

ICES WKGMSFDD3-II REPORT 2015

ICES ACOM COMMITTEE

ICES CM 2015\ACOM:48

Report of the Workshop on guidance for the review of MSFD decision descriptor 3 – commercial fish and shellfish II (WKGMSFDD3-II)

10–12 February 2015

ICES Headquarters, Denmark



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International Council for
the Exploration of the Sea

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Recommended format for purposes of citation:

ICES. 2015. Report of the Workshop on guidance for the review of MSFD decision descriptor 3 – commercial fish and shellfish II (WKGMSFDD3-II), 10-12 February 2015, ICES Headquarters, Denmark. ICES CM 2015\ACOM:48. 36 pp.

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Executive Summary

Good Environmental Status for Descriptor 3 – *Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.*

The assessment of the GES status for the Descriptor D3 is based on three criteria: (3.1) exploited sustainably consistent with high long-term yields, (3.2) have full reproductive capacity and (3.3) exhibit a population age and size distribution that is indicative of a healthy stock.

WKGMSFDD3-II focuses on the clarification scientific challenges for D3 (commercial fish and shellfish) to make the revision of the Decision process more understandable. The text for the criterion 3.2 “reproductive capacity” was consolidated and the criterion 3.3 “Healthy age and size structure” was revised and a roadmap for further development of this criterion was designed.

The consolidation of the 3.2 criteria was based in the current interpretation based on the good environmental status (GES) for Descriptor 3 definition (above) and the aim of the Common Fisheries Policy (CFP) to ‘*restore and maintain populations of harvested species above levels which can produce maximum sustainable yield*’. Hence, in order to fulfil the GES criterion 3.2 for stocks for which ICES advice is used as the basis for the assessment of GES, the recommendation is that $SSB \geq MSY B_{trigger}$ where $MSY B_{trigger}$ marks the lowest boundary associated with SSB_{MSY} .

Updated estimates of both reference levels for criteria 3.1 and 3.2 put forward by the regional authoritative scientific institutions will be periodically adopted for the assessment against GES.

For criterion 3.3 a suite of candidate indicators capturing three relevant properties representing the state and pressure process have been identified following the suggestion from the cross-cutting issues workshop outcomes: Size distribution of the species (state), Selectivity pattern of the fishery exploiting the species (pressure) and Genetic effects of exploitation on the species (state).

The roadmap proposed for the further development of criterion 3.3 involves two separate steps:

- 1) Indicator evaluation and selection against ICES criteria and across stocks from different functional groups and areas with the aim to select one validated indicator per property.
- 2) Assessment against GES. Primary indicators will be processed similar to those in criteria 3.1 and 3.2 where the knowledge of the characteristics of the indicator and its reference level at the single-species level should allow the identification of the requirements for GES. Similarly, Secondary indicators will be processed involving some trend analysis where current state is compared to historic conditions.

Only those indicators that passed the previous step can be considered for assessment against GES where we distinguish between the primary and secondary indicators.

The DG ENV cross-cutting workshop outcomes suggest to distinguish between State-based descriptors and Pressure-based descriptors. D3 represents both these aspects. Criterion 3.1 clearly represents pressure while criterion 3.2 and criterion 3.3 as it was initially defined representing state. As the criterion 3.3. is currently developing the

D3 will represent both state and pressure more comprehensively in that two aspects of pressure are described, i.e. fishing mortality and the size-selectivity of the exploitation, and two aspects of state, i.e. biomass and the age- and size distribution.

1 Terms of Reference and approach of the workshop

This workshop will focus on the scientific challenges for D3 (commercial fish and shellfish) with a view to clarify the text and make the Decision more understandable, e.g. through the use of recent relevant ICES Advice.

The basis for this workshop was the EU_Annex I_D3 and the relevant scientific comments and requests for clarification received from the Working Group on Good Environmental Status (WG GES), DG ENV and stakeholders (Member States, NGO, Industry (see Annex 4)

For criteria 3.1 and 3.2 the aim was to consolidate the text, for criterion 3.3 on “Healthy age- and size structure” the conclusion from the previous workshop was to revise the criterion and the aim for this workshop was to propose a process for the further development of this criterion.

Finally the assessment of D3 was compared to that of other descriptors following the DGENV cross-cutting workshop.

The Terms of Reference (ToRs, Annex 3) were:

Provide further input to the MSFD review D3 manual following on from the initial ICES/JRC workshop and template.

Consolidate and address relevant scientific comments and requests for clarification received from WG GES and DG ENV on the earlier version of the MSFD review D3 manual.

Comment on implications for the MSFD review D3 manual in light of the DG ENV cross-cutting workshop (held in January 2015).

2 Main outcomes of the workshop

The revision of the MSFD review D3 manual, which mostly comprehends the consolidation of criteria 3.1 and 3.2, focused specifically on the criterion 3.2 and for criterion 3.3 on “Healthy age- and size structure”, the development of a roadmap to further develop this criterion.

2.1 Consolidation criterion 3.2

For criterion 3.2 the recommendation after the previous workshop (ICES 2014a) was that in order to fulfil the requirement of GES: $SSB \geq MSY B_{trigger}$. The suitability of this reference level was questioned as it was believed not to represent the SSB_{MSY} reference point. Therefore the following text is was drafted in the manual, based on the previous text and existing ICES advice (ICES 2014b), in order to explain how the consensus requirements for GES were obtained starting from the Safe Biological Limits (SBL) concept in the definition for D3:

Following the precautionary approach the two attributes that were used in the ICES area to assess stocks against safe biological limits, specify that stocks should:

- 1) be exploited sustainably ($F \leq F_{pa}$)
- and
- 2) have full reproductive capacity ($B \geq B_{pa}$).

In order to align with CFP aiming “to restore and maintain populations of harvested species above levels which can produce maximum sustainable yield”, the first attribute of GES, i.e. exploited sustainably, was extended into “be exploited sustainably with high long-term yield” including the requirement $F \leq F_{MSY}$.

The EU request on draft recommendations for the assessment of MSFD Descriptor 3 (ICES 2014b) states that:

Even when a stock is fished at a constant F value, the SSB will fluctuate due to natural factors. For most data-rich stocks, assessed with analytical methods, information on the lower bound of SSB fluctuations around B_{MSY} (e.g. $MSY B_{trigger}$ for ICES stocks) is available to be used as a reference level for Criterion 3.2. ICES considers a stock fulfils the criterion (“green status”) if the spawning-stock biomass is above $MSY B_{trigger}$. An appropriate choice of B_{MSY} requires contemporary data with fishing at F_{MSY} to experience the normal range of fluctuations in SSB. Until this experience is gained, B_{pa} has, for the time being, been adopted for many of the stocks assessed by ICES as $MSY B_{trigger}$ although B_{pa} and $MSY B_{trigger}$ correspond to different concepts. Therefore, $MSY B_{trigger}$ marks the lowest boundary associated with SSB_{MSY} , and in practice this is set as the border of safe biological limits (B_{pa}).

While ICES initially adopted B_{pa} as a proxy (see ICES March 2014 above) for $MSY B_{trigger}$ a process is now underway to update the value of $MSY B_{trigger}$ so that it corresponds to the lower boundary of the range around SSB_{MSY} . For example for sole in the Western Channel, $MSY B_{trigger}$ has been defined as “the lower 95% confidence limits (of SSB) with exploitation at F_{MSY} from long-term simulations”.

Hence for stocks for which ICES advice is used as the basis for the assessment of GES, in order to fulfil the GES criterion 3.2, recommendation is that $SSB \geq MSY B_{trigger}$ where $MSY B_{trigger}$ marks the lowest boundary associated with SSB_{MSY} .

Updated estimates of both reference levels for criteria 3.1 and 3.2 put forward by the authoritative scientific institutions will be periodically adopted for the assessment against GES.

Figure 1 illustrates this showing an example stock with the calculated ranges around SSB when exploited consistently at a specific F. Consistent exploitation at F_{MSY} (green line) shows the observed range of SSB values. Using average value of SSB_{MSY} (middle star) implies 50% of the occasions SSB will be below and 50% of the occasions above SSB_{MSY} . Thus MSY $B_{trigger}$ should be the lower boundary (lowest star) of the range in order to fulfil the requirement that 100% of the stocks should be at or above this reference value.

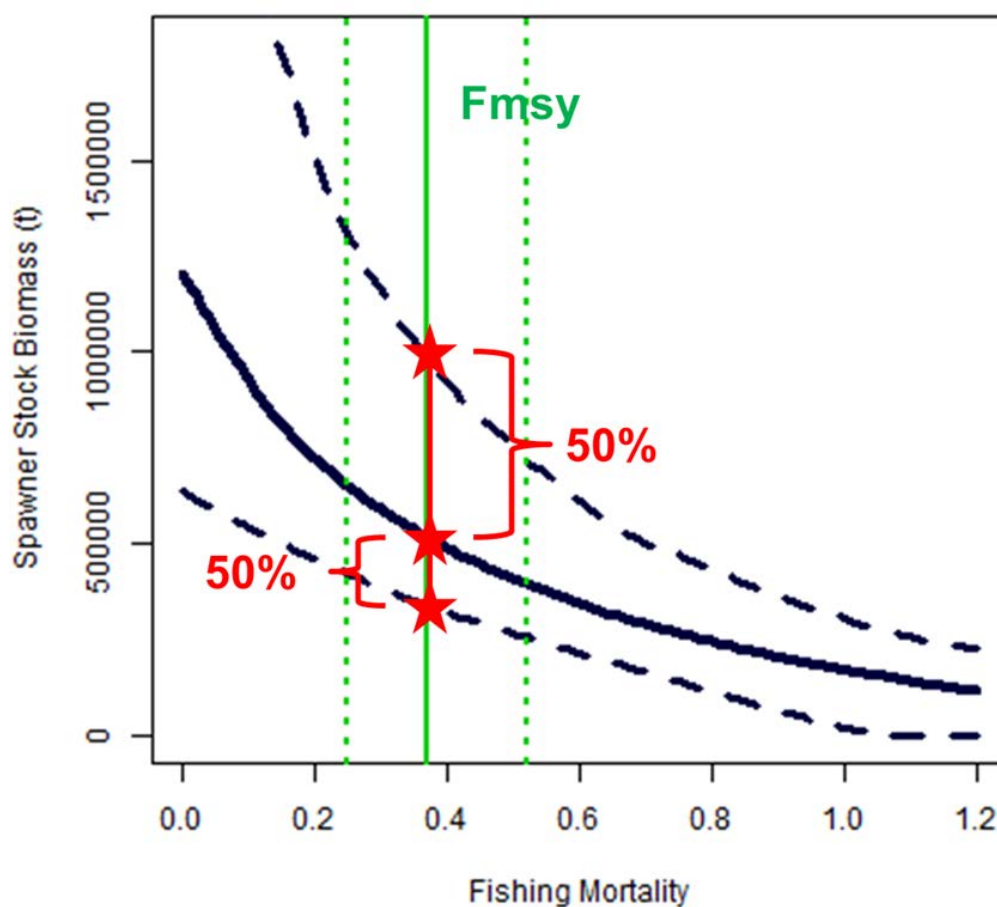


Figure 1. Relationship SSB and F for example stock (haddock 346a) showing the upper and lower ranges around the average SSB_{MSY} .

The quality of the assessment and hence the confidence in the outcome is in part determined by the quality of the data available. Multi-gear considerations in stock assessments such as selectivity and adequate sampling coverage regarding the representative contribution of catches of each stock from each fleet/gear should be considered.

2.2 Roadmap criterion 3.3

Based on the previous workshop a suite of candidate indicators capturing three relevant properties that describe or are directly linked to this criterion have been identified:

- Size distribution of the species (state);
 - Proportion of fish larger than the mean size of first sexual maturation (Former indicator 3.3.1)
 - 95% percentile of the fish length distribution observed in research vessel surveys (Former indicator 3.3.3)
- Selectivity pattern of the fishery exploiting the species (pressure);
 - Length (or age depending on data availability) at first capture (length/age at which 50% of fish are vulnerable to / retained by the gear)
 - Proportion of fish larger than size at which 50% is mature
 - Mean length in the catch
- Genetic effects of exploitation on the species (state).
 - Size at first sexual maturation (Former indicator 3.3.4)
 - Length at which half of the (female) population are mature: TL50

The roadmap proposed for the further development of criterion 3.3 involves two separate steps:

- 1) Indicator evaluation and selection;
- 2) Assessment against GES

Only those indicators passing the first step can be considered for the second step.

2.2.1 Indicator selection

The aim is to select one validated indicator per property. If possible one or more candidate reference levels will be considered. Existing text should be revised accordingly. To that end these candidate indicators will be scrutinized against ICES criteria. High-level criteria are in Box 1, more detail in ICES WKFooWI (ICES 2014c) and WGEKO (ICES 2014d) reports.

Box 1. ICES High level criteria for indicator selection

- Availability of data. *Measurability*, robust quantifiable data covers range of spatial & temporal natural variability of suitable (historic) duration and resolution, availability of historic data or other reference points for benchmarking,
- Quality of underlying data. Data that are *Sensitive* to the magnitude and direction of response to underlying attribute/pressure with high signal to noise ratio, and *Responsive* at an appropriate timescale. A *tangible* indicator that is intuitive to understand.
- Conceptual. *Theoretical basis*, with indicator behaviour (in response to pressure) that is understood to support management advice,
- Communication, an indicator that is simple, credible, *unambiguous, comprehensible* and can be easily communicated
- Manageable, an indicator that is relevant to management, with estimable targets and thresholds and which is *responsive, sensitive* and *cost-effective* to develop.

This methodical indicator selection process requires a dedicated (series of) workshop(s) possibly in conjunction with the WKLIFE (5-9 October 2015) meeting so as to involve the members of the group working on similar topics. A crucial first step will be to ascertain the availability of data to create example datasets consisting of time-series covering contrasting periods (for productivity and exploitation) of example stocks with quantitative assessments (see Annex 1) covering contrasting (e.g. functionality and productivity) species in different MSFD regions. These time-series should include both catch and/or landings data as well as survey catches. Survey catches in the ICES area are covered by surveys in the DATRAS database, the JRC may be able to provide survey data for the Mediterranean (MEDITS) and the Black sea. Different pathways need to be explored to acquire catch/landings length composition data:

- Individual experts bringing data to the meeting;
- Mediterranean data from JRC;
- ICES data from previous data calls;
- New ICES data call (to be approved by ACOM).

The further process then involves:

- Evaluation of the availability and quality of data;
- Evaluation of the procedures for calculation by applying each formula against several of the example datasets.

resulting in:

- an agreed procedure for the calculation of each selected indicator. Without this the indicator cannot be considered for subsequent steps in the further process;
- The identification of the appropriate reference level(s) for the indicator. If there is no scientific basis for setting any reference levels the indicator will be considered a secondary indicator.

2.2.2 Assessment against GES

Only those indicators that passed the previous step can be considered for assessment against GES where we distinguish between the primary and secondary indicators.

Primary indicators will be processed similar to those in criteria 3.1 and 3.2 where the knowledge of the characteristics of the indicator and its reference level at the single-species level should allow the identification of the requirements for GES. This may be expressed in:

- x% of the populations fulfil indicator \geq reference level (in case of pass/fail)
- x% of the populations fulfil indicator \geq reference level 1 AND y% of the populations fulfil indicator \geq reference level 2 (in case a boundary is allowed)

Secondary indicators will be processed similar to those in criteria 3.1 and 3.2 involving some trend analysis where current state is compared to historic conditions. This should also be aligned to the process in D1, D4 and D6.

Considerations of an overall assessment for the criterion 3.3 involving aggregation of indicators across properties is premature as this depends on which (if any?) indicators pass the previous step and further developments on the aggregation process in general.

2.3 Assessment of D3 in relation to other descriptors

The DGENV cross-cutting workshop distinguished between State-based descriptors, (D1, 3, 4, 6) and Pressure-based descriptors (D2, 3, 5, 7, 8, 9, 10, 11) identifying D3 represents both these aspects (Figure 2).

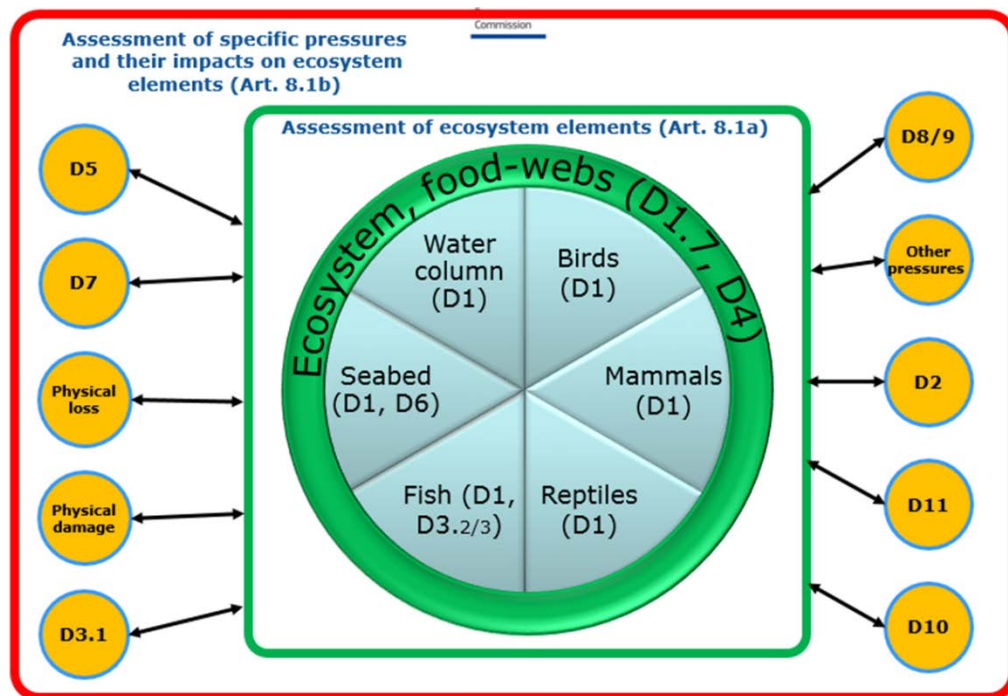


Figure 2. Pizza and satellites illustration of the state elements within the MSFD and the pressure and impact descriptors.

For now criterion 3.1 clearly represents pressure while criterion 3.2 and criterion 3.3 as it was initially defined representing state. As the criterion 3.3. is currently developing the D3 will represent both state and pressure more comprehensively in that two aspects of pressure are described, i.e. fishing mortality and the size-selectivity of the exploitation, and two aspects of state, i.e. biomass and the age- and size distribution.

3 References

- ICES. 2014a. Report of the Workshop on guidance for the review of MSFD Decision Descriptor 3 - commercial fish and shellfish (WKGMSFDD3), 4-5 September 2014, ICES HQ, Denmark. ICES CM 2014\ACOM:59. 47 pp.
- ICES. 2014b. EU request on draft recommendations for the assessment of MSFD Descriptor 3. In Report of the ICES Advisory Committee, 2014. ICES Advice 2014, Book 1, Section 1.5.2.1.
- ICES. 2014c. Report of the Workshop to develop recommendations for potentially useful Food Web Indicators (WKFooWI), 31 March–3 April 2014, ICES Headquarters, Copenhagen, Denmark. ICES CM 2014\ACOM:48. 75 pp
- ICES. 2014d. Report of the Working Group on the Ecosystem Effects of Fishing Activities (WGECO), 8–15 April 2014, Copenhagen, Denmark. ICES CM 2014/ACOM:26. 174 pp.

Annex 1: Candidate example stocks with quantitative assessments from ICES and GFCM used for the regional assessments presented at the DGENV cross-cutting workshop.

Table Assessed ICES stocks per (sub) region

Species Stock	Baltic Sea	Barents Sea and Norwegian Sea	Bay of Biscay and Iberian Coast	Celtic Sea	Iceland and East Greenland	North Sea	Widely distributed
Blue whiting							X
whb-comb							X
Boarfish							X
boc-nea							X
Cod	X	X		X	X	X	
cod-2224	X						
cod-2532	X						
cod-347d						X	
cod-7e-k				X			
cod-arct		X					
cod-farp				X			
cod-iceg					X		
cod-scow				X			
Haddock		X		X	X	X	
had-34						X	
had-7b-k				X			
had-arct		X					
had-faro				X			
had-iceg					X		
had-rock				X			
had-scow				X			
Hake			X				X
hke-nrth							X
hke-soth			X				
Herring	X			X	X	X	X
her-2532-gor	X						
her-30	X						
her-3a22	X						
her-47d3						X	
her-irls				X			
her-irlw				X			
her-nirs				X			
her-noss							X
her-riga	X						
her-vasu					X		

Species Stock	Baltic Sea	Barents Sea and Norwegian Sea	Bay of Biscay and Iberian Coast	Celtic Sea	Iceland and East Greenland	North Sea	Widely distributed
her-vian				X			
Horse mackerel			X				X
hom-soth			X				
hom-west							X
Megrim			X				
mgb-8c9a			X				
mgw-8c9a			X				
Norway pout						X	
nop-34-oct						X	
Plaice				X		X	
ple-eche						X	
ple-echw				X			
ple-nsea						X	
Saithe		X		X	X	X	
sai-3a46						X	
sai-arct		X					
sai-faro				X			
sai-icel					X		
Sandeel						X	
san-ns1						X	
san-ns2						X	
san-ns3						X	
Sardine			X				
sar-soth			X				
Sole			X	X		X	
sol-bisc			X				
sol-celt				X			
sol-eche						X	
sol-echw				X			
sol-iris				X			
sol-nsea						X	
Sprat	X					X	
spr-2232	X						
spr-nsea						X	
Whiting				X		X	
whg-47d						X	
whg-7e-k				X			
whg-scow				X			

Table. Assessed GFCM stocks per (sub)region

Species Stock	Adriatic Sea	Aegean-Levantine Sea	Ionian Sea	Western Mediterranean
Blackbellied angler			X	X
ANK - 15			X	
ANK - 5				X
ANK - 6				X
ANK - 7				X
Blackmouth catshark				X
SHO - 9				X
Blue and red shrimp				X
ARA - 1				X
ARA - 10				X
ARA - 6				X
ARA - 9				X
Blue whiting				X
WHB - 1				X
WHB - 6				X
WHB - 9				X
Common octopus				X
OCC - 5				X
Common pandora			X	X
PAC - 15			X	
PAC - 9				X
Common sole	X			
SOL - 17	X			
Deep-water rose shrimp	X	X	X	X
DPS - 10				X
DPS - 11				X
DPS - 15			X	
DPS - 18	X			
DPS - 5				X
DPS - 6				X
DPS - 9				X
DPS - NA		X		
European anchovy	X		X	X
ANE - 1				X
ANE - 16			X	
ANE - 17	X			
ANE - 20			X	
ANE - 22			X	
ANE - 6				X
ANE - 9				X
European hake	X	X	X	X
HKE - 1				X

Species Stock	Adriatic Sea	Aegean-Levantine Sea	Ionian Sea	Western Mediterranean
HKE - 10				X
HKE - 11				X
HKE - 15			X	
HKE - 17	X			
HKE - 18	X			
HKE - 19			X	
HKE - 20			X	
HKE - 22			X	
HKE - 5				X
HKE - 6				X
HKE - 7				X
HKE - 9				X
HKE - NA		X		
European pilchard	X		X	X
PIL - 1				X
PIL - 16			X	
PIL - 17	X			
PIL - 20			X	
PIL - 22			X	
PIL - 6				X
PIL - 9				X
Giant red shrimp	X	X	X	X
ARS - 10				X
ARS - 11				X
ARS - 15			X	
ARS - 18	X			
ARS - 9				X
ARS - NA		X		
Greater forkbeard				X
GFB - 9				X
Norway lobster	X		2	X
NEP - 1				X
NEP - 18	X			
NEP - 20			X	
NEP - 22			X	
NEP - 5				X
NEP - 6				X
NEP - 9				X
Picarel		X	X	
SPC - 20			X	
SPC - 22			X	
SPC - 25		X		
Poor cod				X
POD - 9				X

Species Stock	Adriatic Sea	Aegean-Levantine Sea	Ionian Sea	Western Mediterranean
Red mullet	X	X	X	X
MUT - 1				X
MUT - 10				X
MUT - 11				X
MUT - 15			X	
MUT - 17	X			
MUT - 18	X			
MUT - 19			X	
MUT - 20			X	
MUT - 22			X	
MUT - 25		X		
MUT - 5				X
MUT - 6				X
MUT - 7				X
MUT - 9				X
MUT - NA		X		
Spottail mantis squillid	X			X
MTS - 10				X
MTS - 17	X			
MTS - 18	X			
MTS - 9				X
Stripe red mullet			X	X
MUR - 20			X	
MUR - 22			X	
MUR - 5				X
MUR - 9				X

Annex 2. WKGMSFDD3-II participants

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Annex 3. Terms of Reference (ToRs)

2015/2/ACOM59 The **Workshop on guidance for the review of MSFD Decision Descriptor 3 - commercial fish and shellfish II** (WKGMSFDD3-II), chaired by Gerjan Piet, The Netherlands, with vice-chairs Alain Biseau, France, Manuela Azevedo, Portugal, Celia Vassilopoulou, Greece, and Cristina Ribeiro, JRC, will meet in Copenhagen, Denmark, 10-12 February 2015 to:

- a) Provide further input to the MSFD review D3 manual following on from the initial ICES/JRC workshop and template (see scientific justification below).
- b) Consolidate and address relevant scientific comments and requests for clarification received from WG GES and DG ENV on the earlier version of the MSFD review D3 manual.
- c) Comment on implications for the MSFD review D3 manual in light of the DGENV cross-cutting workshop (held in January 2015).

WKGMSFDD3-II will report by 27 February 2015 for the attention of ACOM.

Supporting information

Priority

High. This workshop is part of an advice process to respond to a MoU request to ICES from DGENV to review the descriptors for the MSFD 2010/477 Decision.

Scientific justification

The 2010 Decision of the MSFD raised many challenges. Many of these are concerned with the scientific interpretation of the ideas and concepts of the Decision. This workshop will focus on the scientific challenges for D3- commercial fish and shellfish with a view to clarify the text and make the Decision more understandable. Recent relevant ICES Advice should be taken into account in the review.

The present Criterion 3.3 is challenging because there is uncertainty about interpretation and implementation. There is a scientific debate on relevant indicators and reference points. Instead of deleting Criterion 3.3, a new approach is suggested focusing on three properties; Criterion 3.3 should be revised:

- Size distribution of species,
- Selectivity pattern of the fishery exploiting the species
- Genetic effects of exploitation on the species.

Validation is needed for existing indicators and a few new proposed indicators.

Resource requirements

None

Participants

Experts with expertise in MSFD implementations or scientific issues regarding the descriptor are encouraged to participate. Each country can send 1–2 participants. If nominations exceed the meeting space available ICES

reserves the right to reject participants. This will be done based on the experts' relevant qualifications for the Workshop and geographical coverage. National participants join the workshop at national expense.

The Workshop will be open to stakeholders, dependent on availability of space. The WK will be open to secretariat members of RSCs.

The vice chairs are nominated to provide a geographic and expertise spread of relevant researchers.

Secretariat facilities

Secretariat support and meeting room

Financial

No financial implications.

Linkages to advisory committees

Direct link to ACOM.

Linkages to other committees or groups

Direct link to the CSGMSFD

Linkages to other organizations

Links to DG ENV and the EU GES/MSCG

Annex 4. Comments from MS, GES, WG and stakeholders

Nr.	Country	Delegate's name	Page	Line	Comment/input	Proposals to respond to comments	Respond to comments
1	UK	Andrew Scarsbrook			<p>General Comment:</p> <p>We can confirm that the reported outputs for ICES workshops D3 reflects our my understanding of the debate and agreement that took place. However the revision of criterion 3.3 needs careful consideration and should be reviewed against 1.7.1 and 4.2.1 and 4.3 which also consider species size and distribution so to avoid any duplication of effort.</p>		Addressed on Section 3 - "3.3. Population age and size distribution" of the revised MSFD review D3 manual (page 10-11); this shall be read together with the ICES WKGMSFDD3-II report, section 2.2. "Roadmap criterion 3.3".
2	France	Isabelle Terrier			<p>General Comment:</p> <p>The definition of "safe biological limits" and of the "MSFD objectives" are confused.</p>		Addressed on Section 1. "Safe biological limits" of the revised MSFD review D3 manual (page 5-6).
3	France	Isabelle Terrier	p.5	21-25	<p>The first definition of "safe biological limits" (Flim, Blim) is the one adopted by ICES. The following paragraph: "The two attributes currently used to assess stocks against safe biological limits, both in the ICES area and (by GFCM) in the Mediterranean, specify that stocks should:</p> <p>1) be exploited sustainably consistent with high long-term yields; and</p> <p>2) have full reproductive capacity"</p> <p>Should be modified because the term "consistent with long term yield" refers to F_{MSY}.</p>	<p>It should be replace by "The two attributes currently used to assess stocks against safe biological limit, specify that stocks should:</p> <p>1) be exploited sustainably ($F \leq F_{pa}$) and</p> <p>2) have full reproductive capacity ($B \geq F_{pa}$). Furthermore, in order to fulfill the CFP requirements, the stocks should be exploited consistently with high long-term yields ($F = F_{MSY}$);</p>	See comment 2.
4	France	Isabelle Terrier	p.5	37-38	<p>The sentence "Both these reference points ($MSY B_{trigger}$ and B_{pa}) should be used as limits below which SSB must not fall." is not right, because B_{pa} (in the „safe biological limit“sense) is neither a limit, nor a target. This confusion is due to the fact that for several fish stocks, $MSY-B_{trigger}$ is set (preliminary) equal to B_{pa}.</p>	<p>Proposal to replace this sentence by the following one: "$MSY B_{trigger}$ (current B_{MSY} proxy) should be used as a limit below which SSB must not fall".</p>	See comment 2.

5	France	Isabelle Terrier	p.6	38-41	The last sentence of the “climate sensitivity” part (“The achievement on GES.climatic/hydrographical conditions”) is right but the implementation seems hard to achieve.		Addressed on Section 1: The “climate sensitivity” of the revised MSFD review D3 manual (page 7).
6	France	Isabelle Terrier	p.6		The paragraph on the criteria 3.1 looks like a description of what is done in Mediterranean.	Need to be said	Addressed on Section 2- ‘Criterion 3.1 Level of pressure of the fishing activity’ of the revised MSFD review D3 manual (page 10).
7	France	Isabelle Terrier	p.10	3-4	The first paragraph (“Further research is needed to address the fact that an SSB corresponding to MSY may not be achieved for all stocks simultaneously due to possible interactions between them”) is the wording of the ICES report, but it is not precise enough	It should be replaced by the following one: “Further research is needed to address the fact that the values of SSB corresponding to MSY, estimated for each stock in isolation, may not be achieved for all stocks simultaneously due to possible interactions between them”	Addressed on Section 3 - “3.2. Reproductive capacity of the stock ” of the revised MSFD review D3 manual (page 10).
8	France	Isabelle Terrier	p.10		This paragraph should be equivalent to the ICES report which says that the criteria 3.3 should be revised, that the indicator 3.3.2 should be considered in the D1, et which does not recommend the use of the indicator 3.3.4. Concerning the indicators 3.3.1 and 3.3.3, the trends should be monitored.	Propose to explicitly write that 3.3.2 is not relevant (for D3) and that 3.3.4. not to be used. Add that 3.3.1 and 3.3.3 would be monitored by trends. And that possible new indicators could be proposed in future	See comment 1.
9	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.4	9-11	We consider the proposal of the use of the term “Species” to be misleading, since management actions could not, most often affect the species level but only the stock/population level. Therefore we propose to maintain the use of the term “populations” or “stocks”. We also remark that there is an inconsistency in the D3 definition, using the terms population (beginning of the sentence) and stock (at the end) as equivalent. This inconsistency should be removed.		Proposed definition covers all situations, i.e. Populations, stocks and species. The level used should be in accordance with stock assessment and/or data availability.
10	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.4-5	24-26 1-6	It is not clear the hierarchy between DCF and Regional Sea Convention in the selection of species/stocks to be considered for D3 assessment: 1) RSC could add other species to the species’ list as identified by DCF? 2) or RSC could select a subgroup of DCF species to be included in the D3 assessment?		DCF already list species per region. This should be the basis, plus MS can add species regionally and nationally (e.g. local stocks).

11	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.5	14-30	There is the need to better clarify this relevant issue: CFP asks for Blim and Flim, but the MSFD, as it has been phrased, specifically quotes MSY. Thus the text should be amended accordingly... at the same time it is not clear whether MSY $B_{trigger}$ and B_{pa} are equivalent to Blim and if such limits could be used and estimated in the GFCM area.	See comment 2.
12	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.6	20-28	The objective applied to fisheries should be specified: Ecological Objective 3 (EO3) Actually the selection of stocks within EO3 is not the only difference to the Descriptor 3 of MSFD. Indeed there are some differences also in the proposed indicators (the definition of EO3 indicators is still under discussion) The need to make a selection among the various commercially exploited stocks in the Mediterranean is also due to the high biodiversity and to the multispecific nature of Mediterranean fisheries	See comment 10.
13	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.6	35-41	The following sentence should be better clarified: "The achievement of GES..., requires that shifts are taken into account, differentiating between shifts that are due to fishing pressure and those that are due to changes in climatic/hydrological conditions." Fishing pressure and environmental drivers could determine simultaneously changes on fish resources and it is objectively difficult to differentiate the two type of shifts. Moreover, in the Mediterranean, these changes may be amplified by the multi-trophic interactions between species.	See comment 5.
14	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.9	12-18	The text should specify in detail the meaning of "recent values" e.g. how many years before the GES assessment? Is the value equal to all stocks or does it differ between short living and long living species?	Addressed on Section 3 - "3.1. Level of pressure of the fishing activity" of the revised MSFD review D3 manual (page 9).
15	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.9	12-18	The text should clarify the meaning of the term "agreed value from the authoritative scientific institutions": e.g. agreed by whom? At national or international level? Through which formal process? What if different positions are present (e.g. STECF vs. GFCM or ICES or national authorities)? which is the associated hierarchy in the Med. e.g. STECF-SGMED-GFCM or the reverse?	Addressed on Section 1 - "Safe biological limits" of the revised MSFD review D3 manual (page 6, line 1).

16	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.9	19-...	As regards the catch/biomass ratio, the text could specify that when catch value is not available (i.e. for the lack of IUUF, discard, recreational fishing data), total landings data can be used instead of catch for a first estimation of the indicator.	True; whenever total landings are considered to be a good proxy of the catches.
17	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.9	31-36	The text should specify in detail the meaning of “recent values” e.g. how many years before the GES assessment? Is the value equal to all stocks or does it differ between short living and long living species?	See comment 14.
18	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.9	31-36	<p>The text should clarify the meaning of the term “reliable value for SSB_{MSY}”. This issue is relevant since it is not clear what will happen in the application of the Directive:</p> <p>1) how a SSB_{MSY} is deemed to be reliable?</p> <p>2) If you have both reliable and unreliable SSB_{MSY} for different stocks, it means that different ambition (i.e. different reference limits) will be applied for reaching GES? But still in some cases the SSB_{MSY} will be a limit?</p> <p>3) How to cope with such inconsistency that could arise ?</p> <p>Regarding the “authoritative scientific institutions”: e.g. agreed by whom? At national or international level? Through which formal process? What if different positions are present (e.g STECF vs. GFCM or ICES or national authorities?, which is the associated hierarchy in the Med. e.g. STECF-SGMED-GFCM ?</p>	See comment 2.
19	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.10	12-14	The term “surveillance indicator” should be explained. What would it be its use? Moreover we disagree, on the proposal: the indicator could be used as full indicator provided that the time-series allows to set credible reference levels (or directions). We believe MS could opt between the two alternatives (to make or not a full use of the indicator) duly justifying the scientific basis of the choice.	Addressed on Section 3 - “3.1. Level of pressure of the fishing activity” of the revised MSFD review D3 manual (page 10, line 3) and on Section 3 - “3.2. Level of pressure of the fishing activity” and of the revised MSFD review D3 manual (page 10, line 3)
20	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.10	33-34	Replace “(e.g. D1 – Biodiversity and D4 – Foodwebs)” with “(e.g. D1 – Biodiversity, D4 – Foodwebs, D6 - seafloor integrity)”	Replaced.

21	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.11	8-16	The section here seems to be too general quoting many options but not fully clarifying which will be the minimum requirement (all DCF species?) or only those above a landings percentage (and again which percentage?). Moreover, the percentage in landings, should be assessed at regional or subregional scale? And in the latter case, at national level? Why official DCF statistics are not quoted? In some cases in the Med the FAO GFCM statistics are not applicable since the spatial scale they are grouped are not fully consistent with the subregional boundaries; this issue should be acknowledged.	See comment 10.
22	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.12	Table 1	Again: in some cases in the Med the FAO GFCM statistics are not applicable since they do not overlap to subregional boundaries, this should be acknowledged.	GFCM need to take same process as ICES in order to find the best fit between ecoregions and GSAs.
23	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.13	Table 2	As mentioned this table fits to ICES stocks, it should be revised to take into account GFCM stock assessment specificities to use a common approach	The table was removed from the Manual.
24	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p.13	8-10	We consider that the establishment of a roadmap for different Regions for quality standard to meet criteria would be very helpful to guide the MSFD implementation	Not up to this group to put this in place, it is an implementation issue.
25	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p. 16	Table	The selected reference points of primary indicators should be considered as limit RP. To our understanding the phrase, as it is written is VERY misleading, and NOT in agreement with the basic principles of the MSFD for D3.	See comment 2.
26	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p. 15	38-41	There is a mistake: F should be at or below F_{MSY} ($F \leq F_{MSY}$)	Typo; corrected.
27	Italy	C. Silvestri, S. Raicevich, P. Battaglia	p. 15	38-41	Disagree, Secondary indicators could be used in some circumstances provided that historical reference levels (or reference directions) could be established. If used only for surveillance purposes, indicators should anyway lead some management measures in the light of the precautionary approach. This item should be discussed somewhere.	See comment 19.

28	Germany	Dr Pusch			<p>General comment: The first of the Criteria describes the mortality caused by fishing, whereas the second describes the state of the commercial stocks in terms of abundance (biomass or SSB). The third acts as a state criterion, and describes the age and size structure which indicates the resilience of a stock to stresses caused by, for example, unfavorable environmental conditions and human activities like fishing. This shows how the three criteria fulfil the objective of assessing progress towards good environmental status of all commercially exploited fish and shellfish stocks.</p>	General statement, no comment.	
29	Germany	Dr Pusch	p.5	28-30	<p>For the second Criterion 3.2 `Spawning-stock biomass (SSB) there are still discussions about the reference points. We argue that the reference points are achievable, if fishing mortality is reduced accordingly. [...] It is argued that stocks fluctuate naturally and "Therefore it may not make sense to set SSB_{MSY} as a specific target or limit for policy (p.5)." However, despite the much stronger fluctuations at lower stock sizes, two much lower biomass reference points are promoted: "Both these reference points (MSY B_{trigger} and B_{pa}) should be used as limits below which SSB must not fall." This is a contradiction in itself and needs to be corrected in document.</p>	<p>In our point of view, the usage of SSB_{MSY} is legally binding for each EU member state due to the new CFP and the MSFD. Furthermore, some stocks in the North (Herring, Plaice, and Sprat) or Baltic Sea (e.g. Sprat, Herring) already reached SSB_{MSY}, calculated with proxies.</p>	See comment 2.
30	Germany	Dr Pusch	p.6	35-41	<p>The text says (p.6): "However, population dynamic models used for fisheries management assume that stocks are isolated entities, ignoring the influence of environmental factors on stock productivity. The reference points based on these models do not take these environmental factors into account." This statement is factually wrong, because natural mortality, somatic growth and especially recruitment reflect environmental factors and are integral part of the models used to calculate reference points. This was clearly pointed out at the workshop</p>	See comment 5.	
31	Germany	Dr Pusch			<p>General comment: We welcome maintaining Criterion 3.3 and confirm there is a need for further development. Suggestions are on the table and further work on this topic in the ICES WKLIFE for example is very important.</p>	See comment 1.	

32 Germany Dr Pusch p.10 25-26 Selection of commercially exploited fish and shellfish

BfN proposes the following approach for the selection of commercially exploited fish and shellfish species:

Step 1 – The Member States’ lists of commercial stocks should first be derived at the MSFD regional (or subregional scale) level by including stocks that are assessed at the international level.

Step 2 – In addition to the internationally assessed stocks, there may be several fish and shellfish stocks that are important for small-scale/local coastal fisheries on a regional or national scale. Member States should identify these stocks and add them to their national list.

Step 3 – The list should include all stocks that each contributed more than 0.1% of the total landing weight or species, which are sensitive and / or have been of much higher importance regarding landing weight in the past (e.g. European Eel, spurdog).

Step 4 - The result of the Selection of stocks must be a list of all commercially exploited fish and shellfish stocks in the relevant region plus stocks on national scale.

Step 5 - Evaluate the data to carry out an assessment of each stock against the three GES criteria mentioned in EC Decision 2010/477/EU.

Step 6 – The result of the evaluation must be, how many of the stocks are assessed and how many stocks are without enough data to carry out an assessment. Both must be shown by each Member state.

Section 4 - "Selection of commercially exploited fish and shellfish" of the revised MSFD review D3 manual already identifies a practical and common sense approach for selection of fish and shellfish to be assessed.

33	Germany	Dr Pusch	p.12 p.16	Table 1	<p>Table 1. Methodological standards for commercially exploited fish and shellfish. I: Assessment of the status of the marine environment, II: monitoring, and III: environmental targets and p.16 'SSB >MSY B_{trigger}'</p> <p>In the document it is argued (table 1 p. 12): 'Spawning-stock biomass (3.2.1.). Any observed SSB value equal to or greater than SSB_{MSY} is considered to meet this criterion. Where it is not possible to determine a reliable value for SSB_{MSY}, an appropriate reference point (identical for all regions) needs to be identified by the authoritative institutions. ICES has selected MSY B_{trigger} for this purpose'.</p>	<p>From the BfN point of view this is in conflict with the requirements of the CFP and MSFD: The new CFP aims for stock sizes above the level that can produce MSY (> 0.4 B₀). But ICES now promotes MSY B_{trigger} as the corresponding reference point. This is defined as a level of SSB below which the stock is outside the range of values associated with SSB_{MSY} (ICES Advice 2013, Book 1). In other words, MSY B_{trigger} is the biomass that has a close to zero probability of being able to produce MSY. Since there is no method for estimation, ICES stock assessment groups are setting it equal to B_{pa}. Consequently, every stock where $F \leq F_{MSY}$ and $B \geq MSY B_{trigger}$ can be declared as being compatible with the MSY-approach, effectively undermining Article 2 of the new CFP, which mandates stock sizes above the level that can produce MSY. Therefore the correct indicator is $SSB > B_{MSY}$.</p>	See comment 2.
34	CNPMEM - EMPA	Perrine Ducloy			<p>General comment: The document mixes different concepts that do not have the same meaning: safe biological limits (B_{lim} and F_{lim}), precautionary approach (or reasonable biological limits) (F_{pa} and B_{pa}) and maximum sustainable yield (F_{MSY} and MSY-B_{trigger}).</p>	<p>It seems necessary to clearly define every concept and the relationship between each.</p>	See comment 2.

35	CNPMEM - EMPA	Perrine Ducloy			<p>General comment: The document on the general context of ICES advice of May 2014 (see attached) echoes the problems posed by the principle of "MSY for all stocks" because of ambiguities that exist in the way of reaching the MSY: 1° generally perspectives are different depending on the scale we are looking at, 2° it is impossible, when considering the F_{MSY} specific to each stock, to meet all of them simultaneously (due to technical interactions : i.e. you cannot choose to fish only one species), 3° trophic interactions that exist between species do not allow to say that there is a unique F_{MSY} for each species. cf. 1 2 Advice_basis_2014</p>	<p>The conservationist approach of retaining MSY for all stocks doesn't fit into the broader sustainable development objectives of the CFP, and this choice would object to make the best economic use of ecosystem productivity (which is the substance of the concept of MSY), preventing a global maximization of production that anyway provides respect to the biological limits. Thus we propose to introduce the following formulation: "In mixed fisheries and where ecosystem interactions are important, long-term management plans may result in exploiting some stocks at levels different from individual F_{MSY} in order not to prejudice the global exploitation at F_{MSY} level. However, the precautionary approach, and so F_{pa}, shall form an upper bound for exploitation under these conditions."</p>	See comment 7.
36	CNPMEM - EMPA	Perrine Ducloy	p.8	6-12	<p>Section on the criterion 3.1 seems to be a description of what is done in the Mediterranean (GFCM) in which the target is $F_{0.1}$ and the exploitation rate $E = 0.4$ for small pelagic stocks. This could be precised.</p>		See comment 6
37	CNPMEM - EMPA	Perrine Ducloy	p.10	16-20	<p>concerning the criteria 3.3, we don't understand why the manual descriptor does not include the text of the WKGMSFDD3 report (page 25) in the context of the revision of 3.3: - The indicator 3.3.2 must be considered in the D1 and not in the D3, - The indicator 3.3.4 should not be used.</p>		See comment 1.

38	CCB, OCEANA, Seas at risk, FISH	Nils Höglund, Magnus Eckeskog, Björn Stockhausen, Annelie Brand	p.7	<p>on Aggregation Method(s) considered</p> <p>This issue was part of background documents before the expert meeting at ICES and was also discussed at the ICES meeting. The meeting concluded that there is no scientific reason or justification for aggregation in this particular case on Descriptor 3, and therefore there were no suggestions to add anything to the Decision on this matter regarding D3. This should be clarified in the opening statement of this section in the paper.</p> <p>However, we feel it is important to state that we support the use of the OOA principle as an operational use of the precautionary approach when data are insufficient or when the GES boundary is unclear.</p>	Agregation, OOA. Not to be addressed till 3.3 is developed. Diferent workshop.
39	CCB, OCEANA, Seas at risk, FISH	Nils Höglund, Magnus Eckeskog, Björn Stockhausen, Annelie Brand	p.6	<p>on Linkages with international and RSC norms and standards</p> <p>The statement about HELCOM on page 4, and the additional HELCOM target to reach a healthy stock that is distributed throughout its natural geographical range is partly incorrect. It is said that this element does not exist in MSFD D3 and this is true. However it is a part of the MSFD and the D1 (fully covered by criteria 1.1) and should be true also for all commercial species of course and this should be stated here. Furthermore, in the BSAP of 2007, the HELCOM target of reaching maximum sustainable yield is supported by indicators which imply that it is both biomass compared to B_{pa} and fishing mortality compared to F_{pa} that is referred to, thus making the HELCOM BSAP compliant with both the CFP objectives in Art. 2.2. and the MSFD regarding F and SSB_{MSY}.</p>	Addressed on Section 1 - Approach: "Linkages with international and RSC norms and standards " of the revised MSFD review D3 manual (page 6, line 25-34).

40	CCB, OCEANA, Seas at risk, FISH	Nils Höglund, Magnus Eckeskog, Björn Stockhausen, Annelie Brand	p.10	<p>Section 4) Methodological standards for monitoring and assessment in relation to GES</p> <p>A few key topics were discussed at the ICES meeting, which forms the basis of this paper. Some important aspects that were agreed upon at the meeting are not fully included in the current paper:</p> <ol style="list-style-type: none"> 1. An issue repeatedly discussed at the meeting was that the ICES advice and input related to the MSFD on reference levels, indicators, etc., are always based on a regional or sub-basin level and/or at fish stock level. Therefore, it was agreed that the same reference levels and indicators and the same regional scale must be used by all Member States (MS) sharing fish stocks, as they comprise the input for i.e. modelling and/or assessment. MS should not use separate indicators and reference levels, but must focus on a common approach to GES and its indicators. <p>The above discussion is not fully reflected in the report from the ICES meeting, and consequently in this paper from Milieu, but we believe it is an important aspect that all MS need to be aware of as they rely on ICES advice for both commercial fish stocks and relevant parts of the MSFD. Furthermore, this is clearly linked to the discussion in sections 5 and 7 in the cross-cutting issues paper from the Commission (document GES_12-2014-03).</p> <ol style="list-style-type: none"> 2. Another clear conclusion from the ICES meeting was that all the texts from the meeting must be in line with the requirements of the CFP, and that the report from the meeting should be “cleaned” accordingly. This was not fully achieved and there are still problems in meeting the demands of both CFP and MSFD as regards to our next point (3). 3. The key point, which is incorrectly stated both in the report from the WG and in this paper from Milieu, is the acceptance of a definition of GES for a fish stock in relation to criteria 3.2 on biomass. The ICES meeting discussed at some length the need to establish SSB_{MSY} or B_{MSY} levels and did not agree to support a definition of GES as stated: “GES is reached if $SSB > MSY B_{trigger}$”. $MSY B_{trigger}$ is only to be viewed as a proxy, which merely represent a stock that is just above a biomass level where recovery actions are needed. Such definition is neither in line with the CFP objectives nor the MSFD (as it is also stated in Table 1, page 10) and furthermore represents a major step back from the ambitions of the MSFD of reaching GES rather than avoiding dangerously low levels. This cannot be accepted and the Commission must ask ICES to explain this further and give advice in accordance with both MSFD and CFP. 	See comment 2.
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Annex 5. Review Group Technical Minutes

MSFD D 3, 4 and 6 Review Group

2-6 March 2015 (by correspondence)

Reviewers: Carl O'Brien (chair)
Eugene Nixon
Samuli Korpinen

This review group worked by correspondence during the week indicated. Two WebEx meetings were held during the review – one on the 2nd March to agree the approach to the review, ensure that all outstanding review documentation would be made available during the week by the ICES' Secretariat and assign tasks to the reviewers; and the second on the 5th March to ensure consistency in approach to the reviews of the three MSFD Descriptors and agree deadlines for completion.

Review introduction

In the context of the revision of the 2010 MSFD Decision, the Commission (DG-ENV) has asked ICES to provide guidance to address the scientific interpretation of the ideas and concepts of the Decision as part of a review process. This was the second set of 'Workshops on guidance for the review of MSFD decision (WKGMSFD II)' for descriptors on commercial fish and shellfish (D3), food webs (D4) and seafloor integrity (D6).

The workshops have contributed towards revising the existing Manuals (together with workshop reports) addressing the relevant scientific comments received from WG GES, DG ENV, MS and stakeholders and commenting on implications for MSFD cross-cutting issues across descriptors.

The reports, revised manuals and this review will underpin the ICES' advisory process and publication by 20th of March. The ICES' Advice (i.e. the revised Manuals) will contribute to the MSFD WG GES meeting (22-23 April 2015) to inform the discussion on the revision of the 2010 Decision process.

ICES' review of the Marine Strategy Framework Directive Descriptor 3 – Commercially exploited fish and shellfish

Good Environmental Status (GES) for Descriptor 3 – *Populations of all commercially exploited fish and shellfish are within safe biological limits, exhibiting a population age and size distribution that is indicative of a healthy stock.*

The assessment of the GES status for the Descriptor 3 is based on three criteria: (3.1) exploited sustainably consistent with high long-term yields, (3.2) have full reproductive capacity, and (3.3) exhibit a population age and size distribution that is indicative of a healthy stock.

The report (ICES CM 2015\ACOM:48) from the ICES WKGMSFDD3-II has been technically reviewed; together with the EU_Annex_I_D3_Manual_Milieu(1) and proposed amendments.

The ICES' workshop focused on the scientific challenges for the Descriptor 3 (commercially exploited fish and shellfish), specifically to clarify text and make the Com-

mission Decision understandable through the use (and/or revision) of the latest technical service issued by ICES in October 2014. The Terms of Reference (ToRs) have been addressed in a constructive manner.

The basis for the workshop was the EU_Annex_I_D3_Manual_Milieu(1); together with relevant scientific comments and requests for clarification received from WG GES, DG ENV and stakeholders (Member States, NGOs and industry) collated within a separate spreadsheet. In total, 40 comments were received and responded to in the ICES workshop's report Annex 4. All comments have been addressed appropriately with a response but the response to comment 23 is misleading for the following reason. Table 2 has not been suggested for removal from the proposed revision to EU_Annex_I_D3_Manual_Milieu(1) but maintained as specific to ICES' stocks and a note states that this may need further revision to accommodate the classification of Mediterranean stocks. This seems a sensible compromise, as in the original technical service issued by ICES last October 2014, but it is not as stated in ICES' response within the workshop report.

The report of the meeting of the ICES' workshop is well-documented and arguments well-presented. The workshop's findings were immediately applied to provide suggested revisions to EU_Annex_I_D3_Manual_Milieu(1) in a separate document: EU_Annex_I_D3_Manual_Milieu(1) revised. These amendments will greatly assist ICES in drafting its advice for the European Commission, DG Environment.

A weakness of the revised text remains the approach to the assessment of stocks against safe biological limits in the GFCM area - a comment is included in the proposed revision with no guidance provided. During this review, the Chair contacted Celia Vassilopoulou for further clarification with respect to the GFCM area, and the following text and references were helpfully provided:

Stocks outside safe biological limits per area are highlighted in the yearly GFCM reports. According to assessment results of the respective GFCM WG reports in 2014, advice was provided for 26 demersal stocks, the 81% considered as overfished; for the 12 pelagic stocks that were assessed, 75% were considered as either depleted (2 stocks), or overfished (5 stocks), or being at increased risk (2 stocks) (Bernal, 2014). GFCM knowledge on stock status, refers to a total of 83 stocks that have been assessed from 18 out of the 30 Geographical Subareas Areas (GSAs) in the Mediterranean and the Black Sea. Around 40 stocks were assessed per year in the last two years. However, these constitute a low percentage of the declared catches. Five pelagic stocks and one shrimp stock have biomass reference points, with B_{MSY} calculated from production models, and B_{pa} from empirical analysis. All demersal stocks have $F_{0.1}$ as the reference point, while for pelagic stocks the exploitation rate reference point ($E = 0.4$) has been used, except for one case that the $F_{0.1}$ reference point has been adopted. Assessment of the Mediterranean resources, particularly within non-EU countries due to lack of pertinent data, is based mainly on analysis of landing trends, commercial catch-per-unit-effort (CPUE) data, biomass surveys. Data that could be used for stock assessments should become available for the whole Mediterranean and Black Sea basins as currently there are efforts for setting-up joint monitoring programmes in the GFCM area (GFCM, 2014), which would enable further harmonization of the ICES' and GFCM's approaches.

The texts for criteria 3.1 and 3.2 have been amended, with a specific focus on criterion 3.2, and the criterion 3.3 necessitates a further revision which as yet, cannot be fully specified. Instead, a new suite of indicators for criterion 3.3 has been proposed that requires further scientific development before becoming operational. Helpfully, however, the ICES' workshop proposed a roadmap comprising two steps – i) indica-

tor evaluation and selection, and ii) assessment against GES, for the necessary further developments under criterion 3.3.

Additional references to those for review

Cited within the review of Descriptor D3:

Bernal, M. (2014). Sustainable management of fisheries in the Mediterranean and Black Sea. RInES:Research and Innovation in the service of Economy and Society EU Neighbourhood and the Black Sea Region, Thessaloniki, 29-30 May 2014.

GFCM (2014). First MedSuit Regional Workshop on indicators and targets to ensure GES of commercially exploited marine populations in the GFCM area. Technical report, Rome, November 2014.