Task 1.4 Reviewing and mapping of all types of existing marine protected areas in different GSAs in the Mediterranean basin

(Scientific Responsible: C. Smith (HCMR), Partners involved: HCMR, CoNISMa, CNR-IAMC, CNR-ISMAR, COISPA, IEO, CIBM, FCD- MSDEC)

Cited as: *N. Papadopoulou, Smith C., M. Gristina, A. Belluscio, S. Fraschetti, A. Santelli, M. L. Pace, V. Markantonatou, M. Nikolopoulou, V. Valavanis, M. Giannoulaki, E. Palikara, C. Martin, M. Scardi, L. Telesco, Fabi G., Barro J., Grati F., Scarcella G., Punzo E., Knittweis L., Guarnieri G., D'Anna G., Pipitone C.,Spedicato M. T.* Reviewing and mapping of all types of existing marine protected areas in different GSAs in the Mediterranean basin. *Mediterranean Sensitive Habitats (MEDISEH) Final Report, DG MARE Specific Contract SI2.600741*

Background

It is acknowledged that the level of information available and the designation of MPAs between EU and non-EU states is largely unbalanced (Abdulla et al. 2008) although, under the recent UNEP/MAP/GEF Strategic Partnership for the Mediterranean Large Marine Ecosystem backed up by the EU, environmental protection is high on the regional agenda. For the EU Member States obligations arising from the Habitats Directive (eg protection of priority habitats and appropriate conservation targets) and the recent Marine Strategy framework Directive are significant drivers for mapping state and pressures and achieving/maintaining good environmental status. Spatial information will be provided on the existing MPAs along with known initiatives/proposals for new MPAs.

Objectives

The general objectives of Task 1.4 is to provide an up-to-date integrated information system concerning the occurrence of already existing marine protected areas (MPAs), where different types of measures of fishing control are adopted as well as mature proposals for near-future MPAs and Fisheries Restricted Areas (FRAs) with relevant conservation targets. Much of this information is available (although significantly less so for FRAs) but is dispersed in space and time and not yet in a digitilized format in the form of geospatial data and organised in a common database to be used for management purposes.

Thus the specific objectives of this task are to:

- identify and categorize all existing marine protected areas (MPAs) in the Mediterranean area
- identify proposed MPAs at late stage planning
- identify other areas or applied fishery measures with a spatial dimension that currently allow some levels of protection to marine species and habitats.
- review and map all types of existing marine protected areas and areas that have some degree of spatial/temporal protection from fishing activities within the Mediterranean basin.

In order to meet these objectives within the framework of MEDISEH an expert team was composed within the MAREA Consortium from scientists with long term expertise on Marine Protected Areas and fishery protected areas working at different areas in the Mediterranean basin. Details on the list of experts and external collaborators one can see below at Table 1.4.1. For CV details check MAREA expert web-site *http://www.mareaproject.net/*.

Table 1.4.1. Expert list involved in WP1, Task 1.4.

Participant	Participant affiliation
C. Smith	HCMR
N. Papadopoulou	HCMR
S. Fraschetti	CoNISMa (& input from 1.2)
A. Belluscio	CIBM (& input from 1.1)
L. Telesco	CIBM (input from 1.1)
M. Gristina	CNR-IAMC
G. Fabi	CNR-ISMAR
A. Santelli	CNR-ISMAR
F. Grati	CNR-ISMAR
G. Scarcella	CNR-ISMAR
E. Punzo	CNR-ISMAR
V. Markantonatou	HCMR
M. Nikolopoulou	HCMR
M. Giannoulaki	HCMR
E. Palikara	HCMR
V. Valavanis	HCMR (input from WP 3.)
L. Knittweis	FCD (MSDEC)
M. L. Pace	FCD (MSDEC)
M. Scardi	CoNISMA (input from Task 1.3.)
G. Guarnieri	CoNISMA
M. T. Spedicato	COISPA
C. Martin	HCMR/ Current affiliation: UNEP-WCMC (Cambridge, UK) (input from Task 1.3.)
G. D'Anna	CNR-IAMC
C. Pipitone	CNR-IAMC
J. Barro	IEO

Table 1.4.2. Non partners and additional experts list that contributed to WP1, Task 1.4.

Participant	Participant affiliation
Bruno Meola	MedPan
Charis Charilaou	DFMR MOA GOV Cyprus
Marie Romani	MedPan
Menachem Goren	Dept Zoology, Tel Aviv University
Alessandro Lucchetti	CNR-ISMAR
Raquel Goni	IEO
Antonello Sala	CNR-ISMAR
Med Dhia Guezguez	RAC/SPA

Deliverables and Milestones foreseen

The following table describes the Task Deliverables & Milestones as foreseen by the proposal.

Deliverable	Description	Timeframe
M1.4.1.	Identification of Mediterranean MPAs	Month 6
M1.4.2	Identification of areas with certain applied fishery measures that currently allow some levels of protection to marine species and habitats	Month 12
M1.4.3	Synthesis map of existing and proposed MPAs based also on the output of Task 1.1, Task 1.2 and Task 1.3	Month 14
M1.4.4	Report of gaps in knowledge and future research needs	Month 16
D1.4.1	Database with GIS information on existing MPAs	Month 6
D1.4.2	Database with GIS information on habitat areas subjected to particular protective fishing measures in the Mediterranean mainly enforced by national legislation	Month 12
D1.4.3	Report with a synthesis map reviewing the existing information on Mediterranean MPAs, results of WP1 and proposed areas	Month 16

Progress achieved

Within the framework of Task 1.4 and according to MEDISEH proposal four meetings were held within the framework of the project. Specifically:

A one day workshop took place following the kick-off meeting of the project that was held in Heraklion (Crete) in October 2011, in order to exchange information between partners involved in Marine Protected and Fishery Restricted Areas and GIS experts. This aimed to standardise the work among the partners involved especially concerning the input data format. Participants were: Nadia Papadopoulou, Vessa Markantonatou, Vassilis Valavanis (Greece), Leyla Knittweis (Malta), Gianna Fabi, Fabio Grati, Michele Gristina, Simonetta Fraschetti (Italy), Andrea Belluscio (Italy), Maria Teresa Spedicato, Giuseppe Lembo (Italy) and the task coordinator Chris Smith (HCMR).

Half a day workshop was held within the second meeting of MEDISEH at Palermo (Sicily) in February 2012. WP1.4. lead partner and project participants have presented aims and progress towards these meetings, and having assessed the situation, they also agreed to further actions to achieve the task objectives.

At the third MEDISEH meeting held in Orto Botanico, Rome WP1.4 a presentation was given on 26.09.12 and discussions held in parallel sessions on 27-28.09.12 with focus on the completion of the Fishing Restriced Areas work. WP1.4. lead partner presented “Task 1.4 Review and mapping of all types of existing marine protected areas in different GSAs in the Mediterranean basin: Overview of the work done. Smith C.J., Papadopoulou K.N. & V. Markantonatou (HCMR) with multi-partner contributions.” Significant progress was noted at this stage in comparison with Palermo, February 2012) and the Interim Report (March 2012). One Excel database file with all the protected area entries (MPAs, SPAMIs, proposed MPAs, FRAs) was constructed along with the respective shapefiles that have been created separately. The progress noted in numbers on each of the four thematic areas was:

- MPAs: this was noted to be 97% complete with only 5 shapefiles missing (out of 31 missing in the Interim report). As part of the MPA information, the SPAMI list includes an updated list of 32 entities, 100% complete
- Proposed MPAs: all the major mature Med MPA proposals (16 proposals for 337 listed areas) have been recorded in the database, but missing shapefiles were anticipated (unavailable information or detail in certain proposals).
- FRAs: this was noted to be about 90% complete with 25% missing shapefiles. This is part of Deliverable 1.4.2.

In addition, discussions were held to identify WP1 relevant Gaps in the knowledge.

At the fourth and final MEDISEH meeting held in Heraklion, Crete, in January 2013, a status report was made and presented during a plenary session of the meeting participants. The presentation "Task 1.4: Review and mapping of all types of existing marine protected areas in different GSAs in the Mediterranean basin – The Final Deliverable: C.J. Smith, N. Papadopoulou, V. Markantonatou & M. Nikolopoulou, HCMR" was uploaded and made available on the MAREA ftp site.

The presentation and the related discussion covered the following points:

- Update of Deliverable 1.4.1. (delivered by month 6): following the recent update of the MEDPAN resource the project team undertook extensive checks and wherever necessary updated the MPA database records supplementing these with additional shapefiles.
- Progress of work on FRAs and Proposed MPAs (Deliverable 1.4.2). Significant progress was made on FRAs since 3rd MEDISEH meeting in Rome and its potential was shown through the MEDISEH online GIS viewer (eg gear closures across the Mediterranean. Ongoing work on proposed MPAs as parts of major proposals (eg OCEANA or Greenpeace) for Mediterranean Marine reserves or SPAMIs was presented.
- Focus and form of Deliverable D.1.4.3 "Report with a synthesis map reviewing the existing information on Mediterranean MPAs, results of WP1 and proposed areas": This was agreed to be made available through the MEDISEH online GIS viewer as a series of spatial queries allowing for the estimation of the overlap between existing and proposed MPAs and *Posidonia/* and mäerl and coralligenous habitats based on the information collected within Tasks 1.1 and Task 1.2 of MEDISEH.

Project partners present at the meeting were asked for the availability of any further data sources that might have been missed, final checks and to comment on the data presented through the online GIS viewer. It was noted that the data for FRAs in France and Spain were probably under-reported due to the lack of contacts or willingness to provide data. Meetings agendas are given in Annex III of this report.

Details on the progress of the work achieved after January 2013 towards the Task deliverables and milestones prior to the submission of the Final Report are given below:

- Existing MPAs & SPAMIs: the fully updated version of Deliverable 1.4.1., includes 2 datasheets within a common Excel database that involves 146 and 32 entries respectively (including information on 37 and 25 data fields, respectively) accompanied with spatial information. This is now re-submitted with the Final Report and can be found as D.1.4.1. at http://mareaproject.net/FTPMareaProject/#22/Specific Projects/Specific Project 2 MEDISEH/final report/ documentation for the Commission/wp1/task1.4/Annex

1.4.1/ Deliverable 141_142.xlsx and the geoserver at http://geoserver.org/). The visual inspection of these entries can be done at the online GIS viewerhttp://mareaproject.net/mediseh/viewer/med.html

- Proposed MPAs: the majority of entries were accompanied with shapefiles, bringing this task to 100% completion, although a large number of these are depicted as single points on the MEDISEH online GIS viewer. This was anticipated and is mostly the result of the lack of detail in the original proposals (e.g. area descriptions, no name concerning seamounts and the lack of geographic coordinates/spatial data). In some cases shapefiles were created by digitizing maps. Entries in many cases do not represent unique areas as proposed to be protected. For example, a number of areas are consistently proposed by several proposals e.g. Alboran Sea and/or seamounts and Balearic Islands and/or seamounts feature in 5 proposals while Eratosthenes seamount appears in 7 proposals. Every effort was made to check and include all recent updates and proposals (eg replacing less detailed shapefiles with newer as area definitions were firmed up or spatial data were freely available). The final datasheet (within a common database) now includes 333 entries with information given in 31 fields including legal proposed status (i.e. MPA, SPAMI, marine reserve etc) and special protection targets (species and/or habitats). Proposed MPAs is part of Deliverable 1.4.2 and is available in the http://mareaproject.net/FTPMareaProject/#22/Specific Projects/Specific Project 2 MEDISEH/final report/ documentation for the Commission/wp1/task1.4/Annex 1.4.1/ Deliverable 141_142.xlsx and the geoserver at http://geoserver.org/). The visual inspection of these entries can be done at the online GIS viewerhttp://mareaproject.net/mediseh/viewer/med.html
- Fisheries Restricted Areas (FRAs): following extensive quality control, as well as the removal of various technical non spatial measures and small scale short duration temporal restrictions, this datasheet (within the common Excel database) now includes 422 entries with information given in 22 fields including gear group, closure type, shapefile name and viewer identifier, bringing this task to 100% completion. This was a major undertaking and one considered very worthwhile to be continued updated and enriched in the future. The plethora of national legislations in the Mediterranean countries along with the plethora of gears used and the varying degrees of implementation and/or adoption of EU legislation in non-EU MS made this task a challenging necessity. Fisheries Restricted Areas is part of Deliverable 1.4.2. and is available in the http://mareaproject.net/FTPMareaProject/#22/Specific Projects/Specific Project 2 MEDISEH/final report/ documentation for the Commission/wp1/task1.4/Annex 1.4.1/ Deliverable 141_142.xlsx and the geoserver at http://geoserver.org/). The visual inspection of these entries can be done at the online GIS viewerhttp://mareaproject.net/mediseh/viewer/med.html
- Synthesis map: following the completion of all the WP1 tasks quantative queries of spatial overlap of existing and proposed MPAs with priority and sensitive Mediterranean habitats were calculated and selected ones depicted with maps/grabs from the MEDISEH online GIS viewer. This work concerns Deliverable 1.4.3. This deliverable can be visualized and realized through the online GIS viewerhttp://mareaproject.net/mediseh/viewer/med.html
- Detailed descriptions of Deliverables 1.4.1 – 1.4.3 and major findings of D1.4.3. are given in the section below.

Sources of data

Within the framework of this Task information was reviewed from multiple sources and it was collated in a common Excel database with geospatial data. This database is part of Deliverables 1.4.1. & 1.4.2 and are included in the Excel file *MEDISEH_WP14 MPA v20March2013 Deliverable 141142.xlsx*, detailing the existing MPAs, SPAMIs and FRAs as well as the proposed MPAs.

Specifically, a lot for information was derived from 3 critical sources:

- The Network of Managers of Marine Protected Areas in the Mediterranean (MedPAN.org),
- the updated (in accordance to WDPA standards for reporting) and newly available resource Mapamed.org (a MEDPAN and UNEP RAC-SPA collaboration) and
- the World Database on Protected Areas (WDPA-marine.org), whereas additional information obtained through OCEANA, IUCN, CIESM, GFCM, ACCOBAMS, and the EEA (Natura2000 sites).

Additional geospatial information was kindly made available by the MEDISEH participants who have further added, checked data sources and provided additional GIS shapefiles, maps, and sources of published information. GIS shapefiles (or at the very least some geographic coordinates or maps as jpeg files) are present for almost all of MPAs and hot clickable to the original source if available on the web. Effort was made to provide shapefiles for all the proposed MPAs although as expected a large part of the available shapefiles were only single point/circles shapefiles. This is related to the original lack of detail in the proposals as in some cases whole bays/seas are proposed with no local spatial detail. As witnessed in the repeated names of certain areas in the database entries and seen by others (e.g. UNEP MAP RAC-SPA 2010 de Juan & Lleonart, Coll et al 2011, Portman et al 2012, Micheli et al 2013) there is protection consensus for a large number of areas.
Although almost all FRA (i.e. Fishery Closure Area or Fisheries Restricted Area is defined as a fishery closed or restricted by a government entity or a regional authority. A Fisheries Restricted Area is an area closed to fishing permanently, temporary or seasonally and this closure may apply to one or more gears. (http://www.protectplanetocean.org/introduction/introbox/glossary/glossary/introduction-item.html#mpa) entries in the database include some form of spatial information there are still numerous cases where it was not possible to create a shapefile (in 117 out of the 422 entries, i.e. 28%). Most notable reasons included restrictions referring to unknown locations or unknown capes despite thorough check even at navigation maps, relating to distances from undefined locations for example aquaculture farms (the only recent published map with google earth single pointers is by Trujillo et al 2012), harbours, river mouths and deltas, and some referring to un-available bathymetric contours. Another major drawback is the lack of shallow bathymetric contours (less than 50 m depth) in the Mediterranean as well as the lack of mapping data for key habitats, predominant habitats and bottom substrate. It seems that although the pelagic and satellite domain has done relatively well the benthic habitats descriptors data collection and mapping have fallen behind and seem sub-standard and in need of further focussed research efforts.

The status on the work done on this Task in relation to the associated deliverables is summarized in Table 1.4.3.

Table 1.4.3. Table indicating the state of art for each deliverable: the percentage of foreseen results and the possibility to reach the 100% of the foreseen results.

Deliverable	Description	% of foreseen results	Timeframe to reach 100% of results
M1.4.1.	Identification of Mediterranean MPAs	100%	By Month 6
M1.4.2	Identification of areas with certain applied fishery measures that currently allow some levels of protection to marine species and habitats	70%	By Month 12
M1.4.3	Synthesis map of existing and proposed MPAs based also on the output of Task 1.1, Task 1.2 and Task 1.3	20%	By Month 14
D1.4.1	Database with GIS information on existing MPAs	95% 100%	By Month 6 By Month 17
D1.4.2	Database with GIS information on habitat areas subjected to particular protective fishing measures in the Mediterranean mainly enforced by national legislation	50% 100%	By Month 12 By Month 17
D1.4.3	Report with a synthesis map reviewing the existing information on Mediterranean MPAs, results of WP1 and proposed areas	20% 100%	By Month 16 By Month 17

Detailed description of Milestones 1.4.1-1.4.3 and Deliverables 1.4.1-1.4.3.

Detailed description of the final form of the Excel database of the Mediterranean MPAs & FRAs (D. 1.4.1-1.4.2.)

The following section described the combined Excel file database with individual Sheet Descriptions. The sheets are as follows:

- ***Credits/About*****:** self-explanatory introduction about the data file and credits, while acknowledging contributions by MEDISEH partners and external contributors.
- ***Index*****:** index includes definitions of terms (and source/reference) and acronyms used in the different Excel sheets, including List of GSAs, Legal Status, International Recognition, IUCN Management Category, MPA Zoning, Gears Forbidden, Activities Forbidden or regulated and Special Protection Targets. This datasheet contains 144 entries (Tables 1.4.4-1.4.7).

Table 1.4.4. Table showing the GSA **(Geographical Sub-Area)** Number and name.

GSA Number	Geographical Area Name
1	northern Alboran Sea
2	Alboran Island
3	Southern Alboran Sea
4	Algeria
5	Balearic Island
6	northern Spain
7	Gulf of Lions
8	Corsica Island
9	Ligurian and North Tyrrhenian Sea
10	south Tyrrhenian Sea
11.1	Sardinia (west)
11.2	Sardinia (east)
12	northern Tunisia
13	Gulf of Hammamet
14	Gulf of Gabes
15	Maltese Islands
16	south of Sicily
17	northern Adriatic
18	southern Adriatic Sea
19	western Ionian Sea
20	eastern Ionian Sea
21	southern Ionian Sea
22	Aegean Sea
23	Crete Island
24	north Levant
25	Cyprus Island
26	south Levant
27	Levant
28	Marmara Sea
29	Black Sea
30	Azov Sea

Table 1.4.5. Table showing the types of legal status designated to marine protected areas at the national level.

Legal status
Archaeological Protection Area (APA)
Marine Protected Area
Protected area
Marine and Coastal Protected Area
Specially Protected Area
Marine Nature Reserve
Marine Park
Marine Reserve
Natural Monument
Hunting Reserve
National Park
Nature Park
Nature Reserve
Fishery Closure Area = Fisheries Restricted Area (FRA)
Natural Reserve
Biotope Protection Ordered Zone
Special Environmental Protected Areas (SEPAs)
ZTB: biological protection areas
Essential Fish Habitat (EFH)
National Forest Park

Table 1.4.6. Table showing the types of legal status designated to marine protected areas at the international level (at EU, Regional Sea Convention and other levels)

International Recognition
Natura 2000
RAMSAR site (Wetlands of International Importance)
Important Bird Area (IBA)
Biosphere Reserve
SPAMI
World heritage site

Table 1.4.7. Table showing types of activities prohibited or regulated or allowed in the MPAs (or core and other zones of MPAs)

Activities	Acronym

Recreational fishing	RF
Professional fishing	PF
Spear fishing	SF
Mooring, anchoring	M/A
Navigation, sailing	N/S
Scuba diving	SD
Scientific research	SR
Swimming	SW

- ***Existing MPAs***: This datasheet contains 37 data fields and 146 records; the type of data entered in each data field is shown in the Table below (Category vs Explanation).

Table 1.4.8. Information within the Data Set of Existing MPAs (categories and definitions).

Category	**Explanation**
Sub- region	sub part of the Mediterranean where the MPA is located
GSA	GFCM sub-areas within the Mediterranean
Country	The main country where the MPA is located
ID MEDISEH	The Identification code of the MEDISEH project for each MPA
WDPA IDs related to the selected area	Identification Numbers for World Database of Protected Areas (WDPA: http://protectedplanet.net)
Names of the related areas	
Protected area	Area name within countries
Geographical coordinates	Latitude Longitude for the centre of the area
Legal status (Nature Protection Area, Marine Protected Area MPA, Specially Protected Area, Marine Reserve etc)	Legal definition of the MPA
Year Establishment National Recognition	Year that the MPA was officially created
Additional International Recognition (Natura 2000, SPAMI, IBA etc)	Any other recognition information
Year Establishment International Recognition (Natura 2000, SPAMI, IBA etc)	Year that the MPA acquired international recognition
Legal aggreg category	*Legal aggregation category. Records are assigned to 15 aggregation categories given in the index (and include for example MR-MPA Marine Reserve MPA, NP MPA National Park MPA, S-MPA Sanctuary-MPA, FRA, SPAMI etc).*
IUCN Mgmt. category	International Union for Conservation of Nature management category: Ia Strict Nature Reserve, Ib Wilderness Area, II National Park, III Natural Monument, IV Habitat/Species Management

Category	Explanation
	Area, V Protected Landscape/seascape, VI Managed Resource Protected Area
Mgmt. body	Management body overseeing the MPA
Marine area (km2)	Size of the total MPA in the marine environment
Multizone	If there are different protection zones
Zoning	e.g. Core, integral, buffer, etc.
No- take zone	If there is a no-take zone
I surface (km2)	Size of integral zone
Prof_fishing I, gears forbidden in I	*professional gears forbidden in I*
Prof_fishing B, gears forbidden in B	*professional gears forbidden in B*
Prof_fishing P, gears forbidden in P	*professional gears forbidden in P*
I prohibited activities	Prohibited activities in I
I regulated activities	Regulated activities in I
I allowed activities	Allowed activities in I
Special Protection Targets	Targeted protection for species, ecosystems, habitats
Available Polygon/Shapefiles and source	Yes/no, and source or link for an available GIS shapefile
Recommended shapefile	*recommended shapefile and source*
Map Source/Ref	Yes/no and citation or reference for an available map of the area
Additional Information/problems/inconsistencies	Any additional information or problems with the data for example inconsistencies between multiple data sources
information Provider: Partner name	Name and institution of the data provider
References for the MPA	Any additional references for the MPA
WDPA_ID or Natura_ID	WDPA or Natura ID number corresponding to the chosen and displayed in the viewer shapefile
WDPA Name of Protected Area corresponding to WDPA_ID or Natura_ID	WDPA Name of Protected Area corresponding to WDPA_ID or Natura_ID
Gear prohibited in Core/integral part of MPA	Gear prohibited in Core/integral part of MPA
Viewer ID	MEDISEH online GIS viewerID Number

- ***SPAMIs List:*** This datasheet contains the list of SPAMIs (also included in the MPAs), with 25 data fields and 32 records; the type of data entered in each data field is shown in the Table below (Category vs Explanation). These are additional data as given by WDPA as open access data.

Table 1.4.9. Information within the Data Set of Existing ***SPAMIs List*** (categories and definitions).

Category	Explanation
Code, Name of the SPAMI, Year of inscription	Code, name of SPAMI and year of designation
Published Sources	Source and link (e.g. UNEP MAP RAC/SPA reports and links to these)
WDPA ID	WDPA ID by http://www.protectedplanet.net/
Country	country
name	Name of SPAMI
orig_name	The original name of the protected area
desig	Designation. The type of protected area as legally/officially established or recognised (e.g. national park, world heritage site) provided in Latin characters.
desig_eng	The type of protected area as legally/officially established or recognized translated into English, where possible.
desig_type	Designation type: 'national' for nationally designated sites or 'international' for a protected area recognized under an international convention such as UNESCO World Heritage, UNESCO Biosphere Reserve or RAMSAR.
iucn_cat	IUCN Protected Area Management Category (C)
marine	Marine. Given by a "1" for True or "0" for False. Marine sites as defined for the WDPA, encompass any portion of the marine environment in whole or in part according to geographic location and management strategy.
rep_m_area	Reported Marine area. Total marine extent of the protected area (square kilometres) as reported to UNEP-WCMC by the data provider. Contingent on the Marine field being True.
rep_area	Reported Area (km2). Total protected area extent, cumulative of both marine and terrestrial are as reported to UNEP-WCMC (square kilometres).
status	Current legal or "official" status of the site (e.g. proposed, designated).
gov_type	Governance structure of a protected area if reported
mang_auth	Management authority. The organisation(s) or agency/ies responsible for management of the protected area
int_crit	International Criteria used to define the protected area designation type
mang_plan	Management plan. A reference to an official management plan for the protected area
no_take	No take area if present
no_tk_area	Size of no take area
Shape_Length	Shape length
Shape_Area	Shape area
Related Mediseh MPA ID	The related MEDISEH MPA ID is given here, since a lot of MPAs have multiple designations but their spatial borders are not always the same despite the "same" name.
SPAMI ID	This is the MEDISEH ID for the SPAMIs and the corresponding online GIS viewerID

- ***Existing FRAs:*** This datasheet contains the list of FRAs, with 22 data fields and 422 records; the type of data entered in each data field is shown in the Table below (Category vs Explanation) and is part of the future Deliverable 1.4.2.

Table 1.4.10 Information within the Data Set of Existing ***FRAs*** (categories and definitions).

Data Fields	Explanation
Sub- region	sub part of the Mediterranean where the FRA is located
GSA	GFCM sub-areas within the Mediterranean
Country	The main country where the FRA is located
Protected area	Geographical area within the country that is protected
Protected area details	Coordinates or delimitation features of the area (depth, distance, coordinates)
FRA type (FRA, ZTB, FMZ, EFZ, GFCM, reefs, Technical measure, gear ban)	Type: FRA-fisheries restricted area, ZTP-Biological Protection Area. FMZ-, EFZ-, GFCM, reefs-, technical measure-, gear ban
Date established	Date that the FRA was officially created
Prohibition period (no of month per year)	Time period that the prohibition covers
Measure/Gear Information	Measure or type of fishing gear prohibition
Changed/abolished restrictions	Date of major change or abolition of the measure
Shapefile availability "yes/shapefile created", "no" and "NA"	Whether a shapefile is available for the record
Map & Ref.	Reference or website with map
Additional Information/problems/inconsistencies	Any noted inconsistency in the definition for he record (position, gear etc.)
information Provider: Partner name	MEDISEH participant data source
FRA References	Original FRA information source
Shapes, names	Name of shapefile
Viewer_id	Identification number for the MEDISEH online GIS viewer
Gear group	Major fishing gear concerned
Closure type	Closure type (spatial or temporal)
MEDISEH ID	MEDISEH project identification code
Reasons for No and NA shapefiles	Reasons why shapefiles are not available (eg lack of bathymetry contours, unknown location of aquaculture farms or unknown harbours and capes)
Reasons for not shown in the viewer	Reasons why certain shapefiles are not shown in the viewer (mostly due to spatial overlap with other measures/records and in cases of annual temporal restrictions shown in the "general restrictions" part of the viewer as detailed in the viewer help file)

- ***Proposed MPAs & FRAs:*** This datasheet contains the list of Proposed MPAs, with 31 data fields and 333 records; the type of data entered in each data field is shown in the Table below (Category vs Explanation) and is part of the future Deliverable 1.4.2.

Table 1.4.11. Information within the Data Set of Existing ***Proposed MPAs & FRAs*** (categories and definitions).

Category	**Explanation**
Searching by proposal	Searching by proposal name
Sub- region	sub part of the Mediterranean where the MPA is located
GSA	GFCM sub-areas within the Mediterranean
Country	The main country where the MPA is located
ID MEDISEH	The Identification code of the MEDISEH project for each MPA
Protected area	Area name within countries
Geographical coordinates	Latitude Longitude for the centre of the area
Legal existing status	As/if existing
Legal proposed status	As proposed (eg as marine reserves, SPAMIs, Priority areas for Conservation, Marine Peace Parks, EBSAs, etc)
IUCN Mgmt. category	International Union for Conservation of Nature management category: Ia Strict Nature Reserve, Ib Wilderness Area, II National Park, III Natural Monument, IV Habitat/Species Management Area, V Protected Landscape/seascape, VI Managed Resource Protected Area
Marine area (km2)	Size of the total MPA in the marine environment
Multizone?	If the MPA has different protection zones
Zoning	What are the zones (Core, integral, buffer, etc.)
No- take zone	If there is a no-take zone
I surface (km2)	Size of integral zone
Prof_fishing I, gears forbidden in I	*professional gears forbidden in I*
Prof_fishing B, gears forbidden in B	*professional gears forbidden in B*
Prof_fishing P, gears forbidden in P	*professional gears forbidden in P*
I prohibited activities	Prohibited activities in I
I regulated activities	Regulated activities in I
I allowed activities	Allowed activities in I

Category	**Explanation**
Special Protection Targets	Targeted protection for species, ecosystems, habitats.
Available Polygon/Shapefiles and source	Yes/no, and source or link for an available GIS shapefile
Map Source/Ref	Yes/no and citation or reference for an available map of the area
Additional Information/problems/inconsistencies	Any additional information or problems with the data for example inconsistencies between multiple data sources
information Provider: Partner name	Name and institution of the data provider
References for the MPA	Any additional references for the MPA
Shapefile name	Shapefile name
Shapefile provider	Shapefile provider
Comments about shp	Comments about the shapefile (if for example shapefiles are shown as single points based on proposal maps)
Viewer ID	MEDISEH viewer ID Number

- ***References:*** This datasheet contains the References used (263 records and 44 websites) and is part of Deliverable 1.4.1. and Deliverable 1.4.2.

Detailed description of the final form and content of Deliverable 1.4.3.

The deliverable involves various *"Syntheses Maps and Tables"* that effectively integrate information from Tasks 1.1., 1.2 and 1.3 with the different types of spatial restrictions information collected *and* is presented in detail below:

The current status of MPAs, SPAMIs and NATURA in the Mediterranean Sea is shown in Figs 1.4.1 to 1.4.3. The number and the spatial extent of MPAs although higher in the Western Mediterranean they seem rather balanced between eastern and western Mediterranean (Fig 1.4.1, 1.4.4). The picture further differentiates when seen at a country level (Fig. 1.4.5). When Pelagos sanctuary is excluded, Spain seems to have the largest percentage of MPAs compared to the total MPAs area in the Mediterranean (i.e. 33%). Greece, Italy and Turkey are next with a percentage of MPAs up to 16%. Percentages can largely vary upon the inclusion of Pelagos sanctuary and zones such as the Italian ZTB and the Maltese fisheries management zone. Similarly, the percentage of NATURA sites largely differentiates between countries. NATURA sites in Greece correspond to almost 35% of the total area whereas 28% in France and 24% in Italy, respectively (Fig. 1.4.6).

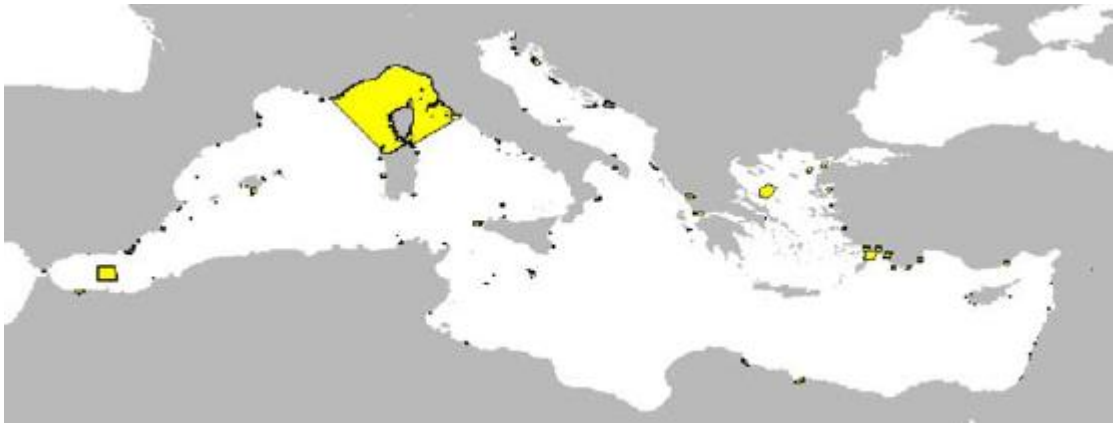

Fig. 1.4.1. The current status (2013) of MPAs (including SPAMIs) distribution across the Mediterranean Sea as seen in the MEDISEH online GIS viewer.

Fig. 1.4.2. The current status (2013) of SPAMIs distribution across the Mediterranean Sea as seen in the MEDISEH online GIS viewer.

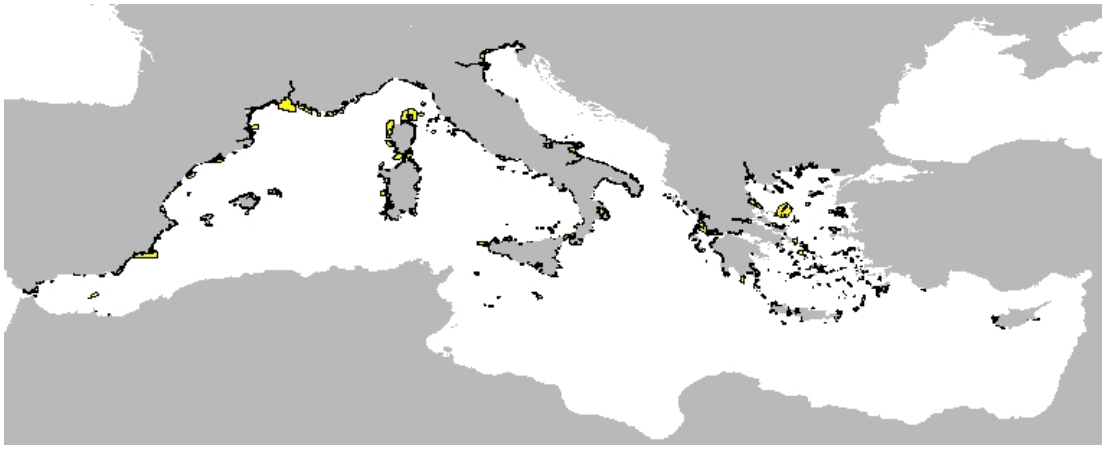

Fig. 1.4.3. The current status (2013) of NATURAs distribution across the Mediterranean Sea as seen in the MEDISEH online GIS viewer.

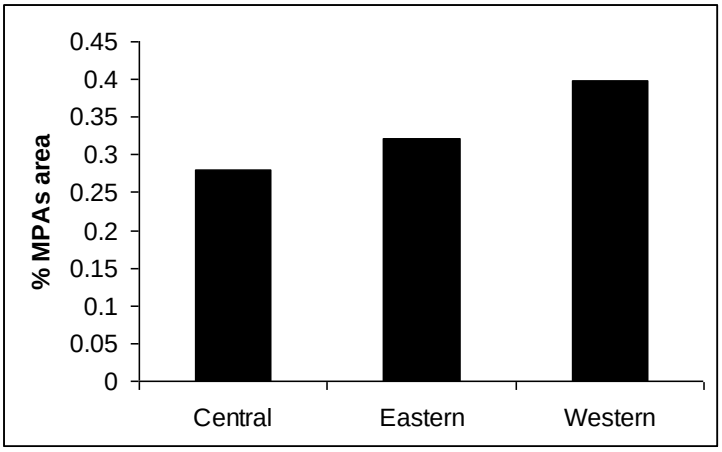

Fig. 1.4.4. The percentage of MPAs in the Eastern, Central and Western part of the Mediterranean in relation to the total MPAs area. (East Med: Aegean Sea & Levantine; Central Med: Adriatic Sea, Sicily, Tunisia; Western Med: Spanish Med Waters, Gulf of Lions, Tyrrhenian, Liguria, Algeria, Morocco). Pelagos Sanctuary is excluded.

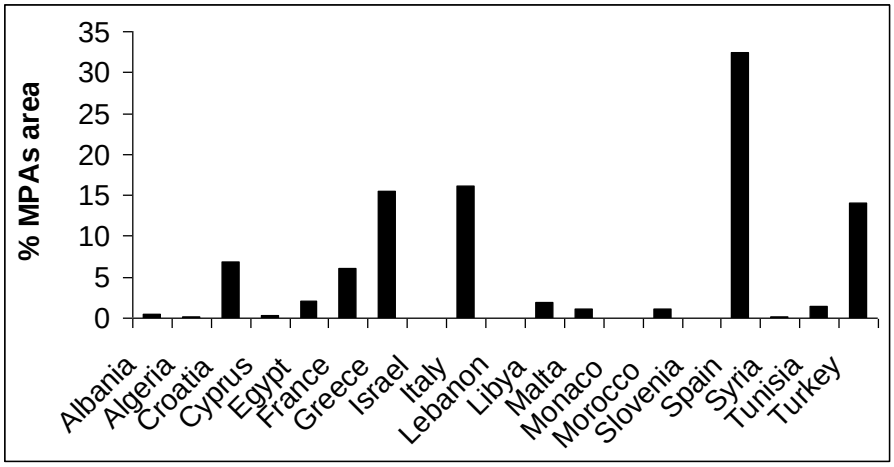

Fig. 1.4.5. The percentage of MPAs as allocated in the different countries across the Mediterranean Sea in relation to the total MPAs area. Pelagos Sanctuary is excluded.

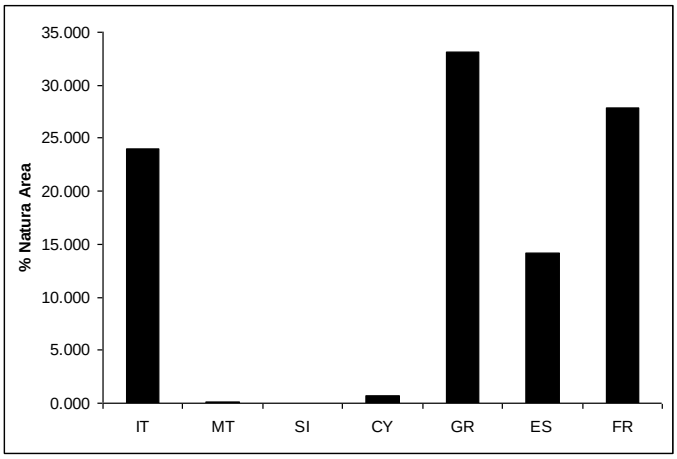

Fig. 1.4.6. The percentage of NATURA areas as allocated in the different countries across the Mediterranean Sea in relation to the total NATURA area.

There is only a limited number of EU/GFCM FRAs, all with international recognition status although more proposals are widely discussed. These EU GFCM FRAs are well known and cover substantial areas however, the work done within MEDISEH is the first attempt to retrieve and collate the often ignored, nationally defined FRAs along with existing well known international FRAs (see for example Figs 1.4.7 and 1.4.8). This was a major undertaking and a task that needs to be continued with more dedicated research efforts. Fisheries restrictions, as revealed by national laws, often refer to different categories of small scale gears, gears-species-times combinations, technical measures, spatial (from the country level to the very local level) and various temporal restrictions (i.e. from 2 months up to 12 months on a yearly basis) and their evolution in time. Current FRAs as depicted and calculated through geospatial information cover a far larger area of the Mediterranean Sea compared to existing MPAs and NATURA 2000 sites (see Figs 1.4.7. and Table 1.4.12). This is especially true for the bottom trawl prohibitions (based on the Mediterranean Regulation 1967/2006) that include depths greater than 1000 m and depths shallower than 50 m or in distances less than 1.5 nm from the shore. This becomes more important considering that the Mediterranean is predominantly a deep sea with the major part deeper than 1000 m.

The number of retrieved FRAs per country is shown in Fig. 1.4.9. Apparently, Greece has the highest number of FRAs (120 for bottom trawls/ 86 for purse seines and 47 for small scale gears) followed by Turkey (48 for bottom trawls/ 31 for purse seines and 2 for small scale gears).

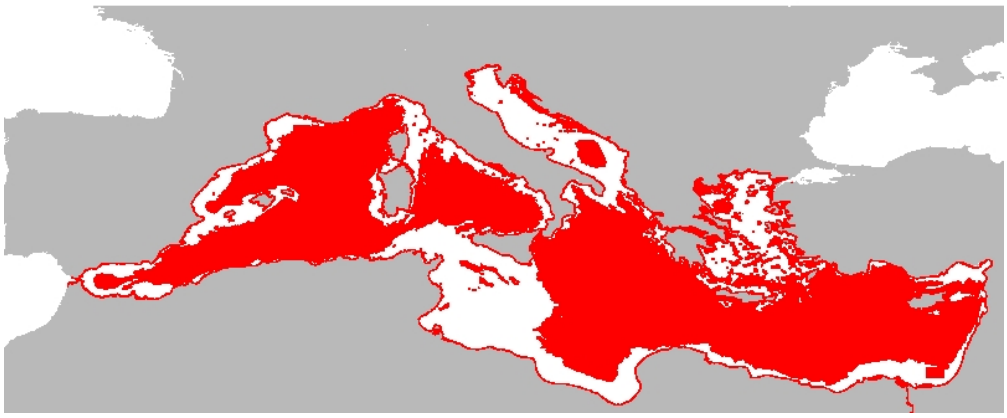

Fig. 1.4.7. Mediterranean FRAs where bottom trawl is prohibited as seen in the MEDISEH online GIS viewer. The 1000 m isobath where bottom trawl operation is prohibited across the Mediterranean is also shown.

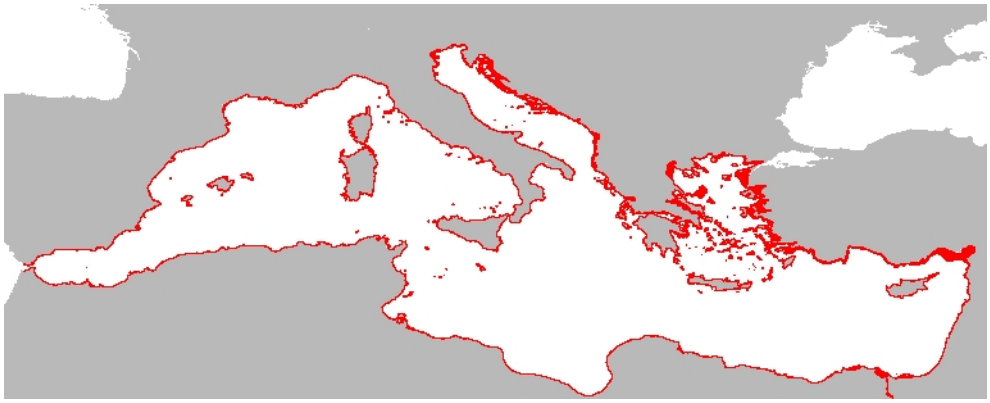

Fig. 1.4.8. Mediterranean FRAs where purse seine is prohibited as seen in the MEDISEH online GIS viewer. Please not that as per EC 1967/2006 “The use of purse seines shall be prohibited within 300 meters of the coast or within the 50 metres isobath where that depth is reached at a shorter distance from the coast”

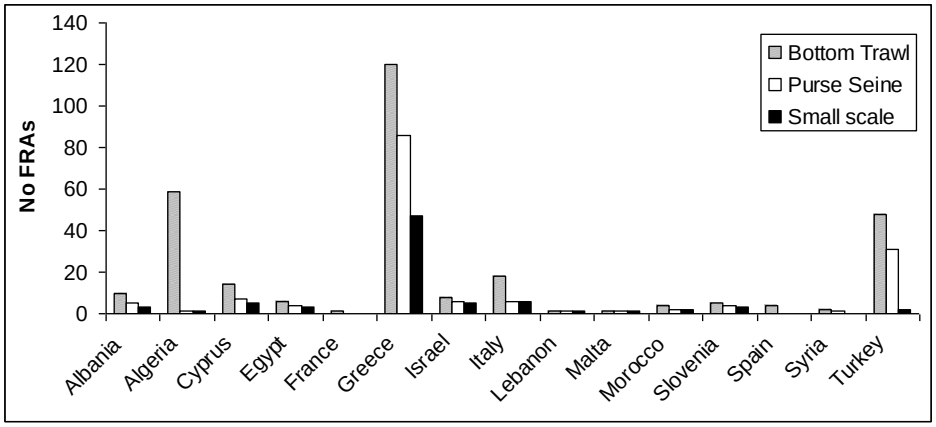

Fig. 1.4.9. Number of FRAs where bottom trawl /purse seine and small scale gears are prohibited per country in the Mediterranean.

Table 1.4.12. Spatial extent information (in km^2 and as percentage of the Mediterranean) of bottom trawl, purse seine and total FRAs in the Mediterranean. Total FRAs in this case include the GFCM bottom trawling prohibition for depths over 1000 m.

	M**editerranean, km²**	FRA extent, **km²**	Percentage **of Mediterranean covered by FRA**
Bottom trawl FRAs	2513713.4	1655854.4	65.9
Bottom trawl excl 1000 m FRA	2513713.4	191453.7	7.6
Purse seine FRAs	2513713.4	65837.0	2.6
> 1000 m depth, 1000 m FRA (GFCM bottom trawl prohibition)	2513713.4	1464401.0	58.3
Total FRAs incl 1000 m	2513713.4	2057926.5	71.9

Table 1.4.13. Spatial extent information (in km^2 and as percentage of the Mediterranean) of FRAs in the Mediterranean (including and excluding include the GFCM bottom trawling prohibition for depths over 1000 m) and FRAs total extent excluding spatial overlap with other designated types of protection i.e. MPAs, SPAMIs and NATURAs.

	M**editerranean, km²**	FRA extent, **km2**	Percentage **of Mediterranean covered by FRA**
FRAs total incl 1000 m FRA	2513713.4	2057926.5	71.9
FRAs total excl 1000 m FRA	2513713.4	593525.5	23.6
FRAs+MPAs+SPAMIs+ NATURAs , excl 1000 m	2513713.4	492529.7	19.6

With the environmental protection being high on the world, EU and regional agendas show initiatives and directives favoring the creation of MPAs networks thus a lot of information is

published on proposals for MPAs and SPAMIs. Despite the consensus in conservation areas (see Fig. 1.4.10 & 1.4.11) and targets (see for example DeJuan & Lleonart 2010, Portman et al 2012, Micheli et al 2013), detailed spatial information is often lacking (see Fig. 1.4.12 & 1.4.13). This largely depends on the level of the maturity of the proposal. Proposals building up support with time will also build consensus on spatial borders of their proposed MPAs. As it is, current proposals cover (aim to protect) a very significant part of the Mediterranean (around 80%), including shallow, shelf and deep habitats. Although biodiversity hotspots of different ecological components (e.g. fish, turtles, cetaceans, see Coll et al 2010 & 2012), conservation targets, representativeness of habitats and human impacts and high threat areas can be variable the spatial coverage of the proposed MPAs is still somewhat disproportionate between eastern and western Mediterranean and/or north south (Fig. 1.4.14).

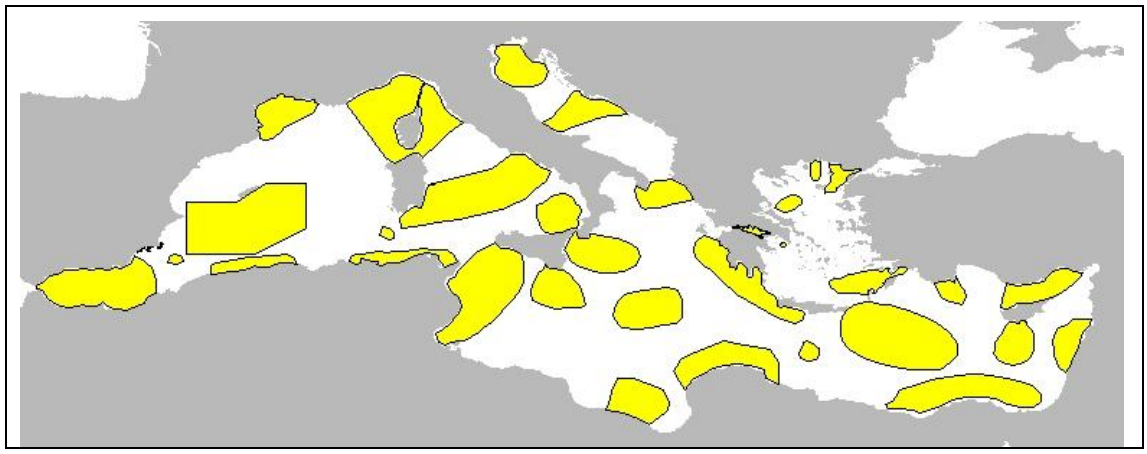

Fig. 1.4.10. Mediterranean proposed MPAs by Greenpeace 2006/2011 as seen in the MEDISEH online GIS viewer

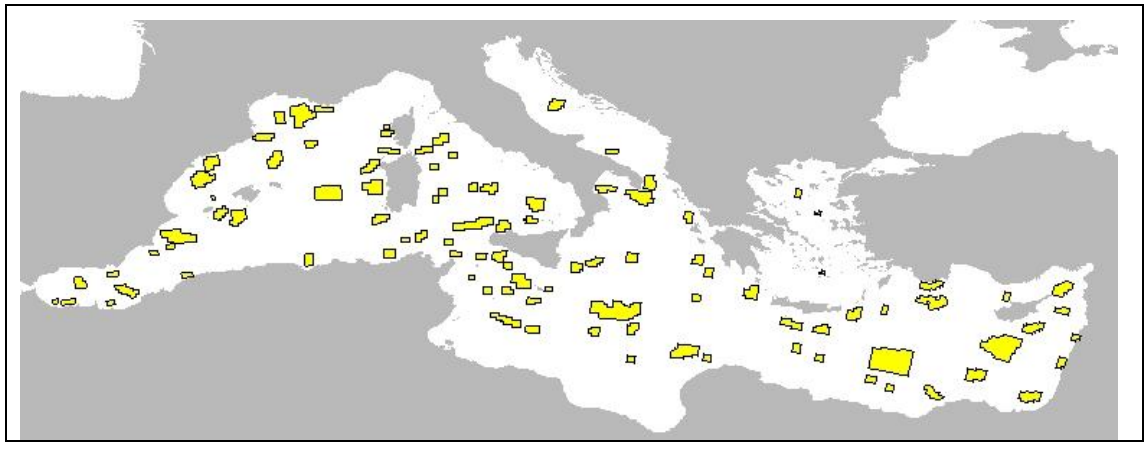

Fig. 1.4.11. Mediterranean proposed MPAs by OCEANA 2011 as seen in the MEDISEH online GIS viewer

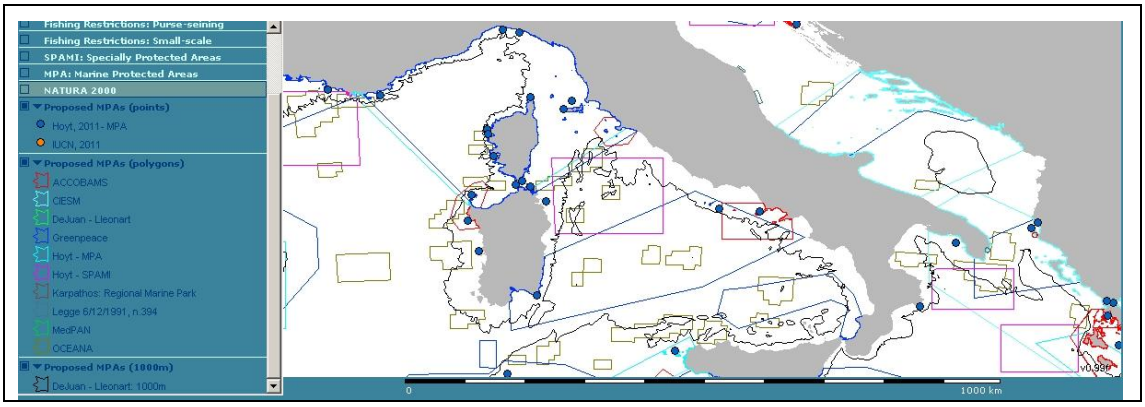

Fig. 1.4.12. Close-up on Mediterranean proposed MPAs in the north-central Mediterranean by Proposal as seen in the MEDISEH online GIS viewer (note range of spatial accuracy in delimitation of areas from detailed spatial borders to single point circles)

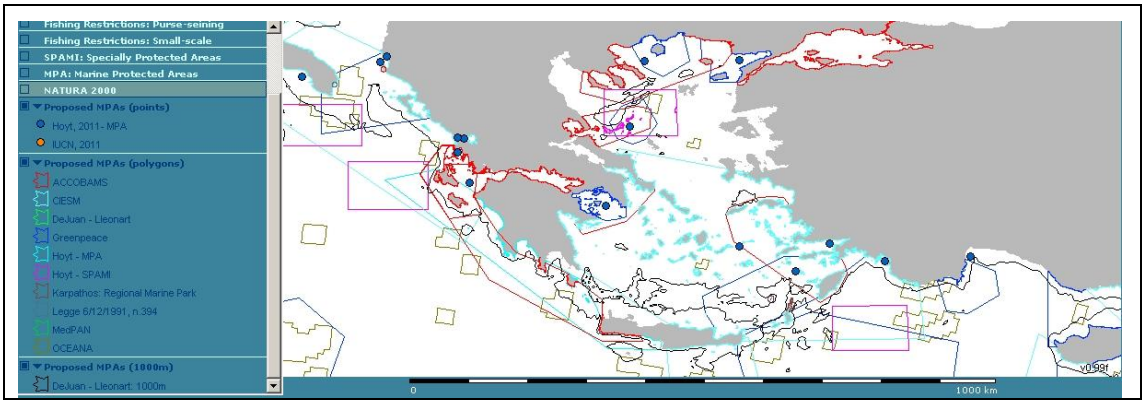

Fig. 1.4.13. Close-up on Mediterranean proposed MPAs in the north east Mediterranean by Proposal as seen in the MEDISEH online GIS viewer (note range of spatial accuracy in delimitation of areas from detailed spatial borders to single point circles)

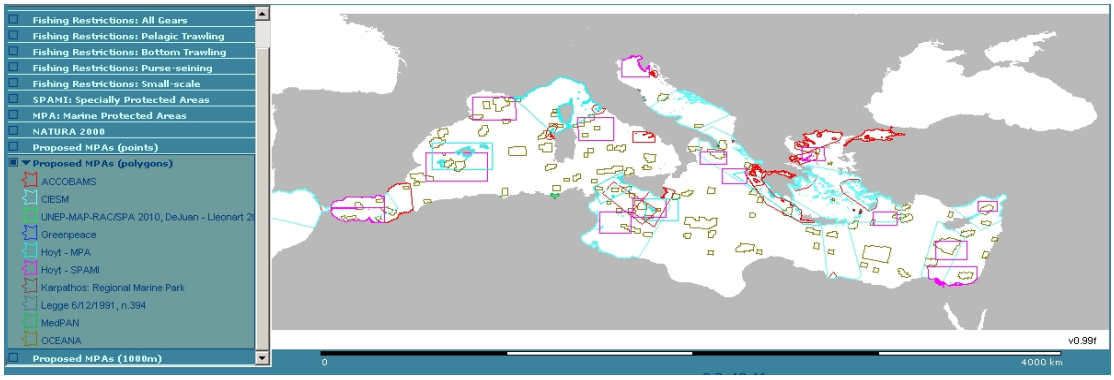

Fig. 1.4.14. Mediterranean proposed MPAs as seen in the MEDISEH online GIS viewer

The work done within MEDISEH and Deliverable 1.4.3 goes beyond recording extents and distribution of existing and proposed protection measures. This is done through a series of spatial queries that look into the spatial overlap of current and existing measures with key habitats and primarily (in relation to D.1.4.3) with *Posidonia oceanica*. Modeled estimates

and actual presence distribution data acquired through WP1.1 - WP.1.3 were used to calculate several spatial overlaps.

As seen below in Tables 1.4.12 to 1.4.17, a significant part (>60%) of the Posidonia habitat is subjected to some form of fisheries restrictions (i.e. FRA or depth or distance from shore resstriction). However, the actual protection levels implemented might deviate from this. A similar part of the habitat is covered by the 1.5 nm distance from shore trawling prohibition (around 60%) and an even larger part of the habitat (around 85%) is within one of the most common depth restrictions concerning 50 m prohibition (Table 1.4.15). Restrictions in depths shallower than 50 m depth cannot be visualized in the viewer due to the inaccuracy of Mediterranean-wide shallower data (e.g. inability to map the 25 m isobath). A rough estimate of Posidonia presence at 25 m depth is given here (Table 1.4.13.) based on the bathymetry grid and selected pixels 25-0 m depth from the Posidonia model.

For Posidonia the difference in modeled habitat covered by the 1.0 and 1.5 nm bottom trawling restriction (FRA) results into an additional protection of 10%. For mäerl and corraligenous the difference is around 75 and 17% respectively, with mäerl being potentially afforded considerably more protection than corraligenous habitats (Table 1.4.16). The spatial overlap of modeled habitat with NATURA, MPAs, SPAMIs and FRAs show marked variations depending on habitat type. FRAs seemingly “cover” large parts (69-72%) of all 3 habitats while larger parts of mäerl and corraligenous are covered by MPAs rather than NATURA 2000 sites. The opposite is true for Posidonia with larger percentage cover seen in NATURA 2000 than MPAs (and probably over the shallower parts of the Posidonia distribution). The spatial overlap between Posidonia habitat with existing MPAs and Natura 2000 sites is estimated around 10%. The actual protection implemented strongly depends on how the locally imposed management measures are actually enforced. For example, large parts of the modelled Posidonia habitat falls within EU fishing restriction zones, however if these Posidonia beds are not mapped and incorporated in the VMS system then trawling prohibition is actually not in place and no protection is applied. Although quantitative summary data on VMS caught violations for fishing over the Posidonia habitat are not available, implementation should not be assumed to be 100%. Difference in extent between modelled and known as existing or mapped Posidonia beds, equally varies between countries as do the MPA designations.

Table 1.4.18 shows the extent of Posidonia per country (EEZ), MPA extent per country and the ratio Posidonia to MPA. The Posidonia habitat in this case is a combination of polygons available to WP.1.1 and single points available to WP 1.3, to improve the models. To show disparity between priority habitat extent and MPA extent per country, in WP.1.4 task, with the help of WP. 3, these single points were transformed to shapefiles each with a minimum pixel area of 90*90 m. The total Posidonia extent estimated this way (51838 km2) is very close to the model result (53541 km2, WP 1.3). A source of variation is the lower resolution of the EEZ coastline of the EEZ layer compared to the coastline layer used by the model. Tunisia, Algeria and Libya show a very high ratio of Posidonia/MPA ratio. This coincides with the fact that a large number of MPAs in the South Mediterranean are in process of being proposed and/or designated. Overall MPA extent in the Mediterranean is roughly twice that of the Posidonia habitat although the average country Posidonia/MPA ratio is around 3.

Finally, only 4.5 % of the Mediterranean and 8.9 % of the Posidonia habitat is currently protected under the MPAs scheme. Targets in both the Habitats Directive (for protection of 60% of the habitat of priority species) and CBD conservation targets are still not met. The CBD Aichi Target 11 calls for by 2020, “*at least 10 per cent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well connected systems of protected areas and other effective area-based conservation measures,*

and integrated into the wider landscapes and seascapes". (http://www.cbd.int/sp/targets/). Although still less that half-way to 10%, the Contracting Parties to the Barcelona Convention adopted the vision of a clean, healthy and productive Mediterranean with preserved ecosystems and biodiversity and set strategic goals and 11 ecological objectives to be achieved by 2020 towards the application of the Ecosystem Approach. This includes the establishment of Marine Protected Areas in open sea areas and the deep sea. Additionally, the EU Marine Strategy Framework Directive with a 2020 goal for achieving Good Environmental Status is further driving the EU Member States in the region, while the recent Antalya Declaration of the 2012 MPA Forum is driving the regional stakeholders towards an operational representative and connected MPA Network that meets the existing international objectives.

Table 1.4.14. Spatial extent information (in km2 and as percentage of the Mediterranean) is shown for MPAs, SPAMIs, NATURA2000 sites, FRAs, Posidonia, mäerl, and coralligenous. NB: MPAs, SPAMIs, NATURA2000 & FRAs estimates are based on geospatial information collated through WP.1.4. Posidonia, mäerl and corraligenous estimates extent are based on modelled data produced by WP.1.3. and displayed in the MEDISEH online GIS viewer. The threshold used for *Posidonia* is >28% probability of presence and for mäerl and corraligenous is >50% probability of presence (for details see report section W.1.3) Total Mediterranean Sea area is 2513713.4 km^2.

Name	Protected Area or habitat Extent, km2	Percent
MPA (incl SPAMIs)	113815.2	4.53
SPAMI	90352.3	3.59
NATURA 2000	34534.7	1.37
FRA	2057926.1	71.9
Posidonia (>28% prob)	53540.9	2.13
Mäerl (>50% prob)	47032.9	1.87
Coralligenous (>50% prob)	111409.0	4.43

Table 1.4.15. Spatial extent (in km2 and as percentage of habitat) of Posidonia within 3 depth zones: a shallow zone up to 25 m depth, the 50 m depth a common fisheries restriction (trawling) limit used in the Mediterranean, and an upper deeper zone up to 100 m depth. (*): Note that the less than 25 depth estimates are indicative only and are based on bathymetry grid and not on the 25m-isobath as this is lacking in the Mediterranean along with any other isobaths for <50 m depths. Posidonia estimates on extent are based on modelled data as produced by WP.1.3. and the threshold used is >28% probability of presence (for details see report section W.1.3)

Posidonia (>28% probability of presence)	Extent (in km^2)	Percent
Total (as produced by modeling by WP 1.3)	53540	
up to 100 m depth	47075	87.9
up to 50 m depth	45860	85.7
up to 25 m depth (* rough estimate)	34076	63.6

Table 1.4.16. Spatial extent (in km2 and as percentage of habitat) of Posidonia, mäerl and coralligenous within four shore zones: 100m, 500m, 1 nm and the recently implemented 1.5 nm in some of the Mediterranean states for bottom trawl fishing. Posidonia, mäerl and corraligenous estimates on extent are based on modelled data as produced by WP.1.3. and displayed in the MEDISEH GIS viewer. The threshold used for Posidonia is >28% probability of presence and for mäerl and corraligenous >50% probability of presence (for details see report section W.1.3)

Name	Zone (distance from coast)	Habitat extent in zone, km^2	Total habitat extent, km^2	Percent habitat in zone
Posidonia (>0.28 prob)	100m	1845.3	53540.9	3.4
Mäerl (>50% prob)	100m	216.0	47032.9	0.5
Coralligenous (>50% prob)	100m	882.2	111409.0	0.8
Posidonia (>0.28 prob)	500m	11208.8	53540.9	20.9
Mäerl (>50% prob)	500m	1851.3	47032.9	3.9
Coralligenous (>50% prob)	500m	7191.2	111409.0	6.5
Posidonia (>0.28 prob)	1 nm	27790.7	53540.9	51.9
Mäerl (>50% prob)	1 nm	8862.4	47032.9	18.8
Coralligenous (>50% prob)	1 nm	31772.2	111409.0	28.5
Posidonia (>0.28 prob)	1.5 nm	33075.6	53540.9	61.8
Mäerl (>50% prob)	1.5 nm	44218.7	47032.9	94.0
Coralligenous (>50% prob)	1.5 nm	12776.8	111409.0	11.5

Table 1.4.17. Spatial extent (in km2) and as percentage of spatial habitat overlap of Posidonia, mäerl and coralligenous within Natura 2000 sites, MPAs, SPAMIs and FRAs. Posidonia, mäerl and corraligenous estimates on extent are based on modelled data as produced by WP.1.3. and displayed in the GIS environment of the MEDISEH viewer. The threshold used for Posidonia is >28% probability of presence and for mäerl and corraligenous >50% probability of presence (for details see report section W.1.3). PA: Protected Area. Percent spatial overlap shows percent of each habitat under each protection scheme.

Name	Habitat in PA, km^2	Habitat extent in Mediterranean, km^2	Percent spatial overlap
Posidonia in Natura	6251.6	53540.9	11.7
Mäerl in Natura	3605.5	47032.9	7.7
Coralligenous in Natura	9205.6	111409.0	8.3
Posidonia in MPA	4763.7	53540.9	8.9
Mäerl in MPA	12957.9	47032.9	27.6
Coralligenous in MPA	16161.0	111409.0	14.5
Posidonia in SPAMI	2726.0	53540.9	5.1
Mäerl in SPAMI	9902.6	47032.9	21.1

Name	Habitat in PA, km^2	Habitat extent in Mediterranean, km^2	Percent spatial overlap
Coralligenous in SPAMI	13553.4	111409.0	12.2
Posidonia in FRA	36679.7	53540.9	68.5
Mäerl in FRA	36314.3	47032.9	77.2
Coralligenous in FRA	91848.9	111409.0	82.4

Table 1.4.18. Posidonia extent (in km^2) in each country (EEZ) and as percentage of total Mediterranean habitat. MPA extent in each country in km2 and as percentage of total MPA extent in Mediterranean. Ratio Posidonia/MPA. NB: Posidonia in this case is not modeled (sensu 1.3) but a combination of polygons available to WP.1.1. and single points available to WP 1.3. to improve the models. For the purpose of the WP.1.4 task, and with the help of WP.3. these single points were transformed to shapefiles each with a minimum pixel area of 90*90 m. The total Posidonia estimated extent this way (51838 km2) is very close to the model output (53541 km^2, WP1.3.).

	MPA extent, km^2	Posidonia extent in EEZ, km^2	% National Posidonia in total Med.	% National MPA in total Med.	Ratio Posidonia/MPA
Albania	73.0	85.4	0.165	0.447	1.17
Algeria	26.4	893.9	1.724	0.162	33.84
Croatia	1128.6	5132.4	9.901	6.901	4.55
Cyprus	49.6	123.8	0.239	0.303	2.50
Egypt	326.1	2100.6	4.052	1.994	6.44
France	993.6	1254.8	2.421	6.075	1.26
Greece	2527.4	10560.6	20.372	15.453	4.18
Israel	11.2			0.069	
Italy	2632.3	4963.4	9.575	16.094	1.89
Lebanon	5.1			0.031	
Libya	307.4	8722.8	16.827	1.879	28.38
Malta	187.0	71.9	0.139	1.143	0.38
Monaco	0.3	0.9	0.002	0.002	2.72
Morocco	190.2	66.6	0.128	1.163	0.35
Slovenia	6.3	0.8	0.001	0.038	0.12
Spain	5333.1	2099.8	4.051	32.608	0.39
Syria	24.3			0.149	
Tunisia	241.2	12812.8	24.717	1.475	53.11
Turkey	2292.1	2947.8	5.686	14.014	1.29
Total extent	16355.5	51838.2	100.000	100.000	3.17

Overall comments

- Analysis of the MPA information and visualization/display within the MEDISEH online GIS viewer is in full agreement with the most recent assessment of "Status of

Marine Protected Areas in the Mediterranean 2012" (http://www.medpan.org/en/mediterranean-mpa-status)

- The information on Mediterranean MPAs is now more accurate, with many more MPAs now having up-to-date validated geo-referenced data available, freely available through the MAPAMED database and the WDPA site
- Within MEDISEH and the current Task, emphasis was given to cover the lack of knowledge concerning the fishing restrictions and measures applied in the various types of protected areas (e.g. MPAs, SPAMIs, FRAs).
- Efforts were also made to document and display (into a GIS environment) the increasing number of proposed MPA and Marine Reserves in the Mediterranean, to allow calculations of spatial queries and future protection scenarios.
- Despite the progress since the last assessment of "Status of Marine Protected Areas in the Mediterranean 2008" (Abdulla et al., 2008) the target of 10% protection is still far from being achieved with current levels of protection closer to 4%.
- Spatial overlap analysis of protection measures and key Mediterranean habitats shows marked variations in coverage and protection levels between different measures (also depending on specificity and implementation e.g. gears forbidden and actual compliance).

Difficulties encountered and remedial actions

Generally, major difficulties included impediments in accessing and assessing sources in many uncommon languages, lack of local knowledge on locations and gears and modes of operation, lack of knowledge of some regionally adopted measures. Even derogations to EU measures were hard to find in sufficient detail. Many national measures are described in laws without accompanied maps, proper geographical or geospatial information. Although there were questions at the beginning of the MEDISEH project concerning the usefulness and the subsequent effort to undertake the MPA and FRAs databases, the final presentations of the deliverable through the online GIS viewerhighlighted its potential power as a management tool and gained the support of the project partnership. The combined MPA/FRA task is a worthwhile candidate for future research, for the task outputs to be continued to be updated and enriched in the future.

For the existing MPAs, certain issues/difficulties were identified concerning the information available on different internet sites: including:

- large amount of conflicting information and inconsistencies between and within data sources,
- variations in geographical names,
- marine protected areas are not always strictly marine (i.e. wetlands, lagoons and occasionally terrestrial/false marine),
- not all the sources are available in a common language,
- project participants were not able to cover all the Mediterranean countries to the same detail,
- not all data sources refer to a unique identification number (for MEDISEH we used the WDPA number).

This has made matching records and comparisons often a very difficult task. Project participants have undertaken extensive screening and digitization tasks. The very recent update (end of 2012) by MEDPAN and RAC-SPA and the release of the *mapamed.org* free open-access resource to information and spatial data is a very significant step towards documenting, assessing the status and following the growth in Mediterranean MPAs.

Moreover,

- Limitations on reporting were largely imposed by the amount and the quality of data available. Some of the available shapefiles have been found, or are known to be "faulty" (e.g. MPAs shown on land, correct coastline issues, or problems with the display of some spatial data and borders of some Natura2000 sites, etc.) and some of the "available" shapefiles were only circles around a mid-point and not clearly border-defined areas.
- Disparity of data availability across the Mediterranean mirroring the differing research efforts and the publications in local languages in regional media.
- There were limitations on access and true availability of even published geospatial data e.g. a large amount of time and effort was spent in redigitizing maps or recreating shapefiles.
- The resolution of the Mediterranean Sea predictors is very coarse with the highest resolution for some at the 20 km pixels level. The bathymetry grid is resolved at 800 m pixels derived from a 400 m grid. This resolution is too low to effectively express the variability found in the distribution of seagrass, coralligenous and mäerl. Bathymetric contours less than 50 m depth e.g. 10 or 20 or 35 m depths relevant to numerous fisheries restrictions in Mediterranean states are not resolvable in GIS and therefore these spatial gear restrictions cannot be depicted/shown in GIS form or in the MEDISEH viewer. Therefore, complete high-resolution spatial overlap of fisheries measures and habitats cannot be assessed.
- One of the difficulties identified through the collation of information was related to the actual extent of the Mediterranean Sea (in total or in different regions and zones). There are several "standard" estimates available through different projects and organisations all of which are different. For the purposes of the Task the value of 2513713.4 km2 was used, based on high resolution coastline (GSHSS link). Care must be taken with different area estimates as each will give different values when related to individual habitats or protected areas.
- Finally, acquiring habitat estimates for Posidonia (to update and contrast with those reported by each EU MS under Article 17 for Habitats Directive every 6 years, http://rod.eionet.europa.eu/obligations/269) and to compare with MPA extent per country was far less straightforward than originally anticipated. However Task 1.4. explored the outputs of both Task 1.3 (model output) and Task 1.1. & 1.2 (presence and distribution data) in a standardized way by employing certain assumptions to transform single data points to minimum size polygons.

Gaps in Knowledge and future actions

- There is a lack of accurate shallow bathymetry data for the Mediterranean, which prevents the creation of shallow bathymetric contours that decrease accuracy in the calculation of areas and overlaps. The lack of high resolution bathymetry data combined with the lack of accurate coastline data and limited habitat mapping data compromise research, marine spatial planning exercises and conservation efforts.
- There is no central archiving of Mediterranean habitats data. The EU/DG Mare European Marine Observation and Data Network (EMODNET) should be promoted as an essential tool for data banking with easily "clickable" downloading for datasets.
- In addition, the lack of knowledge on the extent of artisanal and recreational fishing impacts our knowledge on the restrictions applied in many MPAs where it is largely

not specifically area/effort managed. A large number of fisheries measures have a local nature, involving different areas, gears, species and seasons and are still largely unrecorded.

- Generally, the major impediments concern the difficulty in accessing and assessing sources in many different (and uncommon) languages, lack of local knowledge on locations and gears and modes of operation, lack of knowledge of some regionally adopted but nationalized measures. In certain cases even derogations to EU measures were hard to find in sufficient detail.

The Synthesis map (Deliverable 1.4.3) visualized through the online GIS viewerand the spatial queries highlighted its potential power as a management tool and gained the full support of the project partnership. The combined MPA/FRA and Proposed MPAs/FRAs task is a worthwhile candidate to continue research, with information to be added, updated and enriched in the future. Continued availability of these on the viewer and the ability to allow the use and exploration of existing and additional spatial queries will be beneficial to both marine scientific community and marine policy makers.

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