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Cultural Organization



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Oceanographic  
Commission

**INTERGOVERNMENTAL OCEANOGRAPHIC COMMISSION**  
(of UNESCO)

**FIFTEENTH SESSION OF THE IOC INTERGOVERNMENTAL PANEL  
ON HARMFUL ALGAL BLOOMS**  
23–25 March 2021 (online)

**EXECUTIVE SUMMARY**

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.

The Assembly session will be invited to consider this Executive Summary. For more detailed information on this session, please refer to [http://hab.ioc-unesco.org/index.php?option=com\\_oe&task=viewDoclistRecord&doclistID=226](http://hab.ioc-unesco.org/index.php?option=com_oe&task=viewDoclistRecord&doclistID=226). The decisions and recommendations adopted by the Intergovernmental Panel are annexed to this document in English only.

## ***Executive Summary***

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1. The Fifteenth session of the Intergovernmental Panel on Harmful Algal Blooms (IPHAB-XV) was held on-line on 23–25 March 2021.
2. The Panel reviewed the actions completed during the intersessional period, noted the progress made, notably in addressing several Challenges of the UN Decade of Ocean Science for Sustainable Development 2021–2030. Progress includes: the continued broad engagement of the science and management community in IPHAB activities; the strengthening of collaboration between IOC HAB groups to share knowledge, guidance and capacity building; progress on early warning systems to be implemented and the relevant contribution that autonomous observing systems and molecular-based approaches are bringing to HAB knowledge and partly to the definition of mitigation strategies and effectiveness. The Panel concluded that the decisions and recommendations of the Fourteenth session (April 2019) had been implemented highly satisfactorily within the available resources. The major achievements reported, some still in progress, 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 updates on the continued publication of the IOC *Harmful Algae News*;
  - (iii) the implementation of four training courses;
  - (iv) the growing development of the regional activities in Western Pacific (IOC/WESTPAC/HAB); the Caribbean (IOC/IOCARIBE/ANCA), South America (IOC/IPHAB/FANSA) and North Africa (IOC/IPHAB/HANA);
  - (v) the advances of the PICES HAB-Section;
  - (vi) the progress in development of the GlobalHAB publication “Guidelines for the study of climate change effects on HABS”;
  - (vii) the development of a Technical Guidance Document for the Development of Early Warning Systems for Marine Harmful Algal Bloom Events to be published, as a joint publication of FAO, IOC-UNESCO and IAEA, as a FAO Fisheries and Aquaculture Technical Paper;
  - (viii) the completion of the Global HAB Status Report and overviews on 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;
  - (ix) the advances achieved by the joint interagency strategy for Ciguatera, namely in testing and standards development and availability and the publication of FAO-WHO Expert Meeting Report on Ciguatera;
  - (x) the developments under the joint IOC-SCOR GlobalHAB science programme such as the assessment of economic impacts of HABS in collaboration with NOWPAP, PICES and NOAA;
  - (xi) the opportunities the UN Decade on Ocean Science for Sustainable Development brings to IPHAB for transformative science solutions for sustainable development of the ocean regarding HAB; 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 took eight decisions and endorsed two recommendations for the consideration of the Assembly at its Thirty-first Session. The decisions concern:

- (i) 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-XV.1](#)]
- (ii) the continuation of the Task Team on the Early Detection, Warning and Forecasting of HAB Events; with new terms of reference; [[Decision IPHAB-XV.2](#)]
- (iii) 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-XV.3](#)]
- (iv) the continuation of the Task Team on a Global Inter-Agency Ciguatera Strategy for Improved Research and Management with new terms of reference; [[Decision IPHAB-XV.4](#)]
- (v) the continuation of the Task Team on Harmful Algae and Desalination of Seawater to assess and explore the feasibility of a joint FAO-IOC food safety risk assessment (or what available data allow) for toxins in drinking water coming from desalination plants; [[Decision IPHAB-XV.5](#)]
- (vi) the continuation of the Task Team on Biotoxin Monitoring, Management and Regulations with new terms of reference; [[Decision IPHAB-XV.6](#)]
- (vii) the continuation of the Task Team on Algal Taxonomy with new terms of reference; [[Decision IPHAB-XV.7](#)]
- (viii) the continuation of the Task Team on Harmful Algae and Fish Kills with new terms of reference and renamed to Task Team on Fish Killing Microalgae and Ecosystem Effects. [[Decision IPHAB-XV.8](#)]

4. The Recommendations to the IOC Assembly encompass: (i) the planned intersessional activities into a workplan and budget for the IOC HAB Programme 2022–2023 [[Recommendation IPHAB-XV.1](#)]; and (ii) the continuation of IPHAB with unchanged terms of reference [[Recommendation IPHAB-XV.2](#)].

5. Dr Joe Silke (Ireland) was re-elected as Chairperson and Dr Alexandra Silva (Portugal) was re-elected as Vice-Chairperson.

## ***Résumé exécutif***

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1. La quinzième session du Groupe intergouvernemental chargé d'étudier les efflorescences algales nuisibles (IPHAB-XV) s'est tenue en ligne du 23 au 25 mars 2021.
2. Le Groupe a passé en revue les activités menées au cours de la période intersessions et a pris note des progrès accomplis, notamment pour relever plusieurs défis de la Décennie des Nations Unies pour les sciences océaniques au service du développement durable 2021-2030. Ces progrès comprennent : l'engagement continu de la communauté scientifique et de gestion dans les activités de l'IPHAB ; le renforcement de la collaboration entre les groupes chargés des efflorescences algales nuisibles au sein de la COI pour partager les connaissances, les orientations et le renforcement des capacités ; les progrès réalisés en matière de systèmes d'alerte rapide à mettre en œuvre et la contribution pertinente apportée par les systèmes d'observation autonomes et des approches fondées sur les molécules à la connaissance des efflorescences algales nuisibles et, en partie, à la définition des stratégies de mitigation et de leur efficacité. Le Groupe a conclu que les décisions et recommandations de la quatorzième session (avril 2019) ont été mises en œuvre de manière très satisfaisante compte tenu des ressources disponibles. Parmi les principales réalisations mentionnées, dont certaines sont toujours en cours, figurent notamment :
  - (i) les résultats du groupe de travail CIEM-COI sur la dynamique des efflorescences algales nuisibles et du Groupe de travail CIEM-COI-OMI sur les eaux de ballast et autres vecteurs à bord des navires ;
  - (ii) les mises à jour sur la poursuite de la publication du bulletin *Harmful Algae News* de la COI ;
  - (iii) l'organisation de quatre cours de formation ;
  - (iv) le développement croissant des activités régionales dans le Pacifique occidental (COI/WESTPAC/HAB), dans les Caraïbes (COI/IOCARIBE/ANCA), en Amérique du Sud (COI/IPHAB/FANSA) et en Afrique du Nord (COI/IPHAB/HANA) ;
  - (v) les avancées de la section PICES HAB ;
  - (vi) l'avancement de la publication GlobalHAB « Guidelines for the study of climate change effects on HABs » ;
  - (vii) l'élaboration d'un document d'orientation technique pour la mise au point de systèmes d'alerte rapide en cas de prolifération d'algues nuisibles en milieu marin, qui sera publié conjointement par la FAO, la COI-UNESCO et l'AIEA, sous la forme d'un document technique de la FAO sur les pêches et l'aquaculture ;
  - (viii) l'achèvement du Rapport mondial sur la situation des HAB et les aperçus du Système d'information IPHAB-IODE sur les algues nuisibles avec les bases de données HAEDAT et OBIS en tant que fournisseurs d'informations de haute qualité sur les événements liés aux efflorescences algales nuisibles, l'état et les tendances de l'apparition des efflorescences algales nuisibles et l'évaluation des impacts du changement climatique ;
  - (ix) les progrès réalisés par la stratégie interinstitutions sur la ciguatera, à savoir l'élaboration et la disponibilité de tests et de normes et la publication du rapport de la réunion d'experts FAO-OMS sur la ciguatera ;

- (x) les progrès réalisés dans le cadre du Programme scientifique conjoint COI-SCOR sur les efflorescences algales nuisibles (GlobalHAB), tels que l'évaluation des impacts économiques des efflorescences algales nuisibles, en collaboration avec le Plan d'action du Pacifique Nord-Ouest, l'Organisation des sciences de la mer pour le Pacifique Nord (PICES) et la NOAA ;
- (xi) les possibilités fournies par la Décennie des Nations unies pour les sciences océaniques au service du développement durable à l'IPHAB en matière de solutions scientifiques transformatrices pour le développement durable de l'océan en ce qui concerne les efflorescences algales nuisibles ; et
- (xii) le développement des activités et des partenariats menés par la Société internationale pour l'étude des algues nuisibles (ISSHA) pour promouvoir et favoriser la recherche et la formation sur les HAB.

3. Le Groupe a pris huit décisions et approuvé deux recommandations qui seront soumises à l'examen de l'Assemblée lors de sa 31<sup>e</sup> session. Les décisions portent sur :

- (i) le développement du Programme HAB à l'échelon régional 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-XV.1](#)]
- (ii) 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-XV.2](#)]
- (iii) le maintien, avec un nouveau mandat, de l'Équipe spéciale chargée de l'élaboration du système d'information sur les algues nuisibles et d'un rapport mondial périodique sur la situation des efflorescences algales nuisibles ; [[décision IPHAB-XV.3](#)]
- (iv) le maintien, avec un nouveau mandat, de l'Équipe spéciale pour une stratégie interinstitutions visant à améliorer la recherche et la gestion relatives à la ciguatera ; [[décision IPHAB-XV.4](#)]
- (v) le maintien, avec un nouveau mandat, de l'Équipe spéciale sur les algues nuisibles et la désalinisation de l'eau de mer afin d'évaluer et d'explorer la faisabilité d'une évaluation conjointe FAO-COI des risques pour la sécurité alimentaire (ou ce que les données disponibles permettent) pour les toxines présentes dans l'eau potable provenant des usines de désalinisation ; [[décision IPHAB-XV.5](#)]
- (vi) le maintien, avec un nouveau mandat, de l'Équipe spéciale sur la surveillance et la gestion des biotoxines, et les réglementations qui leur sont applicables ; [[décision IPHAB-XV.6](#)]
- (vii) le maintien, avec un nouveau mandat, de l'Équipe spéciale sur la taxinomie des algues ; [[décision IPHAB-XV.7](#)]
- (viii) le maintien, avec un mandat identique, de l'Équipe spéciale sur les algues nuisibles et la mort des poissons et Équipe spéciale sur les microalgues responsables de la mort de poissons et leurs effets sur l'écosystème. [[décision IPHAB-XV.8](#)]

4. Les recommandations à l'Assemblée de la COI se rapportent : (i) aux 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 2022-2023 [[recommandation IPHAB-XV.1](#)] et (ii) au maintien de l'IPHAB, doté du même mandat [[recommandation IPHAB-XV.2](#)].

5. Le Dr Joe Silke (Irlande) a été réélu Président et le Dr Alexandra Silva (Portugal) a été réélue Vice-Présidente.

## ***Resumen dispositivo***

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1. La decimoquinta reunión del Panel Intergubernamental sobre Floraciones de Algas Nocivas (IPHAB-XV) se celebró en línea del 23 al 25 de marzo de 2021.
2. El Panel revisó las acciones completadas durante el período entre reuniones, tomó nota de los progresos realizados, en particular en el tratamiento de varios desafíos del Decenio de las Naciones Unidas de las Ciencias Oceánicas para el Desarrollo Sostenible 2021-2030. Los avances incluyen: la continua y amplia participación de la comunidad científica y de gestión en las actividades del IPHAB; el fortalecimiento de la colaboración entre los grupos de FAN de la COI para compartir conocimientos, orientaciones y desarrollar de capacidades; los progresos en los sistemas de alerta temprana que se van a poner en marcha y la relevante contribución que los sistemas de observación autónomos y los enfoques basados en la molécula están aportando al conocimiento de las FAN y, en parte, a la definición de las estrategias de mitigación y a la eficacia. El Panel concluyó que las decisiones y recomendaciones de la decimocuarta reunión (abril de 2019) se habían aplicado de forma muy satisfactoria con los recursos disponibles. Entre los principales logros que se han comunicado, algunos aún en curso, se encuentran:
  - (i) los resultados del grupo de trabajo CIEM-COI sobre las dinámicas de las floraciones de algas nocivas y del grupo de trabajo CIEM-COI-OMI sobre el lastre y otros vectores de los buques;
  - (ii) las actualizaciones en la publicación continua de las *Noticias de Algas Nocivas* de la COI;
  - (iii) la puesta en marcha de cuatro cursos de formación;
  - (iv) el creciente desarrollo de las actividades regionales en el Pacífico Occidental (IOC/WESTPAC/HAB); el Caribe (IOC/IOCARIBE/ANCA), América del Sur (IOC/IPHAB/FANSA) y África del Norte (IOC/IPHAB/HANA);
  - (v) los avances de la sección FAN de la PICES;
  - (vi) los avances en la elaboración de la publicación de GlobalHAB "Directrices para el estudio de los efectos del cambio climático en las FAN";
  - (vii) la elaboración de un documento técnico de orientación para el desarrollo de sistemas de alerta temprana para fenómenos de floraciones de algas nocivas que se publicará, como una publicación conjunta de la FAO, la COI-UNESCO y el OIEA, como un documento técnico de pesca y acuicultura de la FAO;
  - (viii) la finalización del Informe Mundial sobre la Situación de las FAN y las reseñas sobre el Sistema de Información sobre Algas Nocivas IPHAB-IODE con las bases de datos HAEDAT y OBIS como proveedores de información de alta calidad sobre los fenómenos de FAN, la situación y las tendencias de la aparición de FAN y la evaluación de los impactos del cambio climático;
  - (ix) los avances logrados por la estrategia interinstitucional conjunta para la ciguatera, concretamente en la elaboración y disponibilidad de pruebas y normas y la publicación del informe de la reunión de expertos FAO-OMS sobre la ciguatera;
  - (x) los avances en el marco del programa científico mixto COI-SCOR GlobalHAB, como la evaluación de las repercusiones económicas de las floraciones de algas nocivas en colaboración con NOWPAP, PICES y NOAA;

- (xi) las oportunidades que el Decenio de las Naciones Unidas de las Ciencias Oceánicas para el Desarrollo Sostenible ofrece al IPHAB para lograr soluciones científicas transformadoras para el desarrollo sostenible de los océanos en relación con las floraciones de algas nocivas; y
- (xii) el desarrollo de actividades y asociaciones llevadas a cabo por la Sociedad Internacional para el Estudio de las Algas Nocivas (ISSHA) para promover y fomentar la investigación y la formación sobre las FAN.

3. El Panel tomó ocho decisiones y aprobó dos recomendaciones para que la Asamblea las examinara en su 31.<sup>a</sup> reunión. Las decisiones se refieren a:

- (i) Desarrollo de programas regionales FAV teniendo en cuenta la diferencia de apoyo a los distintos grupos y redes según estén o no afiliados a un órgano subsidiario regional de la COI; [[Decisión IPHAB-XV.1](#)]
- (ii) la continuación del equipo de trabajo sobre la detección temprana, la alerta y la previsión de fenómenos de FAN; con un nuevo mandato; [[Decisión IPHAB-XV.2](#)]
- (iii) la continuación del equipo de trabajo sobre el desarrollo del sistema de información sobre algas nocivas y un informe periódico sobre la situación mundial de las floraciones de algas nocivas con un nuevo mandato [[Decisión IPHAB-XV.3](#)]
- (iv) la continuación del equipo de trabajo sobre una estrategia mundial interinstitucional contra la ciguatera para mejorar la investigación y la gestión con un nuevo mandato [[Decisión IPHAB-XV.4](#)]
- (v) la continuación del equipo de trabajo sobre algas nocivas y desalinización del agua de mar para evaluar y estudiar la viabilidad de una evaluación conjunta FAO-COI (o lo que permitan los datos disponibles) de los riesgos para la seguridad alimentaria de las toxinas en el agua potable procedente de las plantas de desalinización; [[Decisión IPHAB-XV.5](#)]
- (vi) la continuación del equipo de trabajo sobre vigilancia, gestión y reglamentos relativos a las biotoxinas con un nuevo mandato [[Decisión IPHAB-XV.6](#)]
- (vii) la continuación del equipo de trabajo sobre taxonomía de las algas con un nuevo mandato [[Decisión IPHAB-XV.7](#)]
- (viii) la continuación del equipo de trabajo sobre algas nocivas y muerte de peces con un nuevo mandato y rebautizado como equipo de trabajo sobre microalgas destructoras de peces y efectos en los ecosistemas. [[Decisión IPHAB-XV.8](#)]

4. Las recomendaciones a la Asamblea de la COI abarcan: (i) las actividades previstas entre reuniones en un plan de trabajo y un presupuesto para el programa FAV de la COI 2022-2023 [[Recomendación IPHAB-XV.1](#)]; y (ii) la continuación del IPHAB con un mandato sin cambios [[Recomendación IPHAB-XV.2](#)].

5. El Dr. Joe Silke (Irlanda) fue reelegido como Presidente y la Dra. Alexandra Silva (Portugal) fue reelegida como Vicepresidenta.



**Рабочее резюме**

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1. Пятнадцатая сессия Межправительственной группы по вредоносному цветению водорослей (IPHAB-XV) состоялась 23–25 марта 2021 года в режиме онлайн.
  
2. Группа рассмотрела деятельность, завершённую в межсессионный период, отметила достигнутый прогресс, в частности, в выполнении нескольких приоритетных задач Десятилетия ООН, посвященного науке об океане в интересах устойчивого развития (2021–2030 гг.). Прогресс выражается в следующем: продолжающееся широкое участие научного и управленческого сообщества в деятельности МГВЦВ; укрепление сотрудничества между группами МОК по ВЦВ для обмена знаниями, руководства и развития потенциала; прогресс в области систем раннего предупреждения, которые должны быть внедрены, соответствующий вклад автономных систем наблюдения и молекулярных подходов в расширение знаний о ВЦВ и частично в определение стратегий смягчения последствий и повышения эффективности. Группа пришла к выводу, что решения и рекомендации четырнадцатой сессии (апрель 2019 года) были выполнены весьма удовлетворительно в рамках имеющихся ресурсов. Среди основных достижений, о которых сообщалось и некоторые из которых все еще находятся в процессе осуществления, можно назвать:
  - (i) результаты деятельности Рабочей группы МСИМ и МОК по динамике вредоносного цветения водорослей и Рабочей группы МСИМ, МОК и ИМО по балластной воде и другим переносчикам морских организмов на судах;
  - (ii) обновленную информацию о непрерывной публикации *Информационного бюллетеня МОК о вредоносных водорослях*;
  - (iii) проведение четырех учебных курсов;
  - (iv) расширение региональной деятельности в западной части Тихого океана (МОК/ВЕСТПАК/ВЦВ), Карибском бассейне (МОК/МОКАРИБ/АНКА), Южной Америке (МОК/МГВЦВ/ФАНСА) и Северной Африке (МОК/МГВЦВ/ВВСА);
  - (v) достижения Секции ВЦВ СТОМН;
  - (vi) прогресс в разработке публикации GlobalPHAB «Руководство по изучению влияния изменения климата на ВЦВ»;
  - (vii) разработку Технического руководящего документа по созданию систем раннего предупреждения о вредоносном цветении водорослей в море, который будет опубликован совместно ФАО, МОК-ЮНЕСКО и МАГАТЭ в качестве технического документа ФАО по рыбному промыслу и аквакультуре;
  - (viii) завершение работы над Глобальным докладом о состоянии ВЦВ и обзор информационной системы МГВЦВ-МООД по вредоносному цветению водорослей с базами данных БДВЦВ и ОБИС в качестве поставщиков высококачественной информации о ВЦВ, состоянии и тенденциях возникновения ВЦВ и оценке воздействия изменения климата;
  - (ix) успехи, достигнутые в рамках совместной межведомственной стратегии по сигуатере, а именно в области тестирования и разработки стандартов и их доступности, а также публикация доклада совещания экспертов ФАО/ВОЗ по сигуатере;

- (x) разработки в рамках совместной научной программы МОК и СКОР GlobalPHAB, такие как оценка экономического воздействия ВЦВ в сотрудничестве с НОВПАП, СТОМН и НОАА;
- (xi) возможности, которые открывает перед МГВЦВ Десятилетие ООН, посвященное науке об океане в интересах устойчивого развития, в том, что касается новаторских научных решений для устойчивого развития океана в связи с ВЦВ;
- (xii) развитие деятельности и партнерских отношений, осуществляемое Международным обществом по изучению вредоносных водорослей (МОИВВ) для продвижения и содействия исследованиям и обучению по ВЦВ.

3. Группа приняла восемь решений и одобрила две рекомендации, которые будут представлены на рассмотрение Ассамблеей на ее тридцать первой сессии. Решения касаются:

- (i) разработки региональной программы ВЦВ с учетом различий в поддержке различных групп и сетей в зависимости от их связи с региональным вспомогательным органом МОК [[Решение IPHAB-XV.1](#)];
- (ii) продолжения деятельности Целевой группы по раннему обнаружению, предупреждению и прогнозированию случаев ВЦВ с новым кругом ведения [[Решение IPHAB-XV.2](#)];
- (iii) продолжения деятельности Целевой группы по разработке информационной системы о вредоносном цветении водорослей и периодического Глобального доклада о состоянии вредоносного цветения водорослей с новым кругом ведения [[Решение IPHAB-XV.3](#)];
- (iv) продолжения деятельности Целевой группы по разработке глобальной межучрежденческой стратегии в отношении сигуатеры в целях повышения эффективности исследований и управления с новым кругом ведения [[Решение МГВЦВ-XV.4](#)];
- (v) продолжения деятельности Целевой группы по вредоносным водорослям и опреснению морской воды для оценки и изучения целесообразности совместной оценки риска для пищевой безопасности ФОО и МОК (или того, что позволяют имеющиеся данные) в отношении токсинов в питьевой воде, поступающей с опреснительных установок [[Решение IPHAB-XV.5](#)];
- (vi) продолжения деятельности Целевой группы по мониторингу, управлению и регулированию биотоксинов с новым кругом ведения [[Решение IPHAB-XV.6](#)];
- (vii) продолжения деятельности Целевой группы по таксономии водорослей с новым кругом ведения [[Решение IPHAB-XV.7](#)];
- (viii) продолжения деятельности Целевой группы по вредоносным водорослям и гибели рыбы с новым кругом ведения, переименованной в Целевую группу по микроводорослям, вызывающим гибель рыбы, и последствиям для экосистемы [[Решение IPHAB-XV.8](#)].

4. Рекомендации Ассамблее МОК охватывают (i) запланированную межсессионную деятельность в рамках плана работы и бюджета для Программы МОК по ВЦВ на 2022–2023

гг. [\[Рекомендация ІРНАВ-ХV.1\]](#) и (ii) продолжение деятельности МГВЦВ с неизменным кругом ведения [\[Рекомендация ІРНАВ-ХV.2\]](#).

5. Д-р Джо Силке (Ирландия) был переизбран на пост Председателя, а д-р Александра Сильва (Португалия) — на пост заместителя Председателя.

## ANNEX

### Decision IPHAB-XV-1

#### REGIONAL HAB PROGRAMME DEVELOPMENT

The IOC 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 the ICES-IOC WGHABD and the ICES-IOC-IMO WGBOSV,

**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, IOCAFRICA/HAB, 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 HAB 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/IPHAB-XV/Inf.2](#); [IOC/IPHAB-XV/Inf.6](#); [IOC/IPHAB-XV/Inf.13](#); [IOC/IPHAB-XV/Inf.16](#)) for 2022–2023 subject to availability of funding;

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

**Encourages** the IOC HAB regional groups to identify and prioritize initiatives that can be developed jointly and exchange expertise aiming at reducing the inter- and intra-regional differences in their responsiveness 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** that the Project Leaders and Chairs of regional IOC HAB and related projects and groups identify succinct challenges, objectives and actions with respect to the respective regions that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges with a view to formulate or participate in Ocean Decade initiatives;

**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** 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 Latin American 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-XV.2

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XIV-1 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,

**Acknowledging** the support of the FAO to the Task Team in the intersessional period and the initiation of the work to develop technical guidance on early warning systems for HABs,

**Noting** that few countries have an 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** that there is no one-size-fits-all approach to EWS, regional adaptations are needed,

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

**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 establish 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,

- (ii) Initiating sessions on near real time HAB Observing and Early Warning Systems at forthcoming international and national science meetings such as the ISSHA International Conference on Harmful Algae, the ICES Annual Science Conference, US HAB Symposium and other relevant opportunities,
- (iii) Invite the scientific community and stakeholders to contribute by identifying early warning research topics, 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,
- (v) 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 and harmonization of key messages,
- (vi) Work with the desalination industry and its academic partners to communicate capabilities for HAB EWS through scientific presentations, workshops or other activities. These systems could include in-situ HAB sensors as well as models, forecasts and remote sensing of blooms,
- (vii) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives,

**Decides** that the Task Team will comprise A. Duarte Silva (Portugal) Chair, B. Karlson (Sweden), J. Silke (Ireland), P. Mozetic (Slovenia), M. Broadwater (USA), C. McKenzie (Canada), D. Anderson (USA), L. Guzmán (Chile), J.L. Peña (Mexico), and L.J. Naustvoll (Norway). The Task Team is supplemented by international advisors and experts 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 seafood sustainability;

**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-XVI.

Decision IPHAB-XV.3

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

The IOC 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 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 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 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:

- (i) Advise the IOC secretariat/IODE Project Office and HAIS partners on requirements for HAIS adjustments, quality control and web site edits;
- (ii) Advise and encourage regional groups and editors on data compilation and submission of HAB data to OBIS/HABMAP and HAEDAT;
- (iii) Review a user guide (drafted by the IOC secretariat) for data submission to HAEDAT;

- (iv) Advise on and stimulate the use of HAIS data and data products and act proactively if GHSR/HAIS conclusions or data are misinterpreted or incorrectly referred to;
- (v) Advise and assist in the development of a webinar on the GHSR and HAIS;
- (vi) Compile and assess feedback on the first edition of the GHSR and its components with a view to ultimately advise on a second edition of the GHSR;
- (vii) Engage with working groups, groups of experts within and outside IOC (including IOC IGMETS, IOC Trends-PO, ICES WGPME, the marine sites of the International network on Long Term Ecological Research (I-LTER), EMODNET-Biology, and ICES-IOC WGHABD), and individual scientists to identify time series of phytoplankton data including information on HAB species;
- (viii) Investigate with the IOC-SCOR GlobalHAB programme possibilities of organizing initiatives (such as workshops, interactive data analysis, courses) on HAB time series analysis in the context of environmental variability;
- (ix) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives,

**Decides** also that the Task Team is chaired by Eileen Bresnan (UK) and comprises A. Zingone (Italy), 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 IOC Secretariat, and provide a progress report for the intersessional period to the Chairs of IPHAB and IODE prior to IPHAB-XVI and IODE-XXVI and XXVII.

#### Decision IPHAB-XV.4.

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XIV.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 and other seafood poisoning due to globalized seafood trade, coastal development and climate change,

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

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

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

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

**Noting with appreciation** the preparation of an MoU specifically on Ciguatera, to be signed by the FAO, IAEA, IOC UNESCO, and WHO and the approval of the draft by FAO, IOC UNESCO, and WHO,

**Urging** the IAEA to complete their current evaluation of the MoU on Ciguatera,

**Noting with appreciation** the progress in developing a coordinated IOC-IAEA-FAO-WHO Global Ciguatera Strategy and the confirmation through the MoU of the IAEA, FAO and WHO to participate and assist in the implementation of such a strategy,

**Noting 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. FAO, IAEA and WHO have already supported the goals of the strategy through the support of Ciguatera related projects,

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

**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 FAO, IAEA and WHO for the implementation of the MoU on the inter-agency Global Ciguatera Strategy;
- (ii) Organize an international expert meeting to prioritize sub-tasks of each element of the strategy, where one output of this meeting should be a position paper on a prioritized action plan and a plan to secure funding; this will be conducted in consultation with the FAO, IAEA, IOC UNESCO, WHO and national or international bodies or scientific organizations; as part of this expert workshop also explore the feasibility to develop a technical guidance document on food safety/security and ciguatera risk management, in cooperation with GlobalHAB and the RAMOGE Agreement, including the outcome of the IAEA Technical Cooperation Workshop, April 2018 in Monaco;

- (iii) Regularly update an on-line database of ongoing projects to check whether the prioritized list of urgent requirements is being pursued through these projects and follow up on the project progress;
- (iv) Pursue communication activities and seek funding for a website displaying the strategy, the above mentioned project database and relevant links on the IOC web page on ciguatera;
- (v) Pursue coordination activities to develop and strengthen synergies through the cooperation of currently funded efforts in support of the Strategy;
- (vi) 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;
- (vii) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives;

**Urges** that the relevant Member State agencies to support the implementation of the strategy through funding to implement the above activities and for needed research and development of the capacity to monitor for Ciguatera-causing organisms, toxins, contaminated seafood and for human health studies to identify and reduce the risk 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 to 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 projects toward deriving acute reference dose for CTXs to support risk managers in defining guideline values for CTXs;

**Requests** that the IOC Secretariat and Member States 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 continue to be co-chaired by M. Chinain (France/French Polynesia), M-Y. Dechraoui Bottein (Morocco) and P. Hess (France), and comprises E. Núñez Vázquez (Mexico), L.A.I Solami (Saudi Arabia) and as specified in the Strategy. The Task Team is supplemented by international advisors and experts M-Y. Dechraoui Bottein (Morocco), M. João Botelho (Portugal) 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-XVI.

Decision IPHAB-XV.5

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XIV.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 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** also 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 and interruptions in drinking water supplies, 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** further 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:

- (i) Assess and explore the feasibility of a joint FAO-IOC food safety risk assessment (or what available data allow) for toxins in drinking water coming from desalination plants;
- (ii) 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 or other activities;

- (iii) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives;

**Decides** also that the Task Team will be chaired by D. Anderson (USA), and comprising M. Wells (PICES) and P. Hess (France). The Task Team is supplemented by international advisors and experts M-Y Dechraoui Bottein (Morocco), and may be expanded as required to fulfill the terms of reference;

**Invites** FAO to co-sponsor the Task Team;

**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-XVI.

#### Decision IPHAB-XV.6

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Resolution IPHAB-XIII.6 on the IPHAB Task Team on Biotxin 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 & Community Reference Laboratories, CEN, AOAC, 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 regulated toxin groups and are being developed for a number of other emerging toxin groups such as e.g. cyanobacterial toxins,

**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 bivalve mollusks 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** the results of a workshop on the economic impacts of HABs and an increasing need to mitigate the impacts of HABs, and that while early warning guidance is being developed in 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 FAO, 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 toxicity equivalency factors (TEF) to clarify regulatory status of individual toxin analogs;
- (ii) Establish and maintain regular contact with leading scientists and scientific organizations to ensure that the latest and most robust science is available to the Task Team in discharging its responsibilities;
- (iii) Establish contact with national, regional and global risk evaluation agencies to evaluate the risk of freshwater cyanobacterial toxins in seafood;
- (iv) Advise other IPHAB Task Teams on aspects of toxinology, including emerging toxins;
- (v) Communicate and disseminate information on training workshops and participate (as requested) in the organization of training workshops for toxin detection, monitoring and management;
- (vi) Continue development on the IOC/IODE database of algal toxins which will also serve other Task Teams as a web-based tool for crosslinking knowledge on HAB organisms and toxins;
- (vii) 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);
- (viii) Report to IPHAB-XVI on international activities in marine biotoxin monitoring, management and regulation during the inter-sessional period;
- (ix) Recommend to IPHAB-XVI 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) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-

line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives;

**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 chaired by P. Hess (France) and comprising Beatriz Reguera (Spain); M. Broadwater (USA) and T. Suzuki, (Japan). The Task Team is supplemented by international advisors and experts J. Ramsdell (USA); M. Burford (Australia); A. Gago, (EURL/ES); M. João Botelho (Portugal); E. Hamelin (USA), W. Huang (USA), R. Kudela (USA); H. Mazur (Poland); C. O. Miles, (Canada); Gonzalo Alvarez Vergara (Chili) and may be expanded as required to fulfill its Terms of Reference;

**Invites** FAO, 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-XVI.

#### Decision IPHAB-XV.7

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Decision IPHAB-XIV.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** 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 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,

**Recalling** 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 unchanged terms of reference:

- (i) Verify the Reference List and suggest modifications;

- (ii) Each year issue a summary in *Harmful Algae News* detailing the taxonomic changes to the Reference List;
- (iii) Invite the scientific community to contribute to keeping the Reference List updated,
- (iv) Continue the work to include toxic cyanobacteria, including freshwater cyanobacteria,
- (v) Include information on cysts;
- (vi) Include (where possible) references to selected validated sequences in GenBank obtained at or near the type locality;
- (vii) Include a note on the level of technique required to identify each species;
- (viii) Work in coordination with the Task Team on Biotoxins Monitoring, Management and Regulations to prepare a summary of data [e.g. number of species known to produce each toxin, current taxonomic problems];
- (ix) Interact in the development of the Harmful Algal Information System;
- (x) Suggest themes for round-table discussions and other activities at the International Conference on Harmful Algae (ICHA); give presentation(s) at each ICHA conference, detailing recent changes in the taxonomy of harmful algal species;
- (xi) Identify editors within or external to the Task Team who will be responsible for validating, completing and updating the Reference List, including illustrations showing diagnostic features of each species, and reference or links to such illustrations;
- (xii) Organize a meeting of Reference List editors to discuss issues related to the List and working on the List with guidance from WoRMS;
- (xiii) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives;

**Decides** that the Task Team will comprise Ø. Moestrup (Denmark) Chair, M. Iwataki (Japan), A. Zingone (Italy), L.N Nguyen (Vietnam). The Task Team is supplemented by international advisors and experts K. Matsuoka (Japan) and N. Lundholm (Denmark), 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-XVI.

#### Decision IPHAB-XV.8

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Recalling** Resolution IPHAB-XIV.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) most fish-killing microalgal events are caused by massive blooms of flagellates (particularly of dinoflagellates, raphidophytes, haptophytes and dictyochophytes);
- (iv) the proximal causative organisms of fish-killing events are usually identifiable to group, but many are subject to taxonomic uncertainties and difficulties in assignment at the species level;
- (v) fish-killing algal blooms may cause mortalities due to well-characterized ichthyotoxins, as well by less well defined mechanisms affecting gill membrane integrity (mucus production, harmful allelochemicals, hydromechanical damage, etc.), which may synergistically contribute to fish morbidity and mortalities;
- (vi) operational oceanographic systems for early warning and monitoring of fish-killing microalgal blooms are in development and testing at local sites but have not have been widely deployed;
- (vii) there is only limited application and lack of standardization of current fish- or cell-based bioassay methods for assessing ichthyotoxicity.

**Whereas** these 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 even higher levels of marine food chains (e.g. marine mammals).

The Task Team focuses on these major issues: a) the ecology, oceanography and bloom dynamics of fish-killing microalgae as they relate to fish mortality 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.

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

**Noting** that the ICES-IOC Working Group on Harmful Algal Bloom Dynamics has completed its status report on fish-killing algal events in the ICES region as part of the Term of Reference on fish-killing algae during the IPHAB intersession,

**Noting** with appreciation that the IOC-SCOR GlobalHAB SSC and IOC/WESTPAC have endorsed and supported international scientific symposia and a training workshop with participation from local stakeholders and industry in the intersession,

**Decides** to continue the IPHAB-XIV Task Team on Harmful Algae and Fish Kills as the Task Team on Fish Killing Microalgae and Ecosystem Effects, with the following terms of reference:

- (i) 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;

- (ii) Prepare a state-of-knowledge white paper on research priorities and knowledge gaps to be addressed from a global viewpoint based upon the symposium recommendations (Puerto Varas, Chile 2019)
- (iii) Based upon the defined global priorities considered and the themes defined for the symposium noted in ii) prepare a comprehensive global synthesis publication (e.g., UNESCO Monographs/IOC Manual and Guides series), with chapters focusing on processes and mechanisms, and including future perspectives on climate change effects and advanced technologies for monitoring and mitigation of fish-killing algal blooms and their effects;
- (iv) Complete a manuscript on fish killing microalgae and causative mechanisms of fish mortalities in coastal north European waters for inclusion in a peer reviewed journal;
- (v) Provide assistance in coordination and reviews of special sessions on ichthyotoxins and fish-killing algal blooms for the ICHA 2021 Conference and other relevant international meetings;
- (vi) 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;
- (vii) 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;
- (viii) Report to IPHAB-XVI with the objective to 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;
- (ix) In 6 months develop a succinct list of challenges, objectives and actions with respect to the Task Team topic that will address the UN Decade of Ocean Science for Sustainable Development objectives and challenges and to present these at an IPHAB intersessional on-line consultation September 2021 with a view to formulate an IPHAB strategic framework for the Ocean Decade initiatives;

**Decides** also that the Task Team will be composed of A. Cembella (Germany) (Co-Chair), K. Wakita (IOC/WESTPAC-HAB) (Co-Chair), with members P. Hess (France), L. Guzman (Chile), Po Teen Lim (Malaysia), M. Iwataki (Japan), L.-J. Naustvoll (Norway), B. Karlson (Sweden), C. McKenzie (Canada) and M. Wells (PICES). The Task Team is supplemented by international advisors and experts (G. Hallegraeff (Australia), H. Hégaret (France), J. Mardones (Chile); E. Garcia-Mendoza (Mexico), 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 and/or meet on an opportunistic basis and provide a progress report to the Chair of IPHAB prior to IPHAB-XVI.

Recommendation IPHAB-XV.1

**HARMFUL ALGAL BLOOM PROGRAMME WORKPLAN 2022–2023**

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Referring** to the deliberations of its Fifteenth Session and the priorities identified prior to the session by IOC/IOCAFRICA/HAB, 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 1](#) to this Recommendation within the resources available;

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

Recommendation IPHAB-XV.2

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

The IOC Intergovernmental Panel on Harmful Algal Blooms,

**Noting** the interest of FAO to investigate the possibility of returning as a cosponsor of IPHAB as set out in IOC Assembly Resolution XVI-4,

**Recommends** that the IOC Intergovernmental Panel on Harmful Algal Blooms continue until otherwise decided by the IOC. The Terms of Reference (Resolution XVI-4, 1991) should remain unchanged.

**Annex 1** to Recommendation IPHAB-XV.2

IOC HAB PROGRAMME WORKPLAN 2022–2023

**(Main activities and funding identified as of 25 March 2021 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		FUNDING REQUIRED TOTAL (cash and in- kind): In USD x 1000	AUTHORITY & REMARKS
					IOC HAB	Ex Bud		
<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	Copenhagen	2022- 2023	0	100 Denmark in kind and individual projects		IPHAB-XV
IOC HAB website renewal		Global	IOC	2022	0	Not identified	10	IPHAB-XV
<b>PUBLICATIONS</b>								
Harmful Algae News	B. Reguerra (Spain), E. Bresnan (UK) Editors	Global	HQ / SCCHA	2022- 2023	0	5 in kind via Univ Cph. T.b.c.	5	IPHAB-XV
Scientific Summary for Policy Makers on HABs and Climate Change. With GlobalHAB	With SCOR	Global	SCCHA	2022	1	3 GlobalHAB	6	IPHAB-XV



ACTIVITY:	ORGANIZER/ RESPONSIBLE	TARGET GROUP/ Region:	WHERE:	WHEN:	FUNDING IDENTIFIED in USD x 1000		FUNDING REQUIRED TOTAL (cash and in- kind): <i>In USD x 1000</i>	AUTHORITY & REMARKS
					IOC HAB	Ex Bud		
Regional Working Group on Harmful Algal Blooms in South America (IOC FANSA)	S. Mendez (Uruguay)	S-America	t.b.d.	2022–2023	0	0	10	IPHAB-XV
Regional Working Group on Harmful Algal Blooms in the Caribbean (IOC ANCA)	E. Mancerra (Colombia)	Caribbean	t.b.d.	2022–2023	0	0	10	IOCARIBE and IPHAB-XV
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.	2022–2023	IOC/W ESTPA C Budget	Japan		IOC/WESTPAC
Regional Working Group on Harmful Algal Blooms in North Africa (IOC HANA)	A. Ismael (Egypt), A. Hamsa (Tunisia)	North Africa	t.b.d.	2022–2023	0	0	15	IPHAB-XV
Regional Working Group on Harmful Algal Blooms in Africa (IOCARICA/HAB)	t.b.d.	t.b.d.	t.b.d.	2022–2023	0	0	15	IOCAFRICA-III/ IPHAB-XV
<b>CAPACITY ENHANCEMENT</b>								
IOC Training Course on Identification and Qualification in Harmful Marine Microalgae	SCCHA	Global	University of Copenhage n, Denmark	2022 and 2023	0	Danish partners and cost recovery		IPHAB-XV

ACTIVITY:	ORGANIZER/ RESPONSIBLE	TARGET GROUP/ Region:	WHERE:	WHEN:	FUNDING IDENTIFIED in USD x 1000		FUNDING REQUIRED TOTAL (cash and in- kind): <i>In USD x 1000</i>	AUTHORITY & REMARKS
					IOC HAB	Ex Bud		
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	2022 and 2023	0	partners and cost recovery		IPHAB-XV
13 <sup>th</sup> Advanced Phytoplankton Course	APC Steering Group	Global	Naples, Italy.	2022/23	0	Grants to be sought	25, if grants are to be provided	IPHAB-XV
Regional Training Courses on HAB	To be decided	ANCA, FANSA, HANA, IOCAFRICA/HAB	t.b.d.	2022–23	0	0	100	IPHAB-XV
Totals					27	119	431	

**Expected/Requested funding (2022-2023): US\$ 27,000 from IOC Regular Programme (41/C5)**

**Identified cash funding (2022-2023): US\$ 119,000 from extra-budgetary resources.**

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