



Food and Agriculture  
Organization of the  
United Nations



General Fisheries Commission  
for the Mediterranean  
Commission générale des pêches  
pour la Méditerranée

# Preliminary results from the GFCM discards monitoring programme

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#### 4. Bycatch – discards and incidental catch of vulnerable species

The commonly agreed definition of bycatch, as reported in the GFCM Data Collection Reference Framework (DCRF) (GFCM, 2018a), is “the part of the catch that is unintentionally captured during a fishing operation in addition to target species. It may refer to the catch of other commercial species that are landed, commercial species that cannot be landed (e.g. undersized, damaged individuals), discards of non-commercial species, as well as to incidental catch of endangered, vulnerable or rare species (e.g. sea turtles, seabirds, sharks and marine mammals)” (Figure 57). Defining bycatch is particularly challenging in the Mediterranean and the Black Sea due to the variety of fishing activities and species caught and the dynamic nature of the discarded components (see Chapters 1, 2 and 3). There are therefore historical differences in the definition of bycatch at the country level, various functional interpretations of bycatch, including as catch that a fisher did not intend to catch but could not avoid catching, and different regulatory interpretations of bycatch in fisheries management plans, which may vary from country to country.

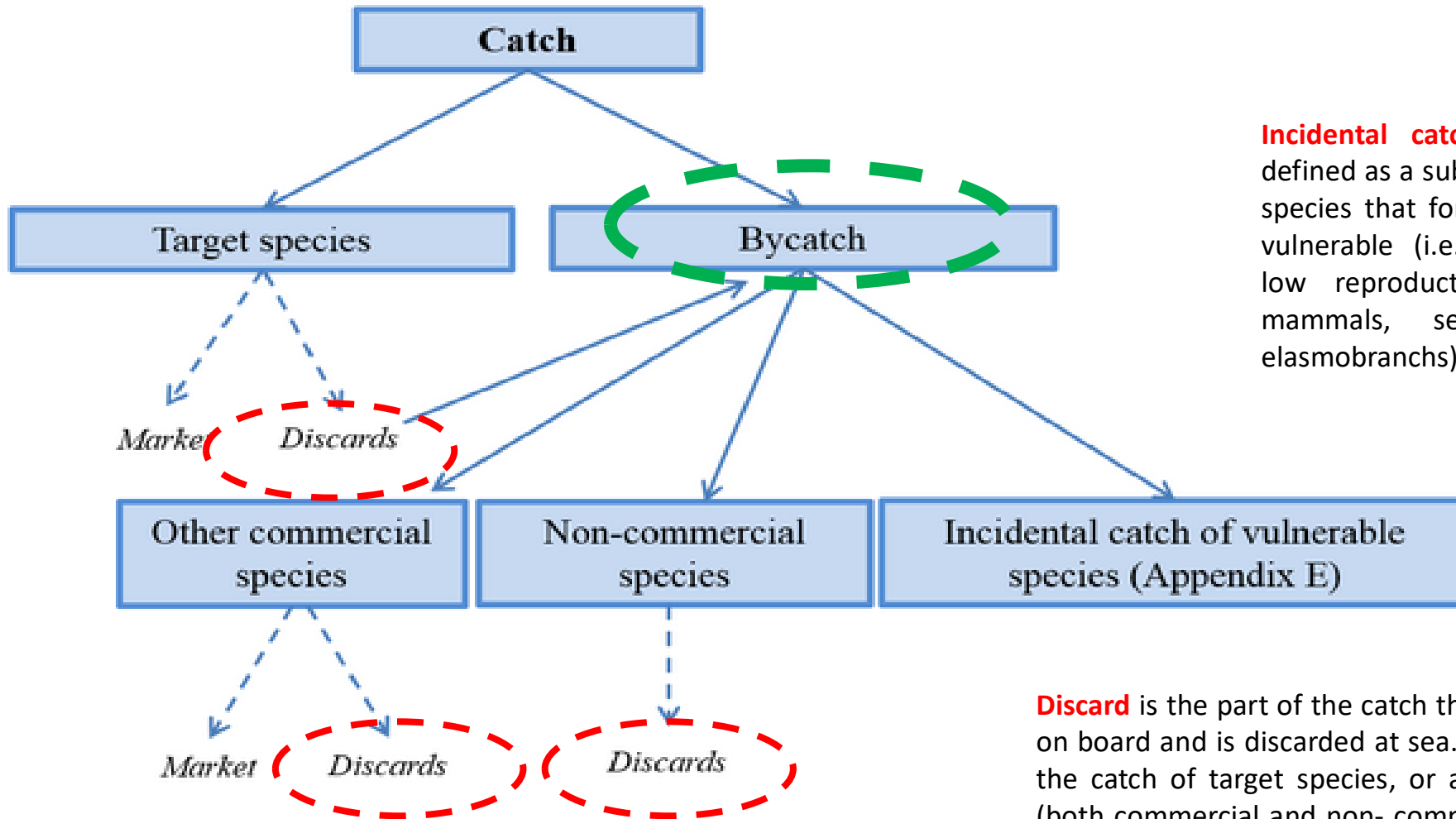
Bycatch from fishing activities is a complex concept with significant implications for the sector, including from economic, regulatory and public perception perspectives. With respect to future yields, it affects harvested resources by increasing

**Bycatch is considered one of the most important threats to the profitability and sustainability of fisheries, and as such has been recently attracting the attention of most regional fisheries management organizations (RFMOs) and other fisheries management bodies.**

<http://www.fao.org/documents/card/en/c/cb2429en>

SoMFi 2020

The term “bycatch” is widely used to refer that part of the catch ‘unintentionally’ captured during a fishing operation, in addition to target species, and consisting of *discards* and *incidental catches of vulnerable species* with or without commercial value.



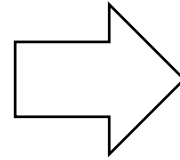
**Incidental catch of vulnerable species** is defined as a subset of bycatch, which includes species that for some reason are considered vulnerable (i.e. long-lived vertebrates with low reproductive rates such as marine mammals, sea turtles, seabirds and elasmobranchs).

**Discard** is the part of the catch that is not retained on board and is discarded at sea. This may include the catch of target species, or any other species (both commercial and non-commercial) discarded at sea.

Understanding bycatch and adopting effective measures to reduce it represent essential steps towards minimizing the impacts of fisheries on vulnerable species, discards, and more generally on marine ecosystems, as well as towards ensuring a sustainable fishery sector.

## GFCM-Discards monitoring programme

Albania  
Algeria  
Egypt  
Lebanon  
Montenegro  
Morocco  
Tunisia  
Turkey  
Ukraine



<http://www.fao.org/gfcm/publications/series/technical-paper/639/en/>

To address this issue and better understand the discards behaviour, the GFCM has launched a number of initiatives to improve knowledge on discards by fleet, subregion and species across the Mediterranean and Black Sea, working with fishers, national and international partners, environmental organizations and researchers

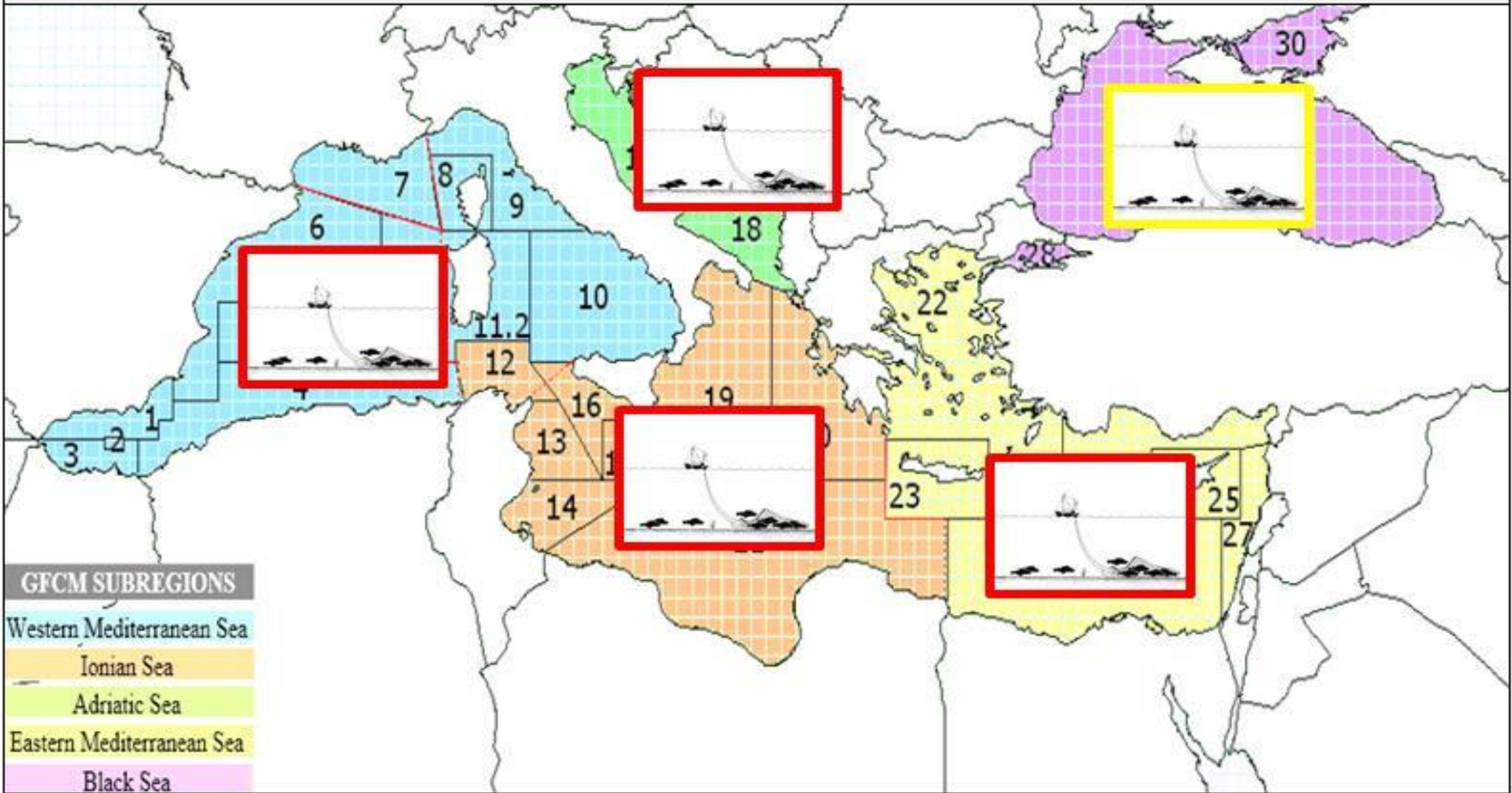
# GFCM mid-term strategy (2017–2020) towards the sustainability of Mediterranean and Black Sea fisheries

Vessel groups			Length classes (LOA)			
			< 6 m	6 - 12 m	12-24 m	> 24 m
Polyvalent	P	Small-scale vessels without engine				
		Small-scale vessels with engine				
		Polyvalent vessels				
Seiners	S	Purse seiners				
		Tuna seiners				
Dredgers	D	Dredgers				
Trawlers	T	Beam trawlers				
		Pelagic trawlers				
		Trawlers				
Longliners	L	Longliners				

- **by observers:** sampled through at-sea monitoring of commercial catches
- **by questionnaires:** to conduct direct dialogues with fishers
- **by self-sampling:** was intended to test a method for fishers to sample their own discards in order that collection of discards data could be made more representative of the whole fleet segment without the need to have too many observers.

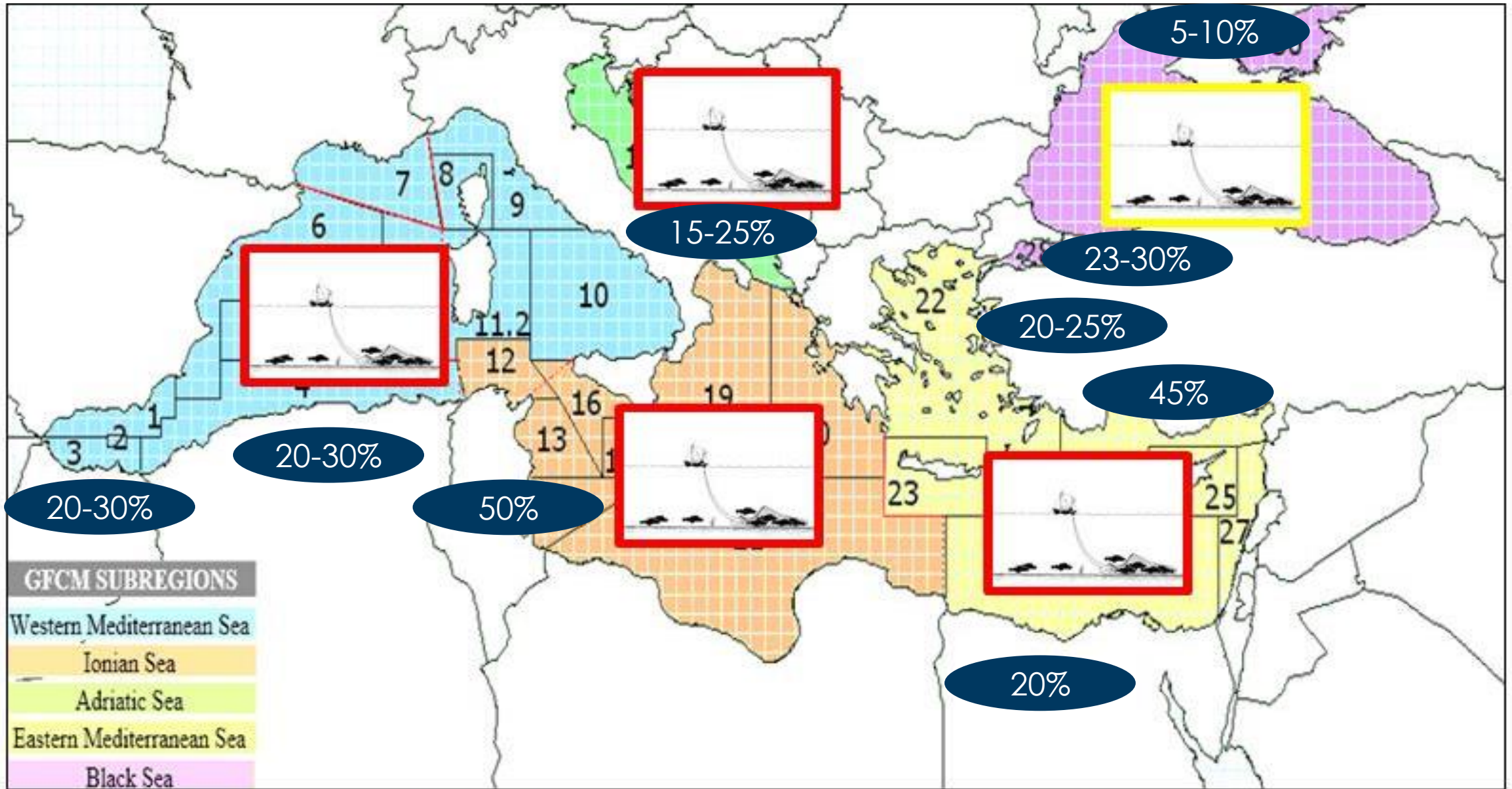
# Bottom trawl: Discard behavior

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# Overview from the GFCM Discards Monitoring Programmes

DISCARDS



High discard rate >40%



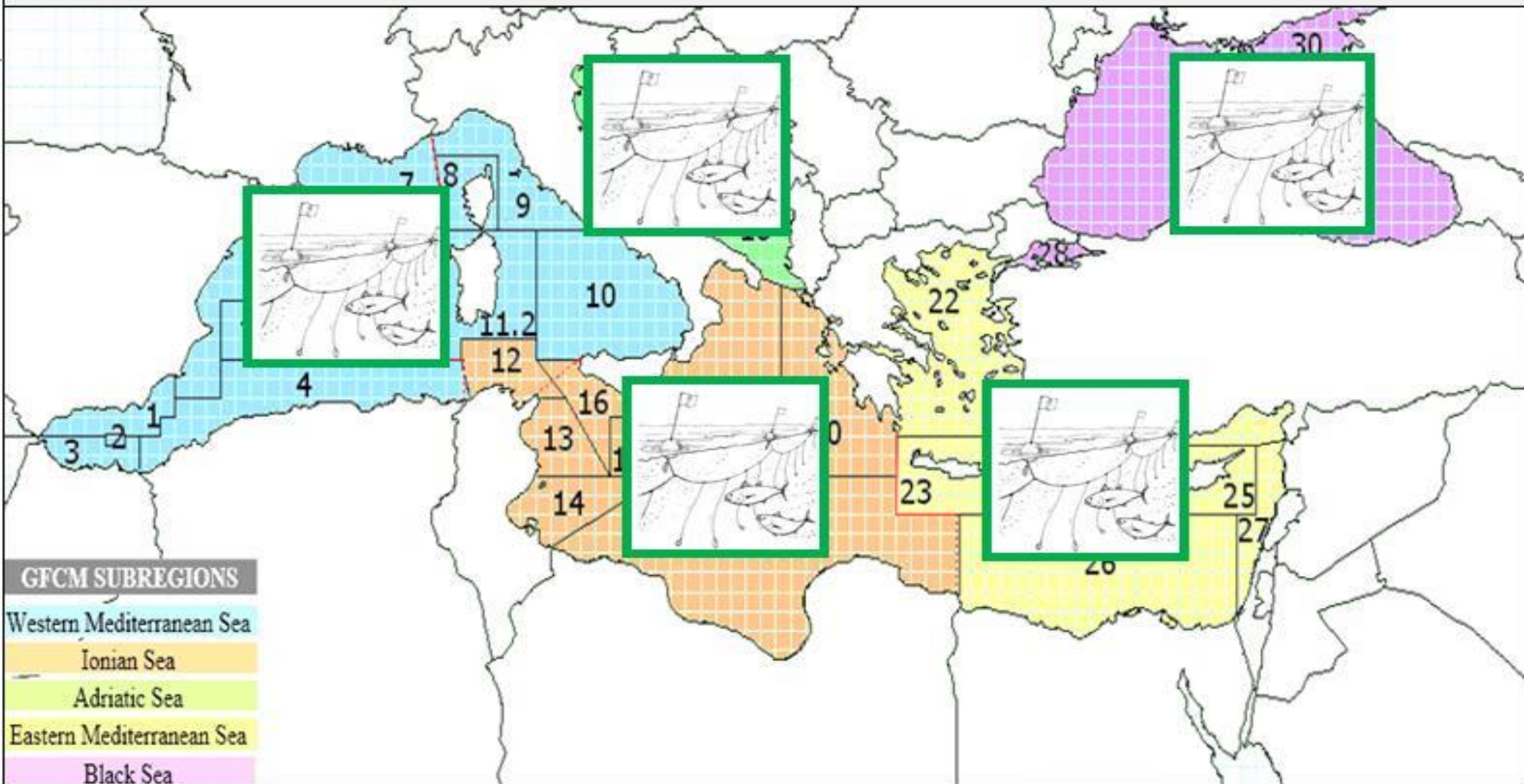
Medium discard rate 15-39%



Low discard rate < 15%

# Longline: Discard behavior

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**High discard rate >40%**



**Medium discard rate 15-39%**

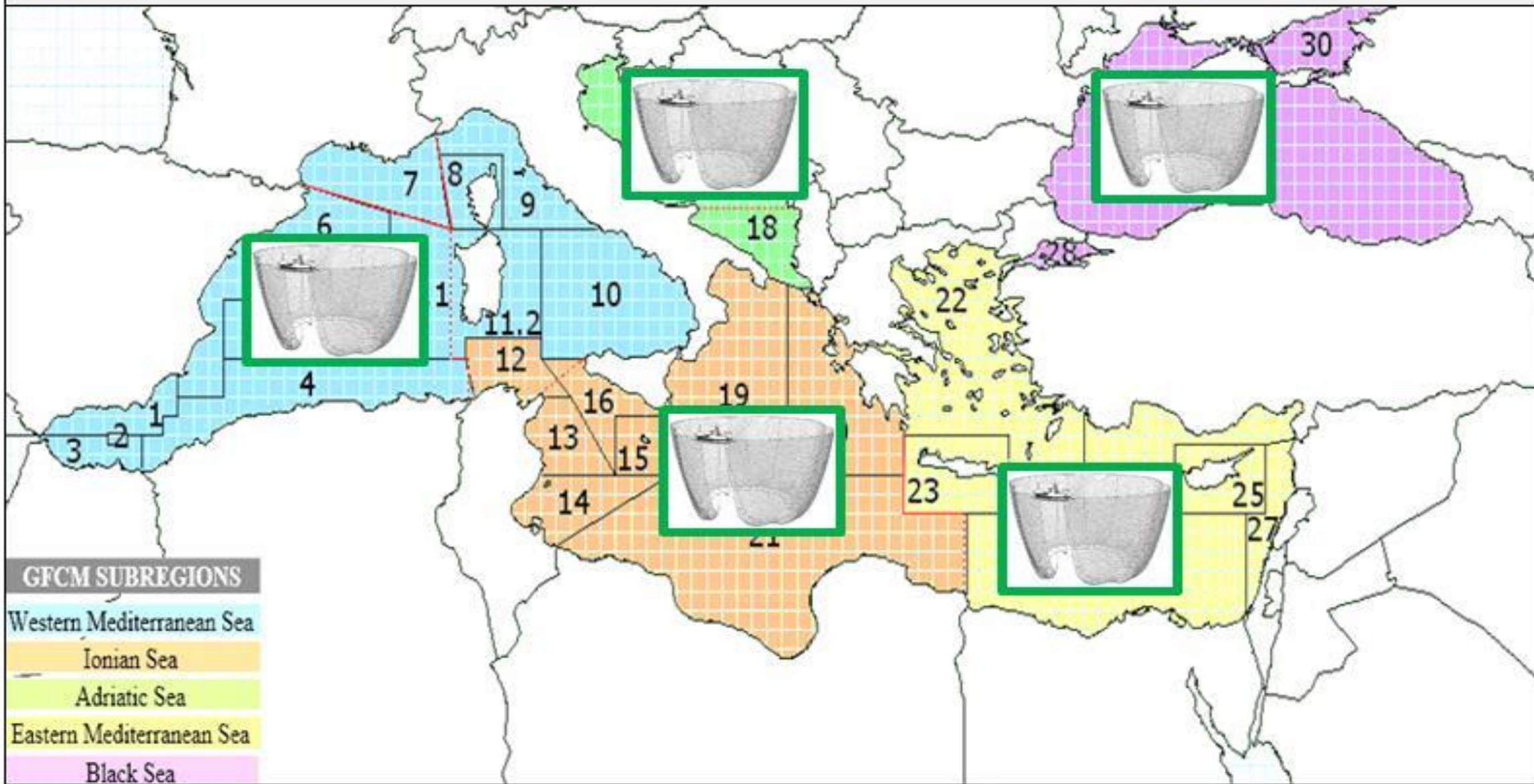


**Low discard rate < 15%**



# Purse seine: *Discard behavior*

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**High discard rate >40%**



**Medium discard rate 15-39%**



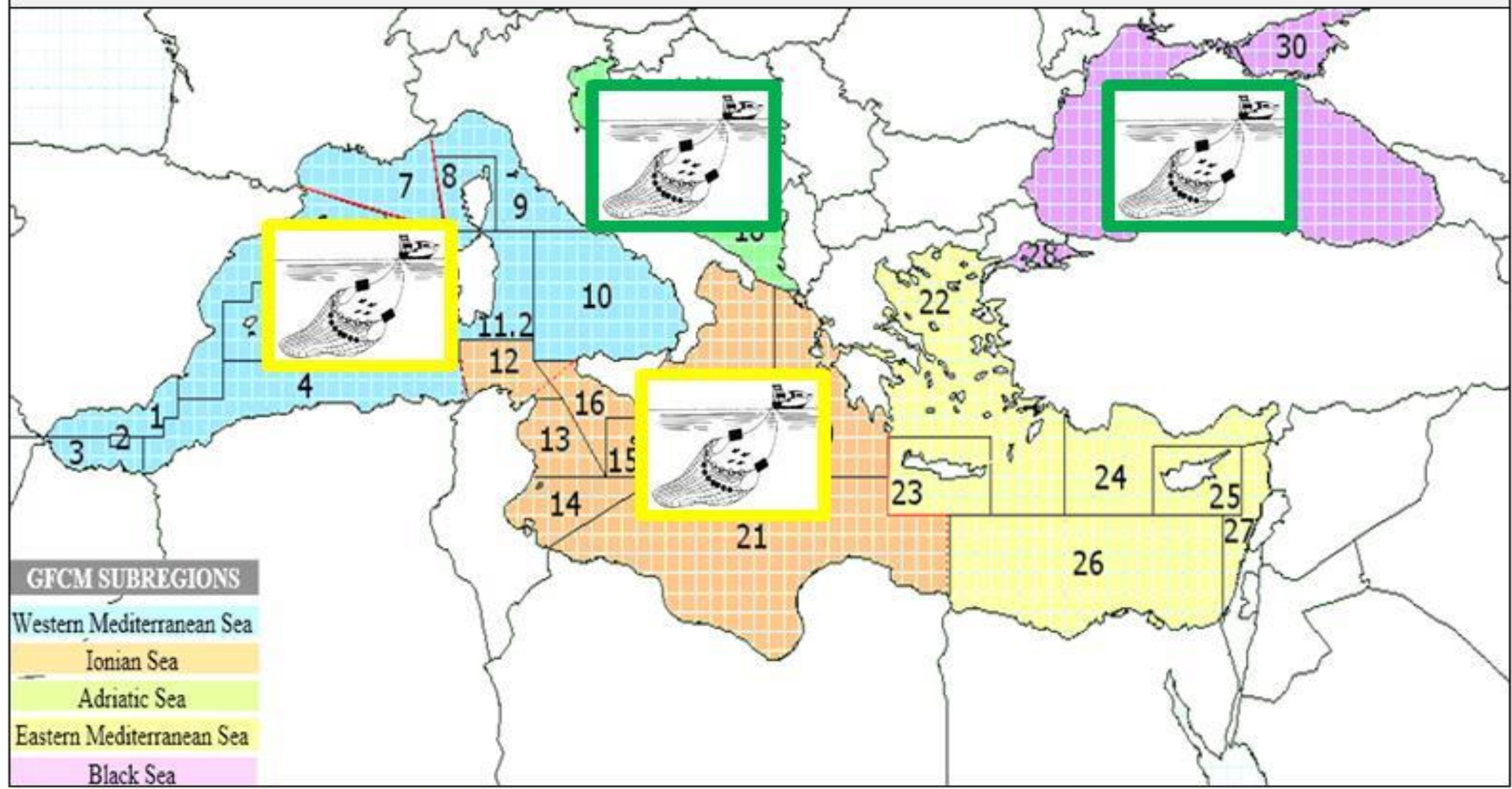
**Low discard rate < 15%**

## Overview from the GFCM Discards Monitoring Programmes

Fleet segments		GSA 27				
Vessel group	Length classes (LOA)	Landing (tons)	Discards (tons)	Tot	Landing (%)	Discards (%)
Small-scale vessels without engine using passive gears	<12 meters	0.020	0.003	0.023	87%	13%
Small-scale vessels with engine using passive gears	< 6	0.295	0.131	0.425	69%	31%
Small-scale vessels with engine using passive gears	6 – 12	2.595	0.919	3.513	74%	26%
Small-scale vessels	Tot	2.909	1.052	3.961	73%	26%
Purse seiners	6 – 12	1.984	0.079	2.063	96%	4%
Purse seiners	12 – 24	1.355	0.045	1.400	97%	3%
Purse seiners	Tot	3.339	0.124	3.463	96%	3.5%
Polyvalent vessels	> 12 meters	0.018	0.009	0.027	67%	33%
average % (all segments)					79%	21%

# Pelagic trawl: Discard behavior

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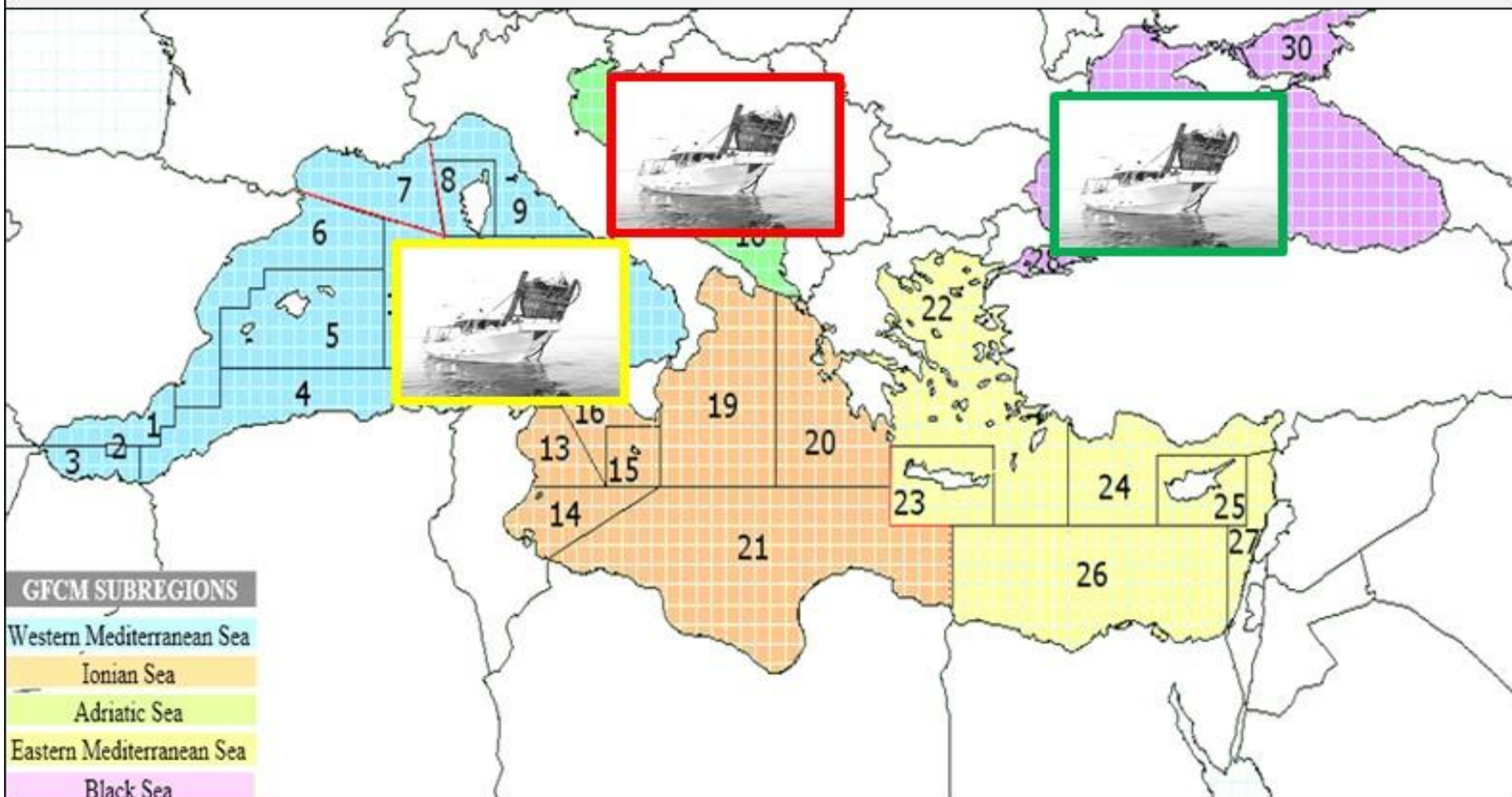
- GFCM SUBREGIONS**
- Western Mediterranean Sea
  - Ionian Sea
  - Adriatic Sea
  - Eastern Mediterranean Sea
  - Black Sea

 **High discard rate >40%**    **Medium discard rate 15-39%**    **Low discard rate < 15%**

# Dredge: Discard behavior

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DISCARDS



**High discard rate >40%**



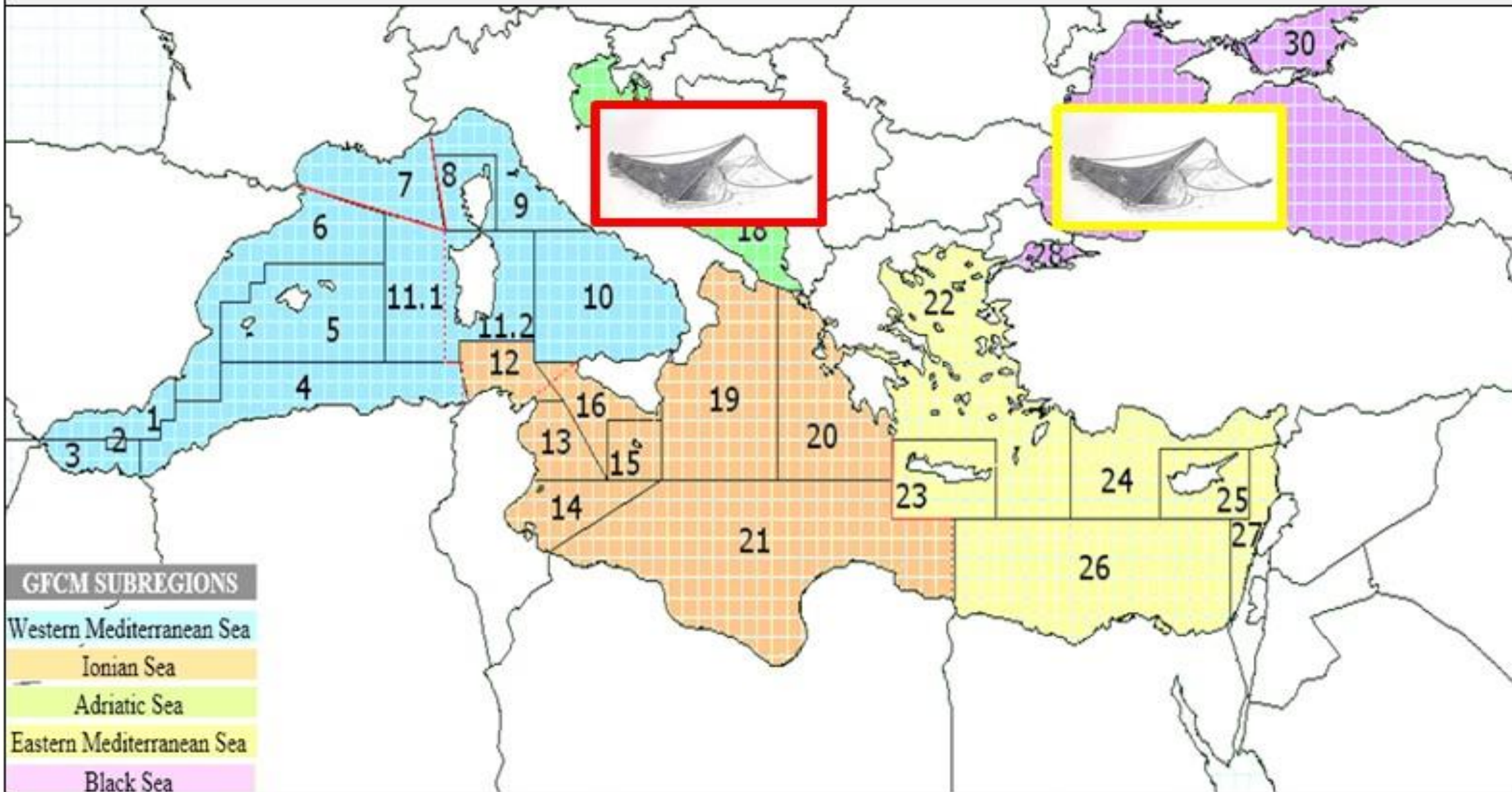
**Medium discard rate 15-39%**



**Low discard rate <15%**

# Beam trawl: *Discard behavior*

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**High discard rate >40%**



**Medium discard rate 15-39%**



**Low discard rate < 15%**



**Reasons for discards** may be **economic** (e.g. low market prices), **legal** (e.g. minimum landing sizes), **environmental** (e.g. weather conditions affecting sorting practices), **technical** (e.g. vessel capacity), **biological** (e.g. poisonous fish, jellyfish), and/or based on personal decisions.

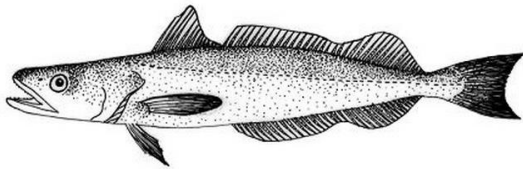
Moreover, the extent of discarding is dependent on a number of variables which include the **gear and fishing method practised, the fishing ground, fishing season, depth, duration of the trip, duration of the haul, the market situation and fluctuation in the abundance of juvenile fish.**

	High discard rates (> 40%)			Medium discard rates (15-39%)		Low discard rates (<15%)		
	Beam trawls	Bottom trawls	Dredges	Beach and Boat seines	Pelagic trawls	Longlines	Small scale fisheries	Purse seines
Target species/ family	<i>Solea vulgaris</i> , <i>Pecten spp.</i> , <i>Penaeus sp.</i> <i>Squilla mantis</i> <i>Rapana venosa</i>	<b>Demersal fish</b> ( <i>Merluccius merluccius</i> , <i>Mullus barbatus</i> <i>Mullus surmuletus</i> , <i>Pagellus sp.</i> , <i>Merlangius merlangus</i> , <i>Lophius spp.</i> , <i>Trachurus sp.</i> , <i>Psetta maxima</i> , Sparidae); <b>Crustaceans</b> ( <i>Parapenaeus longirostris</i> , <i>Nephrops norvegicus</i> , <i>Aristeus antennatus</i> , <i>Aristaomorpha foliacea</i> , <i>Penaeus sp.</i> ); <b>Cephalopods</b> ( <i>Illex sp.</i> , <i>Octopus vulgaris</i> , <i>Eledone spp.</i> , <i>Loligo vulgaris</i> )	<i>Chamelea gallina</i> , <i>Solen marginatus</i> , <i>Donax sp.</i> , <i>Tellina sp.</i> , <i>Cerastoderma sp.</i>	Clupeidae, Sparidae, Mugilidae, Carangidae, Scombridae Siganidae Mullidae Carangidae	<i>Engraulis encrasicolus</i> , <i>Sardina pilchardus</i> , <i>Trachurus sp.</i> , <i>Scomber spp.</i> , Carangidae <i>Boops boops</i> , <i>Sprattus sprattus</i>	<i>M. merluccius</i> , Sparidae, Triglidae <i>Helicolenus dactylopterus</i> , <i>Conger conger</i>	<i>M. barbatus</i> <i>M. surmuletus</i> , Sparidae, Mugilidae, Siganidae <i>Scorpaena sp.</i> , <i>Solea sp.</i> , <i>Lithognatus mormyrus</i> , <i>Sepia officinalis</i> , <i>Octopus sp.</i> , <i>Penaeus sp.</i>	<i>Engraulis encrasicolus</i> , <i>Sardina pilchardus</i> , <i>Trachurus sp.</i> , <i>Sprattus sprattus</i> , <i>Sardinella spp.</i> , <i>Boops boops</i> , <i>Scomber spp.</i> , <i>Spicara smaris</i>
Discarded composition	Benthic invertebrates; Bivalves; Crustaceans (e.g. crabs); Molluscs; Porifers;	Gastropods; Cnidarians ; Echinoderms; Other demersal fish; Bivalves; Elasmobranchs; Lessepsian species; Small individuals of target species;	Clams and other benthic invertebrates; Small individuals of target species;	Other demersal and benthic fish; Macro-invertebrates; Lessepsian species;	Elasmobranchs; Pelagic fish; Small individuals of target species;	Elasmobranchs; Large pelagic species; Other demersal fish;	Macro-invertebrates; Lessepsian species; Other demersal fish	Other pelagic fish; Small individuals of target species;
Reasons for discarding	Damaged specimens; Species with low or no commercial value; Undersize target species;	Undersize specimens; Damaged specimens; Species with low or no commercial value; Small individual with no commercial value;	Species with no commercial value; Damaged specimens; Undersize specimens;	Small individual with no or low commercial value; Damaged specimens;	Species with no commercial value; Undersize specimens; Vulnerable species;	Species with no commercial value; Damaged specimens; Vulnerable species;	Species with low commercial value; Undersize specimens; Specimens damaged or poor condition;	Species with low commercial value; Undersize specimens; Specimens damaged or poor condition;

Discards Monitoring Programme - SWOT Analysis	
Strengths	Weaknesses
<ul style="list-style-type: none"> <li>- <b>Accurate information about species composition</b> through onboard observations.</li> <li>- <b>Precise discards rates by species.</b></li> <li>- <b>More information could be collected</b> while onboard such as fishing area, exact amount of catch, duration of the trip, number of hauls, type and specifications of gear used.</li> <li>- <b>Enhance the bond between research, government and the fishers.</b></li> <li>- <b>Increase awareness among fishermen regarding discards.</b></li> <li>- Introduction of discards concepts as a parameter for studying fish stock interaction with fishing activity.</li> <li>- Providing of significant data on by-catch composition, abundance and LFDs for many species.</li> <li>- Providing possibility to record also data on the incidental catches of endangered species even if this is likely a rare event.</li> </ul>	<ul style="list-style-type: none"> <li>- Answers on questionnaires by fishers often contain misleading information that should be processed and analysed carefully so as not to produce biased conclusions.</li> <li>- <b>Costs of monitoring and lack of funds</b></li> <li>- Observers may affect <b>fishers' behaviour</b> in terms of the way they treat with discards and even fishing operation itself.</li> <li>- Self-sampling might be influenced by every fisher attitude since some fishers provide unclear incomplete information.</li> <li>- Lack of experience for a first-time discard data collection at the national level</li> <li>- <b>Data collected through self-sampling and questionnaire forms are not reliable in comparison to on board observations.</b></li> <li>- Official catches statistics is unsatisfactory in some countries. On-board observations will lead to the collection of adequate information about discard level.</li> </ul>
Opportunities	Threats
<ul style="list-style-type: none"> <li>- Acquire data about discarded species and interaction of vulnerable species.</li> <li>- Provides a reflection of bottom <b>marine litter.</b></li> <li>- <b>Increase connection with fishers.</b></li> <li>- <b>Discards can be reduced through improved fleet communication, awareness/raising, training, better utilization, and economic incentives.</b></li> <li>- <b>The results of discard monitoring program may be useful for improving fisheries management.</b></li> </ul>	<ul style="list-style-type: none"> <li>- Costs of monitoring and lack of funds</li> <li>- Some fishermen would not accept the concept of discards or the idea of a researcher on-board.</li> <li>- <b>Difficulty for researcher to move around and take proper notes in the small-scale fishing vessels.</b></li> <li>- Political instability.</li> <li>- <b>Fishers are becoming reluctant to cooperate because they have too many people on board and we interfere with their work</b> (vessels are very small and number of fishers is too low, so we always sample the same vessels).</li> <li>- Fishers want to quickly preserve the fish, so the catch is quickly removed from the deck into the fridges on the vessels. This makes sampling difficult during summer months.</li> </ul>



# Which technical measures could be proposed and could be tested to improve selectivity and to reduce discards?



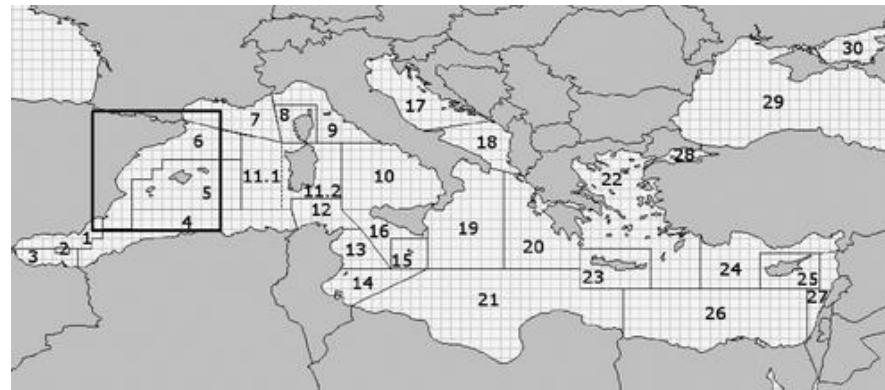
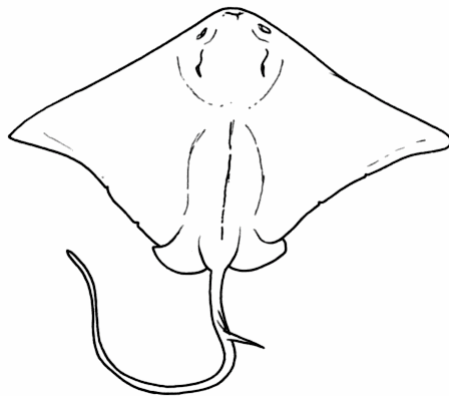
By country?

By area?

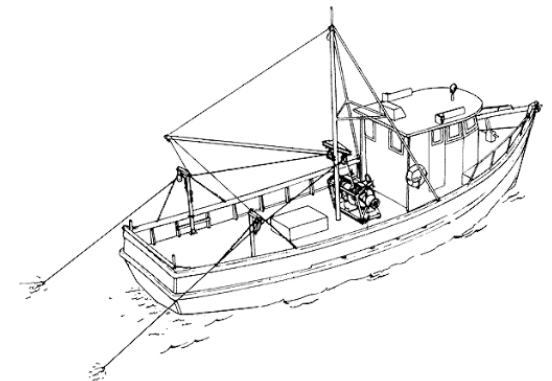
By gear?



By species?



By vessel group?





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# Thank you for your attention

Working Group on Fishing Technology (WGFiT) | 8–9 April 2021

