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1. Status of marine litter and environment

1.1. Information, data and knowledge for marine litter status and the state of the environment

1.1.1. Overview of status on marine litter and environment in Greece

The population of Greece living in direct contact with the coastal zone is about 5,000,000 (Greek Statistical Authority, 2017) and the relative solid waste generation is 500 kg/year/person. Of these, 20% corresponds to plastic waste, corresponding to 100 kg/year/person (EUROSTAT, 2018). Jambeck et al (2015) provided an overall analysis of waste inputs from coastal areas in the oceans and estimated that 4.8 to 12.7 million tonnes of plastics were discarded in the ocean in 2010, which corresponds to an average of about 8.8 million tonnes. In this work, Greece was considered a high income country in the EU, with 0% waste leakage due to poor management and only 2% escape due to involuntary rejection behaviors (based on a US study; MEE, 2018a). Despite the limited information available so far and the high variability of the quantities of marine litter observed (MEE, 2018b), according to available data about coastal and benthic litter in the Aegean and Ionian Sea, it is obvious that marine litter constitutes a serious problem (MSFD Greece, 2012; MEE, 2018a).

Several studies have been reviewed to collate recent data retrieved from scientific publications, projects and beach cleaning events. In the present study we mainly focus on outputs from the implementation of the standardized monitoring protocol for marine litter suggested by the Marine Strategy Framework Directive (EU 2008/56/MSFD). Due to the lack of standardized methodology adopted in the various information sources, most information is partly available (mainly concerns the total weight of collected and qualitative composition of marine litter) and is presented in terms mainly of qualitative assessment. The collated information wherever data and approaches were comparable, has been used to assess the status of marine environment in comparison to the baseline values for litter concentration proposed by UNEP-MAP (2015a; 2016) for the Mediterranean, due to the lack of other numerical thresholds at the national level.

1.1.2. Marine litter on beaches

From the outputs of DeFishGear project the abundance of beach litter in Greece corresponds to 0.24 items/ m^2 (aggregated results at national level; Vlachogianni et al, 2017).

More specifically, two out of the ten beaches studied under the DeFishGear project in Greece (coasts of Corfu- Ipsos beach and Thesprotia- Arillas beach), appear to be more impacted by litter, as density of litter reported may exceed the proposed upper reference limit (Table 1). The highest average litter densities were recorded in Ipsos beach in Corfu with the average number of items being 0.91 items/m² (455 items/100 m). There is no data available for the coasts located at the Aegean and Cretan Seas for the period 2012-2017 in accordance to the methodology and the protocol of the MSFD, in order for data to be comparable.

According to the Clean Coast Index¹ (scale varying from 'Very Dirty' to 'Very Clean'; Alkalay et al, 2007), Ipsos beach was classified as "Dirty" (signifies "a lot of litter on shore"). However, it must be highlighted that based on the same index, from the overall 10 beaches that were surveyed, four beaches in Greece were classified as 'Very Clean' ("no litter seen") and two as 'Clean' ("no litter seen over a large area"; Vlachogianni et al, 2018).

Table 1. Data on the Indicator 10.1.1 'Deposited litter on the coast' for the Adriatic-Ionian Region, as reported by the DeFishGear project surveys

| 2010/477/EU Criteria or Indicators | Proposed baseline threshold (UNEP, 2015) number/100m | Average number of items per 100m stretch | Average number of items per m ² ± S.D. | Area | Beach type | Year | Source | |
|------------------------------------------|------------------------------------------------------------------|------------------------------------------------------|------------------------------------------------------------|-----------------------|-------------------------|-----------|--------------|-------------|
| | | 110 ± 68 | 0.11 ± 0.07 | Valtos, Parga | Semi- urban | | | |
| | | 426 ± 393 | 0.42 ± 0.39 | Arillas | Semi-rural | | | |
| | | 84 ± 94 | 0.08 ± 0.09 | Mega Ammos | Semi-rural | | | |
| | | | 276 ± 160 | 0.28 ± 0.16 | Drepano, Igoumenitsa | Urban | | et al, 2018 |
| 10.1.1 Litter | | 92 ± 47 | 0.09 ± 0.05 | Kalamas | Remote/ natural | 2015 | | |
| on coasts and beaches | 450-1400 | 166 ± 82 | 0.17 ± 0.08 | Sagiada | Remote/ natural | - 2016 | | |
| | | 244 ± 180 | 0.14 | Acharavi, Corfu | Semi-rural | | | |
| | | 455 ± 308 | 0.91 | lpsos, Corfu | Semi-rural | | Prevenios et | |
| | | 156 ± 18 | 0.08 | Issos, Corfu | Remote/ natural | | al., 2017 | |
| | | 178 ± 76 | 0.09 | Chalikounas, Corfu | Remote/ natural | | | |

The main types of waste concentrated on the Greek beaches resulted from the DeFishGear surveys in the years 2014-2015 on the coasts of Corfu (local scale; Prevenios et al, 2018), and corresponding data at country level by the MedSOS campaigns that were carried out the years 2014, 2015 and 2016 (<u>www.medsoscleanup.gr</u>), are shown in Table 2. Differences between the MedSOS data and the DeFishGear regarding the contribution of plastics with higher values (93.23%) in Corfu and lower (57-82%) during the MedSOS campaigns at the country level, in contrast to paper waste and all other categories which had higher contribution, may be related to the fact that during the MedSOS voluntary campaigns the broken pieces of plastic and polystyrene were not taken into account.

¹ Clean Coast Index (CCI) = (Total litter on sampling unit/total area of sampling unit) x K, where CCI is the number of litter items per m^2 , the total area of the sampling unit is generated by multiplying the sampling unit's length with the width and K is a constant that equals to 20.

| Table 2 | . Pe | rcentage | composition | (%) | of | the | main | types | of | waste | on | the | Greek |
|---------|------|----------|-------------|-----|----|-----|------|-------|----|-------|----|-----|-------|
| beaches | 5 | | | | | | | | | | | | |
| ~ | | 2242 | | | | | | | | | | | |

| Source: | MEE, | 2018a |
|---------|------|-------|
|---------|------|-------|

| | Percentage (%) | | | | | | | | |
|------------------------------------------|------------------|------------------|------------------|---------------------------|--|--|--|--|--|
| Litter type | MedSUS (2014) | MedSOS (2015) | MedSOS (2016) | DeFishGear (2014-2015) | | | | | |
| Plastics- Polymers | 57 | 82 | 58 | 93.23 | | | | | |
| Paper | 14 | 5 | 19 | 1.15 | | | | | |
| Metal | 9 | 3 | 8 | 2.34 | | | | | |
| Glass | 7 | 3 | 4 | 1.12 | | | | | |
| Wood | 7 | | 8 | 0.72 | | | | | |
| Rubber | 3 | | 2 | 0.64 | | | | | |
| Cloth | | | | 0.76 | | | | | |
| Other | 1 | 4 | 1 | 0.04 | | | | | |
| Number of beaches Number of collected | 222 | 238 | 196 | 4 | | | | | |
| pieces | 49,437 | - | - | 41,617 | | | | | |
| Number of samplings | - | - | - | 24 | | | | | |

As shown in Figure 1, the most abundant waste reported were plastic and polystyrene pieces corresponding to 10.8% and 10.5% of the total of the items measured respectively.

Studies at the Mediterranean scale have shown that shoreline and recreational activities generate approximately 50% of the marine litter in the Mediterranean, with smoking-related activities representing 40% of total marine litter (Med-IAMER, 2015). This seems to be generally in accordance to the national statistics presented here. Data from Clean up Greece between 2004 and 2008 indicated however the importance plastic and paper abandoned and wind born on island beaches. On isolated beaches, other visible and larger sized litter items (metal, rubber, glass, and textile) have increased due to illegal dumping (UNEP-MAP, 2015b).

In Figure 2 the distribution of plastic debris fluxes in the Mediterranean are shown, as predicted by a recent model developed by Liubartseva et al (2018).



Figure 1. Percentage contribution of the top 10 (more abundant) waste in the ten Greek beaches studied in Corfu and Thesprotia, under the DeFishGear project surveys. Sampling was carried out on a seasonal basis in the years 2014-2015

Source: Vlachogianni et al, 2018



Figure 2. Map of the plastic debris fluxes (kg (km day)⁻¹) onto the Mediterranean coastlines. The fluxes are represented by the selected 6 gradations distinguished via the marker sizes and colors. Marker labels indicate the numbering of the coastline segments

Source: Liubartseva et al, 2018

1.1.3. Marine litter on seafloor

Regarding seafloor litter densities, it is evident that the seafloor of the Aegean and lonian Seas is impacted by marine litter, with amounts of litter approximately being 2-5 times higher than those reported for some other seas worldwide. According to DeFishGear project, Greece is one of the top most affected countries regarding seafloor litter with average densities 847 items/km² reported (Vlachogianni et al, 2017).

Overall, the density values of seafloor litter recorded in the seabed of the Aegean Sea are lower than those reported in Crete and Ionian Sea (Table 3). Surveys with trawls conducted by the DeFishGear concluded that all the areas studied in the Ionian Sea (perimeter of Corfu, Gulf of Patras and Gulf of Echinades) exhibited higher density values than those proposed as baseline threshold values for the Mediterranean, in contrast to the litter density values reported for the Aegean Sea and Evoikos Gulf. In the Saronikos Gulf, the density values of the 1,211 litters/km² reported by Ioakeimidis et al (2014), exceeding the proposed limits for the Mediterranean, are considered quite high compared to the 222 litter/km² reported by Papadopoulou et al (2015) that fall below the proposed threshold. Observed differences between reporting values regarding the abundance of litter deposited on the seafloor in an area may be due to a number of factors, such as the sampling site (e.g. proximity to major cities and other activities considered sources of litter, such as main shipping routes), the sampling tool, depth and season.

Regarding microplastics in deep waters, Woodall et al (2018) sampled in the deep parts southern of Crete at depth of 3500m and quantified the amount of microplastic abundance as 15 plastic fibers per 50ml sediment.

A recent model for the Mediterranean (Figure 3) shows the predicted distribution of marine litter at the sea bottom.

| 2010/477/EU Criteria or Indicators | Proposed baseline threshold (UNEP, 2015) number/m ² | Average number of items per m ² ± S.D. | Area | Year | Source |
|------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------|-----------------------------------|----------------|-----------------------------|
| | | 641 + 579 | Patras Gulf, Ionian | 2013 | |
| | | 416 ± 379 | Echinades Gulf, Ionian Sea | 2013 | |
| | | 1211 ± 594 | Saronikos Gulf, Aegean Sea | 2013 | loakeimidis et al, 2014 |
| | | 948 ± 478 | Corfu Gulf, Ionian Sea | 2014 - 2015 | |
| | | 1099 ± 589 | North Adriatic, Ionian Sea | 2014 - 2015 | |
| 10.1.2 Litter | 130-230 | 368 ± 211 | North Ionian Sea, Ionian Sea | 2014 - 2015 | Vlachogianni et al, 2017 |
| on searcoor | | 452.8 | Gournes, Cretan Sea | 2014 | Papadopoulou |
| | | 352.1 | Dia, Cretan Sea | 2014 | et al, 2015a |
| | | 146 | Cyclades, Aegean Sea | 2014 | |
| | | 43 | North Evoikos Gulf, Aegean Sea | 2014 | Papadopoulou |
| | | 112 | South Evoikos Gulf, Aegean Sea | 2014 | et al, 2015b |
| | | 222 | Saronikos Gulf, Aegean Sea | 2014 | |

Table 3. Data on the Indicator 10.1.2 'Deposited waste on the seafloor' in Greece



Figure 3. Averaged 2013-2017 map of plastic debris fluxes (g km-2 day-1) onto the Mediterranean bottom as predicted by a 2D Lagrangian model (Monte Carlo technique is used to simulate the sedimentation of particles). A thin black line shows 1000m isobath

Source: Liubartseva et al, 2018

1.1.4. Marine litter on water column

The average floating microplastics in the Greek waters is close or below the proposed maximum value for the Mediterranean. However, locally maximum values reported particularly to highly inhabited, urbanized or touristic areas, such as the Strait of Paros-Naxos, the Corfu and Saronikos Gulf (Table 4) that may exceed the recommended thresholds (MEE, 2018a). This is probably related to the oceanographic conditions such as sea surface currents, the geomorphological and oceanographic characteristics of some areas (e.g., the Gulf of Corfu is a closed bay) and the presence of organic matter in the surface waters that acts as a micro-litter concentrating factor (Vlachogianni et al, 2017).

In total, floating microplastics in the South and Central Aegean range within the proposed baseline range with only one highest value recorded in the Strait of Paros-Naxos (654,000 pieces/km²). The same applies to the inhabited and particularly urbanized Saronikos Gulf. Only the maximum value (924,051 pieces/km²) exceeded the recommended threshold and was recorded in the waters of the Western Saronikos Gulf, which is characterized as a densely populated area of the country.

Studies conducted on floating debris at the Aegean Sea have identified areas where most of marine litter has been reported. This information was used to model floating litter in the area (period 1990-2009) by Politikos et al (2017) considering different areas as sources of litter (Figures 4, 5). High concentration of litter particles was found in areas closely related to the southward pathway of waters from the North Aegean Sea, where the most important sources of floating litter particles were located. These areas include the North Eastern Aegean Sea, receiving inputs from Evros/Strymonikos Rivers and the Dardanelles strait, with the semi-permanent anticyclonic circulation in Samothraki and Limnos plateau resulting in the relatively higher residence time of litter particles. Other areas where litter was found to accumulate are the Sporades basin and the eastern coast of Evia, being in the pathway of waters coming from North Eastern Aegean Sea, and also receiving inputs from the Thermaikos Gulf. Further south, increased litter particle accumulation was found in the Saronikos Gulf and the Myrtoan basin, and occasionally in the Cyclades plateau and the Cretan Sea.

At the regional scale, a recent 2D Lagrangian model developed by Liubartseva et al (2018) is in general accordance with the high values reported in Greece, identifying the Thermaikos and Saronikos Gulfs as major areas of surface plastics concentration (Figure 6).

| Table 4. | Data on the | Indica | ator 10.7 | 1.3 'Floating | g mic | ro p | plastics' | in | Greek | waters. |
|-----------|--------------|--------|-----------|---------------|-------|------|-----------|-----|--------|----------|
| Collated | information | from | surveys | conducted | by t | he | DeFishG | ear | (IPA-A | driatic) |
| project (| Source: MEE, | 2018a |) | | | | | | | |

| 2010/477/EU Criteria or Indicators | Proposed threshold (UNEP, 2015) number/km ² | Number of items / km² | Min - Max | n | Area | Year | Source |
|------------------------------------------|--------------------------------------------------------------------|--------------------------|---------------|---|----------------|------|--------------|
| 10.1.3 | 200,000- | 288.137 ± 542.778 | 0 - 1,619,658 | 8 | North Adriatic | 2014 | Digka et al, |

| Floating | 500,000 | 410,014 ± 263,579 | 126,667 - 882,747 | 8 | North Aegean | - 2015 | 2018a; Zeri et |
|--------------|---------|-------------------|--------------------|----|-------------------|--------|----------------|
| meroptastics | | 576,816 ± 545,988 | 82,352 - 1,510,417 | 16 | Corfu Gulf | 2015 | at, 2010 |
| | | 146,416 ± 121,762 | 60,317 - 232,515 | 2 | North Ionian | | |
| | | 160,000 ± 66,000 | 65,000 - 206,000 | 4 | North Aegean | 2017 | Adamopoulou |
| | | 219,000 ± 22,000 | 67,000 - 654,000 | 6 | Central Aegean | | et al., 2018 |
| | | 282,335 ± 367,829 | 35,519 - 924,051 | 7 | Saronikos Gulf | 2015 | HCMR data |



Figure 4. Regions with observed floating litter in the Aegean Sea, as reported from various studies: R1: Saronikos Gulf (Valavanidis and Vlachogianni, 2012; MERMAID Report, 2016), R2: Thermaikos Gulf (Valavanidis and Vlachogianni, 2012), R3: Eastern Aegean Sea (Topcu et al, 2010), R4: Crete island (Cózar et al., 2015), R5: Southwest Aegean Sea (Kornilios et al, 1998), and R6: Crete island (Cózar et al., 2015)

Source: Politikos et al (2017)



Figure 5. Schematic representation of major pathways of floating litter transport among the source regions identified. Different colors represent pathways originated from source regions of floating litter A: Axios River, City of Thessaloniki,

Thessaloniki Port, Major Commercial Fishing Ground; B: Strymonas and Nestos Rivers, City of Kavala, Port of Kavala, Major Commercial Fishing Ground; C: Evros River, Major Commercial Fishing Ground; D: Black Sea Water inflow through Dardannelles Strait; E: Saronikos Gulf, City of Athens, Piraeus Port



Source: Politikos et al, 2017

Figure 6. Averaged 2013-2017 map of plastic debris concentration (g km-2) at the sea surface as predicted by a 2D Lagrangian model, which ensemble of virtual Lagrangian particles from anthropogenic sources (cities, rivers, shipping lanes) to environmental destinations. Some geographical names used in the text are given: the (1) Gulf of Arzew, (2) Gulf of Tunis, (3) Gulf of Sidra, (4) Abu Qir Bay, (5) Cilician Sea, (6) Izmir, the (7) Thermaic Gulf, (8) Saronikos Gulf, (9) Buna-Bojana, (10) NW Adriatic, (11) Taranto Gulf, (12) Gulf of Naples, (13) Gulf of Genoa, (14) Gulf of Lion, (15) Catalan Sea, and (16) Malaga Bay

Source: Liubartseva et al, 2018

1.1.5. Marine litter on biota

Ecological impacts of marine litter include the mortality or sublethal effects on plants and animals through entanglement, physical damage, smothering and ingestion, the uptake of micro-particles (mainly microplastics) and the influence from chemicals through the food web, facilitation of the invasion of alien species, and alternation of the benthic community structure (Galgani et al, 2010).

• Ingestion by marine organisms: Although there are no accurate studies regarding microplastic accumulation by marine organisms yet, more and more the potential threat for direct and indirect impacts of micro- and nanoplastics over timescales are highlighted, facilitating their uptake by marine biota throughout the food chain (Gallo et al, 2018). Information presented here is mainly from studies at the regional scale. More than 50% of the plastics found in trawling grounds from the Mediterranean were colonized by biofilms of microorganisms. In some areas, up to 12% of plastics were totally covered by larger organisms, suggesting indirect effects

on benthic communities (Sanchez et al, 2013). A recent study (Macali et al, 2018) showed the presence of marine litter in the gastrovascular cavity of cnidarians (*P. noctiluca*) probably due to active ingestion of fragments that were wrongly recognised as food, which could be a potential source of microplastics in larger organisms transported through food webs.

Studies on marine debris ingestion by sea turtles in the Mediterranean have been reviewed by Casale et al. (2016), and globally by Lynch (2018). Globally, on a gram/kilogram basis, the meta analysis conducted by Lynch (2018) showed that Mediterranean Sea average debris ingestion quantities of 0.05 g/kg by Caretta caretta. Overall, the Mediterranean Sea ranks fourth with five pieces/turtle globally, although the region was assessed for sea turtles as generally low ingestion concentrations in comparison to other seas and oceans (Lynch, 2018). However, these rankings are expected to be altered as new data will be reported. Regionally, debris in gut contents or faeces of sea turtles has been reported in the western, south-central Adriatic and eastern basin. In most of the cases, sea turtles have small amounts of debris with almost no lethal cases reported (Casale et al. 2016; 2018). In the Mediterranean, the death of a sperm whale of 4.5t. was attributed to 7.6 kg of plastic debris in its stomach, which was ruptured probably due to the large plastic load (De Stephanis et al, 2013). The main source of this litter was linked to the omnipresent greenhouse industry along the coasts of Almeria (De Stephanis et al, 2013). Codina-Garcia et al (2013) identified that from the 49 individuals of Cory's Shearwater (Calonectris borealis) 96% of the sample had ingested plastic debris. In Table 5 some indicative numbers reported for ingestion of litter by marine organisms are presented.

Regarding plastic ingestion by fish, Romeo et al (2015) reported that about 18% of large pelagic fishes in the Mediterranean (tuna, albacore, swordfish) had plastic litter in their stomachs. In the Ionian Sea during DeFishGear project surveys, from the 224 fish that were examined 2.7% had ingested marine litter (species C. linguatula, M. barbatus and P. erythrinus; Table 6). The percentage of litter frequency of occurrence (%F) (i.e. the % ratio of the number of guts found with litter to the total number on non-empty guts) was 3.05% in the Ionian Sea, with M. barbatus showing the highest frequency values (ranged from 2 to 8%) and highest numeric abundance (%N) of ingested marine litter (67%) (Vlachogianni et al, 2017). The average number of litter per gut, taking into account only the guts with litter was found to be 1.0 for the northeastern Ionian and North Adriatic and is in accordance with that of 1.56 reported by Bellas et al (2016) for demersal species in the Spanish Atlantic and Mediterranean coasts. All studies agree that the categories of ingested litter were mainly artificial polymer materials (e.g. filaments, films, granules, sheets, plastic sheeting, plastic fragments) and coal; most of them usually associated with plastics.

| Species | Size of sample | % individuals with ingestion | Area reported | Source |
|----------------------------------------------|-------------------|------------------------------|---------------------|------------------------------|
| Cory's Shearwater Calonectris borealis | 49 | 96 | Mediterranean | Codina-Garcia et al, 2013 |
| Loggerhead Turtle Caretta caretta | 121 | 14 | Sardinia | Camedda et al, 2014 |
| Loggerhead Turtle Caretta caretta | 31 | 71 | Italy | Campani et al, 2013 |
| Loggerhead Turtle Caretta caretta | 54 | 79.6 | Spain | Tomás et al, 2002 |
| Loggerhead Turtle Caretta caretta | 2214 | 40.4 | NW Mediterranean | Darmon et al, 2014 |

Table 5. Data collated from various studies presenting amount of marine litter ingested by organisms

Digka et al (2018b) explored the ingestion of microplastics in the Northern Ionian Sea and showed that frequency of occurrence were 46.25% in mussels (*Mytilus galloprovincialis*) with microplastics abundance ranging from 1.7-2 items/individual while *Sardina pilchardus* showed the highest frequency of microplastic ingestion (47.2%) microplastics abundance ranging from 1.5-1.9 items/individual. The fact that pelagic feeders were found to consume more litter items/fish supports the overall hypothesis that that pelagic species could be more sensitive to litter ingestion because of their filter-feeding behavior associated with their feeding habitat where floating or neutrally buoyant plastic particles may be available for ingestion (Vlachogianni et al, 2017).

| Table 6. Number of marine litter (ML) particles found in the guts of the | examined |
|--------------------------------------------------------------------------------|-----------|
| fish by species and area. The average number of ML (\pm S.D.) per gut exact | amined is |
| also included (Source: Vlachogianni et al, 2017) | |

| | Citharus | Mullus | Pagellus | Sardina | Scomber | Solea | Trachurus |
|----------------|------------|----------|------------|------------|-----------|-------|-----------|
| NE Ionian Sea | linguatula | barbatus | erythrinus | pilchardus | japonicus | solea | trachurus |
| Number of | | | | | | | |
| guts | 52 | 50 | 50 | 58 | | 2 | |
| Number of | | | | | | | |
| guts with ML | 1 | 4 | 1 | | | | |
| Number of ML | | | | | | | |
| in all guts | 1 | 4 | 1 | | | | |
| ML item range | 1 | 1 | 1 | | | | |
| Average | 0.01 | 0.08 | 0.02 | | | | |
| ML/gut (±S.D.) | (0.13) | (0.27) | (0.14) | | | | |



Figure 7. Plastic marine litter found in the stomach of marine species in the Mediterranean Sea Source: Cózar et al, 2015

- Entanglement and by-catch: Entanglement of sea turtles by anthropogenic debris and by-catch (direct or indirect by lost fishing gear) has been reported as the most important stranding cause of sea turtles' death in the Mediterranean (Tomás et al, 2008; Casale et al, 2010). For example, the analysis of catch rates in the Mediterranean allowed for the estimation of 132,000 captures and 44,000 incidental deaths per year (Casale 2011). Dunkan et al (2017) conducted a review on entanglement of marine turtles in plastic debris and concluded that fishing type debris has an impact on all life cycle stages of the Mediterranean sea turtles (pelagic juvenile; neritic juvenile and adults). Wallace et al (2010) were able to highlight region- gear combinations in the Mediterranean Sea requiring urgent action, such as gillnets, longlines and trawls. Highest occurrence of marine debris (80%) has been reported from turtles caught by pelagic longlines in the central Mediterranean (Tomás et al, 2008; Casale et al, 2010). Entanglement depends on body size, shape and the behavior of the animal concerned as well as the type of litter it encounters and the level of litter pollution in the environment in which the animals live (Werner et al, 2016).
- Introduction of non-indigenous invasive species: the estimated 250 billion microplastic particles floating in the Mediterranean Sea (Collignon et al, 2012) are all potential carriers of non-indigenous invasive species and Harmful Algal Bloom (HABs; Maso et al, 2003). In north western Mediterranean substantial specimens of a monospecific foraminiferal assemblage of the benthic foraminifer *Rosalina concinna* planktonic (Tretomphalus) stage were found to colonize floating microplastics (density of about 20 individuals per 100 cm² on floating plastic litter) which is rare under natural substrates, implying a substantial risk of modifying the dispersal efficiency of this highly opportunistic species (Jorissen, 2014).

1.1.6. Drivers, pressures, impacts, sources of pollution

DeFishGear concluded that in Greece out of the 5,028 items collected and classified during the project's surveys, 65% could be attributed to the main source categories. The majority of the sourced items originated from shoreline sources (Figure 8), including poor waste management practices, tourism and recreational activities (46.1%). Fisheries and aquaculture related items had a substantial

contribution of 11.72% of all items collected. Sanitary and sewage related items accounted for 2.41%, shipping related for 1.53%, fly-tipping related items for 1.35% and medical related items for 0.90% (Vlachogianni et al., 2017). Assessment of the relevant pressure level in the Greek coastal water bodies is shown in Figure 9. In terms of areas, available Greek field data indicate that litter come from the lonian Sea, Patraikos Gulf (Stefatos et al, 1999; Koutsodendris et al, 2008) and the Aegean Sea (Katsanevakis and Katsarou, 2004; loakeimidis et al, 2014, 2015; Papadopoulou et al, 2015). However, these studies have focused on detecting big marine litter items on the seafloor, while available data on floating litter distribution are scarce, and the ecological problem of floating litter transport and accumulation is largely unknown. Politikos et al (2017) defined sources regions of floating litter related to big cities, rivers, the inflow of Black Sea waters through the Dardanelles strait, and open sea for the development of a predictive model in the Aegean Sea (period 1990-2009) without excluding though potential impact from maritime and shipping and small-scale fisheries.

At the Mediterranean scale, most of the marine litter comes from land-based rather than sea-based sources (e.g. ships). Litter enters the sea mainly from the shoreline and results from recreational activities. It is composed mainly of plastics, aluminium and glass (PNUE/PAM/MEDPOL, 2009). Coastal and recreational activities account for more than half of the litter found on beaches (EC, 2014). De Stephanis et al (2013) highlighted also as potential source of litter in the Mediterranean the greenhouse industry, in areas where this activity operates, which could be true also for specific regions in Greece as well. Recordings of floating litter confirmed the overwhelming presence of plastics in the Mediterranean Sea. Plastic accounts for about 83% of the observed marine litter items. In some tourist areas more than 75% of the annual waste production is generated in the summer season (Galgani et al, 2013). In Figure 10, the main well known sources for floating debris inputs into the Mediterranean region (i.e., shipping lanes, rivers, cities) are shown.



Figure 8. Sources of marine litter on the basis of aggregated results at national and regional level Source: Vlachogianni et al, 2017



Figure 9. Assessment of the pressure level in terms of relevant pressures and coastal water bodies of Greece. The pressure intensity scale of Borja et al (2011) has been modified to include five levels of evaluation and assigning scores from 3 to 0 for each pressure type within the corresponding area. The scores were estimated using expert judgment based on our knowledge of the study areas. The pressure index has been calculated as the average pressure scores and the selected areas have been grouped in five categories from nor minor pressure intensity to heavy pressure intensity (Pavlidou et al, 2015) Source: MEE, 2018a



Figure 10. Spatial distribution of the floating debris inputs into the Mediterranean Basin: shipping lanes (gray dots), rivers (open blue diamonds), largest rivers (closed blue circles), cities (open red circles), and largest cities (closed red circles)

Source: Liubartseva et al, 2018

1.2. Gaps of knowledge and information, data and expertise on marine litter issue and national level peculiarities

- There are not enough available data regarding marine litter in the water column and the water surface as most studies mainly focus on litter washed ashore or deposited on the seabed of the continental shelf. Therefore, floating litter is not satisfactorily assessed (MEE, 2018a).
- There is a lack of sufficient information on the overall assessment of the current situation as regards to litter and its impact. There are no quantified data on the impact of litter on marine biota. Generating estimates of catch rates and spatial/temporal patterns for entanglement are not yet possible due to the lack of quantitative information regionally. In addition, micro-plastics are a relatively new and poorly investigated topic in terms of their impacts on biota (MSFD Greece, 2012; MEE, 2018a). It is difficult to estimate when the issues will be addressed as there are no scheduled surveys in the monitoring protocols. Issues of insufficient data could be encountered by funding research programmes focusing on the impacts of litter on marine life.
- As most data concern coastal areas, there cannot be safe conclusions about the open sea (mainly about the sea bottom, since floating litter is ultimately washed ashore, if not decomposed). The fact that most research and actions focus on the coastal environment leads to information inadequacy about the state of the deep sea in relation to litter (MSFD Greece, 2012). Levantine Sea constitutes an area which has not been studied in terms of marine litter, although there are anthropogenic activities such as agriculture, recreation and shipping which are expected to generate litter (MEE, 2018a).

- According to national reports marine litter constitutes an important issue for the coastal and marine environment in Greece, although it is difficult to quantify the induced disturbance due to lack of specific criteria at the national or sub-regional scale. Currently Greece is using a set of preliminary baseline values for litter concentrations in the Mediterranean, proposed by UNEP-MAP (2015a; 2016).
- There is a rather limited and fragmented understanding of the problem due to the lack of accurate, coherent, reliable and comparable scientific data under a common monitoring framework. Even for information provided by surveys and clean up campaigns results are inconsistent in terms of parameters investigated; therefore it is difficult to have a complete insight into a holistic assessment of marine litter (MEE, 2018a). The comparisons made between the data generated by voluntary coastal clean-up campaigns and those resulting from scientific programs clearly underline the need for all stakeholders to apply the protocol and methodology proposed by the MSFD, so that these data are useful for assessment of the country's status (Vlachogianni et al, 2017).
- Consistent and systematic socio-economic information related to the full extent of marine litter impacts on marine environment and human welfare, the economic damage caused and mitigation costs at the national level is completely lacking
- Despite variations in marine litter monitoring methodologies and discrepancies on specific results, it is widely accepted that both the levels of marine litter and the rate of input into the coasts and seas are rising overtime. There is an urgent need for immediate prevention and mitigation actions (MEE, 2018b).

2. Legislation

2.1. Legal framework at the European and Regional level

Marine litter has increasingly been highlighted by several other important legal frameworks at the international level, such as the Convention on Biological Diversity (CBD) by the United Nations Environment Programme (UNEP) for the protection of biodiversity, that has published several relevant documents and reports amongst others (e.g. CBD-GEF, 2012; CBD, 2016). Greece, as a Member State of the European Union (EU) has to align, adopt and implement all the EU Directives and Regulations to its national legislations, of which the most important directly related to marine litter are:

• <u>Barcelona Convention - Convention for the Protection of the Marine environment</u> <u>and the Coastal Region of the Mediterranean</u> adopted on 16 February 1976 and last amended on 10 June 1995 (The Barcelona Convention, 1995). The Barcelona Convention and its protocols, together with the Mediterranean Action Plan, form part of the United Nations Environment Programme (UNEP) Regional Seas Programme, under which the UNEP Marine Litter Initiative has been founded with numerous international conventions that directly address various aspects of marine litter. The eight protocols of the Barcelona Convention include different objectives, among which is to prevent and abate pollution mainly through dumping, runoff and discharges in the Mediterranean region (Land-Based Sources - LBS Protocol and the Dumping Protocol).

- <u>Annex V of the MARPOL 73/78 Convention</u> (Regulations for the Prevention of Pollution by Garbage from Ships in the Mediterranean Sea) by the Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) revised in July 2011 and entered into force on 2013, characterised the Mediterranean Sea as a "special area" (Annex V) and prohibited disposal for all ships of various types of waste, including all plastics, paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials, all kinds of food, domestic and operational waste, etc. In addition, it obliges Governments to ensure the provision of adequate reception facilities at ports and terminals for the reception of garbage. The revised MARPOL Annex V is accompanied by the 2012 Guidelines for the implementation of MARPOL Annex V (resolution MEPC.219(63)) and the 2012 Guidelines for the development of garbage management plans (resolution MEPC.220(63)).
- Landfill Directive (Council Directive 1999/31/EC of 26 April 1999) that regulates waste management of landfills in the European Union and was implemented by its Member States by 2001. Aiming to prevent or reduce as far as possible negative effects on the environment (surface water, groundwater, soil, air) and on human health from the land filling of waste by introducing stringent technical requirements for waste and landfills, the Directive defines the different categories of waste, lays down a standard procedure for the acceptance of waste in landfills and sets up system of operating permits for landfill sites which EU Members are obliged to adopt.
- <u>Marine Strategy Framework Directive (MSFD, EU 2008/56)</u> aims to achieve Good Environmental Status (GES) of the EU's marine waters by 2020. The MSFD builds on sector-based approaches such as the Common Fisheries Policy, Natura 2000, and the Nitrates Directive (Galgani et al, 2013). Amongst the 11 qualitative Descriptors that define the main axes of actions to achieve GES in an area, Descriptor 10 "Properties and quantities of marine litter do not cause harm to the coastal and marine environment" focuses on marine litter, stating that GES is achieved only when "properties and quantities of marine litter do not cause harm to the coastal and marine environment" and foresees the elaboration and implementation of a wide range of measures related to litter and micro-litter in the marine environment (coastline, surface layer of the water column, seabed and marine sediments) and the amount of litter and micro-litter ingested by marine biota (Galgani et al, 2013):

<u>Criterion 10.1</u>: Characteristics of waste on marine and coastal environment

✓ Indicator GR 10.1.1: amount of litter (number of items per sampling kilometer) washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source

 \checkmark Indicator GR 10.1.2: amount of litter (number of items per sampling kilometer) in the water column (including floating at the surface) and deposited on

the sea-floor, including analysis of its composition, spatial distribution and, where possible, source

 Indicator GR 10.1.3: amount (pieces per square kilometer), distribution and, where possible, composition of microparticles (in particular microplastics)

<u>Criterion 10.2</u>: Impacts of waste on marine life

 Indicator GR 10.2.1: Quantities and composition of waste ingested by marine animals, e.g. stomach analysis

- The revised European Commission Decision COM/2017/848 of 17 May 2017 provides details for the assessment of litter in the environment in terms of the criteria and methodological standards to achieve GES, while 56 measurable Indicators for the 11 Descriptors for the achievement of GES are proposed based on the Commission Decision 2010/477/EU.
- <u>Waste Framework Directive (Directive 2008/98/EC)</u> sets the basic concepts and definitions related to waste management (i.e. waste, recycling, recovery), lays down basic waste management principles, and introduces the "polluter pays principle" and the "extended producer responsibility". The Directive incorporates provisions on hazardous waste and waste oils, includes two new recycling and recovery targets to be achieved by 2020, and requires that Member States adopt waste management plans and waste prevention programmes.
- <u>Common Fisheries Policy</u> contains provisions to reduce marine debris in the form of fishing gear. Through the <u>Council Regulation (EC) No 1224/2009</u> of 20 November 2009 for establishing a Community control system for ensuring compliance with the rules of the Common Fisheries Policy, fishermen are obliged to recover or report lost gear in order to reduce marine litter from sources such as fishing gear.
- <u>Maritime Spatial Planning Directive (2014/89/EU)</u>: requires all relevant European Member States to develop Maritime Spatial Plans in their territory and EEZ by 31 March 2021. It establishes the framework for Maritime Spatial Planning (MSP) aimed at promoting the sustainable growth of maritime economies, the sustainable development of marine areas and the sustainable use of marine resources. The EU's Maritime Spatial Planning Directive was entered into force in September 2014. As key requirements is for Member States to develop cross-border cooperation and sharing of data, apply an ecosystem-based approach taking into account the landsea interaction into their MSPs under a participatory process.
- <u>Directive (EU) 2015/720/EU</u> of the European Parliament and of the Council of 29 April 2015 amending Directive 94/62/EC as regards reducing the consumption of lightweight plastic carrier bags in Member States, sets the adoption of measures for limiting the annual consumption level per person, ensuring that plastic carrier bags are not free of charge, provide labelled biodegradable and compostable plastic carrier bags, and reporting the assessment of measures effectiveness. The Directive sets specific deadlines for the application of measures in the Member States and is the first EU legislative initiative setting quantitative targets for drastically reducing the annual use and consumption of plastic carrier bags to max 40 lightweight plastic carrier bags per person by the end of 2025.

• <u>Directive (EU) 2018/852 of the European Parliament and of the Council of 30 May</u> <u>2018 amending Directive 94/62/EC on packaging and packaging waste</u>: promotes the prevention of packaging waste including plastic transport bags, reuse systems in an environmentally sound manner and imposes specific quantitative recovery recycling targets for specific materials contained in packaging waste (Tables 7 and 8). Member States are encouraged to increase the share in reusable packaging put on market and take the necessary measures to meet certain targets, such as by December 2025 and 2030 at least 65% and 70% by weight of all packaging must be recycled respectively. The amended Directive (EU) 2018/852 has applied since 4 July 2018 and has to become law in the EU countries by 5 July 2020.

| Table | 7. | National | quantitative | targets | for | recovery | and | recycling | of | packaging |
|--------|----|------------|----------------|-----------|------|----------|-----|-----------|----|-----------|
| waste, | as | set origin | ally by the Di | rective ' | 1994 | /62/EC | | | | |

| Material | Recovery target (%w/w) | Recycling target (%w/w) |
|---------------|------------------------|-------------------------|
| Glass | | 60% |
| Paper | | 60% |
| Metal | | 50% |
| Plastic | | 22.5% |
| Wood | | 15% |
| Total packing | At least 60% | 55-80% |

Table 8. Updated quantitative targets for recycling that all Member States must meet for specific materials contained in packaging waste, as set by the Directive (EU) 2018/852

| | Deadline | Deadline | | | |
|---------------------|----------------------------|----------------------------|--|--|--|
| | 31 December 2025 | 31 December 2030 | | | |
| Material | Recycling target (%w/w) | Recycling target (%w/w) | | | |
| Glass | 70% | 75% | | | |
| Paper and cardboard | 75% | 85% | | | |
| Ferrous metal | 70% | 80% | | | |
| Aluminium | 50% | 60% | | | |
| Plastic | 50% | 55% | | | |
| Wood | 25% | 30% | | | |
| Total packing | 65% | 70% | | | |

- Directive on port reception facilities (PRF) for the delivery of waste from ships (COM/2018/033 - 2018/0012 (COD)), repealing Directive 2000/59/EC on port reception facilities for the delivery of waste from ships and amending Directive 2009/16/EC on Port State Control and Directive 2010/65/EU on reporting formalities for ships arriving and/or departing from ports of the Member States, and informed by an accompanied impact assessment. The Directive, which also implements MARPOL international norms but with focus on ports, requires vessels to land the waste they produce during voyages to and between EU ports to port reception facilities and pay a mandatory fee for landing this waste, and to notify the port of what waste it has in advance of arriving in port in order to ensure that ship waste is not discharged into the sea. In addition, Member States ports are obliged to develop Waste Handling Plans and provide Port Reception Facilities to the ships using their port. The revision aims to achieve a higher level of protection of the marine environment by reducing waste discharges from ships at sea, as well as improved efficiency of maritime transport operations in port by reducing the administrative burden and by updating the regulatory framework, and further alignment with MARPOL and other EU Acts. The new approach relies on a system of electronic reporting and exchange of information, to facilitate monitoring and enforcement, while minimising the associated administrative burden and the overall garbage discharges from ships. The PRF Directive addresses marine litter from sea-based sources introducing the Extended Producer Responsibility under which producers take on the responsibility (and the cost) for managing fishing gear plastic once it is landed. Although the Directive defines the adequacy of waste reception facilities based on port characteristics, the operational measures applications are left for Member States to decide.
- <u>EU Plastics Strategy (European Commission COM/2018/028, 2018)</u> "A European <u>Strategy for Plastics in a Circular Economy</u>" aims to tackle the use of plastics and the management of harmful plastic waste to protect the public and the environment from plastic pollution, address the challenges caused by plastic throughout its value chain by taking into account its entire life cycle (DG ENV & DG GROW, 2017) while to progress toward a European Circular Economy enhancing growth and innovation (EC, 2017). Reducing plastic leakage into the environment is one of the main goals of the EU Plastics Strategy (DG ENV & DG GROW, 2017) that requires sound scientific data and information in order to identify best measures and ascertain progress. The EU Circular Economy Package is the first Directive in the EU targeting directly marine plastics and consists of:
- ✓ a legislative part that aims to harmonises the EU legislative framework on waste, through the amendment of six pieces of waste legislation: Waste Framework Directive, Packaging Waste Directive, Landfill Directive, Directive on electrical and electronic waste, Directive on end-of-life vehicles, Directive on batteries and accumulators and waste batteries and accumulators, and
- ✓ an Action Plan that aims to provide measures to "close the loop" by intending to tackle all phases in the lifecycle of a product. The Action Plan complements the legislative proposal and includes an action timeline and a plan for a monitoring framework for the circular economy.

In the frame of the EU Plastics Strategy, the banning of 10 single-use plastic products most often found on European beaches (e.g. cutlery, cotton buds, straws and stirrers), as well as abandoned fishing gear and oxo-degradable plastics as part of a sweeping law against plastic waste that despoils beaches and pollutes oceans, adopted by the European Parliament on March 2019, comprises an essential element of the Strategy that stimulates the production and use of sustainable alternatives that avoid marine litter.

2.2. Legal framework at the national level

- <u>Law 1269/1982 (A' 89)</u>, amended by Law 3104/2003 (A' 28): implementation of the MARPOL Convention 73/78 regulation, related to the control and prevention of pollution from garbage (pollution from solid waste, including plastic waste), as a relevant legal instrument of implementation for preventing plastic waste from entering the marine environment.
- Joint Ministerial Decision 5673/400/1997: implementation of the EU Urban Waste Water Treatment Directive
- Joint Ministerial Decision 33318/3028/1998: harmonisation with the Habitats Directive 92/43/EC "On the Conservation of Natural Ecosystems as well as Wild Fauna and Flora"
- <u>Presidential Decree 55/1998</u> (GG 58/A/20-3-1998, amended by Laws 3497/2006; 3394/2005; 2881/2001; 163/2001) for the Protection of the Marine Environment in terms of shipping and ports
- Law 2939/2001 (GG 179/A/06.08.2001) on the "Packaging and alternative management of packaging of other products -Establishment of a National Agency for Alternative Packaging Management and Other Products and other provisions", as amended by Law 3854/10 (GG 94/A/23.06.2010) "Amendment of the legislation on alternative management of packaging and other products and the National Organization for Alternative Management of Packaging and Other Products and other provisions" and Law 4042/2012 (see below for details): integration of Greek legal framework with the Directive 2018/852, the Waste Framework Directive (Directive 2008/98/EC) and Directive 94/62/EU regarding the management of packaging and package waste, the obligation of packaging managers, the terms and conditions of sustainable management of packaging and waste systems, and the setting of recovery and recycling targets at the national level. In Article 9 of the Law 3854/2010 Municipalities and Communities are obliged to provide a financial contribution to the Solid Waste Management Institutions on the basis of the cost services provided to the municipalities (i.e. Euros per tones) and the quantities of solid waste corresponding to each Municipality or Community, including their respective residues from the Recycling Materials Selection Centres). The annual contribution of municipalities is paid in four equal amounts.

- <u>Law 3022/2002</u>: implementation of the Barcelona Convention for the Protection of the Mediterranean Sea against Pollution as a national legal instrument in Greece (contradicting party of the Mediterranean Regional Sea Convention). This Law is considered an additional means to address plastic waste in the marine environment of the country.
- <u>Law 3199/2003 and Presidential Decree 51/2007</u> (both as amended) "Definition of National Quality and Quantity Monitoring Network of the waters": EU Water Framework Directive transposed into national legislation, aiming to achieve the good ecological and chemical status of the country's waters, particularly related to land based sources. Greece implements the Directive 2000/60/EC as a legislation which can help to addressing pollution from surface water runoff. This Law is accompanied by the <u>Joint Ministerial Decision 140384/2011</u>, which specifies the monitoring stations and operators in the various water categories (internal waters, marine waters, coastal waters, lakes, rivers)
- Joint Ministerial Decision 9268/469/2007 (GG 286/B/02.03.2007): Greece has been harmonized with the provisions of the EU Packaging and Packaging Waste Directive and is in compliance with the quantitative targets for the recovery and recycling of packing waste as described in the Directive.
- Joint Ministerial Decision 8600/416/2009 (GG 356B/2009) "Bathing Water Quality Monitoring Program": implementation of EU Directive 2006/7 concerning the management of bathing water quality, for the protection and conservation of high quality bathing waters which is a priority for Greece and especially for the Special Secretariat for Water (Ministry of Environment) with the annual implementation of concrete bathing waters monitoring programmes and measures, including cleanup activities on the beaches
- <u>Law 3983/2011</u> (GG 144A/17.06.2011) "National Strategy for the protection and management of the marine environment": incorporation of the EU Marine Strategy Framework Directive (MSFD, EU 2008/56) into the Greek national legislation. The law's specific objectives focused to achieve and maintain a good environmental status in the marine environment by 2020 through the application of measures, managing of human activities that should follow an ecosystem approach, achieving the cohesion of environmental parameters and ensuring the integration of various related policies. As a follow up of this Law the following Ministerial Decisions are endorsed:
 - ✓ <u>Ministerial Decision 1175/2012 (GG B' 2939)</u>: The environmental objectives and indicators for marine litter are determined in paragraph 10a of the Ministerial Decision 1175/2012 making reference to the reduction of waste on the coasts and in the marine environment from anthropogenic sources, in accordance with paragraph 3 of article 10 of Law 3983/2011.
 - ✓ <u>Ministerial Decision 126635/2016</u> (GG B' 3799): establishes national monitoring programs for the continuous assessment of the environmental status of marine waters, referred to in article 11

- \checkmark <u>Joint Ministerial Decision 126856/2017</u> (GG B' 11): assignment of responsible institutions for the implementation of the monitoring programs of the quality of marine waters
- ✓ <u>Ministerial Decision 142569/2017</u> (GG B' 4728): approval of the Programs of Measures (PoMs) for the achievement of Good Environmental Status (GES) of the marine environment in Greece (Implementation of Article 13)

Law 4042/2012 (GG 24/A/13.02.2012) "Criminal Protection of the Environment - Harmonization with Directive 2008/99/EC - Production and management framework waste - Harmonization with Directive 2008/98/EC - Regulation of issues of the Ministry of Environment, Energy and Climate Change": adopts the EU Directive 98/2008 on Waste and Recycling into the national legislation with regard to plastic waste from land based sources, covering the notion of the extended responsibility of the producers that have to take into consideration, in a circular economy context, the whole life-cycle of a product including the potential markets of used parts or materials that could be recovered once it becomes waste. Hence, with Act 4042/2012, the waste management hierarchy is officially adopted in Greece, where prevention is the first priority. Under the principle of producer responsibility, underlines that the managers, packing responsibles with their label on the products, and product importers should organize individual or participate in collective alternative management systems aimed at the management of their packing and other waste they produce in order to achieve the targets of recycling and recovery. According to Article 43 of this Law, municipalities are obliged to manage their own packing waste through their collaboration with approved alternative management systems (MEE, 2014) andhave to pay a special burial fee per tonne of waste by 1 January 2014. The Special Burial Fee is set at 35€/t for 2014 and is increased annually by \notin 5 per tonne (\notin /t) to \notin 60/t. Residues of processing operations disposed of in landfills are not subject to this fee. Although this measure is not included in the Directive 98/2008/EC, it was a national initiative in order to encourage processing and to reduce the quantities for final disposal. This measure promotes the reduction of plastic bags use, as it has direct economic benefits for the municipalities (Life DEBAG, 2016).

- <u>National Waste Management Plan (ESDA)</u>, ratified by the J.M.D. 51373/4684/25.11.2015, as amended by the Ministerial Council Act 49/2015: establishment of the "National Waste Management Plan" and accompanying "National Strategic Plan for Waste Prevention", which define waste management policies, strategies and objectives at national level and identifies the general guidelines for waste management, indicating the appropriate measures and actions to achieve the objectives and principles set by Law 4042/2012. Responsible for the planning and implementation of recycling in Greece is the Hellenic Recycling Organisation under the Ministry of environment and Energy.
- <u>Law 4496/2017 (GG B' 2812/10.8.2017)</u> for the alternative management of packaging and other products: harmonisation of Greek Law with Directive 720/2015/EU, through which it is mandatory for all plastic transport bags to

indicate the origin, place and date of production and the National Producer Register, while consumers are subject to the payment of an environmental fee per piece of thin plastic transport bag

- Law 2742/1999 for Spatial Planning & Sustainable Development: amended by Law 4519/2018 (GG 25/A/20-2-2018), this Law defines the Management Bodies and their responsibilities in protected areas, and activities allowed within these areas
- <u>Law 4546/2018 (GG 4546/2018)</u>: Integration of Directive 2014/89/EU into Greek legislation on the establishment of a framework for Marine Spatial Planning. The law defines the structure and content of marine spatial planning including the national spatial strategy for the marine environment (part of the National Spatial Strategy as described in Law 4447/2016).

2.3. Historical overview of legal framework

Historical overview of legal framework at the Mediterranean level

In 1980 the Mediterranean countries adopted a Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources, under the Barcelona Convention, where the problem of marine litter in the Region was recognized. The Protocol was amended in 1996, and Annex I defined as one of the categories of substances «Litter as any persistent manufactured or processed solid material which is discarded, disposed of, or abandoned in the marine and coastal environment».

The Mediterranean was also designated a Special Area for the purposes of Annex V of the MARPOL 73/78 Convention (Regulations for the Prevention of Pollution by Garbage from Ships in the Mediterranean Sea). The Marine Environment Protection Committee (MEPC) of the International Maritime Organization (IMO) decided that from 1st May 2009, disposal into the Mediterranean Sea of all plastics including paper products, rags, glass, metal, bottles, crockery, dunnage, lining and packing materials, was prohibited for all ships. MARPOL Annex V was revised by the MEPC in July 2011, included additional material in the prohibited listed as garbage discarded in the sea and obliges Governments to ensure the provision of adequate reception facilities at ports and terminals for the reception of garbage. The revised MARPOL Annex V entered into force on 1 January 2013, and was accompanied by the 2012 Guidelines for the implementation of MARPOL Annex V (resolution MEPC.219(63)) and the 2012 Guidelines for the development of garbage management plans (resolution MEPC.220(63)).

Identifying the lack of information regarding coastal and marine litter, in 1988 a pilot survey was organized by UNEP/MAP in cooperation with IOC and FAO, with five participating countries (Cyprus, Israel, Italy, Spain and Turkey), from which (along with bibliographic review) the first Assessment of the State of Pollution of the Mediterranean Sea by Persistent Synthetic Materials, which can Float, Sink or Remain in Suspension was published by UNEP/MAP in 1991 (UNEP/IOC/FAO, 1991). After the 11th Meeting of the Contracting Parties (COP11, Tunisia, 1999) and the UNEP-MAP assessment it was concluded that the main sources of coastal litter in the region are river runoff, tourist activities, and coastal urban centres, while

there is inadequate management of coastal solid waste due to weak enforcement of related policies that almost all Mediterranean countries have. The main reason for this was the poor coordination between different national and local administrations dealing with solid waste issues (UNEP-MAP, 2015).

As a response, UNEP/MAP-MED POL Programme built up a strategy to assist coastal local authorities to improve the management of coastal solid waste and prevent the introduction of litter into the marine environment. In parallel, MED POL within the framework of the Strategic Action Programme (SAP) prepared Guidelines for Management of Coastal Litter for the Mediterranean Region (MAP/UNEP/MED POL, 2004). Since 2006, several public awareness and education campaigns promoted by UNEP/MAP-MED POL and the Regional Seas Programme of UNEP are operating through regional and national NGOs aiming to educate relevant sectors and authorities, conduct surveys and beach cleanup campaigns in the Mediterranean. In 2008, MED POL within the Global Marine Litter Initiative of UNEP (GPA and the Regional Seas Programme) proposed the Strategic Framework for Marine Litter Management to adequately address the problem of marine litter in the Mediterranean, based on the practical recommendations proposed in the regional assessment on the status of marine litter in the Mediterranean by UNEP/MAP and feedback from relevant authorities, NGOs, scientists and economic sectors in the Mediterranean. The Strategic Framework was adopted by the Contracting Parties of the Barcelona Convention (COP12) in February 2012 in Paris, and the Regional Plan on Marine Litter management in the Mediterranean (MLRP) adopted in 2013 by COP18 in Istanbul followed, in the framework of Article 15 of the LBS Protocol of the Barcelona Convention (UNEP-MAP, 2011).

The Barcelona Convention and its Protocols, the Regional Plan on Marine Litter management in the Mediterranean (MLRP) and the EU Marine Strategy Framework Directive (MSFD) were the only legal frameworks and instruments applicable in the Mediterranean with regards to marine litter management. The adoption of the MLRP in 2013 made the Mediterranean the first regional sea committed to legally binding measures, programmes, and related implementation timetables on marine litter management at regional and national levels, thus contributing to the Honolulu Commitment and the Rio + 20 marine litter target (UNEP-MAP, 2015).

Historical overview of legal framework at the national level

In 2011 Greece integrated the MSFD into national law (Law 3983/2011) and the task to implementing complex provisions with a view to achieving and maintaining good environmental status (GES) in the national marine waters (six nm from the coastline) by 2020, under a coordinated strategy between all European Member States. In 2013, the European Commission presented a green paper on plastic waste in the environment to prepare the forthcoming review of the waste legislation. The steps towards the implementation of the MSFD in Greece are a series of Ministerial Decisions, which have followed the integration of the MSFD in the Greek legal system with the Law 3983/2011 (GG A' 144).

• September 2012, Ministerial Decision 1175/2012 approval of the "preparatory phase" for the MSFD implementation

- November 2016, Ministerial Decision 126635/2016 approval of the monitoring programs
- January 2017, Ministerial Decision 26856/2017 assignment of responsible institutions for the implementation of environmental monitoring (national bodies designated: the Hellenic Centre for Marine Research (HCMR) and the Institute for Fisheries Research (INALE ELGO "Dimitra"))
- December 2017, Ministerial Decision 142569/2017 approval of the Programs of Measures (PoMs).

The Greek Program of Measures (GR PoMs) follows the recommendations developed in the Common Implementation Strategy for the MSFD. The training of the GR PoMs was in principle based on a set of existing measures already in place in the framework of the country's environmental protection policy, both at the central government level and at the level of regional administration and local government. Many of these measures have not been fully implemented so far and their reformulation in the MSFD aims to mobilize and complement the competent authorities to create a new implementation framework. Subsequently, based on the objectives of the MSFD, as defined in the Initial Evaluation, the need for additional measures emerged (MEE, 2017). Due to the financial crisis in Greece there were delays in several measures and actions. Subsequently, the national monitoring program was delayed and initiated in July 2018.

Regarding the waste management, in 2015 with the J.M.D. 51373/4684/25.11.2015 ratified the National Waste Management Plan (ESDA) and the National Plan for the Prevention of Waste. These plans define waste management policies and strategies, while set specific targets and actions in Greece according to the EU Directive 2008/98/EC. Following the objectives set by the ESDA, Regional Waste Management Plans (PESDAs) have been established in each Region of the country setting specific actions in each geographic unit of the country.

In 2017, Greece introduced a tax fee for the use of lightweight single-use plastic carrier bags (GG B' 2812/10.8.2017) in supermarkets and retail stores.

2.4. Gaps and challenges in the Greek legal framework

- In Greece currently there is no actual national designated legislation for addressing plastic production and use impacting the oceans, although a part of this issue is covered by a wide range of national legislation regulating waste production (including plastics)
- Despite the fact that in addition to the Marine Directive there is a number of other EU policy frameworks and legislations with varying potential on tackling marine litter, these are not coordinated and coherent (MEE, 2018)
- A frequent issue in Greece inhibiting effective solid waste and marine litter management is that the institutional framework and the relevant competences are fragmented and inadequate. The responsibilities are broken down to many different agencies of different ministries and administrative structures. The roles/functions of these agencies are often not clearly defined and in addition cooperation among them is weak (MEE, 2018b)
- Complicated bureaucracy and weak enforcement of existing legislation is a limiting factor for an effective prevention and mitigation of marine litter due

to a wide range of reasons ranging from inadequate staffing to lack of expertise (MEE, 2018b; Schnell et al, 2017)

- Local administration and municipalities are ultimately responsible for the management of coastal litter. The role of the MEE is limited to the control aspects (UNEP-MAP, 2012). However, still in Greece there is weak control and monitoring mechanisms of waste management implementation (MSFD Greece, 2012; MEE, 2018a;b; MEE, 2017).
- Although recently the plastic bag fee was implemented in the country, there is a reluctance of the competent Greek authorities to put in place legislation and economic or market-based policy instruments such as bans of certain products, taxes and fees, liability instruments, payment for ecosystem services, subsidies, deposit refund schemes, etc. (MEE, 2018b)
- Economic constraints, lack of political will and even the bad relationships between several countries in the Mediterranean Sea can negatively affect the progress of law implementation at higher levels (UNEP-MAP, 2012; Schnell et al, 2017)

3. Stakeholders analysis

At the national level the main responsible for litter is the Ministry of Environment and Energy (MEE) (<u>www.ypeka.gr</u>). MEE holds the responsibility for all issues related to waste management, including course management of packaging, plastic and plastic bags. MEE's main responsibilities include the acceleration of legislation, harmonization with Community Directives, monitoring and enforcement, the drafting of the National Waste Management Plan, the overall coordination of waste management, as well as ensuring the achievement of quantitative and qualitative objectives set by current legislation (LIFE DEBAG, 2016). However, other Ministries such as the Ministry of Tourism (<u>www.mintour.gov.gr</u>) and the Ministry of Shipping and Island Policy (<u>www.yen.gr</u>) are also important actors for the management of marine litter with respect to their sectors which have been identified as important sources of marine debris, and should work in close collaboration for the solution of this issue.

Local administration (regions, municipalities and communities) under the national law maintains increased responsibilities in waste management. In accordance to the National Waste Management Plan, local authorities are entitled to develop and implement waste management plans, including the management of all specific waste flows in their area (LIFE DEBAG, 2016). Regarding packaging, local authorities work closely with the Hellenic Recovery Recycling Corporation (HERRCO; www.herrco.gr), both at the level of participation in the share capital, management, development and operation of the network. Today, the majority of packaging is managed by HERRCO which is the main collective packaging waste management system since 2001, involving the largest obligated packaging waste managers.

The Hellenic Recycling Agency (EOAN) (<u>www.eoan.gr</u>) under the supervision and control of the MEE (Act 2939/2001, as amended by Laws 3854/2010 and

4042/2012), is responsible to design and implementat the policy for alternative management of packaging and other products. The Board of Directors is comprised by representatives from public and private sectors, local authorities, collective bodies and environmental organizations. EOAN is the competent body of the MEE for the design and implementation of the national recycling policy and alternative waste management systems in Greece. In addition, the coastguard and port authorities are responsible for the implementation of all policies that target marine pollution, port reception facilities and with issues related to the surveillance and control of activities at the sea. They are also related to litter that directly enters the marine environment (e.g. ships and lost fishing gear). The contribution of tourism to the production of urban waste particularly during the summer months, while at the same time lacking the necessary infrastructure, has often led to serious collection and management problems related to litter (LIFE DEBAG, 2016). Therefore, Agencies active in the development of tourism such as the Greek Tourism Organisation (EOT, http://www.gnto.gov.gr) with mission to enhance the value of Greek tourism in cooperation with the tourism industry and all stakeholders should merge forces in terms of awareness and actions regarding marine litter.

For the monitoring of litter in the marine environment and biota responsible organizations are the Research Institutions Hellenic Centre for Marine Research (HCMR; www.hcmr.gr) under the supervision of the General Secretariat for Research and Technology (GSRT) of the Ministry of Education, Research and Religious Affairs, and the Institute of Fisheries Research (INALE; https://inale.gr) which is under the supervision of the Ministry of Rural Development and Food. These institutions may provide important information and scientific insights through their research regarding the sources of litter, the status quo and further impacts on the Greek environment and biota. The Athanasios K. Laskaridis Public Benefit Foundation has taken over the initiative to establish a Collaboration Network for the marine environment (https://diktyogiatithalassa.gr), which will provide a data repository for marine litter following common monitoring protocols for all the participants of the Network (in progress). Furthermore, important is the contribution of several NGOs (e.g. MIO-ESCDE, HELMEPA, MedSOS, MEDASSET, i-Sea) that conduct clean-up campaigns each year with volunteers and provide their data, promote awareness, or conduct research projects that assist in monitoring and litter management actions. Finally, users of plastic, such as residents and visitors of coastal areas, and producers in packaging industry in Greece are also considered actors for marine litter that should be engaged and join forces under a collaborative action for addressing the issue of marine litter problem in the country.

In the Appendix 1 an extensive list of stakeholders (497 organisations) related to marine litter in Greece is presented.



Figure 11. Stakeholders identified to have interest and/or influence in the amount of marine litter originating from the tourism sector

Source: Marcou et al, 2016



Figure 12. State-market-and-civil-society diagram characterizing the domains of the identified actors

Source: Marcou et al, 2016

4. Strategies, practices, measures

4.1. National action plans for litter

The most important tools at the European Union level for addressing directly and holistically marine litter management are the EU Marine Strategy Framework Directive (MSFD 2008/56/EC) and the European Strategy for plastics on a circular economy (also known as the "EU Plastics Strategy"), both managed under the European Commission. In 2011, the MSFD harmonization in Greece was accomplished under the Law 3983/2011.

Most of the Mediterranean countries have also developed National Action Plans and/or Programmes of Measures (PoMs) to address marine litter management as a national response of implementation of the Marine Litter Regional Plan (MLRP) to achieve Good Environmental Status (GES) adopted by COP 18, Istanbul Turkey (December 2013), and where appropriate, the EU MSFD in line with the relevant global marine litter agenda and commitments (UNEP-MAP, 2016a). Details on various actions at the European and Regional level related to litter that mainly drive national measures in Greece, are described in the Appendix 2.

Implementation of Article 13 of the Marine Strategy Framework Directive (MSFD 2008/56/EC) at the national level

The Greek Action Plan (GR PoMs) contains the experience of implementing previous Directives (e.g. the Water Framework Directive), the Natura 2000 data, the fishing data from the national monitoring network, and the results of research projects carried out under the FP6 and FP7 European Frameworks for Research (MEE, 2017). As in Article 13 (MSFD 2008/56/EC), the Greek Action Plan must:

✓ implement the objectives of the MSFD in accordance with the criteria and environmental indicators defined in the environmental monitoring programs,

to be compatible with previous EU Directives and Regulations

- $\checkmark\,$ be linked to the capacity of the seas and take into account the socio-economic impacts
- ✓ be limited to the territorial maritime waters in which the country has jurisdiction and not to cause hazards or damage to marine waters where other countries have jurisdiction, in accordance with the International Law of the Sea (UNCLOS).

The GR PoMs follows the recommendations developed in the Common Implementation Strategy for the MSFD. The GR PoMs was based in principle on a set of existing measures already in place in the framework of the country's environmental protection policy, at the central government, regional and local administration levels. Many of these measures have not been fully implemented so far and their reformulation in the MSFD aims to mobilize and complement the competent authorities to create a new implementation framework. Subsequently, based on the objectives of the MSFD as defined in the Initial Assessment, the need for additional measures emerged. To achieve the GR PoMs, it is required (MEE, 2017):

- The amount of marine litter at beaches and the seabed decreases and tends to be minimized

- The mortality of marine organisms (e.g., *Caretta caretta*) due to seizure and obstruction from marine litter, as well as subsequent stranding decreases and tends to be minimized.

National Waste Management Plan (ESDA) and National Strategic Plan for the Prevention of Waste Generation

The establishment of the National Waste Management Plan (ESDA) defines waste management policies, strategies and objectives at the national level and identifies the general guidelines for waste management, indicating the appropriate measures and actions to achieve the objectives and principles set by Law 4042/2012 (A 24) by 2020, according to the EU Directive 2008/98/EC. Priority is given to the prevention of production as an optimal option, followed by reuse, recycling, other forms of recovery (e.g. composting of bio-waste) and safe disposal as the latest management option, while pre-discrimination of waste has a clear advantage over the separation of mixed waste in mechanical processing units.

ESDA sets ambitious re-use and recycling goals regarding the separate collection at source to be reached in 2020. The drastic reduction of the use of plastic bags will lead to quicker achievement of all of the aforementioned quantitative ESDA targets. For certain categories of waste, the Ministry draws up special National Waste Management Plans, which regulate in particular the management of these flows as a whole at country level and which take into account the ESDA. The ESDA promotes the establishment of a National Strategic Waste Prevention Plan which sets the priorities and national targets for the prevention of waste generation (the prevention strategy), which defines the necessary measures and actions to be taken in the PESDA and local municipalities' management plans.

More specifically, ESDA defines strategies to be adopted organized by waste streams and the most relevant to marine litter are described below:

- Urban Solid Waste
 - ✓ Establishment of separate collection and recovery of bio-waste
 - ✓ Establish a separate collection of paper, glass, metals and plastics
 - ✓ Organize separate collection and other managed solid waste with targeted collection for further preparation for re-use and recycling
 - Establishment of measures to prevent the generation of waste, in particular for food waste and packaging.
 - $\checkmark\,$ Development of a Special Waste Management Zone for island and tourist areas
 - ✓ Upgrading the quality of city equipment (buckets, vehicles, public cleaning labels, etc.)
 - ✓ Establishment of regulatory actions by local and regional authorities to organize local communities and reward environmental management of solid urban waste.

• Waste of public utilities, public services, etc.

Promoting the implementation of separate collection systems at least for paper, glass, metal and plastic using the best economic and environmental method and maximizing performance with the responsibility of facility operators

- <u>Alternative management waste flows</u>
 - ✓ Reviewing in depth the functioning of the Alternative Management Systems, upgrading the role of local authorities in particular with regard to municipal waste included in alternative management, reviewing the operational plans of Alternative Management Systems, redefinition of financial contribution and pan-Hellenic expansion of recycling
 - ✓ Full implementation of alternative management in public administration and in the sectors of tourism, science and social societies. Establish separate collection of packaging waste per material
 - ✓ Quality upgrade of recycling
 - \checkmark Strengthening the collection of packaging waste / other products
 - ✓ Recovery-recycling support
 - ✓ Combating tax evasion
 - ✓ Developing markets of recovered materials
 - ✓ Integration of new waste types into alternative management
 - ✓ Recording of packaging managers / producers / other products
 - ✓ Information awareness of audiences / stakeholders
 - ✓ Involvement of civil society

| | | | Recovery from | mechanical processing- final disposal | | | Recovery from pre-selection | mechani | ical processi disposal | ng- final | |
|-------------|-----------|-----------|---------------|------------------------------------------|-----------|-----------|--------------------------------|----------|---------------------------|--------------|-------|
| Material | Total | Total | waste | recovery | disposal | total | Total | of waste | recovery | disposal | total |
| organic | 2,560,500 | 2,560,500 | 1,024,200 | 1,024,200 | 512,100 | 1,536,300 | 100% | 40% | 40% | 20% | 60% |
| paper | 1,283,200 | | | | | | | | | | |
| plastic | 803,400 | 2 560 500 | 1 664 325 | 256 050 | 640 125 | 806 175 | 100% | 65% | 10% | 25% | 35% |
| metal | 225,400 | 2,300,300 | 1,004,525 | 230,030 | 040,125 | 070,175 | 100% | 03/8 | 10/0 | ZJ /0 | 55% |
| glass | 248,500 | | | | | | | | | | |
| wood | 265,800 | 265,800 | 132,900 | 79,740 | 53,160 | 132,900 | 100% | 50% | 30% | 20% | 50% |
| other | | | | | | | | | | | |
| recoverable | 393,200 | 93,200 | 65,240 | 4,660 | 23,300 | 27,960 | 100% | 70% | 5% | 25% | 30% |
| other | | 300,000 | 0 | 0 | 300,000 | 300,000 | 100% | 0% | 0% | 100% | 100% |
| total | 5,780,000 | 5,780,000 | 2,886,665 | 1,364,650 | 1,528,685 | 2,893,335 | 100% | 50% | 24% | 26% | 50% |
| total | 5,780,000 | 5,780,000 | 4,251,31 | 5 | 1,528,685 | | 100% | 74% 26% | | | |

Table 9. Planning of urban solid waste along with national targets for the year 2020 in Greece Source: MEE, 2015a

Table 10. Quantified targets for packaging waste in Greece for the year 2020 Source: MEE, 2015a

| | Production of packing | Recycling | | | | | | |
|----------|-----------------------|------------|----------------|----------|----------------|--|--|--|
| Material | waste | Minimum ta | rgets 2020 | Planning | targets 2020 | | | |
| | thousands tns. | % | thousands tns. | % | thousands tns. | | | |
| paper | 363 | 60% | 218 | 92% | 334 | | | |
| plastic | 199 | 22.50% | 45 | 70% | 139 | | | |
| metal | 116 | 50% | 58 | 70% | 82 | | | |
| glass | 107 | 60% | 64 | 70% | 75 | | | |
| wood | 44 | 15% | 7 | 80% | 35 | | | |
| total | 829 | 55% | 456 | 80.20% | 664 | | | |
Local Waste Management Plan (PESDA)

Regional Waste Management Plans (PESDAs) are established in each Region and specialize in the integrated management of all waste generated in their geographic unit in accordance with the objectives and forecasts of the National Management Plan Waste. PESDAs are implemented by the Regional Solid Waste Management Agency (FODSA), or the relevant Region in case the previous does not exist. PESDAs define the areas that constitute the waste management units, the management methods to be applied in each management unit, and specify specific objectives, measures, conditions and constraints to achieve the strategies and objectives set. The local management plans of municipalities include:

- 1. Prevention and screening activities at the municipal level through which the majority of waste is to be diverted by 2020. In particular:
- ✓ A network of bins for the pre-sorting of discrete organic and recyclable materials, with special provision for the separate collection of garden waste (pruning, etc.).
- ✓ A network of "green points" for the collection of materials (i.e. electrical and electronic devices, accumulators, tires, large items or quantities of recyclable materials by citizens, businesses, services, schools) and promotion of reuse exchange of materials such as clothing, furniture and old objects,
- ✓ A collection and transport system for the necessary vehicles, parking spaces and transshipment stations, with the provision that the need for transshipment and transport of mixed waste will be decreased
- ✓ Actions to stimulate citizens' participation, namely:

Public consultation and social participation actions in the design and implementation of the local project (i.e. open events, meetings with actors, questionnaires, assemblies, group formation)
 Actions to inform citizens, professionals and businesses about the prevention of waste production and the management of special waste, including the reduction of plastic bags and packaging, the separate management of batteries, medical, frying oil, etc.
 Incentives, information, awareness raising and environmental education for sorting in source, recycling and composting

- 2. Composting sorting separation activities at municipality or group level. They mainly include:
- ✓ Areas of reception and sorting of recyclable bins with the assumption that the residual, i.e. undesirable materials in the recycled bins, will gradually decrease as the discrete flows increase
- ✓ Biodegradable waste management units for the composting of pre-packaged organic products and the disposal of the compost produced
- ✓ Decentralized mechanical sorting units of urban solid waste (green bins), with provision in the dimensioning that the quantities of composites will gradually decrease
- ✓ Workshops for the recovery of spare parts, repair and reconstruction of materials.

The above activities may be carried out in distinct places or included in a Decentralized Waste Management Facility. Finally, an installation for the

treatment of aggregates and demolition materials may be considered if the necessary space is provided.

3. Sanitary Landfill Sites developed under a group of Municipalities, which will accept a decreasing amount of composites that will constitute the remains of the recycling process and residues with different qualitative characteristics after an increasing proportion of organic, specific and toxic waste and recyclables will be removed. The necessary landfills will be included in the review of the PESDA and the locations will be defined after careful study and broad consultation.

4.2. National response actions, measures and implementation tools

Infrastructure and services of waste management

- ✓ <u>Creation of Regional Solid Waste Management Agencies (FODSAs)</u>: Today there are 108 FOSDAs, while in areas where no FOSDAs are present, waste management is accomplished by other legal entities of local authorities, or from the Municipalities' services. However, in some cases there is limited staff in these agencies (MEE, 2014).
- \checkmark Network of collection, transportation and transshipment of waste: Currently in Greece, the collection and transportation of managed solid wastes (MSWs) is carried out by the cleaning services of the 325 Municipalities, their Associations or the Solid Waste Management Agencies (FODSAs). In addition, there are 502 licensed non-hazardous waste collection and transport companies, in which Municipalities may assign the collection and transfer of MSW. The collection of MSWs covers 100% of the Greek territory that covers even small islands and remote mountainous areas (NCSD - EKPAA, 2018). The Hellenic Recycling Recovery Company (www.errco.gr), which is a national collective system for the collection of packaging, with an extensive network of blue buckets for recycling ("Blue Bucket Network") all over Greece (LIFEDEBAG, 2016). In addition, the Rewarding Recycling (www.antapodotiki.gr) is a national collective collection system for packaging, that has installed a small network of recycling units ("recycling houses"). However, the financial crisis in Greece since 2009 has delayed the development of a complete network of collection, transportation and transshipment of waste, while has influenced the statistics providing a biased decrease in waste production until the year 2015, which was due to the decreased consumption rather than management measures effectiveness (MEE, 2014).
- ✓ <u>Recycling and recovery</u>: Systems of alternative waste management were created and packing managers were required to organize individual or be part of collaborative alternative waste management systems (principle of producer responsibility). With the programs of waste screening at their source, the discrimination of recycled materials in the blue bins and further selection into four basic types of waste materials is achieved. The recovered materials are gathered and exploited through the systems of alternative waste management.

Overall, there are 31 recovering facilities operating in the country from the recycled waste collected in the blue bins, the packing industrial waste and important producers. Industrial waste management factories have also been established (MEE, 2014). Local authorities are obliged to manage their own packing waste through their collaboration with approved alternative management systems (MEE, 2014), and are charged for disposing of certain untreated waste into landfills (max. 60€/tn) under the Law 4042/2012 (LIFEDEBAG, 2016). According to the 2016 statistics of the Hellenic Recycling Recovery Company, 94% of the country's population is currently served for a separate collection of Recyclable Materials from the Blue Bucket Network and the autonomous collection (297 Municipalities). Partial removal of solid urban waste is also made by social groups of low or no economic income (e.g. economic refugees, trash pickers etc.) which is mainly focused in the blue bins (recycle) targeting metal and paper that have significant resale value (MEE, 2014). In addition, the effectiveness of the alternative waste management systems is partially due to the citizens' actions. Information on recycling and composting through the Municipalities however is partial. Platforms of second hand exchanges through the internet, although they exist, are fragmented and based on voluntary initiatives (MEE, 2015a). Therefore, more measures should be taken in order for the active participation of citizens, the further development of recycling and quality assurance, enhancement of separate collection of waste, and intensification of awareness programmes targeting all social groups.

- ✓ Final disposal, reduction of biodegradable fraction from landfills by 2020: There are 78 operating landfills in the country that cover the basic infrastructure of delivering solid urban waste that cannot be processed in Greece. The operation of landfills allowed for urban waste to be monitored more accurately in contrast to the past assessments that were mainly based on approximate approaches (MEE, 2014). According to the Law 4042 the companies that do not process in advance their waste before transferring them to the landfills, pay a special fee per tone of waste delivered. This fee is expected to act as a motivation for individual initiatives to decrease the waste produced. However, it is important the quantity and quality of urban solid waste that reach the landfills to be further reduced in the country (MEE, 2014). Moreover, in areas where new landfills have been planned to take place there has been remarkable resistance by the residents, claiming a potential decrease of quality in the environment and consequently their lives.
- ✓ Elimination of uncontrolled Waste Disposal Sites: The issue of illegal landfills is still pending for solution by the Greek government. The most updated information indicate that illegal landfills in 2013 are limited to around 5% of the population, which are mainly located in Peloponnesus and islands. Temporary solutions include the transfer of solid waste deposited to neighboring legal landfills, bundling etc. However there is an urgent need for permanent closure of illegal landfills (MEE, 2014; MEE, 2018a).



Figure 13. Production (a) and relevant indicators (b) for packing and packaging waste Source: NCSD - EKPAA, 2018

| Table 11. Qua | ntities of | production | and mana | gement of | solid url | ban waste | in the |
|----------------|------------|------------|----------|-----------|-----------|-----------|--------|
| years 2015 and | d 2016 | | | | | | |

| Production of solid urban waste | Quantity (tn) 20 | 015 | Quantity (tn) 2016 | | |
|--------------------------------------|--------------------|-------|--------------------|------|--|
| | 5,277,209.28 | 3 | 5,362,628.43 | | |
| Management of solid urban waste | Quantity (tn) 2015 | % | Quantity (tn) 2016 | % | |
| Disposal in landfills | 4,160,935.45 | 78.85 | 4,215,701.21 | 78.6 | |
| Uncontrolled Disposal (CIS) | 265,000.00 | 5.02 | 200,000.00 | 3.7 | |
| Incineration | - | - | - | - | |
| Recycling | 698,414.91 | 13.23 | 738,144.00 | 13.8 | |
| Composting | 135,005.94 | 2.56 | 182,016.50 | 3.4 | |
| Energy Recovery (R1) (frying oil) | 17,852.98 | 0.34 | 26,766.72 | 0.5 | |

Source: NCSD - EKPAA, 2018

Table 12. Targets set and achieved for packing and packaging waste in Greece. Percentages in asterisks (*) indicate failure to reach the respective EU targets set

Source: NCSD - EKPAA, 2018

| | | Targets | Performance 2016 | Performance EU 2015 |
|------------------------------|-----------|---------|---------------------|------------------------|
| Recovery (recycling, other | | | | |
| type of recovery, energy | | | | |
| recovery) | | 60% | 67.20% | 79 % |
| Recycling | | 55% | 66.10% | 65.80% |
| | Wood | 15% | 21.90% | - |
| | Paper | 60% | 98.50% | - |
| Minimum target for recycling | Plastic | 22.50% | 38.20% | - |
| material | Aluminium | 50% | 61.70% | - |
| | Metal | 50% | 61.70% | - |
| | Glass | 50% | 36.90%* | - |

Table 13. Performance and target success for solid urban waste Source: NCSD - EKPAA, 2018

| | Targets | Performance 2016 | Performance 2016 | EU |
|-------------------|-------------|---------------------|---------------------|-------------|
| MSWs in landfills | | 82.30% | | 24% |
| Recycling of MSW | 50% by 2020 | 13.80% | | 29 % |
| Bio-waste | | 3.40% | | 16% |

Prevention measures for the reduction of litter

- ✓ In 2018, the Greek Government prohibited in supermarkets and retail stores to distribute free lightweight plastic carrier bags and introduced a tax of €0.04 (\$0.05USD) per bag, which was increased to €0.09 in 2019. Overall, the measure of plastic bag tax has significantly reduced the amount of single-use plastic bags. Since the law (GG B' 2812/10.8.2017) came into force there has been a 50% reduction in single-use plastic bags across Greece (Camarsa et al, 2018).
- \checkmark Before the implementation of the Law, pilot studies attempted to apply the measure through projects providing important recommendations that fed into Greek legislation regarding the plastic bag fee. The most important initiative Greece: was the LIFE DEBAG project (LIFE Task Force https://www.lifetaskforce.gr/en/life/life-project-of-the-month/august-2018) that aimed in reducing the use of plastic bags, which through stakeholder engagement processes produced proposals that were submitted to the different legislative bodies and were presented to the Hellenic Parliament's Environmental Committee, contributing significantly in the implementation of EU legislation in Greece regarding the use of thin plastic carrier bags. The project had important impact through its clean ups, monitoring and awareness actions, while an important reduction of plastic bags was achieved in Syros island (pilot case study).
- ✓ The Project "Mediterranean Space 2007-2013", Action 2.1 "Protection and exploitation of natural resources and culture" targeted to create integrated

waste management systems at the local scale, by developing strategies for litter prevention (recycling, reusing), analysis and mapping of "Zero Production of Waste" systems to reduce waste that end up in landfills. The proposed management systems were applied in pilot case studies, while significant effort for raising public awareness was also accomplished (guides of best practices, education and media, newsletter, training and seminars etc.).

✓ Since the establishment of the Law several private initiatives from companies have harmonized their strategy regarding plastic bag provisioning to consumers.

Recycling and recovery in the private sector

- ✓ The supermarket collection system AB Vassilopoulos has installed recycling houses in about 30 stores in different cities in Greece.
- ✓ The bottling Company has initiated the re-use of packing recycled material, such as part of aluminum cans, bottles, and plastic bags. In additions attempts have been made to produce plastic bottles containing 30% of sugar products. The company promotes recycling and re-use of products, reduction of non-recyclable products and waste (MEE, 2014).
- ✓ Attempts have also been made through LIFE projects for the creation of a public-private partnership scheme to optimize containment, waste recycling and recycling schemes for mass tourism destinations where 3 pilot schemes were developed dealing with packing material (plastic, paper, glass and aluminum), organic waste (slurries and organic sludge) and other waste. The project created a holistic approach for the prevention and recycling of litter taking into consideration the local characteristics of the pilot case study (Chalkidiki, North Greece), and developed a Guide to the prevention of the production of packaging licenses by tourist businesses presenting good examples (cleaning, food and beverage of hotels etc.) and a pilot scheme for recycling waste electronic equipment. However, due to the very limited participation this initiative failed to provide any significant results (MEE, 2014).
- ✓ Green Tourism and Eco-labeling of tourist accommodation promoted by the Ministry of Tourism during the period 2007-2013 that mainly targeted to promote environmental awareness of relevant actors regarding their services and ecological certification of their facilities and operations. Particular emphasis was on saving energy, proper management of the coastal and marine environment, prevention and management of marine litter, and promotion of environmental awareness (MEE, 2014). The increasing touristic activity of the country has improved the acquiring of eco-labels and certificates for environmental protection in the tourist sector (beach cleaning, recycling bins, ashtrays etc.) and the change of behavior of local communities overall.

Monitoring of marine litter

- ✓ National monitoring programme established under the MSFD for Description 10 "Marine Litter" pursuant to the Ministerial Decisions 126635/2016; 26856/2017 and 142569/2017, which has been initiated in July 2018
- ✓ Electronic Registry of Dangerous and Non-hazardous Waste Data (pursuant to Article 42 of Law 4042/2012), linked to the obligors

(producers/holders/managing bodies); the system for the collection of crossborder transport data; other public registers (e.g. national geospatial information infrastructure)

- ✓ Electronic Environmental Registry (<u>http://eprm.ypen.gr</u>) pursuant to article 18 of Law 4014/2011 is fully operational on the 5th of July 2018. It is a common platform for collection of information related to all processes and all stages of environmental licensing while it contains all the information about the environmental performance of a project or activity during its life cycle. In addition, it aims to update and disseminate information to all stakeholders and the general public, by reporting in compliance with EU requirements.
- ✓ The National Collaboration Network for the marine environment (<u>https://diktyogiatithalassa.gr</u>) under the Athanasios K. Laskaridis Public Benefit Foundation that is currently under development for reporting marine litter information retrieved from monitoring and cleanup campaigns in Greece For more details regarding monitoring, see relevant section.

Awareness raising and clean up campaigns

Several clean-up campaigns are organized in Greece at the national and local scale. Clean-ups benefit directly the marine and coastal environmental status and also represent the major source of information concerning the amounts and types of marine litter. However, clean-up activities are a short-term necessity to tackle the symptoms of the plastic pollution crisis, but they do not address the root causes (UNEP, 2016).

- ✓ At the national scale with the support of the Regional Seas Programme of UNEP, UNEP/MAP-MED POL developed in 2006 a public awareness and education campaign entitled "Keep the Mediterranean Litter-free Campaign" implemented by regional NGOs such as the Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO-ECSDE), the Hellenic Marine Environment Protection Association (HELMEPA), and Clean Up Greece (Clean Up Greece/HELMPEPA/MIO-ECSDE, 2007). The objective is to educate the general public as well as all other stakeholders, such as the maritime industry, the tourism sector, agriculture, regional and national authorities, NGOs, the media, etc. Numerous international organizations and NGOs have conducted surveys and beach cleanup campaigns yielding data and information on marine and coastal litter pollution in the Mediterranean Sea. These efforts remain ongoing and are considered to be reliable sources of data and information (MEE, 2014; MEE, 2018a;b).
- ✓ The promotion of "I don't throw away, I donate" and "pay as much as I throw away" national actions. The action "pay as much as I throw away" targets municipalities in which households that produce less waste (measured as weight of waste) could have discounts in taxes. Moreover this action can promote the alternative management waste and prevention/ recycling of litter (MEE, 2018a). The project was implemented in Elefsina Municipality pilot case study in 1500 households and 69 enterprises, and resulted in the reduction of waste that reached the landfills in the area (MEE, 2015a).

- ✓ Greek Non-Governmental Organizations (NGOs) in cooperation with the local authorities carry out on a voluntary basis cleaning of the coasts and recording of the quantities and types of litter under organized annual campaigns (e.g. Let's Do It GREECE), or less periodic initiatives (MEE, 2018a;b). Other NGOs take advantage of important dates that signify the importance of marine conservation, such as the "Water Day", the "Earth Day", "European Weak for Waste Reduction" to organize clean up campaigns at the beaches, rivers and forests of the country. Most of these campaigns have proved to be successful and therefore are currently on going.
- ✓ Ecological schools: the programme was initiated in Greece in 1995. The aim is to promote behavior change through a list of guidelines of environmental friendly actions and behaviors ("Eco-code") and an Action Plan, both targeting at keeping the school area clean and promote the reduction of waste, reuse and recycle. Each school has a Commission of students and teachers that is responsible for organizing cleaning, recycling and awareness actions. In 2012 overall 229 schools have been awarded all over the country since the initiation of the programme (MEE, 2014).
- ✓ At local scale it is also significant the contribution of Marine Protected Areas (MPAs) that organize beach cleanup campaigns, educational programmes and promotion of public awareness. Moreover, some MPAs are currently developing monitoring protocols and action plans for marine litter at the coastal zone and seafloor, such as the case of the National Marine Park of Zakynthos (N.M.P.Z.) under the project "Plastic Busters".

Certificates and awards of marine and coastal environmental status

✓ Blue Flags (BlueFlag Global: www.blueflag.global; Blue Flags Greece: https://eepf.gr/el/blueflag): The "Blue Flag" is a symbol of quality for organized beaches is awarded strictly on organized coasts and marinas that run coastal municipalities, hoteliers and other operators. The "Blue Flag" Environmental Education and Awareness Initiative started as a pilot program for the first time in France in 1985. Today, 45 countries worldwide are participating in this voluntary program. The founder of the Program and its internationally responsible operator is the Foundation for Environmental Education (FEE). The Program criteria apply internationally and are almost all mandatory related to the cleaning of the beach, security for bathers, bathing water quality etc. which are also briefly summarized and distributed electronically to coastal operators, Municipalities and other associates, and are obligatorily placed on the Announcements Table of each award-winning coast or marina. FEE in cooperation with the Coordinators of its member countries, is reforming the award criteria occasionally, making their implementation stricter in order to improve coastal conditions and award winning marinas. In Greece the program operates since 1992, and the national operator of the Blue Flags Program is the Hellenic Society for the Protection of Nature. In 2018 Greece had 519 award winning coasts, 15 marinas and 1 sustainable tourism vessel that have won the Blue Flag (Figures 14 and 15).

✓ <u>Bathing Water Profile</u> (www.bathingwaterprofiles.gr): the Bathing Water Profile (approximately 1400 coasts across the country) is a project carried out by the Special Secretariat for Water of the Ministry of Environment and Energy (MEE). The objective of the Bathing Water Identity Register is to describe and present the key features of the coastline, to identify sources of pollution that may affect water quality and to assess the magnitude of their impacts. The Water Profile is a guide for selecting appropriate mitigation measures for the pollution in bathing waters, allowing more efficient management of resources. Through the interactive website (Bathing Water Identity Registry), citizens are informed about water quality and management measures set in each area (Figures 16 and 17).



Figure 14. Distribution of Blue Flags in the Mediterranean Sea Source: Blue Flags Greece (<u>www.blueflags.org</u>)



Figure 15. Distribution of Blue Flags in Greece Source: Blue Flags Greece (<u>www.blueflags.org</u>)



Figure 16. Example of website Bathing Waters Profiles in Greece Source: Bathing Waters Profiles (<u>www.bathingwaterprofiles.gr</u>)



Figure 17. Example of open accessed information provided for each site under the Bathing Waters Profiles in Greece

Source: Bathing Waters Profiles (www.bathingwaterprofiles.gr)

Actions through Projects

Existing experience and information comes also from the European research programs of research organizations. These projects mainly refer to LIFE Environment Projects, which have assisted in developing of decision support tool for waste prevention through which increased the knowledge from experiences regarding litter prevention, while it supported the training of local authorities, pilot studies for reduction of waste, dissemination of results in schools, local communities and the general public. Important input for marine litter in terms of monitoring information, knowledge and experience in application of innovative technology for providing new monitoring and management approaches, has also been achieved through other EU funding in terms of research and development (e.g. the programs IPA-Adriatic/DEFISHGEAR, EU-PERSEUS, EraNet/MERMAID, FP7/CLEANSEA, MEDCIS, Interreg-MED/MEDSEALITTER) by research Institutions (i.e., HCMR), NGOs (e.g. HELMEPA) Academic Organizations (e.g. University of Patras, University of the and Aegean).

4.3. Summary of issues and challenges faced in Greece related to marine litter requiring further measures and actions

- <u>Knowledge related barriers</u>: there is a rather limited and fragmented understanding of marine litter issue due to the lack of accurate, coherent, reliable and comparable scientific data (MEE, 2018). The application of monitoring that was initiated in July 2018 will provide insights and cover important gaps of information related to marine litter
- Institutional and legislative related barriers: one of the major problems encountered in the operation and effectiveness of a waste management scheme is the inadequate and fragmented institutional regulatory framework for waste management (MEE, 2018). This is further exacerbated by weak control and monitoring mechanisms of waste management implementation (MSFD Greece, 2012; MEE, 2018a; MEE, 2017). Overall, there are no statutory measures to protect the Greek seas from litter and actions are mainly fragmented, partial and focus at the local scale (MEE, 2015a; 2018b).
- <u>Financial related barriers:</u> marine litter and waste management are to a large extent guided by economic considerations in Greece. Apart from the very cost intensive waste collection services and operational expenses of the different facilities, the current financial crisis has also affected the entire waste management market and operation (MEE, 2018a), and has delayed significantly the measures and actions taken for the management of waste in Greece.
- <u>Technological related barriers</u>: there have been significant technological advances that have the potential to catalyse an effective transition towards more sustainable ways of production and consumption. However, orchestrating and accelerating the implementation of these different technological solutions is not an easy task. Selecting the appropriate technology which combines efficiency, reliability and cost effectiveness and ensures uninhibited, reliable and continuous service is very challenging. In addition, there are misconceptions and misunderstandings related to possible technological solutions, i.e. the case of bio-degradable or bio-based plastics that are designed for land filling, or end-of-pipe technological innovations focusing on cleanups (MEE, 2018a;b).
- <u>Waste management implementation barriers:</u> the inadequate management of coastal solid waste is mainly responsible for the presence of litter on the beaches, floating in the water and on the sea bed (UNEP-MAP, 2012). Management of waste is still a problematic sector in Greece. In several coastal areas there are ineffective waste collection facilities, while the most important problem regarding waste is the occurrence of the illegal, uncontrolled landfills that still operate, some very close to the coast (MSFD Greece, 2012; MEE, 2018a).

- It must be clarified that after years of delays, the completion of facilities required to cover the country's needs for waste management is in progress, while the restoration and improvement of landfills that currently are under-operating (particularly in the Greek islands and Peloponnesus) is expected to be completed by 2019 (NCSD - EKPAA, 2018). Moreover, the quantities of solid urban waste are constant the last years (approximately 14%), which are of the lowest in Europe although there was a decrease of the GDP the last 7 years by 25%, and face multiple operational issues regarding the recycling facilities. Transfer of waste in landfills is steadily the main preference in quantities that are over 80% (NCSD - EKPAA, 2018). The National Waste Management Plan (ESDA) had a significant impact on the promotion of recycling and composting through the discrimination of materials, however it is still a big challenge for all levels of governance and citizens, while the alternative model of recycling has not been adopted as planned. However, the discrimination of waste collection into four types (paper, glass, metal, plastics) has improved the management of waste and the plastic bag fee resulted in an important decrease of its use nationally (NCSD - EKPAA, 2018).
- Due to the illegal landfills and the lack of efficient facilities for managing dangerous industrial waste, Greece has been convicted of penalties and fines by the EU. In addition to this, legal landfills have in some cases significant problems or do not operate at all due to local residents' reactions. The government must enforce the laws. Local authorities should address with responsibility the issue of solid urban waste management within their range of authority, contribute to the adoption of a local culture for more sustainable use and management of resources, as well as obedience to the laws and acceptance of solutions that are accompanied by socially fair cost sharing (NCSD EKPAA, 2018).
- <u>Other operational barriers:</u> some additional factors that hamper the effective implementation of a waste management scheme include the very long coastline of Greece, the high number of isolated beaches and scattered rocky isles that are difficult to reach, the strong sea currents that transfer and deposit marine litter in remote sites, the many sensitive coastal environments throughout the country which are subject to intensive tourism; the heavy maritime transport and the large number of ports that are not all equipped with integrated solid waste management facilities (MEE, 2018). Greece is characterized by high number of tourist arrivals and the production of waste water and solid waste in touristic areas often exceeds the carrying capacity of local infrastructures due high seasonal demand (MSFD Greece, 2012; MEE, 2018). Beyond this, the country faces challenges regarding the employment of human resources that increased the unemployment rate until recent years due to the recent financial crisis, while tourism is of major importance for the country's economy (MEE, 2014).
- <u>Awareness and communication barriers:</u> One of the major problems linked with the issue of marine litter is the low level of awareness and responsibility of all stakeholders in dealing with environmental issues. The prevailing production and consumption patterns need to change. Encouragement of educational and

awareness raising programmes on marine litter at all levels of formal, nonformal and informal education, as well as supporting civil society organisations and NGOs which promote actions towards preventing, reducing, monitoring and managing marine litter, are key towards addressing the issue effectively (MEE, 2014; 2018a;b). Therefore, it is crucial for more actions related to raising public awareness (MSFD Greece, 2012).

5. Monitoring status

5.1. Monitoring protocol for marine litter in Greece (Marine Strategy Framework Directive 2008/56/EC developed by the Technical Subgroup on Marine Litter, TSG ML)

The most important tool for promoting monitoring of marine litter in Greece is the Marine Strategy Framework Directive (EU 2008/56/MSFD). Descriptor 10 "Properties and quantities of marine litter do not cause harm to the coastal and marine environment" of the MSFD, is comprised by two main criteria (Table 14) related to (i) Pressures and (ii) Impacts relevant to litter, and measurable indicators related to the pressure level (litter and micro-litter) in the marine environment (coastline, water column, seabed and marine sediments) and the amount of litter and micro-litter that is ingested by marine organisms (Galgani et al, 2013a).

The Technical Subgroup on Marine Litter (TSG ML) under the Working Group on Good Environmental Status (GES), established by the EC Directorate-General for the Environment, for the implementation of MSFD Descriptor 10 (Commission Decision 2010/477/EU) published in 2013 a technical report (Galgani et al, 2013b) aiming to identify how GES and environmental targets could be defined in order to prevent further inputs of litter and reduce the total amount of litter in the marine environment. The report presents discrete sampling methods and monitoring protocols for marine litter (beach litter, floating litter, seafloor litter, litter in biota and micro-litter) to measure progress towards GES (Galgani et al, 2013b). Based on these protocols, Member States should apply monitoring protocols compatible between different survey types (beaches, water column, shallow seafloor <20m depth; deep seafloor 20-800m depth) so that outcomes are comparable. The trends in amounts, the nature and composition (Table 15), the spatial distribution and origin/sources of litter should also be identified. An estimation of the monitoring costs and required expertise for each of the monitoring protocols as assessed by the TSGL ML (Galgani et al, 2013b) is shown in Table 16.

The reporting process of data and information under the MSFD (Art 19.3) is being addressed by the Working Group on Data Information Knowledge and Exchange within the MSFD (WG DIKE) and steered by EC Directorate - General for the Environment (DG ENV) and the European Environment Agency (EEA).

Monitoring and sampling analyses in Greece will provide information regarding the Descriptor 10 of the MSFD ("Marine Litter") regarding the assessment of criteria D10.1 and D10.2 for the impacts of marine litter at the coasts, seafloor and marine

biota of the Greek territory. More specifically, following the MSFD protocols, the actions that will take place during the monitoring of marine litter in Greece are:

- a) collection and sample analysis of marine litter on the beach (number of objects per sampling km and categorization of litter)
- b) collection and sample analysis of marine litter on the seafloor (number of objects per km² and categorization of litter)
- c) collection and analysis of floating microplastics (quantity of micro-plastic expresses as number per km²)
- d) collection and sample analysis for the impact assessment of marine litter on marine biota.

Regarding the impacts of marine litter on marine biota, in the recent report regarding MSFD (MEE, 2018) Greece has identified a list of protected species present in its territory that are impacted by marine litter (Table 17).

In Greece, the Special Secretariat for Water (SSW) under the supervision of the Ministry of Environment and Energy (MEE) is responsible for the coordination of the national programs for the protection and management of the country's water resources, the services and the state bodies on all issues related to the protection and management of water. One of the main pillars of the work of the SSW is the implementation of the Water Framework Directive (Directive 60/2000/EC) and the Marine Strategy Framework Directive (JMD 126856/2017).

The SSW is organized in Directorates and Departments and is headed by the competent Special Secretary of the Ministry of the Environment and Energy. The SSW, in cooperation with the Regional Directorates of Waters, prepares national programs for the protection and management of the country's water resources and monitors and coordinates their implementation. Prior to their adoption, programs are introduced for consultation at the National Water Council.

The institutions responsible for conducting monitoring programmes of marine waters foreseen under the Marine Strategy Framework Directive (JMD 126856/2017) and internal waters under the Water Framework Directive (Directive 60/2000/EC) are the (a) Hellenic Centre for Marine Research (HCMR), a Research Institute under the supervision of the General Secretariat for Research and Technology (GSRT) of the Ministry of Education, Research and Religious Affairs (MEE, 2018), and (b) the Institute of Fisheries Research (INALE ETHIAGE) that operates under the Hellenic Agricultural Organization DIMITRA (ELGO - DIMITRA), which is supervised by the Ministry of Rural Development and Food. Based on the Article 4, paragraph 1 of the JMD 126635/2016, the primary information collected should be delivered in the SSW (printed and electronic format) and submitted electronically in a particular platform for their submission in the European Committee. Information is reported in several formats (tables, spatial geo-referenced data, maps etc.) in accordance with the EU standards (Law 3882/2010).

Examples of monitoring protocols may be found in the Appendix 3.

Table 14. Summary of criteria, indicators and monitoring protocols of Descriptor 10 "Properties and quantities of marine do not cause damage to the marine and environment" (Commission Decision 2010/477/EU) and their implementation as defined in the Greek Monitoring Programme through the Joined Ministerial Decree 126635/2016 (GG 3799/B/25-11-2016)

| | Criteria elements (EU) 2017/848 | Criteria (EU) 2017/848 | 2010/477/EU Indicators | Greek Monitoring Programme (JMD 126635/2016) | Specifications and standardised methods for monitoring and assessment | Units of measurement for the criteria | Methodological standards (EU) 2017/848 |
|-----------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pressures | Litter (excluding micro-litter), classified in the following categories ⁽¹⁾ : artificial polymer materials, rubber, cloth/textile, aper/cardboard, processed/worked wood, metal, glass/ceramics, chemicals, undefined, and food waste. Member States may define further sub- categories | D10C1 — Primary criteria: The composition, amount and spatial distribution of litter on the coastline, in the surface layer of the water column, and on the seabed, are at levels that do not cause harm to the coastal and marine environment. Member States shall establish threshold values for these levels through cooperation at Union level, taking into account regional or subregional specificities. | 10.1.1 Amount of litter (number of items per sampling kilometer) washed ashore and/or deposited on coastlines, including analysis of litter category, composition, spatial distribution and, where possible, source | YES Indicator GR 10.1.1 - Litter on beaches number of items per sampling kilometer | litter shall be monitored on the coastline and may additionally be monitored in the surface layer of the water column and on the seabed. Information on the source and pathway of the litter shall be collected, where feasible | D10C1: amount of litter per category in number of items: - per 100 meters (m) on the coastline, - per square kilometer (km ²) for surface layer of the water column and for seabed | Scale of assessment: Subdivisions of the region or subregion, divided where needed by national boundaries. Use of criteria: The extent to which good environmental status has been achieved shall be expressed for each criterion separately for each area assessed as follows: (a) the outcomes for each criterion (amount of litter or micro-litter per category) and its distribution per matrix |
| | Micro-litter (particles < 5mm), classified in the categories | D10C2 — Primary criteria: The composition, amount and spatial distribution of | 10.1.2 amount of litter (number of items | YES Indicator GR | micro-litter shall be monitored in the surface layer of the | D10C2: amount of micro-litter per | used under D10C1 and D10C2 and whether the threshold values set have |
| | 'artificial polymer materials' and 'other'. | micro-litter on the coastline, in the surface layer of the water column, and in seabed | per sampling square kilometer) deposited on the sea-floor, | 10.1.2 - Litter on seafloor number of | water column and in the seabed sediment and may additionally be | category in number of items and weight in grams | been achieved; (b) the outcomes for D10C3 (amount of litter and micro-litter per |

| Litter | and micro- | sediment, are at levels that do not cause harm to the coastal and marine environment. Member States shall establish threshold values for these levels through cooperation at Union level, taking into account regional or subregional specificities. | including analysis of its composition, spatial distribution and, where possible, source | items pe sampling square kilometer | monitored on the coastline. 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 | (g): — per square meter (m ²) for surface layer of the water column, — per kilogram (dry weight) (kg) of sediment for the coastline and for seabed | category per species) and whether the threshold values set have been achieved. The use of criteria D10C1, D10C2 and D10C3 in the overall assessment of good environmental status for Descriptor 10 shall be agreed at Union level. The outcomes of criterion D10C3 shall also contribute to assessments under |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Litter litter the 'artifici materia 'other', any spe followir birds, reptiles invertel Member establis species assesse regiona subregio coopera | classified in categories ial polymer als' and , assessed in ecies from the ng groups: mammals, is, fish or brates. r States shall th that list of to be d through l or onal ation. | criteria: The amount of litter and micro-litter ingested by marine animals is at a level that does not adversely affect the health of the species concerned. Member States shall establish threshold values for these levels through regional or subregional cooperation. | amount of litter (number of items per sampling square kilometer) in the water column (including floating at the surface) including analysis of its composition, spatial distribution and, where possible, source | Indicator GF 10.1.3 Floating microplastics number o items pe sampling square kilometer | ased on incidental occurrences (e.g. strandings of dead animals, entangled animals in breeding colonies, affected individuals per survey). | 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 | Descriptor 1, where appropriate. |

| | Species of birds, | D10C4 – – Secondary | 10.2.1 | YES | the monitoring may | D10C4: | Scale of assessment: |
|-----|------------------------|------------------------------|--------------------|-----------------|---------------------|---------------|-----------------------------|
| | mammals, reptiles, | criteria: The number of | Quantities and | | be based on | number of | As used for assessment of |
| | fish or invertebrates | individuals of each species | composition of | Indicator GR | incidental | individuals | the species group under |
| | which are at risk from | which are adversely | litter ingested by | 10.2.1 - | occurrences (e.g. | affected | Descriptor 1. |
| | litter. | affected due to litter, such | marine animals | Ingested litter | strandings of dead | (lethal; sub- | Use of criteria: |
| | Member States shall | as by entanglement, other | (mammals, | by marine | animals, entangled | lethal) per | The extent to which |
| | establish that list of | types of injury or | marine birds, and | organisms | animals in breeding | species | good environmental status |
| | species to be | mortality, or health | marine turtles), | • | colonies, affected | • | has been achieved shall be |
| | assessed through | effects. | e.g. stomach | | individuals per | | expressed for each area |
| | regional | | analysis | | survey) | | assessed as follows: |
| | or subregional | Member States shall | - | | • / | | – for each species |
| | cooperation. | establish threshold values | | | | | assessed under criterion |
| cts | - | for the adverse effects of | | | | | D10C4, an estimate of the |
| pac | | litter, through regional or | | | | | number of |
| Ē | | subregional cooperation. | | | | | individuals in the |
| | | | | | | | assessment area that have |
| | | | | | | | been adversely affected. |
| | | | | | | | The use of criterion D10C4 |
| | | | | | | | in the overall assessment |
| | | | | | | | of good environmental |
| | | | | | | | status for Descriptor 10 |
| | | | | | | | shall be agreed at Union |
| | | | | | | | level. The outcomes of this |
| | | | | | | | criterion shall also |
| | | 1 | | | | | contribute to assessments |
| | | 1 | | | | | under Descriptor 1, where |
| | | 1 | | | | | appropriate. |

(1) These are the 'Level 1 — Material' categories from the Master List of categories of litter items from the Joint Research Centre 'Guidance on Monitoring of marine litter in European seas' (2013, ISBN 978-92-79-32709-4). The Master List specifies what is covered under each category, for instance 'Chemicals' refers to paraffin, wax, oil and tar. Table 15. Litter type and size categories in Mediterranean and Black Sea for the monitoring of Descriptor 10 of the Marine Strategy Framework Directive

| Source: | Galgani | et al, | 2013b |
|---------|---------|--------|-------|
| | | , | |

| A. Plastic | B. Rubber | C. Metals | D: Glass/ Ceramics | E. textiles / natural fibers | F. Wood (processed) | G. Paper / cardboard | H. Other (specify) | l. Unspecified |
|-------------------------------------------------|----------------------------------------------------|---------------------------------|--------------------------------|------------------------------------|------------------------|-------------------------|-----------------------------|-------------------|
| A1.Bags | <mark>B1</mark> . Tyres | C1. Beverage cans | D1. Bottles | E1. Clothing (clothes, shoes) | | | | |
| A2. Bottles | <mark>B2.</mark> Other (gloves, shoes, etc.) | C2. Other food cans/wrappers | D2. Pieces of glass | E2. Large pieces (carpets, etc) | | | | |
| A3. Food wrappers | | C3. Middle size containers | D3. Ceramic jars | E3. Natural ropes | | Related size ca | tegory | |
| A4. Sheets | | C4. Large metallic objects | D4. Large objects (specify) | | | A: <5*5 cm= 25 c | m ² | |
| A5. Other plastic objects | | C5. Cables | | | | B: <10*10 cm= 1 | 00 cm ² | |
| A6. Fishing nets | | C6. Fishing related | | | | C: <20*20 cm= 4 | 00 cm ² | |
| A7. Fishing lines | | | | | | D: <50*50 cm= 2 | 500 cm ² | |
| A8. Other fishing related | | | | | | E: <100*100 cm= | = 10000 cm ² = 1 | 1 m^2 |
| <mark>A9.</mark> Ropes/strapping bands | | | | | | F: >100*100 cm | = 10000 cm2= | 1 m2 |
| <mark>A10.</mark> Sanitaries (diapers, etc.) | | | | | | | | |

Table 16. Estimated Costs and Level of Expertise for monitoring protocols regarding Descriptor 10 "Properties and quantities of marine litter do not cause harm to the coastal and marine environment" of the Marine Strategy Framework Directive (MSFD 2008/56/EC). Source: Galgani et al, 2013b

| | Estimated Costs and Level of Expertise | | | | | | | | | | | | | |
|--------------------------|----------------------------------------|------------|---------------|-------------|--------------------|------------------------|---------------|---------------------------------|------------------------|----------------------|----------------|-------------|-----------|-------|
| Compartment | Beach | | Sea-floor | | W | ater | | B | Biota | | | Microlitter | | |
| | Visual | Shallow | 20-800m | Deep | trawl | ship surveys | Ingestion | Ingestion | Ingestion | Entaglement | Intertidal | Subtidal | Water | Biota |
| Protocol | Visual | Diving | Trawling | ROV | Manta trawl (1) | Visual | Birds | Turtles | Fish | Nest/ entaglement | Intertidal | Subtidal | Water | Biota |
| | Cost | | | | | | | | | | | | | |
| Cost categories | | | | L - L | OW: € 1-10k; | M - MEDIUM: | €10 - 50k; H | - HIGH: €50- | 100 k; VH - \ | /ERY HIGH: > € 1 | 00k | | | |
| Collection o samples | f L/M (2) | M/H (3) | L/M (4) | H/VH (6) | M/V (5) | L (6) | L/M (7) | м | L (7) | м | L/M | м | M (5) | M (8) |
| Analysis o samples | f L | м | L | м | L | M/H | м | м | M | L | н | н | н | Н |
| | | | | | Est | imated costs | and level of | expertise | | | | | | |
| Statistical analysis | м | м | L | м | L | м | L | м | M | L | м | м | м | Μ |
| Equipment | L | Μ | L/M (4) | VH | Μ | L/H (9) | Μ | L (10) | Μ | L | Н | Н | Н | Н |
| Overall | L/M | Μ | L/M | VH | Μ | L/M | Μ | Μ | Μ | L/M | M/H | Н | Н | Н |
| | | | | | | | | | | | | | | |
| Expertise categories: | L - L0 | W: Trained | l personnel v | without sp | pecific profe | ssional forma exper | tion; M - MEI | DIUM: Traine cial skills red | ed personne quired. | l with specific p | orofessional f | ormation; I | I - HIGH: | High |
| Sampling | L/M | H/M | L/M | Н | Н | L/M | Μ | L/M | L | L | Н | Н | Н | Н |
| Analysis | м | Μ | L | Μ | L | Н | V | Μ | Μ | L | Н | Н | Н | Н |
| Statistical analysis | Μ | Μ | м | м | м | м | м | м | м | м | м | м | м | м |
| Performers | | | | Vt - V | OLUNTEERS | and ORGANIS | ATIONS; C - | CONSULTAN | TS; A - AGEN | ICIES; S - SCIEN | TISTS | | | |
| Possible performers | Vt, C, | Vt, C, A, | A,S | C,A,S | C,A,S | C,A,S | C, S, Vt | C, S, Vt | C,S | C, S, A, Vt | S | S | S | S |

1 Manta-trawl is applied for collection of Microlitter; 2 No expensive equipment, but could be time-consuming; cheap when carried out by volunteers; 3 Depending on regulations for diving etc.; 4 If combined with fish trawl surveys; 6 Depending on to what extent you can combine the sampling with other monitoring; 5 If ships of opportunity are used; 7 Depends on if sampling is opportunistic (send a bird if you find one) or if it is regular/systematic; 8 If existing monitoring of biota (e.g. Fulmar) is extended 9 High when cameras are being used, needing processing; 10 Assuming lab with standard equipment is available (freezers, microscope, electronic weighing equipment etc.

Table 17. Protected species in Greece impacted by marine litter, as reported in the MSFD Report for Greece

| Species | Protection Status IUCN (Mediterranean) | Protection Status IUCN (Global) | Geographic distribution | Impacts from marine litter |
|---------------------------|----------------------------------------------|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| Physeter macrocephalus | Endangered | Vulnerable | Mainly in the Hellenic trench from Cephalonia until East Rhodes | Ingestion of plastics |
| Ziphius cavirostris | Data deficient | Least Concern | Mainly in the Hellenic trench (South Crete and West Lefkada), Aegean Sea (Northern Sporades) | Ingestion of plastics |
| Grampus griseus | Data deficient | Least Concern | Common in Myrtoo Pelagos until north- western Crete, common in Northern Sporades islands and Chalkidiki, present/ rare/ seasonal in the rest of Ionian and Aegean Seas | Entanglement on longlines, ingestion of plastics |
| Caretta caretta | Least Concern | Vulnerable | Main nesting sites: Ionian Sea (Zakynthos- Laganas Gulf); Peloponnisos Kiparissiakos and Lakonikos Gulfs; Crete (Chania and Rethymno Gulfs) | Entanglement/ By catch on fishing gears, ingestion of plastics |
| | | | Secondary nesting sites: Peloponnisos (Killini Gulf; Kotichi-Strofilia wetlands; Romanos Pylou; Koroni; Messiniakos and Argolikos Gulfs); Kefalonia, Corfu, Rhodes, Lefkada, Kos islands | |
| Chelonia mydas | Endangered | Endangered | Lakonikos Gulf, Rhodes, Mesolongi; Saronikos Gulf; Argolikos Gulf; South Evoikos Gulf (migrating and feeding grounds) | Entanglement/ By catch on fishing gears |
| Dermochelys coriacea | Vulnerable | Vulnerable | n/a (feeding grounds) | Entanglement/ By catch on fishing gears, ingestion of plastics |

5.2. Monitoring network of marine litter in Greece

Member States should define sub-regions to scale their assessments on the indicators and progress towards GES under the MSFD. Greece has adopted the same division as that of the Water Framework Directive, where the Greek territorial waters have been divided in four sub-areas based on hydrological, oceanographic and biological features (amended from the initial areas defined by the Barcelona Convention and the MSFD):

- a) Northern Aegean (Region I)
- b) Central Aegean (Region II)
- c) South Aegean (Region III)
- d) Ionian Sea, Cretan Sea and Levantine Sea

These areas are further divided into sub-areas following scientific criteria (Figure 18).



Figure 18. Geographical sub-areas as divided for the national reporting for the Marine Strategy Framework Directive. The geographical boundaries have been defined based on the International Hydrographic Manual (IHO, 1953)

Source: MSFD Greece, 2012

As in most Member States, marine litter (Descriptor 10) is treated as a relevant group with a coordinated sampling program in Greece (MEE, 2015a). Currently, the

Greek sub-regions regarding specifically Descriptor 10 will be assessed based on a complicated national network of monitoring stations that is compiled mainly by the (GG B' 3799/2016, 25 November 2016):

• <u>Natura 2000 Network</u>: is a European Ecological Network of sites for the monitoring and evaluation of the conservation status of natural habitat types and habitats of species that are important at a European level in Greece. The Natura 2000 network has been established in the framework of the implementation of the Habitats Directive 92/43/EEC which provide for the designation of the Sites of Community Importance (SCI) and Special Areas of Conservation (SAC), and Birds Directive 2009/147/EC, which provide for the designation of the Special Protection Areas (SPA). The Network focuses on the collection, recording and analytical evaluation of bibliographic and field data relating to species and habitats of Community interest in the territory (MEE, 2015b). Responsible authority for the Greek Natura 2000 network is the Directorate of Biodiversity and Protected Areas, Ministry of Environment and Energy. Currently, the Greek Natura 2000 Network includes 446 sites, from which (as of December 2017, GG/B/4432):

- 215 sites are designated as Special Areas of Conservation (SAC)
- 181 sites are designated as Special Protection Areas (SPA)
- 24 sites are designated as Special Areas of Conservation (SAC) and Special Protection Areas (SPA)
- 24 sites are considered as proposed Sites of Community Importance (pSCI)
- 2 sites are considered as proposed Sites of Community Importance (pSCI) and designated as Special Protection Areas (SPA)

The network covers approximately 28% of the country's land and 22% of its marine territory.

• <u>National Network for Monitoring coastal waters</u>, established by JMD 140384/2011 Definition of National Network for Monitoring Quality and Quantity of surface and underground waters, under the Water Framework Directive (Directive 2000/60/EC) specifying the measuring stations and the operators obliged to operate, in accordance with Article 4, Paragraph 4 of the Law 3199/2003 (A²80, GG 2017 B 09.09.2011). The monitoring network includes 449 monitoring stations in rivers, 53 stations in lakes, 34 in transitional, 80 in coastal and 1,392 in groundwater (i.e., total number of 2,008 stations, of which 616 refer to surface and 1,392 in groundwater; NCSD - EKPAA, 2018). The stations are divided into:

- supervisory stations: systems in good environmental status and operate only for a specific period (only for one year), and
- operational stations: systems that are not in good condition and operate continuously (i.e., if an operational station's status has been improved to good, it can be labeled as a supervisor) (NNMW, 2019).

Within the framework of the National Program "Monitoring of the water quality (ecological - chemical) in rivers, lakes, coastal and transitional waters of Greece for the implementation of Article 8 of the Water Framework Directive 2000/60/EC" sampling and analyses of physico-chemical, hydro-morphological and biological quality elements have been carried out at the stations of the National River Monitoring Network of Greece and the relevant reports for all the River Basin Districts of the country have been submitted (NCESD, 2018). The National Monitoring Network fully complies with the relevant requirements of both the

Water Framework Directive 2000/60/EC (Article 8 & Annex V) and the Nitrates Directives of agricultural origin (91/676/EEC), for groundwater (2006/118/EC) and for priority substances (2008/105/EC).

• <u>National Fisheries Data Collection Program</u>, pursuant to Regulation (EC) No 199/2008 concerning the establishment of a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice under the Common Fisheries Policy. Under this program, monitoring of marine litter in the Greek marine waters (water column and seafloor) could potentially be achieved through the hydro acoustic system control of fishing capacity (Chalkiopoulos et al, 2017). The National Fisheries Data Collection Program is coordinated by the Directorate of Fisheries (Ministry of Rural Development and Food). Monitoring is conducted by the Hellenic Centre for Marine Research (HCMR) which a governmental research organisation operating under the supervision of the General Secretariat for Research and Technology (GSRT) of the Ministry of Education, Research and Religious Affairs and the Institute of Fisheries Research (INALE) which is under the supervision of the Ministry of Rural Development and Food.

•<u>MSFD (additional) sampling stations:</u> In addition to the existing national monitoring network, 17 new sampling points provided by the Ministerial Decision 126635/2016 (Government Gazette B'3799): "Approval of monitoring programs for the continuous assessment of the environmental status" is described in Article 11 of Law 3983/2011 "(Government Gazette A 144) have been integrated to the national monitoring network (MEE, 2018).

The existing monitoring networks (1) and (2) have the capacity to provide additional information regarding the identification of pollution introduced into the marine environment by land-based point sources for the MSFD implementation. Other national monitoring networks that will complement information for the MSFD will be the national environmental monitoring infrastructure (POSEIDON network) as well as international environmental monitoring networks (MytiMED network).

Regarding the frequency of monitoring of the parameters for Greece, it has been suggested that pollutants should be monitored every 6 months (2 times/year), while the sediment is monitored once a year. Also, sampling of agencies is proposed on an annual basis. The national network of sampling stations along with frequency of sampling specifically for Descriptor 10 of the MSFD in Greece, are presented in Figures 19 and 20.



Figure 19. Monitoring network in Greece for Descriptor 10 "Properties and quantities of marine litter do not cause harm to the coastal and marine environment" of the Marine Strategy Framework Directive (MSFD 2008/56/EC). Sampling stations are comprised of (a) "MSFD": MSFD additional stations; NFDCP: National Fisheries Data Collection Program; NQQ: National Network for Monitoring Quality and Quantity of surface and underground waters (supervisory and operational monitoring).

Source for coordinates: Ministerial Decision (GG B' 4728/29.12.2017) on the adoption of monitoring programs for the continuous assessment of the environmental status of marine waters, in accordance with Article 11 of Directive 2008/56/EC and Article 11 of Law 3983/2011 (A 144)





Source for coordinates: Ministerial Decision (GG B' 4728/29.12.2017) on the adoption of monitoring programs for the continuous assessment of the environmental status of marine waters, in accordance with Article 11 of Directive 2008/56/EC and Article 11 of Law 3983/2011 (A 144)

Since Greece has not currently established specific national threshold values for the concentration levels of marine litter taking into account specificities of the region in the recent national assessment for MSFD (MEE, 2018) the baseline thresholds used referred to the Mediterranean scale, as proposed by UNEP-MAP (2016a; Table 15). Moreover, during the first six-year cycle of implementation of the MSFD, there was no possibility of activating the above mentioned network, and the protocols suggested by the Technical Subgroup on Marine Litter (Galgani et al, 2013b) for Descriptor 10 of the MSFD have been applied only in the form of pilot studies through research projects (e.g. DeFishGear project). Therefore, until now no official national data from the national monitoring networks have been currently collected in Greece and all the national assessments for MSFD are based on data collected from a number of recent and older research programs, publications and reports from academic and research Institutions and NGOs (MEE, 2018b).

Table 18. Proposed baselines values (concentrations) for monitoring marine litter in the Mediterranean Sea

| | minimum | maximum | mean | |
|------------------------------------------|---------|---------------|---------------|-------------------|
| Indicator | value | value | value | proposed baseline |
| beaches (items/ 100m) | 11 | 3,600 | 920 | 450-1,400 |
| Floating items (items/ km ²) | 0 | 195 | 3.9 | 3-5 |
| Sea floor (items/ km²) | 0 | 7,700 | 179 | 130-230 |
| Microplastics (items/ km ²) | 0 | 4,860,000 | 340,000 | 200,000-500,000 |
| Sea turtles | | | | |
| affected turtles (%) | 14% | 92.5 % | 45.9 % | 40-60% |
| ingested litter (g) | 0 | 14 | 1.37 | 1-3 |

Source: UNEP-MAP, 2016a

5.3. Other international, national and local efforts for monitoring marine litter in Greece

• <u>Blue Flags and Bathing Water Profiles</u>: At national level these actions provide an important monitoring tool regarding the quality of marine and coastal environment, and comprise a dynamic management tool for the continuous and valid monitoring of bathing waters, the setting of prevention and response measures for pollution, the conservation of good water quality and safety of bathers (See Section 4 - Strategies for further details).

• <u>Beach Monitoring and Clean ups</u>: At national level, several Greek NGOs such as MIO-ESCDE, HELMEPA, MedSOS, Let's Do It - GREECE conduct clean-up campaigns on the beaches each year with volunteers and collect data on quantities and types of litter on the coast (Vlachogianni et al, 2017). For instance, the Marine Environment Protection Association (HELMEPA) is the national coordinator of two international voluntary clean-up initiatives in Greece, such as the International Coastal Clean-Up Day directed by Ocean Conservancy at the international scale in September each year since 1997, and the European Clean-Up Day which is organised at the European scale in May each year since 2014 (Addamo et al, 2017). The cleaning campaign Let's Do It - GREECE (<u>www.letsdoitgreece.org</u>) constitutes one of the greatest national volunteer actions for beaches, forests, rivers, lakes, streams, and seas clean ups in the country, operating the last 8 years. The action aims to reach 5% of the Greek population with actions at 3,000 points in Greece by 2021, and takes place in a specific day in several places in the country.

• <u>Specialized NGOs targeting the conservation of protected species</u>, like sea turtles (MoM, Archelon, MEDASET), for cetaceans (Pelagos), for birds (Hellenic Ornithological Society), or for the conservation of the marine environment overall (WWF-Greece, Greenpeace-Greece, Archipelagos) contribute in monitoring marine litter in marine biota and promoting public awareness generally (MEE, 2018).

Past European research programs conducted by research organizations and NGOs have increased the existing experience, such as the projects IPA-Adriatic/DEFISHGEAR, EU-FP7/CLEANSEA, EU-FP7/PERSEUS, EraNet/MERMAID, MEDCIS, Interreg-MED/MEDSEALITTER, and the activity of Academic and Research Organizations such as research projects, for instance of the Hellenic Centre for Marine Research, University of Patras, University of the Aegean. For instance, the collection of samples for floating microplastics was conducted in July 2017 during the Greenpeace campaign entitled "Less Plastic - More Mediterranean" with the Green Warrior II sailboat in the South Aegean-Cretan Sea and the Cyclades, and provided a representative snapshot of the marine litter status on these areas. In the framework of the MERMAID (SEAS-ERA, ERA-NET of the 7th FP EU) program in November 2015, samples were taken for floating microplastics in Saronikos Gulf, providing important information for areas that are characterized as densely populated regions in the country (MEE, 2018). DeFishGear project (www.defishgear.net; Vlachogianni et al, 2017) carried out pilot surveys during 2014-2015 at the Adriatic and Ionian Region, which was the first time that marine litter was monitored in Greece according to the TSGML methodology and protocol on marine litter under the MSFD (Galgani et al, 2013a; Vlachogianni et al, 2017).

• <u>Management Boards of Marine Protected Areas (MPAs) in Greece:</u> like the National Marine Park in Zakynthos targeting the protection of *Caretta caretta* is a partner of the PlasticBusters MPAs program, entitled "Protecting biodiversity from plastics in Mediterranean Marine Protected Areas", aims to apply monitoring protocols for macro- and micro-litter in Mediterranean pelagic and coastal MPAs providing a comprehensive diagnostic analysis of the impacts of marine litter on biodiversity and endangered species in Med MPAs and forecasting marine litter hotspots in Mediterranean MPAs, providing valuable information to support targeted marine litter prevention and mitigation actions in the most affected Mediterranean MPAs.

5.4. Other monitoring web tools and portals

• <u>Marine Litter Watch</u> (MLW; <u>www.eea.europa.eu/themes/coast_sea/marine-litterwatch/marinelitterwatch</u>): The MLW, developed by the European Environmental Agency (EEA) in accordance with the Shared Environmental Information System (SEIS) principles, is a mobile web tool to collect beach litter

data through citizen science. MLW aims to help fill data gaps on beach litter relevant for MSFD purposes, at the same time as it explores the benefits of involving citizens in the collection and monitoring of marine litter. Marine LitterWatch primarily consists in a mobile application. It allows users to conduct beach litter monitoring surveys and support national monitoring programmes. Marine LitterWatch builds on the TSGML beach litter monitoring guidelines and the proposed Master List of litter items. The app also enables the collection of data from popular clean-ups. Data from popular clean-ups are treated as a separate dataflow. Marine LitterWatch also includes a public central database hosted by EEA. From this database, data can be retrieved and used in other databases and/ or further disseminated into a wider range of products (e.g. survey reports and maps). In 2013 MLW mobile application was tested for in volunteer clean-ups and national beach litter monitoring surveys and its potential to become a tool to perform proper beach litter surveys and popular clean-ups was highlighted, while its wider uptake and use will be essential for further fine-tuning, and for filling-in data gaps on beach litter (Galgani et al, 2013b).



Figure 21. Beach clean ups and monitoring that have occurred in Greece during the period 2013-2018 (last updated June 2018) as indicated by the Marine LitterWatch (MLW) data viewer

Source: Marine Litter Watch (MLW): www.eea.europa.eu/themes/water/europes-seas-and-coasts/assessments/marine-litterwatch/data-and-results/marine-litterwatch/data-and-results/marine-litterwatch-data-viewer



Figure 22. Beach clean ups and monitoring that have occurred in the Mediterranean during the period 2013-2018 (last updated June 2018) as indicated by the Marine LitterWatch (MLW) data viewer

Source: Marine Litter Watch (MLW): <u>www.eea.europa.eu/themes/water/europes-</u> seas-and-coasts/assessments/marine-litterwatch/data-and-results/marinelitterwatch-data-viewer



Figure 23. Overview of the distribution of collected litter items by material and the top 10 items in the Mediterranean during the period 2013-2018 (last updated June 2018) as indicated by the Marine LitterWatch (MLW) data viewer

Source: Marine Litter Watch (MLW): <u>www.eea.europa.eu/themes/water/europes-</u> seas-and-coasts/assessments/marine-litterwatch/data-and-results/marinelitterwatch-data-viewer

• <u>The European Marine Observation and Data Network</u> (EMODnet: <u>www.emodnet.eu</u>) is a network of more than 150 organisations supported by the EU's integrated maritime policy. These organisations work together to observe

the sea, process the data according to international standards and make that information freely available as interoperable data layers and data products. EMODnet provides access to European marine data across seven discipline-based themes: Bathymetry; Geology; Seabed habitats; Chemistry; Biology; Physics; Human activities. Currently, available data are being used to create multiresolution maps of all Europe's seas and oceans, spanning all seven disciplinary themes - these are expected to be complete in 2020.

- National Collaboration Network for the marine environment (https://diktyogiatithalassa.gr/) under the Athanasios K. Laskaridis Public Benefit Foundation. A portal that is planned to host marine litter monitoring data, which includes various institutions, research centers and NGOs that conduct monitoring and cleanup projects and campaigns in Greece. Currently, monitoring protocols are being under development.
- <u>Electronic Environmental Registry for non-dangerous and dangerous waste</u> (according to the Law 4042/2012) is expected to be an additional monitoring tool for land-based litter. It aims to collect information related to producers and managers of waste, inform stakeholders and disseminate information to the general public, while progress reports and assessments related to litter from landbased activities will be provided according to the EU requirements.

5.5. Challenges and issues in national monitoring schemes

There is a need to implement common methods for determining the pollutants in the marine environment in Greece in order to have comparability and relevance of results (MEE, 2015b; 2018b). Harmonization and coordination of common and comparable monitoring approaches, protocols and tools is necessary throughout monitoring efforts within the country, but also between Member States (Galgani et al, 2013a).

Although there was a major effort in Greece to identify and report the problems related to litter in the country, there are significant gaps in monitoring information. Indicators for monitoring litter and mitigation actions for litter (ships, beaches, land sources) were recently integrated into the national plans (National MSFD Committee, 2017), while national monitoring was initiated in July 2018.

A better understanding of the mechanisms and processes associated with litter at sea is required to clarify fundamental research gaps in order to link quantities of litter and associated impacts on the marine environment, the effect of microplastics in marine biota and the associated socio-economic impacts should also be monitored through surveys and national statistics. There is a need to improve the scientific and technical basis of monitoring, integration of innovative technologies into monitoring plans, and define baseline thresholds for monitoring and assessing litter in the Greek territory, taking into account the peculiarities and pressures of each sub-region.

5.5. Suggestions and guidelines for the optimization of the design and organization of national monitoring schemes

Other existing national and regional monitoring programmes and networks that could provide complementary information for marine litter are:

1. Bathing water quality monitoring program (BWQMP) on the coasts of Greece: has been systematically applied since 1988 in accordance with the Bathing Water Quality Directive 76/160/EEC as part of a program that organizes and coordinates the Ministry of Environment and Energy. Since 2010, the monitoring of the quality of bathing water is carried out in accordance with Directive 2006/7/EC "on bathing water quality management", as harmonized with the Greek legislation with the Joint Ministerial Decision 8600/416/E103/2009 Government Gazette 356B/2009) within the framework of the "Bathing Water Quality Monitoring Program". The BWQMP aims to protect the marine environment and public health (bathers), and to identify problematic areas in order to take appropriate measures to reduce pollution and improve the water quality. BWQMP is repeated every year during the period from May to October through the conduction of sampling in 2155 bathing areas (beaches) of the 13 Regions in the country. Based on the results of the Program, the evaluation, classification and qualitative characterization of bathing waters and the preparation of the annual report is carried out in order to inform the competent services, bodies and the public. The gualitative parameters monitored have been selected in accordance with Directive 2006/7/EC and grouped into two categories:

- Microbiological control: "Coliform bacteria" "Escherichia coli" and "Enterococci" - "Intestinal enterococci", analyzed according to the laboratory methods described in Annex I to Directive 2006/7/EC
- Optical control: tar residues, glasses, plastics, rubber or any other waste.

There is an information mechanism and early warning in case of pollution, including the necessary measures for the safety of bathers. The results are submitted each year to the Central European Data Protection Supervisor, and are made public in order to inform both the Greek citizens and the member countries of the European Union about the quality of the bathing water, thus raising awareness of the public opinion as well as the international visibility of the country. The BWQMP is funded by the Operational Program "Environment and Sustainable Development".

2. <u>Solid urban waste monitoring</u>: Under the National Action Plan for the management of waste (ESDA) and Action Plans developed at the Regional scale (PESDA) specific targets and monitoring indicators have been defined in order to address litter from land-based activities. This type of monitoring may provide additional information regarding litter received from land and provide guidance for actions in order to address and manage targeted activities at their source point (See Section 6 - Strategies for further details).

3. The <u>MEDITS survey programme</u> (International bottom trawl survey in the Mediterranean) intends to produce basic information on benthic and demersal species in terms of population distribution and structure, on the continental

shelves and along the upper slopes at a global scale in the Mediterranean Sea, through systematic bottom trawl surveys (Figure 23). The MEDITS programme is conducted thanks to the incitement and financial support of the European Commission (Directorate for Fisheries) jointly with the contribution of the partner countries (MEDITS, 2012). In Greece responsible institutions are the Hellenic Centre for Marine Research (HCMR) and the Institute of Fisheries Research (INALE), supervised by the Directorate of Fisheries (Ministry of Rural Development and Food).



Figure 24. Sampling areas within the MEDITS survey programme in the Mediterranean Sea

Source: MEDITS, 2012

4. <u>"National Breeding Zones or Areas for the Production of Bivalve Molluscs for</u> <u>the Presence of Marine Biotoxins"</u> pursuant to Regulations (EC) 853/2004, 854/2004 and 882/2004. The program collects data on the microbiological quality of live bivalve molluscs and periodically checks the possible presence of marine biotoxins (three main groups: lipophilic, paralytic-PSP, amnesic-ASP) in live bivalve molluscs as well as controlling the presence of toxic plankton in the water of the bivalve mollusc production areas under the control of chemical impurities (supervised by the Ministry of Rural Development and Food; MEE, 2015b). This monitoring program is conducted not only in bivalves, but also in marine gastropods, echinoderms and tunicates (live and processed) with sampling in culture facilities, loads and markets. Sampling frequency ranges from at least once per week to more samplings if this is necessary (Katikou et al, 2016).

5. The <u>national environmental monitoring infrastructure</u> (POSEIDON network; <u>www.poseidon.hcmr.gr</u>; Figure 24), implemented and maintained by HCMR, has included passive submersible acoustic measurements on the floating metering stations located in Pylos (Ionian), Athos (North Aegean) and Saronikos Gulf (Central Aegean) for various periods of time. The buoys include passive listening systems (Passive Aquatic Listeners, PAL) equipped with broadband hydrophone low noise and built-in real-time signal processing software for detecting and interpreting sound spectra, and to provide audible categorization and assessment of environmental and biological parameters (MEE, 2018a). POSEIDON could assist in providing information on the factors influencing the distribution and densities of litter at sea (human factors, hydrodynamics, geomorphology etc.) for predicting the litter distribution.



Figure 25. Sampling sites included in the POSEIDON network

Source: HCMR-Poseidon: http://immp-eea.hcmr.gr/ocean-data

As far as for monitoring protocols, methods and tools, in Table 19 a series of suggestions and guidelines for the optimization of the design and organization of national monitoring schemes in Greece, is presented. The description follows the indicators proposed by the MSFD for Descriptor 10, since this is the most important tool for Greece to monitor marine litter. The recommendations are based on a systematic review (Galgani et al, 2010; 2011; 2013a;b), while advantages, disadvantages and the potential for integration in the monitoring methods are

presented. Some methodologies are still under development, or there is still inadequate information for proposing a concrete and accurate monitoring protocol. Therefore, a coordinated process, testing and proposed actions by a group of experts from EU Member States is strongly suggested previous to their application (Galgani et al, 2013a).

Finally, citizen science platforms introducing additional information from volunteers and users (e.g. bathers, beach users, divers) could improve the monitoring capacity in the country.

Table 19. Summary of monitoring approaches proposed for improvement and/or integration with existing monitoring protocols applied in Greece (Compiled based on Galgani et al, 2010; 2011; 2013a; b). Definition of criteria used in the Table:

- a) Level of maturity: refers to the extension to which the protocol has been tested and applied and thus its robustness to be used: HIGH
 when the protocol has been systematically applied for > 1 decade, extensively in 1 or more regions; MEDIUM when it's been applied systematically in a few countries/ regions, for less than 1 decade; LOW when the tool is under development/has been only test in a couple of pilots, and therefore needs further R&D.
- b) Technical/Equipment: Requirements for technical equipment in terms of costs: LOW €1.000-10.000; MEDIUM €10.000 50.000; HIGH >€50.000
- c) Expertise: Level of expertise required for sampling, analysis and data interpretation. LOW trained personnel without specific professional formation; MEDIUM trained personnel with specific professional formation; HIGH high expertise and special skills required.
- d) Cost: Total costs incurred. LOW: €1.000-10.000; MEDIUM: €10.000 50.000; HIGH: >€50.000. Please note that these are only approximate estimations, as they depend greatly on staff costs, existing equipment and whether or not the protocol makes use of existing monitoring programmes and/or maritime operations;
- e) Positive aspects: potential benefits and advantages of monitoring protocol in terms of efficiency, geographic applicability etc.
- f) Limitations and negative aspects: key aspects inherent to the protocol and/or factors that can limit its applicability and/or generation of reliable and comparable data.
- g) Opportunities to reduce costs: opportunities that can improve cost-effectiveness by making use of other monitoring programmes (e.g. for other MSFD descriptors) and/or maritime operations, in which the protocol can be integrated.
| Compartment | Approaches | Level of | Technical equipment | Expertise | Cost | Positive aspects | Limitations and | Opportunities to reduce |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Coastline | Counts of the amount of litter items on known stretches of coast (visual/ collection) | High (extensivel y applied) | Low | Low/ Medium | Low/ Medium | Allows for assessment of composition, amounts, sources, trends, social harm (aesthetic, economic); comprises also a mitigation action (litter removal) | Very small items and microparticles (size ≤ 2.5 cm) in sediments are not quantified. Not all coasts are accessible or appropriate. Highly depend on weather/ sea conditions | Potential to make use of (trained) volunteers |
| Sea surface | Ship observers | High (extensivel y applied) | Low (Considering opportunitie s to couple efforts with existing vessel operations and excluding video) | Low/ Medium | Low/ Medium (Can increase if video is used due to extra time for processi ng) | Precise evaluation at local scale. | May be affected by weather/ sea conditions. Not at large scale, small debris (size ≤ 2.5 cm) not considered, strong temporal variation | Can be integrated in ongoing operations with vessels (e.g. cruises, maritime authorities) or/and other monitoring programmes on the sea surface (e.g. marine mammals) |
| Sea surface | Aerial counts of the number of litter items floating on the sea surface along transects (Unmanned Aerial Systems (UAS); satellite images technology) | Low | High (Can be considerably reduced if coupled with other aerial surveys) | Medium | High (Can be consider ably reduced if coupled with other aerial survevs) | Assessment of densities of litter on water surface over large areas possible; correlation with shipping or fisheries activities | Expensive, unless coupled with existing aerial surveys; Mainly sensitive to large (from TetraPak size upwards), floating items Smaller items not covered | Coupling with aerial surveys (e.g. cetaceans); coupled with MSFD Descriptor D1 ("Biodiversity") |

| Sea surface and water column | Trawling and water filtration | Medium/ High | Low/ Medium | Low/ Medium | Low/ Medium | Precise evaluation at local scale, consider smaller debris | Costs, strong temporal variation | Can be coupled with existing monitoring programs; coupled with MSFD Descriptors: D1 " Biodiversity"; D3 "Commercial fish" |
|------------------------------------|----------------------------------------------------------|------------------------------|------------------------------|----------------|-------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Seafloor shallow | Visual survey with divers | Medium (Low for video) | Medium (Low for video) | Medium | Medium | All substrate types, replicability, feasible to account for detectability. | Depth limitation (<40 m); depends on accessibility to diving areas | Coupled with MSFD Descriptors D1 "Biodiversity"; D3 "Commercial fish"; Potential to make use of volunteer divers and awareness- raising campaigns (e.g. Project AWARE) |
| Seafloor, deep sea litter | Bottom - trawling | Medium/ High | Low/ Medium | Low/ Medium | Low/ Medium (Can increase if video is used due to extra time for processi ng) | Replicability, possible standardization | Restricted to flat/ smooth bottoms; cannot be applied in restricted/ protected areas and areas where vulnerable habitats are present (e.g. maerl; corals etc.) | Can be coupled with existing bottom-trawling programs (e.g. MEDITS in the Mediterranean); coupled with MSFD Descriptors: D1 " Biodiversity"; D3 "Commercial fish" |
| Seafloor, deep sea litter | Submersibles and remote operated vehicles (ROV) | Medium | High | High | High | All sites accessible | Only small areas, high cost, small debris (size ≤ 2.5 cm) not considered | Can be coupled with existing bottom-trawling programs (e.g. MEDITS in the Mediterranean); coupled with MSFD Descriptors: D1 " Biodiversity"; D3 "Commercial fish"; D6 "Seafloor integrity" |

| Entaglement rates of marine organisms | Entanglement rates in birds found on the coastline | Low | Low | Medium | Low | Can be carried out as part of existing surveys | Depends on geographic coverage of birds on colonies; Focus on specific litter sources; Standard protocol would need to be developed and implemented | Can be used during surveys for other studies on bird-colonies in collaboration with relevant NGOs |
|------------------------------------------------------------------------------------------|-----------------------------------------------------------------------|-----|-----------------|-----------------|------------------|-------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| OSPAR Fulmar Plastic Ecological Quality Objective (EcoQO) | Mass of plastic in stomachs of beached seabirds (Fulmars) | Low | Low | Medium | Low/ Medium | Operational and tested in North sea. Applicable everywhere in most of OSPAR area | Focuses on surface litter in offshore habitats; not yet operational in all EU regions: need further developing | During surveys for other studies on bird-colonies in collaboration with relevant NGOs; Could be coupled with MSFD Descriptors: D1 " Biodiversity" |
| Ingestion by other marine organisms (mammals; sea turtles; invertebrates) | Abundance of plastic by mass | Low | Medium/ High | Medium/ High | Medium / High | Potentially similar to Fulmar EcoQO approach | Need to be developed and tested; depends on occurrence of species | Could be conducted during surveys for other studies on bird-colonies in collaboration with relevant NGOs (mammals and sea turtles); Can be applied as part of necropsies procedures of marine mammals; insuffiecient data for invertebrates to support recommendations; Potentially coupled with MSFD Descriptor D8 "Monitoring of Contaminants" in the case of filtering/detritivores organisms are used (invertebrates) hence could be potentially coupled with the "National Breeding Zones or Areas for the Production of Bivalve Molluscs for the Presence of Marine Biotoxins" |

| | | | | | | | | monitoring network |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------|-----|--------|-----------------|------------------|--------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Microplastics on shorelines | Extraction of fragments from sediment samples and subsequent identification using FT_IR spectroscopy | Low | High | High | Medium / High | Positive identification of specific polymers | Analysis is time- consuming and is unlikely to detect all of the microparticles. This is especially true for very small fragments (<100 µm) | Sampling can be coupled with Beach protocol for macro- litter or in parallel with any other routine intertidal monitoring (for chemical contaminants, biota) |
| Microplastic at sea surface | Manta trawl (330 mm) and subsequent identification using FT_IR spectroscopy | Low | Medium | Medium/ High | High | Positive identification of specific polymers | Analysis is time- consuming and is unable to detect all of the microparticles (can be insensitive to fraction < 3mm) | Can be coupled with other monitoring programmes that involve sampling the sea- surface |
| Socio- economic | Assessment of direct costs through survey- based methods | Low | Low | Medium | Low/ Medium | Provides indication of economic burden on marine and coastal sectors. | Does not capture full impact of degradation of ecosystem goods and services due to marine litter | On-line surveys coupled with other monitoring programmes and national statistics (ELSTAT) |

6. Recommendations: policy, mitigation and management actions

Currently there are no statutory measures to protect Greek seas from litter (MEE, 2017). Most actions are not part of an organized national strategy, are fragmented and partial (MEE, 2015a). It is widely accepted that both the levels of marine litter present and the rate of input in coasts and seas are raising overtime thus making imperative the need for immediate prevention and mitigation actions (MEE, 2018a). Due to the seriousness of the waste problem in the Greek seas and the Mediterranean in general, a series of initiatives for the protection of the seas have been developed, however further measures should be adopted. There is an urgent need for concrete and comprehensive actions at national, regional and international level. All responses should be based on the Precautionary, the Polluter Pays and the Prevention at Source Principles.

Marine litter is a complicated issue that deals with decisions and actions reffering to a wide range of actors, sectors and practices. Therefore, the following recommendations have been organized in general categories and groups. Monitoring issues and legislation have been excluded, since these areas have been described in detail in the previous chapters. Examples of good practices are mainly indicative to highlight the various types of recommendation implementations around the world. Finally, as marine litter is gaining attention worldwide and new policies emerge targeting specifically this issue, new information, more efforts and developing technologies are expected to improve our understanding and targeted suggestions towards reduced plastic use and its effective management.

Marine litter management as an integral part of the solid waste management

Recommendations and Tools:

Integrated Solid Waste Management (ISWM) takes an overall approach to creating sustainable systems that are economically affordable, socially acceptable and environmentally effective. An effective ISWM system considers how to prevent, recycle, and manage solid waste in ways that most effectively protect human health and the environment. The marine litter management should be an integral part of the solid waste management system. An integrated solid waste management system involves the use of a range of different treatment methods, and key to the functioning of such a system is the collection and sorting of the waste. It is important to note that no single treatment method can manage all the waste materials in an environmentally effective way. Thus all of the available treatment and disposal options must be evaluated equally and the best combination of the available options suited to the particular community should be selected. Effective management schemes, therefore, need to operate in ways which best meet current social, economic, and environmental conditions of the municipality (UNEP-MAP, 2016b).

In addition, improving plastics recycling technology and infrastructure is a significant step to substitute and tackle plastic material, and produce recycled material of high quality plastic and capable of being used for similar high-end and long-term applications. Creating viable markets for recycled and renewable plastics however is not possible without a guaranteed stream of waste of the right quality, and thus better collection and sorting systems and uniform legislation is also required (Camarsa et al, 2018). LIFE projects is a standard tool for supporting the improvement of quality recyclates, focusing mainly on plastic packaging, waste produced from the construction and automotive sectors, waste from electrical and electronic equipment, agriculture or textiles.

There is an urgent need to eliminate illegal landfills that still operate (MEE, 2014; MEE, 2018a).

Examples of best practices:

- Integrated Solid Waste Management (ISWM): The County of Aschaffenburg (Germany) implements a weight-based collection of residual waste, bio waste, and bulky waste, as well as the separate collection of paper from all households. In nearly all of its 32 municipalities the State operates collection centres (also known as "container parks" or "civic amenitysites") to separately collect recyclable waste fractions such as glass and metals, while composting of green cuttings also occurs. In addition, woody fractions are sent to biomass-fired power plants, residual waste is incinerated according to Best Available Technique (BAT) standards, bio waste is anaerobically digested, and subsidies are provided to households for home composting and for using re-usable nappies, and to households with incontinent persons. The ISWM system required considerable effort to acquire and process data for billing, accounting, and system optimisation purposes. In Kendari City (Indonesia) turning waste into alternative energy in the form of methane gas manifested a service to society in managing waste but also facilitated the poor people, like waste pickers, by supplying them with free electricity and free energy through the installed pipes connecting to their houses and the cooking sites around the Final Waste Disposal (Seemann et al, 2016).

- Collection and sorting of waste: The city of Copenhagen currently collects over 2,000 tonnes of plastic waste each year, intercepting 15% of all plastic packaging used by households thanks to LIFE-funded Plastic ZERO. Nevertheless, addressing the technological challenge posed by difficult-to-sort plastics is of extreme importance. New sorting technologies are ready to be scaled up, such as optic sensitive cameras and automated sensor based sorting systems that have been proven to be of high recovery rate and low operation cost, reducing the carbon footprint and emissions. (Wangyao et al, 2009).

- Recycling technology: Petrochemical producer Total is field-testing a new recycling process to transform expanded polystyrene (EPS) from fish boxes into plastic clean enough for food contact packaging, aiming to broaden the options for plastic converters and support EU efforts to protect public health through its food safety policy. The fish boxes have been collected from supermarkets across Catalonia. They have been washed, treated and shipped to a chemical reactor in which their molecular building blocks will be torn apart. By mixing this recycled feedstock with fresh material to produce polystyrene sheets aims to provide transformed usable plastic of quality as virgin polystyrene, that could fit for new yoghurt pots and meal trays. Once production has been optimised, project partners will run health and safety tests on the plastic and apply to the European Food Safety Authority (EFSA) to launch it on the food market (LIFE EPS SURE project: www.life-eps-sure.com). There are some attempts also in developing innovative methods of recycling material that contains hazardous substances (LIFE EXTRUCLEAN, AUTOPLAST), or finding new end uses for plastic waste that is currently non-recyclable (ECOMETHYLAL). Other projects are upcycling polystyrene packaging into new food containers that meet food safety standards in partnership with major retailers (LIFE EPS SURE) (Camarsa et al, 2018).

- Substitution and tackling of plastic material: Bio-based materials can substitute plastics in a range of applications. Attempts have been made for designing and manufacturing biodegradable and compostable plastics, bringing them to market or close to market. End uses include coffee capsules, food packaging, netting, adhesives and mulching films for agriculture. For instance the LIFE BREAD4PLA project turned bakery waste into bags to pack bakery products, addressing EU policy on food waste and highlighted that the new bioplastic was found to extend shelf life. Viable business opportunities are also being created through LIFE projects that are upcycling plastic waste and putting it back in the production loop for new products, such as in the construction, automotive, logistics (pallets) and footwear industries (Camarsa et al, 2018).

- Processing of non-recyclable plastic waste: using non-recyclable plastic waste from the automotive, electronics and packaging sectors are bombarded with highly energised particles that turn into gas, a process called catalytic hydro-gasification with plasma (CHGP), turning plastic waste into high-quality methylal. CHGP is more efficient, versatile, cleaner and has lower investment costs than other technologies that are normally complementary to traditional mechanical recycling. Methylal is a colourless liquid that is used as a chemical solvent and fuel additive. It's a lucrative business, with a market worth an estimated €5.2 billion per year. Yet only 6% of the 800 000 tones or so used annually in Europe is made in the EU. The pilot study is developed in the framework of the LIFE ECOMETHYLAL project (<u>http://ecomethylal.aimplas.es</u>) in Spain, and aims to reduce land filling, add value to plastic waste and decrease imports of materials derived from fossil fuels from non-EU countries.

Measures to prevention and reduction of solid waste in producers

Recommendations and Tools:

The extended responsibility of waste producers under a circular economy through increased resource efficiency facilitating sustainable consumption and production patterns, including cradle-to-cradle life cycle design, high quality recycling and sustainable packaging, are crucial components for the prevention and management of marine litter. Increasing capacity building and sharing of experiences and good practices between countries and stakeholders on marine litter monitoring, is another factor that could assist in addressing the issue.

- Extended Producer Responsibility schemes (EPR): Under an EPR scheme, legal responsibility for collection, recycling and end of life management of products and packaging is given to producers, manufacturers, brand owners and first importers. EPR programs can cover costs through fees applied per unit, which are differentiated based on the cost to recycle or dispose of in an environmentally sound manner a product at the end of its life (UNEP-MAP, 2016a).

- Green Public Procurement: The Green Public Procurement (GPP) is a fundamental political instrument to promote sustainable development and to move towards a green economy that encourages the development of products and services that maximize social and environmental benefits, given the big percentage of the GDP that represents the public sector in most countries. The GPP has the potential to transform markets, increase the competitiveness of industries, save money, conserve natural resources and promote job creation. In this way, to introduce objectives of recycled plastic composition in products purchased by the public administrations is crucial to facilitate the creation of markets in the country for the recovered plastic, which in turn boost the interest to recover plastic packaging, the main component of Marine Litter (UNEP-MAP, 2016b).

- Deposit, Return and Refunding System (DRRS): the packager or the seller establishes a system to physically recover their packaging. To guarantee this recovery, the packager or the seller collects an amount by way of deposit from the customer and this amount is returned when the packaging is effectively returned. This system has demonstrated high rates of recovery. It is a suitable example for fast food chains and take-away restaurants, services that tend to generate problems of littering when located near the beach. As this system is not always easily applicable, it is recommended to be established on a voluntary basis with the sectors involved (UNEP-MAP, 2016b).

- Integrated Management System (IMS): an important measure for preventing waste generation, where the packing company pays an amount for the quantity in weight of the packaging placed in the market to the managing company of the IMS. This money serves to finance the selective waste collection, and the transport and the selection of the different materials. This system is normally established on a mandatory basis for all the plastic packaging products producers (UNEP-MAP, 2016b).

Examples of best practices:

- More and more industries, particularly dealing with food related products, put effort on creating a truly "circular model" across their business. Reusable cups, full removal of plastic straws from drinks or usage of disposable single-use plastics (e.g. cutlery, straws and stirrers), fully re-cycled plastic bottles, replacement of plastic bags with biodegradable material, are some of the best practices after the recent banning of single-use plastics in EU. Still a critical challenge is the establishment of a tax to the waste producers and manufacturers for every tone of litter they produce.

- The UK new Resources and Waste Strategy promotes increased responsibility to waste industries that will pay the full net costs of recycling or disposing of their packaging placed on the market by extending producer responsibility with higher responsibility schemes for items that can be harder or costly to recycle, encouragement of manufacturers to design products that last longer and drive up the levels of repair and re-use, promotion of tougher penalties for rogue waste crime operators if they mislabel their waste to dodge tax rules, setting of compulsory electronic tracking of waste and consistent labelling on packaging so consumers know what they can recycle, and establish compulsory annual reporting of food surplus and waste by food businesses.

Measures to prevention and reduction solid waste in consumers

Recommendations and Tools:

- Provide free reusable alternatives as a solution in order to present realistic scenarios of reducing waste, such as single-use plastics

- Promote agreements for waste management, provide recycling certificates and eco-labels that may stimulate the market to reduce waste, particularly in the tourism industry (MEE, 2014)

- Promote free garden waste collections for households with gardens, to reduce greenhouse gas emissions from landfill

- Increase awareness of key actors, residents and the general public regarding the impacts of marine litter in the economic, social and environmental aspect, and provide examples of good practices adjusted to the local needs, history and culture of an area. Raising awareness and advising citizens how to recycle plastic waste promoted with the active contribution of local authorities is important.

- Facilitating participation of stakeholders in networks committed to take action to prevent, reduce, monitor and manage marine litter.

- Increase participation of all relevant stakeholders, residents and the general public in clean up campaigns, monitoring actions, and decision-making processes. It is important to communicate results to the public and provide a positive feedback of changing consumer habits. For instance, demand for environmentally-friendly packaging is growing as shoppers pay increasing attention to the waste streams of their supermarkets (Camarsa et al, 2018).

Examples of best practices:

- LIFE DEBAG project (<u>www.lifedebag.eu</u>) arranged an intensive awareness campaign in Syros island (Greece) to prevent and reduce plastic bag pollution in the marine environment targeting mainly residents and actors from tourism (hoteliers, shops, supermarkets etc.). Over 10,000 reusable cotton shopping bags were distributed as a provision of free reusable alternatives, over 6000 students in 56 schools were informed, and persuaded more than 200 shop owners to sign a voluntary agreement to reduce the use of single-use plastic bags. Monitoring of awareness was accomplished through surveys of supermarket customers, and of the amount of plastic bags through beach clean-up campaigns, airborne drone and underwater camera surveys. In addition, a series of national consultation forums with all relevant stakeholders to define policy agreements for single-use plastic bags was arranged to provide policy recommendations, many of which were incorporated into the law for lightweight plastic bag fee. During the first two years of the project a 70% reduction in plastic bags on the beaches of Syros was recorded, as well as a 30% reduction in plastic bags on the seafloor in Ermoupolis Bay (LIFE Task Force Greece: https://www.lifetaskforce.gr/en/life/life-project-of-the-month/august-2018).





- The responsible snack bars project: the project launched by the Spanish Biodiversity Foundation aimed to encourage pro-environmental behaviour and sustainable economic development in traditional beach bars serving food, snacks or drinks on the beach ("chiringuitos"), and to protect and preserve the Spanish coastline incorporating social aspects of the area. "Decalogue of Good Environmental Practices", which includes actions such as recycling and proper waste management, using local products and hiring local staff, raising awareness etc. was established for the chiringuitos to adhere to the Decalogue (www.fundacionbiodiversidad.es/programaplayas/decalogo-y-premios). The Foundation launched at national level the "Responsible Chiringuitos Awards" to award the exemplary activities for the protection of the environment that could be further adopted by others. During the tourist season June-September 2012, overall 526 beach bars in seven regions joined the "Decalogue of Good Environmental Practices", 55 beach bars signed up for the first edition of the "Responsible Chiringuitos Awards, and 6 awards were given for a total amount of €24,000 for initiatives already in place and for new ideas. The project had a broad impact on an environmental and social scale, and potentially can be applied in Mediterranean countries, where such establishments and economic exploitation is more common and similar to that on the Spanish coast (www.magrama.gob.es/es/prensa/noticias/el-secretario-de-estado-de-medioambienteentrega-los-premios-chiringuitos-responsables-a--establecimientos-implicados-conlaprotecci%C3%B3n-del-litoral/tcm7-232104-16; www.marlisco.eu/Responsible_Snack_Bar. en.html)

Enhancement of Port reception facilities

<u>Recommendations and Tools</u>: The promotion of the green/circular economy through increased resource efficiency through environmentally responsible fishing and maritime transport practices, are crucial components for the prevention and management of marine litter. Implementation of the provisions of the MARPOL Convention under the national law and enforcement of the requirements of its technical annexes (i.e., the Comprehensive Manual on Port Reception Facilities, published by the IMO) is of great importance for the provision of port reception facilities for ship-generated waste.

The specific provision included in the 2002 Prevention and Emergency Protocol under the MARPOL Convention by the Mediterranean coastal States, and more specifically Article 14 of the Protocol provides that reception facilities, including facilities for pleasure craft, meeting the needs of ships, shall be available in the ports and terminals of the Parties. The proposed standard designs for port reception facilities are applicable to all ports/terminals of the Mediterranean. The provision does not introduce regulations concerning the discharge of ship-generated waste. These regulations are already addressed in detail by the technical annexes of the MARPOL Convention. The aim of the Protocol is to facilitate the effective implementation and enforcement of these regulations in the Mediterranean region. Article 14 aims at facilitating the implementation by the Mediterranean coastal States of the provisions of MARPOL Convention related to port reception facilities.

Activities that could be undertaken with regard to measures provided for in the MLRP are (UNEP-MAP, 2016b):

 \checkmark Update of the assessment study of port reception facilities in the Mediterranean carried out under the Euro-Mediterranean Partnership Project on port reception facilities for collecting ship-generated garbage, bilge waters and oily wastes in the Mediterranean implemented by REMPEC between 2002 and 2004;

 \checkmark Ranking of Mediterranean ports to be equipped in priority with port reception facilities established;

 \checkmark Mediterranean Port Reception Facilities Regional Forum to facilitate exchanges between ship owners, port authorities and other interested parties with a view to addressing the issue of lack or inadequate port reception facilities in a practical manner established;

 \checkmark Capacity building and awareness raising activities related to the new Annex V (Garbage) of MARPOL;

Enhancing knowledge of Contracting Parties on port reception facilities best practices.

Marine plastic is also being collected through effective management systems in ports, in line with the requirements of the Port Reception Facility Directive (Camarsa et al, 2018).

The role of the European Maritime Safety Agency (EMSA) which is responsible to provide the Commission and the Member States with technical support and guidance to achieve a harmonized interpretation and implementation of the EU Directive on port reception facilities (RPF), could be significant. EMSA is running training and discussion workshops with the main stakeholders on many of the issues raised in the PRF Directive, conducts visits inspections and controls to Member States' ports for the implementation of the PRF Directive, while has developed several web-portals and modules to help the Member States enforce the Directive (e.g. THETIS, information services SafeSeaNet, CleanSeaNet, Copernicus Maritime Surveillance etc.).

Examples of best practices:

In 2007 and 2008, waste bins were distributed to vessels operating in Cascais Municipality (www.cm-cascais.pt/empresa-municipal/cas-cais-ambiente), in order to discourage waste disposal into the sea. In 2008, the first reception point (Ecopoint) for waste from vessels was implemented in the Fishing Port of Cascais, as a waste reception point. This Ecopoint receives

hazardous waste especially from fishing vessels which include batteries, oils and oil filters and contaminated packaging. The fishermen are responsible for the Ecopoint maintenance and waste management. When the Ecopoint is full, the fishermen call the waste management companies to collect the waste and send it for recycling. In addition to the installation of the Ecopoint, a leaflet on the types of marine litter that come from fishing vessels was also distributed (www.marlisco.eu/Waste_reception_point_and_distribution_of_waste_bins_to_vessels_of_Cascai s.en.html).

Application of the No-special-fee system to ship-generated waste and marine litter caught in fishing nets

<u>Recommendations and Tools</u>: The "No-special-fee" is a charging system where the cost of reception, handling and processing (including infrastructure) and disposal of ship-generated wastes (any type of waste), originating from the normal operation of the ship, as well as of marine litter caught in fishing nets, is included in the harbour fee or is charged to the ship irrespective of whether waste are delivered or not. It encourages ships to deliver waste ashore and to avoid undesirable waste streams between ports, thereby encouraging a sound sharing of the waste burden. The fee for reception, handling and disposal of waste and garbage is paid with the arrival of a ship in any port of the participating countries as part of or in addition to the port dues - irrespective of whether or not that particular ship will make use of the reception facilities. The "No-special-fee" system constitutes one of the prerequisites for a substantial decrease in the number of operational and illegal discharges and thus for the prevention of pollution of the marine environment from ships (UNEP-MAP, 2016b). However it must be highlighted that in all these types of measures a strong enforcement and control system should be also in place.

Examples of best practices: The Cypriot Port Authority, in accordance with National and EU legislation (CPD 771/2003 - 2000/59/EC) has implemented an 'Indirect Fee System' for the Collection of Ship Waste in Cyprus (www.cpa.gov.cy). Based on this, every ship that enters Cypriot ports is charged a fee that gives it the right to dispose of its waste (solid waste, sludge and sewage), regardless of whether or not the ship will actually dispose of any waste. The charges for solid waste vary depending on ship type, and range from around 15 Euros/day for ships under construction or entering the port for refuelling/ staff change/fuel supply etc. to around 110 Euros/day for passenger ships, and allow the ships to dispose a "reasonable" quantity of waste depending on the type of ship. The Indirect Fee System provides an incentive for ships to deliver their waste to ports rather than to dispose of it at sea. It is estimated that every year a total of about 15,400 m³ of waste is collected through this system at the three main Cypriot ports. This waste is comprised mainly (about 90%) of waste originating from the preparation of food and other activities taking place in the ships' bars and restaurants. An additional 2,100 m³ of sewage and sewage sludge are collected. The treatment of the collected waste depends on its type. Recyclables are collected separately and sent for recycling, mixed waste is sent for disposal and, where possible, sewage waste is sent to sewage treatment facilities in Cyprus

(www.marlisco.eu/Indirect_fee_system_for_the_collection_of_ship_waste_in_Cyprus.en.html).

Targeted recovery of ghost nets and establishment of derelict fishing gear management schemes

Recommendations and Tools:

- Promoting knowledge, by informing professional and amateur fishermen, on marine litter to reduce pollution from fishing activities.

- Fishing for Litter Schemes (FfL): On the basis of the Regional Plan for Marine Litter Management in the Mediterranean a "Fishing for Litter" (FfL) protocol has been proposed as one of the most important reduction and removal measures of marine litter from the marine environment (mainly from the seafloor), by involving the key sector of fishing industry (UNEP-MAP, 2016b). There are two types of "Fishing for Litter" practices: active and passive. Active practices are specifically performed to remove marine litter and fishermen involved are paid; passive practices are carried out by fishermen during their normal fishing activities without financial compensation. In active practices the following can be considered: (1) Marine litter removal practices during specific fishing trips to remove litter from hotspots (marine litter accumulation) or from protected areas with financial compensation of the fishermen involved; (2) Retrieval of derelict (abandoned, lost or otherwise discarded) fishing gear at sea where individual fishermen are contracted to retrieve nets (UNEP-MAP, 2016c).

The FfL initiative may have multiple benefits in terms of monitoring, environmental, social, economic and scientific benefits. This type of practices substantially contribute to raising awareness on the problem within the sector, in other sectors and the general public, and the need for better waste management, while can gain the support of the fishing industry, harbour authorities and local authorities (UNEP-MAP, 2016b).

In the Appendix 3 the suggested monitoring protocols are presented, including attributes such as the number, type as well as the total weight of marine litter caught. The tasks of recording composition and weight of waste brought ashore might be developed daily on the quayside by qualified personnel and monthly data might be reported to the FfL practice coordinator accordingly. Composition is recorded in order to identify sources of marine litter and the weight to ensure the final waste management. Annually, monthly tons and composition of marine litter collected in each of participating harbours as well data related to harbour details (number of participating vessels, main vessel type) might be reported to the National Competent Authority for the protection of the marine environment. This information might be periodically reviewed by the competent authority to evaluate the success of FfL initiatives, and might look at such factors as costs, benefits and governance. It may also enable to locate accumulation areas and support an optimised strategy to further focus on hot spots (UNEP-MAP, 2016c).



Figure 26: The steps of a FfL practice are presented in the following scheme (blue colour) and are elaborated in the chapters that follow. Where possible to implement, additional steps are also provided (orange colour)

Source: UNEP-MAP, 2016c

FfL is mainly considered at local scale, and putting the fishing industry, coastguards, port authorities, local authorities and waste management companies together is creating a value chain for this type of litter too (Camarsa et al, 2018).

However, marine litter is a transboundary problem and therefore a coordinated, harmonised and coherent approach is the best way to tackle it. At all levels, cooperation in FfL practices should be based on the exchange of relevant information and on addressing significant transboundary ML issues. Agreements should be made so that any vessel involved in the FfL practice can land non-operational waste at participating harbours in Mediterranean countries and other neighbouring countries. In this context, in accordance with UNEP/MAP Programme of Work on pollution assessment and control thematic priority and the objectives of the project on ecosystem approach funded by the European Commission a Guide on best practices for Fishing for Litter in the Mediterranean was adopted by COP 19 of the Barcelona Convention, February 2016 (Decision IG.22/10 Implementing the Marine Litter Regional Plan in the Mediterranean, UNEP(DEPI)/MED WG.424/Inf.4). The objective of this guide is two-fold: to provide technical guidance on the mechanism to remove litter from the sea in an environmentally friendly manner ensuring negative impacts on marine environment and ecosystems are avoided, and to provide guidance on the process of involving the stakeholders responsible for the implementation and coordination of FfL practices (UNEP-MAP, 2016b).

Examples of best practices:

- FfL activities have been widely applied mainly in NE Atlantic Ocean, and specifically in the North Sea; FfL actions in the Baltic Sea and in the Mediterranean Sea have been undertaken more recently while no such actions have been initiated yet in the Black Sea. At global level, one project is under development in the United States with energy recovery from the fishing gear removed. In the Mediterranean, it has been implemented by the projects Ecological bags on board (Spanish East Coast), Ecopuertos (Andalusian Coast, Spain), DeFishGear (Adriatic Sea), Port of San Remo (Ligurian Coast, Italy) and Port of Rovinj (Northern Adriatic Sea, Croatia). Fishing boats in places like Galicia and Sardinia are bringing used nets and other plastic gear back to port rather than dumping them at sea. They are happy to be 'fishing for litter' as a direct result of the stakeholder engagement efforts of projects like Clean Sea LIFE and 3-R Fish (Camarsa et al, 2018).

- The IPA-Adriatic DeFishGear project and the Healthy Seas initiative have been conducting target recovery of ghost nets and collecting nets from fishing and aquaculture industries for regeneration and up-cycling (turning them into high quality materials and textile products). Operations were conducted in all countries of the Adriatic Sea and Mediterranean countries and provide background knowledge and skills for the sustainable valorisation of collected materials (UNEP-MAP, 2016b).

- Finally, the UNEP-MAP (2016c) conducted a survey-based regional assessment of abandoned, lost or discarded fishing gear and ghost nets (ALDFG), as well as marine litter, relying on information collected mainly from fishermen in eleven Mediterranean countries. The target groups were fishermen, sailors, skippers, vessel owners, divers, representatives of unions and cooperatives of fishermen, etc. The overall aim of the survey was to (a) collect data on marine litter and fishing gear; (b) provide opinion-based assessment of current trends related to ALDFG, as well as marine litter; (c) provide information on practices that contribute to the problem but could be part of the solution; (d) take stock of available information on measures and regulations that are in place concerning the management of ALDFG; (e) provide insights into opinions, behaviors and perceptions of fishermen and the other fisheries related target groups on the issue; (f) capture what the fishermen think about their role in the management of ALDFG

and assess their intentions to engage themselves in 'Fishing for Litter' schemes. The survey contributes some valuable insights and findings, and confirmed that that there is a problem in the region. Further work is needed to make accurate estimates of the extent of the problem for the Mediterranean at local, national and regional level in order to facilitate effective decision making and management responses

Conservation initiatives and title awards for citizens and groups

<u>Recommendations and Tools</u>: Concepts such as titles and certificates for the protection of marine environment as "guardians" have always been beneficial. Public participation in these type of projects and community initiatives plays a significant role in increasing general understanding of the litter issue. Such schemes enable people to become actively involved in practical measures to reduce marine litter and raise awareness of the need to prevent coastal pollution. Certificates and types of recognition promotes the responsibility and stimulates local people volunteer to undertake quarterly beach cleans and litter surveys of their chosen beach. *Examples of best practices*:

- "Adopt-a-Beach" (<u>http://adoptabeach.com</u>)is a concept when a school, a local community, a NGO or a group of volunteers "adopts" (not in a legal sense) a beach and takes care of that beach by regular cleanup events. Marine Conservation Society (MCS), UK, co-ordinates a range of projects that encourage public participation in marine conservation, including "Adopt-a-Beach" and "Beach-watch", the biggest beach clean and litter survey projects in Europe. MCS has been collecting data on marine litter through "Beach-watch" since 1993 and "Adopt-a-Beach" since 1999 and has thus amassed a large bank of data detailing both type and source of litter to be found in the UK. The protocols and methodology used are compatible with other systems on a European and worldwide basis. "Beach-watch" provides data for the International Coastal Cleanup on litter surveys and beach cleans over the same weekend in September, providing information on the global extent of Marine Litter. "Adopt-a-Beach" data is fed into the OSPAR project on Marine Litter. The methodology used by OSPAR is based on the Adopt-a-Beach surveys.

- Beach Ambassador title aims to encourage sustainable behaviour and support the public to take personal responsibility in public places by preventing littering, encouraging pack-in, pack out concept to reduce overflowing bins and recycling. Beach Ambassadors are mainly locals so are able to share stories and local knowledge with the community and the general public they engage with. The Beach Ambassador concept has been adopted in several Marine Reserves, touristic areas and beaches.

Marine and coastal environment quality certificates

<u>Recommendations and Tools</u>: Particularly important for coastal countries being an attraction for touristic flows due to their sea and sun provisions are beach certificate types and efficient recognition on the quality of beaches and bathing waters they provide. Certificates widely recognized at the international or national scale (e.g. Blue Flags, Bathing Water Identity Registry etc.) comprise an important stimulation for promoting the good quality of marine and coastal environment. In addition, these awards is a dynamic way for promoting consistent monitoring and assists in immediate management responses in terms of measures and actions to prevent or restore potential pollution in a coastal area, while it provides a key component in terms of touristic development.

Examples of best practices:

The Blue Flag was created in France in 1985 as a pilot scheme where French coastal municipalities were awarded the Blue Flag on the basis of criteria covering sewage treatment

and bathing water quality. In the European Union, the water quality standards are incorporated in the EC Water Framework Directive. The Blue Flag is a certification by the Foundation for Environmental Education (FEE), launched under the Blue Flag Programme as one of several "European Year of the Environment" activities in the European Community, that a beach or marina meets its stringent standards. The Blue Flag is a trademark owned by FEE which is a notfor-profit, non-governmental organisation consisting of 65 organisations in 60 member countries in Europe, Africa, Oceania, Asia, North America and South America. FEE's Blue Flag criteria include high and strict standards for water quality, safety, environmental education and information, the provision of services and general environmental management criteria. The Blue Flag certification is sought for beaches and marinas as an indication of their high environmental and quality standards. Certificates, or "awards", are issued on an annual basis to beaches and marinas of FEE member countries. In 2010 over 3450 beaches and marinas globally were awarded the Blue Flag. 12 Mediterranean countries are currently participating in the (UNEP-MAP, 2016b). In the Mediterranean 12 countries currently participate in the Blue Flag Programme, of which Greece is part of it (Blue Flags Greece: https://eepf.gr/el/blueflag). For more details see Section 4 - Strategies.

Raising awareness and Clean up campaigns

<u>Recommendations and Tools:</u> Encouragement of educational and awareness raising programmes on marine litter at all levels of formal, non-formal and informal education. Supporting of civil society organizations and facilitating initiatives preventing waste from entering the marine environment. Intensive awareness-raising and clean-up campaigns apart from their direct benefits on the environment through the removal of litter, improving the environmental status of an area. In addition, they have empowered citizens to become part of the solution, tackling everything from plastic bags to cigarette butts, bottles and straws (Camarsa et al, 2018). Participating in beach cleans may result in increasing well-being benefits (pleasure, meaningfulness, reward etc.) and marine awareness for the individuals engaging in the act, encouraging a continued commitment to that activity and enhance future pro-environmental behaviors implying a positive spillover (e.g. adopt other environmental citizenship behaviors, such as more sustainable energy use) (Wyles et al, 2017). In any case, when organizing a clean up campaign, it is important to record all the types and quanities of material collected, try to identify the potential sources, communicate results to the public and provide a positive feedback of changing consumer habits.

Examples of best practices:

- The annual International Coastal Cleanup (ICC, <u>https://oceanconservancy.org/trash-free-seas/international-coastal-cleanup</u>) campaign, which is coordinated globally by Ocean Conservancy (US-based ocean conservation NGO) and its many global partners, has been operating since 1986 in the US and globally since 1989. The ICC has engaged 132 countries and territories in its 26 years, involving hundreds of NGOs, government agencies, various private sector and other civil society groups and organizations at the regional, national and local level. The ICC involves hundreds of thousands of volunteers and organizers who annually survey beaches and underwater sites to remove debris around the globe and record valuable information on the types and sources of marine debris using a standardized data. The Cleanup now includes activities along the banks of rivers, lakes and streams, as well as underwater sites along the coast and inland water bodies. 11 Mediterranean countries are currently participating in the ICC. The ICC is unique in that its activities of collecting data on the composition and abundance of Marine Litter provide the only global database of this information worldwide, and its outputs are used to assist policy decisions. The ICC data provides the basic framework for

action at numerous levels of the government and within the private sector to help reduce marine debris and to educate civil society about litter and pollution prevention (UNEP-MAP, 2016b). With a budget of only €2 million Clean Sea LIFE has organised more than 600 clean-ups, recovering 10 tonnes of marine litter to date (Camarsa et al, 2018).

As well as traditional beach cleanups, removal of litter from the sea bottom is also an important parameter of clean up campaigns. For instance, the Project AWARE (a growing movement of scuba divers protecting the oceans) and PADI (Professional Association of Dive Instructors) dive centres, organise underwater beach cleans with volunteer divers. These underwater clean-ups are valuable as they remove plastic, netting, cans, old buoys and general rubbish that has already made it into the marine ecosystem (UNEP-MAP, 2016b). Dive Against Debris (www.projectaware.org/diveagainstdebris) is a year-round, underwater debris and data collection effort. Divers are encouraged to report on locations, types and quantities of litter that they see and remove underwater. Divers wishing to participate are asked to choose a site that they are familiar with and where they find marine litter regularly, and organize with friends to collect and report that litter. A training manual, a data card, a marine debris ID guide, along with other supporting tools, are all download-able from Project AWARE's website. The collected litter is categorised based on material of construction: plastic, glass/ceramic, metal, rubber, wood, cloth, paper/cardboard, mixed materials and other debris items. Individual items are then recorded within the relevant category using the Dive Against Debris Data Card and ID Guide. Information about amounts and types of collected litter, survey location, dive duration, depth, number of participants and entangled animals encountered is then reported into an online database. Divers are asked to re-peat the survey of their chosen dive site as often and as regularly as they can in order to help identify trends at their chosen location.

The campaign "Keep the Mediterranean Litter-free" launched by MIO-ECSDE (http://mioecsde.org/project/keep-the-mediterranean-litter-free-campaign), the Hellenic Marine Environment Protection Association (HELMEPA) and Clean-up Greece with the support of UNEP/MAP MEDPOL and the Mediterranean Pollution Assessment and Control Programme of UNEP/MAP in 2008 aimed to raise public awareness on the causes and impacts of the pollution of the sea from solid waste, but also highlighting the role and responsibilities of all related actors. The campaign included a range of various activities (e.g. beach cleanups, exhibitions and workshops, photo contests, etc), in several Mediterranean countries and involving a wide range of participants such as educators and students, seafarers and staff of ships' managing companies, national and local authorities, port authorities, NGOs and the civil society at large. Apart from the printing material produced in 10 languages, the campaign published a set of sector-based guidelines for the main stakeholders i.e. agriculture, industry, the tourism and maritime sectors, regional, national and local authorities, and civil society. These components have been widely disseminated and are used by the aforementioned organizations in their awareness raising efforts to date.



Figure 27. Example from the material produced by the "Keep the Mediterranean Litter-free campaign" aiming at raising public awareness

The MARLISCO project (www.marlisco.eu) is an example of a project that overall aimed at informing, educating and promoting awareness to key stakeholders and the general public with issues related to marine litter. Within the framework of the MARLISCO project producing various types of informative material were produced. It was one of the first projects that targeted directly on marine litter. The MARLISCO educational pack on marine litter "Know, feel, act! To stop Marine Litter: Activities and lesson plans for middle level students" developed by MIO-ECSDE/MEdIES, aimed to inform, sensitize and enable teachers and students to take action to tackle the problem of litter in seas and coasts, was translated in 15 languages. It combined updated scientific information and practical tips for young consumers, hands-on and reflection activities on marine litter. The material has been designed in such a way that it's flexible and adaptable to be used either at the formal education setting (schools) or the non-formal one (e.g. NGOs, Museums, youth groups and associations). In addition, the "MARLISCO Guide for Reducing Marine Litter: Get Inspired and Become Innovative Through Best Practices" aimed to provide an overview of the types of activities that different key stakeholders can implement reporting more than 70 practical examples of best practices, clustered into 14 wider categories, to reduce marine litter from around the world (MARLISCO, 2014). Finally, the brochure developed under the MARLISCO project provided essential information on marine litter (sources, composition and impacts) and suggestions on how one can contribute to tackling this growing pressure. The brochure targeted citizens and their professional capacity but also as individuals, and specific economic sectors (i.e., tourism, the maritime and wider manufacturing sector) aiming to inform but also to foster a sense of empowerment and take up individual and/or collective actions (UNEP-MAP, 2016b; MARLISCO, 2014).



Figure 28. Award winning photos in the #SayNo2Plastic Instagram contest organized by WWF and its partners conducted, which invited participants to post creative photographs and videos of pointless single-use plastics and what they are doing to help reduce ocean plastic pollution in the Coral Triangle

Source: World Wildlife Fund - WWF, http://wwf.panda.org



Figure 29. Awareness poster from WWF regarding the lifecycle of plastics Source: World Wildlife Fund WWF-SASSI, <u>http://wwfsassi.co.za</u>

Financial support and funding opportunities

<u>Recommendations and Tools:</u> The required financial resources for the implementation of the revenue can be paid out of European, national and the potential income of the polluter pays principle. The financial instruments and tools that can be used to finance public and private investment in waste management projects or actions are mainly:

- ✓ Operational Program "Transport Infrastructure, Environment and Sustainable Development" 2014-2020
- ✓ Operational Program "Competitiveness, Entrepreneurship and Innovation" 2014-2020
- ✓ Regional Operational Programs 2014-2020
- ✓ Operational Program Public Sector Reform to strengthen management in the waste sector
- ✓ European 2020 programs: LIFE, Horizon2020
- ✓ European initiatives: LEADER, INTERREG etc.
- ✓ Green Fund
- ✓ Application of extended producer responsibility

✓ Application of environmental economic tools (burial fee, pay as much as I throw away)

Additional recommendations for measures and actions regarding marine litter

- Improvement of the marine litter policy and regulatory framework by systematically exploiting the full potential of relevant EU Directives (such as the Waste Framework Directive, the Packaging and Packaging Waste Directive, the Landfill Directive, the Port Reception Facilities Directive, etc.) and by ensuring their full coherence and appropriate synergy with the Marine Strategy (MEE, 2018). This measure includes the required political willingness to implement ambitious strategies against marine litter and coordination under a unique national authority

- Fostering collaboration with global, regional and sub-regional organizations, to address the transboundary aspects of marine litter and enhance the effectiveness of multilateral initiatives aimed at preventing, reducing and managing marine litter. This measure includes also agreements and collaboration for common actions between countries that share the marine environment (e.g. EU and non-EU countries), but also countries that are related through rivers, which are considered an additional source of litter in the marine and coastal environment

- Establishment of joint and/or coordinated monitoring programmes at sea-basin or subseabasin level to address shortcomings and gaps related to marine litter. Full exploitation of synergies with Regional Conventions on monitoring programmes and sharing of results

- Establishment and/or effective implementation of Regional Action Plans on marine litter in all European Seas

- Adoption by the countries of ambitious targets to reduce marine litter at all relevant levels, and to sources of marine litter with the strongest impact, such as for example microbeads or plastic bags (MEE, 2018b)

- Encouragement of participatory science initiatives and improvement of scientific knowledge on sources, amounts, pathways, distribution, trends, nature and impacts of macro-, micro- and nano-litter, including the effects of micro-plastics and their additives and absorbed substances on marine biodiversity and human health. Better utilization of relevant research results to enhance marine litter data

- Enhance near-real time access to available spatial data on marine litter

- Develop dynamic predictive products and risk maps by using state of the art modeling of oceanographic variables that drive movement patterns of litter, and use these maps to support managers with information on where the greatest threats are at given time periods

- Develop a new culture and the technology so that vessels which already embed the Automatic Information System (AIS; real time geo-tracking and identification system) could provide infromation on masses of litter.

- Support research and offer funding for wide scale developments of tools based on remote sensing and satellite technology, so as to be used for active monitoring of litter

- Set the monitoring of marine litter and the mitigations of sources and impacts as a high priority to all Marine Protected Areas in the region

- Utilize new technologies (e.g. social networks and smart phones) to deliver applications which would allow fast monitoring and public awareness

References

Addamo AM, Laroche P, Hanke G, 2017. Top Marine Beach Litter Items in Europe, EUR 29249 EN, Publications Office of the European Union, Luxembourg, ISBN 978-92-79-87711-7, doi:10.2760/496717, JRC108181

Alkalay R, Pasternak G, Zask A, 2007. Clean-coast index—A new approach for beach cleanliness assessment. Ocean Coast Manage 50(5-6):352-362

Bathing Water Identity Register, 2018. Website: www.bathingwaterprofiles.gr (Accessed on 13/12/2018)

Bellas J, Martínez-Armental J, Martínez-Cámara A, Besada V, Martínez-Gómez C, 2016. Ingestion of microplastics by demersal fish from the Spanish Atlantic and Mediterranean coasts. Mar Pollut Bull 109:55-60

Blue Flags Greece, 2018. Website: https://eepf.gr/el/blueflag (Accessed on 12/12/2018)

BlueFlag Global, 2018. Website: www.blueflag.global (Accessed on 12/12/2018)

Borja A, Barbone E, Basset E, Borgersen G, Brkljacic M, Elliott M, et al 2011. Response of single benthic metrics and multi-metric methods to anthropogenic pressure gradients, in five distinct European coastal and transitional ecosystems. Mar Pollut Bull 62:499-513

Camarsa G, Toland J, Potter J, O'Donnell B, Travagnin C, 2018. LIFE and the EU Plastics Strategy. Publications Office of the European Union, European Commission- Environment Directorate. 46pp. doi: 10.2779/4462

Camedda A, Marra S, Matiddi M, Massaro G, Coppa S, Perilli A, et al 2014. Interaction between loggerhead sea turtles (Caretta caretta) and marine litter in Sardinia (Western Mediterranean Sea). Mar Environ Res 100: 25-32

Campani T, Baini M, Giannetti M, Cancelli F, Mancusi C, Serena F, et al 2013. Presence of Plastic Debris in Loggerhead Turtle Stranded Along the Tuscany Coasts of the Pelagos Sanctuary for Mediterranean Marine Mammals (Italy). Mar Pollut Bull 74:225-230.

Casale P, Affronte M, Insacco G, Freggi D, Vallini C, d'Astore PP et al, 2010. Sea turtle strandings reveal high anthropogenic mortality in Italian waters. Aquat Conserv 20:611-620

Casale P, 2011. Sea turtle by-catch in the Mediterranean. Fish Fish 12: 299–316

Casale P, Freggi D, Paduano V, Oliverio M, 2016. Biases and best approaches for assessing debris ingestion in sea turtles, with a case study in the Mediterranean. Mar Pollut Bull 110:238–249

Casale P, Broderick AC, Camiñas JA, Cardona L, Carreras C, Demetropoulos A, et al 2018. Mediterranean sea turtles: current knowledge and priorities for conservation and research Endang Species Res 36:229-267

Chalkiopoulos A, Sotiropoulou M, Verdonck J, Korres J, Petichakis G, Perivoliotis L, Kavvadas S, Machias A, Giannoulaki M, Kytinou H, Mantopoulou-Palouka D et al, 2017. Implementation of an integrated marine water monitoring program, GR02- Integrated management if sea and inland waters. Financial mechanism of the European Economic Area 2009-2014. Final report on the implementation and results. Deliverable 5/5.6. Hellenic Centre for Marine Research (HCMR). 33pp. Retrieved from http://immpeea.hcmr.gr/sites/default/files/Deliverable_5.6_final_version.pdf (Accessed on 10/01/2019) Codina-García M, Militão T, Moreno J, González-Solis J, 2013. Plastic debris in Mediterranean seabirds. Mar Pollut Bull 77: 220-226

Collignon A, Hecq J, Galgani F, Voisin P, Collard F, Goffart A, 2012. Neustonic microplastic and zooplankton in the North Western Mediterranean Sea. Mar Pollut Bull 64:861-864

Cózar A, Sanz-Martín M, Martí E, González-Gordillo JI, Ubeda B, Gálvez JÁ, et al 2015. Plastic accumulation in the Mediterranean Sea. PLoS ONE 10:e0121762

Darmon G, Miaud C, Claro F, Gambaiani D, Dell'Amico F, Galgani F, 2014. Pertinence des tortues caouannes comme indicateur de densité de déchets en Méditerranée Dans le cadre de la Directive Cadre Stratégie pour le Milieu Marin (indicateur 2.1 du descripteur n°10). CONTRACT report, CNRS/ IFREMER, 13/3212068, 34pp.

De Stephanis R, Gimenez J, Carpinelli E, Canadas LA, 2013. As main meal for sperm whales: Plastics debris. Mar Pollut Bull 69(1-2): 206-214

DG ENV, & DG GROW, 2017. ROADMAP Strategy on Plastics in a Circular Economy (Vol. 1). Retrieved from http://ec.europa.eu/environment/circulareconomy/index_en.htm%0Ahttp://ec.europa.eu/environment/waste/plastic_waste.htm

Digka N, Tsangaris C, Kaberi H, Adamopoulou A, Zeri C, 2018a. Microplastic Abundance and Polymer Types in a Mediterranean Environment. In: Cocca M, Di Pace E, Errico M, Gentile G, Montarsolo A, Mossotti R (eds) Proceedings of the International Conference on Microplastic Pollution in the Mediterranean Sea. Springer Water. Springer, Cham

Digka N, Tsangaris C, Torre M, Anastasopoulou A, Zeri C, 2018b. Microplastics in mussels and fish from the Northern Ionian Sea. Mar Pollut Bull 135:30-40

ENVI, 2017. Report at the Workshop "EU action to combat marine litter". Study for the ENVI Committee. Directorate-General for Internal Policies, Policy Department, Enconomic and Scientific Policy, Environment, Public Health and Food Safety. Brussels, May 2017. 39pp. Retrieved from:

www.europarl.europa.eu/RegData/etudes/STUD/2017/602059/IPOL_STU(2017)602059_EN.pdf

European Commission (EC), 2017. Report from the commission to the European Parliament, the council, the European Economic and Social Committee and the Committee of the Regions. Official Journal of the European Union, COM(2017)(33), 1-14

EUROSTAT, 2018. Waste Statistics. https://ec.europa.eu/eurostat/statistics-explained/index.php/Waste_statistics#Waste_treatment (Accessed on 20/12/2018)

Galgani F, Fleet D, van Franeker J, Katsavenakis S, Maes T, Mouat J, Oosterbaan L, et al. 2010. Marine Strategy Framework Directive Task Group 10 Report Marine litter, JRC Scientific and Technical Report, ICES/JRC/IFREMER Joint Report (No. 31210-2009/2010), Ed. by N. Zampoukas. 57 pp.

Galgani F, Hanke G, Werner S, Piha H, 2011. MSFD GES Technical Subgroup on Marine Litter. Technical Recommendations for the Implementation of MSFD Requirements. JRC Scientific and Technical Report, EUR 25009 EN - 2011. 93 pp.

Galgani F, Hanke G, Werner S, De Vrees L, 2013a. Marine litter within the European Marine Strategy Framework Directive. ICES Mar Sci 70: 1055-1064

Galgani F, Hanke G, Werner S, Oosterbaan L, Nilsson P, Fleet D, Kinsey S et al, 2013b. Guidance on Monitoring of Marine Litter in European Seas. A guidance document within the Common Implementation Strategy for the Marine Strategy Framework Directive. MSFD Technical Subgroup on Marine Litter (TSGL ML). Scientific and Policy Reports, Joint Research Centre (JRC), Institute for Environment and Sustainability. 128 pp.

Gallo F, Fossi C, Weber R, Santillo D, Sousa J, Ingram I, Nadal A, et al 2018. Marine litter plastics and microplastics and their toxic chemicals components: the need for urgent preventive measures. Environ Sci Eur 30(1):13

Greek Statistical Authority, 2017. Population Statistics. Website: www.statistics.gr/statistics/pop (Accessed on 20/12/2018)

International Hydrographic Organization (IHO), 1953. Limits of Oceans and Seas, International Hydrographic Organization, Bremerhaven, PANGAEA, hdl: 10013 / epic. 37175.

Ioakeimidis C, Zeri C, Kaberi H, Galatchi M, Antoniadis K, Streftaris N, et al 2014. A comparative study of marine litter on the seafloor of coastal areas in the Eastern Mediterranean and Black Seas. Mar Pollut Bull 89:296-304

loakeimidis C, Papatheodorou G, Fermeli G, Streftaris N, Papathanassiou E, 2015. Use of ROV for assessing marine litter on the seafloor of Saronikos Gulf (Greece): a way to fill data gaps and deliver environmental education. Springerplus 4:463

Jambeck JR, Geyer R, Wilcox C, Siegler TR, Perryman M, Andrady A et al 2015. Plastic waste inputs from land into the ocean. Science, 347:768-771

Jorissen F, 2014. Colonization by the benthic foraminifer Rosalina (*Tretomphalus concinna*) of Mediterranean drifting plastics. In: CIESM 2014. Marine litter in the Mediterranean and Black Seas. CIESM Workshop Monograph n° 46 [F. Briand, ed.], 180 p., CIESM Publisher, Monaco, pp 87-97.

Katikou P, Zacharaki Th, Papazachariou A, 2016. Guidance for sampling of laboratorie controls in mollusks for the presence of marine biotoxins from the National Laboratory of Marine Biotoxins. Ministry of Rural Development and Food. 8pp. Retrieved from: http://www.minagric.gr/images/stories/docs/agrotis/Alievmata/odigies_deigmatolopsias_2912 16.pdf (Accessed on 06/01/2019)

Katsanevakis S, Katsarou A, 2004. Influences on the distribution of marine debris on the seafloor of shallow coastal areas in Greece (Eastern Mediterranean). Water Air Soil Pollut 158:325-337

Kornilios S, Drakopoulos PG, Dounas C, 1998. Pelagic tar, dissolved/dispersed petroleum hydrocarbons and plastic distribution in the Cretan Sea, Greece. Mar Pollut Bull 36:989-993

Koutsodendris A, Papatheodorou A, Kougiourouki O, Georgiadis M, 2008. Benthic marine litter in four Gulfs in Greece, Eastern Mediterranean; abundance, composition and source identification. Estuarine Coast Shelf Sci 77:501-512

Let's Do It - GREECE campaign, 2018. Website: www.letsdoitgreece.org (Accessed on 13/12/2018)

LIFE DEBAG, 2016. Current status of the plastic bag issue. Action A.1. Deliverable. Integrated information and awareness campaign for the reduction of plastic bags in the marine environment. LIFE14 GIE/GR/001127. 174pp.

Liubartseva S, Coppini G, Lecci R, Clementi E, 2018. Tracking plastics in the Mediterranean: 2D Lagrangian model. Mar Pollut Bull 129: 151-162

Lynch JM, 2018. Quantities of marine debris ingested by sea turtles: Global meta-analysis highlights need for standardized data reporting methods and reveals relative risk. Environ Sci

Technol 52:12026-12038

Marcou M, Marn N, Suárez Muñoz M, Macías FP, Kalachani F, Parenzan T, Serrini A, 2016. Med-Zero-Plastic Action Plan, Targeting the marine litter of the tourism industry in the Mediterranean Sea. Massive Open Online Course on Marine Litter, Netherlands Open Universiteit. 33pp.

MARILISCO, 2014. The MARLISCO Guide for Reducing Marine Litter: Get Inspired and Become Innovative Through Best Practices. ISOTECH LTD.

Marine LitterWatch (MLW), 2018. Website: www.eea.europa.eu/themes/coast_sea/marinelitterwatch/marinelitterwatch; Data Viewer: www.eea.europa.eu/themes/water/europes-seasand-coasts/assessments/marine-litterwatch/data-and-results/marine-litterwatch-data-viewer (Accessed on 05/01/2019)

Marine Strategy Framework Directive (MSFD) Greece, 2012. Technical report for the preparation stage of Action Plan for Marine Strategies in Greece, for the implementation of Marine Strategy Framework Directive 2008/56/EC. 351pp. Retrieved from: http://cdr.eionet.europa.eu/gr/eu/msfd8910/msfd4text/envux5k3g/GR_PAPER_REPORT_20130 430.en.pdf (accessed on 20/01/2019)

Maso M, Garces E, Pages F, Camp J, 2003. Drifting plastic debris as a potential vector for dispersing Harmful Algal Bloom (HAB) species. Sci Mar 67:107-111

Med-IAMER, 2015. MedMaritime Integrated Projects. Final Report Implementation period: 01/06/2014 – 31/05/2015. 397pp. www.medmaritimeprojects.eu/section/med-iamer-redirect/outputs (Accessed on 25/11/2018)

MEDITS, 2012. International bottom trawl survey in the Mediterranean, MEDITS-Handbook. Revision n. 6, April 2012, MEDITS Working Group : 92 pp. Retrieved from: https://archimer.ifremer.fr/doc/00117/22783/20585.pdf (Accessed on 10/12/2018)

MEPC, 2018. Revised Consolidated Guidance for port reception facility providers and users. International Maritime Organization (IMO). MEPC.1/Circ.834/Rev.1. Retrieved from: http://www.imo.org/en/OurWork/Environment/PortReceptionFacilities/Documents/MEPC.1-Circ.834-Rev.1.pdf (Accessed on 08/12/2018)

Ministry of Environment and Energy (MEE), 2014. National Strategic Plan for the Prevention of
waste production. 190pp. Retrieved from:
http://www.ypeka.gr/LinkClick.aspx?fileticket=2Y2%2B%2BPSM4P0%3D&tabid=238&tlanguage=el-
GR (Accessed on 05/12/2018)

Ministry of Environment and Energy (MEE), 2015a. National Plan for Management of Waste. 125pp. Retireved from: http://www.ypeka.gr/LinkClick.aspx?fileticket=OI1lVu124Jk%3D&tabid=238&language=el-GR

(Accessed on 05/12/2018) Ministry of Environment and Energy (MEE), 2015b. Preliminary assessment of the existing

Anistry of Environment and Energy (MEE), 2015b. Preliminary assessment of the existing available data for the final drafting of monitoring programs for the ongoing assessment of the environmental status of the Greek marine waters (in accordance with the requirements of Article 11 of Directive 2008/56 / EC and as provided for in paragraph 1 of article 11 of Law 3983/2011). Retrieved from:

http://www.ypeka.gr/LinkClick.aspx?fileticket=G2rq6tfUyzE%3D&tabid=232&language=el-GR (Accessed on 15/11/2018)

Ministry of Environment and Energy (MEE), 2017. Action Plan, Implementation of Article 13 of

the Marine Strategy Framework Directive (2008/56/EC). Special Secretariat for waters, Ministry of Environment and Energy. Athens, March 2017. 28pp.

Ministry of Environment and Energy (MEE), 2018a. Marine Strategy Framework Directive (2008/56/EC). First six-year implementation cycle (2012-2018). Article 8: Recording of the status of marine waters, Articles 9 & 10: Determination of Good Environmental Status and Environmental objectives. Technical Report. Athens, October 2018. 322pp.

Ministry Environment and Energy (MEE), 2018b. Ad Hoc Open-Ended Expert Group on Marine Litter and Microplastics, Preliminary position paper - Greece. Special Secretariat for Water, Ministry of Environment and Energy. United Nations, Nairobi, Kenya, 29-31 May 2018 https://papersmart.unon.org/resolution/uploads/position_paper_greece.pdf

National Center for Environment and Sustainable Development (NCSD - EKPAA), 2018. Greece, Report on Environmental Status 2018. National Center for Environment and Sustainable Development. 285pp. Retrieved from: http://ekpaa.ypeka.gr/181019_Book-YPEKA_LOW.pdf

National MSFD Committee, 2017. Minutes of the Meeting of the National Committee for the Marine Strategy Framework Directive. Meeting Room 728 of the Ministry of the Environment and Energy, the National Marine Environmental Strategy Committee, 24.07.2017. Retrieved from: www.ypeka.gr/LinkClick.aspx?fileticket=PEC5ims6gM0%3D&tabid=254&language=el-GR (Accessed on 01/12/2018)

National Network of Monitoring Waters (NNMW), 2019. Website: http://nmwn.ypeka.gr (Accessed on: 18/12/2018)

Papadopoulou K-N, Smith CJ, Apostolidis Ch, Karachle PK, 2015a. Trawled up marine litter, first observations from Heraklion Bay. Proceedings of 11th Panhellenic Symposium of Oceanography and Fisheries, 13-17 May 2015, Mytilene, Lesvos, Greece. 373-376

Papadopoulou N, Anastasopoulou A, Mytilineou Ch, Smith CJ, Stamouli C, 2015b. Seabed marine litter, comparison of 4 Aegean trawling grounds. Proceedings of 11th Panhellenic Symposium of Oceanography and Fisheries, 13-17 May 2015, Mytilene, Lesvos, Greece. 381-384

Pavlidou A, Simboura N, Rousselaki E, Tsapakis M, Pagou K, Drakopoulou P, et al 2015. Methods of eutrophication assessment in the context of the water framework directive: Examples from the Eastern Mediterranean coastal areas. Cont Shelf Res 108:156-168

PNUE/PAM/MEDPOL, 2009. Results of the assessment of the status of marine litter in the Mediterranean. Meeting of MED POL Focal Points No. 334, 91 pp.

Politikos DV, Ioakeimidis C, Papatheodorou G, Tsiaras , 2017. Modeling the Fate and Distribution of Floating Litter Particles in the Aegean Sea (E. Mediterranean). Front Mar Sci 4:191

POSEIDON network, 2019. Website: www.poseidon.hcmr.gr (Accessed on 08/01/2019)

Prevenios M, Zeri C, Tsangaris C, Lyubartseva S, Fakiris E, Papatheodorou G, 2017. Beach litter dynamics on Mediterranean coasts: Distinguishing sources and pathways. Mar Pollut Bull 129(2):448-457

Romeo T, Pietro B, Pedà C, Consoli P, Andaloro F, Fossi MC, 2015. First evidence of presence of plastic debris in stomach of large pelagic fish in the Mediterranean Sea. Mar Pollut Bull 95:358-361

Sanchez P, Maso M, Saez R, De Juan S, Muntadas A, Demestre M, 2013. Baseline study of the distribution of marine debris on soft-bottom habitats associated with trawling grounds in the northern Mediterranean. Sci Mar 77: 247-255

Schnell A, Klein N, Gómez Girón E, Sousa J, 2017. National marine plastic litter policies in EU Member States: an overview. Brussels, Belgium: IUCN viii+64 pp.

Secretariat of the Convention on Biological Diversity (CBD) and the Scientific and Technical Advisory Panel–GEF (2012). Impacts of Marine Debris on Biodiversity: Current Status and Potential Solutions, Montreal, Technical Series No. 67, 61 pages.

Secretariat of the Convention on Biological Diversity (CBD), 2016. Marine Debris: Understanding, Preventing and Mitigating the Significant Adverse Impacts on Marine and Coastal Biodiversity. Technical Series No.83. Secretariat of the Convention on Biological Diversity, Montreal, 78 pages.

Seemann B, Detubio G, Villanueva RM, 2016. Designs for success: Best practices in local waste management. Konrad-Adenauer-Stiftung. 61pp.

Stefatos A, Charalampakis M, Papatheodorou G, Ferentinos G, 1999. Marine debris on the seafloor of the Mediterranean Sea: examples from two enclosed gulfs in Western Greece. Mar Pollut Bull 36:389-393

Tomás J, Guitart R, Mateo R, Raga JA, 2002. Marine debris ingestion in loggerhead sea turtles, *Caretta caretta*, from the Western Mediterranean. Mar Pollut Bull 44:211-216

Tomás J, Gozalbes P, Raga JA, Godley BJ, 2008. Bycatch of loggerhead sea turtles: insights from 14 years of stranding data. Endang Species Res 5: 161–169

Topcu ED, Tonay AM, Öztürk B, 2010. Preliminary study on marine litter in the Aegean Sea. Rapp Comm int Mer Médit 39:804

UNEP, 2016. Marine plastic debris and microplastics - Global lessons and research to inspire action and guide policy change. United Nations Environment Programme, Nairobi. 274pp. Available at http://wedocs.unep.org/handle/20.500.11822/7720

UNEP and GRID-Arendal, 2016. Marine Litter Vital Graphics. United Nations Environment Programme and GRID-Arendal. Nairobi and Arendal. www.unep.org, www.grida.no

UNEP/IOC/FAO, 1991. Assessment of the state of pollution of the Mediterranean Sea by persistent synthetic materials, which can float, sink or remain in suspension. MAP Technical Reports Series No. 56. UNEP, Athens, 113 p.

UNEP/MAP/MED POL, 2004. Guidelines on management of coastal litter for the Mediterranean region. MAP Technical Reports Series No.148, UNEP/MAP, Athens, 2004.

UNEP-MAP, 2011. Draft decision on the adoption of the strategic framework for marine litter management. UNEP(DEPI)/MED WG.363/13. Meeting of MAP focal points, Athens 2011. 73pp.

UNEP-MAP, 2012. Report on the 17th Ordinary Meeting of the Contracting Parties to the Convention for the Protection of the Marine Environment and the Coastal Region of the Mediterranean and its Protocols. UNEP(DEPI)/MED IG 20/8, Annex II. Paris (France), 8-10 February 2012. 130pp.

UNEP-MAP, 2015a. 1st Report of the Informal Online Working Group on Marine Litter UNEP (DEPI)/MED WG.411/Inf.10, 59 pages.

UNEP-MAP, 2015b. Marine Assessment in the Mediterranean. United Nations Environment Programme, Mediterranean Action Plan (UNEP/MAP MED POL). Athens. 86pp. Available at http://web.unep.org/unepmap/marine-litter-assessment-mediterranean-2015-0

UNEP-MAP, 2016a. Integrated Monitoring and Assessment Programme of the Mediterranean Sea

and Coast and Related Assessment Criteria UNEP/MAP Athens, Greece. 26pp.

UNEP-MAP, 2016b. Background Document on Best Practices to tackle Land-Based and Sea-Based Sources of Marine Litter. Agenda item 5 and 6: Best Practices to tackle Land-Based Sources of Marine Litter, and Best Practices to tackle Sea-Based Sources of Marine Litter Regional Meeting on the Further Implementation of the Regional Plan for the Management of Marine Litter in the Mediterranean. UNEP(DEPI)/MED WG.424/3. Tirana, Albania, 19-20 July 2016. 33pp.

UNEP-MAP, 2016c. Regional Meeting on the Further Implementation of the Regional Plan for the Management of Marine Litter in the Mediterranean. Agenda item 3: Implementation of the Regional Plan for Marine Litter Management in the Mediterranean. Decision IG.22/10 Implementing the Marine Litter Regional Plan in the Mediterranean (Fishing for Litter Guidelines, Assessment Report, Baselines Values, and Reduction Targets). UNEP(DEPI)/MED WG.424/Inf.4. Tirana, Albania, 19-20 July 2016. 33pp.

UNEP-MAP, 2016d. Agenda item 4: Enhanced knowledge on amounts, sources and impacts of Marine Litter, including micro-plastics. Regional Survey on Abandoned, Lost or Discarded Fishing Gear (ALDFG) and Ghost Nets in the Mediterranean. Regional Meeting on the Further Implementation of the Regional Plan for the Management of Marine Litter in the Mediterranean Tirana (UNEP(DEPI)/MED WG.424/Inf.7), Albania, 19-20 July 2016. 37pp.

UNEP-MAP, 2016e. Protocol under the Marine Litter Regional Plan in the Mediterranean (Fishing for Litter Guidelines, Assessment Report, Baselines Values, and Reduction Targets). Implementation of the Regional Plan for Marine Litter Management in the Mediterranean Decision IG.22/10 Retrieved from https://wedocs.unep.org/bitstream/handle/20.500.11822/6157/16wg424_inf4_eng.pdf?sequen ce=1&tisAllowed=y

UNEP-MAP, 2016f. Roundtable "Enhancing Regional Coordination on Marine Litter in the Mediterranean", Agenda item 4: Partnership for implementing the Regional Plan on Marine Litter Management in the Mediterranean and the need for coordinated action Regional Cooperation Platform on Marine Litter to facilitate the implementation of the "Regional Plan on Marine Litter Management in the Mediterranean" adopted by Decision IG.21/7 of COP 18 of the Barcelona Convention, Istanbul, Turkey 2013. UNEP(DEPI)/MED WG.425/2/Corr.1. Athens, Greece, 6 September 2016

UNEP/NOAA, 2011. The Honolulu Strategy. Retrieved from: https://marinedebris.noaa.gov/sites/default/files/publications-files/Honolulu_Strategy.pdf (Accessed on 25/10/2018)

Valavanidis A, Vlachogianni T, 2012. Marine Litter: Man-made Solid Waste pollution in the Mediterranean Sea and Coastline. Abundance, Composition and Sources Identification. Available at: www.chem-tox-ecotox.org. Science Advances in Environmental Pollution, Toxicology and Ecotoxicology

Vlachogianni T, Anastasopoulou A, Fortibuoni T, Ronchi F, Zeri C, 2017. Marine litter assessment in the Adriatic and Ionian seas. IPA-Adriatic DeFishGear Project, MIO-ECSDE, Project Report. 167pp. Available at: http://mio-ecsde.org/project/5054 (Accessed on 05/11/2018)

Vlachogianni T, Fortibuoni T, Ronchi F, Zeri C, Mazziotti C, Tutman P, Bojanić Varezić D, Palatinus A, Trdan S, Peterlin M, Mandić M, Markovic O, Prvan M, Kaberi H, Prevenios M, Kolitari J, Kroqi G, Fusco M, Kalampokis E, Scoullos M, 2018. Marine litter on the beaches of the Adriatic and Ionian Seas: An assessment of their abundance, composition and sources. Mar Pollut Bull 131:745-756

Wallace BP, Lewison RL, McDonald SL, McDonald RK et al 2010. Global patterns of marine turtle bycatch. Conserv Lett 3: 131–142

Wangyao K, Towprayoon S, Chiemchaisri C, Gheewala S, Nopharatana A, 2009. Application of the IPCC Waste Model to solid waste disposal sites in tropical countries: case study of Thailand. Environmental Monitoring and Assessment, 164(1-4):249-261

Werner S, Budziak A, van Franeker J, Galgani F, Hanke G, Maes T, Matiddi M, et al 2016. Harm caused by Marine Litter. MSFD GES TG Marine Litter - Thematic Report; JRC Technical report; EUR 28317 EN. 89pp.

Wyles KJ, Pahl S, Holland M, Thompson RC, 2017. Can beach cleans do more than clean-up litter? Comparing beach cleans to other coastal activities. Environment and Behavior, Vol. 49(5) 509 -535

UNEP-MAP, 2017. Action Plan for the Conservation of Cetaceans in the Mediterranean Sea. UN Environment/MAP Athens, Greece 2017. 10pp. www.rac-spa.org/sites/default/files/action_plans/ap_cetaceans_en.pdf

ACCOBAMS, 2016. The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS) Strategy (Period 2014-2020). www.accobams.org/new_accobams/wp-content/uploads/2016/06/ACCOBAMS_Strategy.pdf

Appendix 1

List of stakeholders in Greece related to marine litter

| No. | Organisation | Organisation Type | Organisation Sector | Target group | Authority scale | Organisation Website |
|-----|--------------------------------------------------------------------------------------|-------------------|---------------------|-------------------------------|----------------------------|-----------------------------------------|
| 1 | Federation of Greek Maricultures (SETH) | NGO/ Association | Aquaculture | business support organisation | National | www.fgm.com.gr |
| 2 | President of Pan-Hellenic Union of Middle Range Fisheries Ship owners | NGO/ Association | Fisheries | business support organisation | Local | |
| 3 | Professional Fishing Association "The Aegean" | NGO/ Association | Fisheries | business support organisation | Local | |
| 4 | Small Scale fisheries representative | NGO/ Association | Fisheries | business support organisation | Local | |
| 5 | Encircling nets fisheries Representative | NGO/ Association | Fisheries | business support organisation | National | |
| 6 | Pan-Hellenic Union of Middle Range Fisheries Ship owners | NGO/ Association | Fisheries | business support organisation | National | |
| 7 | Association of Owners of Greek Tourist Boats (EPEST) | NGO/ Association | Maritime transport | business support organisation | National | www.epest.gr, www.hpyoa.gr |
| 8 | Association of Shipowners of Ferries | NGO/ Association | Maritime transport | business support organisation | National | |
| 9 | Greek Association of Real Estate Consultants and Yachts Experts | NGO/ Association | Maritime transport | business support organisation | National | www.hyba.gr |
| 10 | Greek Marinas Association (GMA) | NGO/ Association | Maritime transport | business support organisation | National | www.greek-marinas.gr |
| 11 | Panhellenic Association of Professional Tourist Boat Boats (P.EN.E.T.I.S.) | NGO/ Association | Maritime transport | business support organisation | National | |
| 12 | Shipowners' Association of Passenger Ships (EEEP) | NGO/ Association | Maritime transport | business support organisation | National | |
| 13 | Network for Reform in Greece and Europe | NGO/ Association | Other | business support organisation | National/ International | http://todiktio.eu/ |
| 14 | Association of Greek Tourist Enterprises (SETE) | NGO/ Association | Tourism | business support organisation | National | www.sete.gr |
| 15 | Association of Owners of Professional Vessel Tours - Sailing Yauchts (SITESAP) | NGO/ Association | Tourism | business support organisation | National | www.sitesap.gr |
| 16 | Chamber of Commerce of Greece | NGO/ Association | Tourism | business support organisation | National | www.grhotels.gr |
| 17 | Confederation of Tourist Enterprises of Greece (SETKE) | NGO/ Association | Tourism | business support organisation | National | www.setke.gr; www.greekapartments.gr |
| 18 | General Pan-Hellenic Federation of Tourism Enterprises (GEPOET) | NGO/ Association | Tourism | business support organisation | National | www.gepoet.gr |
| 19 | Institute for Tourism Research and Forecasting (ITEP) | NGO/ Association | Tourism | business support organisation | National | www.itep.gr |

| 20 | Pan-Hellenic Association of Camping Owners | NGO/ Association | Tourism | business support organisation | National | www.panhellenic- camping-union.gr, www.greececamping.org |
|----|-------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------------------------|----------------------------------------------------------------------------|---------------|----------------------------------------------------------------|
| 21 | Panhellenic Federation of Hoteliers (POH) | NGO/ Association | Tourism | business support organisation | National | www.hhf.gr |
| 22 | Visit Greece | NGO/ Association | Tourism | business support organisation | National | www.visitgreece.gr |
| 23 | Aegean Rebreath | NGO/ Association | Environment | business support organisation; education/ training centre and school | Local | http://www.aegeanrebrea th.org/ |
| 24 | All For Blue | NGO/ Association | Diving/ Environment | education/ training centre and school | National | https://allforblue.org |
| 25 | ENALION | NGO/ Association | Education | education/ training centre and school | National | www.enalionoffshore.gr |
| 26 | Hellenic Association of Educators for Environmental Education (HAEEE) | NGO/ Association | Education | education/ training centre and school | National | http://peekpeattikis.gr |
| 27 | Lambrakis foundation | NGO/ Association | Education | education/ training centre and school | National | http://www.lrf.gr/ |
| 28 | Let's Do It Greece | NGO/ Association | Education | education/ training centre and school | National | www.letsdoitgreece.org |
| 29 | ENALEIA | NGO/ Association | Fisheries/ Education | education/ training centre and school | National | http://enaleia.com/ |
| 30 | Cretaquarium - Hellenic Centre for Marine Research (HCMR) | Education/ Research | Education/ Environment | higher education and research | National | www.cretaquarium.gr |
| 31 | Rhodes Aquarium - Hellenic Centre for Marine Research (HCMR) | Education/ Research | Education/ Environment | higher education and research | National | https://rhodes- aquarium.hcmr.gr |
| 32 | ACCOBAMS | Education/ Research | Environment | higher education and research | International | www.accobams.org |
| 33 | Pelagos Cetacean Research Institute | Education/ Research | Environment | higher education and research | International | www.pelagosinstitute.gr |
| 34 | Institute of Fisheries Research (INALE) -Greek Agricultural Organization DIMITRA (ELGO - DIMITRA), Ministry of Rural Development and Food | Education/ Research | Fisheries/ Environment | higher education and research | National | https://inale.gr |
| 35 | Institute of Marine Biological Resources and Inland Waters - Hellenic Centre for Marine Research (HCMR) | Education/ Research | Fisheries/ Environment | higher education and research | National | www.hcmr.gr |
| 36 | Institute of Oceanography - Hellenic Centre for Marine Research (HCMR) | Education/ Research | Fisheries/ Environment | higher education and research | National | <u>claim@hcmr.gr;</u> www.hcmr.gr |

| 37 | Laboratory of Marine Geology and Physical Oceanography, Department of Geology | Education/ Research | Fisheries/ Environment | higher education and research | National | www.lifedebag.eu |
|----|-------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------------|---------------|--------------------------------------------------------------|
| 38 | University of Patras | Education/ Research | Environment | higher education and research | National | http://www.geology.upatr as.gr |
| 39 | University of the Aegean, Department of Marine Sciences | Education/ Research | Fisheries/ Environment | higher education and research | National | https://www.mar.aegean. gr/people/cv/katsanevakis .php |
| 40 | Mediterranean Scientific Association of Environmental Protection (MESAEP) | NGO/ Association | Environment | higher education and research | International | www.mesaep.org |
| 41 | Oceana | NGO/ Association | Environment | higher education and research | International | https://oceana.org; https://eu.oceana.org |
| 42 | Hellenic Recovery Recycling Corporation | Other | Industry | infrastructure and (public) service provider | National | www.herrco.gr |
| 43 | Coastguard of Aegina | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 44 | Coastguard of Agios Nikolaos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 45 | Coastguard of Alexandroupoli | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 46 | Coastguard of Andros | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 47 | Coastguard of Chalkida | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 48 | Coastguard of Chania | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 49 | Coastguard of Chios | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 50 | Coastguard of Corfu | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 51 | Coastguard of Edipsos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 52 | Coastguard of Elefsinas | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 53 | Coastguard of Gytheio | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 54 | Coastguard of lerapetra | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 55 | Coastguard of lerissos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |

| 56 | Coastguard of Igoumenitsas | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
|----|----------------------------|----------------------------------------|----------------------------------------|----------------------------------------------|-------|---------------|
| 57 | Coastguard of los | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 58 | Coastguard of Irakleio | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 59 | Coastguard of Itea | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 60 | Coastguard of Ithaki | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 61 | Coastguard of Kalamata | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 62 | Coastguard of Kalymnos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 63 | Coastguard of Karpathos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 64 | Coastguard of Karystos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 65 | Coastguard of Katakolo | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 66 | Coastguard of Kavala | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 67 | Coastguard of Kefallinia | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 68 | Coastguard of Korinthos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 69 | Coastguard of Kos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 70 | Coastguard of Kymi | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 71 | Coastguard of Lavrio | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 72 | Coastguard of Lefkada | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 73 | Coastguard of Leros | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 74 | Coastguard of Messolongi | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 75 | Coastguard of Milos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |

| 76 | Coastguard of Mykonos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
|----|-------------------------|----------------------------------------|----------------------------------------|----------------------------------------------|-------|---------------|
| 77 | Coastguard of Myrina | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 78 | Coastguard of Mytilene | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 79 | Coastguard of Nafplio | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 80 | Coastguard of Naxos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 81 | Coastguard of Neapoli | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 82 | Coastguard of Paros | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 83 | Coastguard of Patmos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 84 | Coastguard of Patra | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 85 | Coastguard of Piraeus | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 86 | Coastguard of Poros | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 87 | Coastguard of Preveza | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 88 | Coastguard of Pylos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 89 | Coastguard of Rafina | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 90 | Coastguard of Rethimno | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 91 | Coastguard of Rhodes | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 92 | Coastguard of Samos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 93 | Coastguard of Saronikos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 94 | Coastguard of Siteia | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 95 | Coastguard of Skiathos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |

| 96 | Coastguard of Spetses | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
|-----|-------------------------------------------------------------------------------------|----------------------------------------|----------------------------------------|----------------------------------------------|----------|-------------------------------|
| 97 | Coastguard of Stylida | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 98 | Coastguard of Symi | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 99 | Coastguard of Syros | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 100 | Coastguard of Thessaloniki | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 101 | Coastguard of Thira | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 102 | Coastguard of Tinos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 103 | Coastguard of Volos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 104 | Coastguard of Ydra | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 105 | Coastguard of Zakynthos | Statutory body/ Competent authority | Port/ Maritime transport/ Fisheries | infrastructure and (public) service provider | Local | http://hcg.gr |
| 106 | Ecological Recycling Company | NGO/ Association | Other | infrastructure and public service provider | National | http://www.ecorec.gr |
| 107 | Archipelagos Institute of Marine Conservation | NGO | Environment | Interest group including NGOs | National | http://archipelago.gr |
| 108 | Archelon | NGO/ Association | Environment | Interest group including NGOs | National | www.archelon.gr |
| 109 | ELLINIKI ETAIRIA (Hellenic Society for the Environment and Cultural Heritage) | NGO/ Association | Environment | Interest group including NGOs | National | www.ellet.gr |
| 110 | Greenpeace Greece | NGO/ Association | Environment | Interest group including NGOs | National | www.greenpeace.org |
| 111 | Hellenic Ornithological Society (EOE) | NGO/ Association | Environment | Interest group including NGOs | National | www.ornithologiki.gr |
| 112 | Hellenic Society for the Study and Protection of the Monk Seal (MOM) | NGO/ Association | Environment | Interest group including NGOs | National | www.mom.gr |
| 113 | iSea | NGO/ Association | Environment | Interest group including NGOs | National | https://isea.com.gr |
| 114 | Plastic Free Greece | NGO/ Association | Environment | Interest group including NGOs | National | www.plasticfreegreece.co m |
| 115 | Thalassa Foundation | NGO/ Association | Environment | Interest group including NGOs | National | www.thalassafoundation.c |

| 116 | World Wide Fund for Nature Greece (WWF Greece) | NGO/ Association | Environment | Interest group including NGOs | National | www.wwf.gr |
|-----|-------------------------------------------------------------------------------------------------------------|----------------------------------------|------------------------------------|----------------------------------------------------------------------------|----------------------------|----------------------------------------------------------------------------------|
| 117 | MEDASSET | NGO/ Association | Environment | Interest group including NGOs | National/ International | www.medasset.org |
| 118 | Mediterranean S.O.S. Network | NGO/ Association | Environment | Interest group including NGOs | National/ International | www.medsos.gr/ |
| 119 | Hellenic Marine Environment Protection Association (HELMEPA) | NGO/ Association | Environment/ Maritime transport | Interest group including NGOs | National | http://helmepa.gr |
| 120 | Athanasios K. Laskaridis Public Benefit Foundation - Collaboration Network for the marine environment | NGO/ Association | Maritime transport | Interest group including NGOs | National | <u>https://diktyogiatithalassa</u> .gr/ |
| 121 | Hellenic Society for the Protection of Nature (HSPN) | NGO/ Association | Environment/ Education | Interest group including NGOs/ education/ training centre and school | National | <u>https://eepf.gr;</u> <u>www.blueflag.org;</u> www.fee-international.org |
| 122 | Athens Environmental Foundation | NGO/ Association | Education | interest groups including NGOs | International | www.athensenvironmental .org |
| 123 | Mediterranean Education Initiative for Environment and Sustainability (MEdIES) | NGO/ Association | Education | interest groups including NGOs | International | www.medies.net |
| 124 | Network of Marine Protected Areas managers in the Mediterranean (MedPAN) | NGO/ Association | Environment | interest groups including NGOs | International | http://medpan.org |
| 125 | Seas at Risk | NGO/ Association | Environment | interest groups including NGOs | International | www.seas-at-risk.org |
| 126 | Mediterranean Information Office for Environment, Culture and Sustainable Development (MIO- ECSDE) | NGO/ Association | Environment/ Culture | interest groups including NGOs | International | http://mio-ecsde.org/ |
| 127 | European Environment Agency (EEA) | Governance decision making | Environment | international organisation under inter-national law | International | www.eea.europa.eu |
| 128 | International Union for Conservation of Nature (IUCN) | Governance decision making | Environment | international organisation under inter-national law | International | www.iucn.org/europe |
| 129 | Regional Activity Centre for Specially Protected Areas (RAC-SPA) | Governance decision making | Environment | international organisation under inter-national law | International | www.rac-spa.org |
| 130 | United Nations Environment Programme, Mediterranean Action Plan - Barcelona Convention | Governance decision making | Environment | international organisation under inter-national law | International | http://web.unep.org/une pmap; www.unenvironment.org |
| 131 | General Fisheries Commission for the Mediterranean (GFCM) | Governance decision making | Fisheries | international organisation under inter-national law | International | www.fao.org/gfcm |
| 132 | Municipality acharnon (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.acharnes.gr |
| 133 | Municipality agathonisiou (Region kalimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | |

| 134 | Municipality agias (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosagias.gr |
|-----|-------------------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|-----------------------------------------------------------|
| 135 | Municipality agias barbaras (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agiavarvara.gr |
| 136 | Municipality agias paraskevis (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agiaparaskevi.gr |
| 137 | Municipality agion anargiron - kamateroi (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agan.gov.gr |
| 138 | Municipality agiou basileiou (Region rethimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agios-vasilios.gr/ |
| 139 | Municipality agiou dimitriou (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dad.gr |
| 140 | Municipality agiou evstratiou (Region limnou) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 141 | Municipality agiou nikolaou (Region lasithiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosagn.gr |
| 142 | Municipality agkistriou (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agistri.gr |
| 143 | Municipality agrafon (Region evritanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agrafa.gr |
| 144 | Municipality agriniou (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agrinio.gr |
| 145 | Municipality aigaleo (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.egaleo.gr |
| 146 | Municipality aigialeias (Region achaias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.aigialeia.gov.gr |
| 147 | Municipality aiginas (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.aegina.gr/online/ , aeginadimos.wordpress.co m/ |
| 148 | Municipality aktiou - bonitsas (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.anaktorio.gr |
| 149 | Municipality alexandreias (Region imathias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.alexandria.gr |
| 150 | Municipality alexandroipolis (Region ebrou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.alexpolis.gr |
| 151 | Municipality aliartou-thespieon (Region boiotias) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 152 | Municipality alimou (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.alimos.gr |
| 153 | Municipality almiroi (Region magnisias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.almyros-city.gr |
| 154 | Municipality almopias (Region pellas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosalmopias.gov.g <u>r</u> |
|-----|----------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|----------------------------------------------------|
| 155 | Municipality alonnisou (Region sporadon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.alonissos.gr |
| 156 | Municipality amariou (Region rethimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimossyvritou.gr |
| 157 | Municipality amarousiou (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.maroussi.gr |
| 158 | Municipality amfikleias - elateias (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.dimos-amfiklias-</u> <u>elatias.gr</u> |
| 159 | Municipality amfilochias (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.amfiloxia.gov.gr |
| 160 | Municipality amfipolis (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos-amfipolis.gr |
| 161 | Municipality amintaiou (Region florinas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.amyntaio.gr |
| 162 | Municipality amorgoi (Region naxou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.amorgos.gov.gr |
| 163 | Municipality ampelokipon - menemenis (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ampelokipi- menemeni.gr |
| 164 | Municipality anafis (Region thiras) | Statutory body/ Competent authority | Other | Local public authority | Local | www.anafi.gr |
| 165 | Municipality anatolikis manis (Region lakonias) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.anatolikimani.gov.gr</u> , www.anmani.gr |
| 166 | Municipality andrabidas - killinis (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.lehena.gov.gr |
| 167 | Municipality andritsainas - krestenon (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 168 | Municipality androu (Region androu) | Statutory body/ Competent authority | Other | Local public authority | Local | www.andros.gr |
| 169 | Municipality anogeion (Region rethimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.anogeia.gr |
| 170 | Municipality antiparou (Region parou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.antiparos.gr |
| 171 | Municipality apokoronou (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | www.apokoronas.gov.gr |
| 172 | Municipality archaias olimpias (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.arxaiaolympia.gov.gr |
| 173 | Municipality archanon - asterousion (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos-archanon- asterousion.gr |

| 174 | Municipality argitheas (Region karditsas) | Statutory body/ Competent authority | Other | Local public authority | Local | |
|-----|------------------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|--------------------------|
| 175 | Municipality argous - mikinon (Region argolidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.argos.gr |
| 176 | Municipality argous orestikoi (Region kastorias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.argosorestiko.gr |
| 177 | Municipality aristoteli (Region chalkidikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ierissos.gr |
| 178 | Municipality arrianon (Region rodopis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.arriana.gr |
| 179 | Municipality artaion (Region artas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.arta.gr |
| 180 | Municipality aspropirgou (Region ditikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.aspropyrgos.gr |
| 181 | Municipality astipalaias (Region kalimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.astypalaia.gr |
| 182 | Municipality athinaion (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.cityofathens.gr |
| 183 | Municipality avdiron (Region xanthis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.avdera.gr |
| 184 | Municipality baris - boilas - bouliagmenis (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.voula.gov.gr |
| 185 | Municipality belou - bochas (Region korinthias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.velo-vocha.gr |
| 186 | Municipality beroias (Region imathias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.veria.gr |
| 187 | Municipality biannou (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dviannos.gr |
| 188 | Municipality bironos (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosbyrona.gr |
| 189 | Municipality bisaltias (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nigrita.gr |
| 190 | Municipality boiou (Region kozanis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.siatista.gr |
| 191 | Municipality bolbis (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosvolvis.gr |
| 192 | Municipality bolou (Region magnisias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.volos.gr |
| 193 | Municipality boreias kinourias (Region arkadias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.boriakinouria.gov.gr |

| 194 | Municipality boreion tzoumerkon (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pramanta.gr |
|-----|-------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|----------------------------------------------|
| 195 | Municipality brilission (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.vrilissia.gr |
| 196 | Municipality chalandriou (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.halandri.gr |
| 197 | Municipality chalkideon (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos-xalkideon.gr |
| 198 | Municipality chalkidonos (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos-chalkidonos.gr |
| 199 | Municipality chalkis (Region rodou) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.dimoschalkis.gr/port</u> <u>al</u> |
| 200 | Municipality chanion (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | www.chania.gr |
| 201 | Municipality chaïdariou (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.haidari.gr |
| 202 | Municipality chersonisou (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.hersonisos.gr |
| 203 | Municipality chiou (Region chiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.chioscity.gr |
| 204 | Municipality dafnis - imittoi (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dafni.gr |
| 205 | Municipality delfon (Region fokidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.amfissa.gov.gr |
| 206 | Municipality delta (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.echedoros.gr |
| 207 | Municipality deskatis (Region grebenon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos-deskatis.gr |
| 208 | Municipality didimoteichou (Region ebrou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.didymoteicho.gr |
| 209 | Municipality dionisou (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.agstefanos.gr |
| 210 | Municipality diou - olimpou (Region pierias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dion-olympos.gr |
| 211 | Municipality dirfion - messapion (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dirfion-messapion.gr |
| 212 | Municipality distomou-arachobas - antikiras (Region boiotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.daa.gov.gr |
| 213 | Municipality ditikis achaïas (Region achaïas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosdymaion.gov.gr |

| 214 | Municipality ditikis manis (Region messinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosdytikismanis.gr |
|-----|------------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|--------------------------------------------|
| 215 | Municipality dodonis (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.agiosdimitrios-</u> ioanninon.gr |
| 216 | Municipality domokoi (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.domokos.gr |
| 217 | Municipality doridos (Region fokidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dorida.gr |
| 218 | Municipality doxatou (Region dramas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.doxato.gr |
| 219 | Municipality dramas (Region dramas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosdramas.gr |
| 220 | Municipality edessas (Region pellas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosedessas.gov.gr |
| 221 | Municipality elafonisou (Region lakonias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.elafonisos.gov.gr |
| 222 | Municipality elassonas (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimoselassonas.gr |
| 223 | Municipality elevsinas (Region ditikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.elefsina.gr |
| 224 | Municipality ellinikoi - argiroipolis (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.elliniko-</u> argyroupoli.gr |
| 225 | Municipality emmanouil pappa (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.empapas.gr |
| 226 | Municipality eordaias (Region kozanis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ptolemaida.gr |
| 227 | Municipality epidairou (Region argolidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.asklipieio.gr |
| 228 | Municipality eretrias (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.eretria.gr |
| 229 | Municipality erimanthou (Region achaias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.farron.gr |
| 230 | Municipality ermionidas (Region argolidas) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 231 | Municipality evrota (Region lakonias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.evrotas.gov.gr |
| 232 | Municipality faistoi (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.moires.gov.gr |
| 233 | Municipality farkadonas (Region trikalon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.e-farkadona.gov.gr |

| 234 | Municipality farsalon (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosfarsalon.gr |
|-----|--------------------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|--------------------------------------------|
| 235 | Municipality filadelfeias - chalkidonos (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.neafiladelfeia.gr |
| 236 | Municipality filiaton (Region thesprotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.filiates.gr |
| 237 | Municipality filis (Region ditikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.fyli.gr |
| 238 | Municipality filotheis - psichikoi (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.psychiko.gr |
| 239 | Municipality florinas (Region florinas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.cityoflorina.gr |
| 240 | Municipality foirnon korseon (Region ikarias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.geocities.com/fourni korseon |
| 241 | Municipality folegandrou (Region thiras) | Statutory body/ Competent authority | Other | Local public authority | Local | www.folegandros.gr |
| 242 | Municipality gavdou (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>https://gavdos-</u> <u>dimos.com</u> |
| 243 | Municipality galatsiou (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.galatsi.gov.gr |
| 244 | Municipality georgiou karaïskaki (Region artas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimoskaraiskaki.gr |
| 245 | Municipality glifadas (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.glyfada.gr |
| 246 | Municipality gortinas (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 247 | Municipality gortinias (Region arkadias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimitsana.gr |
| 248 | Municipality grebenon (Region grebenon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosgrevenon.gr |
| 249 | Municipality iasmou (Region rodopis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.iasmos.gr |
| 250 | Municipality idras (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ydra.gov.gr |
| 251 | Municipality ierapetras (Region lasithiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ierapetra.gov.gr |
| 252 | Municipality ieras polis mesologgiou (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.messolonghi.gov.gr |
| 253 | Municipality igoumenitsas (Region thesprotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.igoumenitsa .gr |

| 254 | Municipality iiton (Region thiras) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ios.gr |
|-----|--------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|------------------------------------|
| 255 | Municipality ikarias (Region ikarias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.daki.gr |
| 256 | Municipality ilidas (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.amaliada.gr |
| 257 | Municipality ilioipolis (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ilioupoli.gr |
| 258 | Municipality iliou (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ilion.gr |
| 259 | Municipality ioanniton (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ioannina.gr |
| 260 | Municipality irakleias (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosiraklias.gr |
| 261 | Municipality irakleiou (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.iraklio.gr |
| 262 | Municipality irakleiou kritis (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.heraklion-city.gr |
| 263 | Municipality iroikis poleos naousas (Region imathias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.naoussa.gr |
| 264 | Municipality istiaias - aidipsoi (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosistiaiasaidipsou .net_ |
| 265 | Municipality ithakis (Region ithakis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ithaki.gr |
| 266 | Municipality kabalas (Region kabalas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kavala.gov.gr |
| 267 | Municipality kaisarianis (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kessariani.gr |
| 268 | Municipality kalabriton (Region achaïas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.kalavrita.gr</u> |
| 269 | Municipality kalamarias (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kalamaria.gr |
| 270 | Municipality kalamatas (Region messinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kalamata.gr |
| 271 | Municipality kalampakas (Region trikalon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kalambaka.gr |
| 272 | Municipality kalimnion (Region kalimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kalymnos-isl.gr |
| 273 | Municipality kallitheas (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kallithea.gr |

| 274 | Municipality kantanou - selinou (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kantanouselinou.gr |
|-----|-------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|---------------------------------------------|
| 275 | Municipality karditsas (Region karditsas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.dimoskarditsas.gov.g</u> <u>r</u> |
| 276 | Municipality karistou (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimoskarystou.gr |
| 277 | Municipality karpathou (Region karpathou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.karpathos.gr |
| 278 | Municipality karpenisiou (Region evritanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.karpenissi.gr |
| 279 | Municipality kasou (Region karpathou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.ando.gr/dimoi/kasos /index |
| 280 | Municipality kassandras (Region chalkidikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kassandra.gr |
| 281 | Municipality kastorias (Region kastorias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kastoriacity.gr |
| 282 | Municipality katerinis (Region pierias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.katerini.gr |
| 283 | Municipality kato nevrokopiou (Region dramas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nevrokopi.gr |
| 284 | Municipality keas (Region keas- kithnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kea.gr |
| 285 | Municipality kefalonias (Region kefallinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kefallonia.gov.gr |
| 286 | Municipality kentrikon tzoumerkon (Region artas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>info@dhmosktzoumerkwn.</u> g <u>r</u> |
| 287 | Municipality keratsiniou - drapetsonas (Region peiraios) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.keratsini-</u> drapetsona.gr |
| 288 | Municipality kerkiras (Region kerkiras) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.corfu.gr</u> www.corfu.gov.gr |
| 289 | Municipality kifisias (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kifissia.gr |
| 290 | Municipality kileler (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nikaia.gr |
| 291 | Municipality kilkis (Region kilkis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.e-kilkis.gr |
| 292 | Municipality kimis - aliberiou (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kimis-aliveriou.gr |
| 293 | Municipality kimolou (Region milou) | Statutory body/ Competent authority | Other | Local public authority | Local | |

| 294 | Municipality kissamou (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kissamos.gr |
|-----|------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|-----------------------------|
| 295 | Municipality kithiron (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kythira.gr |
| 296 | Municipality kithnou (Region keas- kithnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kythnos.gr |
| 297 | Municipality ko (Region ko) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kos.gr |
| 298 | Municipality komotinis (Region rodopis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.komotini.gr |
| 299 | Municipality konitsas (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.konitsa.gr |
| 300 | Municipality kordelioi - evosmou (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.evosmos.gr |
| 301 | Municipality koridalloi (Region peiraios) | Statutory body/ Competent authority | Other | Local public authority | Local | www.korydallos.gr |
| 302 | Municipality korinthion (Region korinthias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.korinthos.gr |
| 303 | Municipality kozanis (Region kozanis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kozanh.gr |
| 304 | Municipality kropias (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.koropi.gr |
| 305 | Municipality lagkada (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.lagadas.gr |
| 306 | Municipality laireotikis (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.mylavrio.gr |
| 307 | Municipality lamieon (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.lamia.gr</u> |
| 308 | Municipality larisaion (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.larissa-dimos.gr</u> |
| 309 | Municipality lebadeon (Region boiotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.livadia.gr |
| 310 | Municipality leipson (Region kalimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 311 | Municipality lerou (Region kalimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.leros.gr |
| 312 | Municipality lesbou (Region lesbou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.mytilene.gr |
| 313 | Municipality levkadas (Region levkadas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.lefkada.gov.gr |

| 314 | Municipality likobrisis - peikis (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospefkis.gr |
|-----|-----------------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|----------------------------------------------|
| 315 | Municipality limnis plastira (Region karditsas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.plastiras.gr |
| 316 | Municipality limnou (Region limnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.limnos.gov.gr |
| 317 | Municipality lokron (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.atalanti.gr |
| 318 | Municipality loutrakiou - perachoras - ag. theodoron (Region korinthias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.loutraki.gr |
| 319 | Municipality makrakomis (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.dimosmakrakomis.go</u> <u>v.gr</u> |
| 320 | Municipality malebiziou (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.malevizi.gr |
| 321 | Municipality mandras - eidillias (Region ditikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.mandras-eidyllias.gr |
| 322 | Municipality mantoudiou - limnis - agias annas (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.elimnion.gr |
| 323 | Municipality marathonos (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.marathon.gr |
| 324 | Municipality markopoilou mesogaias (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.markopoulo.gr |
| 325 | Municipality maroneias - sapon (Region rodopis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.maroneia-sapes.gr |
| 326 | Municipality megalopolis (Region arkadias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.megalopoli.gr |
| 327 | Municipality meganisiou (Region levkadas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.meganisi.gr |
| 328 | Municipality megareon (Region ditikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.megara.gr |
| 329 | Municipality megistis (Region rodou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.megisti.gr |
| 330 | Municipality messinis (Region messinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.messinia.gr |
| 331 | Municipality metamorfoseos (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.metamorfossi.gr |
| 332 | Municipality metsobou (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.metsovo.gr |
| 333 | Municipality mikis (Region xanthis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos mykis.gr |

| 334 | Municipality mikonou (Region mikonou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.mykonos.gr |
|-----|------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|------------------------------------------------|
| 335 | Municipality milopotamou (Region rethimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.dimosmylopotamou.g</u> <u>r</u> |
| 336 | Municipality milou (Region milou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.milos.gr |
| 337 | Municipality minoa pediadas (Region irakleiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.minoapediadas.gr |
| 338 | Municipality molou - ag. konstantinou (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.mwlos.gr |
| 339 | Municipality monembasias (Region lakonias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.monemvasia.gov.gr |
| 340 | Municipality moschatou - tairou (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.dimosmoschatou-</u> <u>tavrou.gr</u> |
| 341 | Municipality mouzakiou (Region karditsas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.mouzaki.gr |
| 342 | Municipality naipaktias (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nafpaktos.gr |
| 343 | Municipality naiplieon (Region argolidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nafplio.gr |
| 344 | Municipality naxou & mikron kikladon (Region naxou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.naxos.gr |
| 345 | Municipality neapolis - sikeon (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.sykies.gr |
| 346 | Municipality neas ionias (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.neaionia.gr |
| 347 | Municipality neas propontidas (Region chalkidikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nea-propontida.gr |
| 348 | Municipality neas smirnis (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.neasmyrni.gr |
| 349 | Municipality neas zichnis (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimos-neaszixnis.gr |
| 350 | Municipality nemeas (Region korinthias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nemea.gr |
| 351 | Municipality nestoriou (Region kastorias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nestorio.gr |
| 352 | Municipality nestou (Region kabalas) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 353 | Municipality nikaias - agiou i. renti (Region peiraios) | Statutory body/ Competent authority | Other | Local public authority | Local | www.polisnikaia.gr |

| 354 | Municipality nikolaou skoufa (Region artas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nskoufas.gr |
|-----|--------------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|-----------------------------------------|
| 355 | Municipality nisirou (Region ko) | Statutory body/ Competent authority | Other | Local public authority | Local | www.nisyros.gr |
| 356 | Municipality notias kinourias (Region arkadias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.leonidio.gr |
| 357 | Municipality notiou piliou (Region magnisias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.argalasti.gr |
| 358 | Municipality oichalias (Region messinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosoichalias.gr |
| 359 | Municipality oinousson (Region chiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.oinousses.gov.gr |
| 360 | Municipality oraiokastrou (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.oraiokastro.gr |
| 361 | Municipality orchomenoi (Region boiotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.orchomenos.gr |
| 362 | Municipality orestiadas (Region ebrou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.orestiada.gr |
| 363 | Municipality oropediou lasithiou (Region lasithiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.forthnet.gr/internet city/platea |
| 364 | Municipality oropoi (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 365 | Municipality paggaiou (Region kabalas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospaggaiou.gr |
| 366 | Municipality paianias (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.paiania.gov.gr |
| 367 | Municipality pailou mela (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pavlosmelas.gr |
| 368 | Municipality paionias (Region kilkis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.municipalityofpaioni a.gr |
| 369 | Municipality palaioi falirou (Region notiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.palaiofaliro.gr |
| 370 | Municipality palama (Region karditsas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.palamascity.gr |
| 371 | Municipality pallinis (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pallini.gr |
| 372 | Municipality papagou - cholargoi (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.holargos.gr |
| 373 | Municipality paranestiou (Region dramas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.paranesti.gr |

| 374 | Municipality pargas (Region prebezas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospargas.gr |
|-----|------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|---------------------------------------------|
| 375 | Municipality parou (Region parou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.paros.gr |
| 376 | Municipality patmou (Region kalimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.patmos.gr |
| 377 | Municipality patreon (Region achaïas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.e-patras.gr |
| 378 | Municipality paxon (Region kerkiras) | Statutory body/ Competent authority | Other | Local public authority | Local | www.paxi.gr |
| 379 | Municipality peiraios (Region peiraios) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pireasnet.gr |
| 380 | Municipality pellas (Region pellas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.giannitsa.gr |
| 381 | Municipality pentelis (Region boreiou tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.penteli.gov.gr |
| 382 | Municipality peramatos (Region peiraios) | Statutory body/ Competent authority | Other | Local public authority | Local | www.perama.gr |
| 383 | Municipality peristeriou (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.peristeri.gr |
| 384 | Municipality petroipolis (Region ditikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.petroupoli.gov.gr |
| 385 | Municipality pidnas - kolindroi (Region pierias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pydnaskolindrou.gr |
| 386 | Municipality pilaias - chortiati (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pilea-hortiatis.gr |
| 387 | Municipality pilis (Region trikalon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospylis.gr |
| 388 | Municipality pilou - nestoros (Region messinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.pylos.gr |
| 389 | Municipality pineioi (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospineiou.gr |
| 390 | Municipality pirgou (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospyrgou.gr |
| 391 | Municipality platania (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | www.platanias.gr |
| 392 | Municipality pogoniou (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.1366.syzefxis.gov.gr , www.pogoni.gr |
| 393 | Municipality poligirou (Region chalkidikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.polygyros.gr |

| 394 | Municipality porou (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.poros.gov.gr |
|-----|--------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|--------------------------|
| 395 | Municipality prebezas (Region prebezas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosprevezas.gr |
| 396 | Municipality prespon (Region florinas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.prespes.gr |
| 397 | Municipality prosotsanis (Region dramas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.prosotsani.gr |
| 398 | Municipality psaron (Region chiou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimospsaron.gr |
| 399 | Municipality rafinas - pikermiou (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.anat-attiki.gr |
| 400 | Municipality rethimnis (Region rethimnou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.rethymno.gr |
| 401 | Municipality riga ferraiou (Region magnisias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.rigas-feraios.gr |
| 402 | Municipality rodou (Region rodou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.rhodes.gr |
| 403 | Municipality salaminas (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.salamina.gr |
| 404 | Municipality samothrakis (Region ebrou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.samothraki.gr |
| 405 | Municipality samou (Region samou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.vathi.gr |
| 406 | Municipality saronikoi (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kalivia.gr |
| 407 | Municipality serbion - belbentoi (Region kozanis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dservionvelventou.gr |
| 408 | Municipality serifou (Region milou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.serifos.gr |
| 409 | Municipality serron (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.serres.gr |
| 410 | Municipality sfakion (Region chanion) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 411 | Municipality sifnou (Region milou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.sifnos.gr |
| 412 | Municipality sikinou (Region thiras) | Statutory body/ Competent authority | Other | Local public authority | Local | www.sikinos.gr |
| 413 | Municipality sikionion (Region korinthias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kiato.gr |

| 414 | Municipality simis (Region rodou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.symi.gov.gr |
|-----|----------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|----------------------------------------------------|
| 415 | Municipality sintikis (Region serron) | Statutory body/ Competent authority | Other | Local public authority | Local | www.sidiki.gr |
| 416 | Municipality sirou - ermoipolis (Region sirou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.hermoupolis.gr |
| 417 | Municipality siteias (Region lasithiou) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.sitia.gr</u> |
| 418 | Municipality sithonias (Region chalkidikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.sithonia.com |
| 419 | Municipality skiathou (Region sporadon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.skiathos.gr |
| 420 | Municipality skidras (Region pellas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.skydra.gr |
| 421 | Municipality skirou (Region evboias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.skyros.gr |
| 422 | Municipality skopelou (Region sporadon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.skopelos.gov.gr |
| 423 | Municipality sofadon (Region karditsas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.sofades.gr |
| 424 | Municipality soufliou (Region ebrou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.soufli.gr |
| 425 | Municipality souliou (Region thesprotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.paramythia.gr |
| 426 | Municipality spartis (Region lakonias) | Statutory body/ Competent authority | Other | Local public authority | Local | <u>www.sparti.gov.gr</u> , <u>www.sparti.gr</u> |
| 427 | Municipality spaton - artemidos (Region anatolikis attikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.spata.gr |
| 428 | Municipality spetson (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.spetses.gov.gr, www.spetses.gr |
| 429 | Municipality stilidas (Region fthiotidas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.stylida.gr |
| 430 | Municipality tanagras (Region boiotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.tanagra.gr |
| 431 | Municipality tempon (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimostempon.gr |
| 432 | Municipality thasou (Region thasou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.thassos.gr |
| 433 | Municipality thermaïkoi (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.thermaikos.gr |

| 434 | Municipality thermis (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimosthermis.gr |
|-----|--------------------------------------------------------------|----------------------------------------|-------|------------------------|-------|----------------------------------------------------------------|
| 435 | Municipality thermou (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.thermo.gov.gr |
| 436 | Municipality thessalonikis (Region thessalonikis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.thessaloniki.gr |
| 437 | Municipality thibaion (Region boiotias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.thiva.gr |
| 438 | Municipality thiras (Region thiras) | Statutory body/ Competent authority | Other | Local public authority | Local | www.thira.gr |
| 439 | Municipality tilou (Region rodou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.tilos.gr |
| 440 | Municipality tinou (Region tinou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.tinos.gr |
| 441 | Municipality tirnabou (Region larisas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.tirnavos.gr |
| 442 | Municipality topeirou (Region xanthis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.topeiros.gr |
| 443 | Municipality trifilias (Region messinias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.kyparissia.gr |
| 444 | Municipality trikkaion (Region trikalon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.trikalacity.gr |
| 445 | Municipality tripolis (Region arkadias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.tripolis.gr |
| 446 | Municipality troizinias - methanon (Region nison) | Statutory body/ Competent authority | Other | Local public authority | Local | www.troizhna.gov.gr |
| 447 | Municipality xanthis (Region xanthis) | Statutory body/ Competent authority | Other | Local public authority | Local | www.cityofxanthi.gr |
| 448 | Municipality xilokastrou - evrostinis (Region korinthias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.xylokastro- evrostini.gov.gr , www.xylokastro.gov.gr |
| 449 | Municipality xiromerou (Region aitoloakarnanias) | Statutory body/ Competent authority | Other | Local public authority | Local | |
| 450 | Municipality zacharos (Region ileias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.zacharo.gov.gr |
| 451 | Municipality zagoras - mouresiou (Region magnisias) | Statutory body/ Competent authority | Other | Local public authority | Local | www.zagora.gov.gr |
| 452 | Municipality zagoriou (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.zagori.gov.gr |
| 453 | Municipality zakinthou (Region zakinthou) | Statutory body/ Competent authority | Other | Local public authority | Local | www.zakynthos.gov.gr |

| 454 | Municipality ziroi (Region prebezas) | Statutory body/ Competent authority | Other | Local public authority | Local | www.dimoszirou.gr |
|-----|---------------------------------------------------------------------------------|----------------------------------------|-----------------------------|---------------------------|----------|-------------------------------------------------------------------|
| 455 | Municipality zitsas (Region ioanninon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.zitsa.gov.gr |
| 456 | Municipality zografou (Region kentrikoi tomea athinon) | Statutory body/ Competent authority | Other | Local public authority | Local | www.zografou.gov.gr |
| 457 | Ministry of Environment and Energy | Governance decision making | Environment | national public authority | National | www.ypeka.gr |
| 458 | Ministry of Shipping and Island Policy | Governance decision making | Maritime transport/ Port | national public authority | National | www.yen.gr |
| 459 | Ministry of Tourism | Governance decision making | Tourism | national public authority | National | www.mintour.gov.gr |
| 460 | Alonnisos - Northern Sporades National Park - Marine Protected Area (MPA) | Statutory body/ Competent authority | Environment, MPA | national public authority | National | http://alonissos-park.gr |
| 461 | Management Body of Protected Area Axios-Loudias-Aliakmonas National Park | Statutory body/ Competent authority | Environment, MPA | national public authority | National | http://axiosdelta.gr |
| 462 | Marine Protected Area of Santorini Island - Thiraiki Thalassa | Statutory body/ Competent authority | Environment, MPA | national public authority | National | |
| 463 | Protected Area of Schinias - Marathonas National Park | Statutory body/ Competent authority | Environment, MPA | national public authority | National | <u>www.npschiniasmarathon.</u> gr |
| 464 | Zakynthos National Park - Marine Protected Area (MPA) | Statutory body/ Competent authority | Environment, MPA | national public authority | National | http://nmp-zak.org/ |
| 465 | Region Attika | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.patt.gov.gr |
| 466 | Region Central Macedonia | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pkm.gov.gr |
| 467 | Region Crete | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pkr.gov.gr, http://www.crete.gov.gr/ |
| 468 | Region East Macedonia- Thrace | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pamth.gov.gr |
| 469 | Region Ionian islands | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pin.gov.gr |
| 470 | Region Iperous | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.php.gov.gr |
| 471 | Region North Aegean | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pvaigaiou.gov .gr. http://www.northaegean. gr |
| 472 | Region Peloponnisos | Statutory body/ Competent authority | Other | Regional public authority | Local | http://ppel.gov.gr |

| 473 | Region South Aegean | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pnai.gov.gr, www.notioaigaio.gr |
|-----|-------------------------------------------------------------------------------------------------------------------------|----------------------------------------|-------------|---------------------------|----------|-----------------------------------------------|
| 474 | Region Sterea Ellada | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pste.gov.gr |
| 475 | Region Thessalia | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pthes.gov.gr |
| 476 | Region West Greece | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pde.gov.gr |
| 477 | Region West Macedonia | Statutory body/ Competent authority | Other | Regional public authority | Local | http://www.pdm.gov.gr |
| 478 | Hellenic Recycling Agency (EOAN) | Statutory body/ Competent authority | Other | Regional public authority | National | www.eoan.gr |
| 479 | Ministry of Environment and Energy, Directorate for the Protection of Biodiversity, Soil and Waste Management | Governance decision making | Environment | sectoral agency | National | www.ypeka.gr |
| 480 | Ministry of Environment and Energy, Directorate-General for Spatial Planning, Directorate for Spatial Planning | Governance decision making | Environment | sectoral agency | National | www.ypeka.gr |
| 481 | Ministry of Environment and Energy, Special Secretariat for Water | Governance decision making | Environment | sectoral agency | National | www.ypeka.gr |
| 482 | Directorate of Fisheries, Ministry of Rural Development and Food | Governance decision making | Fisheries | sectoral agency | National | www.alieia.gr |
| 483 | Ministry of Tourism, Regional services of Attica Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 484 | Ministry of Tourism, Regional services of Central Greece Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 485 | Ministry of Tourism, Regional services of Central Macedonia Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 486 | Ministry of Tourism, Regional services of Crete Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 487 | Ministry of Tourism, Regional services of Cyclades Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 488 | Ministry of Tourism, Regional services of Dodecanese Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 489 | Ministry of Tourism, Regional services of Epirous Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 490 | Ministry of Tourism, Regional services of Ionia islands Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 491 | Ministry of Tourism, Regional services of North Aegean Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |

| 492 | Ministry of Tourism, Regional services of Peloponneusus Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
|-----|--------------------------------------------------------------------------|-------------------------------|---------|-----------------|----------|--------------------|
| 493 | Ministry of Tourism, Regional services of Thessalia Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 494 | Ministry of Tourism, Regional services of Western Greece Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 495 | Ministry of Tourism, Regional services of Western Macedonia Region | Governance decision making | Tourism | sectoral agency | Local | www.mintour.gov.gr |
| 496 | Greek Tourism Organisation (EOT) | Governance decision making | Tourism | sectoral agency | National | www.gnto.gov.gr |
| 497 | Ministry of Tourism, Central and Regional Services | Governance decision making | Tourism | sectoral agency | National | www.mintour.gov.gr |

Appendix 2

European strategies and action plans for marine litter

According to Article 1 of the EU Marine Strategy Framework Directive (MSFD 2008/56/EC), Member States (MS) have the obligation to incorporate the Directive into national law and to implement a set of activities (Article 5), including:

- The initial assessment of the environmental status of the seas in which it exercises jurisdiction, the environmental objectives and the description of Good Environmental Status (Articles 8, 9 and 10)
- Establishment of monitoring programs for the seas (Article 11)
- The establishment of a program of measures (Article 13) which is deemed necessary in order to ensure that by 2020 the Good Environmental Status is ensured in the EU's waters
- The evaluation of the measures and their revision, if these are deemed ineffective.

According to Article 3 of the MSFD, Good Environmental Status (GES) is defined as the environmental status of the seas that allows optimal provision of goods and services for present and future generations. The MSFD states that in maritime areas where MS are bordering with non-EU states, joint efforts are being made to achieve the GES in the framework of bilateral and international co-operation through Regional Conventions under the United Nations, such as the Barcelona Convention on the case of Mediterranean. In any case, international law, and in particular the United Nations Convention on the Law of the Sea (UNCLOS), which is the framework within which all actions in the oceans and seas are to be developed, is of strategic importance as a basis for national, regional and global action and cooperation in the sea sector.

In December 2015, the Commission adopted an EU Action Plan for a circular economy. There, it identified plastics as a key priority and committed itself to 'prepare a strategy addressing the challenges posed by plastics throughout the value chain and taking into account their entire life-cycle'. In 2017, the Commission confirmed it would focus on plastics production and use and work towards the goal of ensuring that all plastic packaging is recyclable by 2030. This strategy lays the foundations to a new plastics economy, where the design and production of plastics and plastic products fully respect reuse, repair and recycling needs and more sustainable materials are developed and promoted. This will deliver greater added value and prosperity in Europe and boost innovation, and curb plastic pollution and its adverse impact on our lives and the environment.

The Strategy presents key commitments and measures for action at EU level (Table S1 and S2). Yet the private sector, together with national and regional authorities, cities and citizens, will also need to mobilise. Similarly, international engagement will be necessary to drive change outside Europe's borders.

Table S1. List of future EU measures to implement the European Strategy for plastics on a circular economy

| Measures | Timeline | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------|--|--|--|--|--|
| Improving the economics and quality of plastics recycling | Improving the economics and quality of plastics recycling | | | | | |
| Actions to improve product design: | | | | | | |
| Preparatory work for future revision of the Packaging and Packaging Waste Directive: Commission to initiate work on new harmonised rules to ensure that by 2030 all plastics packaging placed on the EU market can be reused or recycled in a cost-effective manner. | Q1 2018 onwards | | | | | |
| - follow-up to COM (2018) 32 "Communication on the implementation of the circular economy package: options to address the interface between chemical, product and waste legislation": improve the traceability of chemicals and address the issue of legacy substances in recycled streams | Q1 2018 onwards | | | | | |
| - new eco-design measures: consider requirements to support the recyclability of plastics | ongoing | | | | | |
| Actions to boost recycled content: | | | | | | |
| - launching an EU-wide pledging campaign targeting industry and public | Q1-Q3 2018 | | | | | |
| assessment of regulatory or economic incentives for the uptake of recycled content, in particular in the context of the: | Q1 2018 onwards | | | | | |
| - Revision of the Packaging and Packaging Waste Directive (see above) | | | | | | |
| - Evaluation/review of the Construction Products Regulation | | | | | | |
| - Evaluation/review of End-of-life Vehicles Directive | | | | | | |
| - as regards food-contact materials: swift finalisation of pending authorisation procedures for plastics recycling processes, better characterisation of contaminants and introduction of monitoring system | ongoing | | | | | |
| - development of quality standards for sorted plastics waste and recycled plastics in cooperation with the European Standardisation Committee | 2018 | | | | | |
| - Ecolabel and Green Public Procurement: Further incentivise the use of recycled plastics, including by developing adequate verification means | 2018 onwards | | | | | |
| Actions to improve separate collection of plastic waste: | | | | | | |
| - Issue new guidelines on separate collection and sorting of waste | 2019 | | | | | |
| Ensure better implementation of existing obligations on separate collection, including through ongoing review of waste legislation | ongoing | | | | | |

| Curbing plastic waste and littering | |
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| Actions to reduce single-use plastics: | |
| - Analytical work, including the launch of a public consultation, to determine the scope of a legislative initiative on single-use plastics | ongoing |
| Actions to tackle sea-based sources of marine litter: | |
| - Adoption of a legislative proposal on port reception facilities for the delivery of waste from ships | Q1 2018 |
| - development of measures to reduce loss or abandonment at sea of fishing gear (e.g. including recycling targets, EPR schemes, recycling funds or deposit schemes) | 2018 onwards |
| - development of measures to limit plastic loss from aquaculture (e.g. possible Best Available Techniques Reference Document) | |
| Actions to monitor and curb marine litter more effectively: | |
| - improved monitoring and mapping of marine litter, including microplastics, on the basis of EU harmonised methods | 2018 onwards |
| - support to Member States on the implementation of their programmes of measures on marine litter under the Marine Strategy Framework Directive, including the link with their waste/litter management plans under the Waste Framework Directive | |
| Actions on compostable and biodegradable plastics: | |
| - Start work to develop harmonised rules on defining and labelling compostable and biodegradable plastics | Q1 2018 onwards |
| - conduct a lifecycle assessment to identify conditions where their use is beneficial, and criteria for such application | Q1 2018 onwards |
| - start the process to restrict the use of oxo-plastics via REACH | ongoing |
| Actions to curb microplastics pollution: | |
| - start the process to restrict the intentional addition of microplastics to products via REACH | ongoing |
| - examination of policy options for reducing unintentional release of microplastics from tyres, textiles and paint (e.g. including minimum requirements for tyre design (tyre abrasion and durability if appropriate) and/or information requirement (including labelling if appropriate), methods to assess microplastic losses from textiles and tyres, combined with information (including possibly labelling)/minimum requirements, targeted research and development funding) | ongoing |
| - development of measures to reduce plastic pellet spillage (e.g. certification scheme along the plastic supply chain and/or Best Available Techniques reference document under the Industrial Emissions Directive) | Q1 2018 onwards |
| - evaluation of the Urban Waste Water Treatment Directive: assessing effectiveness as regards microplastics capture and removal | ongoing |

| Driving investment and innovation towards circular solutions | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--|--|--|
| Actions to promote investment and innovation in the value chain: | | | | |
| - Commission guidance on the eco-modulation of EPR fees | 2019 | | | |
| - Recommendations by the recently launched 'Circular Economy Finance Support Platform' | in mid-2018 | | | |
| examine the feasibility of a private-led investment fund to finance investments in innovative solutions and new technologies aimed at reducing the environmental impacts of primary plastic production | By mid-2019 | | | |
| - direct financial support for infrastructure and innovation through the European Fund for Strategic Investment and other EU funding instruments (e.g. structural funds and smart specialisation strategies, Horizon 2020) | Ongoing | | | |
| - pursue work on life-cycle impacts of alternative feedstocks for plastics production | 2018 onwards | | | |
| – development of a Strategic Research Innovation Agenda on plastics to guide future funding decisions | Q2 2018 | | | |
| Harnessing global action | | | | |
| Actions focusing on key regions: | | | | |
| - project to reduce plastic waste and marine litter in East and South-East Asia to support sustainable consumption and production, the promotion of the waste hierarchy and extended producer responsibility, and improve recovery of fishing gear | 2018 onwards | | | |
| - examining options for specific action to reduce plastic pollution in the Mediterranean, in support of the implementation of the Barcelona Convention | | | | |
| - cooperation on plastic waste prevention in major world river basins | | | | |
| Actions in support of multilateral initiatives on plastic: | | | | |
| - renewed engagement on plastics and marine litter in fora such as the UN, G7, G20, the MARPOL convention and regional sea conventions, including the development of practical tools and specific action on fishing and aquaculture. | 2018 onwards | | | |
| support to action under the Basel Convention, particularly for the implementation of the toolkit on environmentally sound waste management | | | | |
| Actions relating to bilateral cooperation with non-EU countries: | | | | |
| - promote a circular plastics economy in non-EU countries through policy dialogues on trade, industry and environment, as well as economic diplomacy | 2018 onwards | | | |
| - use bilateral, regional and thematic funding in EU development, neighbourhood and enlargement policies to support the plastics strategy by preventing and appropriately managing waste and supporting the circular economy; through programmes and instruments including 'Switch to Green' and the External Investment Plan | | | | |

| Actions relating to international trade: | |
|----------------------------------------------------------------------------------------------------------------|--------------|
| - support the development of international industry standards on sorted plastic waste and recycled plastics | 2018 onwards |
| - ensure that exported plastic waste is dealt with appropriately in line with the EU Waste Shipment Regulation | |
| - support the development of a certification scheme for recycling plants in the EU and in third countries | |

Table S2. List of measures recommended to national authorities and industry for the implementation of the European Strategy for plastics on a circular economy

Key measures to improve the economics and quality of plastics recycling

National and regional authorities are encouraged to:

- favour reusable and recycled plastics in public procurement;

- make better use of taxation and other economic instruments to:

- reward the uptake of recycled plastics and favour reuse and recycling over landfilling and incineration

- step up separate collection of plastics waste and improve the way in which this is done

- put in place well-designed EPR schemes and/or deposit systems, in consultation with the relevant sectors

- make voluntary commitments in support of the strategy's objective, in particular as regards the uptake of recycled plastics

Industry is encouraged to:

- take concrete steps to improve dialogue and cooperation across the value chain, in particular on material and product design aspects

- make voluntary commitments in support of the strategy's objective, in particular as regards the uptake of recycled plastic

Key measures to curb plastic waste and littering

National and regional authorities are encouraged to:

- raise awareness of littering and consider fines, where they do not exist already; promote beach cleanup activities

- step up waste collection, particularly near the coasts, and improve coordination between the authorities responsible for waste management, water and the marine environment

- step up efforts to eradicate illegal and non-compliant landfills

- develop national monitoring of marine litter on the basis of harmonised EU methods

- engage in regional seas conventions, in particular to develop regional plans against marine litter

- consider introducing EPR, in particular to provide incentives for collecting discarded fishing gear and recycling agricultural plastics

- consider introducing deposit refund schemes, in particular for beverage containers

Industry is encouraged to:

- promote existing alternatives to single-use plastic items (e.g. in catering and take-aways), where these are more environmentally beneficial

- pursue and implement cross-industry agreements to reduce the release of microplastics in the environment

- put in place measures to avoid spillage of plastic pellets

Key measures to drive investments and innovation towards circular solutions

National, regional and local authorities are encouraged to:

- make better use of economic instruments, especially to raise the cost of landfilling and incineration and promote plastic waste recycling and prevention

- make greater use of public procurement and funding to support plastic waste prevention and recycling of plastics

Industry is encouraged to:

- increase infrastructure and R&D investment in areas of direct relevance to achieving the strategy's objective

- contribute to work on setting up a private investment fund to offset the environmental externalities of plastic production

Key measures to harness global action

National and regional authorities, including in non-EU countries, are encouraged to:

- engage in international fora to develop a global response to the increase in marine litter

- take domestic action to reduce the leakage of plastics in the environment, prevent plastic waste and increase recycling

Industry is encouraged to:

- Play an active part in supporting an integrated, cross-border circular plastics economy, including through the development of a global protocol for plastics

In addition, to assist the tackling of barriers between producers and plastics recyclers and promote commercial partnerships under the frame that quantity and quality issues can be overcome if the necessary investments are made, the European Commission is launching an EU-wide pledging campaign to ensure that by 2025, ten million tonnes of recycled plastics find their way into new products on the EU market. To achieve swift, tangible results, this exercise is addressed to both private and public actors, inviting them to come forward with substantive pledges by June 2018.



Figure S1. Main steps as described at the EU Strategy for Plastics. Source: Directorate General For Internal Policies, 2017. Workshop - EU Action to combat marine litter. Brussels, 3 May 2017. Report on Proceedings. Policy Department Economic and Scientific Policy.

Source: ENVI, 2017

Mediterranean Regional strategies and action plans for marine litter

Regional Seas Conventions and Action Plans (RSCAPs) play a critical role in encouraging cooperation and coordination amongst countries sharing a common resource (Figure S2). The RSCAPs are instrumental in supporting the implementation of the Global Programme of Action for the Protection of the Marine Environment from Land-based Activities (GPA) at regional levels (UNEP, 2016).



Figure S2. Regional action plans on marine litter established internationally Source: UNEP and GRID-Arendal, 2016

The Convention for the Protection of the Mediterranean Sea Against Pollution (Barcelona Convention) and the Mediterranean Action Plan (MAP) is led directly by the United Nations Environment Programme (UNEP). Both frameworks form part of the United Nations Environment Programme (UNEP) Regional Seas Programme, under which the UNEP Marine Litter Initiative has been founded with numerous international conventions that directly address various aspects of marine litter.

The Barcelona Convention for the protection of the marine environment and the coastal region of the Mediterranean includes eight protocols (the eighth was adopted in 2013 on safety of offshore oil and gas operations) with different objectives, among which is to prevent and abate pollution mainly through dumping, runoff and discharges in the Mediterranean region (Land-Based Sources - LBS Protocol and the Dumping Protocol). Protocol for the Protection of the Mediterranean Sea against Pollution from Land-Based Sources and Activities (LBS Protocol) addresses different aspects of marine litter management including assessment, monitoring and programmes of measures. The Mediterranean Action Plan has been developed to address issues such as marine litter, taking into account of the specific environmental, social and economic context of the region. This was later amended and renamed the Convention for the Protection of the Marine environment and the Coastal Region of the Mediterranean (UNEP-MAP,

2012). The convention promotes the cooperation and assistance between the 21 Mediterranean countries dealing with pollution emergencies, monitoring and scientific research, that directly or indirectly target to marine litter:

 \checkmark The prevention and elimination of pollution of the Mediterranean Sea by dumping from ships and aircrafts or incineration at sea;

 \checkmark Cooperation in preventing pollution from ships and, in cases of emergency, combating pollution of the Mediterranean Sea;

 \checkmark Protection of the Mediterranean Sea against pollution from land-based sources and activities;

 \checkmark Specially protected areas and biological diversity in the Mediterranean;

 \checkmark Protection of the Mediterranean Sea against pollution resulting from exploration and exploitation of the continental shelf and the seabed and its subsoil;

 \checkmark Prevention of pollution of the Mediterranean Sea by transboundary movements of hazardous wastes and their disposal;

✓ Integrated Coastal Zone Management in the Mediterranean.

At the policy level, the 17th meeting of the Contracting Parties of the Barcelona Convention (COP 17) adopted 11 ecosystem approach-based ecological objectives (EO's) for the Mediterranean to achieve good environmental status of marine and coastal environment, including one objective for marine litter (Table S3). They also adopted the Mediterranean Marine litter strategic framework addressing several aspects of Marine Litter management (COP 17).

| Ecological Objective | Operational Objectives | Indicators |
|------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Marine and coastal litter do not adversely affect coastal and marine environment ¹⁸ | 10.1 The impacts related to properties and quantities of marine litter in the marine and coastal environment are minimized | 10.1.1 Trends in the amount of litter washed ashore and/or deposited on coastlines, including analysis of its composition, spatial distribution and, where possible, source |
| | | 10.1.2 Trends in amounts of litter in the water column, including microplastics, and on the seafloor |
| | 10.2 Impacts of litter on marine life are controlled to the maximum extent practicable | 10.2.1 Trends in the amount of litter ingested by or entangling marine organisms, especially mammals, marine birds and turtles ¹⁹ |

Table S3. Ecological objectives, Operational Objectives, and targets proposed for marine litter adopted by the Barcelona Convention (COP Decision IF 17/6, Almeria, 2008) in the framework of the gradual application of the Ecosystem Approach (ECAP) for the management of human activities in the Mediterranean Since the implementation of the Protocols against pollution from land-based sources and activities (LBS) and of the prevention of dumping and hazardous waste are under the guidance of the Marine Pollution Assessment and Control programme of MAP known as MED POL, marine litter is also under MEDPOL's supervision. To specifically address the issue of marine litter in the Mediterranean taking into account the most recent Marine Litter global agenda and commitments including the EU MSFD as appropriate, UNEP/MAP Barcelona Convention Secretariat was the first ever Regional Sea Programme that developed and adopted the Regional Plan on the Management of Marine Litter in the Mediterranean (UNEP, 2016).

The assessment of the status of marine litter in the Mediterranean conducted by UNEP/MAP in 2008 led to the preparation of a Marine Litter strategic framework in the Mediterranean, adopted by the Contracting Parties of the Barcelona Convention (COP12, February 2012, Paris, France), which guided the development and adoption of the Marine Litter Regional Plan (MLRP) in 2013 (COP18, Istanbul, Turkey, 2013), in the framework of Article 15 of the LBS Protocol of the Barcelona Convention (UNEP-MAP, 2015). The MLRP was entered into force in June 2014. As a pioneering legal instrument, the MLRP contains a package of legally binding programmes of measures and implementation timetables to prevent and reduce the adverse effects of marine litter on the marine and coastal environment in the Mediterranean. The ML Regional Plan became legally binding on 8 July 2014. These include innovative and traditional measures of a policy, regulatory (including incentive economic instruments) and technical nature, addressing different aspects of marine litter prevention and management from land and sea based sources at the regional and national level. The MLRP measures impose clear obligations regarding the waste management hierarchy, closure of illegal dumping/dumpsites, shift to sustainable consumption and production patterns, removal of existing marine litter using environmental sound practices such as fishing for litter, clean up campaigns, port reception facilities at possibly no special fees, and monitoring, assessment and reporting on implementation of measures as well as enforcement of national legislation. The timetable for the implementation of the MLRP measures is between 2016 and 2025, with most of the measures to be implemented by the Contracting Parties by 2020 (Table S4). The MLRP provides a sound framework for knowledge enhancement, monitoring and assessment, research, awareness, and cooperation and partnerships among different stakeholders at regional and national levels, including the scientific community and the large public. In this respect, the MED POL programme of UNEP/MAP is mandated to undertake the assessment of marine litter on a six-year basis at the Mediterranean level as well as to coordinate the formulation and implementation of a marine litter monitoring programme based on an ecosystem approach by all Mediterranean countries (UNEP-MAP, 2015).

Most of the Mediterranean countries have developed National Action Plans and or Programmes of Measures to address marine litter management as a national response to implement the MLRP to achieve Good Environmental Status (GES), and where appropriate, the EU MSFD in line with the relevant global marine litter agenda and commitments (UNEP-MAP, 2016).

Other action plans from projects (e.g. MedZeroLitter) have been also been proposed for the management of marine litter. In addition, other action plans targeting the conservation of marine biota (e.g. cetaceans, sea turtles) have been

established, where some actions refer particularly on addressing the issue of marine litter and its impacts to these organisms.

Table S4. Log Frame and Work Plan for the implementation of relevant Articles of the Strategic Framework for the Marine Litter Management in the Mediterranean

Decision IG.20/10 on the Adoption of the Strategic Framework for Marine Litter management, UNEP(DEPI)/MED IG 20/8

| Operational Objectives | Medium term activities at regional level | Long term activities at regional level | Medium term activities at national level | Long term activities at national level |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective 1 Enhance the proper implementation of existing legislation dealing with municipal solid waste, as well as sea based solid waste, by building or further | Activity 1.1: Document and make use of experience of countries in the Region which have specific marine litter policies and practices in place (based on 3.1). | Activity 1.5: Develop and implement twinning programmes for cross-border capacity building within local and port authorities in the application of marine litter management knowledge and technology. | Activity 1.8: Local authorities to integrate beach clean ups into SWM systems and establish networks to improve exchange of experiences between the various national/sub-national/local management authorities | Activity 1.11: Work with ministries and local/port authorities who have already developed Integrated Coastal Zone Management plans to include management of marine litter. |
| developing legal and institutional capacity in local and port authorities, and other institutional stakeholders, to manage marine litter within an integrated coastal zone management framework | Activity 1.2: Develop policy guidelines on drainage and marine litter management for high level decision makers | Activity 1.6: Continue the work on assessing and monitoring the operation of port waste reception facilities as stipulated under MARPOL and provide assistance to ports, harbors and small marinas to develop and implement effective waste disposal procedures. | Activity 1.9: Mapping of the solid waste infrastructures and/or lack thereof on coastal zones (such as landfills, open dumps, transfer points, etc.). Assessment of the impact of waste disposal sites as point sources of marine litter. Proposals for improvement and, whenever feasible, submission of projects to International Financial Institutions. | Activity 1.12: Assist competent authorities to develop SWM plans, which include the management of marine litter, and investment strategies for smaller towns (i.e. of populations less than 100,000) which were not included in SAP. |
| | Activity 1.3: Prepare operational guidelines for environmentally and ecologically friendly downloading from ships and port/marina cleaning equipment | Activity 1.7: Facilitate eligible countries to develop proposals and apply to donors for grant financing of above activities. | Activity 1.10: Support institutional and technical capacity building of national and local administrations in order for large scale waste management projects to be developed and implemented. | Activity 1.13: Parties to encourage sub-national and local authorities to develop proposals for financing activities under the EU Neighbourhood Policy, the European Investment Bank (EIB), African Development Bank, GEF and other International Financial |

| | | | Institutions. |
|--------------------------|---------------------------------|----------------------------------|------------------------------|
| | Activity 1.4: Review, update | | |
| | and develop training | | |
| | programmes to support | | |
| | institutional aspects of the | | |
| | management of marine litter | | |
| Objective 2 | Activity 2.1: Collect good | Activity 2.4: Support the | Activity 2.7: Local |
| Reduce, in view to | practices and provide | International Coastal Clean-up | Authorities to work with |
| eliminate, marine litter | guidelines to countries on | campaigns with aim to | the private sector and |
| generated "in situ" (on | legal and institutional aspects | increase the number of | other actors to introduce |
| beaches) with emphasis | in effectively patrolling and | countries participating in | the means to reduce |
| on plastics and smoking | imposing fines on those | campaigns and also the | marine litter on beaches |
| related marine litter | illegally dumping waste in | number of volunteers and | with a special focus on |
| | coastal areas and littering on | beaches cleaned. The | plastic and smoking related |
| | beaches | campaigns and reporting on | litter. |
| | | the results of the clean-up | |
| | | exercises will be linked to | |
| | | objective four. | |
| | Activity 2.2: Prepare | Activity 2.5: Identification of | Activity 2.8: Work with |
| | guidelines for environmentally | hot spots and conducting | conservation NGOs and |
| | and ecologically friendly | emergency clean-up of | fishing communities to |
| | mechanical beach clean-ups | hotspots and beaches. Once | adopt areas in the |
| | | the area is clean, it is more | Mediterranean Sea and |
| | | likely that people will refrain | ensure that these areas are |
| | | from littering, especially if | litter free. Similar to the |
| | | this is followed by an | concept of adopt a beach. |
| | | awareness campaign as | |
| | | outlined in objective three | |
| | Activity 2.3: Propose | Activity 2.6: Appropriate | Activity 2.9: In the |
| | guidelines (eventually in | national authorities to | absence of national waste |
| | cooperation with other | develop a legal framework to | recycling legislation, local |
| | competent international | introduce enforcement | authorities should take |
| | bodies) including incentive | procedures for waste | responsibility and set |
| | schemes for introduction of | recycling activities (sorting of | targets for amount of |
| | environmentally friendly | waste, provision of recycling | waste required to be |
| | fishing gear | disposal points) where | recycled |
| | | national waste recycling | |
| | | legislation exists. | |

| Objective 3 Influence environmental attitudes and behavior of residents and tourists of coastal areas in the Mediterranean Region with regards to marine litter | Activity 3.1: Carry out a prototype pilot assessment of the economic, social and environmental impacts that marine litter has in the Mediterranean Region in order (a) to assign a financial value to clean beaches and (b) assess the cost of inaction if littering continues inhibited. This assessment and its methodology may act as a blue-print for relevant national assessments. | Activity 3.3: Encourage and coordinate in cooperation with regional NGO networks a major public awareness Mediterranean "litter free" campaign and educational programmes on marine litter reduction and beach clean-ups | Activity 3.5: Undertake an assessment to ascertain the economic aspects of, social and environmental impact of pollution from marine litter at national and local level (based on 3.1). | Activity 3.6: Involve all line ministries and local/port authorities in the dissemination of the findings of the assessment (3.5) |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | Activity 3.2: Promote a communication strategy in order to present the findings of the economic, social and environmental assessments and marine litter surveys undertaken as part of this strategic framework (see 3.1 etc.) and provide periodic updates on marine litter hotspots and the general environmental situation of Mediterranean Sea | Activity 3.4: Implementation of regional and national programmes on promoting sustainable consumption and production in cooperation with the Marrakech Process and thereafter | | Activity 3.7: Develop and implement in cooperation with all willing stakeholders national and local 'Litter-free' Mediterranean Sea campaigns. Use information from above activities to support public awareness campaigns with emphasis on coastal residents and tourists. Involve the media, particularly TV channels and radio stations, in active promotion of the "Litter free Mediterranean Sea" campaigns Activity 3.8: Promote simple formal and non- formal ESD in schools on the multiple impacts of marine litter and what can be done to prevent it. This |

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| | | activity should take into |
| | | consideration already |
| | | existing training material. |
| | | The activity should include |
| | | a component on training of |
| | | teachers |
| | | Activity 3.9: Encourage |
| | | local authorities to work |
| | | with schools. NGOs and |
| | | other CS groups to conduct |
| | | voluntary beach clean ups |
| | | Activity 2 10: Work with |
| | | Line ministries to |
| | | ine innistries to |
| | | implement incentive |
| | | schemes for coastal areas |
| | | using appropriate |
| | | standards such as the ISO |
| | | 14001 standard and the |
| | | EMAS |
| | | Activity 3.11: Develop |
| | | partnership frameworks |
| | | with sea transport network |
| | | providers to ensure waste- |
| | | wise behaviour onboard |
| | | and adequate disposal of |
| | | waste on and off-board. |
| | | Activity 3.12: Work with |
| | | the tourism sector in |
| | | coastal areas to introduce |
| | | sustainable tourism. |
| | | Develop concrete proposals |
| | | of how the tourism |
| | | industry becomes more |
| | | eco-friendly and protect |
| | | the environment from |
| | | littering |
| | | Activity 3 13. Assess the |
| | | various financial |
| | | various mialiciat |

| | | | | opportunities to assist all competent local authorities and other stakeholders at national or local level to implement the aforementioned activities and replicate existing Programmes either through a cost recovery system (charging beach users and law enforcement) or grant financing for start-up activities |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective 4 Establish a monitoring programme for marine litter in the Mediterranean Sea based on the ecosystem approach. Follow the trends of marine litter generation and distribution through the establishment of a monitoring programme for marine litter in the Mediterranean Sea | Activity 4.1: Develop guidelines on monitoring marine litter taking into consideration the UNEP/IOC guidelines. Stakeholders in this process include universities, research institutions, other development agencies, representatives of local and port authorities, national statistics offices, NGOs and other civil society organisations. | Activity 4.6: Consider best practices in the region and implement pilot projects on the collection of floating and sea- bed litter by following the UNEP/IOC guidelines | Activity 4.8: Countries to develop a sampling framework and conduct a baseline study of marine litter based on the ECAP indicators. | Activity 4.10: Parties to establish and implement national marine litter monitoring programmes on the basis of the ECAP |
| based on the ecosystem approach. | Activity 4.2: Formalise the already developed country questionnaire on "Litter management in coastal zones of the Mediterranean Basin" and offer training in administering the questionnaire. It should be sent for completion to the countries every four (4) years. | Activity 4.7: Fundraising for the establishment of a full- scale marine litter monitoring programme from country contributions, bilateral agencies and international financial organisations | Activity 4.9: Countries to conduct routine monitoring programmes in the framework of the ECAP integrated monitoring programme of MAP and report results to the national coordinator and MED POL. | Activity 4.11: Capacity building on implementing the UNEP/IOC guidelines on monitoring marine litter |

| Activity 4.3: Develop and | | |
|----------------------------------|--|--|
| agree on a set of indicators | | |
| from quantitative (baseline | | |
| survey) and qualitative | | |
| (questionnaire) data, in the | | |
| framework of the gradual | | |
| application of the ECAP | | |
| Activity 4.4: Agree on a | | |
| reduction of marine litter by a | | |
| year to be determined, based | | |
| on the national baselines | | |
| developed by each country, | | |
| taking into consideration the | | |
| fluctuation of litter between | | |
| two time horizons. This | | |
| baseline will be used to | | |
| measure progress in the | | |
| reduction of marine litter, it | | |
| is therefore important that | | |
| the methodology for | | |
| conducting the baseline is | | |
| statistically and scientifically | | |
| robust and there is consensus | | |
| amongst all the partners | | |
| taking into account the | | |
| methodologies developed | | |
| under the ECAP, UNEP/IOC | | |
| guidelines and | | |
| international practice | | |
| Activity 4.5: Integrate the | | |
| marine litter monitoring | | |
| system into the MED POL | | |
| information system. The | | |
| system will include the | | |
| baseline information, | | |
| indicators and will be used to | | |
| track progress in reducing | | |
| marine litter. In-putting of | | |
| | data will be a continuous | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Objective 5 Assess lost and abandoned fishing gear and identify and implement counter measures against biological damage | Activity 5.1: Strengthening co-operation between Regional Fishery Bodies and Mediterranean strategic framework | Activity 5.8: Continue the work on assessing and monitoring the operation of port waste reception facilities as stipulated under MARPOL and provide assistance to ports, harbours and small marinas to develop and implement effective waste disposal procedures, with particular reference to lost/abandoned fishing gear | Activity 5.9: Quantification of the problem at national level through a estimation of the amount of gear being purchased by fishers within a country, the number of fishers, the number of vessels, and estimate the loss versus the collection of used and expired fishing gear | Activity 5.13: Work with conservation NGOs and fishing communities to adopt areas in the Mediterranean Sea and ensure that these areas are lost/abandoned fishing gear free. Similar to the concept of adopt a beach |
| | Activity 5.2: Develop training programmes to support Fishery Bodies on the aspects of the management of lost/abandoned fishing gear | | Activity 5.10: Conduct routine monitoring programmes and mapping activities of lost/abandoned fishing gear and report results to the national coordinator and MED POL | Activity 5.14: Establish and implement national lost/abandoned fishing gear monitoring programmes on the basis of regional agreements |
| | Activity 5.3: Develop an awareness campaign, together Fishery Bodies, to the fisheries to sensitize them on environmental and economic consequences following the abandoning of fishing gear at sea | | Activity 5.11: Provide assistance to fisheries to recover their lost fishing gear from the water | |
| | Activity 5.4: Propose guidelines (eventually in cooperation with other competent international bodies) including incentive schemes for introduction of environmentally friendly fishing gear | | Activity 5.12: Develop reception facilities available for the disposal of disused fishing gear and other wastes from vessels | |
| | , | | | |

| | lost/abandoned fishing gear | |
|--------------------------|------------------------------------------------------------------|--|
| | monitoring system into the | |
| | MFD POL information system | |
| | The system will include the | |
| | haceline information | |
| | indicators and will be used to | |
| | track program in reducing | |
| | Last (abandoned fishing goor | |
| | tost/abandoned fishing gear | |
| | Activity 5.6: Stimulate and | |
| | encourage Parties to | |
| | cooperate in conduction of a | |
| | baseline study on | |
| | lost/abandoned fishing gear | |
| | particularly aimed to | |
| | understand the extension of | |
| | the problem in the | |
| | Mediterranean sea and the | |
| | best available solutions | |
| | Activity 5.7: Strengthening | |
| | the cooperation among | |
| | Fishery Bodies, the scientific | |
| | community and the fishing | |
| | industry in reviewing of | |
| | fishing gear materials and | |
| | developing of new | |
| | technologies | |
| Objective 6 | Proposed synergies with other United Nations Organisations and | |
| Establish synergies with | conventions | |
| on-going and planned | Activity 6.1: Development of Activity 6.6: Engage with | |
| initiatives in the | nedagogical tools and LINDESA and LINEP to support | |
| Mediterranean Region | guidelines for the shinning efforts to reduce per capita | |
| as they relate to waste | sector on marine litter generation rates in the | |
| and marine litter | management of chinning Mediterranean Region | |
| including the Marine | waste and use of port | |
| Strategy Framework | recention facilities This | |
| Directive In fact this | activity can replicate the best | |
| objective sime at | activity can replicate the best practices of NGOs on training | |
| objective allis at | practices of NGOS off training | |
| ensuring conerence and | מום ווסנוימנוווצ כופש מום אווף | |

| coordination of | owners to take a more active | | |
|------------------------|---------------------------------|------------------------------------|--|
| scattered activities | role in the environment | | |
| undertaken by various | Activity 6.2: Work with | | |
| stakeholders under all | countries to implement | | |
| previous objectives | MARPOL Anney V through | | |
| previous objectives | development of own | | |
| | legislation and policies | | |
| | Activity 6 3: In collaboration | | |
| | with other component | | |
| | international organizations | | |
| | international organizations | | |
| | and private sector develop a | | |
| | compendium of | | |
| | environmentally safe fishing | | |
| | gear in the Mediterranean | | |
| | Region | | |
| | Activity 6.4: Port authorities | | |
| | to set up a reporting system | | |
| | for abandoned and lost fishing | | |
| | gear | | |
| | Activity 6.5: Advocate for the | | |
| | recent "Adaptation Fund" of | | |
| | UNFCCC to be available to | | |
| | Mediterranean Countries for | | |
| | use in ensuring proper | | |
| | measures against pollution of | | |
| | the Mediterranean Sea from | | |
| | land-based litter | | |
| | Proposed synergies with Interna | ational Financial Institutions and | |
| | the European Union | | |
| | Activity 6.7: Provide software | Activity 6.8: Jointly develop | |
| | assistance in education, | capacity building projects for | |
| | institutional and legal | local and port authorities to | |
| | capacity building and public | manage marine litter | |
| | awareness campaigns to | | |
| | support the MeHSIP | | |
| | infrastructure projects funded | | |
| | by the European Investment | | |
| | Bank | | |

| | Activity 6.9: Following the | |
|-----------------------------------------|----------------------------------|--|
| | entrance into force of the LBS | |
| | Protocol, MED POL to work with | |
| | the EU to develop legally | |
| | binding targets for the | |
| | reduction of marine litter and | |
| | align targets to Marine Strategy | |
| | Framework Directive | |
| Synergies with national level pro | ogrammes and NGO activities | |
| , , , , , , , , , , , , , , , , , , , , | . | |
| Activity 6.10: MED POL to | Activity 6.11: Parties to work | |
| provide technical knowledge | with programmes such as Blue | |
| to local monitoring | Flag and Clean Coast to | |
| programmes on the | replicate them in other coastal | |
| management and monitoring | areas | |
| of marine litter (based on | | |
| UNEP/IOC guidelines) | | |
| Universities and Research Institu | utes | |
| | | |
| | ACTIVITY 6.12: Engage with | |
| | research institutes to promote | |
| | research and development in | |
| | the field of marine litter and | |
| | provide scientific knowledge | |
| | and policy direction activities | |
| | described in the strategic | |
| | framework | |

Table S5. Work Plan with timetable for the implementation of relevant Articles of the Regional Plan for the Marine Litter Management in the Mediterranean (RLRP, UNEP-MAP, 2013)

Source: UNEP-MAP, 2016f.

| | Article | Task | Timetable | Lead Authority | Verification indicator | Possible contribution by the members of the Regional Platform | Status of Implementation |
|--------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------|
| PART I | I - MEASURES | AND OPERATIONAL TARGETS | | • | | | |
| 1. | Art. 7 - Integration of marine litter measures into the LBS National | Update the existing LBS National Action Plan guidelines | 2014 | MEDPOL, in consultation with regional and international organizations | Guidelines sent to Contracting Parties | | Completed |
| 2. | Action Plans (LBS NAPs) | Update the existing LBS National Action Plans to integrate marine litter in accordance with the provisions of the Regional Plan National Stakeholder Workshop and consultancy | 2015 | Contracting Party, in consultation with MEDPOL | Updated LBS National Action Plan sent to the Secretariat | | |
| 3. | | Development of reporting format | 2014 | MEDPOL, in consultation with regional and international organizations | Reporting format sent to countries | | |

| 4. | | National reports on the implementation of the Regional Plan | Biennially, together with the report for the implementation of the LBS protocol | Contracting Party | Report sent to Secretariat | |
|----|--------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|-------------------------------|--|
| 5. | Art. 9 – Prevention of marine litter | To base urban solid waste management on reduction at source, applying the following waste hierarchy as a priority order in waste prevention and management legislation and policy: prevention, preparing for re-use, recycling, other recovery, e.g. energy recovery and environmentally sound disposal | 2025 | Contracting Party, in cooperation with the SCP/RAC and MED POL | Report sent to Secretariat | |
| б. | | Implement adequate waste reducing/reusing/ recycling measures in order to reduce the fraction of plastic packaging waste that goes to landfill or incineration without energy recovery | 2019 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 7. | | Explore and implement to the extent possible prevention measures related to Extended Producer Responsibility strategy by making the producers, manufacturer brand owners and first importers responsible for the entire life- cycle of the product with measures prioritizing the hierarchy of waste management in order to encourage companies to design products with long durability for reuse, recycling and materials reduction in weight and toxicity | 2017 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 8. |] | Explore and implement to the extent | 2017 | Contracting | Report sent to | |

| | possible prevention measures related to Sustainable Procurement Policies contributing to the promotion of the consumption of recycled plastic-made products | | Party, in cooperation with SCP/RAC | Secretariat | |
|-----|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------|-------------------------------|--|
| 9. | Explore and implement to the extent possible prevention measures related to establishment of voluntary agreements with retailers and supermarkets to set an objective of reduction of plastic bags consumption as well as selling dry food or cleaning products in bulk and refill special and reusable containers | 2017 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 10. | Explore and implement to the extent possible prevention measures related to fiscal and economic instruments to promote the reduction of plastic bag consumption | 2017 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 11. | Explore and implement to the extent possible prevention measures related to establishment of [mandatory] Deposits, Return and Restoration System for expandable polystyrene boxes in the fishing sector | 2017 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 12. | Explore and implement to the extent possible prevention measures related to establishment of [mandatory] Deposits, Return and Restoration System for beverage packaging prioritizing when possible their recycling | 2017 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 13. | Explore and implement to the extent possible prevention measures related to establishment of procedures and manufacturing methodologies together with plastic industry, in order to minimize the decomposition characteristics of plastic, to reduce microplastic | 2017 | Contracting Party, in cooperation with SCP/RAC | Report sent to Secretariat | |
| 14. | Take necessary measures to establish as appropriate adequate urban sewer, | 2020 | Contracting Party, in | Report sent to Secretariat | |

| | wastewater treatment plants, and waste management systems to prevent run-off and riverine inputs of litter | | cooperation with MEDPOL | | |
|-----|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|--------------------------------------------------------|-------------------------------|--|
| 15. | In accordance with Article 14 of the Prevention and Emergency Protocol explore and implement to the extent possible ways and means to charge reasonable cost for the use of port reception facilities or when applicable, apply No-Special-Fee system and take the necessary steps to provide ships using their ports with updated information relevant to the obligation arising from Annex V of MARPOL Convention and from their legislation applicable in the field | 2017 | Contracting Party, in cooperation with REMPEC | Report sent to Secretariat | |
| 16. | Explore and implement to the extent possible the "Fishing for Litter" environmentally sound practices, in consultation with the competent international and regional organizations, to facilitate clean up of the floating litter and the seabed from marine litter caught incidentally and/or generated by fishing vessels in their regular activities including derelict fishing gears | 2017 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | |
| 17. | Explore and implement to the extent possible "Gear marking to indicate ownership" concept and "reduced ghost catches through the use of environmentally neutral upon degradation of nets, pots and traps concept", in consultation with the competent international and regional organizations in the fishing sector | 2017 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | |
| 18. | Apply the cost effective measures to prevent any marine littering from dredging activities taking into account the relevant guidelines adopted in the | 2020 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | |

| | | framework of Dumping Protocol of the Barcelona Convention | | | | | |
|-----|--------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------|--|
| 19. | | Take the necessary measures to close to the extent possible the existing illegal dump sites on land in the area of the application of the Regional Plan | 2020 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | | |
| 20. | | Take enforcement measures to combat illegal dumping in accordance with national legislation including littering on the beach, illegal sewage disposal in the coastal zone and rivers in the area of the application of the Regional Plan | | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | | |
| 21. | Art. 10 – Removing existing marine litter and its environmental ly sound disposal | Where it is environmentally sound and cost effective, remove existing accumulated litter, subject to EIA procedure, in particular from specially protected areas and Specially Protected Areas of Mediterranean Importance (SPAMI) and litter impacting endangered species listed in Annexes II and III of the SPA and Biodiversity Protocol | 2019 | Contracting Party, in cooperation with MEDPOL and SPA/RAC | Report sent to Secretariat | SDSN-MED through the Plastic Busters project (WP2 and WP3 activities) | |
| 22. | | Explore and implement to the extent possible the identification in collaboration with relevant stakeholders accumulations / hotspots of marine litter and implementation of national programmes on their regular removal and sound disposal | 2019 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | SDSN-MED through the Plastic Busters project (WP2 and WP3 activities) | |
| 23. | | Explore and implement to the extent possible the implementation of the National Marine Litter Cleanup Campaigns on a regular basis | 2019 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | | |
| 24. | | Explore and implement to the extent possible the participation in International Coastal Cleanup Campaigns and Programmes | 2019 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | | |

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| 25. | | Explore and implement to the extent possible the application as appropriate Adopt-a-Beach or similar practices and enhance public participation role with regard to marine litter management | 2019 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | | |
| 26. | | Explore and implement to the extent possible the application of the Fishing for Litter practices, in consultation with the competent international and regional organizations and in partnership with fishermen and ensure adequate collection, sorting and/or environmentally sound disposal of the fished litter | 2019 | Contracting Party, in cooperation with MEDPOL | Report sent to Secretariat | SDSN-MED through the Plastic Busters project (WP3 activities) | |
| 27. | | Explore and implement to the extent possible charging reasonable costs for the use of port reception facilities or, when applicable application of No- Special-Fee system, in consultation with competent international and regional organizations when using port reception facilities for implementing the measures provided for in Article 10. | 2019 | Contracting Party, in cooperation with REMPEC | Report sent to Secretariat | | |
| | | | PART III – AS | SESSMENT | | | |
| 28. | Art. 11 – Assessment of marine litter in the Mediterranean | Assessment of marine litter in the Mediterranean | Every six years, first report 2 years after entry into force of the Regional Plan | MEDPOL | Report issued | | 2015 Marine Litter Assessment in the Mediterranean |
| 29. | Art. 12 – Mediterranean Marine Litter | Establishment of an Expert Group on Regional Marine Litter Monitoring Programme | 2014 | MEDPOL | Expert Group established | | Established |
| 30. | Monitoring Programme | Guidelines for the preparation of the National Marine Litter Monitoring Programmes, in collaboration with the relevant international and regional organizations | 2014 | MEDPOL, in consultation with regional and international | Guidelines prepared | | Completed |

| | | | | organizations | | | |
|-----|------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| 31. | | Preparation of the Regional Marine Litter Monitoring Programme, as part of the integrated regional monitoring programme ² | | MEDPOL, in consultation with regional and international organizations | Regional Marine Litter Monitoring Programme prepared | | Completed |
| 32. | | For the purpose of the Regional Plan and in compliance with the monitoring obligations under Article 12 of the Barcelona Convention and Article 8 of the LBS Protocol design National Monitoring Programme on Marine Litter | 2017 | Contracting Party, in consultation with MEDPOL | Implementation started | | Ongoing |
| 33. | | Report, in accordance with Article 13 of the LBS Protocol, on the implementation of the National Marine Litter Monitoring Programme | Biennially | Contracting Party | Report sent to the Secretariat | | Expected: 20/6/2017 |
| 34. | | Establishment of the Regional Data Bank on Marine Litter | 2016 | MEDPOL, in consultation with regional and international organizations | Data Bank established | | Analysis of State of Play |
| | | PART I | V - SUPPORT TO | IMPLEMENTA | TION | | |
| 35. | Art. 13 – Research topics and scientific cooperation | Assistance for scientific cooperation | As appropriate | MEDPOL, SCP/RAC, REMPEC, SPA/RAC, in consultation with regional and international organizations | Assistance provided | SDSN-MED through the Plastic Busters project (WP2 activities in the identification of hot spot areas, effect on bioindicator species and fisheries resources) | A priority list decided by COP 18 and may require further prioritization |
| 36. | Art. 14 – Specific | Preparation of specific guidelines for measures listed in Articles 9 and 10 of | By 2016/2017 | MEDPOL, SCP/RAC, | Guidelines published | SDSN-MED through the Plastic Busters | FfL Guidelines;List of Existing |

2 In line with EcAp timeline

| | guidelines | the Regional Plan | | REMPEC, SPA/RAC, in consultation with regional and international organizations | | project (WP2 and WP4 activities) | Guidelines Identified; - List of Potential Guidelines to be Explored. |
|-----|---------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 37. | Art. 15 - Technical assistance | Technical assistance, including capacity building provided | As appropriate | MEDPOL, SCP/RAC, REMPEC, SPA/RAC, in consultation with regional and international organizations | Report sent to Secretariat | SDSN-MED through the Plastic Busters project (WP2, WP3 and WP4 activities) | Regional Actions Undertaken (Tirana, Albania, 19-20 July 2016; Athens, Greece, 6 Sept. 2016); New Activities to be identified by the partners. |
| 38. | Art. 16 – Enhancement of public awareness and education | Undertaking, where appropriate in synergy with existing initiatives in the field of education for sustainable development and in partnership with civil society, public awareness and education activities with adequate duration and follow up, with regard to marine litter management including activities related to prevention and promotion of sustainable consumption and production | As appropriate | Contracting Party, in consultation with MEDPOL | Report sent to Secretariat | SDSN-MED through the Plastic Busters project (WP5 activities) | Marine Litter side event at COP 19; Marine Litter side event for the Mediterranean at UNEA 2. |
| 39. | Art. 17 – Major groups and stakeholder participation | Ensure appropriate involvement of various stakeholders including local authorities, civil society, private sector and other stakeholders as appropriate to implement the measures provided for in the Regional Plan and other measures | As appropriate | Contracting Party, in consultation with MEDPOL | Report sent to Secretariat | | Proposal for establishing of a Cooperation Platform (ReCoP) on Marine Litter in the Mediterranean; Proposal for a |

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|-----|-----------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------|------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | | | | | | joint Work Plan. |
| 40. | Art. 18 – Regional and international cooperation | Establishment of institutional cooperation with various relevant regional and global institutions and initiatives | As appropriate | MEDPOL in cooperation with, SCP/RAC, REMPEC AND SPA/RAC And other regional partners | Report on the implementation of the Regional Plan by the Secretariat | SDSN-MED through the Plastic Busters project (WP4 activities) | Proposal for establishing of a Cooperation Platform (ReCoP) on Marine Litter in the Mediterranean; Proposal for a joint Work Plan. |
| 41. | | Direct cooperation of Contracting Parties, with assistance of the MEDPOL or competent international and regional organizations, to address trans-boundary marine litter cases | As appropriate | Contracting Parties with assistance of the MEDPOL | Report sent to Secretariat | SDSN-MED through the Plastic Busters project | Partners to provide feedback on any collaboration with the Contracting Parties. |
| 42. | Art. 19 – Reporting | National biennial reports on the implementation of the Regional Plan | Biennially | Contracting Party, in consultation with MEDPOL | Report issued | | Expected in 2017; Reporting format under preparation. |
| 43. | | Regional report on the implementation of the Regional Plan | Biennially | MEDPOL, SCP/RAC, REMPEC, SPA/RAC, in consultation with regional and international organizations | Report issued | | Expected in 2017; Reporting format under preparation. |
| 44. | | Review the status of the implementation of the Regional Plan | Biennially | MEDPOL, SCP/RAC, REMPEC, SPA/RAC, in consultation | | SDSN-MED through the Plastic Busters project (WP4 activities) | Expected in 2017; Reporting format under preparation. |
| | | | | with regional and international organizations | | | |

Table S6. MedZeroLitter proposed Action Plan. The table is part of a document Targeting the marine litter of the tourism industry in the Mediterranean Sea

Source: Marcou et al, 2016

| MedZeroLitter Action Plan | | | | | | | |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|
| CATEGORIES | ACTIONS | STAKEHOLDERS | ACTIVITIES | GOALS | MILESTONES / TIMEFRAMES | COMMENTS / REFERENCES | LINK TO HONOLULU STRATEGY |
| AWARENESS CAMPAIGNES | 1) Awareness campaign on sea fronts and beaches - Reduce/No littering during holidays 2) Beach Ambassadors - "Adopt a Beach" Awareness Campaign | Local governments Hospitality Sector (i.e. hotels) | 1) Prepare and distribute informative brochures to the hotel receptions regarding the marine litter and proposed solutions 2) Offer free reusable bags at the hotel receptions, along with a brochure that educate the tourists and facilitate a positive change in their behavior 3) Reading brochures and using reusable bags provided by the | 1) Reduction of single-use plastic items (i.e. plastic bags) used by visitors. 2) No littlering the beach and collecting any debris found. 3) Having visitors respect the local environment and change their behavior being aware and behaving in a manner that will reduce marine litter: using reusable bags, not throwing litter on the beach, etc | March 2017: Distribute the brochure to the coastal hotels By summer 2017 all coastal hotels in the Mediterranean will be able to provide information and reusable bags to visitors. By summer 2020 no marine litter by visitors will be found on Mediterranean beaches. | Use brochures and video produced by MARUSCO PROJECT: http://www.malics.eu/brochure-sectors- specific-in-english.en.html | Goal A |
| | | Tourists (General Public) Education Department (Schools) / National Authorities NGOs and Tourism Organizations | hospitality sector and tourist agencies, educating also their friends 1) Develop an awareness campaign called "Our Litter Heroes" to encourage the kids of taking care the marine environment 2) Agree on a coordinating body to take the initiative and promot an awareness campaign called "Adopt a beach" to encourage tourists and the general public to choose a beach and support their conservation and protection of natural values promoted 3) Develop a network of collaboration and get involved in rotering and cleaning unbache he "adoptime a beach" and | Teach future generations the importance of keeping beaches and oceans clean of wate and marine litter 2) Promote engement/awareness by applying the practice of "adopt a beach" and enhance the role of the public with regard to marine litter management. Convincing tourists and general public of the importance of keeping our natural environment healthy 4) identify and engage individuals' groups' schools', that may act on voluntary basis as "Ambassadors of the beach" | February-March 2016: The coordinating body will develop the logos and the scopes of the 'Adopt a Beach' campaign and bring in some "Tamous people" to not help 2016 genet help to people to participate by "Adopting a beach", cleaning it and being responsible to maintain it clean | The "Our Litter heroes" will be developed through social media by establishing a hashtageouriterHeroes instagram channel to upload the picture on abandoned itter month the most "liked" Hero can be elected as an "ambassador of the Beach" which can | Goal A |
| REMOVING MARINE LITTER | 3) Recover ML on large scale in the Med through sports the Med through sports were classified by the control (Research and Recovery) | Regattas organizations Ports / Marinas Authorities Boat owners (sailing, yachts etc) and professional skippers Sports Activities Facilities/ Providers Liet ski rentals/ Packli /Sailing & Surf schools etc) Scientific Community | encouraging the general public to do the same 1) Educate and sensibilities the general public interested in water- sports and recreational boating, about the Natine Litter problem in the Mediterranean, its causes and solutions. 2) Promote a Reggata with the goal of collecting marine litter 3) Educating the recreational boaters and giving them incentives like exemption from mooring taxes. 4) Create a network around the Mediterranean of recreational boaters ready to collect the debris they see. 5) Establish new kinds of sports events that join up the fun of a regatt and also puts the crease and salivors in the front line of 0, Recover as much marine litter as possible to clean up pre- selected areas in the Mediterranean and to obtain data regardin the concentration and type of marine litter in these areas. 7) Recover marine litter, even from remote areas that can have access, in order to avoid having them re-entering the sea and to preserve the ecosystem and its users. 8) Promote environmental education, awareness and responsible behavior for water-sports users and saliors and yre them incentives such as exemption from mooring taxes, thus creating a network around the Mediterranean of people ready to collect th debris they see. 9) Gather the data from the collected marine litter in for research and for developing possible solutions to the problem | 1) Raising awareness by highlighting the problem of marine litter within the national education programme to obtain recreational seafters permit. 2) Account Marine Litter ents and gather (data (research) regarding the marine litter found in order to propose possible solutions, through the scientific community. | Feb/March 2017: Locate possible regatta course and contact possible port hosts /marinas to check feasibility. April 2017: Confirmation of Regata Home port and general rules for boats admissions, sponsors etc May 2017: Announced the 1st "Med Clean Up" Regatta to look for massive participation and media Coverage. September 2017: "Med Clean Up" Regatta sports September 2017: "Med Clean Up" Regatta sports Coverage. September 2017: "Med Clean Up" Regatta sports Hours Clean September 2018: September 2018: September 2018: September 2018: September 2018: September 2018: September 2018: September 2018: September 2018: September 2018: Conventions as well as the European Environment Agency for heiging them to produce relevant policies and take actions | A Regatta event will aim to sensibilize the sailing community on the issue of marine litter and make them aware how much they can help by coloring the debrin from the event for all kinds of railing boats that will event for all kinds of railing boats that will promote "green sailing code". Recovering and sampling would be done via dragging a Manta Trawf free meters of the at of the vessel. (Relevant Reference: Ecosurf Brasil (http://ecosurc.gbr/site) and Ecosurf italia). In this scenario, it could be useful to implement a "Puri (LES) AS YOU is can have an ettra fun reason to involve their family and children in recovering debris from beaches and sea. | Goal C |
| CAMPAIGNS | 4) "Clean Up the Med" week Pan-Mediterranean initiative | RAC/SPA, MED/PAN, UNEP, European Union and NOOS EU Environment Agency, National Governments and Scientists Media and Local Authorities Scuba Diving Schools and Organizations Hospitality Sector Tourists / Visitors | 1) Launch and encourage participation by all contracting parties to a Mediterranean Costal Clean-up week 2) Coordination of MED costal Clean-up week 2) Coordination of MED costal Clean-up week 2) Costantiation of MED costal Clean-up week 2) Margored Visibility of the national contact patient metworks 3) Improved visibility of key outcomes of the MED Costal Clean- up Day (e.g. top elements, quantities, number participants, etc.) at Regional Sea webpage. 4) Explore and promote possibility to combine clean-up activities with Marine Litter surveys based on existing/agreed monitoring protocols or tools 5) Promotion of the Regional Sea MED Coastal Clean-up week including the development of electronic leaflets, promo-text for Regional Sea-Autional webpages, etc. (at Regional Sea scale) 6) Get involved by collecting and removing marine litter from the sea bottom 7) Promote the event in all the hotels and encourage participation 9) Organice "Green Awards" and give "Green Certificate" for the most "green" accommodations (by measuring waste production, clean-up the beach events, awareness campaignet etc) 9) Get involved in the "Clean Up the Med" week while being on their holidays and thus feeling as being part of something great. | 1) Get everyone involved for a Pan-Mediterranean Clean Up week event in order to remove the marine litter from the beaches, coastal areas and sea bottom. 2) Use the collected marine litter to provide data to scientists. | March 2016: Identify the network of responsible parties to initiate the clean up weak heat meeting of focal points for 8Ac/SPA in 2016: inform and involve all contracting parties in the event. Summer 2016: First materials being distributed for the first weak event that will take place on October 2016: The material can be updated through the years in order to promote awareness and motivation for everyone to participate by the participating parties. By 2017: Provide monitoring protocols and tools to be interested parties in order to use them for the clean-up week event. Every October from 2016: "Clean up the Med" Week | Several of these proposals were made by the Mediterranean EU MS while working for the implements or equipments of the Marine Strategy Framework Directive (RACMDS, 2012), Belevant reference: http://international.legambiente.tl/uncateg orized/clean-up-the-med-2016/ | Goal C |

| CATEGORIES | ACTIONS | STAKEHOLDERS | ACTIVITIES | GOALS | MILESTONES / TIMEFRAMES | COMMENTS / REFERENCES | STRATEGY | |
|-----------------------------------------------------|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|-------|
| | | European Union - DG MARE & UNEP/MAP | 1) Financially Support (through the EMFF) efforts made by (professional) fisheries towards removal of marine litter 2) Explore and agree on common guidelines and best practices for sustainable fisheries. | | 2016 - end 2020: EU financially supports the program throughout the EU financially supports the program throughout the EU financially supports the program throughout the EU financially supports the program throughout the Insteme and Governments are in direct contact with recreational and professional fishermen and collect data of NL fished. Fisherme participate in the FFL program January 2017. UNEP/MAP distributes common avareness about the amount and impact of ALDP For the and best practices to recreational and for distributes to recreational and for distributes to recreational and fishermen. Way 2016 - 2019. NGOs have talks every May (month with lower fishing activity due to regulations), for three years and deutate the fishermen regarding the NL problem. September 2019. JU + UNEP/MAP prepare a report with the final results of the program and extent program if possible. | | | |
| EMOVING MARINE LITTER AND AWARENESS CAMPAIGNS | 5) Fishing For Litter (FFL) Program | National Governments and Environmental NGOs | 3) Educate recreational and professional fishermen about marine litter problem and its possible solutions and how they can get involved. 4) Encourage recreational and professional fisheries to implement to the extent possible the "fishing for litter" program, providing the financial support by the EU and/or UNEP | Promote the transition towards "fishing for litter" while cleaning the marine environment from both floating and submerged litter. Paise awareness about the amount and impact of ALDFG (Abandoned, Lost, or Discorded Fishing Gear) Recovery of fish stock by reducing the fishing pressure and removing ALDFG from the seas | | - EMFF 2014 - 2020 (http://ec.europa.eu/fisheries/cfp/emff/ind ex_en.htm) - Use Code of good practice and the toolkit developed under the EC project MARELITT (http://www.marelitt.eu/?s=39) | Goals B i C | |
| | | Recreational and Professional Fishermen | 5) Get involved in the program and collect marine litter 6) Use best practices for sustainable fishing activities (change equipment material etc) | | | | | |
| | 6) Implement a ban of single use plastic in areas and facilities 200m from the coast | Governments | 1) Massive online campaign asking to enforcing the laws or proposing new one via online petition sites such as change.org. 2) Ban of plastic bags on all establishments close to the beach (less than 200 m). 3) Promotion of incentives for local businesses that ban the use of plastic cutleries. | 1) Reduce use of single use plastics at beaches and seas by reducing the plastic cutleries used in coastal businesses. 2) Reduction of the number of plastic bags used in coastal areas. 3) Promotion of sustainable packaging. 4) Raise awareness about single-use plastics and promote their more sustainable alternatives and a friendly-to-the-environment behavior of local businesses and visitors | Summer 2016: Create and promote a Mediterranean Responsible BeachBar Affiliation Programme that will mimic the Spanish example, across the Mediterranean Basin, which can be enforced by linking it with the obligatory measures to be taken for obtaining or maintaining the Blue Flag for each touristic beach. By end of 2016: launch and promote an online campaign for ban of single use plastic in designated areas: about single-use plastics and promote sustainable alternatives and a sustainable alternatives and a the-environment behavior of local businesses and the-environment behavior of local businesses and patients about single use plastic items replaced with reusable alternatives (in cooperative businesses this can be done regardless of the law implementation) 2016 Achieved milestones should be followed by reports by the media | | | |
| | | Local Authorities | Appoint Coast Guards (paid or volunteers) to ensure no single use plastic is distributed or left behind in the designated areas | | | | | |
| REDUCE-REUSE-RECYCLE | | Beach bars/Chiringuitos | 5 5) Promotion of more sustainable packaging for products: Chiringuito Responsible program affiliation - "It s All Our Trash Campaign" | | | | Goal A | |
| | | Local Business (Sports activities, Hospitality sector, Shops, and markets) | 6) Ban the use of plastic cups, straws and plates and promote the use of reusable or compostable cutleries. 7) Encourage replacing single use plastic items with more sustainable alternatives (e.g. more durable cups, cloth bags, etc.) | | | | | |
| | | Tourists and Media | Inform about alternatives to single use plastics so they join the petition and put pressure on the government | | | | | |
| | | Solid waste managements | Improve available bins - Increase the number of bins found in coastal areas with high number of visitors and use closed-bin designs that will avoid losses of wastes due to the wind. More regular collection of waste during the peak periods | N II 1) Reduce the amount of land based litter by reducing the lost garbage from overflowing bins during peak periods in the coastal areas of the Mediterranean N N S 8 8 9 | March 2016: Start adding more bins (regular and for recycling) to the beach and coastal areas as well as improve the current ones (bigger, different design etc) April - September 2016: Add signs on the bins and coastal areas of the Mediterranean coastal areas of the Mediterranean May - October 2016: If this action will be proven successful, then it will be repeated each year. By summer 2018: All visitors will act in a socially and environmentally responsible way. | | | |
| WASTE MANAGEMENT | Reduce the amount of lost garbage from overflowing bins during peak periods | Local Businesses | 3) Through the high peak season, local stores and businesses, will have the watch of the nearest bins; in case it gets filled, they will be responsible to either inform the local waste management department or they should clear it by collecting the full bag and adding a new one. | | | Improve the current ones (oigger, amerent design etc) April - September 2016: Add signs on the bins and distribute handouts with messages such as "We want to see the sand, not a dump", for promoting environmental awareness, no littering and recycling, May - October 2016: If this action will be proven successful. then it will be repeated each year. | | GoalA |
| | | Tourists (bathers) | 4) Act in a socially and environmentally responsible way - Be aware of the marine litter problem and be a part of its solution by throwing away their litter in suitable bins; if a bin is full, use the next one. | | | By summer 2018: All visitors will act in a socially and environmentally responsible way. | | |
| WASTE MANAGEMENT AND AWARENESS CAMPAIGNS | | Local authorities | Ask Local Authorities and the Government to propose a law or enforce fines for littering cigarette butts on the beach ("Butts free beaches" campaign). | Paduce cigarette butts entering the oceans by proposing new laws and by giving away portable ashtrays on the beach and seasides. Reduce the amount of cigarette butts that remains in the beaches and inform the beach users about the toxicity and persistence of cigarette butts | 1) Reduce cigarette butts entering the oceans by proposing new laws and by giving away portable ashtrays on the beach | | Portable ashtrays with a mark of the beach and/or resort would serve as a souvenir, thus increasing the chance of being kept | |
| | 8) "Butts-free" beaches | Tourists | Distribution of cone ashtrays and informative leaflets in the beach to avoid littering and inform the beach users about the damaee and toxicity of ciarette butts in the oceans | | Summer 2010 : Distribution of cone ashtrays and informative leaflets tourists and bathers | and reused. Even if the portable ashfrays are left on the beach, they will be less likely to end up in the sea, and easier to recover during the beach clean up activities than the individual cigarette butts would be. | Goal A | |

| | MedZeroLitter Action Plan | | | | | | | |
|------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------|---------------|
| CATEGORIES | ACTIONS | STAKEHOLDERS | ACTIVITIES | GOALS | MILESTONES / TIMEFRAMES | COMMENTS / REFERENCES | LINK TO HONOLULU STRATEGY | |
| WASTE MANAGEMENT AND RECOVERY OF MARINE LITTER | | Local Authorities and Environmental Organizations | Promote the need for a good source separation of waste at sea, giving talks to the crews of yachts and teaching them the importance of having all the different containers for all types of waste in their boats. | | 2016: Create a network of volunteers from | | | |
| | | Yacht clubs, Yacht crews and professional skippers | 2) Separate their waste in different containers, promote recycle and reduce the amount of their waste in their boats. 3) Develop and implement a Recovery Campaign named "It s NOSTRUM, so pick it up!" as an incentive to collect floating debris while at sea. | 1) Educate and promote environmental awareness and behavior for the yachting clubs 2) Reduce the amount of waste from private boats (yachts and cruisers) that may end up in the seas 3) Remove floating debris from the environment and thus reduce the amount of marine litter in the Mediterranean by implementing the Recovery Campaign 4) Developa T sining for Plastic "policy/agreement via stabilishing bonus for vessels that recover Marine Litter 5) Decrease the deposition of separated waste in the same landfills as the communal waste of Increase the amount of the material that gets recycled by creasing a network of separated waste in the same landfills as the communal waste of Increase the deposition of separated waste in the same landfills as the communal waste | the local governments, to be also educators lines of y the local governments, to develop a series of talks for the crews and skippers of the yachts. By 2017: 25% Reduction of waste produced in yachts and at least 70% increase of recycling of their wastes. | | | |
| | 9) Promote separation of Inter produced on board of vessels (yachts, ships, cruisers) and recovery of litter encountered in the sea | Cruiser owners and personnel | 4) In addition to promoting waste separation, make incentives to avoid single-use plastics. Cruisers have many tourists on board, and usually serve meals, snacks, and erfleshments on board. Due to water limitation, they often use single-use plastic items. Examples of incentives for waste separation and reduction would be dish washing facilities in ports, fee paid per volume of communal waste with a smaller fee paid per volume of separated waste et al. 5) Formote marine debris retrieval from sea by "buying off" such waste in the ports. Cruisers can decide to pull a mesh while cruising, or encourage their passengers to retrieve marine debris while they stop in ports and/or coves where tourisst can pick up trash to, for example, win a free drink on the cruiser. | | Paravier for the Yaching clubs Paravier for amount of waste from private boats (yachts and cruisers) that may end up in the seas Parave floating debris from the environment and thus teduce the amount of marine litter in the Mediterranaen by a "fishing for Plastic" policy/agreement via establishing bouns for vessels that recover Marine Litter and this teduce the amount of separated waste in the same for macroling collection of waste to either forwaste of lincrease the amount of the material that gets recycled by 6) Summer 2018: Develop and imp collection and recycling facilities that make new items (e.g., utf shorts out of bottle environment. | By 2017: 10% Reduction of waste produced on cruisers. By Summer 2017: Recovery Campaign for promoting crews to collect floating marine litter found while at sea. - Have the required containers available, for the collection of waste to either forward it to scientists or for recycling. - The network for the whole reduce-recycle cricle should have a platform to start attracting users. By Summer 2018: Develop and implement a Strategy to promote and ensure care of the marine By 2019: Increase in the amount of recovered marine. | s or is. iy | Goals B and C |
| | | Private and Public Marinas | 6) Provide specific containers to collect each type of marine litter found in the sea by yachts, for recycling them or for forwarding them to the scientists that might need the data | | Itter from the sea by cruisers 20% By 2019: Everyone on a yacht will be willing to collect any floating debris found while at sea and to continue the Strategy developed | | | |
| | | Recycling companies | Buy off the separated recyclable materials, making a financial incentive for the other stakeholders to separate it. | | | | | |
| | 10) Mediterranean Experience of Eco-Tourism (MEET Project) - Second Phase | MedPAN (Network of Marine Protected Area Managers in the Mediterranean) | 1) Continue the MEET Project in other countries in the Mediterranean Sea 2) Follow up and evaluate the results of the first phase of the MEET Project | (1) Promote an ecotourism model for Mediterranean Protected Areas (MPAs) based on the "European Charter for Sustainable rourism" to promote a better seasonal distribution of tourism flows (Med/PAN MEET project). 2) Produce guidelines for Eco-Tourism Best Practices and promote them through the E.U. or RAC/SPA meetings and documents. 3) Reduction of marine litter through Eco-Tourism practices in MPAs and enforcement of Zero Waste regulation in the areas. 4) Promote Ecotourism and Best Practices through Media coverage. | ecotourism model for Mediterranean s (MPA) based on the "European Charter for usm" to promote a better seasonal tourism flows (Med/PAN MEET first phase and develops the second call of interest 2017. Develop a brochure with guidelines for ecotourism best practices for the Mediterranean coastal and Marine Protected Areas. These guidelines are then forwarded to the E.U. Environment Agency 2014. The Megulation "Zero Vaste in MPAs" and enforcement of Zero Waste regulation in the forcement of Zero Waste regulation in the tourism and Best Practices through Media tourism and Best Practices through Media | Pare 2016: Med/PAN evaluates the results of st phase and develops the second call of evelop a brochure with guidelines for sm best practices for the Mediterranean and Marine Protected Areas. These guidelines forwarded to the E.U. Environment Agency New Regulation "Zero Waste in MPAs" and ment - strict penalties will be applied to those 2020 : Participate in the MEET Project with the areas. 2017 - March 2020: Second phase of MEET U, issuing guidelines for ecotourism best of the Narka 2000 network | | |
| | | European Union | Issuing guidelines for Eco-Tourism best practices for the Natura 2000 network (Habitats Directive 92/43/EEC) | | | | | |
| ECOTOURISM | | RAC / SPA (The Regional Activity Centre for Specially Protected Areas) | 4) continue the collaboration with MedPAN for the next MEET phase and promoting Eco-Tourism activities through Barcelona Convention meetings. 5) Produce a brochure of guidelines for best practices of Eco- Tourism | | | | Goals A and B | |
| | | National Governments and Tourism Organizations of the Mediterranean Countries | 6) Promote Eco-Tourism, especially in Protected Areas. 7) Get involve in the MEET Project 8) Develop "Zero-Waste" Regulation in MPAS. | | | | | |
| | | Media | 9) Make video documentaries and magazine articles to promote areas of natural beauty along with Eco-tourism. Such articles can be added in airlines on-board magazines. | | regarding Eco-Tourism by attending the activities within the MEET Project. | runsia). (http://www.neuecolourismorg/ | | |
| | | Students of the Marine Litter MOOC | Create a multidisciplinary team of people in their countries to report the advances made with the implementation of the different actions of the Action Plan | Keep track of the activities and also to develop new strategies to improve results | | | | |
| ACTION PLAN | | NGO s and governmental organizations and initiatives | Support groups created in various Mediterranean countries and act as a link between the stakeholders and the authorities both locally and nationally | 2) Provide capacity for action throughout the national territory and so extend the scope of the Action Plan 3) Motivate the general public using a strong scientific background (fact), and preferably some more well known community figures who will push and promote the Action plan 2016: make contact / join the international, regional, http://www.mannelitter a strong network | 2015: make contact / isin the international regional | Global Partnership on Marine Litter; | | |
| | 11) Promote and Implement MedZeroLitter Action Plan | Science communicators | Approach science communicators in our respective communities | | ic using a strong scientific and local initiatives (such as: Global Partnership on Push and promote the Action push and promote the Action | | Goals A, B and C | |
| | | Media | 4) Create communication channels through social media (Twitter, Youtube, Facebook, Instagram), posting related actions to dedicated websites such as Recycleopedia (http://www.recycleopedia.com/) in order to promote the Action Plan | 4) Make known to the world the Med Zero Plastic Action Plan and its activities. The more accounts and channels, the more repercussion will have the Action Plan | | | | |

Action Plans at Regional Scale for Marine Biota

1. UNEP-MAP, 2017. Action Plan for the Conservation of Cetaceans in the Mediterranean Sea. UN Environment/MAP Athens, Greece 2017. 10pp. www.rac-spa.org/sites/default/files/action_plans/ap_cetaceans_en.pdf

The main objectives of the Action Plan are:

- a) The overall protection and conservation of cetacean habitats
- b) The protection, conservation and the recovery of cetacean populations in the Mediterranean Sea.

Regarding the protection of cetaceans related to marine litter, Contracting Parties are encouraged to:

| Priority | Action |
|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| prevention and elimination of pollution | cooperate with existing programmes and plans, such as the global conventions regarding the protection of the marine environment (in particular the 1973/78 MARPOL Convention and London Dumping Convention), as defined by the Convention for the Protection of the Mediterranean Sea against Pollution and incidental catches in fishing gear establish port reception facilities for the collection of ship generated garbage |
| elimination of incidental catches in fishing gear | regulate fishing gears and practices in order to eliminate by-catches and to prevent fishing gear from being lost or discarded at sea, and ensure the safe release of any cetaceans incidentally caught in fishing gear ensure that cetaceans are covered, at national level, by appropriate regulation measures providing for the mitigation of the adverse impacts from their interactions with human activities, in relation to by catch and depredation in fishing gears (amongst others) reduce the cetacean-fisheries interactions by assessing the cetacean bycatch and depredation in their fisheries and adopt mitigation measures taking into account the requirements for cetacean conservation and the need for the development of sustainable and responsible fishing activities. In this context, the Contracting Parties are invited to conform to the recommendations from ACCOBAMS and GFCM on this issue. SPA/RAC should strengthen its collaboration with the Secretariats of ACCOBAMS and GFCM to provide assistance to the Mediterranean countries in mitigating the impacts of the interactions occurring between cetacean species and fishing activities, through investigating innovative and environmentally sound mitigation measures and by disseminating information on relevant best practices and successful |

| | | initiatives |
|---------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| monitoring, research and data collection and dissemination with regard to biology, behavior, range and habitats of cetaceans | • | adopt concrete protection measures, co-ordinated programmes for scientific research and public awareness campaigns to ensure the survival and assist in the recovery of cetacean populations develop scientific research and monitoring, using non-destructive and non-invasive procedures in order to make full use of the information by establishing an efficient system for reporting by-catches and stranded specimens, and carry out full autopsies in order to collect issues for further studies and reveal possible cause of death, with special regard to contaminant loads, stomach contents, disease incidents and any physiological or anatomical abnormalities |
| educational activities aimed at the public at large and fishermen | • | adopt concrete public awareness campaigns to ensure the survival and assist in the recovery of cetacean populations develop widespread campaigns to increase public and fishermen awareness to support the conservation measures and to encourage the establishment of voluntary observer programmes to report sightings and strandings |

2. The Agreement on the Conservation of Cetaceans of the Black Sea, Mediterranean Sea and contiguous Atlantic Area (ACCOBAMS) Strategy (Period 2014-2020). www.accobams.org/new_accobams/wpcontent/uploads/2016/06/ACCOBAMS_Strategy.pdf

Main Objective: Reduce human pressures on cetaceans, in particularly those related to bycatch, habitat loss and degradation (pollution)

Desired outcomes:

- a) Mortality rate and number of animals injured through activities caused by humans are decreased by at least 30%
- b) No recorded redistribution of cetacean populations that can be linked to human pressures.

Interaction with Fisheries (by catch, depredation):

Action: Assess cetaceans bycatch and depredation impacts on cetaceans in the Mediterranean Sea and adjoining Atlantic area and propose mitigation measures focusing on pilot areas through a joint GFCM/ACCOBAMS project (Secretariat, Scientific Committee, Parties in cooperation with GFCM)

Expected output: Analysis of cetacean bycatch in the Mediterranean Sea and proposal of mitigation measures

Action Priority: Very high - High

Action: Prepare a cetaceans bycatch reduction strategy for the Mediterranean Sea and adjoining Atlantic area, based on the results of the joint GFCM/ACCOBAMS project

Appendix 3

Monitoring protocols applied at the national, regional and European level by research projects (e.g. DeFishGear project), institutions and organisations (e.g. Regional Plan for Marine Litter Management in the Mediterranean)

Figure S1. Monitoring protocol for marine litter beach survey adopted by DeFishGear Project Source: Vachogianni et al, 2017

| Name and area of beach: | Name of surveyor 1: |
|-----------------------------------------------------------------|---------------------------------------------------------------|
| Beach ID: | e-mail address: |
| Country: | Name of surveyor 2: |
| | e-mail address: |
| | Total number of surveyors: |
| Date of survey: | |
| Start time of the survey: | |
| End time of the survey: | |
| Additional In | formation |
| When was the beach last cleaned: | (d/m/y) |
| Did you divert from the predetermined 100 meters: | No Yes, please specify |
| | |
| | |
| | |
| Did any of the following weather conditions affect the data of | the survey? If so, please tick appropriate box: |
| | □ Wind □ Rain □ Snow □ Ice □ Fog |
| | Sand storm Exceptionally high tide |
| | |
| | |
| Did you find stranded or dead animals: | Yes No If so, how many: |
| Please describe the animal, or note the species name if known | 1: |
| | Alive Dead |
| Sex of animal (if known): | |
| Age of animal (if known): | |
| Is the animal entangled in litter: | Yes No |
| If so, please describe nature of the entanglement and type of I | litter: |
| | |
| | |
| | |
| Were there any circumstances that influenced the survey? (For | r example tracks on the beach (cleaning or other), recent |
| replenishment/nourishment of the beach or other, difficulties | in identifying items due to the presence of large amounts |
| of wood washed ashore, etc.). | |
| Please specify: | |
| | |
| | |
| Were there any events that led to unusual types and/or amount | ts of litter on the beach? (For example beach party or other) |
| Please specify: | |
| | |
| | |

Monitoring Marine Litter on Beaches Survey Sheet (100 m)

| | ARTIFICIAL POLYMER MATERIALS | | | | | | | |
|------|---------------------------------------------------------------------|-------------|-------|--|--|--|--|--|
| Code | Items name | Item counts | Total | | | | | |
| G1 | 4/6-pack yokes, six-pack rings | | | | | | | |
| G3 | Shopping bags, incl. pieces | | | | | | | |
| G4 | Small plastic bags, e.g. freezer bags, including pieces | | | | | | | |
| G5 | Plastic bag collective roll; what remains from rip-off plastic bags | | | | | | | |
| G7 | Drink bottles <=0.5I | | | | | | | |
| G8 | Drink bottles >0.5I | | | | | | | |
| G9 | Cleaner/cleanser bottles & containers | | | | | | | |
| G10 | Food containers incl. fast food containers | | | | | | | |
| G11 | Beach use related cosmetic bottles and containers, e.g. Sunblocks | | | | | | | |
| G12 | Other cosmetics bottles & containers | | | | | | | |
| G13 | Other bottles & containers (drums) | | | | | | | |
| G14 | Engine oil bottles & containers <50 cm | | | | | | | |
| G15 | Engine oil bottles & containers > 50 cm | | | | | | | |
| G16 | Jerry cans (square plastic containers with handle) | | | | | | | |
| G17 | Injection gun containers | | | | | | | |
| G18 | Crates and containers / baskets | | | | | | | |
| G19 | Car parts | | | | | | | |
| G21 | Plastic caps/lids from drinks | | | | | | | |
| G22 | Plastic caps/lids from chemicals, detergents (non-food) | | | | | | | |
| G23 | Plastic caps/lids unidentified | | | | | | | |
| G24 | Plastic rings from bottle caps/lids | | | | | | | |
| G25 | Tobacco pouches / plastic cigarette box packaging | | | | | | | |
| G26 | Cigarette lighters | | | | | | | |
| G27 | Cigarette butts and filters | | | | | | | |
| G28 | Pens and pen lids | | | | | | | |
| G29 | Combs/hair brushes/sunglasses | | | | | | | |
| G30 | Crisps packets/sweets wrappers | | | | | | | |
| G31 | Lolly sticks | | | | | | | |
| G32 | Toys and party poppers | | | | | | | |
| G33 | Cups and cup lids | | | | | | | |
| G34 | Cutlery and trays | | | | | | | |
| G35 | Straws and stirrers | | | | | | | |
| G36 | Fertilizer/animal feed bags | | | | | | | |
| G37 | Mesh vegetable bags | | | | | | | |
| G40 | Gloves (washing up) | | | | | | | |
| G41 | Gloves (industrial/professional rubber gloves) | | | | | | | |
| G42 | Crab/lobster pots and tops | | | | | | | |
| G43 | Tags (fishing and industry) | | | | | | | |
| G44 | Octopus pots | | | | | | | |
| G45 | Mussel nets, Oyster nets | | | | | | | |
| G46 | Oyster trays (round from oyster cultures) | | | | | | | |
| G47 | Plastic sheeting from mussel culture (Tahitians) | | | | | | | |

| G49 | Rope (diameter more than 1 cm) | | |
|------|-------------------------------------------------|-------------------|--|
| G50 | String and cord (diameter less than 1 cm) | | |
| G53 | Nets and pieces of net < 50 cm | | |
| G54 | Nets and pieces of net > 50 cm | | |
| G56 | Tangled nets/cord | | |
| G57 | Fish boxes – plastic | | |
| G58 | Fish boxes - expanded polystyrene | | |
| G59 | Fishing line/monofilament (angling) | | |
| G60 | Light sticks (tubes with fluid) incl. packaging | | |
| G62 | Floats for fishing nets | | |
| G63 | Buoys | | |
| G64 | Fenders | | |
| G65 | Buckets | | |
| G66 | Strapping bands | | |
| G67 | Sheets, industrial packaging, plastic sheeting | | |
| G68 | Fiberglass/fragments | | |
| G69 | Hard hats/Helmets | | |
| G70 | Shotgun cartridges | | |
| G71 | Shoes/sandals | | |
| G72 | Traffic cones | | |
| G73 | Foam sponge | | |
| G79 | Plastic pieces 2.5 cm > < 50 cm | | |
| G80 | Plastic pieces > 50 cm | | |
| G82 | Polystyrene pieces 2.5 cm > < 50 cm | | |
| G83 | Polystyrene pieces > 50 cm | | |
| G84 | CD, CD-boxes | | |
| G85 | Salt packaging | | |
| G86 | Fin trees (from fins for scuba diving) | | |
| G87 | Masking tape | | |
| G88 | Telephone (incl. parts) | | |
| G89 | Plastic construction waste | | |
| G90 | Plastic flower pots | | |
| G91 | Biomass holder from sewage treatment plants | | |
| G92 | Bait containers/packaging | | |
| G93 | Cable ties | | |
| G95 | Cotton bud sticks | | |
| G96 | Sanitary towels/panty liners/backing strips | | |
| G97 | Toilet fresheners | | |
| G98 | Diapers/nappies | | |
| G99 | Syringes/needles | | |
| G100 | Medical/Pharmaceuticals containers/tubes | | |
| G101 | Dog faeces bags | | |
| G102 | Flip-flops | | |
| G124 | Other plastic/polystyrene items (identifiable) | | |
| | | Total weight (kg) | |

| RUBBER | | | | | | |
|--------|------------------------------------------------------|-------------------|-------|--|--|--|
| Code | Items name | Item counts | Total | | | |
| G125 | Balloons and balloon sticks | | | | | |
| G126 | Balls | | | | | |
| G127 | Rubber boots | | | | | |
| G128 | Tyres and belts | | | | | |
| G129 | Inner-tubes and rubber sheets | | | | | |
| G130 | Wheels | | | | | |
| G131 | Rubber bands (small, for kitchen/household/post use) | | | | | |
| G132 | Bobbins (fishing) | | | | | |
| G133 | Condoms (incl. packaging) | | | | | |
| G134 | Other rubber pieces | | | | | |
| | | Total weight (kg) | | | | |

| CLOTH/TEXTILE | | | | | | |
|---------------|-----------------------------------------|-------------------|-------|--|--|--|
| Code | Items name | Item counts | Total | | | |
| G137 | Clothing / rags (clothes, hats, towels) | | | | | |
| G138 | Shoes and sandals (e.g. leather, cloth) | | | | | |
| G139 | Backpacks & bags | | | | | |
| G140 | Sacking (hessian) | | | | | |
| G141 | Carpet & furnishing | | | | | |
| G142 | Rope, string and nets | | | | | |
| G143 | Sails, canvas | | | | | |
| G144 | Tampons and tampon applicators | | | | | |
| G145 | Other textiles (incl. rags) | | | | | |
| | | Total weight (kg) | | | | |

| PAPER/CARDBOARD | | | | | | |
|-----------------|---------------------------------------------------|-------------------|-------|--|--|--|
| Code | Items name | Item counts | Total | | | |
| G147 | Paper bags | | | | | |
| G148 | Cardboard (boxes & fragments) | | | | | |
| G150 | Cartons/Tetrapack Milk | | | | | |
| G151 | Cartons/Tetrapack (others) | | | | | |
| G152 | Cigarette packets | | | | | |
| G153 | Cups, food trays, food wrappers, drink containers | | | | | |
| G154 | Newspapers & magazines | | | | | |
| G155 | Tubes for fireworks | | | | | |
| G156 | Paper fragments | | | | | |
| G158 | Other paper items | | | | | |
| | | Total weight (kg) | | | | |

| | PROCESSED/WORKED WOOD | | | | |
|------|------------------------------------------------------|-------------------|-------|--|--|
| Code | Items name | Item counts | Total | | |
| G159 | Corks | | | | |
| G160 | Pallets | | | | |
| G161 | Processed timber | | | | |
| G162 | Crates | | | | |
| G163 | Crab/lobster pots | | | | |
| G164 | Fish boxes | | | | |
| G165 | Ice-cream sticks, chip forks, chopsticks, toothpicks | | | | |
| G166 | Paint brushes | | | | |
| G167 | Matches & fireworks | | | | |
| G171 | Other wood < 50 cm | | | | |
| G172 | Other wood > 50 cm | | | | |
| | | Total weight (kg) | | | |

| | METAL | | | | |
|------|--------------------------------------------------|-------------------|-------|--|--|
| Code | Items name | Item counts | Total | | |
| G174 | Aerosol/Spray cans | | | | |
| G175 | Cans (beverage) | | | | |
| G176 | Cans (food) | | | | |
| G177 | Foil wrappers, aluminium foil | | | | |
| G178 | Bottle caps, lids & pull tabs | | | | |
| G179 | Disposable BBQs | | | | |
| G180 | Appliances (refrigerators, washers, etc.) | | | | |
| G181 | Tableware (plates, cups & cutlery) | | | | |
| G182 | Fishing related (weights, sinkers, lures, hooks) | | | | |
| G184 | Lobster/crab pots | | | | |
| G186 | Industrial scrap | | | | |
| G187 | Drums, e.g. oil | | | | |
| G188 | Other cans (< 4 L) | | | | |
| G189 | Gas bottles, drums & buckets (> 4 L) | | | | |
| G190 | Paint tins | | | | |
| G191 | Wire, wire mesh, barbed wire | | | | |
| G193 | Car parts / batteries | | | | |
| G194 | Cables | | | | |
| G195 | Household Batteries | | | | |
| G198 | Other metal pieces < 50 cm | | | | |
| G199 | Other metal pieces > 50 cm | | | | |
| | | Total weight (kg) | | | |

| GLASS/CERAMICS | | | |
|----------------|----------------------------------------------|-------------------|-------|
| Code | Items name | Item counts | Total |
| G200 | Bottles, including pieces | | |
| G201 | Jars, including pieces | | |
| G202 | Light bulbs | | |
| G203 | Tableware (plates & cups) | | |
| G204 | Construction material (brick, cement, pipes) | | |
| G205 | Fluorescent light tubes | | |
| G206 | Glass buoys | | |
| G207 | Octopus pots | | |
| G208 | Glass or ceramic fragments > 2.5 cm | | |
| G210 | Other glass items | | |
| | | Total weight (kg) | |

| | UNIDENTIFIED AND/OR CHEMICALS | | |
|------|----------------------------------------------------------------|-------------------|-------|
| Code | Items name | Item counts | Total |
| G211 | Other medical items (swabs, bandaging, adhesive plaster, etc.) | | |
| G213 | Paraffin/Wax | | |
| | | Total weight (kg) | |

Figure S2. Monitoring protocol for marine litter (macro) on the water surface adopted by DeFishGear Project

Source: Vachogianni et al, 2017

Monitoring Marine Litter (Macro) on the Water Surface Data Sheet

| Location name | |
|----------------|--|
| Location ID | |
| Country | |
| Surveyor Name | |
| e-mail address | |
| Date of survey | |

| VESSEL CHARACTERISTICS | | | |
|--------------------------|--|--|----------------------------------------------------------------------|
| Vessel name | | | Name of the vessel |
| Type of vessel | | | Type e.g. research, fishing, hired, regular ferry etc. |
| Vessel length and weight | | | Length of the vessel (metres) Gross weight of the vessel (tonnes) |

| VISUAL SURVEY TRANSECT DETAILS | | |
|--------------------------------|----------------------------------------------------------------------|--|
| Latitude/longitude start | <i>Recorded as nnn.nnnnn degrees at the start of the sample unit</i> | |
| Latitude/longitude end | Recorded as nnn.nnnnn degrees at the end of the sample unit | |
| Coordinates system | Datum and coordinate system employed | |
| Vessel speed | Average ship speed in knots | |
| Observation height | Observation elevation above the sea | |
| Distance covered | Total distance covered by the transect (m) | |
| Time start/end | Time over which the survey took place | |
| Surface covered | Area covered by the vessel (km²) | |

| ENVIRONMENTAL PARAMETERS - OBSERVATION DETAILS | | | | |
|------------------------------------------------|--|----|----|--------------------------------------------------------------------|
| Wind speed | | | | Recorded in (Beaufort) |
| Wind direction | | □s | □w | Tick more than one boxes e.g. for SE wind |
| Sea surface salinity | | | | Expressed in % owhen reporting |
| Viewing quality | | | | Good/Moderate/Poor ; in the latter two case state cause (e.g. fog) |
| Sea state | | | | Expressed in accordance with the Douglas Sea Scale (0-9) |

| SITE CHARACTERISTICS | | | | |
|-------------------------------------------|------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|--|--|
| Nearest river name | | Name of nearest river | | |
| Nearest river distance | | Distance to the nearest natural input (river or stream) (kilometres) | | |
| Nearest river position | □n □e □s □w | Position of river mouth in relation to survey area | | |
| Nearest major fishery | | Name of the nearest major fishery (named by type) | | |
| Nearest major fishery distance | | Distance to the nearest major fishery (kilometres) | | |
| Nearest major fishery position | □n □e □s □w | Position of the nearest major fishery in relation to survey area | | |
| Nearest town | | Name of nearest town | | |
| Nearest town distance | | Distance to the nearest town (kilometres) | | |
| Nearest town position | □n □e □s □w | Position of the nearest town in relation to survey area | | |
| Population size of this town | | No of inhabitants | | |
| Additional features of the town | Residential Winter Tourist Spring Residential & tourist Summer Autumn Summer | Indicate the main characteristic of the town, residential or touristic town; in case of the later indicate the high season peak | | |
| Name of the nearest beach | | Name of the nearest beach | | |
| Distance to nearest beach | | Distance to the closest coastline (kilometres) | | |
| Position of the nearest coast | | Position of the closest coastline in relation to survey area | | |
| Nearest shipping lane distance | | Distance to the nearest shipping lane (kilometres) | | |
| Estimated traffic density | | Recorded in number of ships/year | | |
| Vessel type | | Indicate the type of vessels that mainly use it e.g. merchant ships, etc. | | |
| Position of the shipping lane | | Position of shipping lane in relation to survey area | | |
| Name of the nearest harbour | | Name of nearest harbour | | |
| Distance to nearest harbour | | Distance to the closest harbour (kilometres) | | |
| Harbour position | | Position of the nearest harbour in relation to survey area | | |
| Type of harbour | | Based on the types of vessels visiting the harbour | | |
| Size of harbour | | Record the number of ships that reach the harbour per year | | |
| Nearest discharge of waste water distance | | Distance to the closest waste water discharge point(kilometres) | | |
| Position of nearest discharge point | | Position of nearest discharge points in relation to survey area | | |
| Type of waste water discharge | □Industrial □Municipal □Other | Indicate type of waste water discharged | | |

| | | 62 | Bags | |
|------|----------|------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | | 66 | Bottles | |
| | | 610 | Food containers inc. fast food containers | |
| | | 618 | Crates and containers / backets | |
| | | 630 | Plastic runs and lids | |
| | | 617 | Circuit a butte and filters | |
| | 1 | 620 | Cigarette outis and inters | |
| | 8 | 0.39 | to overs | |
| | Ę. | UNO | Mussei nets / Oyester nets | |
| | E S | 048 | Synthetic rope | |
| | 5 | 651 | Fishing net | |
| | 5 | G55 | Fishing line (entagled) | |
| | 2 | G59 | Fishing line / monofilament (angling) | |
| | 2 | 661 | Other fishing related | |
| | ġ | G66 | Strapping bands | |
| | È | G67 | Sheets, indus. packaging, plastic sheeting | |
| | ž. | G93 | Cable ties | |
| | | G95 | Cotton bud sticks | |
| | | G96 | Sanitary towels/panty liners/backing strips | |
| | | G98 | Diapers/nappies | |
| | | G99 | Syringes/needles | |
| | | 6124 | Other plastic/polystyrene items (identifiable) | |
| | | G125 | Balloons and balloon sticks | |
| | | 6127 | Rubber boots | |
| | 5 | 6128 | Tures and helts | |
| | 8 | 6113 | Babbias Mishinal | |
| 3 | 2 | 6333 | Condems (inc paring) | |
| 2 | | 0133 | Concoms (inc.pac.aging) | |
| 2 | | 0134 | Ucher rubber pieces | |
| 1 | | 0139 | shoes | |
| 5 | 23 | 6137 | Clothing/rags (clothing, hats, towels) | |
| 8 | 5 E | G141 | Carpet & Furnishing | |
| ۶. | 10 21 | 6142 | Rope, string and nets | |
| - | | 6145 | Others textiles (inc.rags) | |
| | ARD- ARD | G146 | Paper/cardboard | |
| | | G148 | Cardboard (boxes & fragments) | |
| | SED/ PAR | G158 | Other paper items | |
| | | G160 | Pallets | |
| | OCES | 6170 | Wood (processed) | |
| | £ > | G173 | Other (specify) | |
| | | G175 | Cans (beverage) | |
| | | 6176 | Cans (food) | |
| | | 6180 | Appliances (refrigerators washers etc.) | |
| | | 6183 | Eiching salated functions, manners, etc., | |
| | | C185 | Middle size containers | |
| | ¥ | 0183 | Devent a c al | |
| | E | 6187 | Drums, e.g. on | |
| | 5 | 0133 | Calification of Decomes | |
| | | 6105 | Lana matalla abiasta | |
| | | 0199 | Large metallic objects | |
| | | 6197 | Other (metal) | |
| | . 10 | 0200 | eoutes (incl. pieces) | |
| | NC NC | G201 | Jars (incl. pieces) | |
| | 33 | G208 | Glass or ceramic fragments (> 2.5 cm) | |
| | 98 | G209 | Large glass objects (specify) | |
| | 188 | 6210 | Other glass items | |
| SIZE | | CLASSES | G. < Scm*Scm = 2Scm ² H. < 10cm*10cm = 100cm ² I. < 20cm*20cm = 400cm ² J. < 50cm*50cm = 2500cm ² K. < 100cm-100cm = 10000cm ² = 1m ² L. > 100cm-100cm = 10000cm ² = 1m ² | |
| | | | | |

| | HAUL RESULTS | |
|---------------------------------------------------|--------------|----------------------------|
| Total weight of litter in the haul | | Record litter weight in Kg |
| Total weight of artificial polymer materials | | Record litter weight in Kg |
| Total No of items of artificial polymer materials | | Record number of items |
| Total weight of rubber | | Record litter weight in Kg |
| Total No of items of rubber | | Record number of items |
| Total weight of cloth/textile | | Record litter weight in Kg |
| Total No of items of cloth/textile | | Record number of items |
| Total weight of paper/cardboard | | Record litter weight in Kg |
| Total No of items of paper/cardboard | | Record number of items |
| Total weight of processed/worked wood | | Record litter weight in Kg |
| Total No of items of processed/worked wood | | Record number of items |
| Total weight of metal | | Record litter weight in Kg |
| Total No of items of metal | | Record number of items |
| Total weight of glass/ceramics | | Record litter weight in Kg |
| Total No of items of glass/ceramics | | Record number of items |

Figure S3. Monitoring protocol for marine litter (macro) on the seafloor adopted by DeFishGear Project Source: Vachogianni et al, 2017

Monitoring Marine Litter (Macro) on the Seafloor

Data Sheet

| Location name | |
|----------------|--|
| Location ID | |
| Country | |
| Surveyor Name | |
| e-mail address | |
| Date of survey | |

| VESSEL CHARACTERISTICS | | | | | |
|--------------------------|--|--|----------------------------------------------------------------------|--|--|
| Vessel name | | | Name of the vessel | | |
| Type of vessel | | | Type e.g. research, fishing, hired, regular ferry etc. | | |
| Vessel length and weight | | | Length of the vessel (metres) Gross weight of the vessel (tonnes) | | |
| Vessel engine power | | | Vessel engine power (kilowatt) | | |

| Latitude/longitude start | | Recorded as nnn.nnnnn degrees at the start of the sample unit |
|---------------------------------------|--|---------------------------------------------------------------|
| Latitude/longitude end | | Recorded as nnn.nnnnn degrees at the end of the sample unit |
| Coordinates system | | Datum and coordinate system employed |
| Vessel speed | | Average ship speed in knots |
| Start time/end time | | Time over which the survey (haul) took place |
| Mouth horizontal/ vertical opening | | Record the trawl mouth horizontal and vertical opening (mm) |
| Haul position/depth | | Record the average haul position |
| Cod end mesh size | | Record mesh size (mm) |
| Cod end type | | Type of cod end e.g. diamond mesh, square mesh |
| Head rope length | | Record the length of the head rope (m) |

| ENVIRONMENTAL PARAMETERS - OBSERVATION DETAILS | | | | | |
|------------------------------------------------|----|---|----|----|----------------------------------------------------------|
| Wind speed | | | | | Recorded in (Beaufort) |
| Wind | ΠN | E | □s | □w | Tick more than one boxes e.g. for SE wind |
| Sea state | | | | | Expressed in accordance with the Douglas Sea Scale (0-9) |
| NOTES | | | | | |

| | SITE CHARACTERISTICS | |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Nearest river name | | Name of nearest river |
| Nearest river distance | | Distance to the nearest natural input (river or stream) (kilometres) |
| Nearest river position | | Position of river mouth in relation to survey area |
| Nearest major fishery | | Name of the nearest major fishery (named by type) |
| Nearest major fishery distance | | Distance to the nearest major fishery (kilometres) |
| Nearest major fishery position | | Position of the nearest major fishery in relation to survey area |
| Nearest town | | Name of nearest town |
| Nearest town distance | | Distance to the nearest town (kilometres) |
| Nearest town position | □n □e □s □w | Position of the nearest town in relation to survey area |
| Population size of this town | | No of inhabitants |
| Additional features of the town | Residential Winter Tourist Spring Residential & tourist Summer Autumn | Indicate the main characteristic of the town, residential or touristic town; in case of the later indicate the high season peak |
| Name of the nearest beach | | Name of the nearest beach |
| Distance to nearest beach | | Distance to the closest coastline (kilometres) |
| Position of the nearest coast | □n □e □s □w | Position of the closest coastline in relation to survey area |
| Nearest shipping lane distance | | Distance to the nearest shipping lane (kilometres) |
| Estimated traffic density | | Recorded in number of ships/year |
| Vessel type | | Indicate the type of vessels that mainly use it e.g. merchant ships, etc. |
| Position of the shipping lane | □n □e □s □w | Position of shipping lane in relation to survey area |
| Name of the nearest harbour | | Name of nearest harbour |
| Distance to nearest harbour | | Distance to the closest harbour (kilometres) |
| Harbour position | □n □e □s □w | Position of the nearest harbour in relation to survey area |
| Type of harbour | | Based on the types of vessels visiting the harbour |
| Size of harbour | | Record the number of ships that reach the harbour per year |
| Nearest discharge of waste water distance | | |
| Position of nearest discharge point | | Position of nearest discharge points in relation to survey area |

| | | 62 | Bags | | 10.00 | | | | 11- | | | |
|------|----------|----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----|-------|------|---|-----|-----|----|-------|---|
| | | G6 | Bottles | | | 2 | | | | | | |
| | | G10 | Food containers inc. fast food containers | | 0.000 | | | | | 1 | 1000 | |
| | | G18 | Crates and containers / baskets | | | | | | | | | |
| | | 620 | Plastic cups and lids | | 1000 | | | | | | 1000 | |
| | ~ | 627 | Cigarette butts and filters | | | 1 | | | | 11 | 1 | |
| | N. | G39 | Gloves | | | 1 | | | | | | |
| | Ē | G45 | Mussel nets / Ovester nets | | 6000 | 10 | | | | | | |
| | N. | G48 | Synthetic rope | | | - | | | | | | |
| | a a | G51 | Fishing net | | 10.00 | 1 | | | | | 100 | |
| | N. | 655 | Fishing line (entagled) | | 1000 | | | | | | 1.00 | |
| | 8 | G59 | Fishing line / monofilament (angling) | | 1000 | | - | - | | | 1.000 | |
| | 5 | 661 | Other fishing related | | | _ | - | | | | | |
| | 8 | G66 | Strapping bands | | 0.000 | | | | | | | |
| | Ē | G67 | Sheets, indus, packaging, plastic sheeting | | 200 | 10 | - | | | | - | - |
| | E S | 693 | Cable ties | | 1000 | - | | | | 1 | | |
| | 1.1.1 | 695 | Cotton bud sticks | | | _ | - | - | - | - | - | - |
| | | 6%6 | Sanitary towels/nanty liners/harking strins | | - | - | - | - | | - | - | - |
| | | G98 | Diapers/nappies | | | - | - | - | - | | 1000 | - |
| | | 055 | Suringes/nondles | | | - | - | - | - | | 1000 | - |
| | | 6124 | Other plastic inductorena items Eductic shiel | + + | - | - 10 | - | - | | | - | - |
| | - | 6125 | Balloons and balloon sticks | | | | - | - | | | | - |
| | | 6122 | Rubber boots | | | - 10 | - | - | | _ | 1 | |
| | | 6128 | Tures and holes | | | - 10 | - | - | | | - | - |
| | 8 | 6123 | Enhbine (fiching) | | | | - | - | | - | - | - |
| 3 | 2 | 6113 | Condems (inc excitation) | | - | - | - | - | - | - | - | - |
| 2 | | 0133 | Concoms (inc.pacjaging) | | | - | - | - | - | - | - | - |
| E | | 0134 | Other Proder preces | | - | | - | - | - | - | - | - |
| 3 | | 0130 | Clathing from fainthing hats tought | | - | - | - | - | | - | - | - |
| - | 굿긜 | 0157 | Country rays (country, nats, towers) | | - | - | - | - | - | - | - | - |
| ž | LO LX | 6143 | Carpet & Furnishing | | | - 10 | - | - | _ | - | - | - |
| 12 | 0 F | 20102 | Rope, string and nets | + | | - | - | - | _ | - | - | - |
| - | | CP10 | Ocners textures (inc.rags) | | | - | - | - | _ | | | - |
| | 249 0100 | Paper/cardboard | + + | | - | - | - | _ | | - | - | |
| | AR | 0148 | Cardboard (boxes & tragments) | + + | - | - 6 | - | - | - | - | - | - |
| | 202 | 202 6158 | Other paper items | | | | | - 1 | | | | |
| | 6160 | Ballate | | | _ | - | - | | | | | |
| | | raitos | | (| - | - | - | | _ | | | |
| | S N O | 6170 | Wood (morester) | 1 1 | | | | - 1 | | | | |
| | X 2 X | | and the second | | | | | | | | | |
| | 2- | G173 | Other (specify) | | | | | | | 1 | 1 | |
| | | G175 | Cans (beverage) | | | | | | | | | |
| | | 6176 | Cans (food) | | | - 1 | - | - | | | - | |
| | | 6180 | Appliances (refrigerators, washers, etc.) | | 0 | 1 | | | | | | - |
| | | G182 | Fishing related (weights, hooks, sinkers, lures | | | | - | - | | - | - | |
| | 1.00 | G185 | Middle size containers | | 5 0 | | | | | | | |
| | 18 | G187 | Drums, e.e. oil | 1-1 | | - | - | | _ | | | - |
| | 5 | 6193 | Car parts / batteries | | | - | | | | | | |
| | | 6194 | Cables | | | | | | | | | _ |
| | | G196 | Large metallic objects | | 0.00 | | | | | | | |
| | | 6197 | Other (metal) | | 1 | | | | | | | |
| | | 6200 | Bottles (incl. pieces) | | | | | | | | | |
| | ~0 | G201 | Jars (incl. pieces) | + + | | 1 | - | - | | | | - |
| | SS III | G208 | Glass or ceramic fragments (> 2.5 cm) | | | 1 | - | - | | | 1 | |
| | ER4 | G209 | Large glass objects (specify) | | 1000 | 1 | - | - | | | 0.000 | |
| | 0 | 6210 | Other glass items | | | | - | | | | | |
| SIZE | | CLASSES | G. < Scm*Scm = 25cm ² H. < 10cm*10cm = 100cm ² I. < 20cm*20cm = 400cm ² J. < 50cm*50cm = 2500cm ² K. < 100cm-100cm = 10000cm ² = 1m ² L. > 100cm-100cm = 10000cm ² = 1m ² | | | | | | | | | |
| SIZE | GLAS | CTOSES CTOSES CTOSES | Glass or ceramic fragments (> 2.5 cm) Large glass objects (specify) Other glass items G. < 5cm*5cm = 25cm ³ H. < 10cm*10cm = 100cm ² I. < 20cm*20cm = 400cm ² J. < 50cm*50cm = 2500cm ² K. < 100cm-100cm = 10000cm ² = 1m ³ L. > 100cm-100cm = 10000cm ² = 1m ³ | | | | | | | | | |

| | HAUL RESULTS | |
|---------------------------------------------------|--------------|----------------------------|
| Total weight of litter in the haul | | Record litter weight in Kg |
| Total weight of artificial polymer materials | | Record litter weight in Kg |
| Total No of items of artificial polymer materials | | Record number of items |
| Total weight of rubber | | Record litter weight in Kg |
| Total No of items of rubber | | Record number of items |
| Total weight of cloth/textile | | Record litter weight in Kg |
| Total No of items of cloth/textile | | Record number of items |
| Total weight of paper/cardboard | | Record litter weight in Kg |
| Total No of items of paper/cardboard | | Record number of items |
| Total weight of processed/worked wood | | Record litter weight in Kg |
| Total No of items of processed/worked wood | | Record number of items |
| Total weight of metal | | Record litter weight in Kg |
| Total No of items of metal | | Record number of items |
| Total weight of glass/ceramics | | Record litter weight in Kg |
| Total No of items of glass/ceramics | | Record number of items |

Figure S4. Monitoring protocol for marine litter (macro) on the seafloor (visual census) adopted by DeFishGear Project

Source: Vachogianni et al, 2017

Monitoring Marine Litter (Macro) on the Seafloor - visual survey

Data Sheet

| Location name | |
|----------------|--|
| Location ID | |
| Country | |
| Surveyor Name | |
| e-mail address | |
| Date of survey | |

| SITE DETAILS | | | | | |
|--------------------------------|--|--|---------------------------------------------------------------|--|--|
| Latitude/longitude start 100 m | | | Recorded as nnn.nnnnn degrees at the start of the sample unit | | |
| Latitude/longitude end 100 m | | | Recorded as nnn.nnnnn degrees at the end of the sample unit | | |
| Latitude/longitude start 8 m | | | Recorded as nnn.nnnnn degrees at the end of the sample unit | | |
| Latitude/longitude end 8 m | | | Recorded as nnn.nnnnn degrees at the end of the sample unit | | |
| Depth | | | Record depth in m | | |
| Coordinates system | | | Datum and coordinate system employed | | |
| Start time/end time | | | Time over which the survey took place | | |

| ENVIRONMENTAL PARAMETERS - OBSERVATION DETAILS | | | | |
|------------------------------------------------|-------------|-------------------------------------------------------------|--|--|
| Wind speed | | Recorded in (Beaufort) | | |
| Wind | □n □e □s □w | Tick more than one boxes e.g. for SE wind | | |
| Sea state | | Expressed in accordance with the Douglas Sea Scale (0-9) | | |
| NOTES | | | | |

| | SITE CHARACTERISTICS | |
|----------------------------------------------|---------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Nearest river name | | Name of nearest river |
| Nearest river distance | | Distance to the nearest natural input (river or stream) (kilometres) |
| Nearest river position | □n □e □s □w | Position of river mouth in relation to survey area |
| Nearest major fishery | | Name of the nearest major fishery (named by type) |
| Nearest major fishery distance | | Distance to the nearest major fishery (kilometres) |
| Nearest major fishery position | | Position of the nearest major fishery in relation to survey area |
| Nearest town | | Name of nearest town |
| Nearest town distance | | Distance to the nearest town (kilometres) |
| Nearest town position | | Position of the nearest town in relation to survey area |
| Population size of this town | | No of inhabitants |
| Additional features of the town | Residential Winter Tourist Spring Residential & Summer tourist Autumn | Indicate the main characteristic of the town, residential or touristic town; in case of the later indicate the high season peak |
| Name of the nearest beach | | Name of the nearest beach |
| Distance to nearest beach | | Distance to the closest coastline (kilometres) |
| Position of the nearest coast | | Position of the closest coastline in relation to survey area |
| Nearest shipping lane distance | | Distance to the nearest shipping lane (kilometres) |
| Estimated traffic density | | Recorded in number of ships/year |
| Vessel type | | Indicate the type of vessels that mainly use it e.g. merchant ships, etc. |
| Position of the shipping lane | □n □e □s □w | Position of shipping lane in relation to survey area |
| Name of the nearest harbour | | Name of nearest harbour |
| Harbour position | □n □e □s □w | Position of the nearest harbour in relation to survey area |
| Type of harbour | | Based on the types of vessels visiting the harbour |
| Size of harbour | | Record the number of ships that reach the harbour per year |
| Nearest discharge of waste water distance | | |
| Position of nearest discharge point | □n □e □s □w | Position of nearest discharge points in relation to survey area |
| NOTES | | |
| | | 62 | Bags | | |
|------|-------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
| | | 66 | Bottles | | |
| | | 610 | Food containers inc. fast food containers | | |
| | | G18 | Crates and containers / baskets | | |
| | | 620 | Plastic cups and lids | | |
| | *2 | 627 | Cigarette butts and filters | | |
| | IM | 639 | Gloves | | |
| | ER. | 645 | Mussel nets / Övester nets | | |
| | 3 | G48 | Synthetic rope | | |
| | 8 | 651 | Fishing net | | |
| | 2 | 655 | Fishing line (entagled) | | |
| | 8 | G59 | Fishing line / monofilament (angling) | | |
| | 5 | 661 | Other fishing related | | |
| | 8 | G66 | Strapping bands | | |
| | E | G67 | Sheets, indus, packaging, plastic sheeting | | |
| | A8 | 693 | Cable ties | | |
| | 1.020 | G95 | Cotton bud sticks | | |
| | | G96 | Sanitary towels/panty liners/backing strips | | |
| | | G98 | Diapers/nappies | | |
| | | G99 | Syringes/needles | | |
| | | 6124 | Other plastic/polystyrene items (identifiable) | | |
| | | 6125 | Balloons and balloon sticks | | |
| | ~ | 6127 | Rubber boots | 2000 | |
| | 38 | 6128 | Tynes and belts | | |
| | 80 | 6132 | Bobbins (fishing) | | |
| 3 | - | G133 | Condoms (inc.pacjaging) | | |
| ē. | | G134 | Other rubber pieces | | |
| \$ | | 6136 | Shoes | | |
| - | 23 | 6137 | Clothing/rags (clothing, hats, towels) | | |
| 5 5 | 65 | 6141 | Carpet & Furnishing | | |
| ۶ | 0 H | 6142 | Rope, string and nets | | |
| - | | 6145 | Others textiles (inc.rags) | | |
| | 249 | 6146 | Paper/cardboard | | |
| | AR | 0148 | Cardboard (boxes & magments) | | |
| | 208 | G158 | Other paper items | | |
| | - | 6160 | Pallets | | |
| | 880 | | ranets | | |
| | O RK | 6170 | Wood (processed) | | |
| | 00M | 1.12 | | | |
| | E | G173 | Other (specify) | | |
| | | G175 | Cans (beverage) | and a state of the | |
| | | 6176 | Cans (food) | | |
| | | 6180 | Appliances (refrigerators, washers, etc.) | | |
| | | G182 | Fishing related (weights, hooks, sinkers, lures | | |
| | - | G185 | Middle size containers | | |
| | 6 | G187 | Drums, e.g. oil | | |
| | 2 | 6193 | Car parts / batteries | | |
| | | 0194 | Lates matellin ablants | | |
| | | 6196 | Large metallic objects | | |
| | | 6300 | Bottles (incl. nieces) | | |
| | - 12 | 6203 | lars (incl. preces) | | |
| | SS/ | 6308 | Glass or ceramic fragments (> 2.5 cm) | | |
| | SLA | 6209 | Large glass objects (specify) | | |
| | - 8 | 6210 | Other class items | | |
| - | | | a start Brane userus | | |
| SIZE | | CLASSES | G. < 5cm*5cm = 25cm ² H. < 10cm*10cm = 100cm ² I. < 20cm*20cm = 400cm ² J. < 50cm*50cm = 2500cm ² K. < 100cm-100cm = 10000cm ² = 1m ² L. > 100cm-100cm = 10000cm ² = 1m ² | | |
| | | | | | |

| RESULTS | | | | | | |
|---------------------------------------------------|--|----------------------------|--|--|--|--|
| Total weight of litter collected | | Record litter weight in Kg | | | | |
| Total weight of artificial polymer materials | | Record litter weight in Kg | | | | |
| Total No of items of artificial polymer materials | | Record number of items | | | | |
| Total weight of rubber | | Record litter weight in Kg | | | | |
| Total No of items of rubber | | Record number of items | | | | |
| Total weight of cloth/textile | | Record litter weight in Kg | | | | |
| Total No of items of cloth/textile | | Record number of items | | | | |
| Total weight of paper/cardboard | | Record litter weight in Kg | | | | |
| Total No of items of paper/cardboard | | Record number of items | | | | |
| Total weight of processed/worked wood | | Record litter weight in Kg | | | | |
| Total No of items of processed/worked wood | | Record number of items | | | | |
| Total weight of metal | | Record litter weight in Kg | | | | |
| Total No of items of metal | | Record number of items | | | | |
| Total weight of glass/ceramics | | Record litter weight in Kg | | | | |
| Total No of items of glass/ceramics | | Record number of items | | | | |

Figure S5. 'Masterlist' of litter item categories and attribution of sources for litter surveyed in the different marine compartments (beach, sea-surface, seafloor-continental selves, seafloor-swallow waters) by DeFishGear Project. The sources include: shoreline, including poor waste management, tourism and recreational activities (ST); fishing & aquaculture (FA); sanitary & sewage related litter (SS); fly-tipping (FT); shipping (SH); medical related (ME); agriculture (AG); non-sourced (NS).

| | | | Sources attribution | | | |
|---------------------------------|------|---------------------------------------------------------------------|---------------------|----------------|-------------------|----------------|
| Material type | Code | Items name | Beach | Sea surface | Seafloor trawl | Seaflo SCUB |
| ARTIFICIAL POLYMER MATERIALS | G1 | 4/6-pack yokes, six-pack rings | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G2 | Bags | | ST | ST | ST |
| ARTIFICIAL POLYMER MATERIALS | G3 | Shopping bags, incl. pieces | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G4 | Small plastic bags, e.g. freezer bags, including pieces | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G5 | Plastic bag collective roll; what remains from rip-off plastic bags | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G6 | Bottles | | ST | ST | ST |
| ARTIFICIAL POLYMER MATERIALS | G7 | Drink bottles <=0.5 l | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G8 | Drink bottles >0.5 l | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G9 | Cleaner/cleanser bottles & containers | SH | | | |
| ARTIFICIAL POLYMER MATERIALS | G10 | Food containers incl. fast food containers | ST | | ST | ST |
| ARTIFICIAL POLYMER MATERIALS | G11 | Beach use related cosmetic bottles and containers | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G12 | Other cosmetics bottles & containers | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G13 | Other bottles & containers (drums) | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G14 | Engine oil bottles & containers < 50 cm | SH | | | |
| ARTIFICIAL POLYMER MATERIALS | G15 | Engine oil bottles & containers > 50 cm | SH | | | |
| ARTIFICIAL POLYMER MATERIALS | G16 | Jerry cans (square plastic containers with handle) | SH | | | |
| ARTIFICIAL POLYMER MATERIALS | G17 | Injection gun containers | FT | | | |
| ARTIFICIAL POLYMER MATERIALS | G18 | Crates and containers / baskets | NS | NS | NS | NS |
| ARTIFICIAL POLYMER MATERIALS | G19 | Car parts | FT | | | |
| ARTIFICIAL POLYMER MATERIALS | G20 | Plastic cups and lids | | | ST | ST |
| ARTIFICIAL POLYMER MATERIALS | G21 | Plastic caps/lids from drinks | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G22 | Plastic caps/lids from chemicals, detergents (non-food) | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G23 | Plastic caps/lids unidentified | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G24 | Plastic rings from bottle caps/lids | NS | | | |

Source: Vachogianni et al, 2017

| ARTIFICIAL POLYMER MATERIALS | G25 | Tobacco pouches/plastic cigarette box packaging | ST | | | |
|---------------------------------|-----|----------------------------------------------------|----|----|----|----|
| ARTIFICIAL POLYMER MATERIALS | G26 | Cigarette lighters | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G27 | Cigarette butts and filters | ST | | SH | ST |
| ARTIFICIAL POLYMER MATERIALS | G28 | Pens and pen lids | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G29 | Combs/hair brushes/sunglasses | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G30 | Crisps packets/sweets wrappers | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G31 | Lolly sticks | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G32 | Toys and party poppers | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G33 | Cups and cup lids | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G34 | Cutlery and trays | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G35 | Straws and stirrers | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G36 | Fertilizer/animal feed bags | А | | | |
| ARTIFICIAL POLYMER MATERIALS | G37 | Mesh vegetable bags | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G38 | Cover/packaging | | ST | | |
| ARTIFICIAL POLYMER MATERIALS | G39 | Gloves | | | SH | NS |
| ARTIFICIAL POLYMER MATERIALS | G40 | Gloves (washing up) | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G41 | Gloves (industrial/professional rubber gloves) | SH | | | |
| ARTIFICIAL POLYMER MATERIALS | G42 | Crab/lobster pots and tops | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G43 | Tags (fishing and industry) | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G44 | Octopus pots | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G45 | Mussel nets, Oyster nets | FA | | FA | FA |
| ARTIFICIAL POLYMER MATERIALS | G46 | Oyster trays (round from oyster cultures) | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G47 | Plastic sheeting from mussel culture (Tahitians) | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G48 | Synthetic rope | | FA | FA | FA |
| ARTIFICIAL POLYMER MATERIALS | G49 | Rope (diameter more than 1 cm) | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G50 | String and cord (diameter less than 1 cm) | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G51 | Fishing net | | FA | FA | FA |
| ARTIFICIAL POLYMER MATERIALS | G53 | Nets and pieces of net < 50 cm | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G54 | Nets and pieces of net > 50 cm | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G55 | Fishing line (entangled) | | | FA | FA |

| ARTIFICIAL POLYMER MATERIALS | G56 | Tangled nets/cord | FA | | | |
|---------------------------------|-----|-------------------------------------------------|----|----|----|----|
| ARTIFICIAL POLYMER MATERIALS | G57 | Fish boxes - plastic | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G58 | Fish boxes - expanded polystyrene | FA | FA | | |
| ARTIFICIAL POLYMER MATERIALS | G59 | Fishing line/monofilament (angling) | FA | | FA | FA |
| ARTIFICIAL POLYMER MATERIALS | G60 | Light sticks (tubes with fluid) incl. packaging | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G61 | Other fishing related | | | FA | FA |
| ARTIFICIAL POLYMER MATERIALS | G62 | Floats for fishing nets | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G63 | Buoys | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G64 | Fenders | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G65 | Buckets | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G66 | Strapping bands | NS | | NS | NS |
| ARTIFICIAL POLYMER MATERIALS | G67 | Sheets, industrial packaging, plastic sheeting | NS | NS | NS | NS |
| ARTIFICIAL POLYMER MATERIALS | G68 | Fiberglass/fragments | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G69 | Hard hats/Helmets | SH | | | |
| ARTIFICIAL POLYMER MATERIALS | G70 | Shotgun cartridges | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G71 | Shoes/sandals | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G72 | Traffic cones | FT | | | |
| ARTIFICIAL POLYMER MATERIALS | G73 | Foam sponge | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G74 | Foam packaging/insulation/polyurethane | | | | |
| ARTIFICIAL POLYMER MATERIALS | G79 | Plastic pieces 2.5 cm > < 50 cm | NS | NS | NS | NS |
| ARTIFICIAL POLYMER MATERIALS | G80 | Plastic pieces > 50 cm | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G82 | Polystyrene pieces 2.5 cm > < 50 cm | NS | NS | | |
| ARTIFICIAL POLYMER MATERIALS | G83 | Polystyrene pieces > 50 cm | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G84 | CD, CD-boxes | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G85 | Salt packaging | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G86 | Fin trees (from fins for scuba diving) | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G87 | Masking tape | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G88 | Telephone (incl. parts) | NS | | | |
| ARTIFICIAL POLYMER MATERIALS | G89 | Plastic construction waste | FT | | | |
| ARTIFICIAL POLYMER MATERIALS | G90 | Plastic flower pots | NS | | | |

| ARTIFICIAL POLYMER MATERIALS | G91 | Biomass holder from sewage treatment plants | SS | | | |
|---------------------------------|------|----------------------------------------------------------|----|----|----|----|
| ARTIFICIAL POLYMER MATERIALS | G92 | Bait containers/packaging | FA | | | |
| ARTIFICIAL POLYMER MATERIALS | G93 | Cable ties | NS | | SH | NS |
| ARTIFICIAL POLYMER MATERIALS | G94 | Table cloth | | | | |
| ARTIFICIAL POLYMER MATERIALS | G95 | Cotton bud sticks | SS | | SS | SS |
| ARTIFICIAL POLYMER MATERIALS | G96 | Sanitary towels/panty liners/backing strips | SS | | SS | SS |
| ARTIFICIAL POLYMER MATERIALS | G97 | Toilet fresheners | SS | | | |
| ARTIFICIAL POLYMER MATERIALS | G98 | Diapers/nappies | SS | | SS | SS |
| ARTIFICIAL POLYMER MATERIALS | G99 | Syringes/needles | ME | | ME | ME |
| ARTIFICIAL POLYMER MATERIALS | G100 | Medical/Pharmaceuticals containers/tubes | ME | | | |
| ARTIFICIAL POLYMER MATERIALS | G101 | Dog faeces bags | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G102 | Flip-flops | ST | | | |
| ARTIFICIAL POLYMER MATERIALS | G123 | Polyurethane granules <5mm | | | | |
| ARTIFICIAL POLYMER MATERIALS | G124 | Other plastic/polystyrene items (identifiable) | NS | NS | NS | NS |
| RUBBER | G125 | Balloons and balloon sticks | ST | | ST | ST |
| RUBBER | G126 | Balls | ST | | | |
| RUBBER | G127 | Rubber boots | FA | | FA | FA |
| RUBBER | G128 | Tyres and belts | NS | | SH | NS |
| RUBBER | G129 | Inner-tubes and rubber sheets | NS | | | |
| RUBBER | G130 | Wheels | FT | | | |
| RUBBER | G131 | Rubber bands (small, for kitchen/household/ post use) | NS | | | |
| RUBBER | G132 | Bobbins (fishing) | FA | | FA | FA |
| RUBBER | G133 | Condoms (incl. packaging) | SS | | SS | SS |
| RUBBER | G134 | Other rubber pieces | NS | NS | NS | NS |
| CLOTH/TEXTILE | G136 | Shoes | | | SH | ST |
| CLOTH/TEXTILE | G137 | Clothing / rags (clothes, hats, towels) | ST | | ST | ST |
| CLOTH/TEXTILE | G138 | Shoes and sandals (e.g. leather, cloth) | ST | | | |
| CLOTH/TEXTILE | G139 | Backpacks & bags | ST | | | |
| CLOTH/TEXTILE | G140 | Sacking (hessian) | NS | | | |
| CLOTH/TEXTILE | G141 | Carpet & furnishing | FT | | FT | FT |
| CLOTH/TEXTILE | G142 | Rope, string and nets | FA | FA | FA | FA |
| CLOTH/TEXTILE | G143 | Sails, canvas | SH | | | |

| CLOTH/TEXTILE | G144 | Tampons and tampon applicators | SS | | | |
|--------------------------|------|------------------------------------------------------|----|----|----|----|
| CLOTH/TEXTILE | G145 | Other textiles (incl. rags) | NS | NS | NS | NS |
| PAPER/CARDBOARD | G146 | Paper/cardboard | | | SH | NS |
| PAPER/CARDBOARD | G147 | Paper bags | ST | | | |
| PAPER/CARDBOARD | G148 | Cardboard (boxes & fragments) | NS | NS | SH | NS |
| PAPER/CARDBOARD | G149 | Paper packaging | | ST | | |
| PAPER/CARDBOARD | G150 | Cartons/Tetrapack Milk | ST | | | |
| PAPER/CARDBOARD | G151 | Cartons/Tetrapack (others) | NS | | | |
| PAPER/CARDBOARD | G152 | Cigarette packets | ST | | | |
| PAPER/CARDBOARD | G153 | Cups, food trays, food wrappers, drink containers | ST | | | |
| PAPER/CARDBOARD | G154 | Newspapers & magazines | ST | ST | | |
| PAPER/CARDBOARD | G155 | Tubes for fireworks | ST | | | |
| PAPER/CARDBOARD | G156 | Paper fragments | NS | | | |
| PAPER/CARDBOARD | G158 | Other paper items | NS | NS | SH | NS |
| PROCESSED/WORKED WOOD | G159 | Corks | ST | | | |
| PROCESSED/WORKED WOOD | G160 | Pallets | SH | | SH | SH |
| PROCESSED/WORKED WOOD | G161 | Processed timber | NS | | | |
| PROCESSED/WORKED WOOD | G162 | Crates | SH | | | |
| PROCESSED/WORKED WOOD | G163 | Crab/lobster pots | FA | | | |
| PROCESSED/WORKED WOOD | G164 | Fish boxes | FA | | | |
| PROCESSED/WORKED WOOD | G165 | Ice-cream sticks, chip forks, chopsticks, toothpicks | ST | | | |
| PROCESSED/WORKED WOOD | G166 | Paint brushes | NS | | | |
| PROCESSED/WORKED WOOD | G167 | Matches & fireworks | ST | | | |
| PROCESSED/WORKED WOOD | G168 | Wood boards | | | | |
| PROCESSED/WORKED WOOD | G169 | Beams/dunnage | | NS | | |
| PROCESSED/WORKED WOOD | G170 | Wood processed | | | NS | NS |
| PROCESSED/WORKED WOOD | G171 | Other wood < 50 cm | NS | | | |
| PROCESSED/WORKED WOOD | G172 | Other wood > 50 cm | NS | | | |
| PROCESSED/WORKED WOOD | G173 | Other (specify) | | NS | NS | NS |
| METAL | G174 | Aerosol/Spray cans | SH | | | |
| METAL | G175 | Cans (beverage) | ST | ST | SH | ST |
| METAL | G176 | Cans (food) | ST | | SH | ST |

| METAL | G177 | Foil wrappers, aluminium foil | ST | | | |
|-----------------------------------|------|----------------------------------------------------------------|----|----|----|----|
| METAL | G178 | Bottle caps, lids & pull tabs | ST | | | |
| METAL | G179 | Disposable BBQs | ST | | | |
| METAL | G180 | Appliances (refrigerators, washers, etc.) | FT | | FT | FT |
| METAL | G181 | Tableware (plates, cups & cutlery) | ST | | | |
| METAL | G182 | Fishing related (weights, sinkers, lures, hooks) | FA | | FA | FA |
| METAL | G184 | Lobster/crab pots | FA | | | |
| METAL | G185 | Middle size containers | | | SH | NS |
| METAL | G186 | Industrial scrap | FT | | | |
| METAL | G187 | Drums, e.g. oil | SH | | SH | SH |
| METAL | G188 | Other cans (< 4 L) | NS | | | |
| METAL | G189 | Gas bottles, drums & buckets (> 4 I) | NS | | | |
| METAL | G190 | Paint tins | FT | | | |
| METAL | G191 | Wire, wire mesh, barbed wire | NS | | | |
| METAL | G192 | Barrels | | | | |
| METAL | G193 | Car parts / batteries | FT | | FT | FT |
| METAL | G194 | Cables | NS | | SH | NS |
| METAL | G195 | Household Batteries | ST | | | |
| METAL | G196 | Large metallic objects | | | SH | NS |
| METAL | G197 | Other (metal) | | NS | SH | NS |
| METAL | G198 | Other metal pieces < 50 cm | NS | | | |
| METAL | G199 | Other metal pieces > 50 cm | NS | | | |
| GLASS/CERAMICS | G200 | Bottles, including pieces | ST | | SH | ST |
| GLASS/CERAMICS | G201 | Jars, including pieces | ST | | SH | ST |
| GLASS/CERAMICS | G202 | Light bulbs | SH | | | |
| GLASS/CERAMICS | G203 | Tableware (plates & cups) | ST | | | |
| GLASS/CERAMICS | G204 | Construction material (brick, cement, pipes) | FT | | | |
| GLASS/CERAMICS | G205 | Fluorescent light tubes | SH | | | |
| GLASS/CERAMICS | G206 | Glass buoys | FA | | | |
| GLASS/CERAMICS | G207 | Octopus pots | FA | | | |
| GLASS/CERAMICS | G208 | Glass or ceramic fragments >2.5 cm | NS | | SH | NS |
| GLASS/CERAMICS | G209 | Large glass objects (specify) | | | SH | NS |
| GLASS/CERAMICS | G210 | Other glass items | NS | | SH | NS |
| UNIDENTIFIED AND/ OR CHEMICALS | G211 | Other medical items (swabs, bandaging, adhesive plaster, etc.) | ME | | | |
| UNIDENTIFIED AND/ OR CHEMICALS | G213 | Paraffin/Wax | SH | | | |

Table S6. Marine Litter collected form. Monitoring form for marine litter from fishing, based on the Regional Plan for Marine Litter Management in the Mediterranean

Source: UNEP-MAP, 2016d

| Harbour | |
|-------------------|--|
| Vessel | |
| Date | |
| Number of bags | |
| Total weight (Kg) | |
| Observations | |
| | |
| | |

| ID | PLASTIC/POLYSTYRENE | Total No. |
|------|------------------------------------------------|-----------|
| G2 | Bags | |
| G6 | Bottles | |
| G10 | Food containers incl. fast food containers | |
| G18 | Crates and containers / baskets | |
| G20 | Plastic caps and lids | |
| G27 | Cigarette butts and filters | |
| G39 | Gloves | |
| G48 | Synthetic rope | |
| G51 | Fishing net | |
| G55 | Fishing line (entangled) | |
| G59 | Fishing line/monofilament (angling) | |
| G61 | Other fishing related | |
| G66 | Strapping bands | |
| G67 | Sheets, industrial packaging, plastic sheeting | |
| G93 | Cable ties | |
| G124 | Other plastic/polystyrene items (identifiable) | |
| ID | RUBBER | Total No. |
| G125 | Balloons and balloon sticks | |
| G127 | Rubber boots | |
| G128 | Tyres and belts | |
| G132 | Bobbins (fishing) | |
| G134 | Other rubber pieces | |
| ID | CLOTH/TEXTILE | Total No. |
| G136 | Shoes | |
| G137 | Clothing / rags (clothing, hats, towels) | |
| G141 | Carpet & Furnishing | |

| G142 | Rope, string and nets | |
|-------|--------------------------------------------------|-----------|
| G145 | Other textiles (incl. rags) | |
| ID | PAPER/CARDBOARD | Total No. |
| G146 | Paper/Cardboard | |
| G148 | Cardboard (boxes & fragments) | |
| G158 | Other paper items | |
| ID | PROCESSED/WORKED WOOD | Total No. |
| G160 | Pallets | |
| G170 | Wood (processed) | |
| G173 | Other (specify) | |
| ID | METAL | Total No. |
| G175 | Cans (beverage) | |
| G176 | Cans (food) | |
| G180 | Appliances (refrigerators, washers, etc.) | |
| G182 | Fishing related (weights, sinkers, lures, hooks) | |
| G185 | Middle size containers | |
| G187 | Drums, e.g. oil | |
| G193 | Car parts / batteries | |
| G194 | Cables | |
| G196 | Large metallic objects | |
| G197 | Other (metal) | |
| ID | GLASS/CERAMICS | Total No. |
| G200 | Bottles incl. pieces | |
| G201 | Jars incl. pieces | |
| G208 | Glass or ceramic fragments >2.5cm | |
| G209 | Large glass objects (specify) | |
| G210 | Other glass items | |
| ID | SANITARY WASTE | Total No. |
| G95 | Cotton bud sticks | |
| G96 | Sanitary towels/panty liners/backing strips | |
| G98 | Diapers/nappies | |
| G133 | Condoms (incl. packaging) | |
| ID | MEDICAL WASTE | Total No. |
| G99 | Syringes/needles | |
| TOTAL | | |

Table S7. Reporting format-Monthly tons of marine litter collected. Monitoring form for marine litter from fishing, based on the Regional Plan for Marine Litter Management in the Mediterranean.

Source: UNEP-MAP, 2016e

| Harbour | Number of vessels | Main vessel type | Observations |
|---------|-------------------|------------------|--------------|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

| | Tons of marine litter collected | | | | | | | | | | | | |
|---------|---------------------------------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| Harbour | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| | | | | | | | | | | | | | |
| Total | | | | | | | | | | | | | |

Table S8. Reporting format-Monthly composition of marine litter collected. Monitoring form for marine litter from fishing, based on the Regional Plan for Marine Litter Management in the Mediterranean

Source: UNEP-MAP, 2016d

| Harbour | |
|-------------------|--|
| | |
| Number of vessels | |
| Main vessel type | |
| Observations | |
| | |
| | |
| | |
| | |

| | | Tota | al No. | of iter | ns | | | | | | | | | |
|------------|--------------------------------------------|------|--------|---------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-------|
| ID | PLASTIC/POLYSTYRENE | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Total |
| G 2 | Bags | | | | | | | | | | | | | |
| G6 | Bottles | | | | | | | | | | | | | |
| G10 | Food containers incl. fast food containers | | | | | | | | | | | | | |
| G18 | Crates and containers / baskets | | | | | | | | | | | | | |
| G20 | Plastic caps and lids | | | | | | | | | | | | | |
| G27 | Cigarette butts and filters | | | | | | | | | | | | | |
| G39 | Gloves | | | | | | | | | | | | | |
| G48 | Synthetic rope | | | | | | | | | | | | | |
| G51 | Fishing net | | | | | | | | | | | | | |
| G55 | Fishing line (entangled) | | | | | | | | | | | | | |
| G59 | Fishing line/monofilament (angling) | | | | | | | | | | | | | |
| G61 | Other fishing related | | | | | | | | | | | | | |

| Ge | 56 Strapping bands | | | | | | | | | | | | | | |
|----------------|-----------------------------------------------------------------------------------|----------|-----|-----|-----|------|----------|----------|----------|----------|-----|------|-----|----------|--------|
| Ge | 57 Sheets, industrial | | | | | | | | | | | | | | |
| 6 | packaging, plastic sheeting | | | | | | | | | | | | | | \neg |
| G | Cable lies | | | | | | | | | | | | | <u> </u> | \neg |
| | items (identifiable) | | | | | | | | | | | | | | |
| D | RUBBER | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tota | al I |
| Gl | 125 Balloons and balloon sticks | | | | | | | | | | | | | | |
| G1 | 127 Rubber boots | | | | | | | | | | | | | | |
| G1 | 128 Tyres and belts | | | | | | | | | | | | | | |
| G1 | 132 Bobbins (fishing) | | | | | | | | | | | | | | |
| Gl | 134 Other rubber pieces | | | | | | | | | | | | | | |
| D | CLOTH/TEXTILE | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tota | al |
| Gl | 136 Shoes | | | | | | | | | | | | | | |
| Gl | 137 Clothing / rags (clothing, hats, towels) | | | | | | | | | | | | | | |
| Gl | 141 Carpet & Furnishing | | | | | | | | | | | | | | |
| Gl | 142 Rope, string and nets | | | | | | | | | | | | | | |
| Gl | 145 Other textiles (incl. rags) | | | | | | | | | | | | | | |
| ID | PAPER/CARDBOARD | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tota | ıl |
| Gl | 146 Paper/Cardboard | | | | | | | | | | | | | | |
| G1 | 148 Cardboard (boxes & fragments) | | | | | | | | | | | | | | |
| Gl | 158 Other paper items | | | | | | | | | | | | | | |
| D | PROCESSED/WORKED WOOD | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tota | al |
| Gl | 160 Pallets | | | | | | | | | | | | | | |
| G1 | 170 Wood (processed) | | | | | | | | | | | | | | _ |
| Gl | 173 Other (specify) | | | | | | | | | | | | | | |
| ID | METAL | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tota | al |
| Gl | 175 Cans (beverage) | | | | | | | | | | | | | <u> </u> | _ |
| Gl | 176 Cans (food) | | | | | | | | | | | | | | _ |
| G1 | 180 Appliances (refrigerators, washers, etc.) | | | | | | | | | | | | | | |
| Gl | 182 Fishing related (weights, sinkers, lures, hooks) | | | | | | | | | | | | | | |
| Gl | 185 Middle size containers | _ | | | | | | | | | | | | | _ |
| Gl | 187 Drums, e.g. oil | _ | | | | | | | | | | | | | _ |
| Gl | 193 Car parts / batteries | | - | | | | | | | | | | | | - |
| Gl | 194 Cables | | | | | | | | | | | | | | _ |
| Gl | 196 Large metallic objects | - | - | | | | | | | | | | | | - |
| Gl | 197 Other (metal) | - | | 25 | | 25.1 | | | | 0 | 0.1 | | P | - | _ |
| D | GLASS/CERAMICS | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oct | Nov | Dec | Tota | u - |
| G2 | Bottles incl. pieces | + | | | | | | | | | | | | | \neg |
| G2 G2 | 201 Jars incl. pieces 208 Glass or ceramic fragments | - | - | | | | | | | | | | | | \neg |
| | >2.5cm | <u> </u> | | | | | | | | | | | L | <u> </u> | |
| 209 | Large glass objects (specify) | | | | | | | | | | | | | | |
| 210 | Other glass items | | | | | | | | | | | | | | _ |
| D | SANITARY WASTE | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oc | t No | v D | ec] | Fota |
| 95 | Cotton bud sticks | | | | | | <u> </u> | <u> </u> | <u> </u> | <u> </u> | - | + | _ | | |
| 96 | Sanitary towels/panty liners/backing strips | | | | | | | | | | | | | | |
| | | | | | | 1 | 1 | 1 | 1 | 1 | | | | | |
| 98 | Diapers/nappies | | | | | | | <u> </u> | | | _ | _ | _ | | |
| 98 133 | Diapers/nappies Condoms (incl. packaging) | | | | | | | | | | | | | | |
| 98 133 D | Diapers/nappies Condoms (incl. packaging) MEDICAL WASTE | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oc | t No | v D | ec] | [ota |
| 98 133 D | Diapers/nappies Condoms (incl. packaging) MEDICAL WASTE Syringes/needles | Jan | Feb | Mar | Apr | Mai | Jun | Jul | Aug | Sep | Oc | t No | v D | ec] | Fota |

Table S9. Format for reporting alleged inadequacies of port reception facilities Source: MEPC, 2018

FORMAT FOR REPORTING ALLEGED INADEQUACIES OF PORT RECEPTION FACILITIES¹

The master of a ship having encountered difficulties in discharging waste to reception facilities should forward the information below, together with any supporting documentation, to the Administration of the flag State and, if possible, to the competent Authorities in the port State. The flag State shall notify IMO and the port State of the occurrence. The port State should consider the report and respond appropriately informing IMO and the reporting flag State of the outcome of its investigation.

| 1 | SHIP'S PARTICULARS | | | | |
|-----|-------------------------------|------------|--------------|--------------|------|
| 1.1 | Name of ship: | - | | | |
| 1.2 | Owner or operator: | - | | | |
| 1.3 | Distinctive number or lette | ers: | | | |
| 1.4 | IMO Number ² : | - | | | |
| 1.5 | Gross tonnage: | - | | | |
| 1.6 | Port of registry: | - | | | |
| 1.7 | Flag State ³ : | - | | | |
| 1.8 | Type of ship: | | | | |
| | Oil tanker | Chemi | cal tanker | Bulk carrier | |
| | Other cargo ship | Passer | nger ship | Other (spec | ify) |
| 2 | PORT PARTICULARS | | | | |
| 2.1 | Country: | - | | | |
| 2.2 | Name of port or area: | - | | | |
| 2.3 | Location/terminal name: | - | | | |
| | (e.g. berth/terminal/jetty) | | | | |
| 2.4 | Name of company operat | ing | | | |
| | the reception facility (if ap | plicable): | | | |
| 2.5 | Type of port operation: | | | | |
| | Unloading port | Loadin | g port | Shipyard | |
| | Other (specify) | | | | |
| 2.6 | Date of arrival: | | (dd/mm/yyyy) | | |
| 2.7 | Date of occurrence: | | (dd/mm/yyyy) | | |
| 2.8 | Date of departure: | _/_/_ | (dd/mm/yyyy) | | |

¹ This format was approved by MEPC 53.

² In accordance with the IMO ship identification number scheme, adopted by the Organization by Assembly resolution A.1117(30).

³ The name of the State whose flag the ship is entitled to fly.

3 INADEQUACY OF FACILITIES

3.1 Type and amount of wastes/residues for which the port reception facility was inadequate and nature of problems encountered

| Type of wastes/residues | Amount for discharge (m ³) | Amount <u>not</u> accepted (m ³) | Problems encountered Indicate the problems encountered by using one or more of the following code letters, as appropriate. A No facility available B Undue delay C Use of facility technically not possible D Inconvenient location E Ships had to shift berth involving delay/cost F Unreasonable charges for use of facilities G Other (please specify in paragraph 3.2) |
|----------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MARPOL Annex I - related | | | |
| Oily bilge water | | | |
| Oily residues (sludge) | | | |
| Oily tank washings (slops) | | | |
| Dirty ballast water | | | |
| Scale and sludge from tank cleaning | | | |
| Other (please specify) | | | |
| MARPOL Annex II – related Category of NLS ⁴ residue/water mixture for discharge to facility from tank washings: | | | |
| Category X substance | | | |
| Category Y substance | | | |
| Category Z substance | | | |
| MARPOL Annex IV – related | | | |
| Sewage | | | |
| MARPOL Annex V – related | | | |
| A. Plastics | | | |
| B. Food wastes | | | |
| C. Domestic wastes | | | |
| D. Cooking oil | | | |
| E. Incinerator ashes | | | |
| F. Operational wastes | | | |
| G. Animal carcasses | | | |
| H. Fishing gear | | | |
| I. E-waste | | | |
| J. Cargo residues (non-HME) ⁵ | | | |
| K. Cargo residues (HME) ⁵ | | | |
| MARPOL Annex VI – related | | | |
| Ozone-depleting substances and equipment containing such substances | | | |
| Exhaust gas-cleaning residues | | | |

⁴ Indicate, in paragraph 3.2, the proper shipping name of the NLS involved and whether the substance is designated as "solidifying" or "high viscosity" as per MARPOL Annex II, regulation 1, paragraphs 15.1 and 17.1 respectively.

⁵ Indicate the proper shipping name of the dry cargo.

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| 3.2 | Additional information with regard to the problems identified in the above table. |
|-----|--------------------------------------------------------------------------------------------------------------------------------------------|
| | |
| | |
| 3.3 | Did you discuss these problems or report them to the port reception facility? |
| | □ Yes □ No |
| | If Yes, with whom (please specify) |
| | |
| | If Yes, what was the response of the port reception facility to your concerns? |
| | |
| 3.4 | Did you give prior notification (in accordance with relevant port requirements) about the ship's requirements for reception facilities? |
| | □ Yes □ No □ Not applicable |
| | If Yes, did you receive confirmation on the availability of reception facilities on arrival? |
| | 🗆 Yes 🔲 No |
| 4 | ADDITIONAL REMARKS/COMMENTS |
| | |
| | |
| | |
| | |
| | |
| | Master's signature Date: _/_/(dd/mm/yyyy) |
| | |

Table S10. Standard format of the advance notification form for waste delivery to port reception facilities

Source: MEPC, 2018

STANDARD FORMAT OF THE ADVANCE NOTIFICATION FORM FOR WASTE DELIVERY TO PORT RECEPTION FACILITIES

DELIVERY FROM SHIPS (ANF)

1. SHIP PARTICULARS

| 1.1 Name of ship: | | | 1.5 Owner or ope | erator: | |
|--------------------|----------------------------------------------------------|--------------|----------------------------|-------------------------------------------------|--------------------------------------------------------|
| 1.2 IMO number: | | | 1.6 Distinctive nu | imber or letters: | |
| 1.3 Gross tonnage: | | | 1.7 Flag State: | | |
| 1.4 Type of ship: | Oil tanker Other cargo ship | Chen Pass | nical tanker enger ship | Bulk carrier Ro-ro | Container Other (specify) |

2. PORT AND VOYAGE PARTICULARS

| 2.1 Location/Terminal name and POC: | 2.6 Last Port where wastes/residues were delivered: |
|---------------------------------------|----------------------------------------------------------------|
| 2.2 Arrival Date and Time: | 2.7 Date of Last Delivery: |
| 2.3 Departure Date and Time: | 2.8 Next Port of Delivery (if known): |
| 2.4 Last Port and Country: | 2.9 Person submitting this form is (if other than the master): |
| 2.5 Next Port and Country (if known): | |

3. TYPE AND AMOUNT OF WASTES/RESIDUES FOR DISCHARGE TO FACILITY

| MARPOL Annex I – Oil | Quantity (m ³) |] | MARPOL A |
|-------------------------------------|--------------------------------------------------|---|---------------|
| Oily bilge water | |] | A. Plastics |
| Oily residues (sludge) | |] | B. Food was |
| Oily tank washings | | 1 | C. Domestic |
| Dirty ballast water | | 1 | D. Cooking |
| Scale and sludge from tank cleaning | |] | E. Incinerato |
| Other (please specify) | | 1 | F. Operation |
| MARPOL Annex II – NLS | Quantity (m ³) /Name ¹ |] | G. Animal c |
| Category X substance | |] | H. Fishing g |
| Category Y substance | | | I. E-waste |
| Category Z substance | |] | J. Cargo res |
| OS – other substances | |] | K. Cargo res |
| MARPOL Annex IV – Sewage | Quantity (m ³) | | MARPOL A |
| | | - | |

| MARPOL Annex V – Garbage | Quantity (m ³) |
|---------------------------------------------------------------------------|----------------------------|
| A. Plastics | |
| B. Food wastes | |
| C. Domestic wastes | |
| D. Cooking oil | |
| E. Incinerator ashes | |
| F. Operational wastes | |
| G. Animal carcasses | |
| H. Fishing gear | |
| I. E-waste | |
| J. Cargo residues (non-HME) ² | |
| K. Cargo residues (HME) ² | |
| MARPOL Annex VI – Air pollution | Quantity (m ³) |
| Ozone-depleting substances and equipment containing such substances | |
| Exhaust gas-cleaning residues | |

Indicate the proper shipping name of the NLS involved.

Indicate the proper shipping name of the dry cargo.

Table S11. Standard format for the waste delivery receipt

Source: MEPC, 2018

STANDARD FORMAT FOR THE WASTE DELIVERY RECEIPT

The designated representative of the reception facility provider should provide the following form to the master of a ship that has just delivered wastes/residues. This form shall be retained on board the ship along with the appropriate Oil Record Book, Cargo Record Book or Garbage Record Book.

1. RECEPTION FACILITY AND PORT PARTICULARS

| 1.1 Location/Terminal name: | |
|---------------------------------------------------------------|----|
| 1.2 Reception facility provider(s) | |
| 1.3 Treatment facility provider(s) – if different from above: | |
| 1.4 Waste/residue Discharge Date and Time from: | to |

2. SHIP PARTICULARS

| 2.1 Name of ship: | | | 2.5 Owner or operator: | | |
|--------------------|----------------------------------------------------------|-------------------------------------------------------------|-------------------------------------------------|------------------------------------|--|
| 2.2 IMO number: | 2.2 IMO number: | | | 2.6 Distinctive number or letters: | |
| 2.3 Gross tonnage: | | | 2.7 Flag State: | | |
| 2.4 Type of ship: | Oil tanker Other cargo ship | Chemical tanker Passenger ship | Bulk carrier Ro-ro | Container Other (specify) | |

3. TYPE AND AMOUNT OF WASTES/RESIDUES RECEIVED

| MARPOL Annex I – Oli | Quantity (m ³) | MARPOL Annex V – Garbage | Quantity (m ²) |
|-------------------------------------|----------------------------------------------|------------------------------------------------------------------------|----------------------------|
| Oily blige water | | A. Plastics | |
| Oily residues (sludge) | | B. Food wastes | |
| Oily tank washings | | C. Domestic wastes | |
| Dirty ballast water | | D. Cooking oil | |
| Scale and sludge from tank cleaning | | E. Incinerator ashes | |
| Other (please specify) | | F. Operational wastes | |
| MARPOL Annex II – NLS | Quantity (m ³)/Name ¹ | G. Animal carcasses | |
| Category X substance | | H. Fishing gear | |
| Category Y substance | | I. E-waste | |
| Category Z substance | | J. Cargo residues (non-HME) ² | |
| OS – other substance | | K. Cargo residues (HME) ² | |
| MARPOL Annex IV – Sewage | Quantity (m ³) | MARPOL Annex VI – related | Quantity (m ²) |
| | | Ozone-depleting substances and equipment containing such substances | |
| | | Exhaust gas-cleaning residues | |
| | | | |

Indicate the proper shipping name of the NLS involved.

Indicate the proper shipping name of the dry cargo.

Table S12. Waste reception facility reporting requirements for port States Source: MEPC, 2018

WASTE RECEPTION FACILITY REPORTING REQUIREMENTS

Table 1: Waste reception facility reporting requirements for port States

| Reporting requirements Reference | | | | | |
|-------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|
| | The port State is required to communicate to the Organization a list of reception facilities in its ports including their location, capacity, available facilities and other characteristics. | Article 11(1)(d) of MARPOL | | | |
| Reporting on the availability of reception facilities | The port State is required to upload information on new reception facilities on the Port Reception Facilities Database (GISIS) and to maintain and update the required information continuously. | Port Reception Facilities Database (PRFD) as a module of the Global Integrated Shipping Information System (GISIS); Global Integrated Shipping Information System (GISIS) (resolution A.1029(26)) | | | |
| Reporting on alleged inadequacies of reception facilities | The port State should ensure the provision of proper arrangements to consider and respond appropriately and effectively to reports of inadequacies, informing IMO and the reporting flag State of the outcome of their investigation. | Resolution MEPC.83(44), annex, paragraph 10.3; MEPC.1/Circ.834/Rev.1, paragraph 41 | | | |
| Reporting on the assessment of the port reception facilities | The port State is encouraged to make use of the assessment form appended to the <i>Guidelines for ensuring the adequacy of port</i> <i>waste reception facilities</i> , to conduct regular assessments of waste/residue reception facilities in its ports and advise IMO of the outcome of such assessments, including any inadequacies of port reception facilities, as well as any technical cooperation assistance that may be needed to address those inadequacies. | Guidelines for ensuring the adequacy of port waste reception facilities (resolution MEPC.83(44)) | | | |
| Consulting with IMO on regional arrangements for port reception facilities | Small island developing States participating in a regional arrangement shall consult with IMO for circulation to the MARPOL Parties: (1) how the Regional Reception Facilities Plan takes into account the Guidelines (resolution MEPC.221(63); (2) particulars of the identified Regional Ships Waste Reception Centres; and (3) particulars of those ports with only limited facilities. | Regulations 38.4 and 38.6 of Annex I; Reg. 18.3 of Annex II; Reg. 12.2 of Annex IV; Reg. 17.2 of Annex V; 2012 Guidelines for the Development of a Regional Reception Facilities Plan (resolution MEPC.221(63)) | | | |

| | Reporting requirements | Reference |
|-----------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reporting on alleged inadequacies of reception facilities | The flag State is requested to distribute the Format for reporting alleged inadequacies of port reception facilities, as set out in appendix 1 of MEPC.1/Circ.834/Rev.1, to ships and urge Masters to use this format to report alleged inadequacies of port reception facilities to the Administration of the flag State and, if possible, to the authorities of the port State. | MEPC.1/Circ.834/Rev.1, paragraph 39 |
| | The flag State is required to notify IMO, for transmission to the Parties concerned, of any case where facilities are alleged to be inadequate. | Reg. 38.8 of Annex I; Reg. 18.5 of Annex II; Reg. 12.2 of Annex IV; Reg. 8.3 of Annex V; Reg. 17.3 of Annex VI; resolution MEPC.83(44), annex, paragraph 8.3; MEPC.1/Circ.834/Rev.1, paragraph 39 |
| | The flag State shall notify the port State of the occurrence of the alleged inadequacy of port reception facilities. | MEPC.1/Circ.834/Rev.1, paragraph 39; resolution MEPC.83(44), annex, paragraph 8.3 |
| | Notification shall be made as soon as possible following completion of the alleged inadequacies reporting form (MEPC.1/Circ.834/Rev.1, appendix 1) and should include a copy of the master's report, together with any supporting documentation. | Resolution MEPC.83(44), annex, paragraph 8.3.1; MEPC.1/Circ.834/Rev.1, paragraph 40 |

Table 2: Waste reception facility reporting requirements for flag States

Table S13. Survey on marine litter, abandoned or discarded fishing gear and ghost nets in the Mediterranean Sea conducted on sea users by UNEP-MAP

Source: UNEP-MAP, 2016d

| 1. GENERAL INFORMATION | | | |
|------------------------|-----------------------------------------|--|--|
| Interviewer's name | | | |
| Phone number | | | |
| e-mail | | | |
| Interviewee's name | | | |
| Profession | Fisherman Sailor Skipper Other, specify | | |
| Phone number | | | |
| e-mail | | | |
| Location name | | | |
| Country | | | |
| Date (dd/mm/yyyy) | | | |

| 1.1. VESSEL CHARACTERISTICS & FISHING AREAS | | | | | |
|---------------------------------------------|---------------------------------------------|----------------------------------------------|--|--|--|
| Vessel name | | | | | |
| Vessel port | | | | | |
| Vessel length (meters) | | | | | |
| Vessel tonnage (tonnes) | | | | | |
| Fishing area | Within national waters NM (nautical miles): | Outside national waters NM (nautical miles): | | | |

| 1.2. TYPE OF FISHING GEAR USED (INCLUDING VESSELS FOR AQUACULTURE) | | | | | |
|--------------------------------------------------------------------|--------------------------------|-------------------------------|--|--|--|
| ☐ Seines | Trawls | Working boats for aquaculture | | | |
| Longlines & hooks | Gillnets and similar nets | Other, please specify below | | | |
| ☐ Pots and traps | Surrounding nets and lift nets | | | | |

| 1.3. NUMBER OF FISHING DAYS PER YEAR (of vessel) | | | | | |
|--------------------------------------------------|---------|---------|--|--|--|
| □ <60 | 100-120 | 160-180 | | | |
| 60-80 | 120-140 | 180-200 | | | |
| 80-100 | 140-160 | >200 | | | |
| 1.4. AVERAGE NUMBER OF FISHING HOURS PER DAY | | | | | |
| □ <4 | 8-10 | 14-16 | | | |
| 4-6 | 10-12 | 16-20 | | | |
| □ 6-8 | □ 12-14 | □>20 | | | |

ADDITIONAL INFO/NOTES (if needed)

2. INFORMATION RELATED TO DERELICT FISHING GEAR

| 2.1. ESTIMATES OF TYPES AND AMOUNTS OF FISHING GEAR <u>USED</u> THROUOUT THE YEAR | | | | | |
|---------------------------------------------------------------------------------------------|--------|--------|--------------------------------|--------|--------|
| Types | Number | Meters | Types | Number | Meters |
| Seines | | | Trawls (net) | | |
| Pots and traps | | | Trawls (cod end) | | |
| Gillnets and similar nets | | | Surrounding nets and lift nets | | |
| Longlines & hooks | | | Working boats for aquaculture | | |
| Other, specify | | | Other, specify | | |
| 2.2. ESTIMATES OF TYPES AND AMOUNTS OF FISHING GEAR <u>DISPOSED</u> OF THROUOUT THE YEAR | | | | | |
| Types | Number | Meters | Types | Number | Meters |
| Seines | | | Trawls (net) | | |
| Pots and traps | | | Trawls (cod end) | | |
| Gillnets and similar nets | | | Surrounding nets and lift nets | | |

| Longlines & hooks | Working boats for aquaculture | |
|-------------------|----------------------------------|--|
| Other, specify | Other, specify | |

2.3. ESTIMATES OF QUANTITIES OF FISHING GEAR DISPOSED THROUOUT THE YEAR BY WEIGHT(Kg/y) Metal (e.g. cables, chains, trawl doors, etc.) Plastic (e.g. cables, traps, buoys, mussel-culture socks, rope, etc.) Nets

Other, specify

| 2.4. HOW WOULD YOU ASSESS THE OCCURRENCE OF THE FOLLOWING PRACTICES WITHIN THE FISHING COMMUNITY REGARDING THE USAGE AND DISPOSAL OF FISHING GEAR? | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|------------------------|--|--|
| Fishing gear is used in a way that increases the risk of losing it at sea | rarely | 🗌 often | almost every time | | |
| Derelict fishing gear is stored somewhere by owner | rarely | 🗌 often | ☐ almost every time | | |
| Derelict fishing gear is dumped somewhere on land (illegal dumpsite) | rarely | 🗌 often | almost every time | | |
| Derelict fishing gear is destroyed by the owner (burned?) | rarely | 🗌 often | ☐ almost every time | | |
| Derelict fishing gear is disposed at land in relevant waste infrastructure | rarely | 🗌 often | almost every time | | |
| Other, specify | rarely | 🗌 often | almost every time | | |

| 2.5. DISPOSAL SCHEMES IN PLACE | | |
|----------------------------------------------------------------------------------------------|-------|------|
| Is there a specific collection area for derelict fishing gear at the port? | 🗌 Yes | □ No |
| If yes, is it easily accessible? | 🗆 Yes | □ No |
| Is there any specific infrastructure in place (e.g. containers, bins)? | 🗌 Yes | 🗆 No |
| If not, are the derelict fishing gear being disposed together with all other types of waste? | 🗆 Yes | □ No |
| Other, specify | | |

| 2.6. HAVE THERE BEEN ANY MEASURES (REGULATIONS, ESTABLISHMENT OF DERELICT FISHING GEAR SCHEMES, AWARENESS RAISING, ETC.) UNDERTAKEN TO ENSURE THE SUSTAINABLE MANAGEMENT OF THESE IN YOUR AREA or COUNTRY? | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|------------------------------------------|--|--|--|--|--|--|--|
| 🗌 Yes | 🗌 No | If yes, please list below these measures | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |
| | | | | | | | | | |

3. INFORMATION RELATED TO GHOST NETS (LOST FISHING NETS)

| 3.1. HOW WOULD YOU ASSESS THE OCCURRENCE OF GHOST NETS (LOST FISHING GEAR) IN YOUR AREA? | | | | | | | | | |
|---------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|
| insignificant problem moderate problem serious problem | | | | | | | | | |
| | | | | | | | | | |

 3.2. HOW WOULD YOU ASSESS THE IREND RELATED TO GHOST NETS (LOST FISHING GEAR) IN YOUR AREA?

 diminishing problem

 diminishing problem

| 3.3. HOW WOULD YOU ASSESS THE IMPACTS OF GHOST NETS (LOST FISHING GEAR) ON FISHERIES AND/OR BIODIVERSITY IN YOUR AREA? | | | | | | | | | |
|---------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------|--|--|--|--|--|--|--|
| insignificant problem | in moderate problem is serious problem | | | | | | | | |
| | In case it is a moderate or serious problem, can you specify which species are the ones most affected? (name them) | | | | | | | | |
| | | | | | | | | | |
| 3.4. WHICH TYPE OF FIS YOUR AREA? | HING GEAR DO YOU OBSER | VE BEING LOST AT SEA IN | | | | | | | |
| Seines | Trawls | Working boats for aquaculture | | | | | | | |
| Longlines & hooks | Gillnets and similar nets | Other, please specify below | | | | | | | |
| Pots and traps | | | | | | | | | |

| 3.5. ESTIMATES OF TYPES AND AMOUNTS OF FISHING GEAR <u>YOU LOSE</u> AT SEA THROUOUT THE YEAR | | | | | | | | | |
|-------------------------------------------------------------------------------------------------|--------|--------|------------------|--------|--------|--|--|--|--|
| Types | Number | Meters | Types | Number | Meters | | | | |
| Seines | | | Trawls (net) | | | | | | |
| Pots and traps | | | Trawls (cod end) | | | | | | |

| Gillnets and similar nets | Surrounding nets and lift nets | | | | | | | |
|---------------------------------------------------------------|-----------------------------------|-----------------------|-----------------------|----------------------------------|-------------------|----------------|--|--|
| Longlines & hooks | Longlines & hooks | | | Working boats for aquaculture | | | | |
| Other, specify | | | Other, specify | | | | | |
| 3.6. HAVE YOU OBSERVED ANY AREAS WHERE GHOST NETS ACCUMULATE? | | | | | | | | |
| □ Y | es 🗌 No | If y | es, list th | nese areas below | | | | |
| Area (name and coverage in m²) | Depth (m) | Dist from coast | ance n the (km) | Latitude (if possible) | Longi (if poss | tude sible) | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

3.7. HAVE MEASURES (REGULATIONS, CLEANUP OPERATIONS, ETC.) BEEN TAKEN TO MITIGATE GHOST FISHING IN YOUR AREA or COUNTRY?

4. INFORMATION RELATED TO MARINE LITTER FOUND AT SEA

4.1. HOW WOULD YOU ASSESS THE OCCURRENCE OF MARINE LITTER OBSERVED AT SEA IN YOUR AREA?

insignificant problem

moderate problem

serious problem

4.2. HOW WOULD YOU ASSESS THE TREND RELATED TO MARINE LITTER OBSERVED AT SEA IN YOUR AREA? growing problem

diminishing problem

no noticeable trend

| 4.3. HAVE YOU OBSERVED AREAS WHERE MARINE LITTER TENDS TO ACCUMULATE AT SEA? | | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|--|--|--|--|--|--|--|--|--|
| Yes No If yes, list below these areas | | | | | | | | | | |
| Area (name and coverage in m ²) Depth (m) Distance from the coast (km) Latitude (if possible) Longitu (if possible) | | | | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

| 4.4. DO YOU EXPH HAULS/NETS? | RIENCE PROBLEMS | WITH MARINE DEBRI | S CAUGHT IN YOUR |
|---------------------------------|-----------------|-------------------|-------------------|
| never | 🗌 rarely | 🗌 often | almost every time |

| 4.5. BELOW WE'VE CONTRIBUTE 7 LITTER DO YO | E LISTED TO MARI U THINK | DIFF NE LI | ERENT TTER. H OF T | MAT WHA HESE | ERIAI T PER MATH | S THA CENTA CRIAL | AT MIC AGE O S REPI | GHT F MAI RESEN | RINE (TS? (I | N |] |
|--------------------------------------------------|--------------------------------|---------------|--------------------------|--------------------|------------------------|-------------------------|---------------------------|-----------------------|-----------------|------|-----|
| TERMS OF THE | E NUMBE | ROF | TIEMS | S FOUI | ND) 7 | | | | udala li | | |
| riease mark your | estimates | atong | ine 70 s | cales. 1 | our es | umate J | or all t | ne mai | ertais u | stea | |
| snoulla and up to | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Metal | I | I | I | I | I | I | I | I | I | I | I |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Plastic/polystyrene | I | I | I | I | I | I | I | I | I | I | I |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Glass | I | I | I | I | I | I | I | I | I | I | I |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Paper/cardboard | I | I | I | I | I | I | I | I | I | I | I |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Processed wood | I | I | I | ····I | I | I | I | I | I | I | I |

| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
|--------|---|----|----|-------|----|----|----|----|----|----|-----|
| Cloth | I | I | I | ····I | I | I | I | I | I | I | I |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Rubber | I | I | I | I | I | I | I | I | I | I | I |

| 4.6. BELOW WE'VE LISTED THE TOP 10 ITEMS OF MARINE LITTER FOUND IN THE MEDITERRANEAN. PLEASE ASSESS THE FREQUENCY WITH WHICH THESE ARE CAUGHT IN YOUR HAULS/NETS. | | | | | | | | | | | |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------|----------|---------|------------------------|--|--|--|--|--|--|--|
| Plastic bags | never 🗌 | rarely | 🗌 often | ☐ almost every time | | | | | | | |
| Plastic bottles | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Food wrappers | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Fishing nets | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Fishing lines | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Synthetic ropes | never 🗌 | rarely | 🗌 often | ☐ almost every time | | | | | | | |
| Metal cans | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Glass bottles | never 🗌 | rarely | 🗌 often | ☐ almost every time | | | | | | | |
| Wooden crates | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Plastic items (identifiable) | never 🗌 | rarely | 🗌 often | almost every time | | | | | | | |
| Other, specify | never 🗌 | 🗌 rarely | 🗌 often | almost every time | | | | | | | |

| 4.7. MARINE LITTER ORIGINATES FROM LAND-BASED OR SEA BASED SOURCES. IN YOUR OPINION, IN YOUR AREA WHAT PERCENTAGE OF MARINE LITTER COMES FROM LAND-BASED OR SEA BASED SOURCES? (IN TERMS OF THE NUMBER OF ITEMS FOUND) Please mark your estimates along the % scales. Your estimate for the two sources listed should add up to 100 %. | | | | | | | | | | | |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|----|----|----|----|----|----|----|----|----|-----|
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Land-based sources | I | I | I | I | I | I | I | I | I | I | I |
| | 0 | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| Sea-based sources | I | I | I | I | I | I | I | I | I | I | I |

| 4.8. MARINE LITTER MANAGEMENT ON BOARD VESSELS | | |
|------------------------------------------------|-------|------|
| Are there waste bins on board? | 🗌 Yes | 🗌 No |
| If yes, is litter sorted on board? | 🗌 Yes | 🗌 No |

| If no, is litter being discarded at sea? | 🗌 Yes | 🗌 No |
|------------------------------------------|-------|------|
| Other, specify | | |

| 4.9. MARINE LITTER MANAGEMENT ON SHORE | | |
|--------------------------------------------------------|-------|------|
| Is there waste collection infrastructure in your port? | 🗌 Yes | □ No |
| If yes, are you satisfied with it? | 🗆 Yes | □ No |
| If yes, is it easily accessible? | 🗌 Yes | □ No |
| Other, specify | | |

4.10. WHAT IS YOUR OPINION ABOUT THE 'FISHING FOR LITTER' MEASURE? IT IS THE PRACTICE WHEREBY FISHERMEN COLLECT MARINE LITTER CAUGHT IN THEIR NETS AT SEA AND DISPOSE IT IN WASTE COLLECTION INFRASTRUCTURE AT THE PORT UPON RETURN, INSTEAD OF THROWING IT BACK INTO THE SEA.

| I am against it | I will do it, if everybody | I am all for it, ready to be a | | |
|-----------------|----------------------------|--------------------------------|--|--|
| | does it | pioneer in my area | | |

Appendix 4

List of national spatial data related to marine litter

| No. | Sector | Short title of the dataset | Short description of the dataset | Temporal coverage | Geographical coverage | References |
|-----|---------------------|---------------------------------|-------------------------------------------------------------------------------------------------------------|-------------------|--------------------------|----------------------------------------------------------------------------------------------------------------|
| 1 | Shipping | Major ports | Major ports | 2017 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Major ports |
| 2 | SeaWater Quality | State of Bathing Waters | Bathing Water Directive - Status of bathing water | 2017 | EU/ National (GR) | EMODnet Human Activities: Status of Bathing Waters |
| 3 | Shipping | Shipping Density | Average shipping density (hours per square kilometre per year- 2017) | 2017 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Vessel Density 2017 |
| 4 | Management | Barcelona Convention Area | marine area covered by the Barcelona Convention | 2014 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: International Conventions |
| 5 | Management | Management Advisory Councils | areas covered by the Regional Advisory Councils (RAC) as poligons as exposed in the Atlas of the Seas | 2018 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Management Advisori Councils |
| 6 | Environment | Depth | Mean depth | 2018 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Bathymetry: Mean depth |
| 7 | Aquaculture | Aquaculture FreshWaterFish | Presence of freshwater finfish farms in the EU and partner countries | 2017 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Freshwater farming sites |

| 8 | Aquaculture | Aquaculture FinFish | Presence of sea and inland facilities related to the farming of marine finfish | 2019 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Marine finfish aquaculture |
|----|--------------|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|----------------------|---------------------------------------------------------------------------------------------------------------|
| 9 | Aquaculture | Aquaculture ShellFish | Presence of shellfish farms | 2016 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Shellfish production areas |
| 10 | Conservation | Nationally Designated Areas | European Nationally Designated Areas. The Common Database on Designated Areas (CDDA) was created in 2014 by Cogea for the European Marine Observation and Data Network with data from the European Environmental Agency's (EEA). | 2019 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Nationally Designated Areas |
| 11 | Conservation | Natura 2000 | The dataset on Natura 2000 sites was created in 2014 by Cogea for the European Marine Observation and Data Network, with data from the European Environmental Agency's (EEA). Natura 2000 is an ecological network composed of sites designated under the Birds Directive (Special Protection Areas, SPAs) and the Habitats Directive (Sites of Community Importance, SCIs, and Special Areas of Conservation, SACs). | 2019 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Natura 2000 |
| 12 | Management | Maritime boundaries | International conventions establishing maritime boundaries in Europe, including territorial waters, bi- or multi- lateral boundaries as well as contiguous and exclusive economic zones. Some fishing areas are also defined. | 2005 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: Maritime boundaries |

| 13 | Management | MSFD Reporting Units | Marine regions and subregions listed in Article 4 of the Marine Strategy Framework Directive (MSFD), together with other surrounding seas of Europe. The MSFD marine regions and subregions map was developed to support DG Environment and EU Member States in their implementation of the MSFD. | 2019 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Human Activities: MSFD Reporting Units |
|----|------------------------|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|----------------------|--------------------------------------------------------------------------------------------------------|
| 14 | Environment | Geomorphology | landforms and physiographic features | 2019 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Geology |
| 15 | Environment | Seabed substrate | Types of substrate, sampling dates | 2019 | EU/ National (GR) | European Marine Observation and Data Network (EMODnet) Geology |
| 16 | Ecological features | Coastal Water Surfaces | Boundaries of the Coastal Water Surfaces of Greece. Coastal water is the surface water on the landward side of a line, every point of which is at a distance of one nautical mile on the seaward side from the nearest point of the baseline from which the breadth of territorial waters is measured, extending where appropriate up to the outer limit of transitional waters. | 2015 (published) | National (GR) | National list of open geospatial data and services for Greece |
| 17 | Management | Municipalities | Municipalities management units (administrative management units in Greece) | 2015 | National (GR) | National list of open geospatial data and services for Greece |
| 18 | Management | Perfectures | Perfectures management units (administrative management units in Greece) | 2015 (published) | National (GR) | National list of open geospatial data and services for Greece |
| 19 | Management | Regions | Regional management units (administrative management units in Greece) | 2015 | National (GR) | National list of open geospatial data and services for Greece |

| 20 | Monitoring | Water measuring stations | Monitoring network for water quality | 2015 | National (GR) | National list of open geospatial data and services for Greece |
|----|----------------|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|---------------|------------------------------------------------------------------|
| 21 | Oceanographic | Wind | Wind potential of Greek territory (except for Crete and parts of the prefectures of Kavala and Ksanthi) | 2011 | National (GR) | National list of open geospatial data and services for Greece |
| 22 | Urbanisation | Big cities | Capitals of the prefectures of Greece | 2015 | National (GR) | National list of open geospatial data and services for Greece |
| 23 | Water quality | Bathing water quality | Bathing water quality for 2013 | 2013 | National (GR) | National list of open geospatial data and services for Greece |
| 24 | Water quality | Blue Flags | Beaches with Blue Flags (2010) | 2010 | National (GR) | National list of open geospatial data and services for Greece |
| 25 | Water quality | Blue Flags | Beaches with Blue Flags (2010) | 2009 | National (GR) | National list of open geospatial data and services for Greece |
| 26 | Urbanisation | Settlements | The Settlements of the country as used by EL.STAT., for census purposes | 2010 | National (GR) | National list of open geospatial data and services for Greece |
| 27 | Transportation | Airports | Location_of airports in Greece | 2016 | National (GR) | National list of open geospatial data and services for Greece |
| 28 | Environment | Rivers | These data include mapped river water surfaces in Greece and were created in accordance with the Community Water Directive (2000/60 / EC). | 2011 | National (GR) | National list of open geospatial data and services for Greece |
| 29 | Management | Boundaries of Management Boards (protected areas) | Boundaries of authority of the Protected Areas Management Bodies of Greece. | 2015 | National (GR) | National list of open geospatial data and services for Greece |
| 30 | Management | Transitional waters | Boundaries of Transitional Waters of Greece. Transitional waters are surface water systems near the mouth of rivers which are partly salty due to their proximity to coastal waters but which are substantially affected by freshwater currents. | 2015 | National (GR) | National list of open geospatial data and services for Greece |

| 31 | Conservation | International legislation | Boundaries of terrestrial and aquatic areas protected by international conventions (eg BARCELONA, BIOGEN, BIOSPHERE, DIPLOMA, MPK). | 2015 | National (GR) | National list of open geospatial data and services for Greece |
|----|-----------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 32 | Conservation | Natura 2000 | Natura 2000 network | 2011 | National (GR) | National list of open geospatial data and services for Greece |
| 33 | Ecological feature | River network (RIV) | Rivers network and lakes | 2008 | World/ National (GR) | Lehner, B., Verdin, K., Jarvis, A. (2008): New global hydrography derived from spaceborne elevation data. Eos, Transactions, AGU, 89(10): 93-94. |
| 34 | Ecological feature | Hydrobasins | River hydrobasins | 2008 | World/ National (GR) | Lehner, B., Verdin, K., Jarvis, A. (2008): New global hydrography derived from spaceborne elevation data. Eos, Transactions, AGU, 89(10): 93-94. |
| 35 | Monitoring | MSFD Stations water quality | Monitoring network in Greece for Descriptor 10 "Properties and quantities of marine litter do not cause harm to the coastal and marine environment" of the Marine Strategy Framework Directive (MSFD 2008/56/EC) | 2017 | National (GR) | Ministerial Decision (GG B' 4728/29.12.2017) |
| 36 | Conservation | Natura 2000 | Natura 2000 network | 2018 | EU/ National (GR) | European Environmental Agenacy (EEA) |
| 37 | Shipping | Ports | Ports | 2013 | EU/ National (GR) | EC EUROPA- EUROSTAT |
| 38 | Transportation | Airports | Airports | 2013 | EU/ National (GR) | EC EUROPA- EUROSTAT |
| 39 | Management | Exclusive Economic Zone | World EEZ v10 | 2018 | World/ National (GR) | Flanders Marine Institute (2018). Maritime Boundaries Geodatabase: Maritime Boundaries and Exclusive Economic Zones (200NM), version 10. |

| 40 | Environment | Current velocity | Mean current velocity | 2017 | World/ National (GR) | Tyberghein L, Verbruggen H, Pauly K, Troupin C, Mineur F, De Clerck O (2012) Bio-ORACLE: A global environmental dataset for marine species distribution modelling. Global Ecology and Biogeography, 21, 272–281. Assis, J., Tyberghein, L., Bosh, S., Verbruggen, H., Serrão, E. A., & De Clerck, O. (2017). Bio-ORACLE v2.0: Extending marine data layers for bioclimatic modelling. Global Ecology and Biogeography. |
|----|--------------|----------------------------|-----------------------------------------------------------------------------------------|-----------|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 41 | Conservation | Protected Areas | Marine and terrestrial protected areas | 2019 | World/ National (GR) | UNEP-WCMC (2019). Protected Area Profile for Greece from the World Database of Protected Areas, May 2019. |
| 42 | Urbanisation | Population | Population | 2011 | EU/ National (GR) | EC EUROPA- EUROSTAT-GEOSTAT |
| 43 | Urbanisation | Light pollution | nighttime lights | 2016 | / National (GR) | NASA-Earth Observatory |
| 44 | Land Uses | Corine Land Cover (CLC) | Land cover / land use status based on the photointerpretation of satellite images | 2012/2018 | EU/ National (GR) | Copernicus Land Monitoring Service (CLMS) |

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