

**ECOREGION**      **General advice**  
**SUBJECT**        **Request from EU for scientific advice on data collection issues – part 2**

**Advice summary**

ICES provides an inventory (in the form of annexed tables) of the main bycatch issues for fisheries in each of Europe's Data Collection Framework (DCF) regions (Baltic, Atlantic, Mediterranean, Black Sea). An assessment is made as to how well the current DCF meets the need to understand these fishery interactions in the context of the EU's Marine Strategy Framework Directive (MSFD).

The detailed design of catch and bycatch observation schemes should integrate the needs for data both for fish stock assessment and for ecosystem assessment purposes. ICES advises that detailed planning, dependent on decisions at policy level, will be required to integrate all these data collection needs into existing survey protocols while ensuring that existing monitoring commitments are not compromised.

The design of on-board observer schemes, whether carried out by humans or by remote technology (e.g. closed-circuit television CCTV) will also need care, and will need to take account of likely future changes in human observer coverage as a consequence of the 'landings obligation' being introduced.

Detailed data on fishing effort will be required for any assessment of the effect of fishing. Data requirements are of higher temporal and spatial resolution and differ from those currently used for fish stock assessments.

Further research and additional survey effort (including additional surveys) will be needed to interpret several of the DCF and MSFD indicators, especially if they are to be used in management.

**Request**

*According to the MoU between ICES and the European Commission, ICES shall provide further scientific advice on data collection issues. ICES is therefore requested to assist in the identification of new data to be collected in support of the implementation of the Common Fisheries Policy (CFP) and the Marine Strategy Framework Directive.*

*Indicators for impacts on the ecosystem from fisheries can contribute to assessments for MSFD Descriptors 1, 4 and 6. As such they would need to be integrated with assessments of non-fishery impacts in order to provide an overall assessment for these descriptors in each (sub-) region. This will require discussion with Member States (via the Regional Sea Conventions) on how to incorporate such indicators. ICES should provide recommendations on how this can be included in the MSFD assessment and reporting process, as well as the implementation of the EU Biodiversity Strategy, including the periodic assessment of the data and access to the data and assessments.*

ICES interpretation of this request is based on the understanding that the DG Environment wants to consider how further data could be collected via the DCF/DC-MAP that would also be useful in the implementation of the MSFD and the EU Biodiversity Strategy. The European Commission clarified the request by suggesting a simplified scope to address the request in a logical sequence:

- (a) *Produce an inventory of the main fisheries per region: Identify the main bycatch issues per fishery (initially whether it is birds, mammals, reptiles, non-commercial fish or benthos); Coarsely quantify which fisheries are the main threats to each of these groups – some sort of high-level prioritisation; i.e. bird bycatch is an important issue for fishery X and Y in region Z).*
- (b) *Assess how well current DCF addresses the main threats – to indicate where current DCF is OK and hence priorities for revision.*
- (c) *Consider what methods for data collection (e.g. observers, use of CCTV etc.), sampling regime and periodicity would lead to the collection of data suitable for an indicator (Note there may be several options and costs might vary considerably, depending on links to observer systems for commercial stocks etc.) – it may be too early to pin down precisely the best methods.*

ICES provided advice on other parts of the request from DG ENV (not quoted above) earlier in 2013:

[http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/EU\\_%20data\\_%20collection\\_issues.pdf](http://www.ices.dk/sites/pub/Publication%20Reports/Advice/2013/Special%20requests/EU_%20data_%20collection_issues.pdf)

## ICES advice

### *Inventory of main fisheries and their bycatch*

Summary overviews of the main fisheries (metiér level 4) for each of the Data Collection Framework regions and their potential for bycatch have been made for the vertebrate groups birds, mammals, reptiles, elasmobranchs, and bony fish (Annex 1). The first three of these groups include all species that occur in the respective region, while the overviews for fish are based on the threatened and declining fish species listed by HELCOM, OSPAR, and the Barcelona Convention. Roughly half of the listed species are sampled for biological variables in commercial fisheries under the DCF. Most elasmobranch species are sampled.

Non-target and non-commercial fish are taken as bycatch in many fisheries, notably by trawls, nets, and seines. This includes many sharks and rays among elasmobranchs, and also many species of bony fish. Species of marine mammals are taken as bycatch in some fisheries, including by pelagic trawls and nets, as well as in longline fisheries in the Mediterranean Sea. Seabirds are taken in some fisheries, notably in nets and longline fisheries. Reptiles are taken as bycatch in net and trawl fisheries in the Mediterranean Sea.

Summary overviews of the potential to physically impact benthic habitats are provided for the same fisheries (Annex 2). Habitats chosen for this evaluation are relevant to each DCF region. The degree to which each habitat is affected by bottom gears depends on the scale of the fishing operations and the sensitivity of the habitat. Bottom trawls generally affect the largest areas and have the potential to cause most damage to sensitive habitats. Pelagic trawls on the other hand do not generally come in contact with the seafloor and have no impacts. Set nets, longlines, seines, and traps have more spatially limited contact with the seafloor and generally smaller and more local effects compared to bottom trawls. There is limited information on the potential impacts from some gears on benthic habitats, as reflected by question marks in the tables.

It should be noted that these overview assessments represent a wide span in real or potential impacts or threats, from low levels that might be assessed as insignificant, up to substantial and serious threats. Some impacts may be local while others will be widespread. If these assessments are to be used in management or targeting of studies/research, it will be necessary to carry out more detailed assessments in order to scale the impacts or threats for the various combinations of fishing activities and species or habitats. Because of this, ICES is not able to directly quantify all impacts.

### *Current DCF sampling in relation to main threats*

There are gaps in the bycatch data for marine mammals, seabirds, reptiles, and of species indicative of benthic habitats, because there is no obligation in the current DCF to record this information. The gaps identified for monitoring the status of threatened and declining fish species are for coastal and inshore (some anadromous) listed species, pelagic sharks, and demersal deep-water species south of ICES Subarea VI.

There is currently a gap in information on the spatial distribution of fishing activities by vessels under 12 m (in some regions, for example the Mediterranean, VMS data from fishing vessels of less than 15 m in length are not available).

### *Data collection methods and recommendations*

The DCF requires a sampling programme of commercial fisheries that includes landings on shore and total catches (including discards) at sea. Sampling effort is stratified according to the relative contribution of a particular metiér to overall landings, value of landings, and fishing effort. As a consequence, this sampling effort may not be adequate to provide sufficient data on fisheries that have a particularly high bycatch of certain protected, threatened, or declining species.

The detailed design of catch and bycatch observation schemes should integrate the needs for data both for fish stock assessment and for ecosystem assessment purposes. Monitoring should be based on statistically sound sampling schemes and will need a number of inputs, including a detailed set of quality targets and some knowledge of the required precision for indicators. Guidance on the desired precision, development, and provision of quality metrics of collected data would make it possible to advise on sampling intensity and the stratification of sampling. Guidance on prioritizing differing needs for time and personnel resources will also be needed. These are societal, not scientific, judgements that require the input of policy-makers.

There are several general principles to follow when establishing an observer scheme (regardless of method of observation).

- Vessels with gears that apparently cause most unwanted bycatch should have highest sampling, based on a risk-based approach.
- If possible, vessels should be selected randomly (ideally working with the industry, perhaps through fishing federations).
- Relevant parameters of the fishing operation should be collected, such as technical features of the fishing gear, location, frequency of the fishing activities, etc.
- Power analyses can be used to estimate and stratify studies; it may not be necessary to observe every ship every year to estimate the amount of bycatch per gear.

Additional information on the state of threatened and/or declining species and habitats is needed. The use of existing monitoring programmes may not be sufficient to get adequate information on many species and habitats. Recording the (by-)catch of these species by observers or scientific surveys might fill an information gap, as long as it is a limited list of readily recognisable species (including epifauna as indicators for their associated threatened and declining habitats) that can provide valuable information on, e.g. distribution of these species and habitats.

The use of observation schemes on commercial vessels may not be sufficient to determine the state or condition of benthic species and habitats. This is due to the variation in catchability between benthic species, and our lack of detailed knowledge of this variation. A better assessment may be made based on models linking data on the location of fishing activities and their effects on benthic habitats. However, if an observer is on board and benthic species are bycaught, photos can be made for determination. This information could also be used to improve the quality of modelling.

Increasing the scope of observer programmes and of CCTV observations of bycatch and discards need to be considered under the perspective likely decisions of the EU to introduce landing obligations. Assuming that there is compliance with the landing obligation, it is likely that observations of catch (and commercial species bycatch) could switch from being predominantly at sea to being predominantly on land due to cost–benefit reasons. This would reduce the potential for at-sea observations of other features such as bycatch by human observers.

When using CCTV cameras on board vessels, the following issues will need to be addressed.

- A catch (and bycatch) sampling scheme will still be required to confirm some information (e.g. species identity, age).
- Compulsory CCTV schemes, and schemes that recompense or incentivize fishers are more likely to be successful than voluntary schemes.
- Protocols for the analysis of CCTV records will need to be developed.
- Additional requirements for recording in logbooks (e.g. for rare species, species listed under the Habitats and Birds Directives, or under the Regional Sea Conventions) could be required when CCTV is in use, in order to compensate for the loss of records from on-board observers. The association of position (from integration of electronic logbook to GPS) could provide spatial details on the area where species were caught. The technical feasibility of such an approach might be experimentally tested on portions of the fleets.

Species known to be indicative of seabed habitat type, caught in surveys and on-board commercial vessels with on-board observers, should be recorded. This information can be used to identify and prioritize the management of gear/habitat interactions and to provide stronger links to implementation by EU Member States working through the Regional Sea Commissions of MSFD criteria 6.1 and 6.2 (seafloor integrity) and 1.6 (habitat condition). The inclusion of benthic taxa to be assessed by on-board observation may need the development of guidelines and the availability of proper taxonomic expertise.

Assessing the surface and sub-surface disturbance by bottom contact gears for the proposed MSFD indicators (of HELCOM and OSPAR) requires data on the extent of physical damage and loss of seabed habitats resulting from human activities. Fishing activity information therefore needs to be provided on the spatial distribution of fishing, including: location (maximum 30-minute position updates, preferably shorter), gear type (Levels 4 and 5), gear width, vessel speed, and whether fishing is occurring or not. Effort should be recorded in appropriate units (e.g. hours towed, km of net × soak time, number of hooks set).

To better interpret the results from monitoring under DCF, ICES offers the following further advice.

- a) Additional research is required to better understand the ‘fishing pressure – benthic state’ relationship and to develop predictive tools for this means.
- b) The spatial distribution of most habitat features is generally only known at a coarse scale. If impacts are to be assessed at a finer scale, further research and survey will be required (in some cases modelling may be adequate).
- c) Equally, knowledge of the population abundance and the spatial and temporal distribution of many species is inadequate. Dedicated surveys are likely to be required to remedy this situation.
- d) If indicators are to be used to inform management, then it will be important to distinguish between effects caused by human activities and those that may be described as natural (e.g. hydrographic change). This may require data collection beyond that needed to assess the state of the indicators.

Annually collected DCF data and Regional Seas indicators on fisheries impacts could contribute to the overall assessment and reporting for D1, 4, and 6 of the MSFD.

#### *Integrated assessment*

Data collected under DCF in the period 2014–2020 can be used to (further) develop, test, and evaluate the Regional Seas indicators. Information from adopted indicators can be included in the reporting process of the Regional Sea Commissions and included in Regional Sea Commission Assessments, leading to a common report for each (sub)region of the MSFD assessment. This will support Member States in reporting for the assessment required in 2018 under the MSFD.

Furthermore, the interim data of DCF may be used for future state of the environment of the Regional Sea Commissions (such as the OSPAR Quality Status Report in 2021 and future HELCOM reports on the Ecosystem Health of the Baltic Sea).

Integrated assessment (IA, or integrated ecosystem assessment, IEA) is seen as a core element of the ecosystem approach to management, being the step where information from monitoring is compiled and evaluated as a basis for scientific advice on management measures. ICES advises that IA should be used as a mechanism for integrating information collected for the various purposes under the CFP and MSFD, including indicators for impact of fisheries on other components of the ecosystem than commercial fish. ICES has established working groups for integrated assessment for some of the MSFD regions, including the Baltic Sea and the North Sea. These working groups can contribute to the overall holistic assessments of the status and trends of the regional ecosystems supporting the reporting by EU member states according to MSFD (and other) requirements.

#### **Sources**

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## Annex 1 Potential bycatch of vertebrate groups in fishing métiers for the four DCF regions

NA (not applicable) – the vertebrate group does not occur; N (no) – the fishing métier does not impact the vertebrate group (or bycatch is minimal); Y (yes) – a real or potential impact on the vertebrate group; ? – the fishing métier and vertebrate group are likely to overlap in space and time but with insufficient information to make a judgement. Colours of fishing gear cells symbolize level of activity: orange – common fishing gear/activity in this ecoregion; green – negligible or non-existent; white – not known.

**Table 1.5.2.2.1 Baltic region** (based on Anderson *et al.*, 2011; Cosgrove and Browne, 2007; ICES, 2013a; Zydalis *et al.*, 2013).

Gear groups	Gear type	Birds	Mammals	Reptiles	Threatened and declining	
					Elasmobranch	Bony fish
Bottom trawls	Bottom otter trawl [OTB]	Y	Y	NA	Y	Y
	Multi-rig otter trawl [OTT]	?	?	NA	Y	Y
	Bottom pair trawl [PTB]	?	?	NA	Y	Y
Pelagic trawls	Midwater otter trawl [OTM]	?	Y	NA	N	Y
	Midwater pair trawl [PTM]	?	Y	NA	N	Y
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	N	NA	Y	N
Longlines	Drifting longlines [LLD]	?	N	NA	?	N
	Set longlines [LLS]	?	N	NA	?	N
Traps	Pots and Traps [FPO]	N	Y	NA	N	N
	Fykenets [FYK]	N	Y	NA	N	N
	Stationary uncovered poundnets [FPN]	N	Y	NA	N	N
Nets	Trammelnet [GTR]	Y	Y	NA	Y	Y
	Set gillnet [GNS]	Y	Y	NA	Y	Y
Surrounding nets	Purse-seine [PS]	?	N	NA	?	Y
Seines	Fly-shooting seine [SSC]	N	N	NA	?	Y
	Anchored seine [SDN]	N	N	NA	?	Y
	Pair-seine [SPR]	N	N	NA	?	Y
	Beach and boat seine [SB] [SV]	N	N	NA	?	?
Recreational fisheries		Yes	N	NA	?	Y

**Table 2**

**North Sea** (based on Anderson *et al.*, 2011; Cosgrove and Browne, 2007; ICES, 2013a; Zydalis *et al.*, 2013).

Gear groups	Gear type	Birds	Mammals	Reptiles	Threatened and declining	
					Elasmobranch	Bony fish
Dredges	Boat dredge [DRB]	N	N	NA	N	Y
	Mechanized / Suction dredge [HMD]	N	N	NA	N	N
Bottom trawls	Bottom otter trawl [OTB]	Y	N	NA	Y	Y
	Multi-rig otter trawl [OTT]	?	N	NA	Y	Y
	Bottom pair trawl [PTB]	?	N	NA	Y	Y
	Beam trawl [TBB]	N	N	NA	Y	Y
Pelagic trawls	Midwater otter trawl [OTM]	N	Y	NA	N	N
	Midwater pair trawl [PTM]	N	Y	NA	N	N
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	N	NA	N	N
Longlines	Set longlines [LLS]	?	N	NA	N	N
Traps	Pots and Traps [FPO]	N	Y	NA	N	N
	Fykenets [FYK]	N	N	NA	?	?
Nets	Trammelnet [GTR]	Y	Y	NA	Y	Y
	Set gillnet [GNS]	Y	Y	NA	Y	Y
	Driftnet [GND]	Y	?	NA	N	N
Surrounding nets	Purse-seine [PS]	N	N	NA	Y	Y
Seines	Fly-shooting seine [SSC]	N	N	NA	Y	Y
	Anchored seine [SDN]	N	N	NA	Y	Y
	Pair-seine [SPR]	N	N	NA	Y	Y
	Beach and boat seine [SB] [SV]	N	N	NA	N	Y
Recreational fisheries		N	N	NA	Y	N

**Table 1.5.2.2.3 Atlantic region** (based on Anderson *et al.*, 2011; Cosgrove and Browne, 2007; ICES, 2013a; Zydalis *et al.*, 2013).

Gear groups	Gear type	Birds	Mammals	Reptiles	Threatened and declining	
					Elasmobranch	Bony fish
Dredges	Boat dredge [DRB]	N	N	N	N	Y
	Mechanized / Suction dredge [HMD]	N	N	N	N	N
Bottom trawls	Bottom otter trawl [OTB]	Y	N	?	Y	Y
	Multi-rig otter trawl [OTT]	?	N	N	Y	Y
	Bottom pair trawl [PTB]	?	N	N	Y	Y
	Beam trawl [TBB]	?	N	N	Y	Y
Pelagic trawls	Midwater otter trawl [OTM]	N	Y	N	Y	Y
	Midwater pair trawl [PTM]	N	Y	N	Y	Y
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	N	N	N	N
	Trolling lines [LTL]	N	Y	N	N	N
Longlines	Drifting longlines [LLD]	Y	N	N	N	N
	Set longlines [LLS]	Y	N	N	N	N
Traps	Pots and Traps [FPO]	N	Y	Y	N	N
	Fykenets [FYK]	N	N	N	N	N
	Stationary uncovered poundnets [FPN]	N	N	N	N	N
Nets	Trammelnet [GTR]	Y	Y	?	Y	Y
	Set gillnet [GNS]	Y	Y	Y	Y	Y
	Driftnet [GND]	Y	Y	Y	Y	N
Surrounding nets	Purse-seine [PS]	Y	Y	N	N	Y
Seines	Fly-shooting seine [SSC]	N	N	N	Y	Y
	Anchored seine [SDN]	N	N	N	Y	Y
	Pair-seine [SPR]	N	N	N	Y	Y
	Beach and boat seine [SB] [SV]	N	Y	N	N	N
Recreational fisheries		N	N	N	N	N

**Table 1.5.2.2.4 Mediterranean and Black Sea region** (based on Casale, 2011; Cebrian Menchero, 2010; GFCM, 2008; ICES, 2013a; Tudela, 2004).

Gear groups	Gear type	Birds	Mammals	Reptiles	Threatened and declining	
					Elasmobranch	Bony fish
Dredges	Boat dredge [DRB]	N	N	N	N	?
Bottom trawls	Bottom otter trawl [OTB]	Y	Y	Y	Y	Y
	Multi-rig otter trawl [OTT]	?	?	Y	Y	Y
	Bottom pair trawl [PTB]	?	?	Y	Y	Y
	Beam trawl [TBB]	N	N	N	Y	Y
Pelagic trawls	Midwater otter trawl [OTM]	?	?	Y	Y	Y
	Pelagic pair trawl [PTM]	?	Y	Y	Y	Y
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	?	?	?	?
	Trolling lines [LTL]	Y	?	?	?	?
Longlines	Drifting longlines [LLD]	Y	Y	Y	Y	Y
	Set longlines [LLS]	Y	Y	Y	Y	Y
Traps	Pots and Traps [FPO]	N	Y	N	N	?
	Fykenets [FYK]	?	Y	?	?	?
	Stationary uncovered poundnets [FPN]	?	Y	?	Y	?
Nets	Trammelnet [GTR]	Y	Y	Y	Y	Y
	Set gillnet [GNS]	Y	Y	Y	Y	Y
	Driftnet [GND]	Y	Y	Y	Y	Y
Surrounding nets	Purse-seine [PS]	?	Y	Y	?	Y
	Lampara nets [LA]	?	?	?	?	Y
Seines	Fly-shooting seine [SSC]	N	N	?	N	Y
	Anchored seine [SDN]	N	N	?	N	Y
	Pair-seine [SPR]	N	N	?	N	Y
	Beach and boat seine [SB] [SV]	N	N	?	?	?
Recreational fisheries		?	Y	?	Y	?



## Annex 2 Tables of fishing metiér and their potential to impact relevant benthic habitats

NA (not applicable) – the fishing metiér is not employed or would not contact the benthic habitat; N (no) – the fishing metiér does contact, but does not impact, the benthic habitat; Y (yes) – a real or potential impact on the benthic habitat; ? – the fishing metiér and benthic habitat are likely to overlap in space and time, but with insufficient information to make a judgement. For the Mediterranean and Black Sea, the NA and N categories are combined as NA. Colours of fishing gear cells symbolize level of activity: orange – common fishing gear/activity in this ecoregion; green – negligible or non-existent; white – not known.

**Table 1.5.2.2.5 Baltic Sea region**

Gear group	Gear type	Sea-grasses	Mud	Sea pens	Sand	Gravel	Muddy gravel	Mixed sediments	Kelp forests	Bivalve reefs ( <i>Modiolus</i> , <i>Musculus</i> , <i>Ostrea</i> )
Bottom trawls	Bottom otter trawl [OTB]	NA	Y	NA	Y	Y	Y	Y	Y	NA
	Multi-rig otter trawl [OTT]	NA	Y	NA	Y	Y	Y	Y	Y	NA
	Bottom pair trawl [PTB]	NA	Y	NA	Y	Y	Y	Y	Y	NA
Pelagic trawls	Midwater otter trawl [OTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Midwater pair trawl [PTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	N	N	N	N	N	N	N	N
Longlines	Drifting longlines [LLD]	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Set longlines [LLS]	Y	?	?	N	?	?	?	Y	?
Traps	Pots and Traps [FPO]	Y	?	?	N	?	?	?	Y	?
	Fykenets [FYK]	Y	?	?	N	?	?	?	Y	?
	Stationary uncovered poundnets [FPN]	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nets	Trammelnet [GTR]	Y	?	?	N	?	?	?	Y	?
	Set gillnet [GNS]	Y	?	?	N	?	?	?	Y	?
Surrounding nets	Purse-seine [PS]	?	?	?	?	?	?	?	?	?
Seines	Fly-shooting seine [SSC]	Y	?	?	N	?	?	?	Y	?
	Anchored seine [SDN]	Y	?	?	N	?	?	?	Y	?
	Pair-seine [SPR]	Y	?	?	N	?	?	?	Y	?
	Beach and boat seine [SB] [SV]	Y	?	?	N	?	?	?	Y	?
Recreational fisheries		?	N	?	N	N	N	N	Y	Y

**Table 1.5.2.2.6 North Sea**

Gear groups	Gear type	Hard biogenic reefs ( <i>Lophelia</i> , carbonate mounds, maerl, etc.)	<i>Sabellaria</i> reefs	Sea-grasses	Mud	Sea pens	Sand	Gravel	Muddy gravel	Mixed sediments	Kelp forests	Circa-littoral reefs incl. coral gardens, sponges	Bivalve reefs ( <i>Modiolus</i> , <i>Musculus</i> , <i>Ostrea</i> )	Deep-water sponges
Dredges	Boat dredge [DRB]	Y	?	?	Y	Y	Y	Y	Y	Y	Y	NA	Y	Y
	Mechanized / Suction dredge [HMD]	NA	NA	NA	NA	?	Y	NA	NA	Y	NA	NA	NA	NA
Bottom trawls	Bottom otter trawl [OTB] <sup>1</sup>	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Multi-rig otter trawl [OTT]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Bottom pair trawl [PTB]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Beam trawl [TBB]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pelagic trawls	Midwater otter trawl [OTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Midwater pair trawl [PTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	N	N	N	N	N	N	N	N	N	N	N	N
Longlines	Set longlines [LLS]	Y	Y	Y	?	?	N	?	?	?	?	Y	?	Y
Traps	Pots and Traps [FPO]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
	Fykenets [FYK]	NA	NA	N	?	NA	N	N	N	?	NA	NA	?	NA
Nets	Trammelnet [GTR]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
	Set gillnet [GNS]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
	Driftnet [GND]	N	N	N	N	N	N	N	N	N	N	N	N	N
Surrounding nets	Purse-seine [PS]	N	N	N	?	?	?	?	?	?	N	N	N	N
Seines	Fly-shooting seine [SSC]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
	Anchored seine [SDN]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
	Pair-seine [SPR]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
	Beach and boat seine [SB] [SV]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	Y
Recreational fisheries		Y	?	?	N	?	N	N	N	N	?	Y	Y	NA

**Table 1.5.2.2.7 Atlantic region**

Gear group	Gear type	Hard biogenic reefs ( <i>Lophelia</i> , carbonate mounds)	<i>Sabellaria</i> reefs	Seagrasses	Mud	Seapens	Sand	Gravel	Muddy gravel	Mixed sediments	Kelp forests	Circa-littoral reefs incl. coral gardens	Bivalve reefs ( <i>Modiolus</i> , <i>Musculus</i> , <i>Ostrea</i> )	Deep-water sponges
Dredges	Boat dredge [DRB]	Y	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	Y	?
	Mechanized / Suction dredge [HMD]	N	N	N	N	N	Y	?	Y	Y	NA	NA	NA	NA
Bottom trawls	Bottom otter trawl [OTB]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Multi-rig otter trawl [OTT]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Bottom pair trawl [PTB]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Beam trawl [TBB]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Pelagic trawls	Midwater otter trawl [OTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Midwater pair trawl [PTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rods and Lines	Hand and Pole lines [LHP] [LHM]	N	N	N	N	N	N	N	N	N	N	N	N	N
	Trolling lines [LTL]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Longlines	Drifting longlines [LLD]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Set longlines [LLS]	Y	Y	Y	?	?	?	?	?	?	Y	Y	?	Y
Traps	Pots and Traps [FPO]	Y	Y	Y	?	?	?	?	?	?	Y	Y	?	Y
	Fykenets [FYK]	NA	NA	N	?	NA	N	N	N	?	NA	NA	?	NA
	Stationary uncovered poundnets [FPN]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Nets	Trammelnet [GTR]	Y	Y	NA	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Set gillnet [GNS]	Y	Y	?	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
	Driftnet [GND]	N	N	N	N	N	N	N	N	N	N	N	N	N
Surrounding nets	Purse-seine [PS]	N	N	N	?	?	?	?	?	?	N	N	N	N
Seines	Fly-shooting seine [SSC]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	NA
	Anchored seine [SDN]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	NA
	Pair-seine [SPR]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	NA
	Beach and boat seine [SB] [SV]	Y	Y	Y	?	?	N	?	?	?	Y	Y	?	NA
Recreational fisheries		Y	?	?	N	?	N	N	N	N	Y	Y	Y	NA

**Table 1.5.2.2.8 Mediterranean and Black Sea (based on Tudela, 2004; Bazairi *et al.*, 2010).**

Gear groups	Gear type	INFRALITTORAL					CIRCALITTORAL			BATHYAL			ABYSSAL
		Fine muddy-sands	Coarse sands in very shallow waters	Stones and pebbles (incl. biogenic reefs: maerl, Rhodolites, etc.)	<i>Posidonia oceanica</i> meadows	Hard beds and rocks	Muds	Sands	Hard beds and rocks (coralligenous)	Muds	Sands	hard rocks (incl. deep-sea corals)	Muds
Dredges	Boat dredge [DRB]	Y	NA	?	NA	NA	Y	Y	Y	NA	NA	NA	NA
Bottom trawls	Bottom otter trawl [OTB]	Y	NA	Y	Y	NA	Y	Y	Y	Y	Y	Y	NA
	Multi-rig otter trawl [OTT]	Y	NA	?	Y	NA	Y	Y	?	Y	Y	Y	NA
	Bottom pair trawl [PTB]	Y	NA	?	Y	NA	Y	Y	?	Y	Y	Y	NA
	Beam trawl [TBB]	Y	NA	?	NA	NA	Y	Y	Y	NA	NA	NA	NA
Pelagic trawls	Midwater otter trawl [OTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pelagic pair trawl [PTM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Rods and Lines	Hand and Pole lines [LHP] [LHM]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Trolling lines [LTL]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Longlines	Drifting longlines [LLD]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Set longlines [LLS]	?	?	?	?	?	?	?	?	NA	NA	NA	NA
Traps (d)	Pots and Traps [FPO]	Y	?	Y	?	Y	Y	Y	Y	NA	NA	NA	NA
	Fykenets [FYK]	Y	?	Y	?	?	Y	Y	Y	NA	NA	NA	NA
	Stationary uncovered poundnets [FPN]	?	?	?	?	?	?	?	?	NA	NA	NA	NA
Nets	Trammelnet [GTR]	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA
	Set gillnet [GNS]	Y	Y	Y	Y	Y	Y	Y	Y	NA	NA	NA	NA
	Driftnet [GND]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Surrounding nets	Purse-seine [PS]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lampara nets [LA]	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Seines	Fly-shooting seine [SSC]	?	?	?	?	?	?	?	?	NA	NA	NA	NA
	Anchored seine [SDN]	?	?	?	?	?	?	?	?	NA	NA	NA	NA
	Pair-seine [SPR]	?	?	?	?	?	?	?	?	NA	NA	NA	NA

Gear groups	Gear type	INFRALITTORAL					CIRCALITTORAL			BATHYAL			ABYSSAL
		Fine muddy-sands	Coarse sands in very shallow waters	Stones and pebbles (incl. biogenic reefs: maerl, Rhodolites, etc.)	<i>Posidonia oceanica</i> meadows	Hard beds and rocks	Muds	Sands	Hard beds and rocks (coralligenous)	Muds	Sands	hard rocks (incl. deep-sea corals)	Muds
	Beach and boat seine [SB] [SV]	?	?	NA	Y	?	NA	NA	NA	NA	NA	NA	NA
	Recreational fisheries	?	?	?	?	Y	?	?	?	NA	NA	NA	NA