



**Template for the review of Decision 2010/477/EU
concerning MSFD criteria for assessing good environmental status
according to the review technical manual**

Descriptor 2

Version	Date	Authors	Description
0.0	10/03/2014	DG ENV, Milieu, JRC, ICES	Draft manual to guide the technical review of the GES decision.
1.0	24/06/2014	DG ENV, Milieu	Approach and results from the Art.12 assessment filled up.
2.0	21/07/2014	JRC	Further developed and distributed to experts for comments and input.
2.1	13/10/2014	JRC, Member States experts	Comments and input from experts incorporated in the current draft version. To be sent for a 2 nd round of consultation after the GES meeting.
3	17/03/2015	JRC, Member States experts, GES	1st round comments and inputs from experts group and GES members incorporated in the current draft version, also including outcomes from cross-cutting workshop (Jan. 2015). To be sent for a 3 rd round of consultation to experts and ENV.
4	08/04/2015	JRC, Member States experts, GES	Final version of the document sent to WG GES for the April's 2015 meeting

1 **Review of Decision 2010/477/EC**

2 **Introduction**

3 The MSFD Committee (Art. 25 of the MSFD) discussed and concluded an approach and an outline for
4 the process of a review and possible revision of Commission Decision 2010/477/EU on GES criteria
5 and of MSFD Annex III (see Committee/07/2013/03rev for details). Based on the template in the
6 annex to the mandate of the MSFD Committee, a more detailed manual for the technical phase
7 relating to the review of Commission Decision 2010/477/EC has been developed to guide the parallel
8 preparatory process and discussions per descriptor. The review will aim to define GES criteria more
9 precisely, including setting quantifiable boundaries for the GES criteria where possible and
10 specifications and standardised methods for GES assessment in particular as regards temporal and
11 spatial aggregation. The review of Annex III will be carried out as a parallel process. The review of
12 the Common Understanding Document is also taking place alongside these two processes. Close
13 coordination between these three processes should be ensured.

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Descriptor 2: Non-indigenous species

Good Environmental Status for Descriptor 2: "Non-indigenous species introduced by human activities are at levels that do not adversely alter the ecosystem" (Annex I of the MSFD).

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32 combine several descriptors together)..... 15

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57	dated or may need to be aligned with other or new legislation, etc.	23
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74	for assessment of each criterion, including parameters, units of measurement and data quality	
75	requirements), which aim at ensuring the comparability of monitoring results, on the basis of	
76	JRC / ICES / RSC survey protocols, relevant European/international standards (e.g. ISO/CEN) and	
77	Article 12 findings.	27

78	7.2 Proposals for specifications on methods for assessment, which aim at ensuring	
79	comparability of assessment results, including aggregation of monitoring data within an	
80	assessment area for a particular criterion and if necessary aggregation across assessment areas	
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89	decision, these elements should be specified and a proposal should be made in which way they	
90	should be laid down, e.g. interpretative guide for the application of the future Decision or CU	
91	guidance document or technical background document.	29
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1. Approach

1.1 General guiding principles for the review

The review aims to analyse the results from the first MSFD reporting round on Articles 8, 9 and 10 with a view to update/improve and simplify the Com Decision 2010/477/EU.

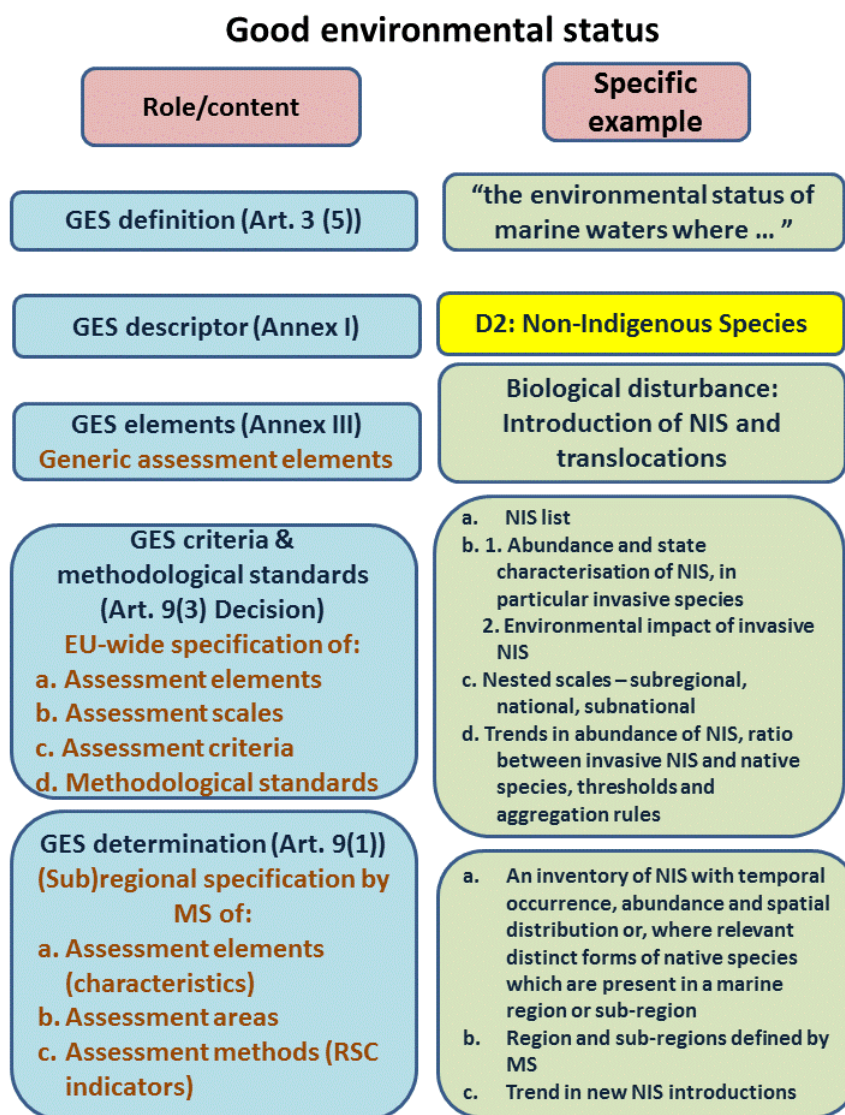
Based on the information in the Art 12 assessment reports (COM(2014)97 final) and the JRC in-depth assessments (JRC, 2014) a template has been prefilled by Milieu for DG ENV, commented by DG ENV and completed by JRC which should enable the experts group to analyse current shortcomings, propose ways forward, such as e.g. needs for further guidance and development, but eventually also to develop proposals for amending the Decision 2010/477/EU, based on scientific knowledge and experience in the implementation process.

The current review should lead to a new GES Decision which is:

- Simpler
- Clearer
- Introducing minimum requirements (to be enhanced by regions and MS, if necessary)
- Self-explanatory
- Coherent with other EU legislation
- Coherent with regional assessment methods (where EU does not exist)
- Have a clear and minimum list of criteria and methodological standards and related characteristics (Table 1, Annex III)
- Ensure that criteria and methodological standards are adequately addressing the Descriptors and these are covered by the proposed criteria, to lead to complete assessments
- Coherent with the MSFD terminology

This review should lead to a more coherent approach to the definition of GES based on agreed criteria and methodological standards that allow for determining the distance of the current state from GES. Figure 1¹ show an example to test the proposed architecture of the MSFD. This can be used as guide for the characteristics/ elements to be addressed under Annex III and the revised Decision and to streamline the discussion to be carried out through the review process.

¹ Modified from DG ENV's presentation in June's 2014 DG GES group: <https://circabc.europa.eu/w/browse/f3953f48-f965-43d4-93a5-075f82cc1f12>



128
129 **Fig. 1** Relationship of MSFD provisions for determining GES. The specificity of the requirements
130 increase from Art. 3(5) through to Art. 9(1) MSFD. The generic role for D2 is outlined.
131

132
133 The following points are summarising the role of GES in MSFD. According to the Directive GES is:

- 134 • starting and end point of MSFD
- 135 • reference point for the other MSFD provisions
- 136 • determined at the level of marine (sub)regions
- 137 • specified by common criteria and methodological standards
- 138 • legally time bound (2020) and subject to legally defined exceptions where this is not feasible

139
140 GES needs to be established in a way as to allow determining the distance of the current state from
141 GES and for defining targets to guide progress towards GES².
142

2 From DG ENV’s presentation in March’s 2014 WG GES group:
https://circabc.europa.eu/d/a/workspace/SpacesStore/2e3f1f2f-c1ef-407f-a433-12cf73e9e61b/GES_11-2014-13_CommonUnderstanding.ppt

143 **1.2 Overall reflection of the type of descriptor and descriptor criteria (e.g.**
144 **state/pressure, quantitative/qualitative) and its relationship with Article 3(5).**

145 There are currently over 1 300 non-indigenous marine species in the European seas (Katsanevakis et
146 al. 2013a³). About 6% of these species have been documented to have high impact on marine
147 ecosystem services and biodiversity; in many cases non-indigenous marine species impact
148 keystone/protected species and habitats and substantially modify ecosystem processes or wider
149 ecosystem functioning (Katsanevakis et al. 2014⁴).

150 Invasive non-indigenous species (IAS) cause adverse effects on environmental quality resulting in
151 changes in biological, chemical and physical properties of aquatic ecosystems. They can displace
152 native species, cause the loss of native genotypes, modify habitats, change community structure,
153 affect food-web properties and ecosystem processes, impede the provision of ecosystem services,
154 impact human health, and cause substantial economic losses (Grosholz, 2002⁵; Wallentinus and
155 Nyberg, 2007⁶; Molnar et al., 2008⁷; Vilà et al., 2010⁸; Katsanevakis et al., 2014⁹). The magnitude of
156 impacts may vary from low to massive and they can be sporadic, short-term, mid-term or
157 permanent.

158 According to Art.3 (5) of the MSFD, D2 is referring to the environmental status of marine waters
159 where non-indigenous species (NIS) introduced by human activities are at levels that do not
160 adversely alter the ecosystem. Thus, D2 pressure level should be accompanied by measurable
161 criteria. However, this could be difficult to accomplish due to e.g. lack of linear correlation between
162 the numbers/ abundance of NIS and their impacts.

163 Invasive non-indigenous species don't pollute the marine environment in the same way as occurs
164 with chemical pollution or eutrophication¹⁰. The later can be effectively tackled provided that
165 appropriate measures are taken. For IAS, prevention by identification and risk analysis of different
166 pathways and vectors for species introductions is by far more cost-effective and environmentally
167 desirable than post-introduction measures, such as eradication or long-term containment (recital
168 (15) of IAS Regulation 1143/2014/EU). In the marine environment, prevention seems to be the only
169 feasible alternative, as with current understanding eradication is unfeasible with established species,
170 but there has been some successes in the early stages of introduction (e.g. the eradication of
171 *Caulerpa taxifolia* in California, Anderson, 2005¹¹, which was a success according to Final *Caulerpa*

³ Katsanevakis S, Gatto F, Zenetos A, Cardoso AC, 2013a. How many marine aliens in Europe? Management of Biological Invasions 4(1): 37–42.

⁴ Katsanevakis S, Wallentinus I, Zenetos A, Leppäkoski E, Çinar ME, Oztürk B, Grabowski M, Golani D, Cardoso AC, 2014. Impacts of marine invasive alien species on ecosystem services and biodiversity: a pan-European critical review. Aquatic Invasions 9(4): 391–423.

⁵ Grosholz, E, 2002. Ecological and evolutionary consequences of coastal invasions. *Trends Ecol. Evol.* 17, 22-27.

⁶ Wallentinus I, Nyberg CD, 2007. Introduced marine organisms as habitat modifiers. *Mar. Pollut. Bull.* 55, 323–332.

⁷ Molnar JL, Gamboa RL, Revenga C, Spalding MD, 2008. Assessing the global threat of invasive species to marine biodiversity. *Front. Ecol. Environ.* 6, 458–492.

⁸ Vilà M, Basnou C, Pysek P, Josefsson M, Genovesi P, Gollasch S, et al., 2010. How well do we understand the impacts of alien species on ecosystem services? A pan-European, crosstaxa assessment. *Front. Ecol. Environ.* 8, 135–144.

⁹ Katsanevakis S, Wallentinus I, Zenetos A, Leppäkoski E, Çinar ME, Oztürk B, et al., 2014. Impacts of marine invasive alien species on ecosystem services and biodiversity: a pan-European critical review. *Aquat. Invasions*, in press.

¹⁰ Task Group 2 Report Non-indigenous species JOINT REPORT, 2010.

¹¹ Anderson LWJ, 2005. California's reaction to *Caulerpa taxifolia*: a model for invasive species rapid response. *Biol. Invasions* 7, 1003-1016.

172 *taxifolia* Eradication Report, May 2006¹²). The risk of new biological invasions could be effectively
173 minimized by precautionary measures such as the IMO Convention on ballast water management.

174 The Descriptor 2 (MSFD, 2008/56/EU) is a pressure descriptor that focuses on the prevention and
175 reduction of impacts of marine non- indigenous species. New introductions of NIS and increases in
176 the abundance and spatial distribution of established NIS should be prevented. Descriptor 2
177 interacts with several other GES pressure Descriptors which have impact on native biodiversity,
178 ecosystem functioning and seabed habitats as well as commercial marine resources (seafood),
179 namely D 3, 5, 6 7, 8, 9, 10. Indeed, perturbations induced by pressure on ecosystem state, may
180 facilitate installation and/or spread of NIS, which are often opportunistic. In particular, impacts that
181 result from NIS should be managed, where feasible, so that the achievement of GES for the
182 biodiversity Descriptors 1, 3, 4 and 6 is not compromised.

183

184 **1.3 Linkages with existing relevant EU legal requirements, standards and limit values,** 185 **such as the WFD, and the identification of potential incoherence.**

186 With the exception of the EU Regulation concerning the use of alien and locally absent species in
187 aquaculture (EU, 2007¹³) and its implementing rules (EU, 2008b¹⁴), no comprehensive instrument
188 existed on EU level to tackle alien species until recently, when in 2008 the EC, within its
189 Communication¹⁵, addressed the need for coordinated action to tackle the spread of invasive NIS. In
190 2013 the European Commission published a proposal for an EU Regulation¹⁶ designed to respond to
191 the increasing problems caused by the impacts of IAS on the environment and the economy. As a
192 follow up an EU regulation has been recently published (⁵Regulation No 1143/2014/EU).

193 The Regulation No 708/2007/EU establishes a framework for the management of aquaculture
194 practices in relation to NIS, to assess and minimise their potential impact and that of any associated
195 non-target species on aquatic habitats. The information collected under this Regulation, e.g.
196 introduced species, location of aquaculture facility, species risk assessment and monitoring results
197 should be considered in relation to the MSFD D2. Furthermore, this Regulation could be an
198 instrument to tackle identified impacts from NIS in relation to the MSFD.

199 The Regulation No 1143/2014/EU establishes rules to prevent, minimise and mitigate the adverse
200 impact on biodiversity of the intentional and unintentional introduction and spread within the EU of
201 IAS. It indicates three types of interventions; prevention, early warning and rapid response, and
202 management to tackle the problem. It is expected that a list of invasive non-indigenous species of EU
203 concern will be developed, so as to guide implementation of the Regulation. With this aim, the
204 Regulation on the prevention and management of the introduction and spread of IAS specifically
205 requests action plans on the main pathways of invasive non-indigenous species (Article 13). Member

¹² Merkel & Associates. 2006. Final report on eradication of the invasive seaweed *Caulerpa taxifolia* from Agua Hedionda Lagoon and Huntington Harbour, California. Prepared for Steering Committee of the Southern California *Caulerpa* Team.

¹³EU, 2007. Council Regulation Concerning Use of Alien and Locally Absent Species in Aquaculture. Regulation 708/2007, OJ L 168.

¹⁴EU, 2008b. Commission Regulation Laying Down Detailed Rules for the Implementation of Council Regulation (EC) No 708/2007 Concerning Use of Alien and Locally Absent Species in Aquaculture. Regulation 535/2008, OJ L 156.

¹⁵Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions 'Towards an EU Strategy on Invasive Species', COM(2008) 789 final.

¹⁶ Proposal for a Regulation on the prevention and management of the introduction and spread of invasive alien species, (COM(2013) 620).

206 States can also take emergency measures when there is evidence concerning the presence, or
207 imminent risk of introduction into its territory of an invasive non-indigenous species, which is not
208 included on the Union list (Art. 10 of IAS Regulation 1143/2014/EU) but were found during
209 surveillance or monitoring. Furthermore, the Member State has the obligation to build a surveillance
210 system of IAS of Union concern or include it in their existing system (Art. 14 of IAS Regulation
211 1143/2014/EU), as such systems offer the most appropriate means for early detection and rapid
212 eradication at an early stage of invasion as is stipulated in articles 16 and 17 of the IAS Regulation
213 1143/2014/EU to prevent the spread of IAS into or within the Union.

214 It is yet not known which marine species will be included in the list of species as "of Union concern"
215 to be developed by the Commission in cooperation with the Member States. The list derived by
216 evidence-based risk assessments will be of dynamic nature and will potentially include species (Art.
217 4, Regulation 1143/2014 on IAS¹⁷) across all environments and taxonomic groups. Species of Union
218 concern will be the ones whose negative impact requires concerted action at Union level.

219 Also as with EU Regulation concerning the use of alien and locally absent species in aquaculture, the
220 information collected under the Regulation 1143/2014 e.g. species risk assessment and monitoring
221 results should be considered in relation to the MSFD D2 and the Regulation can become an
222 instrument to tackle identified impacts from NIS in relation to the MSFD. Furthermore, an efficient
223 implementation of both the Regulation and the MSFD for D2 would benefit from the coordination of
224 the required monitoring programs and programme of measures under the two policies.

225 Other EU legislations related to NIS include: (i) the Birds Directive (2009/147/EC), (ii) the Habitats
226 Directive (92/43/EC), (iii) the Phytosanitary Directive (2000/29/EC), (iv) the Regulation on wild
227 species trade (1997/338/EC),(v) the Water Framework Directive (2000/60/EC) and the Directive on
228 animal health requirements for aquaculture animals and products thereof (2006/88/EC). These six
229 legislative instruments are not focused on NIS but partly cover this issue by requiring NIS
230 consideration in the frame of restoration of biodiversity conservation status, ecological conditions
231 and animal health.

232 In the context of the Water Framework Directive (WFD), EU Member States have developed
233 pressure-based assessments of the ecological status of their water bodies, including coastal water
234 bodies. Invasive non-indigenous species are recognised to constitute a major pressure in many
235 aquatic ecosystems, yet are not explicitly accounted for by the majority of WFD assessment
236 methods. Most Member States argue that no explicit assessment of IAS is required, assuming that
237 significant IAS pressures will affect the WFD biological quality elements (BQEs), and be detected by
238 generic WFD status assessments. Thus, these are in most cases not specifically targeted in the WFD
239 monitoring and assessment; no specific ecological quality ratio have been agreed for non-indigenous
240 species.

241

¹⁷ REGULATION (EU) No 1143/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species. OJ:L317/35/2014 .

242 **1.4 Linkages with international and RSC norms and standards**

243 At the **international level**, the United Nation Convention on the Law of the Sea (UNCLOS, 1982¹⁸)
244 explicitly places a general requirement on Parties to take measures “to prevent, reduce and control
245 pollution of the marine environment resulting from...the intentional or accidental introduction of
246 species alien or new, to a particular part of the marine environment, which may cause significant and
247 harmful changes thereto” (Article 196). The Convention on the Conservation of European Wildlife
248 and Native Habitats (Bern Convention, 1979¹⁹) recommends a European strategy on IAS.
249 Furthermore, the Convention on Wetlands (Ramsar Convention, 1994²⁰) and the Bonn Convention
250 on Migratory Species (1979²¹) have both adopted resolutions regarding alien species. The
251 Convention on Biological Diversity (CBD) recognised the need for the “compilation and dissemination
252 of information on alien species that threaten ecosystems, habitats, or species, to be used in the
253 context of any prevention, introduction and mitigation activities”, and calls for “further research on
254 the impact of alien invasive species on biological diversity” (CBD 2000²²). CBD in its Strategic Plan for
255 Biodiversity 2011–2020 agreed on a set of targets (Aichi targets), including Target 9 on alien species:
256 ‘By 2020, invasive alien species and pathways are identified and prioritized, priority species are
257 controlled or eradicated, and measures are in place to manage pathways to prevent their
258 introduction and establishment.’ This Aichi Target 9 has been widely adopted, e.g. by the EU in its
259 ‘EU Biodiversity Strategy 2020’ (COM (2011) 244²³).

260 The International Maritime Organisation’s (IMO) International Convention on the Control and
261 Management of Ships’ Ballast Water and Sediments (Ballast Water Management Convention –
262 BWMC, 2004²⁴) aims to prevent, minimize and ultimately eliminate the transfer of harmful aquatic
263 organisms and pathogens through the control and management of ships’ ballast water and
264 sediments. The Convention will enter into force 12 months after ratification by 30 States,
265 representing 35 per cent of world merchant shipping tonnage. To-date, the Convention is not in
266 force as the current ratifications do not represent yet 35 per cent of the world merchant shipping
267 tonnage.

268 Although the best strategy is to prevent introduction of NIS, this is extremely difficult as ships move
269 constantly in and out of an area, especially for species introduced through growth on the ship’s hull
270 (hull fouling or biofouling) that is open to the environment. Recently, voluntary guidelines have been

¹⁸ United Nations Convention on the Law of the Sea, 1982. United Nations Treaty Series.

¹⁹ Convention on the Conservation of European Wildlife and Natural Habitats, 1979
<http://conventions.coe.int/Treaty/en/Treaties/Html/104.htm>

²⁰ Convention on Wetlands of International Importance especially as Waterfowl Habitat, 1994. Ramsar, Iran, 2.2.1971 as amended by the Protocol of 3.12.1982 and the amendments of 28.5.1987.
http://www.ramsar.org/library/field_date/%5B1971-01-01T00%3A00%3A00Z%20TO%201972-01-01T00%3A00%3A00Z%5D/field_tag_body_event/establishing-the-convention-566

²¹ Convention on the Conservation of Migratory Species of Wild Animals (CMS), 1979. <http://www.cms.int/en/node/3916>

²² CBD, 2000. Executive Secretariat to the CBD, Climate Change and Biological Diversity: Cooperation between the Convention on Biological Diversity and the United Nations Framework Convention on Climate Change (UNEP/CBD/SBSTTA/6/11), available at <<http://www.biodiv.org>>

²³ EU, 2011. Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and the Committee of the regions. Our life insurance, our natural capital: an EU biodiversity strategy to 2020. COM (2011) 244.

²⁴ Available at the following link:
<http://www.imo.org/About/Conventions/ListOfConventions/Pages/International-Convention-for-the-Control-and-Management-of-Ships%27-Ballast-Water-and-Sediments-%28BWM%29.aspx>

271 adopted by the IMO to avoid the introduction of NIS through the ship's hull for commercial and
272 recreational ships (IMO Hull Fouling guidelines. MEPC.1/Circ.792 12 November 2012²⁵).

273 The **Regional Sea Conventions** have taken various initiatives in relation to NIS.

274 **HELCOM** parties have agreed to ratify the BWMC following the adoption of a HELCOM Ballast Water
275 Road Map by the HELCOM Ministerial Meeting (2007) in Krakow. A Joint HELCOM/OSPAR Task
276 Group on NIS is working to develop a common framework on the specific issue of exemptions for the
277 BWMC, for both the Baltic Sea and the North-East Atlantic regions (HELCOM, 2013a²⁶). A list of non-
278 indigenous, cryptogenic and harmful native species in the Baltic Sea was compiled for the needs of
279 HELCOM Ballast Water Road Map, HELCOM HABITAT and MONAS and is continuously edited and
280 updated by various HELCOM subsidiary bodies, expert workshops and projects (list of taxa identified
281 from ports surveyed within HELCOM ALIENS- projects in HELCOM, 2014a²⁷). Since 2008 the list has
282 been modified by HELCOM HABITAT (11/2009 and 12/2010), HELCOM MONAS (12/2009), the
283 HELCOM HOLAS project and, most recently, by the HELCOM CORESET project. HELCOM ALIENS
284 projects focused on NIS (ALIENS 3 was the most recent project that ended in 2013 and aimed to
285 support the ratification of BWMC by developing NIS monitoring in ports and the risk assessment
286 methods) (HELCOM, 2014a³¹, b²⁸). HELCOM CORESET stated that in 2012 there were 118 NIS
287 reported in the Baltic Sea and 90 of those were considered to be established (Rolke et al., 2013²⁹). In
288 addition, the HELCOM CORESET project developed a set of core indicators in the Baltic Sea.
289 Currently, 20 core indicators are established for biodiversity, covering the needs of MSFD including
290 NIS (HELCOM, 2013b³⁰).

291 NIS introductions are identified as a relevant pressure from human activities in the **OSPAR** Maritime
292 Area (OSPAR, 2009 (draft)³¹). Recently the OSPAR Intercessional (OSPAR ICG COBAM) has proposed a
293 D2 indicator which will be likely promoted by the Environmental Impacts of Human Activities
294 Committee (EIHA) from a candidate to a common indicator for OSPAR Regions II, III, and IV. The
295 OSPAR Quality Status Report (QSR, 2010³²) states that over 160 NIS have been identified in the
296 OSPAR area, acknowledging ships' ballast water as the main vector of introduction. Other main
297 vectors are aquaculture and fouling on ships. The QSR provides a detailed list of NIS (taxonomic
298 group, common names, regions affected, vector, first reported and probable impacts) and highlights
299 the necessity of the OSPAR countries to ratify and implement the IMO BWMC. At the last update
300 (03/09/2014), there are 38 biodiversity indicators under development by OSPAR, one is dedicated to

²⁵ IMO Hull Fouling guidelines, 2012. Guidance for minimising the transfer of invasive aquatic species as biofouling (hull fouling) for recreational craft [MEPC.1/Circ.792 12 November 2012].

²⁶ HELCOM, 2013a. Joint HELCOM/ OSPAR Guidelines on the granting of exemptions under the International Convention for the Control and Management of Ships' Ballast Water and Sediments Regulation A-4. This document is a part of the 2013 HELCOM Ministerial Declaration and was adopted by the 2013 HELCOM Ministerial Meeting.

²⁷ HELCOM, 2014a, HELCOM ALIENS 3 – Tests of the harmonized approach to ballast water management exemptions in the Baltic Sea. 56 pp.

²⁸ HELCOM, 2014b. HELCOM guide to Alien Species and Ballast Water Management in the Baltic Sea.

²⁹ Rolke M, Michalek M, Werner M, Lehtiniemi M, Strake S, Antsulevich A, Zaiko A, 2013. Trends in arrival of new non-indigenous species. HELCOM Core Indicator of Biodiversity. Online, viewed on 09/03/2015, http://www.helcom.fi/Core%20Indicators/HELCOM-CoreIndicator-Trends_in_arrival_of_new_non-indigenous_species.pdf

³⁰ HELCOM, 2013b. HELCOM core indicators: Final report of the HELCOM CORESET project. BALT. Sea Environ Proc. No. 136.

³¹ OSPAR, 2009 (draft). Trend analysis of maritime human activities and their collective impact on the OSPAR maritime area. Prepared by the Intersessional Correspondence Groups for the BA6 Assessment and the Cumulative Effects Assessment.

³² OSPAR, 2010. Quality Status Report 2010. OSPAR Commission. London. 176 pp.

301 NIS or invasive NIS (D2): trends in the arrival of new non-indigenous species (adopted as common
302 indicator in February 2015).

303 The **Barcelona Convention's** Action Plan on Invasive Species deals with the growing number of IAS in
304 the Mediterranean (2005) and aims at strengthening the capacities of the Mediterranean countries
305 with regards to the prevention and control of introductions of non-indigenous species into the
306 Mediterranean Sea. About 1000 non-indigenous species have been identified in the Mediterranean
307 Sea, of which 500 are well established, with a new species being introduced roughly every ten days
308 (UNEP/ MAP, 2012³³). A large portion has been introduced through the Suez Canal (47% according to
309 UNEP/MAP, 2009³⁴). The Ecosystem Approach (EcAp) in the Mediterranean will gradually implement
310 such an approach for management and is expected to include an integrated monitoring programme
311 on non-indigenous species. The process follows a similar approach to that of HELCOM and OSPAR,
312 notably through the Integrated Correspondence Groups of GES and Targets (CORGEST) and the
313 Correspondence Group on Monitoring, (CORMON) Biodiversity and Fisheries. These recent groups
314 work on issues in line with D1, D2, D3, D4 and D6.

315 The **Black Sea Commission (BSC)** has committed to the Black Sea Strategic Action Plan (BSSAP, 2009)
316 ³⁵adopted in Sofia. The action plan set out four Ecosystem Quality Objectives (ECOQs) in relation to
317 the MSFD descriptors of Good Environmental Status. The BSSAP ECOQs encompass several MSFD
318 descriptors: ECOQ 2 covers MSFD descriptors 1, 2, 4, 6 and 11 together. Finally, a Memorandum of
319 Understanding (MOU) to increase mutual support between IMO and BSC, was signed (2010) to cover
320 several environmental aspects of shipping, including ballast water management.

321

322 **1.5 Clarification of the relevant scientific, technical and policy terminology in relation to** 323 **the descriptor.**

324 Discussion on general policy terminology is on-going in parallel to the review exercise.

325 Regarding D2 terminology, specific definitions can be found in scientific literature, legal documents
326 and associated reports and in RSC reports.

327 A variety of definitions of the term “non-indigenous species” exists both in scientific literature (e.g.
328 Leppäkoski et al., 2002³⁶; Occhipinti Ambrogi and Galil, 2004³⁷; Carlton, 2009³⁸) and
329 legislative/administrative (e.g. IAS Regulation 1143/2014/ EU) documents.

330 **The following definition of non-indigenous species (NIS)** was proposed by TG2³⁹: “Non-indigenous
331 species (NIS; synonyms: alien, exotic, non-native, allochthonous) are species, subspecies or lower

³³ UNEP/MAP, 2012. State of the Mediterranean marine and coastal environment, UNEP/ MAP- Barcelona Convention, Athens, 2012.

³⁴ UNEP/MAP/BP/RAC, 2009. The State of the Environment and Development in the Mediterranean 2009. United Nations Environment Programme, Mediterranean Action Plan, Blue Plan Regional Activity Centre, Vallbone.

³⁵ <http://www.blacksea-commission.org/ bssap2009.asp# Toc222222324> (accessed on 09/03/2015)

³⁶ Leppäkoski E, Gollasch S, Olenin S, 2002. Introduction: alien species in European waters, in: Leppäkoski E et al. (Ed) (2002). Invasive aquatic species of Europe: distribution, impacts and management 1-6.

³⁷ Occhipinti A and Galil B, 2004. A uniform terminology on bioinvasions: a chimera or an operative tool? Marine Pollution Bulletin 49:688–694.

³⁸ Carlton JT, 2009. Deep invasion Ecology and the assembly of communities in historical time, in: Rilov G et al. (Ed) (2009). Biological invasions in marine ecosystems. Ecological, management and geographic perspectives. Ecological studies 204: 13-48

332 taxa introduced outside of their natural range (past or present) and outside of their natural dispersal
333 potential. This includes any part, gamete or propagule of such species that might survive and
334 subsequently reproduce. Their presence in the given region is due to intentional or unintentional
335 introduction resulting from human activities. Natural shifts in distribution ranges (e.g. due to climate
336 change or dispersal by ocean currents) do not qualify a species as a NIS. However, secondary
337 introductions of NIS from the area(s) of their first arrival could occur without human involvement
338 due to spread by natural means.”

339 A subset of NIS are **invasive NIS** (synonym ‘**invasive alien species’ (IAS)**), which are defined by TG2
340 as “a subset of established NIS which have spread, are spreading or have demonstrated their
341 potential to spread elsewhere, and have an adverse effect on biological diversity, ecosystem
342 functioning, socio-economic values and/or human health in invaded regions”.

343 These definitions are equivalent to the concept of ‘invasive non-indigenous species’ underlining the
344 Com Decision 2010/477/EU.

345 In addition, TG2 described the key terms “...**levels that do not adversely alter the ecosystems**” as
346 the absence or minimal level of “biological pollution”. **Biological pollution** is defined by TG2 as the
347 impact of IAS at a **level that disturbs environmental quality** by effects on: an individual (internal
348 biological pollution by parasites or pathogens), a population, a community, a habitat or an
349 ecosystem. It means that impacts can be observed at different levels, but it does not mean that any
350 impact is produced directly and exclusively at a given level. Thus, the sum of a given impact at
351 individual level will result in an impact at population level, which in its turn can produce changes in
352 the community and finally affect the ecosystem functioning. Conceptually, any impact in the lower
353 levels would produce, in larger or lesser degree, some change at ecosystem level. Therefore,
354 biological pollution can be defined by impacts at different levels, but GES according to MSFD could
355 be considered as not achieved only when the effects are observable at ecosystem level. However, to
356 be coherent with D1 and other relevant policies it is necessary to establish how to define GES in
357 cases when the impact on ecosystem as a whole apparently is minimal but e.g. there is a strong
358 impact on a protected species.

359 In the new IAS Regulation on the prevention and management of the introduction and spread of
360 invasive alien species the following definitions are given:

361 'alien species' means any live specimens of a species, subspecies or lower taxon of animals, plants,
362 fungi or micro-organisms introduced outside its natural range; it includes any part, gametes, seeds,
363 eggs, or propagules of such species, as well as any hybrids, varieties or breeds that might survive and
364 subsequently reproduce;

365 'invasive alien species' means an alien species whose introduction or spread has been found to
366 threaten or adversely impact upon biodiversity and related ecosystem services;

367 'invasive alien species of Union concern' means an invasive alien species whose adverse impact has
368 been deemed such as to require concerted action at Union level pursuant to Article 4(3);

³⁹Task Group 2 Report Non-indigenous species JOINT REPORT, 2010

369 'invasive alien species of Member State concern' means an invasive alien species other than an
370 invasive alien species of Union concern, for which a Member State considers on the basis of scientific
371 evidence that the adverse impact of its release and spread, even where not fully ascertained, is of
372 significance for its territory, or part of it, and requires action at the level of that Member State.

373 'pathways' means the routes and mechanisms of the introduction and spread of invasive alien
374 species;

375 The definition of 'alien species' given in the EU Regulation on IAS is similar to the one by TG2,
376 although less complete. Including aspects of intentional/unintentional introduction, natural shifts
377 and secondary introductions would be useful. Also, it could also be completed by including
378 genetically modified organisms, according to definition in the Regulation (EC) 708/2007 concerning
379 use of alien and locally absent species in aquaculture ([http://eur-lex.europa.eu/legal-
380 content/EN/TXT/PDF/?uri=CELEX:32007R0708&from=EN](http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32007R0708&from=EN)).

381 A definition including these different aspect would be: 'alien species' means any live specimens of
382 species, subspecies or lower taxon of animals, plants, fungi or micro-organisms introduced outside
383 its natural past or present distribution; it includes any part, gametes, seeds, eggs, or propagules of
384 such species, as well as any genetically modified organisms, hybrids, varieties or breeds that might
385 survive and subsequently reproduce. Their presence in the given region is due to intentional or
386 unintentional introduction resulting from human activities. Natural shifts in distribution ranges (e.g.
387 due to climate change or dispersal by ocean currents) do not qualify a species as a NIS. However,
388 secondary introductions of NIS from the area(s) of their first arrival could occur without human
389 involvement due to spread by natural means.

390 There is the necessity to agree on a single (MSFD) definition per term to avoid confusion. This
391 requires taking into consideration definitions underlining the Com Decision 2010/477/EU with those
392 in the IAS Regulation to ensure expected coherence across the two policies.

393 Terminology should be carefully taken into account and harmonized across MSs. This requires that
394 issues arising from translations to the official languages of the MSs for publication in the EU Official
395 Journal must be addressed (e.g. the term "invasive" became invasivo/a, when translated to
396 Portuguese but it should be invasor/a/es/s). We recommend that official translations should be
397 reviewed by scientific experts of every MS.

398 Also, the relationships between certain management and scientific terminologies are required to
399 reduce the level of discrepancies between scientists, ecosystem managers and policy makers in the
400 EU Member States: Some relevant terminologies to be revisited under this vision include: normal
401 ecosystem quality and functioning, and an impacted ecosystem function and quality.

402 For definitions not yet covered by policy or the MSFD GES Common Understanding Document,
403 definitions established in the context of relevant initiatives should be considered, e.g. the
404 background document produced by OSPAR⁴⁰ including definitions on biodiversity issues.

⁴⁰ OSPAR, 2012. MSFD Advice Manual and Background Document on Biodiversity. London,
Publication Number: 581/2012, 141 pp. (available at:
http://www.ospar.org/v_publications/download.asp?v1=p00581

405

406 **1.6 Descriptor specificities should be highlighted and justified (e.g. if it is recommended**
407 **to combine several descriptors together).**

408 The main specificity of this descriptor, already highlighted in many documents, is that non-
409 indigenous species constitute a pressure on the ecosystems, which should be evaluated through
410 pressure indicators; but at the same time the non-indigenous species, once established, become a
411 new element of the bioceonosis of the invaded ecosystems, and their impact on state could
412 potentially be evaluated with indicators applied for assessing other descriptors, e.g. via multi-metric
413 indicators for plankton and benthos.

414 Specific to the descriptor is the requirement for development of specific and independent criteria
415 and indicators, and hence monitoring systems, to evaluate what has been defined as “propagules
416 pressure” in relation to the diverse introduction and spreading pathways; but the monitoring and
417 evaluation of their impacts when they are already established should be, to get more sound and
418 reliable conclusions and also coherent evaluations, integrated with those of the biodiversity
419 descriptors.

420

421 **1.7 An analysis of whether the criteria and/or indicators and/or methodological**
422 **standards for the particular descriptor are likely to be common across the EU or need**
423 **aspects to be specific at region or other scales.**

424 The problem of NIS is a trans-regional one and therefore needs common standards for monitoring,
425 prevention and management of targeted species. However, specific standards need to reflect
426 specific regional risks associated to exposure to vectors, pathways and sensitivity to species
427 introductions, e.g. in the Baltic Sea with its salinity gradient, these standards need to be adapted to a
428 differing set of freshwater invaders in the eastern and northern parts.

429 An analysis for the consistency in the implementation of the MSFD and coherence amongst MS,
430 especially amongst those sharing the same region, was performed for the needs of the Art. 12 in-
431 depth assessment (IDA, JRC, 2014). This work provides crucial information for the feasibility of
432 having common criteria and methodological standards across EU and the identification of areas
433 requiring regional approaches. The results of this analysis are summarised in a chapter 2 (analysis of
434 the implementation process).

435

436 **1.8 The "climate sensitivity" for D2 (or criteria/indicators)**

437 Descriptor 2 has a range of climate sensitivities that can increase the risk of NIS secondary spreading
438 and the level of this pressure. Changes such as increased sea temperature can make conditions more
439 suitable for NIS from specific geographic areas resulting in an increased that those NIS can more
440 easily establish and spread in European waters. Lastly, some native species will naturally migrate
441 into new areas due to the changing climatic conditions and consequently change their potential
442 spatial habitats, which might be difficult to differentiate from human-induced introductions.

443 Thus, efforts are required to develop knowledge needed to distinguish between climate-change
444 mediated alterations to species distributions and human introduced NIS. The ability to distinguish

445 these two processes and categories of species enhances the formulation of cost-effective
446 management measures directed at achieving the desired GES levels.
447

448 **1.9 An indication of whether a quantitative GES definition for the descriptor will be**
449 **possible or whether a qualitative/normative definition only should be used (on the basis**
450 **of Article 3(5)).**

451 It may be possible to determine quantitatively the status of NIS in a given ecosystem, but as
452 indicated above this presents particularly challenges.

453 Abundance may be difficult to assess quantitatively due to difficulties associated to e.g. account for
454 species with different life form strategies (e.g. single or colony forming) and low abundance in early
455 stages of invasion. Yet, it must be considered that the GES will depend ultimately of the direct
456 impacts of NIS on local biota, which is not necessarily related, at least linearly, with their abundance.
457 Because of that, taking into account the variety of NIS and the variability of their potential impacts in
458 different ecosystems, it will be difficult to define proper and widely accepted definitions of GES in
459 relation to NIS presence merely fixing a unique and common abundance threshold.

460 More accurate and cost-effective is to perform species presence inventories or number of species
461 encountered in widely spread locations in a subregion, e.g. Port of Rotterdam sampling and survey
462 or the Wadden Sea. It will be more of spatial distribution but also forms a kind of abundance figure
463 and level of invasiveness.

464 For other indicators, as Biopollution Level index (BPL) qualitative definitions could be easier to agree,
465 but even so it is difficult to evaluate the GES in relation to NIS, since their mere presence may
466 represent a potential threat to local biota. The BPL is not applicable in some MS's waters (at least in
467 France, according to French experts), due to the high level of uncertainty and approximation of this
468 index at cost-effective acquisition of required data. Limiting its validity to some places well studied,
469 or to some taxa would not have any ecological meaning.

470 One option could be to use ADR (abundance and distribution range), which is the basis for the BPL
471 but would be easier to assess as it does not need the impact information.

472 An alternative, or complement, to this approach would be to put the focus on the impacts, on the
473 effects of the presence of NIS instead of their abundance. In this way, to evaluate the GES in relation
474 to NIS results of the application of the indicators developed for the "biodiversity" descriptors, 1, 4
475 and 6. This would ensure the coherence of the evaluations from the point of view of the biodiversity
476 conservation. Thus, any definition of GES referred to descriptor 2 should be linked to the
477 achievement of the GES in the biodiversity descriptors, in such a way that the environmental status
478 in relation to NIS would be defined as negative if it is also negative for these other descriptors, and
479 vice-versa.

480 In parallel, taking into account the irreversibility of most of marine bio-invasions, a more dynamic
481 and operative approach for GES definition could be adopted. Thus, any increasing trend in the
482 presence and abundance of NIS in a given ecosystem, independently of their real impact, should be
483 qualified as negative, whereas negative trends or stable situations, even if the environmental status
484 cannot be defined as positive could be considered at least acceptable.

485 GES could be at a first step defined qualitatively, notably according to the actual lacks of knowledge
486 for many species or habitats. For example, impacts on habitats or broader ecosystems condition and
487 functions could be defined qualitatively (e.g. based on community structure changes) and the
488 GES/no GES could be a deviation (qualitative or semi-quantitative=range) around this qualitatively
489 defined reference. Ideally, this biological pressure (extent, intensity, frequency) should be estimate
490 at least semi-quantitatively.

491 Due to lack of data and a full understanding everywhere of how NIS are introduced, where they
492 occur, how abundant they are and factors influencing their survival, establishing baseline
493 information for trend comparisons may be very difficult.

494

2. Analysis of the implementation process

496

497 **2.1 Based on the Commission / 'Milieu' Art.12 reports and the JRC in-depth assessments**
498 **(IDA), a detailed summary of Art.12 findings related to the determination of GES and,**
499 **specifically, the use of the Decision criteria and indicators, should be made.**

500 All Member States have defined GES for Descriptor 2. Most MS defined GES either at Descriptor
501 and/or Criterion level. Only six Member States have also defined GES at indicator level, of which four
502 defined GES only at indicator level. For a large proportion of MS the definitions were vague, with
503 some MSs reproducing the description provided in Annex I of the MSFD verbatim or very close to it
504 and did not provide measurable definition of GES and relative thresholds. There were significant
505 differences on the level of detail and focus of the approach reported by MS, i.e. some focused on
506 NIS, others on invasive NIS and others on both categories; several adopted a risk-based approach,
507 and some referred to impacts of NIS.

508 According to the SWD (2014/49), no Member State was judged to have an adequate definition of
509 GES. Eleven Member States were considered to have a partially adequate definition of GES, while
510 nine were considered inadequate.

511 **Criterion 2.1** was used more frequently than criterion 2.2. Several Member States explicitly adopted
512 a risk-based approach, primarily addressing vectors and pathways for introductions of NIS. The MSs
513 have in most cases indicated that GES could be achieved when the introduction of NIS does not
514 adversely affect the ecosystem but very few relate this to trends in abundance of NIS introductions
515 in order to achieve GES.

516 **Criterion 2.2** (Environmental impact of invasive non-indigenous species). Ten Member States
517 referred to impacts of NIS. The types of adverse effects are generally not clarified.

518 The initial assessment (Art. 8) for Descriptor 2 was mostly based on existing literature,
519 supplemented in some instances by expert judgment. All MS provided an inventory of NIS present,
520 and generally the main vectors and pathways were described. Great variation was observed in the
521 number of NIS reported even between neighboring MSs, and across regions (IDA, 2014), reflecting
522 partly differences in the monitoring systems. Other potential reasons are: 1) variable number of
523 specific studies on NIS carried out in each country and 2) the resources invested by each country in

524 compiling information for the initial evaluation, since many information on this issue do not came
525 from regular monitoring systems carried out by the Administrations, but from sparse scientific, peer
526 reviewed or grey, literature.

527 It is suggested that to facilitate and harmonize the D2 implementation, regional and national NIS
528 inventories should be linked. The European Alien Species Information Network (EASIN,
529 <http://easin.jrc.ec.europa.eu/>) could serve for this purpose. EASIN was established with the scope of
530 facilitating the exploration of existing alien species information in Europe to assist the
531 implementation of European policies on alien species, including marine species.

532 Art. 9 implementation assessments concluded that the level of coherence in the definition of GES for
533 Descriptor 2 within each of the four regional seas is considered to be low. That said there are
534 exceptions at sub-regional level, with a moderate level of coherence between the three Member
535 States in the Western Mediterranean Sea. Coherence in the Celtic Seas is also assessed as moderate.
536 Clear links should be made between Art. 8, 9, 10, 11 and 13 of MSFD. Specific assessment methods
537 and associated boundaries or thresholds should be reported to facilitate the evaluation of GES
538 achievement, of targets' efficiency and the implementation of MSFD in general (IDA, 2014). Explicit
539 guidelines for indicator development should be provided to MSs aiming to ensure harmonisation of
540 assessments. As there has been very little information gathered on marine NIS from many MSs, this
541 will be the first time that national information on the current state of NIS will be gathered. This will
542 form a baseline from which further changes in relation to GES will be measured.

543 **2.2 Identification of any questions arising from the application of the current Decision,**
544 **including those identified by the Article 12 assessment.**

545 Mediterranean and North East Atlantic Member States on the whole described knowledge and data
546 gaps in some detail and in some cases even (limited) plans to address them. This was not the case in
547 the Baltic where only two MS analyzed knowledge gaps in any detail (SWD2014/49/EU).

548 Just three MS provided (or tend to establish) baseline and thresholds in their initial assessment. IDA
549 (JRC, 2014) highlighted the need to link initial assessment (Art. 8) and definition of GES (Art. 9) with
550 specific trends, boundaries and thresholds (Table 1).

551 D2 reports are poor in detailing the methodological approaches applied by the MSs. MSs focused on
552 listing NIS and addressing the important vectors related to NIS, and less on assessing their impact in
553 particular ecosystems (IDA, 2014).

554 Some MSs associated BPL (Olenin, 2007) to GES definition, indicating its applicability in some regions
555 but also the need for better indicators and methodological standards related to NIS.

556

557 **Table 1** MS non-indigenous species baselines and indicators thresholds (JRC, 2014)

Belgium
2.1.1 Introduction of new human induced non-indigenous species of macrofauna and macroflora (>1 mm) in relation to the 2012 baseline is prevented.
Estonia
2.1.1 80% of cases in time series abundance significantly higher than absolute minimum registered abundance
2.2.1 no increase in abundance
2.2.2 BPL index < 1
Greece
2.1.1 No increase in proportion of NIS in the abundance or biomass of the respective community
2.2.1 all NIS spp include <5% of biomass or space coverage
No algal blooms due to NIS

558

559

560 **2.3 Relevant data from other sources, specific to every descriptor and recent findings**
 561 **from MS should also be considered**

562 The data gaps and inherent uncertainties existing information from sources prohibit to address all
 563 three existing D2 indicators even partially and this despite the largely availability of existing
 564 information through open access information systems such as the European Commission’s European
 565 Alien Species Information System (EASIN; <http://easin.jrc.ec.europa.eu/>), AquaNIS
 566 (<http://www.corpi.ku.lt/databases/index.php/aquanis/>), DAISIE (<http://www.europe-aliens.org/>),
 567 MAMIAS (<http://www.mamias.org/>) and NOBANIS (<http://www.nobanis.org/>). These information
 568 systems should be linked or unified to facilitate data access for MSs and properly address D2.
 569 However, their usefulness is strongly dependent on MS data input to regional databases. This should
 570 be highly recommended and regional organizations like OSPAR or HELCOM can have a major role.

571 Other issues that should be further discussed and analysed include:

- 572 • inclusion of pathogens in D2
- 573 Comments received express different opinions, thus it has to be further discussed to be able
- 574 to conclude.

575 **2.4 Good examples and approaches applied by MS, especially if used by multiple Member**
576 **States, and shortcomings should be listed systematically.**

577 On a regional level, HELCOM is highlighted as a good practice in the way they adopt the MSFD and
578 their progress in developing relevant indicators (HELCOM, 2013b³⁵).

579 HELCOM applied the BPL for estimating the magnitude of the non-indigenous phytoplankton species
580 effects on local phytoplankton community, pelagic habitat and ecosystem functioning in the Baltic
581 Sea (Olenina et al., 2009). BPL was reported by most of the HELCOM members (where it is already
582 operational) and from a few non-HELCOM members that are going to evaluate BPL's utility in other
583 regions. BPL was linked to all reported MSFD Articles (8, 9 and 10) at least once and to Criteria 2.2 of
584 the COM DEC (2010/477/EC).

585 Estonia's approach could be considered as a good practice for linking well-defined metrics with
586 indicators accompanied by specific thresholds. In addition, they presented high level of consistency
587 in the way they reported for the three MSFD Articles (8, 9 and 10). However, this approach should
588 be considered with caution, since GES and targets are defined similarly and that raises some doubts
589 as to what exactly is the GES definition.

590 The Finish report on Art. 9 could be characterized as good practice, since they provided a variety of
591 GES statements covering pressures, impacts on the basis of number, frequency and ratio of NIS, as
592 well as species vectors.

593 The Greek and Portuguese's approaches are considered as a good practice for their implementation
594 of Art 8. in respect to the NIS reported, because of the detailed information provided including NIS
595 recorded in national waters, year of the first record, origin of NIS, pathways of introduction,
596 population status (e.g. established, occasional, unknown) and NIS' taxonomic group.

597 More working relationships are encouraged between MS and also development of new working
598 relationships between Regional Conventions.

599 **2.5 Differences and similarities between the regions should be highlighted, where**
600 **applicable.**

601 The regional coherence between the GES definitions is low in all sub-regions (SWD (2014) 47; IDA,
602 2014).

603 In respect to the methodologies listed in MS reports, BPL is referred by some HELCOM members but
604 not all contracting parties accepted to use the indicator. Non-HELCOM MSs reported that careful
605 studies are required to prove and advise on the applicability of the BPL in their areas of interest..

606 An OSPAR wide common indicator on NIS is being developed in relation to criterion 2.1.1 . – 'Risk
607 management of key pathways and vectors of introduction of NIS' (OSPAR, 2013⁴¹).

608 The OSPAR common indicator NIS3, developed by UK and Germany, has been adopted in subregions
609 II, III and IV and its merging to the HELCOM Trend indicator is at the moment discussed by HELCOM
610 CORESET II. Collaboration is planned to be opened up to other RSCs and it was proposed to develop
611 a network of experts to connect the communities in the different convention areas (Back to back

⁴¹ OSPAR, 2013. Report of the EIHA Common indicator Workshop. (Accessed 11/03/2015).

612 meeting of CORESETII and ICG-COBAM, October 2014⁴²). The HELCOM core indicator is expected to
613 be adopted in June 2015.

614

3. Analysis of the current text of the Decision

615

616

617

618 **3.1 Analysis of the current text of the Decision, identifying in particular those parts which**
619 **are best placed in guidance, those parts which are interpretative or explicative**
620 **information and those parts which need to be kept in the Decision in accordance with the**
621 **mandate provided by the Directive.**

622

623 ➤ **To be kept in the Decision, in accordance with the mandate provided by the Directive (but**
624 **revised if necessary)**

625

626 The following part of the Decision forms the core of the criteria and methodological standards.
627 Revised text appears in Bold. Explanations in parentheses are provided for all suggested changes.

628 *COM Decision PART B- 'Criteria for good environmental status relevant to the descriptors of Annex I*
629 *to Directive 2008/56/EC'*

630 *Descriptor 2: Non-indigenous species introduced by human activities are at levels that do not*
631 *adversely alter the ecosystem.*

632 *2.1. Abundance ~~and state~~ and characterization of **non-indigenous species**, in particular invasive*
633 *species (As D2 is a pressure and not a state descriptor, the 'state' in Criterion 2.1 is confusing and is*
634 *better to be deleted. Other state descriptors by which the environments need to be assessed should*
635 *reflect the state with consideration of pressures including alien species pressure).*

636 *— Trends in **new introductions**, abundance, temporal occurrence, and spatial distribution in the wild*
637 *of **non-indigenous species**, notably in risk areas, in relation to the main vectors and pathways(2.1.1).*
638 *(Trends in new introductions of alien species by pathway is an indicator closely related to the*
639 *management of pathways as requested by the new Regulation 'on the prevention and management*
640 *of the introduction and spread of invasive alien species'; such an indicator can reflect the*
641 *effectiveness of measures to manage pathways)*

642 *2.2. Environmental impact of [invasive] **non-indigenous species***

643 *— Ratio between [invasive] **non-indigenous species** and native species [in some well-studied*
644 *taxonomic groups (e.g. fish, macroalgae, molluscs)] that may provide a measure of change in species*
645 *composition (e.g. further to the displacement of native species) (2.2.1) (If only IAS are included in the*
646 *estimation of alien/native ratio then this is not a measure of community change)*

647 *— Impacts of non-indigenous invasive species at the level of species, habitats and ecosystem, where*
648 *feasible (2.2.2)*

⁴² HELCOM and OSPAR Commissions, 2014. Communication paper resulting from the joint meeting of HELCOM CORESET II and OSPAR ICG-COBAM. Back to back meeting of CORESET II and ICG-COBAM, 1 October 2014. (Accessed 11/03/2015)

649 *Summary of comments received:*

650 - criterion 2.2 could be maintained, stating that GES could be evaluated through other
651 biodiversity indicators. Thus, criteria 2.1 would consider potential impact from “internal
652 pressure” of introduced NIS, taking into account presence and relative abundance of these
653 NIS, providing a sort of risk assessment, whereas 2.2 would deal with demonstrated
654 impacts, measured through state indicators related to other descriptors. However, 2.1, as
655 mentioned before, deals with already established NIS, when in many cases too late to do
656 something. A new criteria could be considered, dealing with the “external” pressure to a
657 given ecosystem, it is the “propagules” pressure.

658 **OR**

659 - Remove criterion 2.2 based on the reasoning that the impact of non-indigenous species
660 should be considered in the status descriptors. The pressure level is measured by criterion
661 2.1 and should be such as to ensure GES for those descriptors.

662 **OR**

663 - Remove the indicator ratio between alien and native species. This will only consider
664 community changes rather than full ecosystem impact. Also, monitoring for all alien species
665 will be operationally difficult to achieve and the cost would be disproportionate taking
666 account that not all present an important risk to the marine environment. Furthermore,
667 change of species composition is unlikely to be controllable and thus to relate to the
668 programme of measures.

669 - 2.2.1 and 2.2.2 overlap; both measure impact from non-indigenous species. Suggest to
670 remove 2.2.1.

671 **OR**

672 - Change 2.2.1 to ‘Impacts of alien species, where feasible’

673 In conclusion, there is agreement on alteration to criterion 2.1 but criterion 2.2 needs further
674 consideration to agree if needed to adequately assess D2 and if needed to agree on the revised
675 version.

676

677 ➤ **To be taken out of the Decision and included in guidance**

678 The following part of the Decision provides guidance on assessment and monitoring methodologies
679 and would be better placed (after substantial revision) in a separate guidance document. In addition,
680 it should be updated according to the entering into force of the new Regulation 1143/2014 and the
681 latest research and the progress made at RSC-level and by IMO. Finally, it should also be updated
682 with the findings from the first initial assessment of the MSFD.

683 *“The identification and assessment of pathways and vectors of spreading of non-indigenous species
684 as a result of human activities is necessary to prioritize actions for the management of pathways and
685 the prevention of new invasions. The initial assessment has to take into account that some
686 introductions due to human activities are already regulated at Union level to assess and minimise
687 their possible impact on aquatic ecosystems and that some non-indigenous species have commonly
688 been used in aquaculture for a long time and are already subject to specific permit treatment within*

689 *the existing Regulations. There is still only limited knowledge about the effects of the non-indigenous*
690 *species on the marine environment. Additional scientific and technical development is required for*
691 *developing potentially useful indicators especially of impacts of invasive non-indigenous species,*
692 *which remain the main concern for achieving good environmental status. The priority in relation to*
693 *assessment and monitoring relates to state characterisation, which is a prerequisite for assessment*
694 *of the magnitude of impacts but does not determine in itself the achievement of good environmental*
695 *status for this descriptor.”*

696 However, the amended Decision would need to make reference to the guidance were this
697 background information would be included.

698 **3.2 The analysis should then include an overall identification of needs for guidance.**

699 Guidance might be needed to clarify and harmonize descriptors’ definitions, methodological
700 standards under each criterion and their links.

701 In particular, detailed guidance for harmonized methodologies on how to assess particular impacts
702 at ecosystem level is needed.

703

704 **3.3 An analysis of what to keep should take place, including specification on what may be**
705 **out dated or may need to be aligned with other or new legislation, etc.**

706 The following criterion and indicator should be kept with suggested modifications:

707

708 *2.1. Abundance ~~and state~~ and characterization of non-indigenous species.*

709 — *Trends in **new introductions**, abundance, temporal occurrence, and spatial distribution in the wild*
710 *of non-indigenous species, notably in risk areas, in relation to the main vectors and pathways of*
711 *spreading of such species (2.1.1).*

712 This could be decomposed in two methodological standards (indicators) taking in consideration the
713 already included NIS metrics,

714 Criterion 2.2 needs further consideration to agree if needed to enable an adequate assessment of D2
715 and if needed to agree on revised version (see section 3.1).

716

717

4. Identification of issues

718 **Main findings and information that will be used in the next step of the revision process.**

719

720 There is still lack of information and understanding of NIS impact, therefore its inclusion in GES
721 definition is difficult. In fact, types of impacts occurring due to NIS are hardly specified in the related
722 GES definitions; it could be useful to create a stronger link between Descriptor 2 and the biodiversity
723 Descriptors (see e.g. Katsanevakis et al. 2014⁴³).

724 Clarify and review inter-Descriptor links is definitively a task to further progress, notably through
725 links between Art.8, 9, 10 and 11, and taking into account the “cross-cutting issues” workshop (21-
726 23/01/2015, Copenhagen).

⁴³ • Katsanevakis S, Wallentinus I, Zenetos A, Leppäkoski E, Çinar ME, Oztürk B, Grabowski M, Golani D, Cardoso AC, 2014. Impacts of marine invasive alien species on ecosystem services and biodiversity: a pan-European critical review. *Aquatic Invasions*, *Aquatic Invasions*9(4): 391-423..

727 The link with D1 and D4 could be made by 2.2 (see table 1 crosscutting issues document): Impacts of
728 this biological pressure could be assessed by assessing D1.7 (impacted ecosystem structure and
729 functions); D1.6 (impacted habitat condition; those under pressure and the contribution to 2.1 as «
730 NIS habitat » itself); D6.2 (for benthic habitats, when IAS become an engineering species sensus
731 Crooks, 2002⁴⁴, 2009⁴⁵); D1.3 (Impacted population condition and distribution (D1.1) for contribution
732 to 2.1 of NIS itself, notably for hybrids); D4.1 (productivity of key species- invasive non-indigenous
733 species) and D4.3 (abundance/distribution of key species, for invasive non-indigenous species which
734 impact trophic webs).

735 The regional coherence amongst countries when defining GES for D2 is low in regions and sub-
736 regions; the relatively low level of operational approaches for D2 provides an opportunity to work
737 for regional coherence through joint development of methodological standards and indicators.
738 OSPAR and HELCOM (see above) have made initial plans towards a common indicator.

739 According to MSFD, assessing state of transitional waters are not under the scope, but pressures
740 which may affect state in marine waters should be assessed (e.g. nutrients inputs). Thus, NIS and
741 notably IAS in transitional waters, as potential biological pressure to surrounding marine waters,
742 should be assessed. Coordination of the MSFD with other relevant legislations, in particular with the
743 new IAS Regulation is required to avoid duplication of work and ensure through coordination of
744 activities the achievement of GES and prevention and management of NIS.

745 The observed inconsistencies and uncertainties in the NIS lists included in the national reports may
746 lead to inefficient management and it could be improved by linking regional and national species
747 inventories. The European Alien Species Information Network (EASIN) is developing towards an
748 information exchange mechanism to facilitate the EU policy on invasive alien species, thus, it could
749 play a role of EU NIS database. It is strongly recommended updating national lists and uploading at
750 least basic data to existing regional databases is required.

751 The guidance to prepare in association to the Commission Decision should include a table of
752 synonyms were terms such as NIS should be included.

753 It should be clarified that the reduction of the existing pressure (distribution and/or abundance of
754 NIS) is often only possible in a few specific cases. This assertion leads to the following suggestions:

- 755 ○ The criteria trend in new introductions per vector should be kept. It shows clearly if
756 the pressure from non-indigenous species has changed and it is also possible to
757 relate to success/failure of management.
- 758 ○ Criterion 2.2 needs further consideration to agree if needed to enable an adequate
759 assessment of D2 and if needed to agree on revised version (see section 3.1)

760 More information on ecosystem impacts of IAS, along with economic impacts, should be collected, in
761 particular if criterion 2.2 is retained.

⁴⁴ Crooks J.A., 2002. "Characterizing ecosystem-level consequences of biological invasions: the role of ecosystem engineers". *Oikos* 97, pp. 153-166.

⁴⁵ Crooks J.A., 2009. "The role of exotic marine ecosystem engineers". In: Rilov G., Crooks J.A. (Eds). "Biological Invasions in Marine Ecosystems: Ecological Management, and Geographic Perspectives", *Ecological Studies*, vol. 204 (XXVI). Springer-Verlag, pp. 215-238.

762

763

5. GES criteria (in accordance with Art. 9.3)

764

5.1 Conclude on the use of the existing Decision criteria and indicators, in the light of the "refined" common understanding, the findings of the Article 12 assessment and relevant international, EU and RSC legislation and approaches.

765 COM DEC Criteria have to be defined in a way to allow for a direct GES assessment that is related to
766 the Descriptor (Art. 6). However this is difficult for D2 of the quantitative nature of the descriptor for
767 reasons explained above. However, this requirement is currently not achieved. The lack of guidelines
770 may lead to different interpretations to define GES in different levels (descriptor, criterion or
771 indicator) and variety of information type.

773 Several Regional Sea Conventions are developing indicators, both in line with criteria 2.1 (new 2.2),
774 and coherent between Regions:

775 HELCOM: Trends in arrival of new non-indigenous species (adopted as core indicator)

776 OSPAR: Trends in the arrival of new non-indigenous species (adopted as common indicator)

777 Barcelona: Trends in the abundance, temporal occurrence and spatial distribution of non-indigenous
778 species, particularly invasive, non-indigenous species, notably in risk areas in relation to the main
779 vectors and pathways of spreading of such species (adopted as common indicator).

780 Guidelines and methodological standards associated with these indicators should thus be integrated
781 on the revised Decision

782

5.2 Recommendation on which criteria to retain, which to amend and any to remove;

784

785 The criteria 2.1, once amended as "Trends in new introductions, abundance, temporal occurrence
786 and spatial distribution in the wild of non-indigenous species notably in risk areas, in relation to the
787 main vectors and pathways of spreading of such species" should be retained, since it addresses the
788 minimum information requirements for any risk assessment and rough evaluation of GES in relation
789 to this descriptor. Criterion 2.2 needs further consideration to agree if needed to enable an
790 adequate assessment of D2 and if needed to agree on revised version (see section 3.1)

791

5.3 Proposals for new criteria, if needed.

792 The current criteria address the pressure and impact exerted by the already established IAS.
793 However, except in cases in which the bio-invasions have been detected in very early phases, little
794 can be done with this information from the management point of view. As already stated, most of
795 management actions should be taken in the field of prevention of primary and secondary spreading
796 of NIS, acting on vectors. In consequence, a new criteria dealing directly with "propagules pressure",
797 could be considered, developing indicators and related monitoring systems in relation to the
798 different vectors (fouling, ballast waters, aquaculture...), which would allow to evaluate the
799

800 effectiveness of preventive management measures. The rate of new introductions can be used as a
801 proxy of this external pressure, but it is not a direct and reliable measure.

802 Instead “Pathways management measures”, at present an OSPAR candidate indicator, could possibly
803 be considered as criterion.

804 **5.4 Rationale and proposal, where appropriate, for defining GES threshold values and**
805 **reference points, based on established and agreed scientific methods for quantifying and**
806 **applying GES boundaries, or for a normative definition of GES**

807 See section 1.9. It will require further discussion.

808 **5.5 Link to possible future EEA indicator.**

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811 **6. GES methodological standards (in accordance with Art. 9.3)**

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815 **To further discuss and complete when other paragraphs clarified**⁷.
816 **Specifications and standardized methods for monitoring and assessment (in**
817 **accordance with Art. 11(4))**

818

819 **7.1 Proposals for specifications on methods for monitoring (i.e. the collection of data**
820 **needed for assessment of each criterion, including parameters, units of measurement**
821 **and data quality requirements), which aim at ensuring the comparability of monitoring**
822 **results, on the basis of JRC / ICES / RSC survey protocols, relevant**
823 **European/international standards (e.g. ISO/CEN) and Article 12 findings.**

824 It is important to agree on a feasible and cost-effective monitoring standard that will provide results
825 which are comparable between MS.

826 Monitoring of everything everywhere is not feasible. Focus dedicated monitoring on selected areas,
827 habitats or species groups (either taxonomy or trait based) in relation to risk of new introduction
828 through the various pathways (including, but not limited to ports)⁴⁶. Use the regular monitoring for
829 the different biodiversity elements to cover other areas/habitats/species groups. When needed
830 amended with something like rapid assessment surveys.

831 Monitoring should use the standard methods for biological monitoring (e.g. HELCOM COMBINE
832 guidelines for the Baltic Sea). HELCOM and OSPAR monitoring methods, e.g. port sampling protocol
833 and RAS could be considered for use in other areas than those of their original applicability and in
834 other European seas.

⁴⁶ Lehtiniemi M, Ojaveer H, David M, Galil B, Gollasch S, McKenzie C, Minchin D, Occhipinti-Ambrogi A, Olenin S, Pederson J 2015: Dose of truth- Monitoring marine non-indigenous species to serve legislative requirements. Marine Policy, 54: 26–35.

835 http://helcom.fi/Documents/Ministerial2013/Ministerial%20declaration/Adopted_endorsed%20documents/Joint%20HELCOM_OSPAR%20Guidelines.pdf#search=Helcom%20Ospar%20guidelines

837 Another bottleneck in NIS monitoring is the lack of taxonomic expertise. New molecular methods
838 are being developed (e.g. by Cefas in the UK and by Denmark) on the use of molecular tools to get
839 around this issue.

840 **7.2 Proposals for specifications on methods for assessment, which aim at ensuring**
841 **comparability of assessment results, including aggregation of monitoring data within an**
842 **assessment area for a particular criterion and if necessary aggregation across**
843 **assessment areas up to larger areas (e.g. (sub) region scales), and based on general**
844 **guidance prepared on scales and aggregation rules⁴⁷ and taking account of JRC / ICES /**
845 **RSC inventories and Article 12 findings.**

846 Links should be established between MSs and EASIN database, which is the Commission's NIS
847 inventory and can promote a coherent approach in the reporting of NIS. EASIN (European Alien
848 Species Information Network; <http://easin.jrc.ec.europa.eu/>) aims to facilitate the exploration of
849 existing alien species information in Europe from distributed sources, and to assist the
850 implementation of European policies on biological invasions. This is planned to be the information
851 support mechanism in relation to the new regulation on IAS.

852 Monitoring, methodological standards and assessment methodologies should also be linked with the
853 specifications of the regulation for alien species (1143/2014). The alien species database should be
854 fulfilling the following conditions: Be regularly updated by all MS, compatible with early warning and
855 rapid response tools.

856 More NIS databases that could contribute to harmonize MS' reporting are listed in the IDA (2014).

857

858 See also: Ojaveer H, Eero M (2011) Methodological Challenges in Assessing the Environmental Status
859 of a Marine Ecosystem: Case Study of the Baltic Sea. PLoS ONE 6(4): e19231.

860 doi:10.1371/journal.pone.0019231

861

8. Rational and technical background for proposed revision

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865 **8.1 Justification and technical background justifying the above proposals.**

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9. Other related products (e.g. technical guidance, reference in common understanding document)

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⁴⁷ Deltares SCALES project is developing guidance for WG GES.

872 **9.1 Where aspects are identified which should be usefully laid down but not as part of the**
873 **decision, these elements should be specified and a proposal should be made in which way**
874 **they should be laid down, e.g. interpretative guide for the application of the future**
875 **Decision or CU guidance document or technical background document.**

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10. Background Documents

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- 881 • Review of the GES Decision 2010/477/EU and MSFD Annex III Approach and outline
882 for the process, (EC- Committee/07/2013/03rev, 2013);
- 883 • First steps in the implementation of the Marine Strategy Framework Directive -
884 Assessment in accordance with Article 12 of Directive 2008/56/EC, (CSWD, 2014);
- 885 • Article 12 Technical Assessment, (Milieu ltd, 2014);
- 886 • Marine Strategy Framework Directive - Descriptor 3, (ICES, 2012);
- 887 • Common Understanding of (Initial) Assessment, Determination of Good
888 Environmental Status (GES) & Establishment of Environmental Targets (Articles 8, 9
889 & 10 MSFD), (DG GES, 2014);
- 890 • Coherent geographic scales and aggregation rules in assessment and monitoring of
891 Good Environmental Status – analysis and conceptual phase, (Deltares, 2014);
- 892 • In-depth assessment of the EU Member States’ Submissions for the MSFD under
893 articles 8,9 and 10, EUR26473EN (JRC, 2014)
- 894 • Review of Methodological Standards Related to the Marine Strategy Framework
895 Directive Criteria on Good Environmental Status (JRC, 2011)
- 896 • Guidance / Terms of Reference for the task groups ‘criteria and methodological
897 standards for the Good Ecological Status (GES) descriptors’ (JRC, 2010)
- 898 • CSWP (2011) on the Relationship between the initial assessment of marine waters
899 and the criteria for good environmental status.
- 900 • OSPAR (2012b). MSFD Advice Manual and Background Document on Biodiversity.
901 London, Publication Number: 581/2012, 141 pp. (available at:
902 http://www.ospar.org/v_publications/download.asp?v1=p00581)

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