Wildlife and Countryside LINK

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20th December 2017

Dear Dominic and Richard,

Firstly, we thank you for the opportunity to input into the development of new targets and indicators for the Second Cycle of the Marine Strategy Framework Directive (MSFD).

The MSFD provides the governments of the UK with the greatest opportunity to improve the health of marine ecosystems in a holistic way. Through different pressure Descriptors the framework integrates human use of the sea and recognises that the heavily degraded status of marine waters is not acceptable.

Environment Links UK expressed concerns over the low level of ambition in the initial Marine Strategy Part One. It is our view that the UK Governments should therefore treat the 2018 review of the Targets and Indicators as a priority mechanism for proactively improving the environment, and that in delivering a healthy marine environment there are vast economic benefits. However, these benefits can only be achieved through ambitious targets and indicators for Good Environmental Status (GES).

Whatever the nature of the future relationship with the EU, all Governments within the UK should work together to develop a strong mutually agreed framework, demonstrating increased ambition and leading the world in investing in and conserving the marine environment.

Only by maintaining our commitment to the shared ambitions of the framework, across EU member states and all four nations of the UK, can we protect the shared ecosystem upon which marine-related economic and social activities depend.

Annex 1 shows our collective views on new and/or improved targets and indicators. We have drawn on our collective expertise and interest, and the advice stemming from Commission decision (EU) 2017/848 and relevant OSPAR ICG groups. While the list is not exhaustive, we hope that it informs the development of the 2018 review of the Targets and Indicators. We would also like to request a meeting with your team in January to discuss the contents of this document in more detail.

I understand that next year there will be further consultation by Defra together with the devolved administrations on proposed MSFD indicators, at which point we look forward to responding alongside our sister organisations in Scotland, Wales and Northern Ireland collectively as Environment Links UK.

Best regards,

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Gareth Cunningham
On behalf of the Wildlife and Countryside Link Marine Working Group

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The following organisations support this briefing:

- Friends of the Earth
- Greenpeace
- Institute for Fisheries Management
- Marine Conservation Society
- MARINELife
- ORCA
- RSPB
- The Wildlife Trusts
- Whales and Dolphin Conservation
- Wildfowl and Wetland Trust
- WWF

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Annex 1: Table of targets and indicators for 2nd cycle of MSFD

Descriptor	Target/ Indicator	Rationale
1	By-catch rates of Chondrichthyes should not inhibit population size targets being met or significantly affect population size.	Highly sensitive to the selective extraction of species, Some existing monitoring but not systematic across regional sea area. Would be a further step in delivering GES, and commitments under OSPAR convention.
1	Distributional range and pattern of seal haul-outs and breeding colonies should be stable or increasing	Ensures that conditions on land are suitable to support healthy populations, access to haul-outs & breeding colonies is an important factor in pup production assessments. Current targets only cover the range and pup production targets without details covering for haul outs or breeding colony locations despite targets being proposed for these locals in the OSPAR ICG-MSFD.
1	Changes in abundance of marine birds should be within individual target levels in 90% of species.	Under the current indicator, it would be possible to have populations of 75% of bird species that lay more than one egg decline by up to 30% relating to baseline levels (either in one year or over the next 8 years), with even greater declines in the other 25% of these species and non-breeding birds, and still claim to achieve GES. Given that the 9% decline in seabirds identified in Charting Progress 2 represents over 600,000 birds, and that this level of decline has continued since, we do not feel that this definition of GES is adequate. We support and welcome the use of the ICES and OSPAR developed work on Ecological Quality Objectives (EcoQOs) for population abundance, which has recently been officially adopted by OSPAR. The UK should strongly encourage and support OSPAR to further develop this work in the light of the MSFD, to ensure this approach to seabird targets is taken across both the Celtic and Greater North Sea subregions and show a positive example by adopting the more ambitious 90% target.
1	No major shifts or shrinkage in the population distribution of marine birds in 90% of species	This view is supported by the HBDSEG group within the Cefas report which states that "Given that ICES (2008) considered 75% to be the limit below which remedial action should be instigated, the option of a higher target, up to 90% is more likely to achieve GES" (Page 136), noting that this also applies to targets for population size below.
1	**Population abundance/structure of a coastal/demersal shelf fish: spurdog** 1. Spurdog population abundance is increasing	Aims to assess population abundance and structure of a species sensitive to the pressures coastal fish and demersal shelf fish are exposed to (and hence assumed to be a good representative of these groups). These indicators incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing abundance). Spurdog are critically endangered in the NE Atlantic and listed by OSPAR T&D.

	(within subregions with extant populations) Spurdog length class ratios are indicative of a healthy population structure (within subregions with extant populations).	
1 & 4	The population abundance, reproductive success and geographic spread of marine birds from the defined species groups (Grazing birds, Wading Birds, Surface-feeding birds, Pelagic feeding birds and Benthic-feeding birds) are not negatively affected by reduced food availability.	There is currently a national indicator for the UK but this only relates to Kittiwake, a surface feeding bird. Inclusion of additional species from each defined species group is essential (e.g. Puffin as a deep diving species). This will also help provide a more cohesive view of the health of the marine food web that marine birds rely upon, and not be limited only to species available to surface feeding birds. This will contribute towards delivery of Commission decision (EU) 2017/848, D1C2 — Primary: The population abundance of the species is not adversely affected due to anthropogenic pressures, such that its long-term viability is ensured. This requires Member States to establish a set of species representative of each species group.
1 & 4	Risk of bycatch of Cetaceans, should be reduced and where possible eliminated.	Bycatch of non-target species, particularly endangered, threatened and protected species (including seabirds, marine mammals, and turtles) must be recorded and minimised, (i.e. ultimately reduced to zero). There should be a requirement for regulatory bodies to develop a bycatch strategy, with the aim to continually reduce bycatch, which will include the use of effective mitigation measures, robust data collection on board and annual reporting protocol, and a monitoring regime including the use of stranding data, and Remote Electronic Monitoring with cameras where higher levels of footage are reviewed on high risk vessels. To reduce unwanted catches in the first instance, regulatory bodies and decision-makers should be empowered to incentivise more selective fishing methods and gear types. This will deliver towards Commission decision (EU) 2017/848, namely D1C1 — Primary: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured.
1 & 4	Risk of bycatch of Marine Birds, across the defined species groups (Grazing birds, Wading Birds, Surface-feeding birds, Pelagic feeding birds and Benthic-feeding birds), should be reduced and where possible eliminated.	Bycatch of non-target species, particularly endangered, threatened and protected species (including seabirds, marine mammals, and turtles) must be recorded and minimised, (i.e. ultimately reduced to zero). There should be a requirement for regulatory bodies to develop a bycatch strategy, with the aim to continually reduce bycatch, which will include the use of effective mitigation measures, robust data collection on board and annual reporting protocol, and a monitoring regime including the use of stranding data, and Remote Electronic Monitoring with cameras where higher levels of footage are reviewed on high risk vessels. To reduce unwanted

		catches in the first instance, regulatory bodies and decision-makers should be empowered to incentivise more selective fishing methods and gear types. This will deliver towards Commission decision (EU) 2017/848, namely D1C1 — Primary: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured.
1 & 4	Risk of bycatch of Seals, should be reduced and where possible eliminated.	Bycatch of non-target species, particularly endangered, threatened and protected species (including seabirds, marine mammals, and turtles) must be recorded and minimised, (i.e. ultimately reduced to zero). There should be a requirement for regulatory bodies to develop a bycatch strategy, with the aim to continually reduce bycatch, which will include the use of effective mitigation measures, robust data collection on board and annual reporting protocol, and a monitoring regime including the use of stranding data, and Remote Electronic Monitoring with cameras where higher levels of footage are reviewed on high risk vessels. To reduce unwanted catches in the first instance, regulatory bodies and decision-makers should be empowered to incentivise more selective fishing methods and gear types. This will deliver towards Commission decision (EU) 2017/848, namely D1C1 — Primary: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured.
1 & 4	Risk of bycatch of Turtles, should be reduced and where possible eliminated.	Bycatch of non-target species, particularly endangered, threatened and protected species (including seabirds, marine mammals, and turtles) must be recorded and minimised, (i.e. ultimately reduced to zero). There should be a requirement for regulatory bodies to develop a bycatch strategy, with the aim to continually reduce bycatch, which will include the use of effective mitigation measures, robust data collection on board and annual reporting protocol, and a monitoring regime including the use of stranding data, and Remote Electronic Monitoring with cameras where higher levels of footage are reviewed on high risk vessels. To reduce unwanted catches in the first instance, regulatory bodies and decision-makers should be empowered to incentivise more selective fishing methods and gear types. This will deliver towards Commission decision (EU) 2017/848, namely D1C1 — Primary: The mortality rate per species from incidental by-catch is below levels which threaten the species, such that its long- term viability is ensured.
1 & 4	In UK waters where the sandeel fishery is allowed to operate, fishing mortality (f) should be reduced such that at least one-third of the maximum sandeel biomass is left to take account of	The UK Marine Strategy Regulations 2010 require an ecosystem-based approach to the management of human activities in the marine environment, to ensure that the pressure they exert 'is kept within levels compatible with the achievement of good environmental status'. The sandeel, a small shoaling 'forage' fish, is a staple diet of many seabirds (and essential for their successful breeding), as well as commercially important fish (e.g. cod, mackerel) and sea mammals. The current ICES assessment model for sandeel does not take sufficient account of the provisioning needs of seabirds and other species highly reliant on this forage fish.

	the needs of seabirds, cetaceans and other dependent predators.	
1& 6	The proportion of protected sites that are well managed, and are in a favourable condition should be more than 75% by 2030, and more than 95% by 2040.	A well-managed and ecologically coherent network of protected sites is essential to restore, enhance and extend habitats to allow biodiversity to expand and spread, making them more resilient to climate change. Measurable targets ensure that designations deliver change, and not simply paper parks. Monitoring to track changes in ecosystem health/recovery/seafloor integrity, that is reviewed and used to inform management. However MPAs designated on basis of 'least damaged, most natural sites', cannot contribute to improvement of seafloor Integrity (6). Additional (more damaged) MPAs would need to be designated, and then managed for recovery, in order to contribute to 'recovery'/increasing seafloor integrity.
1 & 6	Biodiversity loss is halted and where possible restored, with key ecosystems recovered, maintained and enhanced and at least 15% of degraded ecosystems restored	Marine ecosystems and their constituent species and habitats are increasingly resilient to natural and human-induced changes, and the specific structures and functions necessary for their long-term maintenance exist both now and in the foreseeable future. Therefore, we strongly urge the following amendments to make the characteristic more ambitious, in line with Target 2 of the EU Biodiversity Strategy 2020 target[1], and showing a clear desire to move towards the 2050 vision[2]. It also reflects and extends the CBD and EU target for restoring 15% of degraded ecosystems by 2020 above, which the UK has signed up to.
2	The adverse impacts of Non-indigenous species are reduced to a level that they do not adversely affect marine ecosystem functioning or the conservation status of particular marine taxa or habitat types.	In line with Commission decision (EU) 2017/848, Abundance and spatial distribution of established non-indigenous species, particularly of invasive species, contributing significantly to adverse effects on particular species groups or broad habitat types. While broadly similar to what is already within the current Marine Strategy, this proposed indicator is stronger, and specifically mentions prevention of adversely altering ecosystems.
2	The Number of newly-introduced non-indigenous species is minimised and where possible reduced to zero.	In line with Commission decision (EU) 2017/848, The number of non-indigenous species which are newly introduced via human activity into the wild, per assessment period (6 years), measured from the reference year as reported for the initial assessment under Article 8(1) of Directive 2008/56/EC, is minimised and where possible reduced to zero.

[1] "By 2020, ecosystems and their services are maintained and enhanced by establishing green infrastructure and restoring at least 15 % of degraded ecosystems."

[2] "By 2050, European Union biodiversity and the ecosystem services it provides – its natural capital – are protected, valued and appropriately restored for biodiversity's intrinsic value and for their essential contribution to human wellbeing and economic prosperity, and so that catastrophic changes caused by the loss of biodiversity are avoided."

2	A thorough Risk Management analysis of all established Non-indigenous species populations that impact upon UK seas should be undertaken with the aim of identifying priority Non-indigenous species populations for either population control, population containment, or eradication	In line with Commission decision (EU) 2017/848, regarding the "Abundance and spatial distribution of established non-indigenous species, particularly of invasive species, contributing significantly to adverse effects on particular species groups or broad habitat types." Eradication of all established Non-indigenous species is unlikely, therefore to target resources, it is important to identify which Non-indigenous species can be contained, controlled and where possible eradicated.
2	Where ever possible and following a prioritisation of resources, all already established Non-indigenous species populations are either: i) prevented from increasing in their abundance; ii) prevented from increasing in their spatial distribution; or iii) eradicated entirely	In line with Commission decision (EU) 2017/848, "Established non-indigenous species, particularly invasive non-indigenous species, which include relevant species on the list of invasive alien species of Union concern adopted in accordance with Article 4(1) of Regulation (EU) No 1143/2014 and species which are relevant for use under criterion D2C3."
2	There is a significant reduction in the annual rate of establishment of marine Non-indigenous species via Biofouling.	Biofouling is a significant pathway for marine Non-indigenous species from both commercial and recreational vessels. The proposed target would put the UK at the forefront of work to tackle biofouling. For example, the work currently being developed by the IMO – exploring a global biofouling treaty (https://www.maritime-executive.com/article/the-imo-starts-biofouling-project)
2	There is a significant reduction in the annual rate of establishment of marine Non-indigenous species via introduction from Ballast Water.	Ballast water is a current and significant source of Non-indigenous species introduction to UK waters. Seeking action to reduce this pathway will aid in reducing the number of new Non-indigenous species colonising the UK.
2 & 1	Biosecurity plans are written and implemented at each of the key UK seabird islands/island groups	Future invasion by non-native mammals should be minimised through pathway analysis and mitigation and improved biosecurity measures. There are approximately 45-50 islands prioritised across the UK for biosecurity, however these are those that are currently free of predators but where significant biodiversity features are at risk from new incursions. This number does not include any currently undergoing eradication, or that have been prioritised for eradication in the future. As an indicator this is a relatively simple metric to measure, yet contributes to the delivery of 2 descriptors.

2 & 1	Where technically feasible, an effective proactive programme of eradication of non-native mammals should be completed at the key UK seabird islands/island groups.	Work on island restoration and biosecurity should be guided by Standbury et al. (2017) & Walton and Crawford in 2010. Examples are Orkney Mainland (stoat eradication) and Uists (hedgehog removal), as well as Rathlin which has ferrets in addition to brown rats. This relates to and delivers to the Commission decision (EU) 2017/848; D2C2 — Secondary: Abundance and spatial distribution of established non-indigenous species, particularly of invasive species, contributing significantly to adverse effects on particular species groups or broad habitat types.
3	The exploitation of living marine biological resources restores and maintains populations of harvested species at least at levels which can produce MSY. This exploitation rate shall be achieved by 2020 for all stocks at the latest.	Will aid in the delivery of GES descriptor 3 as currently defined "The level of stock mortality generated by fishing activity (F) is lower than Fmsy - the level capable of producing Maximum Sustainable Yield (MSY). The spawning stock biomass is within safe biological limits and all stocks are sustainably exploited."
3	The exploitation rate of each stock is below FMSY, or within the range of plausible fishing mortalities consistent with FMSY. Where data does not allow FMSY, or FMSY proxies, to be calculated exploitation of each stock will be based on the precautionary approach	In order to allow an overfished stock to rebuild to BMSY, the fishing rate F has to be set at FMSY or below. Also corresponds to Commission decision (EU) 2017/848: "The Spawning Stock Biomass of populations of commercially-exploited species are above biomass levels capable of producing maximum sustainable yield."
3	The Spawning Stock Biomass of populations of commercially-exploited species are above biomass levels capable of producing maximum sustainable yield.	In line with Commission decision (EU) 2017/848, in combination with current large fish indicator will help ensure healthy stocks both in terms of number of reproductive adults but also provide a mechanism to assess and determine fecundity of adult fish is not being adversely affected.
4	There are no significant increases or decrease, beyond natural variation, in production of	Current indicators relate only to biomass and functional type not being reduced. Would a proactive target for production be more useful? Phytoplankton primary production can thus be useful as an early warning indicator of pressures on the food web. Phytoplankton primary production is an available flow of energy (i.e. organic matter) through the ecosystem. The ability of an ecosystem to

	phytoplankton caused by anthropogenic impacts.	recover from disturbance is a complex process; primary production can help understanding this process. There are several case studies supporting the validation of this indicator. Depending on the pressures on the ecosystem, an increasing or a decreasing trend could reflect either a progress or an increase of pressures.
4	There should be an increase in the average trophic level of marine predators to ensure healthy ecosystem functioning.	Food webs are networks of organisms related by predator-prey interactions (*i.e.* feeding relationships). The trophic level (TL) expresses the position of an organism in a food web. It is estimated by using dietary analysis and stable isotope analyses. The average trophic level or Mean Trophic Level (MTL) is calculated using biomass data on species (from surveys and landings) and their assigned TL. Changes in the MTL can reflect changes in the food webs structure. This indicator, not specific to fish, is mainly sensitive to the effect of fishing pressure. Fisheries usually target species with a high TL causing a decrease in the availability of these predators in the ecosystem. A decline in the abundance of such high TL species will be reflected through a decline of the MTL of the global catch of fisheries (landings). With a decreasing availability of predators, the fishing pressure is progressively targeting lower TL species which is known as fishing down the marine food webs; in turn increasing the decline of the MTL. If this phenomenon persists, the resulting modification of the food webs structure could leave marine ecosystems increasingly vulnerable to natural and human induced stresses.
5	Human-induced eutrophication is minimised, especially adverse effects thereof, such as losses in biodiversity, ecosystem degradation, harmful algae blooms and oxygen deficiency in bottom waters.	While broadly similar to what exists in the current UK Marine Strategy this proposal is stronger, and specifically mentions prevention of harmful impacts.
5	The photic limit (transparency) of the water column is not reduced, due to increases in suspended algae, to a level that indicates adverse effects of nutrient enrichment.	In line with Commission decision (EU) 2017/848, there does not appear to be an existing indictor regarding photic limits.
5	The concentration of dissolved oxygen is not reduced, due to nutrient enrichment, to levels that	In line with Commission decision (EU) 2017/848, current indicators rely on WFD, and more limited OSPAR, monitoring, however this does not cover the entirety of the Marine area. Current measures in Part 3 (Program of Measures) states, "*There should be no kills in benthic animal species as a*

	indicate adverse effects on benthic habitats (including on associated biota and mobile species) or other eutrophication effects.	*result of oxygen deficiency that are directly related to anthropogenic input of nutrients."* Proposed indicator aims to reduce impact of sublethal effects.
5	The abundance of opportunistic macroalgae is not at levels that indicate adverse effects of nutrient enrichment.	In line with Commission decision (EU) 2017/848, Provides aspiration for wider monitoring beyond those macroalgae currently monitored by WFD and the limited OSPAR monitoring.
6	Condition of the benthic community is stable or recovering. There should be no adverse impacts through changes in species composition and their relative abundance by physical disturbance.	Presence of particularly sensitive and/or tolerant species as indicator e.g. Size-frequency distribution of bivalve or other sensitive indicator species. Sets a higher level of ambition than "*ecological quality ratio based on the sensitivity, richness and diversity (evenness) of benthic communities"*
6	The absence or loss of particularly sensitive or fragile species providing a key ecosystem function, caused by physical disturbance, should be prevented and where feasible such species should be restored.	Utilising current baselines and understanding of benthic communities, the absence of sensitive and fragile species, particularly those playing a key role in healthy ecosystem functioning, should be limited and where feasible these species should be resorted.
6	Area of habitat loss, caused by physical damage to predominant and special habitats (broad habitat types under descriptor 1 & 6) is prevented, and action should be taken to restore lost and damaged habitat.	The indicator aims to evaluate to what extent the seafloor is being damaged or disturbed by current pressures caused by human activities. It uses the distribution & intensity of pressures and the distribution and extent of habitats & their sensitivity to those pressures. Initial calculations have used fisheries activity data, it is expected that other activities will be added later. It is important to note that some areas have already lost some of the sensitive species/biotopes due to past human activities, which will result in a lower disturbance score. This indicator is only showing part of the picture in terms of benthic habitat deterioration at the regional scale, due to gaps in data and knowledge on habitat and pressure distribution which limits analysis. OSPAR work on T&D habitats implies a basis for a threshold (e.g. "no further loss of habitat") and should be used to inform this work.

6	The Structure and function of benthic habitats (broad habitat types under descriptor 1 & 6) are stable or recovering.	The habitat itself must be in good condition itself to support biological communities. Targets could include maintaining/restoring habitat composition, topographic characteristics and volume of sediment.
6 & 1	**Biogenic reef: Ostrea edulis bed** Ostrea edulis beds are actively re-establishing at [quantify] historic sites from which they have been lost within each subregion, and the level of exposure to pressure at existing and re-establishment sites is not greater than 'Low'.	Aims to assess and enable recovery of a specific heavily impacted habitat type listed on the OSPAR T&D list (oyster beds have been lost from 5 out of 6 sections of the NI coast since the 1830). This uses the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing) and incorporating a pressure-based threshold proxy value (low).
6 & 1	**Biogenic reef: maerl bed** The proportion of live maerl on maerl beds within each subregion is not significantly declining, and individual beds are not exposed to a level of pressure greater than 'Low'.	Aims to assess the condition and enable protection of maerl beds (listed on OSPAR T&D list). This uses the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is not significantly declining) and incorporating a pressure-based threshold proxy value (low).
6 & 1	**Benthic habitat disturbance: fan mussel** 1. New [quantify] fan mussel populations of viable size [define] are establishing on infralittoral sand, infralittoral coarse sediment, circalittoral sand and circalittoral coarse sediment within each relevant subregion.	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance) and incorporating a pressure-based threshold proxy value (low). For background, fan mussels are large infaunal bivalves that have contracted in distribution in response to bottom trawling and dredging They form part of the typical species assemblage of certain sediment habitats.

	2. Fan mussel population abundance is increasing (within subregions with extant populations). Fan mussel populations are not exposed to a level of pressure greater than 'Low'.	
6 & 1	**Benthic habitat disturbance: Angel shark** 1. Angel sharks are found within an increasing proportion of 10x10km^2 that contain infralittoral sand and circalittoral sand (within the Irish Sea). 2. Angel shark population abundance is increasing within the Irish Sea. Angel shark populations are not exposed to a level of pressure greater than 'Low'.	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance) and incorporating a pressure-based threshold proxy value (low). For background, angel sharks are listed on the OSPAR T&D list and are critically endangered globally - largely as a result of pervasive bottom trawling along the North East Atlantic shelf and Mediterranean basin. They are an apex predator, and in the past, they would have formed part of the typical species component of certain sediment habitats. The last known Angel Shark population in UK waters is in the Irish Sea around Cardigan Bay in Wales, but it used to occur in all UK jurisdictions.
6 & 1	**Benthic habitat disturbance: common skate complex** 1. New common skate populations are establishing in subregions from which they have been extirpated.	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance) and incorporating a pressure-based threshold proxy value (low). For background, the common skate complex comprises 2 critically endangered species together listed on the OSPAR T&D list. They are apex predators, and have declined largely due to bottom trawling. In the UK, they have been extirpated in the North Sea and English Channel, and almost in the Irish Sea. The last strongholds of the larger species in the complex (flapper skate) are off

	2. Common skate are found within an increasing proportion of 10x10km^2 that contain infralittoral mud, infralittoral sand, infralittoral coarse sediment, circalittoral mud, circalittoral sand and circalittoral coarse sediment (within subregions with extant populations). 3. Common skate population abundance is increasing (within subregions with extant populations). Common skate populations are not exposed to a level of pressure greater than 'Low'.	western Scotland and northern and western Ireland. In the past, they would have formed part of the typical species component of certain sediment habitats.
6 & 1	**Benthic benthic disturbance: thornback ray** 1. Thornback ray are found within an increasing proportion of 10x10km^2 that contain infralittoral mud, infralittoral sand, infralittoral coarse sediment, circalittoral mud, circalittoral sand and	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance). For background, thornback ray is listed on the OSPAR T&D list, forms part of the typical species assemblage of certain sediment habitats, and is sensitive to pressures generated by bottom trawling.

	circalittoral coarse sediment (within subregions with extant populations). Thornback ray population abundance is increasing (within subregions with extant populations).	
6 & 1	**Benthic habitat disturbance: turbot** 1. Turbot are found within an increasing proportion of 10x10km^2 that contain infralittoral sand and circalittoral sand (within subregions with extant populations). Turbot population abundance is increasing (within subregions with extant populations).	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance). For background, turbot are listed as vulnerable in Europe by the IUCN redlist, form part of the typical species assemblage of certain sediment habitats, and are sensitive to pressures generated by bottom trawling.
6 & 1	**Benthic habitat disturbance: Ostrea edulis bed** *Ostrea edulis* biomass and density within existing native oyster beds is not significantly declining.	Native Oyster, *Ostrea edulis*, are sensitive to benthic disturbance. Successful recruitment requires sufficient old shells to be present. Damage to the benthos can reduce the coverage of old shells, reducing successful breeding of the species.
6 & 1	**Benthic habitat disturbance: Sea Pens**	The population abundance of sea pen species is increasing within 10x10km2 that contain infralittoral and/or circalittoral mud habitat exposed to a level of pressure greater than 'Medium' within the last 10 years.

	The proportion of mature sea pens is not significantly declining within 10x10km2 squares that contain infralittoral mud and/or circalittoral mud.	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance) and incorporating a pressure-based threshold proxy value (low).
6 & 1	**Benthic habitat disturbance: ocean quahog** The proportion of mature ocean quahog is not significantly declining within 10x10km2 squares that contain infralittoral sand/muddy sand and/or circalittoral sand/muddy sand within each relevant subregion. Ocean quahog population abundance is increasing (within subregions with extant populations). Ocean quahog populations are not exposed to a level of pressure greater than 'Low'.	This suite of indicators measures benthic habitat disturbance by measuring the recovery of a disturbance sensitive species. They incorporate the approach given in Article 4 (part 2) of the Commission Decision on GES by addressing the directional trends of the values (target here is increasing distribution and abundance) and incorporating a pressure-based threshold proxy value (low). For background, ocean quahog are a medium/large bivalve mollusc living in sand or muddy sand at a wide range of depths. They are highly sensitive to physical disturbance and slow to recover. Their addition to the suite would add a long-term measure of seabed recovery.
6 & 1	**Benthic habitat disturbance: OSPAR rare/threatened/declining species and habitats**	The UK's Charting Progress 2 Report http://webarchive.nationalarchives.gov.uk/20141203170558/http://chartingprogress.defra.gov.uk/ and Scotland's Marine Atlas http://www.gov.scot/Publications/2011/03/16182005/0 both highlight the ongoing concerns and declines in the status of rare/threatened/declining species and habitats.

	Restore and recover all OSPAR rare/threatened/declining species and habitats, and ensure populations are not exposed to a level of pressure that halts restoration or recovery.	The emerging MPA network across the UK, with the component sites from processes in Scotland, England, Wales and Northern Ireland, is of course welcome but these must not be 'paper parks' and need proper protection, which has commenced in many English inshore SACs and inshore Scottish MPAs and SACs. However, new MPAs are still needed, management measures are still awaited in many existing sites and, crucially for this indicator, many examples of rare/threatened/declinined species and habitats exist *outside* MPAs/MCZs/SACs and/or are yet to be protected. We would welcome an approach taken throughout UK seas similar to that already committed to in Scotland – in line with General Policy 9(b) of Scotland's National Marine Plan whereby human activity must not significantly impact the national status of Priority Marine Features (PMFs) – where commitment has been made to "*improve the protection given to Priority Marine Features outside Marine Protected Areas".* Such an approach is needed to proactively recover and restore vulnerable benthic habitats in line with OSPAR ambitions.
6 & 1	**Benthic habitat disturbance: representative species and habitats** Ensure status and extent of representative seabed habitats, and the associated species that they support, is sufficient in order to support benthic ecosystem functioning and achieve GES for seafloor integrity.	A motion passed by IUCN in 2016 recognised that at least 30% of the global ocean needs protected: https://blog.marine-conservation.org/2016/09/iucn-world-conservation-congress-passes-motion-to-protect-30-of-ocean-by-2030-by-large-margin.html. This is in line with emerging scientific consensus of the proportion of the sea that needs protected from the most damaging activities. (Wider seas protection measures would still be required in the wider 70% of the seas as part of a three-pillared approach to marine nature conservation). As well as most if not all examples of the most vulnerable features discussed above, at least 30% of the widespread/'representative' seabed features would also need protected. Recent published research also suggests that this would also have benefit for commercial fisheries management: https://www.gla.ac.uk/news/headline_565166_en.html. Protecting a suitable proportion of representative habitat, as well as 'special' habitat (rare/threatened/declined, see above) is therefore crucial for wider ecosystem and economic benefit in order to ensure seafloor integrity and therefore that the benthic ecosystem can continue to provide its crucial ecosystem service functions. The findings of the OSPAR 2017 interim report bring this into sharp relief: *"A first OSPAR assessment of physical disturbance from bottom trawling is now presented, which shows that 86% of the assessed areas in the Greater North Sea and the Celtic Seas are physically disturbed, of which 58% is highly disturbed. Consistent fishing pressure occurs in 74% of all assessed areas, which is very likely to affect the ability of habitats to recover."* (https://oap.ospar.org/en/ospar-assessments/intermediate-assessment-2017/key-messages-and-highlights/benthic-habitats-affected-by-bottom-fisheries/)

7 & 6	Area of habitat loss of predominant and special habitats (broad habitat types under descriptor 1 & 6), caused by permanent alteration of hydrographical conditions, is prevented.	In line with Commission decision (EU) 2017/848 and supports action above in relation to physical damage to habitats and functional benthic communities. Also in line with Commission decision (EU) 2017/848,
8	Additional contaminants, such as from offshore sources, should not give rise to pollution effects and the health of species and the condition of habitats are not adversely affected.	Whilst the majority of contaminants are considered under WFD and licencing of new developments, consideration must be given to the decommissioning of offshore installations such as those associated with the oil and gas industry.
8	The Input of emerging chemicals of concern, as identified through the watch list created under the priority substances Directive 2000/60/EC, should not cause negative impacts to species or habitats, and where possible be prevented.	The UK should be proactive in ensuring future chemicals of concern do not enter the marine environment and as a minimum not cause negative impacts to species or habitats, and where possible be prevented.
8	The health of species and the condition of habitats (such as their species composition and relative abundance at locations of chronic pollution) are not adversely affected due to contaminants including cumulative and synergetic effects.	Builds on existing indicator, in that it includes cumulative and synergetic effects. However, it should be noted that a list of species and relevant tissues to be assessed, and habitats, still needs to be agreed at regional/sub-regional level.
8	There is a reduction in the severity and number of preventable events involving significant and acute pollution, including crude oil and similar compounds.	In line with Commission decision (EU) 2017/848, and seeks to measure and Improve on prevention measures.

10	The composition, amount and spatial distribution of litter on the coastline, in the surface layer of the water column, and on the seabed, are reduced and are at levels that do not cause harm to the coastal and marine environment. Information on the source and pathway of Marine litter shall be collected, where feasible;	Sets a clearer target to demonstrate if government measures are working. Proposed units of measurement for the criteria (amount of litter per category in number of items); - per 100 metres (m) on the coastline; - per square kilometre (km2) for surface layer of the water column and for seabed; - Amount of micro-litter per category in number of items and weight in grams (g); - per square metre (m2) for surface layer of the water column; - per kilogram (dry weight) (kg) of sediment for the coastline and for seabed; - Amount of litter/micro-litter in grams (g) and number of items per individual for each species in relation to size (weight or length, as appropriate) of the individual sampled; - Number of individuals affected (lethal; sub-lethal) per species.
10	Micro-litter shall be monitored in a manner that can be related to point-sources for inputs (such as harbours, marinas, waste-water treatment plants, storm-water effluents), where feasible	Recognising the sources of marine litter will enable targeted actions to be taken to reduce future input.
10	The amount of litter and micro-litter ingested by fulmar, is reduced both in volume and spatially.	Provides a measurable action to assess if the volume of Marine litter is being reduced. Northern fulmar is a formal marine litter indicator in OSPAR (Oslo/Paris Convention for the Protection of the Marine Environment of the North-East Atlantic) and the European MSFD (Marine Strategy Framework Directive). However, the current target is "Ecological Quality Objective (EcoQO)' for an ecologically acceptable level of marine debris in the North Sea has been defined as fewer than 10% of beached fulmars in the North Sea having more than 0.1 g of plastic (OSPAR, 2010).". However fulmar stomach contents are also a useful spatial and temporal indicator of marine litter[3]. Early studies indicate that more northern Northern Fulmar had significantly lower volumes of marine litter than their southern counterparts. A measure of success for current and future Government marine litter reduction programs would see a reduction in volume of plastic litter in Northern Fulmar stomachs, as an early indicator.
10	The amount of litter and micro-litter ingested by commercial fish is reduced and at a level that does	In tandem with above will allow a measure of effectiveness to litter reduction measures. Additionally, with commercial fish occupying a key role within marine food webs (i.e. not

[3] Seabirds, gyres and global trends in plastic pollution, A.van Franekera & Kara LavenderLawb, Environmental Pollution Volume 203, August 2015, Pages 89-96

	not adversely affect the health of the species concerned. The amount of litter/micro-litter in grams (g) and number of items per individual for each species in relation to size (weight or length, as appropriate) of the individual sampled.	automatically a top predator), this will enable assessment of the volume of litter throughout different trophic levels of the marine ecosystem.
10	There is a reduction in the number of individuals of each species which are adversely affected due to litter, such as by entanglement, other types of injury or mortality, or health effects.	This indicator seeks to provide a means to measure if the volume of marine litter is being reduced. In line with Commission decision (EU) 2017/848 and will help record the number of individuals affected by lethal and sub lethal impacts per monitored species. Monitoring should record the number of individuals affected (both lethal and sub-lethal impacts) per species.
11	The spatial distribution, temporal extent, and levels of anthropogenic impulsive sound sources are reducing and do not exceed levels that adversely affect populations of marine animals.	In line with Commission decision (EU) 2017/848, which determines that; *Scale of assessment*: Region, sub region or subdivisions. *Use of criteria:* The extent to which good environmental status has been achieved shall be expressed for each area assessed as follows: (a) for D11C1, the duration per calendar year of impulsive sound sources, their distribution within the year and spatially within the assessment area, and whether the threshold values set have been achieved; The UK should develop noise thresholds as part of a wider UK noise reduction strategy to reduce the impact of both impulsive and ambient noise, as monitored by the UK Marine Noise Registry
11	The spatial distribution, temporal extent and levels of anthropogenic continuous low-frequency sound are reducing and do not exceed levels that adversely affect populations of marine animals.	In line with Commission decision (EU) 2017/848, which determines that; *Scale of assessment*: Region, subregion or subdivisions. *Use of criteria:* The extent to which good environmental status has been achieved shall be expressed for each area assessed as follows: (a) For D11C2, the annual average of the sound level, or other suitable temporal metric agreed at regional or subregional level, per unit area and its spatial distribution within the assessment area, and the extent (%, km2) of the assessment area over which the threshold values set have been achieved.

		The UK should develop noise thresholds as part of a wider UK noise reduction strategy to reduce the impact of both impulsive and ambient noise, as monitored by the UK Marine Noise Registry