

Case Study Report, Task 7.3

Synthesis and recommendations for Discard Mitigation Strategies by case study

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Case Study: Eastern Mediterranean

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1 What has been going on in this case study during the last 12 months?

1.1 Important changes in stock development, discard data and ecosystem

- No major changes were observed in stock development, discard data and ecosystem in the Eastern Mediterranean since the Landing Obligation (LO) is not yet applied. According to the REGULATION (EU) No 1380/2013¹, (Article 15.1. a&d):

“All catches of species, in the Mediterranean, which are subject to minimum sizes as defined in Annex III to Regulation (EC) No 1967/2006², caught during fishing activities in Union waters or by Union fishing vessels outside Union waters in waters not subject to third countries' sovereignty or jurisdiction, shall be brought and retained on board the fishing vessels, recorded, landed and counted, except when used as live bait, in accordance with the following time-frames:

(a) From 1 January 2015 at the latest:

— small pelagic fisheries (i.e. fisheries for mackerel, herring, horse mackerel, blue whiting, boarfish, anchovy, argentine, sardine, sprat);

— large pelagic fisheries (i.e. fisheries for bluefin tuna, swordfish, albacore tuna, bigeye tuna, blue and white marlin);

From 1 January 2017 at the latest for species which define the fisheries and from 1 January 2019 at the latest for all other species in fisheries not covered by point (a) in the Mediterranean”.

The landing obligation for some fisheries in the Mediterranean Sea is to apply as of 1 January 2015 at the latest, and so before multiannual plans under the new framework of the CFP are adopted (other fisheries will be covered as of 2017 or 2019 by virtue of art. 15(1)(d)). Moreover, no management plans in accordance with Article 18 of Regulation (EC) No 1967/2006 (the Mediterranean Regulation) have been adopted so far in the Mediterranean³. However, Regulation (EU) No 1380/2013 on the CFP, foresees the possibility to adopt on a temporary basis for a period no more than 3 years a specific discard plan to support the implementation of a LO in the fisheries of the Mediterranean Sea. This proposal specifies the details for the implementation of the LO in the Mediterranean Sea as circumscribed in Art 15(6) of Regulation (EU) No 1380/2013 (the Basic

¹<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:354:0022:0061:EN:PDF>

²<http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32006R1967&from=en>

³[http://www.europarl.europa.eu/meetdocs/2014_2019/documents/pech/dv/com_adl\(2014\)07550_/com_adl\(2014\)07550_en.pdf](http://www.europarl.europa.eu/meetdocs/2014_2019/documents/pech/dv/com_adl(2014)07550_/com_adl(2014)07550_en.pdf)

Regulation), by laying down specific provisions on certain species and fisheries subject to landing obligation and providing for *de minimis* exemptions.

Figure 1. Diagram of the gradual implementation of the EU landings obligation by geographical area and fishery (source: REGULATION (EU) No 1380/2013). NWW, 'North Western waters'; SSW, 'South Western waters'.

| | Baltic sea | Black sea | Mediterranean | North Sea | NWW | SWW |
|------|--|--|---------------|---|-----|-----|
| 2015 | <div>Small and large Pelagic and industrial fisheries (fisheries for mackerel, herring, horse mackerel, blue whiting, boarfish, anchovy, argentine, sardine, sprat, bluefin tuna, swordfish, albacore tuna, bigeye tuna, blue and white marlin, capelin, sandeel and Norwegian pout)</div> <div>Salmon and fisheries for species that define fisheries (i.e., cod)</div> | | | | | |
| 2016 | | | | <div>Demersal fisheries for species that define fisheries: <u>North sea</u>: fisheries for cod, haddock, whiting, saithe, Norway lobster, common sole and plaice, hake, Northern prawn <u>North Western waters</u>: fisheries for cod, haddock, whiting, saithe, Norway lobster, common sole and plaice, hake <u>South Western waters</u>: Fisheries for Norway lobster, common sole and plaice, hake Other fisheries for species subject to catch limits</div> | | |
| 2017 | all remaning species subject to catch limits | Demersal fisheries for species that define fisheries | | | | |
| 2018 | | | | | | |
| 2019 | all remaining species subject to catch limits or subject to minimum landing sizes (Mediterranean) | | | | | |

Source: P. Veiga et al. / *Marine Policy* 64 (2016) 64–71

There is a derogation for bluefin tuna, as the management of this species is regulated by the International Commission for the Conservation of Atlantic Tunas (ICCAT). For the implementation of the ICCAT measures, the European Commission adopted the delegated [Regulation 98/2015](#), according to which it is allowed to land and use for human consumption of up to 5% of undersized individuals of between 8 and 30 Kgr, or length between 75 and 115 cm, by vessels targeting tuna and have fishing license for this. The same percentage is allowed as incidental catches by vessels not fishing actively bluefin tuna and having no fishing license.

In the first case the percentage is calculated on the total catch (in number) of fish retained on board each time after each fishing operation, while in the second case the percentage is calculated on the total catch in weight or number of individuals, with the number of individuals applied only to tuna and tuna-related species.

In accordance with Art 18 of the Basic Regulation, the proposed delegated act is based on the joint recommendations (JR) developed and submitted to the Commission by the Member States concerned, namely Italy, France, Spain, Slovenia, Croatia, Greece and Malta. Cyprus, although having a direct fisheries management interest in the Mediterranean Sea, currently has no active fishery which would fall under the provisions of the landing obligation as from 1 January 2015 and is therefore not directly concerned by Communication C(2014) 7550 final⁴. According to this

⁴ [http://www.europarl.europa.eu/meetdocs/2014_2019/documents/pech/dv/com_adl\(2014\)07550_/com_adl\(2014\)07550_en.pdf](http://www.europarl.europa.eu/meetdocs/2014_2019/documents/pech/dv/com_adl(2014)07550_/com_adl(2014)07550_en.pdf)

Communication, in the Aegean Sea and Crete Island⁵, up to 3% of the total annual catches of the species anchovy, sardine, mackerel and horse mackerel that are subject to minimum sizes in the small pelagic purse seines fisheries set out in point 5 of the Annex⁶.

- There are different available reports from STECF ([stecf-med](#)) and **GFCM (General Fisheries Commission for the Mediterranean; [gfc](#))** meetings, which could be used to feed the Eastern Mediterranean case study of the DiscardLess ATLAS.

The GFCM is the main fishery management organization in the Mediterranean. Consisting of 23 Member countries along with the European Union, the GFCM's objectives are to promote the development, conservation, rational management and best utilization of living marine resources, as well as the sustainable development of aquaculture in the Mediterranean, Black Sea and connecting waters. The GFCM has the authority to adopt binding recommendations for fisheries conservation and management in its Convention Area and plays a critical role in fisheries governance in the Region. The GFCM has established 30 management areas in the Mediterranean based on political and statistical considerations rather than biological or economic factors.

Apart from the GFCM, the European Union, through the STECF, established in 2008 a working group specifically focused to the assessment of Mediterranean and Black Sea stocks (known as SG-MED up to 2011). The SG-MED was born as a request to the STECF to set up an operational work-programme to update the status of the main demersal stocks and evaluate the exploitation levels with respect to their biological and economic production potentials and the sustainability of the stocks by using both trawl surveys and commercial catch/landing data as collected through the Community Data Collection regulation N° 1543/2000 as well as other scientific information collected at national level.

Each year, the GFCM and the STECF assess the exploitation status of the main target stocks and the results of these assessments (both inputs and outputs) are publicly available on their websites: i) GFCM (<http://www.fao.org/gfc/reports/statutory-meetings/en/>); and ii) STECF (<https://stecf.jrc.ec.europa.eu/reports/medbs>). Apart from stock assessments, additional data and information relevant to fisheries management is also available. For instance, the STECF has set up a working group dealing specifically with the LO, which first meeting took place in October 2016 (<https://stecf.jrc.ec.europa.eu/ewg1514>).

- The **Mediterranean Advisory Council (MEDAC)**, is made up of European and national organizations representing the fisheries sector (including the industrial fleet, small-scale fisheries, the processing sector and trade unions) and other interest groups (such as environmental organizations, consumer groups and sports/recreational fishery associations)

⁵ 'Aegean Sea and Crete Island' means GFCM Geographical Sub-Area 22 and 23

⁶ [http://www.europarl.europa.eu/meetdocs/2014_2019/documents/pech/dv/com_adl\(2014\)07550\(par2\)_/com_adl\(2014\)07550\(par2\)_en.pdf](http://www.europarl.europa.eu/meetdocs/2014_2019/documents/pech/dv/com_adl(2014)07550(par2)_/com_adl(2014)07550(par2)_en.pdf)

which operate in the Mediterranean area in the framework of the CFP. Among other activities, the MEDAC is organising meetings related to the LO (<http://en.med-ac.eu/events.php>).

- The Central Fisheries Administration in Greece (Greek General Directorate Fisheries) has worked with MEDAC to create the **South Eastern Mediterranean Sea Forum (SEMSF)** a newly established body with the participation of Cyprus, Greece, Italy and Malta. A similar initiative exists for western Mediterranean between Spain and Italy.

This initiative is under Articles 9,10 and 18 of the Regulation (EU) 1380/2013 referring to shared stocks and that the relevant long-term management plans should be developed taking into account the provisions of Art. 18 on regionalisation in order to contribute to the stocks' sustainable exploitation and the protection of the marine ecosystems.

SEMSF is organised into a High Level Group and a Technical Group. The High Level group is the Ministries of Fisheries that will meet annually. The Presidency of the Forum is cyclical with Italy chairing on 2016 and Greece in 2017.

Soon, a meeting will take place as a joint proposal for the LO will have to be submitted to MEDAC by June 2016 prior the official submission to the European Commission.

Our understanding is that there is a general trend that SEMSF Member States will request an exemption from the LO as, in their opinion, it seems that it is not financially feasible to implement it.

- Information on discards in the Eastern Mediterranean case study was summarized in the Factsheets (Appendix to deliverable D1.1).
- A two-day seminar was co-organised by the European Commission (DG MARE) and the Mediterranean Advisory Council (MEDAC) in Catania (Italy) on 9-10 February 2016 for the status of stocks in the Mediterranean and on the CFP approach⁷.

The meeting did not focus on the LO implementation but on a new Mediterranean management plan that will focus on more selective gears and Spatio-temporal closures or Fisheries Restricted Areas. [STECF Assessments](#) show that from 64 assessed Mediterranean stocks, **61 stocks** (i.e. >95%) are fished in excess of F_{MSY} levels.

- Current STECF Evaluation of National Management Plans for the Mediterranean⁸ show that:

⁷ See link below for agenda and presentations:

http://ec.europa.eu/fisheries/news_and_events/events/20160209/index_en.htm

⁸ Most assessments are not from Eastern Mediterranean species and stocks. However, although the status could be different in East Med, the general trend must be similar to the reported stocks.

- ✓ Given high exploitation patterns – the majority of stocks are not compatible with CFP objectives.
- ✓ Many stocks require rebuilding plans as a matter of urgency.
- ✓ Many stocks are transboundary relative to the current boundaries of National Management Plans.
- ✓ Broader scale regional based management plans are more appropriate.

1.2 Important changes in terms of fisheries and stakeholders perception

- The LO has not been applied to the Eastern Mediterranean fisheries yet. Therefore, no changes in the fisheries were observed until March 2016.
- As in many other areas in Europe, when the DiscardLess project started (March 2015), most fishermen and fisheries associations were not fully aware or seriously concerned for the landing obligation regulations. During consultations with stakeholders in Nea Michaniona (summer 2015), the implementation of the LO in Greece was discussed, however, numerous questions and doubts were raised especially for the complete lack of infrastructure to utilise discards as well as concerns for the extra time needed to separate discards and the financial implications for the extra cost that the fishermen will have to face.
- There are not important changes in terms of fisheries and stock status in the eastern Mediterranean in relation to the LO. A management plan for the Greek bottom trawlers is in place since 2014 ([East Med MAP](#)) as well as for purse seiners ([purse seiner MAP](#)) for implementation of the Mediterranean Regulation ([Council Regulation \(EC\)No.1967/2006](#)), but they are mainly focused on reducing fishing effort and improving the selectivity, whereas the LO is hardly mentioned.
- As in western Mediterranean, stakeholders perception (fishermen and managers) as a result of the two years they have to “adapt” **before sanctions for failing to comply with the LO take effect** ([Fish-discard-ban-MEPs-delay-sanctions](#)), they believe that these two years extension will help to demonstrate the unfeasibility of implementing the LO in the Mediterranean owing to the scattered distribution of ports and, more importantly, the lack of available infrastructures to process discards. In eastern Mediterranean they try to work out solutions through the South Eastern Mediterranean Sea Forum (SEMSF) in collaboration with MEDAC.

1.3 Important changes in management

The two-day [high level seminar in Catania](#) (Italy) on 9-10 February 2016 for the status of stocks in the Mediterranean and on the CFP approach, highlighted the following aspects.

- **Summary Points on National Plans:**
 - ✓ Modifications required to conform with CFP objectives
 - i.geographic scope to an appropriate regional level;
 - ii.operational changes to improve the implementation of management plans;

iii. adoption of harvest control rules, limit and target reference points

- **Summary Points – Stock Status:**

- ✓ Almost all stocks are chronically over-exploited with low biomass.
- ✓ Few large adult fish impairing recruitment.
- ✓ For some stocks fishing mortality continues to rise.
- ✓ Demersal fish stocks are most chronic compared to crustacean and pelagic stocks.
- ✓ **Status of hake is of particular concern.**

- **Other Points for Consideration:**

- ✓ Current management approaches require strengthening to achieve F_{MSY}
- ✓ Effort or capacity regulation has not reduced fishing mortality for demersal fish
- ✓ Better protocols for effort estimation required e.g. kWdays
- ✓ For crustaceans there are signs of reductions in fishing mortality
- ✓ An average effort reduction between 50% and 60% is necessary to reach F_{MSY}
- ✓ Management needs should drive the science and advisory process
- ✓ Additional resources and cooperation with GFCM required to further enhance and harmonise science and advice
- ✓ Need to avoid duplication and multiple advice
- ✓ Enhanced data compilation and sharing; assessment benchmarking and multi-annual planning useful
- ✓ Stock ID remains uncertain in some cases and requires further work but:
- ✓ Sufficient evidence showing that stocks are heavily over-exploited

Hake and associated demersal species

- **National level**

Spatio-temporal closures, real-time closure, Progressive reduction of fishing effort, Report catches from the first Kg; Enforcement of MCS measures; Emergency measures in case of a serious threat to marine biological resources (under the CFP, Article 13);

- **EU level**

Increase the minimum conservation reference size, improve selectivity of fishing gears; Improve scientific process, to establish a multi-annual plan for demersal fisheries

- **International level**

- Set a minimum conservation reference size for the whole Mediterranean basin at the GFCM;
- Progressive reduction of fishing effort.
- Spatio-temporal closures or Fisheries Restricted Areas.
- to improve the selectivity of the bottom trawls.

Mediterranean Swordfish

- **National level**

Enforcement of MCS measures;

- **International level (ICCAT)**

- The obligation to land in designated ports to facilitate controls and pre-notifications;

- The introduction of a tagging program to guarantee the origin of the catches;
- The implementation of an observer program to gather the information on discards levels (address the concerns of high bycatches).
- The EC is recasting the Data Collection Framework (DCF) to address needs stemming from:
 - the CFP Regulation (Regulation (EU) No 1380/2013):
 - ✓ Ecosystem-based approach
 - ✓ Effects of the Landing Obligation
 - ✓ Sustainable aquaculture
 - ✓ Socio-economic data for Impact assessment
 - the EMFF Regulation (Regulation (EU) No 508/2014⁹):
 - ✓ new reporting obligations (OP, work plans)
 - ✓ shared management (Member States and funding)
 - ✓ while simplifying and removing duplications
 - Strengths and Weaknesses:
 - ✓ Data quantity: satisfactory but new needs arising
 - ✓ Data quality: scope for improvement, harmonization between Member States
 - ✓ Data availability: most progress needed – Key areas:
 - procedure of data calls
 - compliance
 - under-utilization of DCF data leading to missed opportunities in the maritime sector.
 - Main Changes – Strengthened Regional Cooperation
 - ✓ Building on success:
 - from Regional Coordination Meetings to Regional Coordination Groups.
 - Enhances joint work (regional workplans).
 - Consultation by COM for EU-MAP.
 - Consultation for Member State workplans.
 - Main Changes – Enhanced Data Availability
 - ✓ Principle of availability enshrined in DCF, with enhanced personal data protection.
 - ✓ Ensure interoperability of data systems, at national, regional and EU level.
 - ✓ Gradually move away from burdensome data calls.

⁹ See: <http://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R0508&from=DE>

2 The Year behind us: What has DiscardLess produced in this case study during the last 12 months?

2.1 Impact assessments

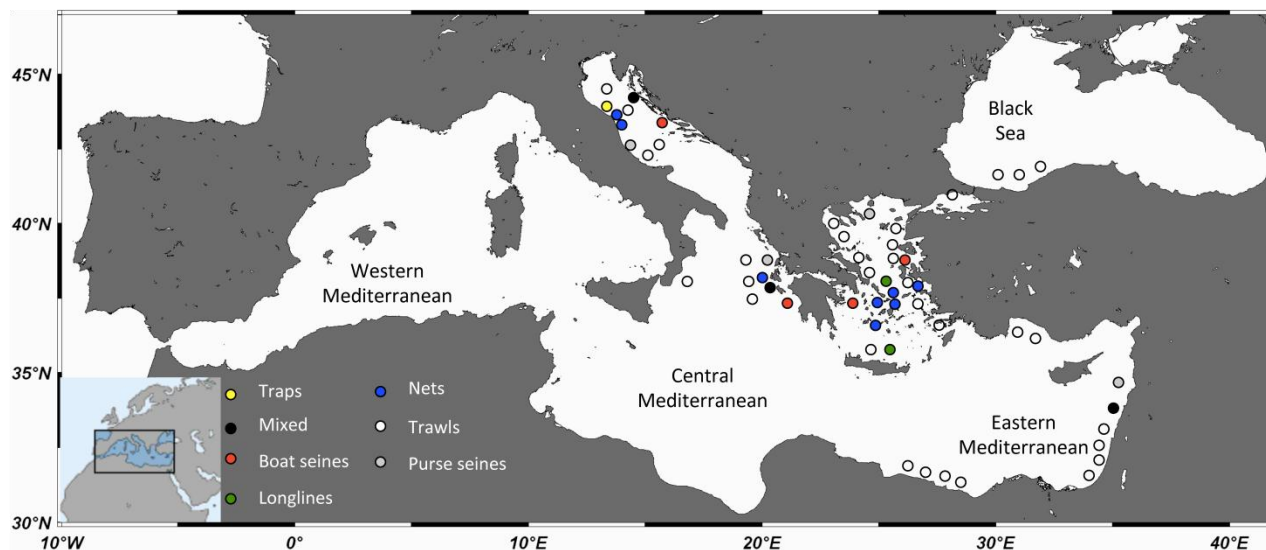
2.1.1 Ecosystem scale

Current status of ecosystem knowledge and data and identification of knowledge gaps

1. Factsheets from the Greek case study area (Thermaikos Gulf) were elaborated (Appendix to Deliverable D1.1). All métiers used in Thermaikos Gulf share the same market and regulation causes for discarding. The general fisheries regulations for the Greek seas, based on the European legislation, apply in Thermaikos Gulf. For example, Minimum Landing Size (MLS) is the main reason for discarding hake *Merluccius merluccius*, red mullet *Mullus barbatus* and cuttlefish *Sepia spp.*, while low market demand is the reason of discarding spottail mantis shrimp *Squilla mantis* and other crustaceans. Discarding practices are influenced by fishing processes and fishers' decision making, which, at least in Greek waters, is affected by several factors, including weather conditions, economic pressure, market demands, fishing strategies, skipper's knowledge and skills. The effects of discarding are discussed whereas discard rates and levels are presented.
2. A literature review on the impacts of discards on ecosystems from the eastern Mediterranean was elaborated (Appendix to Deliverable D1.1). The literature review underlines a significant difference between Mediterranean and Atlantic fishery:
 - In Mediterranean the discard fraction of undersized commercial species is about 15%-20% of the total catch, while the remaining are non commercial species.
 - In the Atlantic the discarding fraction of undersized species usually is the main part of the total discards.

Most of these studies focus on bottom trawl fisheries, with only few studies analyzing purse seine or small-scale fisheries.

Figure 1. Map of the Mediterranean indicating the areas where data for discards are available per gear category.



Source: NAYS (data from Table 1)

Table 1. Studies with data on discards for the eastern Mediterranean Sea (including Marmara and Black Seas).

| AA | Code | Country | Gear | Region | GSA | Discards | Depth | Target | Reference |
|-------------------------|------|---------|--------------|--------------|-----|----------|-------|-----------|------------------------------|
| Beach/boat seine | | | | | | | | | |
| 1 | BS | Turkey | Beach seine | Aegean | 22 | 21 | | | Akyol (2003) |
| 2 | BS | Greece | Boat-seine | Ionian | 20 | 10 | | | Petrakis et al. (2009) |
| 3 | BS | Greece | Boat-seine | Aegean | 22 | 10 | | | Petrakis et al. (2009) |
| 4 | BS | Croatia | Boat-seine | E Adriatic | 17 | 28.5 | | | Cetinic et al. (2011) |
| Longlines | | | | | | | | | |
| 5 | LL | Greece | Long-lines | C Aegean | 22 | 3.2 | | | Stergiou et al. (2002) |
| 6 | LL | Greece | Long-lines | Aegean | 22 | 2 | | swordfish | Peristeraki et al. (2008) |
| Mixed gears | | | | | | | | | |
| 7 | Mix | Croatia | mixed | C Adriatic | 17 | 0 | | | Matic-Skoko et al. (2011) |
| 8 | Mix | Greece | mixed | Ionian | 20 | 10 | | | Tzanatos et al. (2007) |
| 9 | Mix | Syria | mixed | Medit. Coast | 27 | 0 | | | Kelleher (2005) |
| Nets | | | | | | | | | |
| 10 | Nets | Italy | Gillnets | C Adriatic | 17 | 19 | | | Fabi and Grati (2005) |
| 11 | Nets | Greece | Gillnets | C Aegean | 22 | 5.1 | | | Stergiou et al. (2002) |
| 12 | Nets | Italy | Trammel nets | C Adriatic | 17 | 19 | | | Fabi and Grati (2005) |
| 13 | Nets | Greece | Trammel nets | E Ionian | 20 | 12.9 | | | Vassilopoulou et al. (2007b) |
| 14 | Nets | Greece | Trammel nets | Aegean | 22 | 10.6 | | | Vassilopoulou et al. (2007b) |
| 15 | Nets | Greece | Trammel nets | C Aegean | 22 | 14.7 | | | Goncalves et al. (2007) |
| 16 | Nets | Greece | Trammel nets | Aegean | 22 | 43.5 | | | Gokce and Metin (2007) |
| 17 | Nets | Turkey | Trammel nets | Aegean | 22 | 47 | | | Akyol (2008) |

Table 1 continued.

| AA | Code | Country | Gear | Region | GSA | Discards | Depth | Target | Reference |
|---------------------|-------|---------|------------------------------|--------------|-----|------------------------|-------|---------------------|--------------------------------|
| Trawls | | | | | | | | | |
| 18 | OTB | Italy | Bottom trawl | Adriatic | 17 | 43.5 Shallow | | Fish/shrimps | Sanchez et al. (2007) |
| 19 | OTB | Italy | Bottom trawl | W. Ionian | 19 | 34 250–750 m | | Shrimps | D'Onghia et al. (2003) |
| 20 | OTB | Greece | Bottom trawl | E Ionian | 20 | 38 All | | Fish | Tsagarakis et al. (2008) |
| 21 | OTB | Greece | Bottom trawl | E Ionian | 20 | 44 All | | Fish | Machias et al. (2001) |
| 22 | OTB | Greece | Bottom trawl | Aegean | 22 | 44 All | | Fish | Machias et al. (2001) |
| 23 | OTB | Greece | Bottom trawl | E Ionian | 20 | 45 All | | Fish | Stergiou et al. (1998) |
| 24 | OTB | Greece | Bottom trawl | Aegean | 22 | 45 All | | Fish | Stergiou et al. (1998) |
| 25 | OTB | Turkey | Bottom trawl | Mersin Bay | 24 | 70.3 Coastal | | Shrimps | Duruer et al. (2008) |
| 26 | OTB | Turkey | Bottom trawl | Mersin Bay | 25 | 9.6 Shallow (<94m) | | Shrimps/fish | Atar & Malai (2010) |
| 27 | OTB | Egypt | Bottom trawl | Medit. Coast | 26 | 14.7 30–225 m | | Shrimps/fish | Alsayes et al. (2009) |
| 28 | OTB | Egypt | Bottom trawl | Medit. Coast | 26 | 15.3 | | | Faltas et al., (1998) |
| 29 | OTB | Egypt | Bottom trawl | Medit. Coast | 26 | 26.6 | | | Rizkalla (1995) |
| 30 | OTB | Egypt | Bottom trawl | Medit. Coast | 26 | 14.9 | | | El-Mor et al. (2002) |
| 31 | OTB | Syria | Bottom trawl | Medit. Coast | 27 | 0 | | | Kelleher (2005) |
| 32 | OTB | Israel | Bottom trawl | Medit. Coast | 27 | 23.3 Deep (>83 m) | | Shrimps/fish | Edelist et al. (2011) |
| 33 | OTB | Israel | Bottom trawl | Medit. Coast | 27 | 26.7 Shallow (37–83 m) | | Fish | Edelist et al. (2011) |
| 34 | OTB | Israel | Bottom trawl | Medit. Coast | 27 | 40.1 Coastal (<37 m) | | Shrimps | Edelist et al. (2011) |
| 35 | OTB | Turkey | Bottom trawl | Marmara | 28 | 16 Shallow | | Shrimps | Zengin and Akoyol (2009) |
| 36 | OTB | Greece | Bottom trawl | Aegean | 22 | 52.4 | | | Apostolidis et al. (2013) |
| 37 | OTB | Greece | Bottom trawl | Aegean | 22 | 63.8 | | chondrichthyans | Damalas & Vassilopoulou (2011) |
| 38 | OTB | Greece | Bottom trawl | Aegean | 22 | 50.4 | | non-chondrichthyans | Damalas & Vassilopoulou (2011) |
| 39 | OTB | Turkey | Bottom trawl | Aegean | 22 | 44 | | | Gurbet et al. (2013) |
| 40 | OTB | Turkey | Bottom trawl | Black Sea | 29 | 16.5 10–57 m (T1) | | | Ceylan et al. (2014) |
| 41 | OTB | Turkey | Bottom trawl | Black Sea | 29 | 49 72–118 m (T2) | | | Ceylan et al. (2014) |
| 42 | OTB | Turkey | Bottom trawl | Black Sea | 29 | 42 | | | Ceylan et al. (2014) |
| 43 | OTB | Turkey | Bottom trawl (40 mm square) | Aegean | 22 | 25 | | | Duruer & Tosunoglu (2012) |
| 44 | OTB | Turkey | Bottom trawl (44 mm diamond) | Aegean | 22 | 42 | | | Duruer & Tosunoglu (2012) |
| 45 | OTB | Turkey | Bottom trawl-200MC | Aegean | 22 | 30 | | Shrimps | Tokac et al. (2009) |
| 46 | OTB | Turkey | Bottom trawl-300MC | Aegean | 22 | 22 | | Shrimps | Tokac et al. (2009) |
| 47 | OTB | Turkey | Bottom trawl-SMTPC | Aegean | 22 | 19 | | Shrimps | Tokac et al. (2009) |
| 48 | OTB | Italy | Rapido trawl | Adriatic | 17 | 69.4 Shallow | | Flatfish | Pranovi et al. (2001) |
| 49 | OTB | Italy | Rapido trawl | Adriatic | 17 | 13 Shallow | | Queen scallop | Pranovi et al. (2001) |
| 50 | OTB | Italy | Rapido trawl | Adriatic | 17 | 90.4 Shallow | | Scallop | Pranovi et al. (2001) |
| Purse-seines | | | | | | | | | |
| 51 | PS | Greece | Purse seines | E Ionian | 20 | 2.2 | | | Tsagarakis et al. (2012) |
| 52 | PS | Greece | Purse seines | Aegean | 22 | 4.6 | | | Tsagarakis et al. (2012) |
| 53 | PS | Lebanon | Purse seines | Medit. Coast | 27 | 0 | | | Bariche et al. (2006) |
| 54 | PS | Italy | Purse seines/midwater trawls | Adriatic | | 17.2.0-15.0 | | | Santojanni et al. (2005) |
| Traps | | | | | | | | | |
| 55 | Traps | Italy | Traps | Adriatic | 17 | 9 | | | Fabi and Grati (2005) |

Standard ecosystem criteria for evaluating discard mitigation strategies

1. The standard ecosystem criteria for evaluating the most relevant effects of discards on MSFD descriptors have been identified and deliverable D.1.2 finalised. The descriptors considered in DiscardLess to evaluate whether the Discard Mitigation Strategies promote GES are: the descriptors 1 (biodiversity), 3 (commercial fish and shellfish), 4 (food web), 5 (eutrophication) and 6 (sea-floor integrity). DiscardLess uses a selection of simulation models to assess the outcomes of scenarios in different case studies based on standard criteria. In the Eastern Mediterranean case study the model EwE will be used. EwE is a food-web facility that can be used to build trophic static mass-balanced snapshots (Ecopath) and to create temporal dynamic (Ecosim) of an ecosystem (Christensen and Pauly, 1992; Walters et al., 1997; Pauly et al., 2000; Walters et al., 2000; Christensen and Walters, 2004, <http://www.ecopath.org>).

2. Indicators were defined for the following criteria: population abundance or biomass (D1), population demographic characteristics (D1), composition and relative proportions of ecosystem components (D1), fishing mortality (D3), spawning stock biomass (D3), proportion of fish larger than the mean size of maturity (D3), performance of key predator species using their production per unit biomass (D4), proportion of large fish (D4), abundance trends of functionally groups or species (D4), nutrients concentration in the water column (D5), chlorophyll concentration in the water column (D5), dissolved oxygen changes and size of the area concerned (D5), and bottom trawling effort maps (D6).

Discard mitigation strategies scenarios and parameterisation of operational models

- The ecosystem modelling of the Eastern Mediterranean is in progress.
For the **Bio-economic approaches**, the bioeconomic model MEFISTO will be used to examine the three implementation scenarios. We will use 'business as usual' scenario and from that we will simulate bioeconomic fisheries indicators to the 'full implementation' scenario assuming that all the discards are landed. The details for the 'partial implementation' scenario remain to be finalized.

For the **Ecosystem approach**, an ECOPATH with ECOSIM model that will be parameterized for Thermaikos Gulf, will examine the three implementation scenarios as in the bioeconomic approach. The scenarios will be 'business as usual', 'full implementation' and 'partial implementation'. The details of the latter will be finalized in due time.

Size spectra analyses will be used to assess the concepts of 'Balance Harvesting' and 'Selective harvesting' under 'business as usual', 'full implementation' and 'partial implementation' scenarios.

Estimating the outcome of selected scenarios

- Preliminary runs of the discards as usual scenario were run but the ecosystem and fisheries indicators were not analysed yet.

2.1.2 Fishery scale assessment

- A site visit in the sea port of Nea Michaniona took place during the summer of 2015 and discussions held with the relevant stakeholders (fishermen, fish landing site, scientists). Consultations revealed that in Greece exists little information and communication about the LO. Only research institutes like HCMR test new fishing gears, or make observations about discards, however, fishers in general believe that they have never been informed extensively about the new LO. PEPMA (the Greek National Federation of trawlers and purse-seine owners) heard that the Mediterranean Advisory Council (MEDAC) organized one meeting about the LO but they didn't participate for financial reasons. In consultations held in Nea Michaniona, the only information they got it was when HCMR requested assistance for a survey they were conducting.

Since the end of 1950'ies, Greek trawlers have already seasonal and spatial closures. Fishermen believe that the closure period (25th of May to 30th of September) is corresponding to the reproductive period of the majority of species that spawn during the late spring/early summer months. Trawling is also forbidden in all bays and gulfs of the country.

The fish landing port in Nea Michaniona lacks infrastructure to receive and/or process excessive landings derived from former discards. The Director of the fish landing site spoke about the possibility to send all discards as an animal feed to mink furfarms. Some of the unsold landings are already sold there. However, no studies have been made in order to examine this potential.

The Greek fishers consulted consider that the discard quantities are very few and usually comprise species without or with very low economic value and under the legal size. The latter can be given for charity purposes (which is now illegal). Except this case they don't agree to spend extra time and workload without any compensation. They are also opposed to the idea to give their fish for fishmeal destined for aquaculture as they have the perception that aquaculture is a competitor that often restricts their fishing operations. They are also against the compensation of discards because they think that some boats will target discards to get the compensation.

Purse seiners that mainly target small pelagics (sardine and anchovy) have an exemption for the moment. Purse seine fishery is forbidden during from December 15 each year till the end of February as well as 2 days before and after fullmoon.

Summarising, the current general perception in the fishing community is that the LO cannot be implemented as there is neither infrastructure nor incentives for the fishermen. Current unsold fish is directed to farms that grow animals for fur in the area of Drama, Kastoria and Kozani in Northern Greece.

- In cooperation with Dr Katia Frangoudes from UBO, consultations with fishermen in Nea Michaniona took place and a relevant questionnaire has been filled in.
- A literature review on the socioeconomic impacts of discards in the eastern Mediterranean was elaborated (Appendix to Deliverable D2.1). This review showed that little attention has been paid to Mediterranean fisheries. Most Mediterranean discards are driven by market factors (low or non-commercial value of discarded species) rather than regulatory issues (MLS). In this context, it is feared that the LO may have little impact on Mediterranean fisheries. There are several gaps of knowledge regarding discards in the Mediterranean Sea. At present research in the Mediterranean regarding discards' management focus on the characterization and evaluation stage. It is necessary to move from descriptive to more analytical studies, aiming to disentangle incentives and factors affecting discarding, as well as to carry out socioeconomic evaluations of the LO.

2.2 Avoiding unwanted catches

2.2.1 gear technology

In Greece, HCMR recently accomplished the project EPILEXIS (see <http://epilexis.hcmr.gr/>). The project compared 3 types of the trawl codend (40 mm diamond, 40mm square and 50mm diamond) and made selectivity studies for the 5 most commercial species. Aiming to improve the selectivity of the bottom trawl fishery and to reduce the mortality of juvenile fish of commercial importance and the amount of discarded fish in the Mediterranean, European Regulation EC1967/2006 set the minimum mesh size in the trawl codend to 40 mm square (40S) or 50mm diamond (50D), a change from the 40 mm diamond (40D). So far in there had been no comprehensive selectivity study in Greece to investigate the proposed mesh changes, which meant that there were no data to document, which one was better for the sustainability of the bottom trawl fishery and the environment.

Results show that square mesh size has the better selectivity and reduces discards. The mean value of the catches was though not statistically significant among the 3 types of trawl codend studied.

2.3 fishing strategies

The “fishers’ story”

According to the majority of fishers in the Aegean Sea, landing discarded products will lead to technical and operational problems for them for various reasons, the most important of which are related to increased economic costs and the lack of potential economic benefits.

Firstly, the storage of the -low economic value- discards onboard will reduce the vessel's capacity to store products of higher economic value, and the costs (mainly work load) associated with the manipulation and storage of discards on board will be increased. The same holds for the infrastructure, facilities, capacity and staff availability at the landing port, which for the majority of landings ports in Greece, are completely insufficient to accommodate and handle even a small increase in landed quantities.

Secondly, the fishers have no or low economic incentives to land discards (that, as mentioned above, have low market value), given the technical and operational issues discussed above. As a consequence, with no or low economic incentive, the enforcement of the discard ban and the associated monitoring and controlling costs may be problematic, at least for the eastern Mediterranean where the compliance to fisheries regulations is generally low (Sarda et al. 2015¹⁰).

An important disadvantage is the lack of infrastructure and facilities in the majority of landing ports in Greece. There are 239 [designated ports](#) in Greece and eleven landing sites in Greece, three of which in northern Aegean Sea (Thessaloniki, Kavala and Alexandroupoli), including the one in Thermaikos Gulf (NW Aegean Sea), that of Thessaloniki. Some of the small scale coastal fisheries catches are not landed

¹⁰ Sardà F, Coll M, Heymans JJ, Stergiou KI (2015) Overlooked impacts and challenges of the new European discard ban. *Fish Fish* 16: 175–180. doi: 10.1111/faf.12060

through the official landing sites (11 of them in Greece) and are directly sold from the vessel. These cannot be considered as landings because they are unreported catches. Contrary to the majority of landing ports that are small and lack infrastructure and facilities, the landing port of Thessaloniki is relatively new and large enough to accommodate the landings of the largest fleet in northern Aegean Sea, including a large amount of imports.

2.4 Policy outreach

A meeting was held with WP7 leaders during the annual meeting in March 2016 to talk about the guidelines for the Mediterranean, which have to be presented next year in Rome (*D7.2-Guidelines for landing obligation implantation in the Mediterranean based on D7.4.1, Due: M24*). The WP7 leaders will provide a template with the main issues to be dealt with in these guidelines. Once the guidelines from the Baltic Sea are available they will be used as a sort of pilot.

There is cooperation with Agrocampus to include the Eastern Mediterranean data into the DiscardLess Atlas.

2.5 Summary:

During the first year, NAYS and UBO participated actively mainly in WP1 and WP2 (impact assessments) where deliverables were due on month 6. Consultations made with key stakeholders (Ministry, the fishing industry, the scientific community) in order to have their perception for the LO and their concerns for the Eastern Mediterranean case study (notably Greece) were recorded. In general the fisheries industry is not well informed for the LO and is not convinced at all of the benefits of the LO. They agree for more selectivity and for tools that will assist them to reduce their costs and discards if possible.

In parallel, data collection for the models to be used is continuing and these efforts will continue in year 2, when most activities are previewed to start in these WPs as well as on the other WPs.

3 The Year ahead of us: What do we expect for the next year?

3.1 Impact assessments

- We will continue the data collection and the parameterization of the functional groups that will form the basis of the ECOPATH model.
- We will continue the modelling work as follows:

| Scenarios | Status | General description | Eastern Mediterranean 1-Bio-economic approach |
|------------------------|----------|--|--|
| Business as usual | required | (Projection, as realistic as possible (given the constraints of the Ecopath model), including all existing management rules (e.g: temporal and spatial closures, Fmsy for certain demersal species and exploitation rates for sardine and anchovy), except for the LO. | <p>The bioeconomic model MEFISTO, which was specifically designed to address management issues under the Mediterranean regulation system will be used as the basis for the three implementation scenarios.</p> <p>The demersal bottom trawl fishery from Thermaikos Gulf will be analyzed. The red mullet <i>Mullus barbatus</i>, caramote prawn <i>Melicertus kerathurus</i>, deep-water rose shrimp <i>Parapenaeus longirostris</i>, and European hake <i>Merluccius merluccius</i>. Red mullet and surmullet <i>Mullus surmuletus</i>, deep-water rose shrimp, European hake, cuttlefish and octopus are the main target species of the trawl fishery in Thermaikos Gulf.</p> |
| Full implementation | required | No avoidance strategy implemented; all discards are landed. Implementation schedule applies to all species/fisheries at once. | Bioeconomic fisheries indicators such as MSY, MEY, F/F_{MSY} , B/B_{MSY} and, revenues and costs will be analyzed under this full implementation scenario, that is, all hake, red mullet and accompanying by-catch species with minimum conservation size (MCS) are landed. In the Mediterranean, the LO only applies to those species with MCS. |
| Partial implementation | optional | If several fisheries studied/modelled, test the full implementation per fisheries (in a sort of sensitivity analyses way) | An intermediate scenario in between the baseline and full implementation scenarios will be analyzed, simulating the use of avoidance strategies (larger mesh sizes, hotspots of recruits) by fishers and of landing a lower percentage of species with MCS. |

| Scenarios | Status | General description | Eastern Mediterranean 2-Ecosystem approach |
|------------------------|----------|---|--|
| Business as usual | required | Projection, as realistic as possible (given the constraints of the Ecopath model), including all existing management rules (e.g: temporal and spatial closures, Fmsy for certain demersal species and exploitation rates for sardine and anchovy), except for the LO. | <p>The Ecopath model will be used as the basis for the three implementation scenarios. The model will cover Thermaikos Gulf (NW Aegean Sea). In total, 40 functional groups have been previously used to model the Thracian Sea in NE Aegean (Tsagarakis et al. 2010). The same groups will form the basis for modeling Thermaikos Gulf but slight modifications might apply.</p> <p>The full implementation and partial implementation scenarios will be implemented using the modifications requested to the Ecopath team in the framework of the DiscardLess project.</p> |
| Full implementation | required | No avoidance strategy implemented; all discards are landed. Implementation schedule applies to all species/fisheries at once. | Main indicators of ecosystem structure and dynamics from Ecopath will be analysed under the scenario of zero discards, i.e. all species with MCS are landed and thus removed from the modelled demersal ecosystems. |
| Partial implementation | optional | If several fisheries studied/modelled, test the full implementation per fisheries (in a sort of sensitivity analyses way) | An intermediate scenario in between the baseline and full implementation scenarios will be analyzed, simulating the use of avoidance strategies (larger mesh sizes, hotspots of recruits) by fishers and of landing a lower percentage of species with MCS. |

3.2 Avoiding unwanted catches

- We will continue the work for WP3 (Manual of selective fishing gears and review of industry-led selective fishing gear development)
- We will continue the work for WP4 for initial avoidance manuals by case study including tactical, strategic and gear based approaches agreed by scientists and fishers.
- We will further exploit the feasibility to use catches of species below the minimum conservation reference size to purposes other than direct human consumption, including fish meal, fish oil, pet food, food additives, pharmaceuticals and cosmetics in Greece.

3.3 Policy outreach

- We will try to understand the incentives for the fishermen provided in other countries to land discards. So far our understanding is that in Norway there are ways and incentives to land discards¹¹. In Norway, as an incentive to land the unintended catch instead of discarding it, fishers may apply for compensation for the extra work of handling and landing the fish. The 'illegal' catches may be sold together with the rest of the catch and through ordinary market outlets. However, as all firsthand sales and all payments for fish are by law channelled through one of the six Norwegian fishermen's sales organisations, the value of the 'illegal' part of the catch is retained by the sales organisation. Nevertheless, 20% of the value of the 'illegal' catch may be paid to the fisher as compensation for any extra work. In purse seine fisheries for mackerel, herring and capelin, this 20% rule was abandoned as it turned out to be too strong an incentive for vessels to exceed their quota by "filling up" on the last trip. The sales organisations are allowed to keep the confiscated 80% of the value, and use the money on their lawful duties related to fisheries control, which include the collection and revision of all data related to firsthand sales of fish in Norway.
- We will monitor progress in the remaining case studies as well as progress in WP5 and WP6 and keep informed the fishery community and Ministry people for technological improvements and solutions that could be adopted in the Eastern Mediterranean area to reduce discards or to utilise them.
- In general, we will try to see the feasibility of the following items under Regulation 1380/2013:

Item 5. The CFP shall, in particular:

- (a) gradually eliminate discards, on a case-by-case basis, taking into account the best available scientific advice, by avoiding and reducing, as far as possible, unwanted catches, and by gradually ensuring that catches are landed;

1 ¹¹ See Gullestad et al., 2015. The "Discard Ban Package": Experiences in efforts to improve the exploitation patterns in Norwegian fisheries. <http://www.sciencedirect.com/science/article/pii/S0308597X14002589>

(b) where necessary, make the best use of unwanted catches, **without creating a market for such of those catches that are below the minimum conservation reference size;**

Item 11. For the species subject to the landing obligation as specified in paragraph 1, **the use of catches of species below the minimum conservation reference size shall be restricted to purposes other than direct human consumption, including fish meal, fish oil, pet food, food additives, pharmaceuticals and cosmetics.**

Item 12. For species that are not subject to the landing obligation as specified in paragraph 1, the catches of species below the minimum conservation reference size shall not be retained on board, but shall be returned immediately to the sea.

Item 30: The destination of landings of catches of fish under the minimum conservation reference size should be limited **and should exclude sale for human consumption.**

We will continue the cooperation with Agrocampus to include the Eastern Mediterranean data into the DiscardLess Atlas.