

## Working Group on Harmful Algal Bloom Dynamics (WGHABD)

**2014/MA2/SSGEPD02** The Working Group on Harmful Algal Bloom Dynamics (WGHABD), chaired by Eileen Bresnan\*, UK, will work on ToRs and generate deliverables as listed in the Table below.

	MEETING DATES	VENUE	REPORTING DETAILS	COMMENTS (CHANGE IN CHAIR, ETC.)
Year 2015	13–17 April	Lisbon, Portugal	Interim report by 15 June to SSGEPD	
Year 2016	19–22 April	Brest, France	Interim report by 10 June to SSGEPD	
Year 2017			Final report by DATE to SSGEPD, SCICOM	

## ToR descriptors

ToR	Description	Background	Science Plan topics addressed	Duration	Expected Deliverables
A	Deliver National Reports on harmful algal events and bloom dynamics for the years 2014, 2015, 2016	HAB events may affect the human activities and marine ecosystems at different levels. Understanding can best be achieved by integrating multiyear data sets.	ICES Strategic Plan, Goal No. 1, and 2.	Year 1,2,3	Contribute with reports to HAEDAT
B	Finalise a review document quantifying the scale, nature and extent of the problems associated with fish killing algae in the ICES region	The WG identified a need for a detailed assessment of the scale of the problem and the identification of key knowledge gaps.	ICES Strategic Plan, Goal No. 1, and 2.	Year 1	Review paper
C	A one day Harmful Algal Event Data Workshop as part of the 2015 WGHABD Meeting (with intersessional work performed by delegates prior to WG meeting).	With participation from data base experts with experience in data input, export and analysis, formulating data for entry in HAEDAT, assist in bringing reports up to data and perform systematic QC of older data sets.	ICES Strategic Plan, Goal No. 1, and 2.	Year 1	Review of HAEDAT functionality; enhanced data set in HAEDAT; contribute to the development of a Global Harmful Algal Bloom Status Report by having standardized data analysis products. Summary of progress in Harmful Algal News.
D	Review the methodology used for the collection of phytoplankton samples in harmful phytoplankton monitoring programmes and the abundances used as threshold levels in harmful	Sample collection is a critical component of monitoring programmes with methodology and factors such as water depth potentially regionally variable. There is a lack of	ICES Strategic Plan, Goal No. 1, and 2.	Year 1 and 2	Section in WGHABD report. Potentially also a review publication.

	phytoplankton monitoring programmes	<p>information about how country to country differences vary in this approach or how methods vary from other standards (e.g. OSPAR ect).</p> <p>Many HAB monitoring programmes are designed to provide an early warning of HAB species and in some instances threshold levels (abundance of a particular species) are used to take further action. Threshold levels vary between region and in some instances were established historically. The use of threshold levels will be reviewed to establish if they are valid. This ToR will establish how homoegeous sampling methodology is in the ICES are and the usefulness and purpose of threshold levels.</p>			
E	Report on new findings in the area of harmful algal bloom dynamics	WG members report new findings on the topic of algal bloom dynamics in the ICES area. This is a particularly valuable ToR for providing the most up-to-date status of HAB dynamics in the ICES area.	ICES Strategic Plan, Goal No. 1, and 2.	Year 1,2,3	A report on new findings in the area of harmful algal bloom dynamics.
F	Identify HAB datasets that could be used to investigate climate related changes in HAB species phenology; present the assessment of representative datasets to describe HAB initiation and temporal trends and spatial variability; review outputs using the standard WGZE and WGPME result formatting.	Consult with Todd O'Brien (NOAA) about the feasibility of using WGZE/WGPME time series analysis techniques to analyse identified harmful phytoplankton and/or toxin time series data available from WGHABD and identify editorial team(Year 1) to produce a Harmful Algal and Toxin Status CRR (Year 32).	ICES Strategic Plan, Goal No. 1, and 2.	Year 1, 2	An ICES Harmful Algal and/or Toxin status report; contribute to the development of a Global Harmful Algal Bloom Status Report.
G	Evaluate use of harmful/nuisance algae as an indicator of 'Good Ecological Status' for the Marine Strategy	Descriptor 5 of the MSFD lists 'bloom events of nuisance/toxic algal blooms (e.g. cyanobacteria) caused by human activities'	ICES Strategic Plan, Goal No. 1, and 2.	Year 1 and 2	Potentially a comment paper for ICES Journal.

	<p>Framework Directive Descriptor 5 (Eutrophication).</p> <p>Review draft OSPAR JAMP Eutrophication Guidelines on phytoplankton species composition.</p>	<p>as a direct effect of nutrient enrichment. The use of nuisance/toxic algae as indicators for this descriptor will be reviewed.</p> <p>ICES is requested to advise OSPAR on the revision of the OSPAR JAMP Eutrophication Guidelines. Since these guidelines were developed there has been considerable work done on the response of the phytoplankton community to environmental and anthropogenic drivers. The use of the JAMP guidelines will be reviewed.</p>			
H	<p>Review progress and advice the scientific steering committee for the planned joint ICES-PICES-IOC scientific symposium on Climate change and harmful algal blooms. The symposium is planned to be arranged in 2015</p>	<p>Climate change will affect the distribution of HAB species and the development of HAB. An ICES-PICES-IOC scientific symposium on climate change and harmful algal blooms is planned to be arranged in Gothenburg, Sweden 18-22 May 2015.</p>	<p>ICES Strategic Plan, Goal No. 1, and 2.</p>	<p>Year 1</p>	<p>Advice to the Organizing Committee.</p>
I	<p>Review progress in development and application of molecular genetic technologies for taxonomic identification, phylogenetic reconstruction, biodiversity, toxin detection and population dynamic studies of HABs.</p>	<p>Molecular technologies are developing at a rapid pace. These new methods have the potential to deliver key information about the diversity and toxicity of HABs and revolutionise how monitoring is performed. Many methods are being developed in isolation with little standardisation between protocols or integration in monitoring programmes which have the capacity to exploit their potential.</p>	<p>ICES Strategic Plan, Goal No. 1, and 2.</p>	<p>Year 1, 2, and 3</p>	<p>a) A review of progress in development of new methods for HAB species dynamics (Year 1)  b) Common sampling and methodological protocols for application to field studies (Year 2)  c) Contribute to a workshop on validation and comparison of alternative technologies (Year 3)  d) A review of advances in new technologies for research and monitoring applications (Year 3)</p>
J	<p>Review the existing</p>	<p>Although the the research</p>	<p>ICES Strategic</p>	<p>1</p>	<p>Part of WG HABD</p>

	knowledge and latest findings on BMAA, the amino compound β-methylamino alanine	into BMAA has been conducted for more than decade, there is still some controversy regarding the status of this toxin. Recently, new data on BMAA producers among phytoplankton organisms and on its toxicity have been published. They shed new light on the real threat related to BMAA presence in sea food and methodologies on how to accurately measure this toxin.	Plan, Goal No. 1, and 2.		report
K	Review how physical and biological interactions control the dynamics of relevant harmful micro-algal blooms	Harmful algal genera respond to environmental forcing in different ways. in each year a different genus will be evaluated to provide a comparative evaluation of known and potential responses to physical / environmental forcing.	ICES Strategic Plan, Goal No. 1, and 2.	Year 1,2 and 3	Review papers on physical and biological interactions control the dynamics of selected genera of HAB. Year 1 will focus on <i>Gymnodinium</i> . Species for subsequent years will be decided by the WG. Each review will result in a 'review' paper for the ICES journal.
L	<b>Review of draft OSPAR JAMP Eutrophication Guidelines on phytoplankton species composition</b>  ICES is requested to advise OSPAR on the revision of the OSPAR JAMP Eutrophication Guidelines which will be revised by experts from Germany, The Netherlands and Sweden.  WGHABD is asked to address the identification of harmful algae species and blooms in line with MSFD Descriptor 5 and relevant	The guidelines should be revised to reflect new knowledge about phytoplankton and needs within (directives such as) the EU Marine Strategy Framework Directive (MSFD) and the Water Framework Directive (WFD).  It is the intention of the revision that the existing aims described in the guidelines <sup>1</sup> will be supplemented with the following: <ul style="list-style-type: none"> <li>• to identify harmful algae species and blooms</li> </ul>			Report on this OSPAR 1/2015 request by 1 May 2015

<sup>1</sup> 1. to establish the spatial distribution and frequency of phytoplankton blooms; 2. to establish temporal trends, over periods of several years, in phytoplankton species composition and their relative abundance; 3. to identify key phytoplankton species

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monitoring and measurement techniques as mentioned in the background information	<p>in line with MSFD Descriptor 5.</p> <ul style="list-style-type: none"> <li>• to identify invasive (non-indigenous) species in line with MSFD Descriptor 2.</li> <li>• to monitor effects of ocean acidification as e.g. on coccolithophorids (e.g. <i>Emiliana huxleyi</i>) in line with Descriptor 1 in MSFD.</li> </ul> <p>The revised guidelines should incorporate coming monitoring and measurement techniques such as (but not limited to) spectrofluorometry, flow cytometry and qualitative observations of foam production, and should make use of existing standards, such as EN 159722 and EN 152043 and reflect developments within the OSPAR ICG – COBAM which is working on biodiversity monitoring and assessment. Data handling issues, such as the format required for reporting to ICES, should also be addressed.</p>
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### Summary of the Work Plan

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Year 1	Review of OSPAR and MSFD D5 Eutrophication guidelines, review of fish killing algae, Updating and quality control of data in HAEDAT, symposium on climate change and HABs. Identify data sets and editorial team for the HAB status report. , current status of BMAA. Review on Hab genus Gymnodinium.
Year 2	Completion of HAB status report, review of sampling methodologies and threshold levels in monitoring programmes, plan workshop on molecular techniques, Contribute towards Global HAB report as required. Contribute towards MSFD as required. Review on HAB genera tbc. ToR to be decided.
Year 3	Contribute to a workshop on new/molecular genetic techniques, Review of new technologies, Review on Hab genera tbc. Contribute towards Global HAB report as required. Contribute towards MSFD as required. ToR to be decided.
Year 1-3	Work on Global HAB report , update the Harmful Algal Event Database, report new findings, physical-biological interactions – selected HAB genera

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<sup>2</sup> Water quality – guidance on quantitative and qualitative investigations of marine phytoplankton

<sup>3</sup> Water quality – guidance standard on the enumeration of phytoplankton using inverted microscopy (Utermöhl method)

## Supporting information

Priority	The current activities of this Group will lead ICES into issues related to the ecosystem effects of fisheries, especially with regard to the application of the Precautionary Approach. Consequently, these activities are considered to have a very high priority. Work performed will also address to ICES action areas on Aquaculture and MSFD. ICES Pillars 1 – 3 and Goals 1 – 3.
Resource requirements	The research and monitoring programmes which provide the main input to this group are already underway, and resources are already committed. The additional resource required to undertake additional activities in the framework of this group is negligible.
Participants	The Group is normally attended by some 20–25 members and guests.
Secretariat facilities	None.
Financial	No financial implications.
Linkages to ACOM and groups under ACOM	There are no obvious direct linkages.
Linkages to other committees or groups	There are working relationship with WGPME, WGZE and WGPBI. The cooperation with WGAQUA and WGIMT could be further developed.
Linkages to other organization	UNESCO-IOC Intergovernmental Panel on Harmful Algal Blooms, IOC/SCOR Global HAB (previously GEOHAB - Global Ecology and Oceanography of Harmful Algal Blooms)