIS fournissant des informations de haute qualité sur les phénomènes d'efflorescences algales nuisibles, la situation et les tendances concernant l'occurrence des HAB et l'évaluation des effets du changement climatique, ainsi qu'une base de données sur les toxines liée à la liste de référence taxonomique par l'intermédiaire du Registre mondial des espèces marines (WoRMS) ;
  - (x) les progrès accomplis dans le cadre de la stratégie sur la ciguatera ;

- (xi) les progrès réalisés dans le cadre du Programme scientifique conjoint COI-SCOR sur les efflorescences algales nuisibles (GlobalHAB), tels que des ateliers sur la modélisation avancée et les observations *in situ* automatisées ;
  - (xii) les possibilités offertes à l'IPHAB par la Décennie de l'Océan de trouver des solutions scientifiques transformatrices pour le développement durable de l'océan en ce qui concerne les HAB ; et
  - (xii) le développement d'activités et de partenariats menés par la Société internationale pour l'étude des algues nuisibles (ISSHA) afin de promouvoir et d'encourager la recherche et la formation sur les HAB.
3. Le Groupe a adopté 11 décisions et soumis deux recommandations pour examen par l'Assemblée de la COI à sa 32<sup>e</sup> session et par le Comité des pêches de la FAO (COFI). Les décisions portent sur :
- Décision [IPHAB-XVI.1](#) : le développement du Programme HAB à l'échelle régionale, en tenant compte des écarts de soutien entre les différents groupes et réseaux selon qu'ils relèvent ou non d'un organe subsidiaire régional de la COI ;
- Décision [IPHAB-XVI.2](#) : le maintien, avec un nouveau mandat, de l'Équipe spéciale pour la détection, l'alerte et la prévision rapides concernant les phénomènes d'efflorescences algales nuisibles ;
- Décision [IPHAB-XVI.3](#) : le maintien, avec un nouveau mandat, de l'Équipe spéciale sur la mise en place d'un système d'information sur les algues nuisibles et l'élaboration d'un rapport mondial périodique sur la situation des efflorescences algales nuisibles ;
- Décision [IPHAB-XVI.4](#) : le maintien, avec un mandat actualisé, de l'Équipe spéciale pour une stratégie mondiale visant à améliorer la recherche et la gestion relatives à la ciguatera ;
- Décision [IPHAB-XVI.5](#) : le maintien de l'Équipe spéciale sur les algues nuisibles et la désalinisation de l'eau de mer en vue de formuler une proposition d'évaluation conjointe FAO-OMS des risques pour la sécurité sanitaire de l'eau concernant l'eau potable provenant des installations de dessalement ;
- Décision [IPHAB-XVI.6](#) : le maintien, avec un nouveau mandat, de l'Équipe spéciale sur la surveillance et la gestion des biotoxines et les réglementations applicables ;
- Décision [IPHAB-XVI.7](#) : le maintien, avec un nouveau mandat, de l'Équipe spéciale sur la taxinomie des algues ;
- Décision [IPHAB-XVI.8](#) : le maintien, avec un nouveau mandat, de l'Équipe spéciale sur les microalgues mortelles pour les poissons et leurs effets sur les écosystèmes ;
- Décision [IPHAB-XVI.9](#) : la création d'une Équipe spéciale sur la communication relative aux efflorescences algales nuisibles ;
- Décision [IPHAB-XVI.10](#) : le programme GlobalHAB COI-SCOR au-delà de 2025 ; et
- Décision [IPHAB-XVI.11](#) : l'élaboration de Solutions HAB (HAB-S) en tant que proposition de programme dans le cadre de la Décennie de l'Océan.
4. Les recommandations de l'Assemblée de la COI portent sur : (i) les activités qu'il est prévu de mener au cours de la période intersessions au titre du plan de travail et du budget du Programme HAB de la COI pour 2024-2025 (rec. [IPHAB-XVI-1](#)) ; et (ii) le maintien de l'IPHAB, avec un mandat identique (rec. [IPHAB-XVI-2](#)). Les recommandations sont mentionnées dans le projet de décision IOC-

32/3.4.3 qui figure dans le Document relatif aux décisions à adopter soumis à l'Assemblée (IOC-32/AP Prov.).

5. M. Philipp Hess (France) a été élu Président et Mme Maggie Broadwater (États-Unis d'Amérique) a été élue Vice-Présidente par acclamation par les membres du Groupe.

## Resumen ejecutivo

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1. La 16ª reunión del Panel Intergubernamental sobre Floraciones de Algas Nocivas (IPHAB-XVI) de la COI y la FAO se celebró en la Sede de la FAO, en Roma, del 27 al 29 de marzo de 2023. Sobre la base de la resolución XVI-4 de la Asamblea de la COI, era la primera reunión del IPHAB, desde su tercera reunión (IPHAB-III) en 1995, en la que la FAO copatrocinaba el Panel.
2. El Panel examinó las actividades llevadas a cabo durante el periodo entre reuniones, tomó nota de los progresos realizados y concluyó que el programa abordaba diversos desafíos del Decenio de las Naciones Unidas de las Ciencias Oceánicas para el Desarrollo Sostenible (2021-2030). El Panel observó también que las decisiones y recomendaciones de su 15ª reunión (marzo de 2021) se habían aplicado de forma muy satisfactoria dentro de los límites de los recursos disponibles. Entre los principales logros durante el periodo entre reuniones de los que se ha informado, algunos de los cuales aún están en curso, figuran los siguientes:
  - i) los resultados del Grupo de Trabajo CIEM-COI sobre la Dinámica de las Floraciones de Algas Nocivas y del Grupo de Trabajo CIEM-COI-OMI sobre el Agua de Lastre y otros Vectores del Buque;
  - ii) la prosecución de la publicación del boletín de la COI titulado *Harmful Algae News*;
  - iii) la realización de tres cursos internacionales de formación y varios cursos regionales y nacionales;
  - iv) el desarrollo continuo de las actividades regionales en el Pacífico Occidental (IOC/WESTPAC/HAB) y el Caribe (IOC/IOCARIBE/ANCA), y de actividades en América del Sur (IOC/IPHAB/FANSA) y África del Norte (IOC/IPHAB/HANA) a pesar de la falta de recursos;
  - v) los avances de la Sección HAB de la Organización del Pacífico Norte para las Ciencias del Mar (PICES);
  - vi) la publicación de *Guidelines for the study of climate change effects on HABs* (Directrices para el estudio de los efectos del cambio climático sobre las floraciones de algas nocivas) de GlobalHAB (Manuales y Guías de la COI, [88](#));
  - vii) la publicación conjunta FAO-COI-OIEA titulada *Joint FAO-IOC-IAEA technical guidance for the implementation of early warning systems for harmful algal blooms* (Directrices técnicas para el establecimiento de sistemas de alerta temprana de floraciones de algas nocivas) (Documento Técnico de Pesca y Acuicultura de la FAO n.º [690](#));
  - viii) la recopilación continua de datos a todos los niveles para el Sistema de Información sobre Algas Nocivas del IPHAB y el IODE, con las bases de datos HAEDAT y OBIS como proveedores de información de alta calidad sobre fenómenos de floraciones de algas nocivas, la situación y las tendencias de la aparición de floraciones de algas nocivas y la evaluación de los efectos del cambio climático, así como una base de datos sobre las toxinas vinculada a la lista de referencia taxonómica por conducto del Registro Mundial de Especies Marinas (WoRMS);
  - ix) los avances logrados en el marco de la estrategia sobre la ciguatera;
  - x) los avances realizados en el marco del programa científico conjunto GlobalHAB de la COI y el SCOR, como talleres sobre modelización avanzada y observaciones *in situ* automatizadas;



- xi) las oportunidades que ofrece al IPHAB el Decenio del Océano de las Naciones Unidas de encontrar soluciones científicas transformadoras para el desarrollo sostenible del océano en relación con las floraciones de algas nocivas;
- xii) el desarrollo de actividades y asociaciones puestas en marcha por la Sociedad Internacional para el Estudio de las Algas Nocivas (ISSHA) con el fin de promover y alentar la investigación y la formación sobre las floraciones de algas nocivas.

3. El Panel adoptó 11 decisiones y sometió dos recomendaciones a la consideración de la Asamblea de la COI en su 32ª reunión y del Comité de Pesca de la FAO (COFI). Las decisiones se refieren a las siguientes cuestiones:

Decisión [IPHAB-XVI.1](#): el desarrollo de programas regionales sobre floraciones de algas nocivas, teniendo en cuenta la diferencia de apoyo a distintos grupos y redes dependiendo de si son miembros de un órgano subsidiario de la COI o no;

Decisión [IPHAB-XVI.2](#): el mantenimiento del Equipo de trabajo sobre detección temprana, alerta y previsión de fenómenos de floraciones de algas nocivas, con un nuevo mandato;

Decisión [IPHAB-XVI.3](#): el mantenimiento del Equipo de trabajo sobre el establecimiento de un sistema de información sobre algas nocivas y la elaboración de un informe periódico mundial sobre la situación de las floraciones de algas nocivas, con un nuevo mandato;

Decisión [IPHAB-XVI.4](#): el mantenimiento del Equipo de trabajo sobre una estrategia mundial para mejorar la investigación y la gestión de las ciguateras, con un nuevo mandato;

Decisión [IPHAB-XVI.5](#): el mantenimiento del Equipo de trabajo sobre algas nocivas y desalación del agua de mar con miras a formular una propuesta de evaluación conjunta FAO-OMS de los riesgos para la salubridad del agua en relación con el agua potable procedente de plantas desalinizadoras;

Decisión [IPHAB-XVI.6](#): el mantenimiento del Equipo de trabajo sobre vigilancia, gestión y reglamentos relativos a las biotoxinas, con un nuevo mandato;

Decisión [IPHAB-XVI.7](#): el mantenimiento del Equipo de trabajo sobre taxonomía de las algas, con un nuevo mandato;

Decisión [IPHAB-XVI.8](#): el mantenimiento del Equipo de trabajo sobre microalgas que afectan letalmente a los peces y sus efectos en los ecosistemas, con un nuevo mandato;

Decisión [IPHAB-XVI.9](#): creación de un Equipo de trabajo sobre la comunicación relativa a las floraciones de algas nocivas;

Decisión [IPHAB-XVI.10](#): el programa GlobalHAB de la COI y el SCOR después de 2025;

Decisión [IPHAB-XVI.11](#): la elaboración de Soluciones HAB (HAB-S), como una propuesta de programa en el marco del Decenio del Océano de las Naciones Unidas.

4. Las recomendaciones formuladas a la Asamblea de la COI abordan lo siguiente: i) las actividades para el periodo entre reuniones en el marco del plan de trabajo y el presupuesto del Programa HAB de la COI para 2024-2025 (rec. [IPHAB-XVI-1](#)); y ii) la continuación del IPHAB con el mismo mandato (rec. [IPHAB-XVI-2](#)). Las recomendaciones se recogen en el proyecto de decisión IOC-32/3.4.3 que figura en el documento de decisión de la Asamblea (IOC-32/AP Prov.).

5. El Dr. Philipp Hess (Francia) fue elegido Presidente y la Dra. Maggie Broadwater (Estados Unidos de América) Vicepresidenta por aclamación por los miembros del Panel.



## **Рабочее резюме**

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1. Шестнадцатая сессия Межправительственной группы МОК-ФАО по вредоносному цветению водорослей (МГВЦВ-XVI) проходила в штаб-квартире ФАО в Риме с 27 по 29 марта 2023 г. В соответствии с резолюцией XVI-4 Ассамблеи МОК эта сессия МГВЦВ впервые после МГВЦВ-III в 1995 г. прошла с участием ФАО в качестве одного из соучредителей Группы.
2. Группа рассмотрела мероприятия, завершённые в межсессионный период, приняла к сведению достигнутый прогресс и пришла к выводу, что программа по ВЦВ способствует решению целого ряда задач Десятилетия Организации Объединённых Наций, посвященного науке об океане в интересах устойчивого развития (2021-2030 гг.). Группа также приняла к сведению в высшей степени удовлетворительное выполнение решений и рекомендаций 15-й сессии (март 2021 г.) в рамках имеющихся ресурсов. Основные результаты работы в межсессионном периоде (работа по некоторым направлениям еще идет) включают:
  - (i) результаты деятельности рабочей группы ИКЕС-МОК по динамике вредоносного цветения водорослей и рабочей группы ИКЕС-МОК-ИМО по балластной воде и другим переносчикам морских организмов на судах;
  - (ii) продолжение публикации «Информационного бюллетеня МОК о вредоносных водорослях»;
  - (iii) организацию трех международных учебных курсов и нескольких курсов на региональном и национальном уровнях;
  - (iv) продолжение развития региональных мероприятий в западной части Тихого океана (МОК/ВЕСТПАК/ВЦВ) и Карибском бассейне (МОК/МОКАРИБ/ВВКА), а также планы работы в Южной Америке (МОК/МГВЦВ/ФАНСА) и Северной Африке (МОК/МГВЦВ/ВВСА), несмотря на нехватку ресурсов;
  - (v) результаты работы секции ВЦВ СТОМН;
  - (vi) публикацию руководящих принципов ГлобалВЦВ по изучению влияния изменения климата на ВЦВ в серии [88](#) «Справочники и руководства МОК»;
  - (vii) совместную публикацию ФАО-МОК-МАГАТЭ «Техническое руководство по эксплуатации систем раннего оповещения о вредоносном цветении водорослей» в серии [690](#) Технических документов ФАО по рыболовству и аквакультуре;
  - (viii) продолжение компиляции данных на всех уровнях для Информационной системы МГВЦВ-МООД по вредоносным водорослям из баз данных ВЦВДАТ и ОБИС в качестве поставщиков высококачественной информации о событиях, связанных с ВЦВ, состоянии и тенденциях возникновения ВЦВ и оценке воздействия изменения климата, а также из базы данных по токсинам, связанной с классификационным справочным списком через Всемирный регистр морских видов (ВРМВ);
  - (ix) успехи, достигнутые в ходе реализации стратегии борьбы с сигуатерой;

- (x) работу в рамках совместной научной программы МОК-СКОР ГлобалВЦВ, в частности, семинары по усовершенствованному моделированию и автоматизированным наблюдениям *in situ*;
- (xi) возможности, которые открывает перед МГВЦВ Десятилетие океана ООН для поиска преобразующих научных решений проблемы ВЦВ в интересах устойчивого развития океана;
- (xii) мероприятия и партнерские связи Международного общества по изучению вредоносных водорослей (МОИВВ), направленные на популяризацию и содействия исследованиям и обучению в области ВЦВ.

3. Группа приняла 11 решений и представила две рекомендации для рассмотрения Ассамблеей МОК на ее 32-й сессии и Комитетом ФАО по рыбному хозяйству (КОФИ). Решения приводятся ниже:

Решение [IPHAB-XVI.1](#): разработка региональной программы по ВЦВ с учетом различий в поддержке различных групп и сетей в зависимости от статуса их отношений с региональными вспомогательными органами МОК;

Решение [IPHAB-XVI.2](#): продолжение работы целевой группы по раннему обнаружению, предупреждению и прогнозированию явлений ВЦВ с новым кругом ведения;

Решение [IPHAB-XVI.3](#): продолжение работы целевой группы по разработке Информационной системы по вредоносным водорослям и подготовке периодического Глобального доклада о положении дел с вредоносным цветением водорослей с новым кругом ведения;

Решение [IPHAB-XVI.4](#): продолжение работы целевой группы по глобальной стратегии борьбы с сигуатерой в целях повышения эффективности исследований и управления с обновленным кругом ведения;

Решение [IPHAB-XVI.5](#): продолжение работы целевой группы по вредоносным водорослям и опреснению морской воды с целью подготовки предложения по совместной оценке ФАО и ВОЗ уровня безопасности питьевой воды, поступающей с опреснительных установок;

Решение [IPHAB-XVI.6](#): продолжение работы целевой группы по мониторингу, управлению и регламентации в отношении биотоксинов с новым кругом ведения;

Решение [IPHAB-XVI.7](#): продолжение работы целевой группы по классификации водорослей с новым кругом ведения;

Решение [IPHAB-XVI.8](#): продолжение работы целевой группы по вызывающим гибель рыбы микроводорослям и последствиям для экосистемы с новым кругом ведения;

Решение [IPHAB-XVI.9](#): создание целевой группы по коммуникации в области ВЦВ;

Решение [IPHAB-XVI.10](#): ГлобалВЦВ МОК-СКОР после 2025 г;

Решение [IPHAB-XVI.11](#): предложение по программе для Десятилетия океана ООН – разработка решений по борьбе с ВЦВ (ВЦВ-Р).

4. Рекомендации Ассамблее МОК касаются: (i) плана работы с межсессионными мероприятиями и бюджета для программы МОК по ВЦВ на период 2024-2025 гг. (Рес. [IPHAB-XVI-1](#)) и (ii) продолжения деятельности МГВЦВ с тем же кругом ведения (Рес. [IPHAB-XVI-2](#)). Данные рекомендации отражены в проекте решения IOC-32/3.4.3, включенном в подготавливаемый для Ассамблеи МОК документ о принятых и предлагаемых мерах (IOC-32/AP Prov.)
5. Члены Группы путем аккламации избрали председателем д-ра Филиппа Хесса (Франция), а заместителем председателя – д-ра Мэгги Бродуотер (США).

**ADOPTED DECISIONS AND RECOMMENDATIONS**

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Code

Title

**Decisions**

Decision IPHAB-XVI.1	Regional HAB Programme Development
Decision IPHAB-XVI.2	Task Team on the Early Detection, Warning and Forecasting of Harmful Algal Events
Decision IPHAB-XVI.3	Task Team on the development of the Harmful Algal Information System (HAIS) and the Global HAB Status Report (GHSR).
Decision IPHAB-XVI.4	Task Team on a Global Ciguatera Strategy for Improved Research and Management
Decision IPHAB-XVI.5	Task Team on Harmful Algae and Desalination of Seawater
Decision IPHAB-XVI.6	Task Team on Biotoxin Monitoring, Management and Regulations
Decision IPHAB-XVI.7	Task Team on Algal Taxonomy
Decision IPHAB-XVI.8	Task Team on Fish Killing Microalgae and Ecosystem Effects
Decision IPHAB-XVI.9	Task Team on HAB Communication
Decision IPHAB-XVI.10	HABs in a Changing World: Global Approach to HAB Research to Meet Societal Needs
Decision IPHAB-XVI.11	HAB Solutions (HAB-S) an UN Ocean Decade Programme Proposal

**Recommendations**

Recommendation IPHAB-XVI.1	HABP Work Plan for 2024-2025
Recommendation IPHAB-XVI.2	Operation of the IOC Intergovernmental Panel on Harmful Algal Blooms

Decision IPHAB-XVI.1

**REGIONAL HAB PROGRAMME DEVELOPMENT**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** the priority of implementing and maintaining IOC programmes at the regional level,

**Noting with appreciation** the reports of the regional HAB activities within IOC/IOCARIBE-ANCA, IOC/WESTPAC-HAB, IOC/WESTPAC-Toxic Marine Organisms, FANSA, HANA and the ICES-IOC WGHABD,

**Acknowledging** that regional HAB groups and networks enhance collaboration on scientific and technical matters in support of Member State management and mitigation of harmful algal blooms and help to represent Member State priorities at IPHAB,

**Acknowledging also** the fundamental different dependence and financial support of FANSA and HANA in comparison to IOC/IOCARIBE-ANCA, IOC/WESTPAC-HAB, IOC/WESTPAC-TMO and the challenges faced by the regional HAB groups not affiliated to an IOC regional sub-commission,

**Recognizing** the diverse nature of HABs regionally, the knowledge gap, and the differences in capability and readiness to address the increasing impacts of HABs,

**Endorses** the proposed activities and priorities of the IPHAB regional groups and projects (IOC-FAO/IPHAB-XVI/Inf.2; IOC-FAO/IPHAB-XVI/Inf.2; IOC-FAO/IPHAB-XVI/Inf.6; IOC-FAO/IPHAB-XVI/Inf.7; IOC-FAO/IPHAB-XVI/Inf.8; IOC-FAO/IPHAB-XVI/Inf.9) for 2024–2025 subject to availability of funding;

**Supports** the establishment of new regional HAB groups or networks upon request;

**Encourages** the IOC HAB regional groups to continue to identify and prioritize initiatives that can be developed jointly and share knowledge with the aim of reducing inter-regional and intra-regional differences in their ability to respond to HAB-related threats;

**Encourages** all regional groups to address topics such as species identification and enumeration, marine toxins detections and quantification, systematic contribution of HAB event data to IODE/HAEDAT and OBIS through national and regional collaboration, early warning systems and outreach activities to stakeholders, other users and coastal communities' inhabitants;

**Requests** that the Project Leaders and Chairs of regional IOC HAB and related projects and groups maintain contact with IPHAB Chair and Vice-Chair and the Executive Secretariat of IPHAB and coordinate activities;

**Encourages** the regional groups and networks to address key challenges related to HABs in their work and initiatives on related to achieving the 2030 Agenda Goals;

**Urges** regional HAB groups to contact relevant regional organizations with a view to have their support;

**Urges further** Member State institutions to contribute resources to help implement the activities and priorities of the regional HAB groups and networks, in particular Member States of the South American, Caribbean and North African region, in order to sustain the FANSA and HANA regional groups for the benefit of the Member States and regional cooperation.





Decision IPHAB-XVI.2

**TASK TEAM ON THE EARLY DETECTION, WARNING  
AND FORECASTING OF HARMFUL ALGAL EVENTS**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XV.2 on a Task Team on the Early Detection, Warning and Forecasting of Harmful Algal Events,

**Being aware** of the increasing number of harmful algal events across a wide range of ecosystems, habitats and times of the year; noting that their impacts affect ecosystem services, human health and several areas of society,

**Recognizing** that novel technology for frequent, automated in situ observations of HAB species is available commercially and that high-resolution predictive models for HAB advections are being improved—the combination of new knowledge and technology is making HAB forecasting feasible when human expertise is used for evaluating results,

**Acknowledging** that there are existing guidelines for monitoring and management of HAB, and HAB impact observations,

**Acknowledging also** that there are existing programmes and databases on oceanographic parameters, and that there are some existing operational programmes derived from previous research projects,

**Noting** that few countries have an early warning system (EWS) for HABs implemented and that monitoring programs are primarily designed to meet local/national obligations of seafood safety regulations (protect public health, reduce economic disruptions and minimize ecosystem associated losses on fisheries due to HABs),

**Noting also** that there is no one-size-fits-all approach to EWS, regional adaptations are needed,

**Noting further** that stakeholders need high quality, live information (from in situ observational systems, satellite, models) readily available, to make timely and scientifically based decisions about managing and mitigating HAB impacts on coastal fishery/shellfish resources and aquaculture,

**Recalling** the requirement for mitigation of harmful events and avoidance of human illness stemming from HABs is related to environmental drivers that may be mitigated by having a predictive service,

**Decides**, with reference to the HAB Programme Plan, objective 6.3.2 (IOC/IPHAB-IX.3, Annex VII), to continue a Task Team on the Early Detection, Warning and Forecasting of HAB Events with the following terms of reference:

- (i) Serve as a strategic and advisory group for the establishment of guidelines, recommendations, and advancement of Early Warning Systems, ensuring the alignment with UN Ocean Decade challenges, objectives and actions,
- (ii) Interact with HAB working groups and committees (e.g. ICES -IOC/WGHABD, PICES, IOC/FANSA, IOC/HANA, IOCARIBE/ANCA, IOC/WESTPAC-HAB) in the development of regional EWS and in the standardization of alerts, harmonization of key messages and initiating sessions on near real time HAB Observing and Early Warning Systems at

forthcoming international and national science meetings (e.g. ISSHA, U.S HAB Symposium),

- (iii) Invite the scientific community and stakeholders, e.g. from the desalination industry, to contribute by identifying early warning research topics, assessment of capabilities, seeking for transformative solutions, promoting strategies for engagement, and communicating scientific information to policy makers, managers and other end-users,
- (iv) Promote the presence of HAB observations in the IOC Global Ocean Observing System and its regional components such as USA-IOOS and EuroGOOS, and the consolidation of integrated multi-hazard Early Warning Systems that employ scalable and affordable HAB technologies and methodologies for the continuous monitoring of coastal and ocean ecosystems;

**Decides also** that the Task Team will comprise A. Duarte Silva (Portugal) Chair, B. Karlson (Sweden), D. Clarke (WGHABD/Ireland), P. Mozetic (Slovenia), M. Broadwater (USA), C. McKenzie (Canada), D. Anderson (USA); L. Guzmán (Chile); J.L. Peña (Mexico); L.J. Naustvoll (Norway). The Task Team is supplemented by international advisors and experts Greg Doucette (USA), A. T. Yñiguez (Philippines), M. J. Botelho (Portugal) and M.Y. Dechraoui Bottein (Morocco) and may be expanded as required to fulfil the Terms of Reference;

**Urges** that the relevant Member State agencies support the implementation of EWS for HABs, through funding the system development and implementation, in order to reduce the economic, social and risk of human health impacts associated with sustainable production of safe seafood;

**Invites** IAEA and WHO to support the activities of the Task Team;

**Encourages** Member States to assist in providing funding for the development of early warning systems and for dissemination activities;

**Notes** that the Task Team will work until otherwise decided by the Panel, and that it will work by correspondence and/or meet on an opportunistic basis and provide a progress report to the Chair of IPHAB prior to IPHAB-XVII.

### Decision IPHAB-XVI.3

#### **TASK TEAM ON THE HARMFUL ALGAL INFORMATION SYSTEM (HAIS) AND THE GLOBAL HAB STATUS REPORT (GHSR)**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**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 IOC regional 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:

- (iv) 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,
- (v) 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,
- (vi) 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;
- (vii) 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,
- (viii) 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,

- (ix) 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,
- (x) 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.

#### Decision IPHAB-XVI.4

### **TASK TEAM ON A GLOBAL CIGUATERA STRATEGY FOR IMPROVED RESEARCH AND MANAGEMENT**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XV.4 on an IPHAB Task Team on a Global Inter-Agency Ciguatera Strategy for Improved Research and Management,

**Noting** the extensive human suffering from toxigenic benthic microalgae, e.g., *Gambierdiscus* induced ciguatera poisoning (CP) affecting 1 in every 4 persons in the Oceania region and half as many in the Caribbean; and responsible for repeated and severe cases in the Pacific and Indian Ocean regions and significant social and economic impacts, especially in tropical, small island developing states (SIDS),

**Noting also** the emergence of Ciguatera events in non-tropical areas,

**Noting further** the potential global increase in Ciguatera poisoning due to globalized seafood trade, coastal development and climate change,

**Noting** the significant global social and economic consequences of unrecognized, under-reported and unverified increases of Ciguatera,

**Noting also** the lack of Ciguatera toxin standards and absence of validated detection methods,

**Recognizing** the mandate and activities of IAEA and WHO in the area of marine biotoxins and seafood safety,

**Recalling** the 2017 memorandum of understanding (MoU) between UNESCO and WHO, explicitly referring to Ciguatera,

**Urging** the FAO, IOC of UNESCO and IAEA to complete the MoU on Ciguatera,

**Noting with appreciation** the synergy created through the implementation of Ciguatera-components in the international agencies IOC, IAEA, FAO and WHO towards the Global Ciguatera Strategy,

**Noting also with appreciation** the progress in developing the strategy and the engagement of the natural science, coastal management and public health communities in the Member States,

**Acknowledging** that some Member States, regional groups, e.g. IOC/WESTPAC, and international organizations, e.g. IAEA, WHO, PICES and EFSA have already supported the goals of the strategy through the support of Ciguatera related projects,

**Acknowledging also** the Joint FAO-WHO Report of the Expert Meeting on Ciguatera Poisoning,

**Acknowledging further** the recent publication of the joint FAO-IOC-IAEA Technical guidance for the implementation of early warning systems for harmful algal blooms,

**Decides** to continue the Task Team on a Global Inter-Agency Ciguatera Strategy for Improved Research and Management with the following terms of reference:

- (i) Interact with IOC, FAO, IAEA and WHO to pursue and strengthen the concertation of their respective actions in support of the Global Ciguatera Strategy,
- (ii) Pursue coordination activities to develop and strengthen synergies through the cooperation of currently funded efforts in support of the Ciguatera Strategy (other than international agencies),
- (iii) Evaluate the methods used for isolating and culturing benthic HAB organisms (bHABs). Convene a meeting of experts to establish protocols and a training course for the isolation and culturing of bHABs, with the aim of enhancing proficiency and representing the natural diversity present in the field. Additionally, provide financial support for conducting inter-laboratory exercises on bHAB collection techniques, standardizing methods, and facilitating trans-regional studies.
- (iv) Pursue communication activities (including Harmful Algal News) and update the existing IOC web page on ciguatera displaying the strategy (e.g. relevant links)
- (v) Interact with ICHA organizers to solicit presentations on ciguatera research and stimulate the convening of special ciguatera sessions at relevant medical, seafood safety and security, and other scientific meetings,
- (vi) Contribute to the HAB Solution (HAB-S) UN Decade of Ocean Science for Sustainable Development proposal to integrate the Ciguatera Strategy into integrated and co-developed mitigation solutions for reducing ciguatera poisoning,

**Urges** the relevant Member State agencies to provide financial support for the implementation of the strategy, including funding for the aforementioned activities, as well as for research and capacity building necessary to monitor Ciguatera-causing organisms, toxins, contaminated seafood, and conduct human health studies aimed at identifying and minimizing the risks associated with benthic HABs;

**Invites** scientific organisations, institutions and international bodies to:

- (i) consider supporting the further development of the scientific aspects and research priorities of the strategy; in particular to develop research toward establishing a solid link between algal toxins and fish toxicity in the Atlantic and Indian oceans for enhanced early surveillance and early warning of ciguatera; to prepare fish tissue reference material,
- (ii) provide the support needed for countries to maintain or further entries into the OBIS, HAEDAT and INFOSAN databases on worldwide occurrence reports of *Gambierdiscus/Fukuyoa* spp and ciguatera events,
- (iii) conduct method validation exercises as well as inter-laboratory exercises on benthic HAB collection methods,
- (iv) conduct <sup>2</sup>projects toward deriving acute reference doses for CTXs to support risk managers in defining guideline values for CTXs;

**Requests** that the FAO Secretariat make the CODEX Committee on Contaminants in Food (CCCF) and other relevant committees aware that IPHAB prioritizes efforts on Ciguatera;

**Decides also** that the Task Team will comprise M. Chinain (France/French Polynesia) as co-chair, P. Hess (France) as co-chair, Lafi S. Al Sulami (Saudi Arabia). The Task Team is supplemented by experts M.Y. Dechraoui Bottein (Morocco) co-chair, E. Núñez Vázquez (Mexico) and will be expanded, as required, to fulfill the terms of reference;

**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 on an opportunistic basis, and provide a progress report to the Chair of IPHAB prior to IPHAB-XVII.

#### Decision IPHAB-XVI.5

### **TASK TEAM ON HARMFUL ALGAE AND DESALINATION OF SEAWATER**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XV.5 on 'Harmful Algae and Desalination of Seawater',

**Noting** that more than 150 countries worldwide operate more than 20,000 desalination plants to produce drinking water from seawater, providing treated water for 300 million people, and that many of these countries are IOC Member States,

**Recognizing** that desalination capacity is forecast to continue to grow rapidly in the coming years as demand for fresh water grows,

**Noting** that the global urban population facing water scarcity is projected to potentially double from 930 million in 2016 to between 1.7 and 2.4 billion people, in 2050,

**Noting also** that in recent years, HABs have caused serious impacts at desalination plants [e.g. the cessation of operations due to clogging of filters, fouling of surfaces and membranes, taste and odour problems] and the concern that HAB-derived toxins could be present in the freshwater produced,

**Noting further** that the problems caused by HABs at desalination plants are expected to increase in the future as desalination capacity continues to grow worldwide, as will the extent and diversity of HAB problems,

**Recognizing** that there is a risk to public health, plant operations, interruptions in drinking water supplies, and negative impacts on water for agriculture or other such uses, there is considerable value in assembling information on gaps in scientific understanding and engineering challenges and in seeking a consensus on methodologies to reduce risks,

**Noting** that standard desalination methods decrease all known algal toxins to insignificant levels during normal operations, however on some conditions there can be algal toxins in the treated water, e.g. failure of membranes or/and high density HABs,

**Noting also** that research on this topic is limited and that the detailed guidance being requested by stakeholders in Member States is difficult to provide,

**Recalling** that a successful international conference co-sponsored by the IOC on HABs and Desalination was convened in Muscat, Oman in April 2014 with the participation of 130 delegates from 18 countries, and that [IOC Manuals and Guides, 78: Harmful Algal Blooms \(HABs\) and Desalination: A Guide to Impacts, Monitoring and Management](#) was published in 2017, with more than 3,000 copies provided to the international community,

**Decides** to continue the IPHAB Task Team on Harmful Algae and Desalination of Seawater to:

- (v) Assess and stimulate interest within the HAB and desalination communities for special HAB sessions or satellite workshops during regular international desalination conferences. The objective would be to:
  - a) Review the current state of knowledge on the impact of HABs on desalination plants and other facilities that utilize large volumes of seawater in commercial, agricultural, or industrial applications,
  - b) Highlight new ocean observing technologies as well as the engineering and operational strategies that are used, or could be used to detect, forecast, and mitigate the impact of HABs and other planktonic threats to desalination facilities,
  - c) Review current thinking of the trends in HAB occurrences as impacted by climate change and major anthropogenic factors,
- (vi) Formulate a proposal for a joint FAO WHO water safety risk assessment (or what available data allow) for toxins in drinking water coming from desalination plants, working closely with the appropriate FAO division, including on aspects of chronic, low-level toxicity,

- (vii) In the context of HABs being detrimental to water security (either to public health or to freshwater production procedures), seek cooperation with the FAO Land and Water Division for support to evaluate the increased needs for freshwater production through desalination for both secure drinking water and freshwater for agricultural use,
- (viii) In coordination with the IPHAB Task Team on Early Warning Systems for HABs, explore opportunities to work with the desalination industry and its academic partners to communicate and implement capabilities for HAB early warning systems through scientific presentations, workshops, pilot projects, or other joint activities,
- (ix) Engage with desalination plant operators, drinking water suppliers and authorities managing water supplies for agricultural uses on the potential impacts of HABs on the capacity for desalination to provide adequate freshwater supplies under a range of climate scenarios including increased periods of drought,
- (x) When appropriate, provide newsworthy articles on HABs and desalination for publication in *Harmful Algae News*,
- (xi) Invites WHO and ROPME to nominate a representative to participate in the Task Team,

**Decides also** that the Task Team will be comprised of D. Anderson (USA) chair, M. Wells (PICES), P. Hess (France), B. Karlson (Sweden), A. Bennouna (Morocco), E. Jamali, and H. Ali Saeed Bin Subaih Al Ali (United Arab Emirates). The Task Team is supplemented by expert M-Y Dechraoui Bottein (Morocco), and may be expanded as required to fulfill the terms of reference;

**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 on an opportunistic basis, and provide a progress report to the Chair of IPHAB prior to IPHAB-XVII.

#### Decision IPHAB-XVI.6

### **TASK TEAM ON BIOTOXIN MONITORING, MANAGEMENT AND REGULATIONS**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Resolution IPHAB-XV.6 on the IPHAB Task Team on Biotoxin Monitoring, Management and Regulations,

**Acknowledging** that biotoxins from harmful algae pose a serious threat to human health, food security, the seafood industry and the socio-economic wellbeing of coastal communities,

**Acknowledging** also the work of groups that address the scientific aspects of methodologies and legislations regarding contamination of seafood with HAB-derived toxins, and that these groups generate valuable scientific information that is used to recommend regional or national policies; some working groups have operated on an *ad hoc* basis [FAO/IOC/WHO expert consultation 2004/5; ECVAM/DG Sanco workshop 2005; EFSA risk evaluations 2006 – 2010], while others are standing working groups, in particular those for methodological development or policies [e.g., Asia Pacific Economic Cooperation (APEC), US-ISSC, EU National & European Union Reference Laboratories, CEN, AOAC Task Force on Marine & Freshwater Toxins, FAO-WHO Codex Committee on Contaminants and Joint Expert Committee on Food Additives and Contaminants], as well as the projects implemented by the IAEA on biotoxin detection and management,

**Noting** that there is a continued potential to improve the coordination and exchange of information among these groups,



**Noting also** that new discoveries of algal biotoxins and routes of exposure continue, bringing to light heretofore unknown risks,

**Noting further** that new and improved methodologies for detecting and monitoring the occurrence of HAB toxins in seawater and seafood tissue have recently been validated for some groups (STX, OA, AZA, YTX and PTX) and are being developed for a number of other toxin groups (TTX, CTX, Palytoxins, cyclic imines, marine and freshwater cyanobacterial toxins, etc.),

**Noting** that freshwater HABs have been increasing globally, and that there is increasing evidence that freshwater HABs may transfer to estuarine and brackish water bodies as well as to coastal areas; the transfer of freshwater cyanobacterial toxins to estuarine and coastal environments potentially poses problems to public health and problems to marine organisms; the public health problems require risk evaluation before management and monitoring can be implemented,

**Noting also** that emerging toxins (including tetrodotoxins) have recently been reported to accumulate in shellfish bivalve mollusk and gastropods, and that these toxins have a mode of action very similar to that of saxitoxins and may thus contribute to the overall paralytic toxin load of seafood,

**Noting further** the relevant economic impacts of HABs and an increasing need to mitigate these impacts, and notwithstanding early warning guidance developed by a separate task team, there is no concerted effort on remediation that encompasses also safeguarding, bloom destruction and detoxification of shellfish as ways of mitigating the impacts of HABs,

**Recalling** that IPHAB contributes to minimize HAB effects on sustainable safe seafood supply, human health, international trade in seafood and economic wellbeing,

**Decides** to continue with the Task Team on Biotoxin Monitoring Management and Regulation with the following terms of reference:

- (i) Establish and maintain regular contact with IAEA, WHO, and other regulatory or advisory bodies; follow-up on finalization of methodological annex of Codex standard 292-2008, in particular with reference to TEFs to clarify regulatory status of individual toxin analogs,
- (ii) Contribute to the development of a *Technical Guidance for the development and implementation of biotoxins monitoring and management* to complement other relevant documents such as the “Joint FAO-WHO Technical guidance for the development of the growing area aspects of bivalve mollusk sanitation programmes”, the “Joint FAO-WHO Report on ciguatera poisoning”, and the “Joint FAO/IOC/IAEA Technical guidance for the implementation of early warning systems for harmful algal blooms”, as identified by different stakeholders,
- (iii) Establish and maintain regular contact with relevant scientists and scientific organizations to ensure that the latest and most robust science is available to the Task Team in discharging its responsibilities,
- (iv) Establish contact with national, regional and global risk evaluation agencies to evaluate the risk of freshwater cyanobacterial toxins in seafood,
- (v) Advise other Task Teams on aspects of toxinology, including emerging toxins, as requested,
- (vi) Progress the development of the toxin database as a web-based tool for crosslinking knowledge on HAB organisms and toxins,

- (vii) Communicate and disseminate information on training workshops (e.g. through the website or *Harmful Algal News*) and participate, as requested, in the organization of training workshops for toxin detection, monitoring and management,
- (viii) Develop a concerted (inter-agency) effort and seek opportunities to get this effort funded on drafting guidance on mitigation (EWS, safeguarding shellfish during HAB-events, HAB-destruction and shellfish detoxification),
- (ix) Recommend to IPHAB-XVII on revised priorities for research, capacity development and engagement with regulatory bodies to address the most pressing issues and threats posed by HAB toxins in the marine environment;
- (x) Contribute to the HAB-S Ocean decade proposal to integrate toxin detection, management & regulations into integrated and co-developed mitigation solutions for reducing HAB impacts.

**Encourages** relevant organizations to invite the IPHAB Task Team to participate as observer at the principal meetings of their respective groups to facilitate international compatibility of applied methodology and legislation with respect to HAB toxins,

**Decides** that the Task Team will be comprised by P. Hess (France) chair, Beatriz Reguera (Spain), and M. Broadwater (USA). The task team is supplemented by external experts John Ramsdell (USA) co-chair, Elisabeth Hamelin (USA), Wade Huang (USA), Raphe Kudela (USA/GlobalHAB SSC); Zhihong Wang (USA); Ana Gago Martinez (ES); Maria João Botelho (Portugal); Hanna Mazur (Poland), Christopher O. Miles, (CA), Beth Mudge (CA), Fabienne Hervé (FR), Manoëlla Sibat (FR), Toshiyuki Suzuki, (JP), Naomasa Oshiro (JP), Gonzalo Álvarez Vergara (CL), Aifeng Li (CN), Arjen Gerssen (NL), Tim Harwood (NZ), Bernd Krock (DE), Aida Zuberovic Muratovic (SE), the Task Team will invite scientists to contribute on specific toxin groups; the Task Team maybe expanded as required to fulfil its Terms of Reference.

**Invites** IAEA and WHO to be members of the Task Team;

**Notes** that the Task Team is established until otherwise decided by the Panel and that it will work by correspondence and/or meet on an opportunistic basis, and provide a progress report for the inter-sessional period to the Chair of IPHAB prior to IPHAB-XVII.

#### Decision IPHAB-XVI.7

### **TASK TEAM ON ALGAL TAXONOMY**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XV.7 on the IPHAB Task Team on Algal Taxonomy,

**Recognizing** the pivotal role of taxonomy in scientific research, monitoring and management activities in the HAB programme,

**Acknowledging** that there are publications available on the taxonomy and identification of harmful algae, including those published by UNESCO IOC,

**Acknowledging also** the progress made by the Task Team in publishing and updating the IOC Taxonomic Reference List of Harmful Marine Microalgae as an integrated element of the World

Register of Marine Organisms (WoRMS) and the IOC/IODE Harmful Algal Information System (HAIS),

**Recalling** that the frequent change of taxonomic status of many harmful algae and the identification of new harmful species require continuous updating of the Reference List,

**Noting** that frequent taxonomic changes must be considered and incorporated into the work of ecologists, toxicologists, and those undertaking regulatory monitoring and those studying ecology and biodiversity by biomolecular approaches,

**Recalling also** the decisions of the previous sessions of the Panel regarding the Task Team on Algal Taxonomy,

**Decides**, with reference to the HAB Programme Plan, objective 6.2.2(ii) ([IOC/IPHAB-IX.3](#), Annex VII), to continue the Task Team on Algal Taxonomy with only slightly modified terms of reference as follows:

- (i) verify the Reference List and modify it as required, continuing the inclusion of toxic cyanobacteria,
- (ii) include morphological information of each species and the level of technique required to identify them, information on resting stages, and links to selected verified DNA sequences existing in GenBank obtained at or near the type locality,
- (iii) produce a grey list for species for which documentation for toxicity is lacking or doubtful,
- (iv) develop lists of a) harmful but non-toxic species causing damages or killing of marine fauna and b) harmful but non-toxic species producing high biomass blooms, mucilages, foams and discolorations with impacts on human activities in the coastal zone (e.g. tourism, fisheries, recreation, and desalination plants),
- (v) each year issue a summary in *Harmful Algae News* detailing the taxonomic changes to the Reference List,
- (vi) invite the scientific community to contribute to keeping the Reference List updated,
- (vii) work in coordination with the Task Team on Biotoxins Monitoring, Management and Regulations to intercalibrate and interlink the information on toxigenic species,
- (viii) suggest themes for round-table discussions and other activities at the International Conference on Harmful Algae (ICHA); give presentation(s) at the next ICHA conference detailing recent changes in the taxonomy of harmful algal species and in the information included in the Reference List,
- (ix) identify editors within or external to the Task Team who will be responsible for validating, completing and updating the Reference List, including descriptions and illustrations showing diagnostic features of each species,
- (x) convene online meetings with Reference List Editors, TT members and a representative from WoRMS approximately every third month have to discuss issues related to the List,
- (xi) contribute to the development of HAIS,

**Decides** that the Task Team will comprise N. Lundholm (Denmark) chair, M. Iwataki (Japan), A. Zingone (Italy), M. De Rijcke (Belgium), and Asmae Bennouna (Morocco). The Task Team may be supplemented by international advisors and experts and expanded as required to fulfill the terms of reference;

**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 on an opportunistic basis, and provide a progress report to the Chair of IPHAB prior to IPHAB-XVII.

Decision IPHAB-XVI.8

**TASK TEAM ON FISH KILLING MICROALGAE AND ECOSYSTEM EFFECTS**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Resolution IPHAB-XV.8 on the IPHAB Task Team on Harmful Algae and Fish Kills,

**Recalling** the related Term of Reference of the ICES-IOC Working Group on Harmful Algal Bloom Dynamics,

**Noting that:**

- (i) there is increasing concern about the impact of fish-killing algal blooms on socioeconomic interests, local coastal ecosystem disruption, and sustainability and security of seafood and living resources;
- (ii) global expansion of fisheries and fish aquaculture within coastal resource management strategies are particularly susceptible to the threat of fish-killing blooms and their consequences;
- (iii) fish-killing microalgal events are typically caused by high-biomass blooms of flagellates (less frequently by diatoms) of diverse phylogenetic and functional ecological groups;
- (iv) the proximal causative taxa of fish-killing events are usually identifiable to group, but many are subject to taxonomic and toxigenic uncertainties and difficulties in assignment at the species level;
- (v) some fish-killing algal blooms may cause mortalities due to well-characterized ichthyotoxins, but most events occur by less well-defined mechanisms affecting gill membrane integrity (e.g, mucus production, harmful and lytic allelochemicals, hydromechanical damage, etc.);
- (vi) fish-killing events coinciding with HABs may be influenced by multi-factorial environmental and anthropogenic stressors, disease and pathologies, and other biotic factors, which may synergistically contribute to sub-lethal fish morbidity and mortalities;
- (vii) there is only limited application and lack of standardization of current fish- or cell-based bioassay methods for assessing ichthyotoxicity;
- (viii) operational oceanographic systems for early warning and monitoring of fish-killing microalgal blooms are in development and testing at local fish-aquaculture sites but have not have been widely deployed or incorporated into monitoring strategies.

**Whereas** these HAB events are categorized as “fish-killing”, there are collateral impacts on other components of coastal marine ecosystems, including benthic invertebrates, macrophytes, plankton communities, and in certain cases higher levels (e.g., marine mammals) of food chains,

**Recognizing** that there has been inadequate consideration of fish-killing blooms and the associated socio-economic impacts outside the aquaculture and fisheries industry sector, and that the topic has not been systematically addressed within the scientific community on a global basis,

**Decides** to continue the Task Team on Fish Killing Microalgae and Ecosystem Effects, with the following modified terms of reference:

- (i) the Task Team will focus on:
  - a) the ecology, oceanography and bloom dynamics of fish-killing microalgae as they relate to wild fish and aquaculture operations, causing enhanced mortality and morbidity events;
  - b) the aetiology and specific mechanisms of fish morbidity and mortality;
  - c) the management and mitigation of fish-killing algal events;
  - d) a global synthesis of the status of fish-killing blooms leading to conceptual models and scenarios of expected shifts in biogeographical distribution, frequency, diversity and magnitude in response to climate change and anthropogenic stressors in coastal zones.
- (ii) support and assist in the coordination of relevant advanced technical workshops with ICES-IOC-PICES and WESTPAC to better define global understanding of the causes of fish kill events and operational approaches to development of early warning systems, and monitoring, forecasting and mitigation strategies, with focus on fish aquaculture in coastal zones;
- (iii) prepare a state-of-knowledge global White Paper on future research priorities and knowledge gaps to be addressed from a global viewpoint, followed by a peer-reviewed publication on climate change and anthropogenic factors affecting bloom dynamics and toxigenicity of fish-killing microalgae;
- (iv) pending acceptance of the defined global priorities in ToR ii and iii, prepare a comprehensive global synthesis publication with chapters focusing on processes and mechanisms, and including future perspectives on climate change effects, advanced technologies for EWS, monitoring and mitigation of fish-killing algal blooms and their effects;
- (v) complete a manuscript on fish-killing microalgae and causative mechanisms of fish mortalities in coastal north European waters for inclusion in a Special Issue of a peer-reviewed journal;
- (vi) provide assistance in coordination and reviews of Special Sessions on ichthyotoxins and fish-killing algal blooms for the ICHA 2023 Conference and other relevant international meetings;

- (vii) submit periodic Task Team contributions on special fish-killing bloom and events highlights to *Harmful Algae News* and other scientific and public interest newsletters and networking forums;
- (viii) coordinate with and upon request support the IOC/WESTPAC-HAB activity on causative mechanisms of fish kills, including those in relation to harmful substances in the environment, including multiple stressors and cyanobacterial toxin effects on fish health;
- (ix) promote comparative studies of HABs causing fish mortalities in coordination with GlobalHAB, e.g., by comparing bloom dynamics and forcing factors of blooms and ecosystem effects of blooms in different geographical regions;
- (x) develop a long-term broad-scale strategy for implementation by resource managers and the aquaculture and fisheries industries in affected countries with focus on development and application of mitigation strategies;
- (xi) coordinate with the IPHAB Task Team on Biotxin Monitoring, Management and Regulations on defining ichthyotoxins for the IOC Toxins List, GlobalHAB endorsed activities on HABs and Fish Farms, and the ICES-IOC WGHABD by reporting on environmental multi-stressor and fish health issues within the relevant ToR on fish-killing algal blooms;
- (xii) assist in the development of objectives and challenges for fish-killing algal issues with focus on implementation of early warning and forecasting systems, and mitigation strategies for the IPHAB initiative for the UN Decade of Ocean Science for Sustainable Development.

**Decides also** that the Task Team will be comprised by Allan Cembella (Germany) co-chair, Kazumi Wakita (IOC/WESTPAC-HAB) co-chair, M. Iwataki (Japan), L. Guzmán (Chile), P. Hess (France), B. Karlson (Sweden), P.T. Lim (Malaysia, GlobalHAB-SSC), C. McKenzie (Canada), L.-J. Naustvoll (Norway), M. Wells (PICES). The Task Team is supplemented by international advisors and experts A. Yñiguez (Philippines), E. García-Mendoza (Mexico), G. Hallegraeff (Australia), H. Hégaret (France), and J. Mardones (Chile), and may be further expanded as required to fulfil the Terms of Reference.

**Notes** that the Task Team will continue its work until otherwise decided by the Panel and that it will work by correspondence, strategic sessions at international conferences, symposia and workshops, video-networking, and provide a progress report to the Chair of IPHAB prior to IPHAB-XVII.

#### Decision IPHAB-XVI.9

### **TASK TEAM ON HAB COMMUNICATION**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** that the IOC newsletter *Harmful Algae News* (HAN) has been published regularly since 1992 and that it is currently distributed/announced to about 5.500 recipients,

**Recognizing** the role of HAN as a media for sharing HAB event news, information of events in the HAB science and management community and its role as newsletter for the International Society for Harmful Algae Studies (ISSHA) and the IOC-SCOR GlobalHAB Programme,

**Acknowledging** that HAN captures and communicates news and HAB events that are not be recorded in the peer reviewed literature,

**Recalling** that an editorial board with regional editors for HAN exists: Caribbean: Ernesto Mancera; Atlantic Europe: Maud Lemoine; Mediterranean Sea: Adriana Zingone; India: K.B. Padmakumar; Western Pacific: Chu Pin Leaw and Kazumi Wakita; North Africa: Hamid Taleb; North America: Patricia Tester and Cynthia McKenzie; South America: Patricio Díaz and and Luiz Mafra; South Pacific: Mireille Chinain; and Lesley Rhodes Lesley,

**Decides**, with reference to the HAB Programme Plan, objective 6.1.1 ([IOC/IPHAB-IX.3](#), Annex VII), to establish a Task Team on HAB Communication with terms of reference:

- (i) act as the editorial board for HAN,
- (ii) be alert to HAB events around the world that could become news items for the HAN,
- (iii) contact relevant experts in their field and invite them to prepare feature articles,
- (iv) solicit FAO and IOC secretariats for programme news for each issue.
- (v) regional editors are expected to actively follow up on HAB events e.g. appearing in the media in their respective regions and find the appropriate person to write an article for HAN or alternatively write it themselves on basis of collated information and references;
- (vi) coordinate reporting on ICHA Conferences (Highlights) and other biannual activities occurring during the International Conferences;
- (vii) identify new ways (communities, list-servers, social media) to announce and disseminate HAN at global, regional and national level and provide such information to the IOC and FAO secretariats;
- (viii) advise the IOC and FAO secretariats on their HAB website scientific contents,
- (ix) in their capacity as HAN Editors-in-chief the Task Team Co-chairs will:
  - a) receive articles/announcements/meeting reports and acknowledge receipt as soon as are received,
  - b) decide if submissions are suitable for HAN and acceptable as submitted or if there is a need for improved quality of images, reduced number of figures, and guide the author to HAN format requirements,
  - c) prepare the table of content, organize the compiled material by topics and provide the lay-out service provider a numbered list of files,
  - d) check the mounted draft, annotating redistribution of figures, including to fill the empty spaces,
  - e) proofread final draft,
  - f) prepare the table of abbreviated titles for the front page and the full table of contents to be sent for assigning a DOI.

**Decides** that the Task Team will comprise B. Reguera (Spain) co-Chair, E. Bresnan (UK), co-Chair, the Chair of the GlobalHAB Scientific Steering Committee, the chairs of each IPHAB Task Team, Chairs of the IOC Regional HAB groups (IOCARIBE/ANCA, FANSA, HANA, IOC/WESTPAC-HAB,

ICES-IOC WGHABD, and ICES-IOC-IMO WGBOSV, a representative of the ISSHA Council, and the IOC and FAO secretariat. The Task Team may be expanded as required to fulfill the terms of reference;

**Notes** that the Task Team will work until otherwise decided by the Panel and that it will work by correspondence and/or meet on an opportunistic basis, and provide a progress report to the Chair of IPHAB prior to IPHAB-XVII.

Decision IPHAB-XVI.10

**HABS IN A CHANGING WORLD: GLOBAL APPROACH  
TO HAB RESEARCH TO MEET SOCIETAL NEEDS**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Referring** to the joint IOC-SCOR international science programme on Harmful Algal Blooms (GlobalHAB) as established through IOC Decision IOC-XXVII/Dec.5.4.2, and the associated GlobalHAB Science Plan and Implementation Plan,

**Noting** that GlobalHAB provides a unique ability to address underlying scientific questions and concerns related to harmful algae and their science-based management,

**Noting also** the achievements and ongoing activities of GlobalHAB detailed in the GlobalHAB report series and the contributions made to the scientific literature,

**Noting further** that GlobalHAB provides an interface between IOC, SCOR and other international coordinating organizations for research and science such as IOCCG, ICES, PICES,

**Noting** that within the current joint framework of IOC and SCOR, GlobalHAB is expected to synthesize its current activities by the end of 2025,

**Recognizing** that to fully realize the benefits of the accumulated investments in GlobalHAB and to continue to have an international programme focusing the HAB research agenda, it is desirable to revisit and revise the HAB research priorities for the time beyond 2025,

**Requests** the IOC-SCOR GlobalHAB Scientific Steering Committee to:

- (i) review the GlobalHAB Science and Implementation Plan with a view to present to IPHAB-XVII what it recommends as the main elements of an international HAB research programme after 2025 focusing on understanding HABs in the context of global sustainability;
- (ii) assess the ideal organization of and partnerships for such an international research programme after 2025;
- (iii) recommend to IPHAB-XVII whether an international HAB research programme after 2025 should be as a continuation under the name GlobalHAB or under a new name.



Decision IPHAB-XVI.11

**HAB SOLUTIONS (HAB-S) AN UN OCEAN DECADE PROGRAMME PROPOSAL**

The IOC-FAO Intergovernmental Panel on Harmful Algal Blooms,

**Referring** to United Nations Decade of Ocean science for Sustainable Development 2021–2030,

**Recalling** that Harmful Algal Blooms (HABs) increasingly impacts coastal ecosystem services such as fish and shellfish aquaculture, desalination, tourism and fisheries on local and regional scales,

**Recognizing** the demand for novel and transformational science-based solutions for sustainable management and use of marine resources and ecosystem services affected by harmful algae in a changing world,

**Referring** to the demands for improved data resources, innovative observing instrumentation, and sound knowledge for decision-making to manage and mitigate HAB impacts in order to sustainably provide safe seafood, drinking water and healthy environments for professional and leisure use of coastal and marine ecosystems, as identified by IPHAB Task Teams and formulated by Task Team Chairs, GlobalHAB SSC and WGHABD chairs at a workshop held May 2022 in Elsinore, Denmark,

**Noting** that a Decade action addressing these demands would contribute significantly to UN Ocean Decade Outcomes:

- (i) Outcome 3: A productive ocean supporting sustainable food supply and a sustainable ocean economy
- (ii) Outcome 4: A predicted ocean where society understands and can respond to changing ocean conditions.
- (iii) Outcome 6: An accessible ocean with open and equitable access to data, information, technology and innovation.

**Decides** to lead or co-lead the development and implementation of a co-designed UN Ocean Decade programme, the HAB Solutions Programme (HAB-S), to deliver solutions to sustainably provide safe seafood, drinking water and ensure healthy coastal socio-ecosystems;

**Recommends** that co-developed regionally balanced HAB-S actions should serve the needs of regulators to develop policies on ecosystem management, focusing on ecosystem health and biodiversity:

- (i) Mitigate HAB impacts on society, coastal and marine ecosystems;
- (ii) Improve ecosystem observation through the development of transformational instrumentation and approaches;
- (iii) Provide data solutions including innovative database management and data integration through an interactive portal that meets user needs;
- (iv) Improve HAB literacy.

Recommendation IPHAB-XVI.1

**HARMFUL ALGAL BLOOM PROGRAMME WORK PLAN FOR 2024–2025**

The IOC FAO Intergovernmental Panel on Harmful Algal Blooms,

**Referring** to the deliberations of its Sixteenth Session and the priorities identified prior to the session by IOC/IOCARIBE/ANCA, IOC/IPHAB/FANSA, IOC/IPHAB/HANA, and IOC/WESTPAC/HAB;

**Endorses** the implementation of the Work Plan for the IOC Harmful Algal Bloom Programme as presented in Annex to this Recommendation within the resources available;

**Urges** Members of the Panel and the IOC and FAO Secretariat to help identify the required resources.

Recommendation IPHAB-XVI.2

**OPERATION OF THE IOC-FAO INTERGOVERNMENTAL PANEL  
ON HARMFUL ALGAL BLOOMS**

The IOC FAO Intergovernmental Panel on Harmful Algal Blooms,

**Recommends** that the IOC FAO Intergovernmental Panel on Harmful Algal Blooms continue until otherwise decided by the IOC and FAO. The Terms of Reference should remain unchanged.

**Annex to Recommendation IPHAB-XVI.1**

## IOC HAB PROGRAMME WORKPLAN 2024–2025

***(Main activities and funding identified as of 29 March 2023 only)***

SCCHA = IOC Science and Communication Centre on Harmful Algae; HQ = IOC-UNESCO Headquarters Paris

ACTIVITY:	ORGANIZER/ RESPONSIBLE	TARGET GROUP/ Region:	WHERE:	WHEN:	FUNDING IDENTIFIED in USD x 1000 IOC HAB Ex Bud		FUNDING REQUIRED TOTAL (cash and in-kind): <i>In USD x 1000</i>	AUTHORITY & REMARKS
<b>OPERATION &amp; SERVICES</b>								
IOC SCCHA & HAB Programme Office <i>Incl. the activities and services in this workplan implemented by the Centre and required to justify a decentralised PO.</i>	IOC/H.Enevoldsen	Global	Copenhag en	2024- 2025	0	100 Denmark in kind and individual projects		IPHAB-XVI
HAB Programme Staff		Global	IOC or FAO	2024- 2025	0	Not identified	110	IPHAB-XVI
<b>PUBLICATIONS</b>								
Harmful Algae News	B. Reguera (Spain), E. Bresnan (UK) Editors	Global	HQ / SCCHA	2024- 2025	0	5 in kind via Univ Cph. T.b.c.	5	IPHAB-XVI
Scientific Summary for Policy Makers on HABs and Climate Change. With GlobalHAB	With SCOR	Global	SCCHA	2024	1	3 GlobalHA B	6	IPHAB-XV
<b>TRAVEL</b>								
IOC Staff	H. Enevoldsen/ Yun Sun	-		2024- 2025	5	0	12	IPHAB-XVI
Chair/vide-chair IPHAB	Philipp Hess/ Maggie Broadwater	-		2022- 2023	0	4 (Member State)	4	IPHAB-XVI

<b>SCIENTIFIC ELEMENTS</b>								
GlobalHAB Scientific Steering Committee	IOC and SCOR	Global	-	2024-2025	10	To be identified	50	IPHAB-XVI and SCOR
ICES-IOC WGHABD	D. Clarke (Ireland)	North Atlantic	T.b.c.	Yearly	0	0		IPHAB-XVI
ICES/IOC/IMO WGBOSV	O. Outinen (Finland)	Global	t.b.d.	Yearly	0	0		IPHAB-XVI
Project on Early Warning Systems for HAB in Africa	IPHAB Task Team Chair A. Silva (Portugal)	Africa	t.b.d.	2024-25	0	30	270	IPHAB-XVI
Harmful Algal Information System development incl. Global HAB Status Report	HABP-IODE	Global	-	2024-2025	10	To be identified	200	IPHAB-XVI IODE-XXVII
<b>REGIONAL GROUPS</b>								
Regional Working Group on Harmful Algal Blooms in South America (IOC FANSA)	A. Martinez (Uruguay)	S-America	t.b.d.	2024-2025	0	0	10	IPHAB-XVI
Regional Working Group on Harmful Algal Blooms in the Caribbean (IOC ANCA)	E. Mancera (Colombia)	Caribbean	t.b.d.	2024-2025	0	0	10	IOCARIBE and IPHAB-XVI
Regional HAB Project in the Western Pacific: WESTPAC-HAB & WESTPAC-TMO	K. Wakita(Japan)/ Po Teen Lim (Malaysia); D.V. Ha (Vietnam)	Western Pacific	t.b.d.	2024-2025	IOC/W ESTPA C Budget	Japan		IOC/WESTPA C
Regional Working Group on Harmful Algal Blooms in North Africa (IOC HANA)	A. Ismael (Egypt), A. Bennoua (Morocco)	North Africa	t.b.d.	2024-2025	0	0	15	IPHAB-XVI
Regional Working Group on Harmful Algal Blooms in Africa (IOCARICA/HAB)	t.b.d.	t.b.d.	t.b.d.	2024-2025	0	0	15	IOCAFRICA-IV
<b>CAPACITY ENHANCEMENT</b>								
IOC Training Course on Identification and Qualification in Harmful Marine Microalgae	SCCHA	Global	University of Copenhagen, Denmark	2024 and 2025	0	Danish partners and cost recovery		IPHAB-XVI

International Phytoplankton Intercalibration (IPI)	University of Las Palmas Gran Canarias (Spain) – IOC SCCHA	Global	University of Las Palmas Gran Canarias (Spain) and Univ. of Copenhagen	2024 and 2025	0	partners and cost recovery		IPHAB-XVI
13 <sup>th</sup> Advanced Phytoplankton Course	APC Steering Group	Global	Naples, Italy.	2024	0	Grants to be sought	40, if grants are to be provided	IPHAB-XVI
Regional Training Courses on HAB	To be decided	ANCA, FANSA, HANA, IOCAFRIC A/HAB	t.b.d.	2024-25	0	0	100	IPHAB-XVI
Totals					27	34	847	

**Expected/Requested funding (2024–2025): US\$ 26,000 from IOC Regular Programme (42 C/5)**  
**(xi) Identified cash funding (2024–2025): US\$ 0 from extra-budgetary resources**

**US\$ ~285,000 to be identified cash from extra-budgetary resources and/or in-kind for full implementation.**