

Working group on fisheries benthic impact and trade-offs (WGFBIT)

The **Working Group on Fisheries Benthic Impact and Trade-offs (WGFBIT)**, chaired by Gert van Hoey, Belgium; Jan-Geert Hiddink, UK; and Marija Sciberras, 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 2021	22–26 November	Palermo, Italy (tbc)		
Year 2022	DATE September			
Year 2023	DATE September		Final report by DATE to SCICOM	

ToR descriptors

ToR	Description	Background	SCIENCE PLAN TOPICS ADDRESSED	Duration	Expected Deliverables
a	REGIONAL ASSESSMENTS Apply and improve theseafloor assessment framework developed by WGFBIT (2018–2020) to produce (sub-)regional assessments for the North, Celtic, Baltic, Arctic (Icelandic, Norwegian Barents sea), Mediterranean Seas and the Bay of Biscay and the Iberian Coast.	Produce a worked example of how science can operationalize EBM (ecosystem based management) and contribute towards IEAs (intergrated ecosystem assessment) as ICES advice products. I.e. develop an EU MSFD D6/D1 assessment with management options that can be applied also by non-EU ICES countries. Links (avoiding overlaps) will be established with key experts also attending WGEKO, WGDEC, WGSFD, BEWG, MHWG, WGIMM, WGMBRED, and WGMPCZM.	1.9; 2.1; 2.4; 6.3	3 years	Year 1: a worked example for all regional seas, based on the preliminary achievements in the period 2018–2020. Initiating the 'pipeline process' for inclusion of relevant outputs to ecosystem overviews, starting with North and Baltic Sea. Year 2: Updating of the regional and sub-regional assessments for the different regions. Year 3: Final regional assessments of the impact of bottom abrasing fisheries for all regions in the ToR, which can feed into the ICES fishery and ecosystem overviews.
b	UPDATES FOR ASSESSMENT FRAMEWORK Explore and potentially implement options to improve the parameterisation of the WGFBIT seafloor assessment framework components, in shallow waters and deep-sea areas.	These updates can focus on following aspects: E.g. through; i) standardisation of benthos data sampled with different gears, ii) development of methods to predict benthos longevity biomass in data poor areas, iii) integration of environmental drivers in the predictions, iv) improve the resolution of	2.3; 2.4	3 years	Year 1- 3: Stepwise progress for the different aspects that can be tackled. Updates or adaptations need to feed in Tor A, to improve the regional assessments. If appropriate progress or results, research paper(s) will be conducted.

		gear-specific depletion rates, v) estimation of parameter uncertainty			
c	WGFBIT AND THE WIDER WORLD Alignment of the WGFBIT seafloor assessment framework with other assessment methods for benthic habitats under relevant EU directives.	The WGFBIT seafloor assessment framework (based on assessing the relative benthic state) is not the only way to assess benthic impacts from physical disturbance. Therefore, alignment with other methods needs to be explored.	2.3; 2.4	3 years	Year 1-3: Research paper(s)
d	ECOSYSTEM FUNCTIONING Explore if ecosystem functioning can be incorporated more explicitly into the WGFBIT seafloor assessment methodology.	This can be done through examining the direct influence of bottom fishing on sediment parameters related to ecosystem functioning (e.g. apparent redox discontinuity potential layer). The link between total benthic community biomass and/or particular traits (e.g. longevity or sediment position) with biogeochemical parameters that are related to particular benthic ecosystem functions will also be explored – for this part links to work by BEWG and WGECO will be sought.	1.3; 1.9; 2.3	3 years	Year 1-3: Research paper(s)

Summary of the Work Plan

ToR a) **REGIONAL ASSESSMENTS.** Apply and improve the EU MSFD D6/D1 assessment framework related to bottom abrasion of fishing activity at the regional / subregional scale, which was developed by ICES WGFBIT (2018–2020). Priority will be given to improve the parameterisation of framework components at regional and sub-regional scale and with that also improve the overall assessment of benthic status and of alternative management options to achieve good environmental status (GES). The framework should remain generic enough that it allows cross regional comparison and specific enough that it addresses regional-specific trade-offs (i.e. incorporating other pressures than fisheries).

ToR b) **UPDATES FOR THE ASSESSMENT FRAMEWORK.** Explore and potentially implement options to improve the parameterisation of framework components. This can be done through the below action points.

- i) The default WGFBIT seafloor assessment framework uses data collected by grab or box corer and therefore targeting the infauna. For some regions, such infauna data is not always available, and assessments are therefore based on epi-benthic data from trawl samples. The use of different sampling methodologies, with subsequent assessment focus on different parts of the ecosystem, has influence on the outcome. Therefore, these differences or commonalities in a regional context, need to be investigated,

- ii) The determination of grid cell recovery values are based on longevity compositions sampled from un-fished areas. In some regions this type of data is sparse, so alternative approaches/data are needed. A thorough investigation of this aspect will enlarge the WGFBIT assessment framework applicability and increase the confidence of the assessments,
- iii) Application of the WGFBIT assessment framework for regional areas requires the development of statistically robust relationships between the benthic biomass longevity distribution and environmental drivers, such as depth, sediment, bottom shear stress, salinity, temperature, primary production, etc. For some regions it has been difficult to obtain meaningful relationships that distinguish sensitive and less sensitive areas spatially, and improved modelling (inclusion of more and better environmental data across larger cross-regional scales) could potentially solve this,
- iv) The gear-specific depletion rate of the assessment method is currently based on only 3 different metiers; beam trawl, otter trawl and dredges. Recent approaches have provided the basis for having a finer gear resolution of the depletion rates (cf Rijnsdorp et al., 2020) and this should be pursued. Methodology to estimate the seabed disturbance area of passive fishing gears is on its way and inclusion of these gears in the assessment framework can be explored in alignment with ICES WGSFD, where these aspects are already being investigated,
- v) It is necessary to quantify the uncertainty in the risk assessment methodology developed by WGFBIT. This is required to a) identify which input parameters and modelling steps account for the majority of the uncertainty, and therefore will benefit from efforts to reduce it (e.g. by carrying out further studies), and b) to map the distribution of the overall uncertainty in the assessment area in order to consider it when evaluating management scenarios. The utility of a bootstrapping approach will be explored.

ToR c) WGFBIT AND THE WIDER WORLD

- i) Alternative EU MSFD D6/D1 assessment frameworks are under development. Comparing different methods has several advantages; 1) Multiple assessments with similar outcomes will increase the confidence of the assessment within a region, as locations with a low or high state/impact should be clearly distinguishable across assessment methods. Areas that differ between assessments, need more investigation, 2) Multiple assessments will help to improve approaches and the guiding of decision making. A more profound decision can be made, when it is based on several outputs.
- ii) Threshold Values for determining adverse effects (and loss) and GES is highly requested for policy purpose in relation to: 1) impacts of physical pressures (and bio-geo-chemical pressures); 2) specific indicators (and response value levels) and 3) areal protection – what, where, how much and how strict? (securing ecosystem functioning). The lack of empirically based threshold values is an upcoming and increasingly urgent concern internationally (TG Seabed, HELCOM, OSPAR) and at the national level concerning the implementation of the EU MSFD D6C3 and D6C5, as well as for the D1 and D5. The options to integrate GES threshold values in WGFBIT will be explored by looking to current practices under the WFD and NATURA 2000 management at the national level.

ToR d) ECOSYSTEM FUNCTIONING

The WGFBIT seafloor assessment framework uses total benthic community biomass as key metric to assess seabed impacts under the assumption of a strong correlation with ecosystem functions such as carbon mineralization and nutrient cycling. We propose to test this assumption and investigate how ecosystem functioning can be incorporated into the PD methodology. This will not only ascertain that RBS is a good way forward, but also help us in setting thresholds for acceptable ecosystem impacts. This can be done

through examining the direct influence of bottom fishing on sediment parameters related to ecosystem functioning (e.g. apparent redox discontinuity potential layer). The link between total benthic community biomass and/or particular traits (e.g. longevity or sediment position) with biogeochemical parameters that are related to particular benthic ecosystem functions will also be explored – for this part links to work by BEWG and WGEKO will be sought.

Year 1	ToR a, b, c, d
Year 2	ToR a, b, c, d
Year 3	ToR a, b, c, d

Supporting information

Priority	The 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.
Resource requirements	Experts that provide the main input to this group have been involved in successful EU funded projects (BENTHIS). It is envisioned that future funding will be available and that this ICES working group experts can also provide an international platform to establish a consortium. This would allow to commit future resources to the group's work.
Participants	The Group is normally attended by around 30 members and guests.
Secretariat facilities	Standard support
Financial	No financial implications
Linkages to ACOM and groups under ACOM	Advice products and working groups (e.g. WGEKO and WGDEC)
Linkages to other committees or groups	There is a very close working relationship with all the groups under the Ecosystem Pressures and Impacts Steering Group. It is also very relevant to the Working Groups WGEKO, WGDEC, WGSFD, BEWG, WGMHM, WGIMM, WGMBRED, WGMPCZM.
Linkages to other organizations	EU (DG-ENV, DG-MARE), RSCs (Baltic's HELCOM, North Atlantic's OSPAR, Mediterranean's Barcelona Convention and Black Sea's Bucharest Convention), JRC, STCEF.