ERA Environment & Resources Authority

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Mapping of marine key habitats and assessing their vulnerability to fishing activities

in Malta

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ACRONYMS AND ABBREVIATIONS

APPENDIX A	Cartographic appendix
CPUE	Catch per Unit of Effort
DCF	EU Data Collection Framework
DGPS	Differential Global Positioning System
DTM	Digital Terrain Model
ERA	Environment and Resources Authority (Malta)
FADs	Fish Aggregating Devices
FMZ	Fisheries Management Zone
FVR	Fishing Vessels Register
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
MBES	Multibeam Echosounder
MFA	Full-time commercial fishing vessels (one of FVR categories)
MFB	Part-time commercial fishing vessels (one of FVR categories)
MFC	Non-commercial, i.e. recreational, fishing vessels (one of FVR categories)
MSFD	Marine Strategy Framework Directive
No.	Number
NTZs	No Take Zones
QC	Quality Control
RfP	Request for Proposal
SAC	Special Area of Conservation
SBAS	Satellite-based augmentation system
SBES	Single Beam Echosounder
SCUBA	Self-Contained Underwater Breathing Apparatus
SDF	Standard Data Form
SPA/BD	Specially Protected Areas and Biological Diversity
SSS	Side Scan Sonar
TVG	Time Varing Gain
UTM	Universal Transverse Mercator

1

1 INTRODUCTION AND SCOPE OF WORK

Golder Associates S.r.l. (hereinafter referred as "Golder") has been appointed by the Specially Protected Areas Regional Activity Centre (hereinafter referred as the "Client" or "SPA/RAC")[1] to carry out a study within the scope of the *MedKeyHabitats II* Project and titled *"Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta"* (hereinafter referred as the "Study") in five sites within the Maltese Archipelago (furtherly detailed in Chapter 2.0).

MedKeyHabitats II is a project commissioned by the SPA/RAC and funded by MAVA Foundation[2] aiming at establishing a map inventory of marine key habitats upon six pilot sites in Mediterranean[3] countries and assessing their sensitivity to fishing activities. *MedKeyHabitats II* is also conceived to contribute to the objectives of the MAVA Foundation for the Mediterranean Sea and enable the related countries to fulfil their obligations with the regional and global environmental Conventions, regarding the conservation of fragile and threatened habitats, the creation and development of an ecologically representative network of marine protected areas, and to the reduction of the fishing impacts on biodiversity (SPA/RAC, 2020b).

The activities carried out by SPA/RAC and its contractors (among which Golder, for this specific study) under the *MedKeyHabitats II* project are:

- To conduct cartographic inventories of marine key habitats of conservation interest and assess their vulnerability to fishing activities to possibly propose zoning and management measures;
- To set up and strengthen monitoring network for marine key habitats;
- To improve the capacity of the involved countries to establish, maintain and update geodatabases on marine key habitats and their sensitivity to fishing activities; and
- To disseminate the project output, findings, and results to national and local stakeholders, and communicate on the value of key habitats and their importance for sustainable fisheries.

MedKeyHabitats II project does not pursue only the objective of mapping marine habitats to establish the distribution of key habitats (i.e. *Posidonia oceanica* meadows, coralligenous assemblages and other bio-concretions, and dark habitats such caves) in the selected pilot sites, but also the objective of providing the concerned authorities with the necessary elements to elaborate measures for the conservation and monitoring of such habitats.

Within the framework of this Study in particular, SPA/RAC is collaborating with the Environment and Resources Authority (ERA) of Malta for implementing the activities identified in common agreement with the Maltese SPA/RAC National Focal Point and planned for the *MedKeyHabitats II* in the Country. These activities intend also to help the development of Marine Protected Areas (MPAs) in Malta.

1. The Institution established in Tunis, Tunisia, since 1985 by the Contracting Parties to the Barcelona Convention and its Protocols in order to assist Mediterranean countries in implementing the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD) (SPA/RAC, 2020a).
2. Funding Institution created in 1994 to support the conservation of places like the Camargue and Doñana and evolved since then into a key funder of global biodiversity conservation. MedKeyHabitats II is funded under strategy for the Mediterranean for the period 2017-2022 (MAVA, 2020).
3. Algeria, Cyprus, Malta, Morocco Tunisia, and Turkey.

1 .1. Scope of work

The Study was conceived to be implemented in 3 Phases, aiming at characterizing the distribution of marine habitats (and key habitats in particular) in given zones (see Chapter 2.0) of the Maltese archipelago and assessing their vulnerability to fishing activities. The abovementioned Phases are the following:

- **Phase I** of bibliographic search;
- **Phase II** of fieldwork; and
- **Phase III** of return of the outputs and reporting.

The aim of Phase I was to collect the available data in order to perform a Gap Analysis to assess the state of knowledge and aimed at better planning the fieldwork of Phase II. A Report of Phase I was prepared submitted in November 2019 to the Client, and presented to ERA and SPA/RAC during a meeting held in the ERA office in Malta, in December 2019.

Field activities (Phase II) were held between November 2019 and September 2020 (the large time interval was caused by the outburst of the Covid-19 health emergency). Primary data were collected during this period in order to develop the return phase (Phase III).

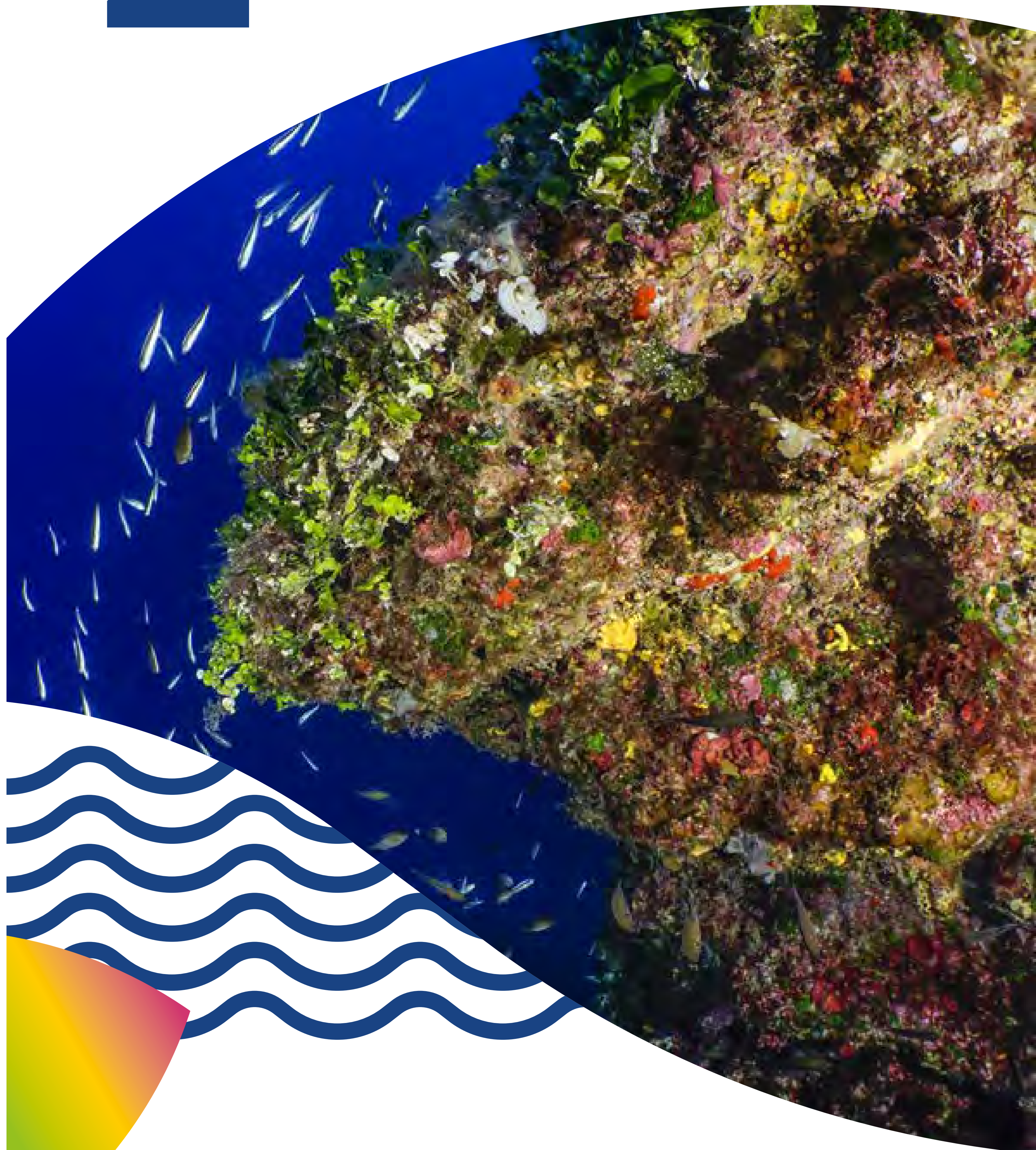
This is the Report of Phase III, aiming at reporting the results and outputs of the field data collection.

1 .2. Key experts involved

The Study was conducted by a team of experienced marine biologists and geophysicists, directed and managed by the following team of key experts:

- **Giovanni Torchia**, as Project Leader, with expertise in habitat mapping and fishery studies;
- **Filippo Luzzu**, as Key Expert #1, with expertise in habitat mapping and monitoring of *Posidonia oceanica* meadows;
- **Fabio Morfea**, as Key Expert #2, with expertise in the application of Side Scan Sonar (SSS), Multibeam (MBES) and Single Beam Echosounder (SBES) in marine habitat mapping;
- **Chedly Raïs**, as Key Expert #3, with expertise in assessing the vulnerability of marine habitats to anthropogenic pressures; and
- **Mark Dimech**, as Key Expert #4, Maltese native speaker, with expertise in fishery studies and management in relation to the littoral and marine environment.
- **Krista Farrugia** supported the team for local logistics and relations with the authorities.

2



2
STUDY AREAS

Five areas were selected by mutual agreement with ERA. These are all listed in the G.N.[4] 682 of 2018 as Special Areas of Conservation (SAC) – Sites of International Importance under the Flora, Fauna and Natural Habitats protection Regulation of 2006 (S.L. 549.44) and the EU Habitat Directive (92/43/EEC).

The 5 SACs considered in this Study are the following (Figure 1):

- MT0000101 – Żona fil-Baħar bejn Rdum Majjiesa u Għar Lapsi, which includes the western and southwestern coast of the island of Malta;
- MT0000102 – Żona fil-Baħar fl-inħawi ta' Għar Lapsi u ta' Filfla, which includes the island of Filfla and the corresponding stretch of coast in the island of Malta;
- MT0000103 – Żona fil-Baħar fl-inħawi tad-Dwejra (Għawdex), which is located in the west coast of the island of Gozo;
- MT0000104 – Żona fil-Baħar bejn Il-Ponta tal-Ħotba u Tal-Fessej (Għawdex), which corresponds to the southern coast of the island of Gozo;
- MT0000105 – Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u Il-Qaliet, which is a wide portion of sea including the whole island of Comino, as well as the northern and eastern sectors of the coast of the island of Gozo and the northern and northeastern sectors of the coast of the island of Malta.

However, as reported in the RfP (Call for tender/SPA-RAC/ MedKeyHabitats II Project n°6/2019_SPA RAC), considering that the meadows of *Posidonia oceanica* are one of the key habitats which the Study is focused on and considering that in the Maltese archipelago they can spread up to -50 m of depth, the study areas are composed by all the sea portions above the 50 m isobath for all the sites, except for MT0000105. In such case, in agreement with the Client, the following bays are investigated (Figure 1):

- Ramla Bay;
- San Blas Bay;
- Dahlet Bay;
- Mellieha Bay;
- Saint Paul Bay; and
- Salini Bay.

4. Government Notice.

Figure 1

The study areas considered in the Study. The map in its original scale is available in APPENDIX A (isobaths data source EMODnet).

3

3 SUMMARY OF PHASE I

As previously described (see 1.1), The Phase I consisted in a desktop study aimed at assessing the state of knowledge in the study areas. A report titled "*Phase I - Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta - Final Report – Report N° 19126259/12415 – November 2019*" was prepared and submitted in November 2019.

This chapter summarises the main outcomes of the report.

3.1. Physical characteristics of the study areas

The Maltese archipelago comprises three main islands (Malta, Gozo, and Comino) and several minor uninhabited islets (e.g., Cominotto, Filfla, St. Paul's Islands, Fungus Rock). The archipelago is very close to the shelf break and flanked by a very steep bathymetry in the south where Malta Graben reaches a depth of around 1650 m. The shelf is characterized by a plateau (deep about 150 m) in its shallower parts. Along the eastern and southern perimeter, the shelf is embraced by a submarine ridge, whose emerged parts correspond to the Maltese Islands. The Hurds bank represent a shallower area of the ridge (at about 50 m of depth) (Drago, Sorgente, & Ribotti, 2003). Some bathymetric surveys were carried out during recent decades, such as two European Regional Development Fund (ERDF) projects conducted respectively in 2006 around Filfla and between 2012 and 2013 with an interferometric system. However, bathymetric digital data seems to be unavailable (Espinal & Hunter, 2014).

In general, the shoreline of the Maltese archipelago is characterized by high cliffs, especially in the southern and south-western portions of Malta (i.e. MT0000101 and MT0000102), eastern portions of Comino and most of Gozo. *Rdum* areas are a peculiarity of the Maltese coast and they are especially found north of the Victoria Lines Fault (i.e. MT0000101) and in eastern Gozo. The northeastern coast of Malta and northern of Gozo (i.e. MT0000105) is characterized by low rocky coastline (Schembri, 1990; Magri, 2006). Only some 2.5% of the Maltese coastline consists of sediments (Borg & Schembri, 2002). Caves and sinkholes are widespread, such as, for example, the well-known Blue Grotto in the southern coast of Malta (MT0000102).

3.2. Marine biodiversity

The cliffs and the low rocky coastline are characterized by benthic assemblages which varies according to the bathymetry. The intertidal rock is dominated by associations with *Lithophyllum byssoides* and associations with *Ceramium ciliatum* and *Ellisolandia elongata* (Borg & Schembri, 2002).

The upper infralittoral is mainly colonized by photophilic algae, showing in some cases associations with *Cystoseira amentacea*, facies with *Mytilus galloprovincialis*, and associations with encrusting algae and sea urchins (e.g. *Centrostephanus longispinus*). The fauna species of this zone include the sponge *Chondrilla nucula*, the anthozoan *Astroides calycularis*, as well as bioconstructor species such as the cushion coral (*Cladocora caespitosa*) and the vermetid *Thylacodes arenarius*. Also reported are Dendropoma/ Neogoniolithon trottoirs (Borg & Schembri, 2002).

A typical Maltese underwater environment in the infralittoral zone consists in the coralligenous formations (UNEP/MAP-RAC/SPA, 2008). This particular habitat has been recorded within shallow caves and shaded vertical rock faces at relatively shallow depths, not exceeding 42 m (Borg, Dimech, & Schembri, 2004; AIS Environmental & Malta Environment and Planning Authority, 2006).This type of habitat is characterized by encrusting algae (including *Peyssonnelia squamaria* recorded in the Filfla area, MT0000102, and *Lithophyllum frondosum* in association with *Zonaria tournefortii* recorded at the mouth of multiples caves in the Dwejra area, MT0000103), both encrusting and erect bryozoans (including *Myriapora truncata, Caberea boryi, Smittina cervicornis* and possibly *Celleporina caminata* and *Schizoporella* spp.), anthozoans (i.e. *Leptosammia pruvoti*), several species of sponges (including *Agelas oroides, Petrosia ficiformis, Faciospongia cavernosa, Buskea dichotoma* and *Chondrosia reniformis*), the ascidian *Halocynthia papillosa* and hydroids of the genus *Eudendrium* (Ballesteros, 2006).

The soft bottoms are mainly sandbanks, muds and shallow mixed sediments and within 50 m depth are colonised by ecologically important seagrass species forming meadows, such as *Posidonia oceanica* and *Cymodocea nodosa*. The MT0000105 area hosts the largest variety of sub-types of Posidonia meadows. In addition, special attention should be paid to the endemic marine gastropod *Steromphala nivosa* (previous name *Gibbula nivosa*), listed in Annexes II and IV of the Habitat Directive (

Council Directive 92/43/EEC), Annex II of the Bern Convention, and Annex II of the SPA/BD Protocol. Even if the main habitat for such species is reported to be the leaves of the seagrass *P. oceanica*, it has also been reported to inhabit under stones in shallow water (Evans & Schembri, 2014). Also, in shallow sublittoral sands, the noble pen shell *Pinna nobilis* (Annex IV of the Habitats Directive and Annex II of the SPA/BD Protocol), and the echinoderm *Paracentrotus lividus* (Annex III of Bern Convention and Annex III of the SPA/BD Protocol) are reported to occur (MSFD, 2012).

Another habitat of conservation interest reported for the study areas is represented by the associations with rhodoliths, recorded in several sites off southeastern Malta at depths of 50 m to 100 m (LIFE BaĦAR, 2018). The associations with rhodoliths are formed by the coralline algae *Lithothamnium coralloides* and *Phymatolithon calcareum* and are listed, as habitat, in the Annex V of the Habitats Directive.

Regarding the ichthyofauna, species of conservation interest are reported to occur in the study areas. Such species are the common stingray (*Dasyatis pastinaca*; MT0000105), the giant devil ray (*Mobula mobular*; MT0000105), the common eagle ray (*Myliobatis aquila*; MT0000101), the dusky grouper (*Epinephelus marginatus*; MT0000101, MT0000104, and MT0000105) and the green wrasse (*Labrus viridis*; MT0000104). However, around Filfla (MT0000102), Borg et al. (1997) reported an impoverishment of the demersal fish fauna probably due to the illegal fishing practiced in this area (explosive and spearfishing using SCUBA).

3.3. Touristic and fishing activities

The main threats to the marine environment are linked to the human activities along the coast, mainly fishing and tourism.

With over a million tourists every year, the Maltese islands experience one of the highest tourist arrival densities in the world (Deidun, 2010), mostly for SCUBA diving or nautical tourism. The total inbound visitors for August 2019 were estimated at 338,758, showing an increase of 6.7% when compared to the corresponding month in 2018 (National Statistics Office [NSO], 2019). Another popular activity is the recreational fishery, which is not monitored as commercial fisheries are (Font and Lloret, 2010).

Regarding the fishery sector, this is mainly artisanal and fairly typical of the fisheries found in many Mediterranean countries (Dimech at al., 2009). Fishing is mostly conducted within the Maltese fisheries management zone, which is a 25 nautical mile Fisheries Management Zone (FMZ), in which fishing effort and capacity are restricted by size and engine power. In particular, only vessels smaller than 12 m are allowed to conduct fishing in the zone since these are considered as boats doing small scale coastal fishing and which therefore are expected to have minimal impacts on the marine environment. The number of vessels that can fish in this zone has been set by the Treaty of Accession and is reflected in Council Regulation (EC) 813/2004 and Council Regulation (EC) 1967/2006. Malta carries out an annual National Fisheries Data Collection Programme according to EC 2016/1701, and has been collecting such data on a regular basis since 2006. The catch data include data on commercial landings derived from exhaustive data reported in logbooks (for the over 10 metre fleet) or by sampling landings (for the under 10 metre fleet). For the small-scale fleet, face to face interviews are conducted with the vessel owners every fortnight. Information on catches, effort in fishing days, by type of gear, fishing areas and activity are obtained. This methodology of obtaining data overcomes the difficulty of acquiring data from the fish market and other official sources for the small scale fishery which can show some errors due to various reasons, such as the underestimation in information on landings declared in the invoices for fiscal reasons and erroneous names attributed to fish species which are difficult to identify.

The most important fisheries for the study areas are those for demersal species, the dolphinfish (*Coryphaena hippurus*) and coastal pelagic species. Large pelagic, including bluefin tuna (*Thynnus thunnus*) and swordfish (*Xiphias gladius*) are usually fished in offshore waters outside of the study areas.

Fishing for demersal species is undertaken with different types of gears: gillnets and entangling nets, bottom trawlers, bottom longlines and traps (Dimech et al., 2009). The dolphinfish, or "*lampuka*" in Maltese, is captured using "Fish Aggregating Devices" (FADs) and represent one of the most important species for the economy of the Maltese fishing industry (Gatt et al., 2015). Coastal pelagic species such as Bogue and Mackerel are the main targeted species using "lampara" fishing.

Regarding the aquaculture in Malta, it is marine-based. Inside the study areas, within the SAC MT0000105 there are 4 aquaculture farms, and 1 or 2 are within the SAC but outside the study area. Inside Melieħa Bay, along the northern coast, there is an intensive aquaculture farm with the gilt-head bream (*Sparus aurata*), the European bass (*Dicentrarchus labrax*), and the meagre (*Argyrosomus regius*) in floating cages, and a smaller one, for which no information of the species bred was retrieved. In Xemxija Bay (Saint Paul Bay) there are two intensive aquaculture farms with gilt-head bream, European bass, and meagre in floating cages. About 1.5 km offshore the Bay, a bluefin tuna farm was also registered but, according to the most recent satellite photo, the farm seems to have been relocated. However, a bluefin tuna farm is still present outside the study areas but inside this SAC, about 0.5 km south of Comino (Malta Geoportal, 2016).

For further available details about the 5 study areas please refer to the report of Phase I.

4

4 ADOPTED METHODOLOGY FOR PHASE II

4.1. Main adopted parameters

All survey operations were governed by a navigation software, such as *PDS2000* for the geophysical campaign (see 4.2) and *QPS QINCy* for the biological campaign (see 4.3), that collected sensor output (position, altitude, timing, and bathymetric data), synchronising and georeferencing all data, and computing the position of the towed instruments (*towfish* for Side Scan Sonar and towed camera) to output for the acquisition programmes. A schematic representation of navigation system is shown in Figure 2.

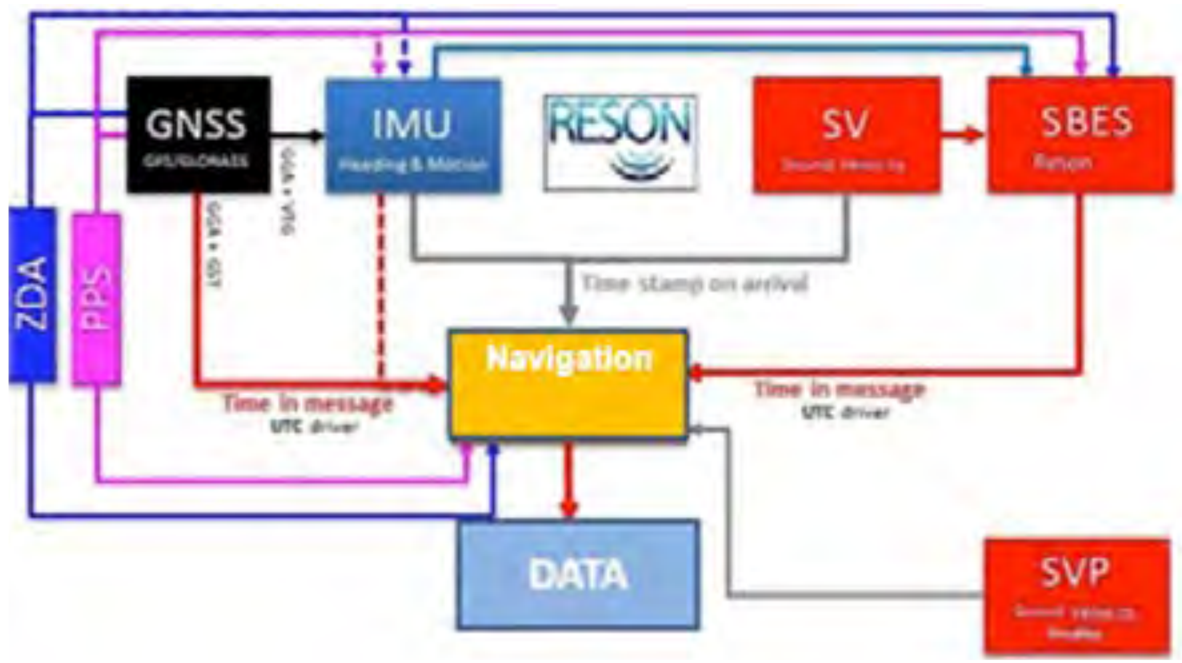


Figure 2

Navigation system layout and interfacing.

The navigation programme included line design, route and chart visualization and QC check during data acquisition, plus helmsman view with chart and graphic inline steering for boat pilot.

Positioning of the ship, and hence georeferencing of data, were obtained by Global Navigation Satellite System (GNSS) generically known as GPS, operating with differential correction (DGPS). The positioning of the vessel during the surveys was provided by the Differential Global Positioning System (DGPS). The Hemisphere A101 (antenna) and R330 (receiver) systems were used to receive the differential correction based on the EGNOS[5] satellite-based augmentation system (SBAS), in order to achieve a position accuracy of less than 1 m.

All the geographic data recorded on the field during the two surveys were georeferenced in the WGS84 worldwide coordinate system with system projection UTM.

5. The EGNOS is a system developed by the European Space Agency to improve the reliability and the accuracy of the positioning data.

Geographic coordinates, derived from GPS, were converted in plane coordinates using UTM (*Universal Transverse Mercator*) projection formulas inside the navigation software, zone 33 North. Such geodetical parameters are summarised in Table 1.

Table 1
Geodetic and cartographic parameters.

Geodetic and cartographic parameters		
Datum	WGS84	
Ellipsoid:	WGS84 a = 6 378 137 m c = 6 356 752,3142 m f = 1/298,257223563	Major semi axis: Minor semi axis: Flattening:
Projection:	UTM fuse 33 (Universal Transverse Mercator)	
Longitude origin:	00"'15°00	
False East:	000 500	
False North:	0	
Scale factor	0.9996	

For each survey, the DGPS Antenna was installed on an open space on the vessel and the position of all the equipment was reported as relative location (offset) within the navigation software system by making a comparison with the DGPS. For calibration purposes, a daily DGPS horizontal control was performed by checking the position of the survey vessel moored alongside the jetty before starting the operations.

4.2. Geophysical campaign: spatial distribution of habitats

General overview	
DATE(S):	
First mission	From the 28th November to the 7th December 2019
Second mission	9th, 10th, 11th, 12th July 2020
PORT OF DEPARTURE:	
First mission	Ta' Xbiex in Msida and Paradise Bay
Second mission	Marsa
TEAM:	
Planification and data management	Giovanni Torchia (Project Leader), Fabio Morfea (Key Expert #2)
Fieldwork	Giuseppe Bisconti, Giovanni Pipitone
VESSEL(S):	SIMO, owned by DiveSystem Diving Centre
MAIN INSTRUMENTS:	Side Scan Sonar Klein 3900, Multbeam Echosounder Reson 8125, Single beam Echosounder Reson 205, Hemisphere A101 Smart Antenna DGPS, Gyrocompass MRU TSS Mahrs, SVP Valeport Swift, PDS2000 navigation software.

The geophysical campaign had the objective of mapping the spatial distribution of marine habitats in the study areas.

To achieve this, three typologies of surveys have been conducted:

- Side Scan Sonar (SSS) survey;
- Bathymetric survey with Single Beam Echosounder (SBES); and
- Morpho-bathymetric survey with Multibeam Echosounder (MBES).

The main survey activities were carried with the use the SSS and SBES, both allowing for an extensive investigation of the study areas, whereas the MBES, requesting a minimal navigation speed, was focused on the in-deep investigation of Filfla island.

The positioning of the vessel and all involved equipment was assured by a *Hemisphere* DGPS (*A101 Smart Antenna*). All the positioning data were acquired by the *PDS2000* navigation software, which also recorded the relative position of the vessel and all the involved equipment (offset).

The aforementioned techniques are described here below.

4.2.1. Side Scan Sonar (SSS) survey and bathymetric survey with Single Beam Echosounder (SBES)

The SSS survey was conducted using the Side Scan Sonar *Klein 3900* (Figure 3), with a lateral range of 100 m for a full coverage. This configuration allowed to detect the main seabed features to mid-scale: seabed forms, textures, specific habitats (e.g. seagrass meadows) and any presence of both natural morphologies and non-natural objects (e.g. wrecks and small hard substrates on the seafloor, such as rocky outcrops).

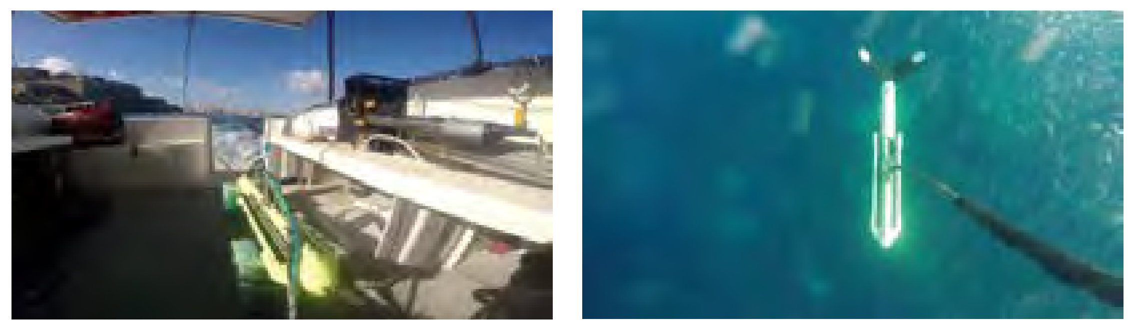


Figure 3
The Side Scan Sonar Klein 3900 towfish on board and towed underwater.

Concurrently with the SSS acquisition, bathymetric data were collected using the Single Beam Echosounder (SBES) *Reson 205*. The acquired data were recorded with the navigation software *PDS2000*.

The adjacent routes were planned to assure a full coverage with an overlap of more than 30% between contiguous lines (e.g. Figure 4).

The acquisition lines in the study areas are shown in the figures in APPENDIX A. An example of map is provided in Figure 4.

A total of 22.12 km^2 were covered.

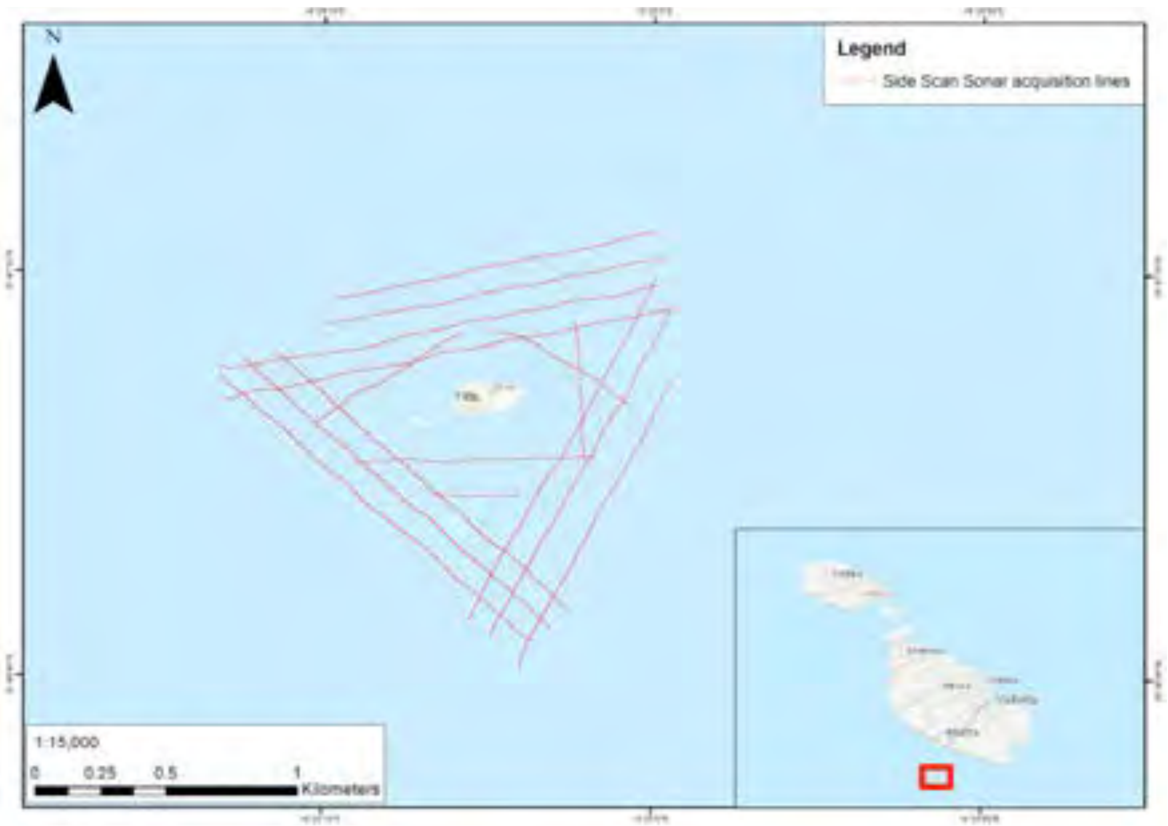


Figure 4

Side Scan Sonar acquisition lines in Filfla. The map in its original scale is available in APPENDIX A.

4.2.2. Morpho-bathymetric survey with Multibeam Echosounder (MBES)

A morpho-bathymetric survey was carried out using the high-resolution Multibeam Echosounder (MBES) *Reson 8125* around Filfla island, in order to investigate what appeared to be one of the most morphologically complex sectors of the study areas.

The acquisition lines were spaced variably according to the water depth, still ensuring an overlap of about 20-30% (Figure 5).

The acquisition lines for the morpho-bathymetric data are shown in the figures below. A total of 1.70 km^2 were covered.

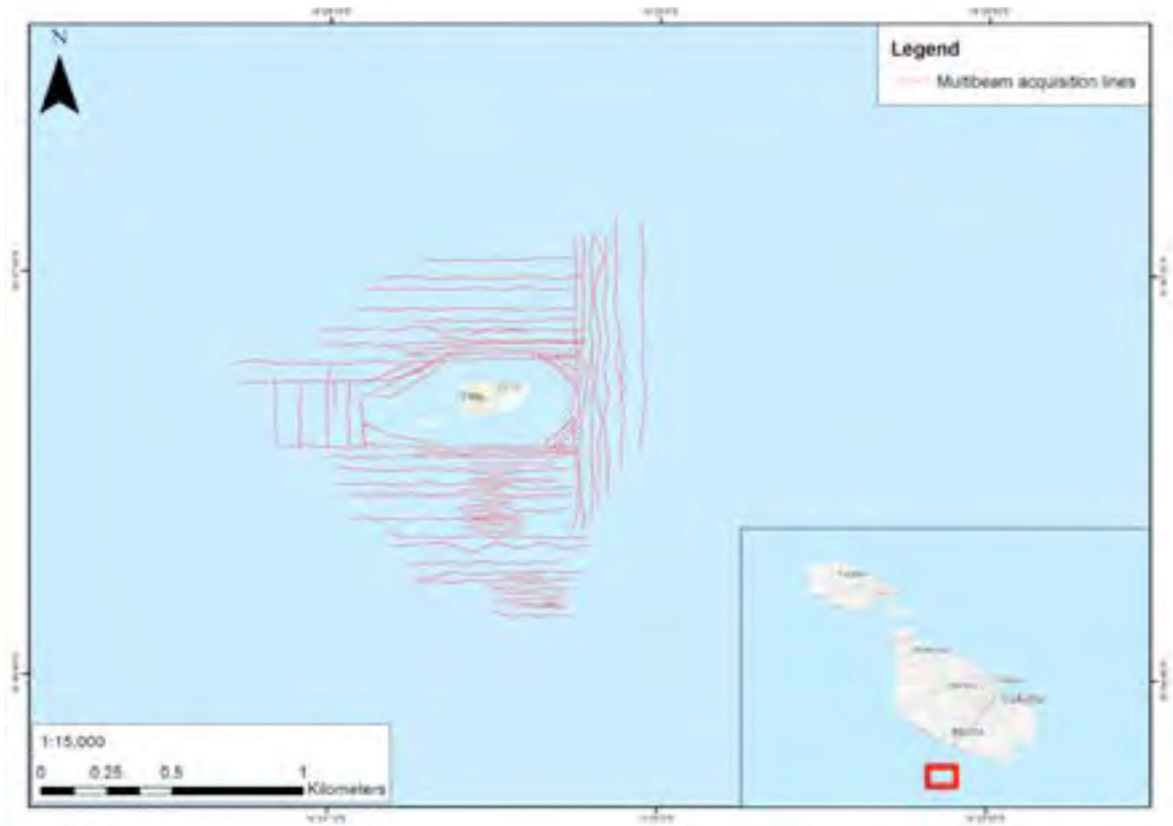


Figure 5

Multibeam acquisition lines. The map in its original scale is available in APPENDIX A.

4.2.3. Data processing and analysis

The collected data were preliminarily elaborated in order to plan the following biological survey. The final data processing was then carried out according to the standard methods and workflows reported in the bibliography for each technique and adopted software.

The SSS data elaboration was carried out using SeaView software to process and export the mosaic into GeoTIFF files.

In practice the acquired sonar data were elaborated to obtain some acoustic images of the sea bottom, according to their effective geometry. The main phases of the elaboration procedure were the following (Figure 6):

- validate and smooth the navigation of all survey lines;
- check the bottom track;
- set the adequate gain (e.g. the Time Varing Gain, TVG), equalization and image enhancement;
- generate the georeferenced images;
- mosaic the adjacent images in rasters.

At the end of the process, a complete georeferenced mosaic (geotiff file) has been produced, with a pixel resolution of 5 cm.

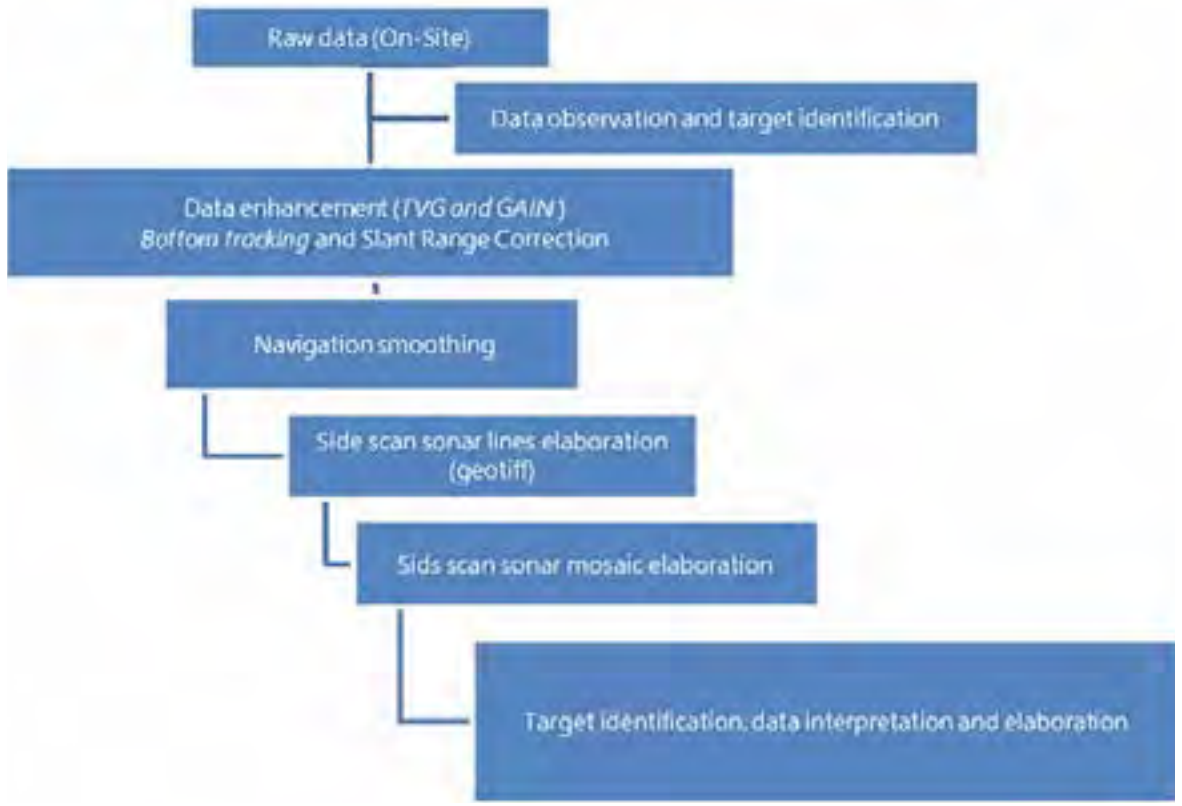


Figure 6
The general workflow for SSS data elaboration.

The SSS photomosaic was uploaded in the GIS project to support the cartographic interpretation of the main geomorphological and biological features of the sea bottom in the two study areas.

For what concerns the procedures for the **bathymetric and morpho-bathymetric data elaboration**, starting from the raw data collected on-site, the navigation was validated and the depth data were graphically processed to control and manually eliminate any presence of erroneous measures (e.g. spikes or multiple echoes). The processed data were then exported as x,y,z files and gridded in *PDS2000* software to calculate a Digital Terrain Model (DTM). The DTM generated was imported in the GIS software to extrapolate contour and support all the remaining analysis and derived considerations, as well as fundamental layers in all the produced maps.

4.3. Biological campaign: habitat characterisation

General overview	
DATE(S):	7th, 8th,9th September 2020
PORT OF DEPARTURE:	Marfa jetty
TEAM:	
Planification and data management	Giovanni Torchia (Project Leader), Filippo Luzzu (Key Expert #1)
Fieldwork	Giovanni Torchia, Paolo Berutti, Valentina Losi, Paolo Burzio, Egidio Trainito
The fieldwork was carried out with the support of 3 diving operators from Orange Shark Diving Centre.	
VESSEL(S):	
Underwater towed camera and grab	SIMO, owned by DiveSystem Diving Centre
SCUBA dives	PAOLA, owned by Orange Shark Diving Centre
MAIN EQUIPMENT:	
Instrument(s)	Hemisphere A101 Smart Antenna DGPS, Gyrocompass MRU TSS Mahrs, QINSy navigation software.
Material(s)	SCUBA equipment, self-made underwater towed camera, GoPro Hero3+ Black, Sony RX100 digital camera, Sony A6000 Digital Camera in Sea&Sea housing, laser pointers, van Veen grab (17 l), plastic bottles, pure alcohol.

The surveys aiming at characterising habitats had the objective of ground-truthing the preliminary maps prepared after the geophysical campaigns (see 4.2), aiming at assessing the spatial distribution of marine habitats.

To achieve this, three typologies of survey have been conducted:

- Visual observations with underwater towed camera;
- Sediment samplings with van Veen grab (17 l); and
- Visual observations and photographic samplings taken during SCUBA dives.

The main ground-truthing activities were carried with the use of a towed camera, allowing for an extensive investigation of the study areas, whereas SCUBA dives were mainly used for those places resulting inaccessible with the towed camera and/or to investigate vertical rocky faces.

Samplings with the grab were intended to act as a discrimination tool to investigate the differences among the soft bottom typologies present in the study areas.

A Standard Data Form (SDF) adopted by the Contracting Parties to the Barcelona Convention for National Inventories of Natural Sites of Conservation Interest was filled in for the whole investigated area.

4.3.1. Visual observations with underwater towed camera

As already stated, an underwater boat-towed camera was used to perform most of the ground-truth along transects previously established based on the SSS results.

A self-constructed metallic sled was used to weigh down a real-time camera so that it could sink to an adequate depth to record the environment (Figure 7). A GoPro Hero 3+ Black Edition camera was mounted on the sled to record high-definition videos to perform post-analyses, whereas the real-time camera was mostly used as tool to verify the proper framing (as well as back-up in case of GoPro malfunctioning).

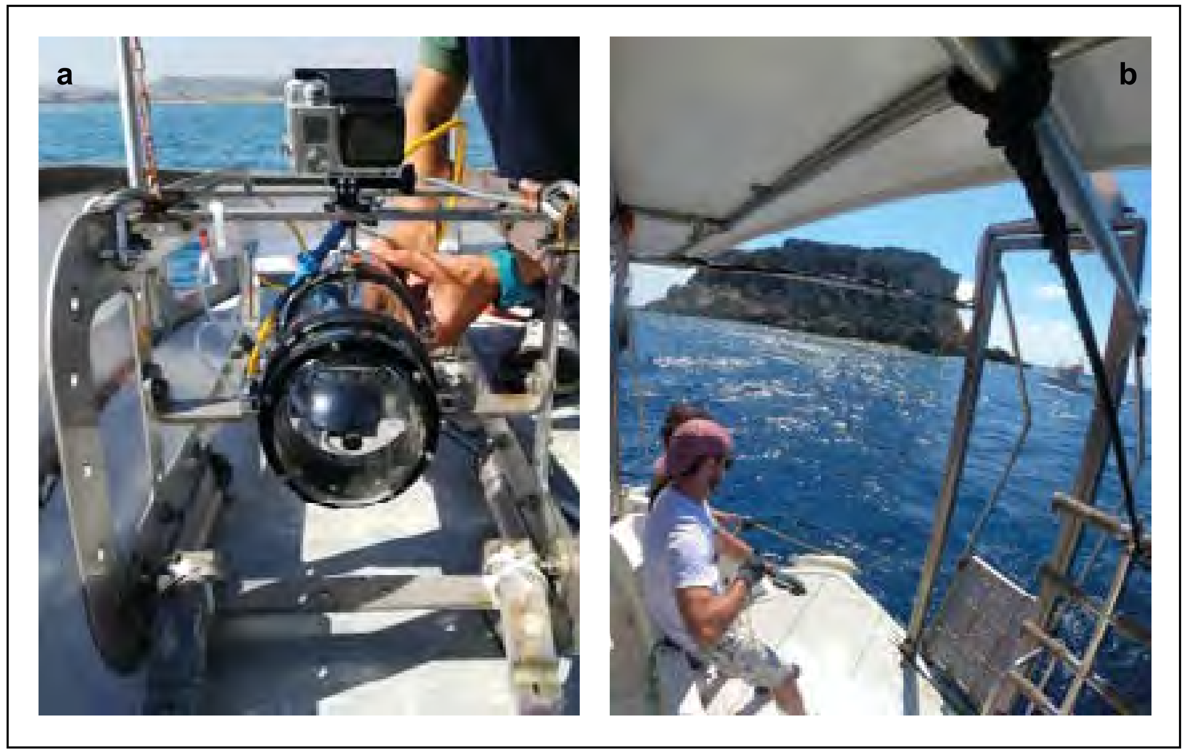


Figure 7
The self-made system of underwater towed camera (sled, camera, towing rope, and umbilical) (a) and towing operations on board (b).

18 towed camera transects were covered in total within all the study areas. The location of such transects are shown in APPENDIX A. An example of map is provided in Figure 8.

Figure 8
Underwater towed camera transects in Filfla. The map in its original scale is available in APPENDIX A.

The correct positioning of the transect was ensured by the positioning and navigation system, to which the camera recording system was linked in order to have the correct coordinates of everything filmed. Also, the clocks of the GoPro and the real-time camera were synchronised to have the correct coordinates in the high-definition videos too (Figure 9).

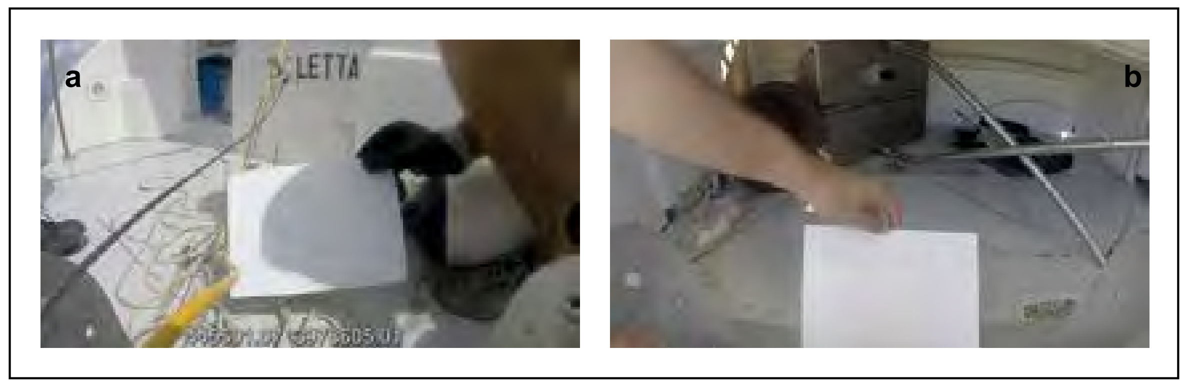


Figure 9
The marking system to (a) distinguish among the videos of the different transects and (b) synchronise the clocks[6] of the cameras.

All the real-time videos were observed *in-situ* to take preliminary notes on the modifications

6. "*Orologio*" is the Italian translation of "clock".

to bring to maps prepared after the geophysical campaigns (where needed), while high-definitions GoPro videos were subsequently analysed to report on GIS all modifications needed.

The position of the towed camera was recorded as a georeferenced shapefile by a GPS receiver with layback corrections. All videos were recorded and associated to the investigated transects. All the videos of the investigated transects are available in DIGITAL ANNEX.

4.3.2. Sediment samplings with van Veen grab

In order to classify the soft bottom biocenoses present in the study areas, a total of 5 sediment samples with van Veen grab (17 l) were planned in order to investigate the different soft bottom typologies, based on the SSS results (e.g. detritic, sandy, muddy) (Figure 10).

Figure 10

Planned sediment sampling locations.

Once on field, however, the seafloor appeared cemented and hard in most sampling stations, making the grab fail. In such situations, the proper lowering of the van Veen grab was checked by a diver to understand whether the failure was caused by the grab itself or by the substrate typology. The bottom was also checked every time the grab failed to see whether it would be possible to collect some samples.

Only stations B3 and B4, as shown in Figure 11, were successful in the sediment sampling with grab. For this reason, an additional sediment sample was collected during the dive to initiate the monitoring network for the coralligenous assemblage (see 4.4.2). Such sampling was directly performed by a SCUBA diving operator without the use of the grab. The location of the successful sediment samplings is shown in the map in Figure 11. The correct positioning of the sampling stations was ensured by the positioning and navigation system also used for the underwater towed camera (see 4.3.1).

Figure 11

Successful sediment sampling locations. The map in its original scale is available in APPENDIX A.

Sample from B3, whose sediment was finer, was rinsed with freshwater, sieved with a 1 mm meshed sieve and fixed in a plastic bottle with pure alcohol, whereas samples from B4 and B6, being more detrital (i.e. whose most grains larger than 1 mm), were directly fixed in pure alcohol for subsequent laboratory analyses.

In laboratory, samples were re-rinsed and sorted using a stereoscope (Figure 12) and identified by Pelagosphera Scarl., a research unit of the Laboratory of Zoology and Marine Biology of the University of Turin, Italy, to the lowest taxonomical level (i.e. species) as practicable. The species identification was performed using the most relevant taxonomic guides available in the scientific literature. Special attention was paid for the indicator species of biocenoses (Pérès and Picard, 1964; Meinesz, *et al*., 1983; Tunesi, *et al*., 2002; Bellan-Santini, *et al*., 2002).

Figure 12

Sorting process of sediment samples.

4.3.3. Visual observations and photographic samplings taken during SCUBA dives

Visual inspections of the marine environment in the study areas were also made by means of SCUBA dives. Dives were planned based on the SSS results to investigate potential areas of hard bottom (coralligenous assemblages in particular) and/or areas potentially resulting inaccessible with the underwater towed camera (Figure 13).

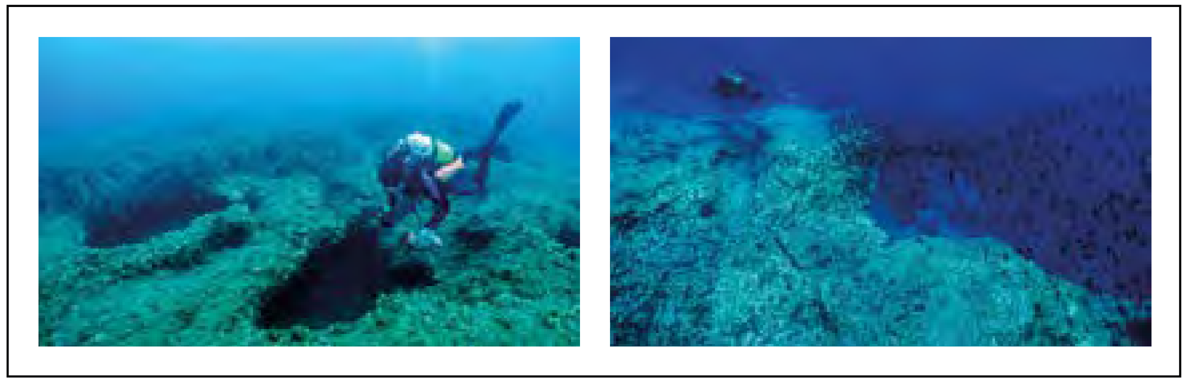


Figure 13

SCUBA diving inspections of hard bottom.

A total of 9 dives were performed (Figure 14), mainly focusing on an in-deep investigation of the hard-bottom communities.

Figure 14

SCUBA dive locations. The map in its original scale is available in APPENDIX A.

Each location was visually inspected by two or more SCUBA diving operators to ground-truth the preliminary interpretation of the SSS. During the underwater inspections, the operators collected the data about species distribution and the bathymetry in correspondence of the observations.

In addition, a photographic sampling was conducted by the underwater photographer and filmmaker Egidio Trainito in each location, namely:

- High resolution photos of the most representative habitats and underwater seascapes, to qualitatively describe the study areas; and
- High resolution laser-calibrated photos per location of the hard substrates, to assess species presence and abundance (i.e. coverage), to classify habitats and biocenoses.

A total of 184 qualitative photos and 83 laser-calibrated photos were taken. Among those latter, 10 photos per dive location were randomly chosen for image analysis, whereas the qualitative photos where used to ground-truth the Side Scan Sonar photomosaics (Pititto et al., 2014).

Every photo was carefully post-analysed by Egidio Trainito and Golder specialists in order to identify the captured species to the lowest taxonomical level (i.e. species) as practicable. The species identification was performed using the most relevant taxonomic guides available in the scientific literature. Special attention was paid for the indicator species of biocenoses, as well as protected species[7]. In addition, the photographed surface area was calculated using the laser pointers for the calibration and the covering area for each *taxon* was estimated.

4.3.4. Habitat mapping

The habitat distribution maps were drawn up integrating in ArcGIS all the available geographical data (i.e. SSS data, bathymetry, video and photo information) and the georeferenced notes taken during the field missions. When possible (i.e. presence of indicator species and geophysical parameters identified with certainty), the biocenosis were indicated. In case of uncertainty, the habitat was reported by its physiognomic characteristics.

The thematic maps were prepared in compliance with the most relevant scientific literature (Pérès and Picard, 1964; Meinesz *et al*., 1983; Bellan-Santini *et al*., 2002, Bianchi *et al*., 2003). The symbols and conventions adopted comply with the accepted standard reported in Meinesz *et al*. (1983) and with the colour standard proposed by Tunesi *et al*. (2002).

4.4. Biological campaign: initiation of monitoring networks

In order to investigate the future evolution of the marine key habitats of the study areas (i.e. *Posidonia oceanica* meadows and coralligenous biocenoses), a monitoring network was initiated on one Posidonia meadow and one coralligenous assemblage.

4.4.1. Monitoring network on *Posidonia oceanica* in Mellieha Bay

General overview	
DATE(S):	10th September 2020
PORT OF DEPARTURE:	Marfa jetty
TEAM:	
Planification and data management	Giovanni Torchia (Project Leader), Filippo Luzzu (Key Expert #1)
Fieldwork	Giovanni Torchia, Paolo Berutti, Valentina Losi, Paolo Burzio
The fieldwork was carried out with the support of 2 diving operators from Orange Shark Diving Centre.	
VESSEL(S):	SIMO, owned by DiveSystem Diving Centre
MAIN EQUIPMENT:	
Instrument(s)	Hemisphere A101 Smart Antenna DGPS, Gyrocompass MRU TSS Mahrs, QINSy navigation software.
Material(s)	SCUBA equipment, GoPro Hero3+ Black, Sony RX100 digital camera, cement ballasts (balises), plastic bottles, pure alcohol.

7. Species listed in the Annexes of the SPA/BD Protocol and in other Conventions (including CITES) or in EU Directives.

The monitoring network of one *Posidonia oceanica* meadow, in correspondence of its lower limit, was set-up in Mellieha Bay, following the methodology reported by Pergent (2007), considering the deployment of 11 markers, also known as *balises* (Figure 15). Such methodology establishes that, in addition to other *in situ* parameters, multiple photos need to be taken, namely:

- balise to balise; and
- photos taken from above.

These latter, in particular, are meant to reconstruct the shape of lower limit of the posidonia meadow by using the stitching technique. Such reconstruction is reported in **APPENDIX I**.

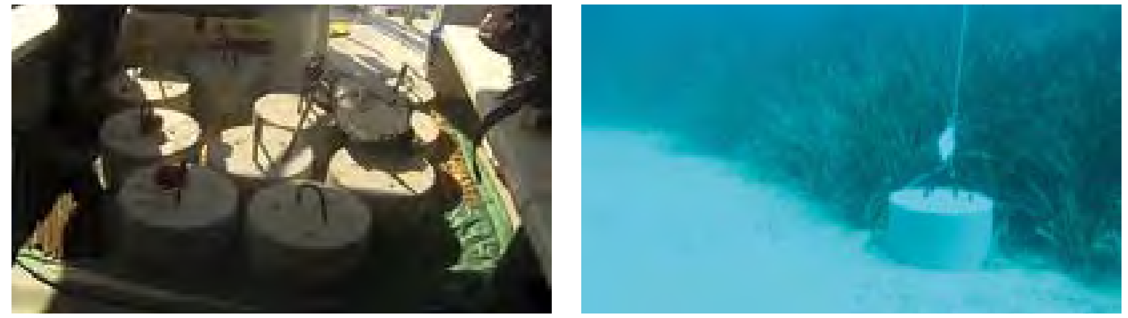


Figure 15

The 11 markers (balises) specifically constructed for this Study on board and deployed.

A first identification of the lower limit of the meadows (where present within the areas to be investigated[8]) was carried out using the outputs coming from the geophysical campaign (see 5.1.1), such as the SSS photomosaics. Then, the lower limit was verified during the ground-truth activities (carried out during the biological campaign) and the meadow to be monitored was identified based on the observations performed through the towed camera and the observations of the coast (e.g. degree of anthropisation).

Based on the aforementioned parameters, a *P. oceanica* meadow to be monitored was chosen in Mellieha Bay because of its sharp lower limit, the high density of buildings on the coast and boats moored in the Bay, clearly indicating a high human activity, and the low depth of the limits itself (about 18-19 m) allowing for an easy periodic monitoring in the future.

The finer position of the lower limit to be monitored was selected using the videos taken with the towed camera.

Before the deployment of the *balises*, the lower limit was furtherly checked by two SCUBA diving operators to verify the feasibility (e.g. presence of ballasts for mooring or other objects indicating the normal use of the area by boats possibly anchoring).

Once checked the lower limit, the *balises* were deployed by two diving operators at the coordinates 35°58.4921'N 14° 21.9182'E (*balise* no. 6; Figure 16) using a SCUBA lifting bag, such

8. In multiple situations, the lower limit of the meadow was beyond the border of the study area as indicated by the RfP (Call for tender/SPA-RAC/ MedKeyHabitats II Project n°6/2019_SPA RAC).

as prescribed by Pergent (2007). Then, one operator (accompanied by a buddy diver) took the photos requested by the protocol (i.e. *balise* to *balise* and above each of them) and, later, all *in-situ* data requested were gathered by two operators. Eventually, two orthotropic rhizomes were collected about 2 meters behind each *balise* and a sample of sediment was collected in front of *balise* no. 6 (Figure 17).

Figure 16

Posidonia oceanica **monitoring network. The map in its original scale is available in APPENDIX A.**

Figure 17

Data gathering at each balise according to Pergent (2007).

The samples collected were stored in pure alcohol and transferred to the lab for the subsequent analyses (i.e. granulometry and organic matter content for the sediment and lepidochronology and phenology for the Posidonia leaf fascicles). Analysis on Posidonia were conducted by Pelagosphera Scarl., a research unit of the Laboratory of Zoology and Marine Biology of the University of Turin, Italy, whereas the sediment was analysed at Chelab laboratory of Volpiano, Italy.

4.4.2. Monitoring network on coralligenous assemblages at Filfla

General overview	
DATE(S):	9th September 2020
PORT OF DEPARTURE:	Marfa jetty
TEAM:	
Planification and data management	Giovanni Torchia (Project Leader), Filippo Luzzu (Key Expert #1)
Fieldwork	Giovanni Torchia, Egidio Trainito
The fieldwork was carried out with the support of 2 diving operators from Orange Shark Diving Centre.	
VESSEL(S):	PAOLA, owned by Orange Shark Diving Centre
MAIN EQUIPMENT:	
Instrument(s)	Hemisphere A101 Smart Antenna DGPS, Gyrocompass MRU TSS Mahrs, QINSy navigation software.
Material(s)	SCUBA equipment, GoPro Hero3+ Black, Sony RX100 digital camera, Sony A6000Digital Camera in Sea&Sea housing, laser pointers, metal markers, two-component underwater filler, underwater temperature logger (HOBO U22 Pro v2).

On September 9, 2020, the monitoring network of the coralligenous was set-up by a team of 3 SCUBA divers in Stork Rock, about 600 m south of Filfla. Stork Rock is a rocky mass whose top is located at about 8-9 m of depth and the base at about 42-45 m depth. Two 3D images shoving the submarine morphology around Filfla and the position of Stork Rock are available in Figure 19. The monitoring station was positioned under an easily recognizable arch in the western part of Stork Rock (Figure 21) at a depth between 26 m and 21 m depth. The monitoring station is located at the following coordinates: 35°46.823' N, 14°24.654' E (Figure 18).

Figure 18
Coralligenous monitoring network. The map in its original scale is available in APPENDIX A.

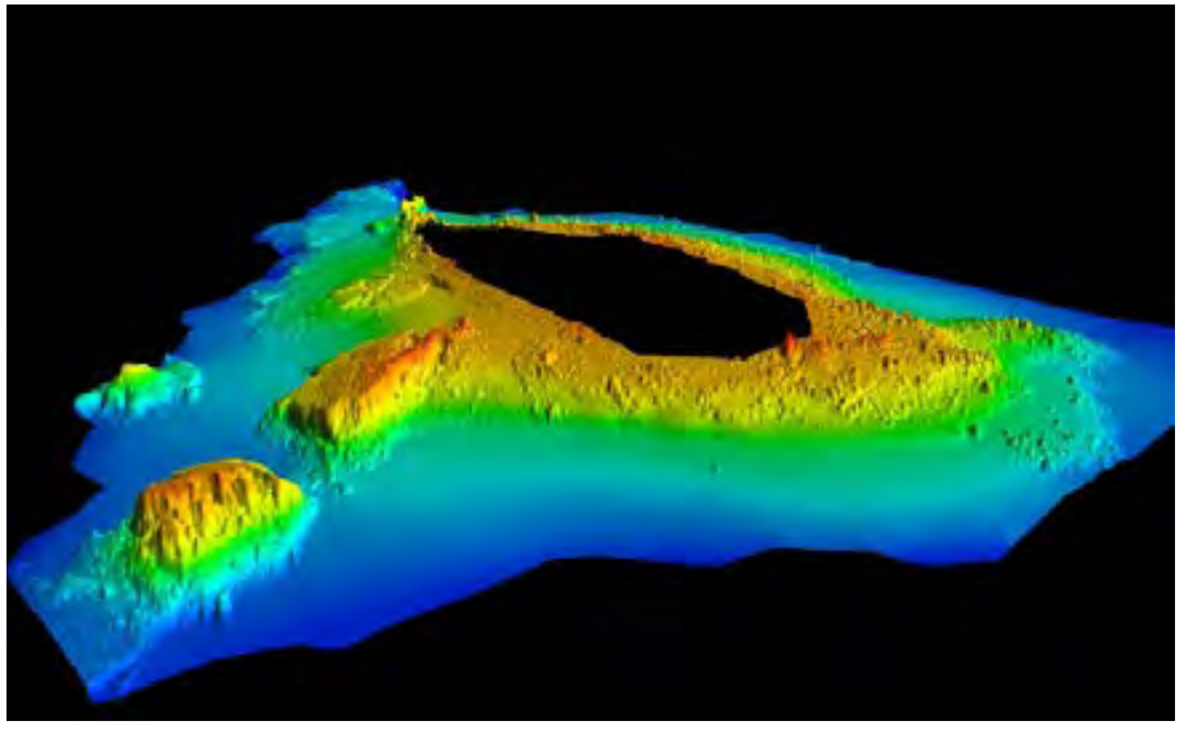


Figure 19
Submarine morphology around Filfla. Stork Rock is indicated by the red arrow. The 3D image was produced by the Multibeam survey carried out in the scope of this Study.

Figure 20
Stork Rock (Filfla). One of the SCUBA operators looking for the appropriate location for the set up of the coralligenous monitoring network.

Figure 21
Stork Rock (Filfla) - The submarine arch seen from above, where the coralligenous network was set-up. The float attached to the upper permanent mark is visible (red arrow).

The methodology proposed by Garrabou, et al. (2014) was applied: two permanent marks were placed in the area measuring 20 m x 5 m (100 m2), the two-component underwater filler Subcoat XT was used to fix the marks on the substrate. Two white floats were attached to each of the two marks in order to make easier to identify and to find the monitoring area for future checks (Figure 21).

A photosampling of three series of 10 contiguous photos was carried out. Two laser pointers, distanced 25 cm each other, were used to identify the size of the area in each photo. Each photo resulted covering an area of about 50 cm x 75 cm. Three visual censuses along transects measuring 10 m x 1 m were conducted. All the environmental and biological parameters defined by the methodology (i.e. erect layers estimation, macro-bioeroders abundance, fishing pressure, mucilaginous aggregates) were recorded during the visual censuses.

A temperature logger was activated and deployed in correspondence of the mark located at 21 m depth. The logger was set up in order to record the temperature every two hours. According the technical features of the tool, the battery and memory space allow for recording for a period of over 9 years. A spare logger, as well as the software and an USB interface cable as communication system for downloading the data was provided to ERA[9].

Images below show some phases of the setting up of the coralligenous monitoring network.

Figure 22

Set up of the monitoring network on coralligenous: measurement of the area with a graduated rule.

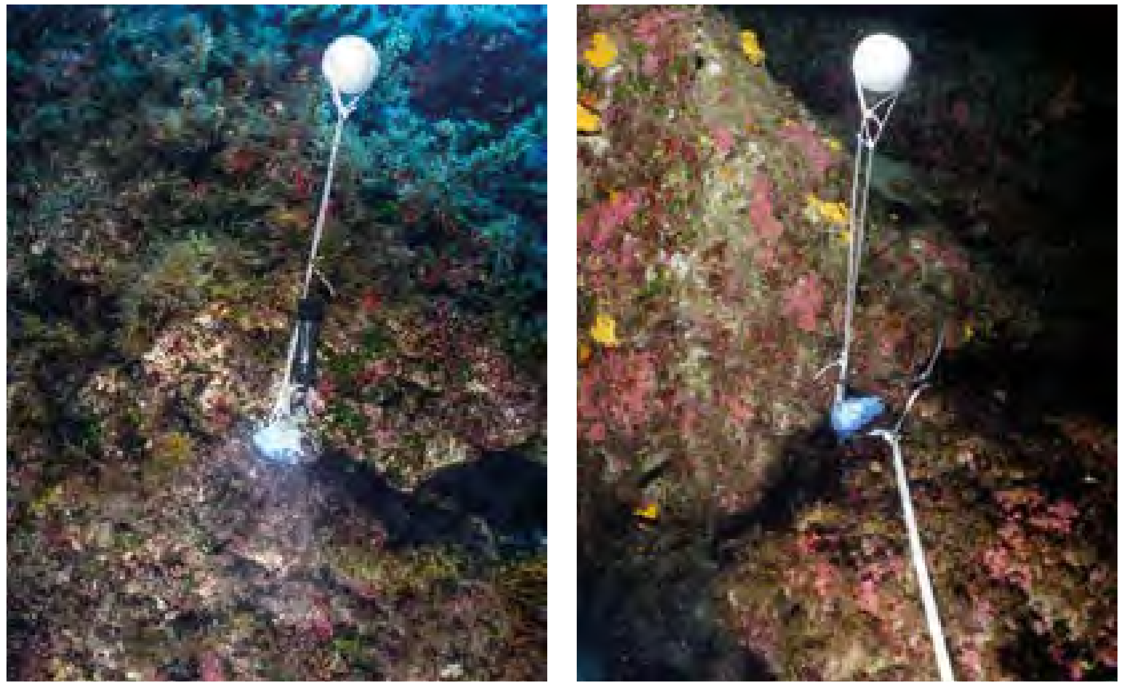


Figure 23

The two permanent marks positioned to define the boundaries of the monitoring area. The upper mark (21 m of depth), together with the temperature logger is shown on the left-hand side; the lower mark deeper mark (26 m depth) is shown on the right-hand side.

4.5. Fish counts

General overview	
DATE(S):	8th September 2020
PORT OF DEPARTURE:	Marfa jetty
TEAM:	
Planification and data management	Giovanni Torchia (Project Leader), Mark Dimech (Key Expert #4)
Fieldwork	Giovanni Torchia, Paolo Burzio, Egidio Trainito
The fieldwork was carried out with the support of 2 diving operators from Orange Shark Diving Centre.	
VESSEL(S):	PAOLA, owned by DiveSystem Diving Centre
MAIN EQUIPMENT:	
Instrument(s)	Hemisphere A101 Smart Antenna DGPS, Gyrocompass MRU TSS Mahrs, QINSy navigation software.
Material(s)	SCUBA equipment

9. The material was delivered to Krista Ferrugia (official contact with ERA for the MedKeyHabitats II project in Malta)

Fish counts were conducted in 3 diving sites in Dwejra and one diving site at Filfla (Figure 24). Three random transects of 25 m each were carried out in each location. For each transect, a corridor wide about 5 m (i.e. 2.5 m on the right-hand-side and 2.5 m on the left-hand-side of the transect) and a height of 2 m was covered by one marine biologist. A PVC table was used to record all present species, their relative abundance and the size-class they belonged to (Figure 25). Three size-classes were used (La Mesa and Vacchi, 1996, 2003; Harmelin-Vivien *et al*., 1985), based on the species characteristics (i.e. juvenile, sub-adult, adult) and the following abundance classes were adopted: 1, 2, 3-5, 6-10, 11-30, 31-50, 51-100, > 101.

Depth and direction were registered for each transect.

Figure 24

Fish count locations. The map in its original scale is available in APPENDIX A.

Figure 25

Fish count activity.

In addition to the abovementioned quantitative fish counts, qualitative inventories of fish were conducted during each dive. Using this data, a qualitative list of fish species was also produced.

4.6. Training

A session of training on job was planned for representatives ERA, Malta University and NGOs.

A first training session had to be conducted at the beginning of the geophysical campaign to present the activities to be conducted. It was then planned to continue during the geophysical survey (training on the job).

Analogously, the same training was planned for the biological campaign. This training had also to cover the techniques of underwater photography and image processing and had to be held by the underwater photographer and filmmaker Egidio Trainito.

Unfortunately, the Covid-19 emergency outburst prevented the possibility of holding this training sessions, even if invitations were regularly sent.

Krista Farrugia from Adi Associates Environmental Consultants Ltd., as intermediary between Golder and ERA, joined the team on the 10th September. She was informed of all the activities carried out and she was given the backup temperature logger to be delivered to ERA. This was delivered to Duncan Borg at ERA on 15th October 2020.

4.7. Identification, quantification, spatial and temporal distribution of commercial and recreational fishing activities, and unauthorized fishing in the study areas

Some technical data on the fleet, such as the population of fishing vessels by home port and mean vessel length, were obtained from the Malta Fleet Vessel Register from the Department of Fisheries. Data on the catches, effort and economic situation of the small-scale fleet in Malta according to the EU Data Collection Framework (DCF) for the years from 2008 - 2018 was also obtained through the Department of Fisheries. This was done in order to compare the fishing activity inside the areas under study with the general situation of the small-scale fishing sector in Malta.

The fishing activity, catches, effort, attitudes and perceptions of fishers in relation to the impact of fishing in the study areas were investigated using a questionnaire survey which was produced in both English and Maltese (APPENDIX B) The Maltese version was used for the field surveys. The questionnaire was designed to evaluate the activity of fishers, some economic circumstances (value of the catch) together with their attitudes and perceptions of the status of the resources inside the study areas, the impact of fishing gear on the resources and habitats and questions regarding No Take Zones (NTZs) and the impact of this management measure on their fishing activity. The questions were asked for 2019 as a reference year. A letter was sent to the two commercial fishers cooperatives and to the Federation of the Recreational fishing co-operatives (Federazzjoni ta l-Ghaqdiet tas-Sajjieda Dilettanti Malta) to inform them that members of their organization may be asked to participate in a fisheries survey (APPENDIX C). They were asked for full cooperation and in turn it was stated that the survey would be kept as simple as possible, so as not to take up too much of their time. The letter also specified that a meeting could be held between the expert and the cooperatives to explain better the purpose of the survey. A reply was only received from the recreational fishers cooperative and a meeting was held in this respect. This was also a good opportunity to gather general information on the recreational fishing activity in the study areas as well as contacts, and telephone numbers of fishers, which helped in contacting the first fishers in order to conduct the field surveys.

A total of 101 interviews were conducted. Interview transcripts were entered into a Microsoft Excel database in English (DIGITAL ANNEX).

Fishers to be sampled were selected by visiting the ports which are present in the study areas. Furthermore, telephone numbers of fishers from the respective areas were also obtained through the Federation of the Recreational fishing co-operatives, and fishers that were encountered in person during the port visits. The interviews were done initially face to face however after the onset of the COVID-19 these continued through a telephone interview.

5

5 RESULTS

5.1. Spatial distribution of habitats

5.1.1. Side Scan Sonar (SSS) survey and bathymetric survey with Single Beam Echosounder (SBES)

Based on the results provided by the Side Scan Sonar and the Single beam echosounder, the Maltese archipelago can be divided in two discrete sectors:

- The northern to eastern-southeastern sector, characterised by multiple bays with a seascape gently sloping whose seafloor is mostly composed of soft bottoms (sands and muddy sands), both uncovered and covered with seagrass (mainly *Posidonia oceanica*) meadows; and
- The western to southwestern sector, including Filfla, with mostly rocky shores and cliffs, few bays, and characterised by vertical seascapes with abrupt change in depth, where the bathymetry of -50 m is reached within few meters from the coast. The seafloor in this sector is mainly rocky and, when soft, the bottom is prevalently detrital.

Here below is an example of the photomosaic resulted from the Side Scan Sonar, whereas the photomosaics for all the study areas are reported in APPENDIX A in printed version and are available as layers in DIGITAL ANNEX. The bathymetry is reported in the habitat maps in APPENDIX A.

Figure 26
Side Scan Sonar photomosaic in Filfla. The map in its original scale is available in APPENDIX A.

5 .1.2. Morpho-bathymetric survey with Multibeam Echosounder (MBES)

Based on the morpho-bathymetric survey carried out with the Multibeam echosounder, the seascape around the island of Filfla appears very heterogeneous, in particular in its western and southern portions. Here, multiple rocky structures vertically emerge from the deep (40-50 m) up to a depth of about 20-25 m, forming a very diverse environment characterised by submarine channels.

The map in Figure 27 shows the heterogenous bathymetry of the area of Fifla. Figure 28 shows an example of the digital 3-D reconstructions performed. Other 3-D points of view are reported in APPENDIX D. The digital multibeam data are provided in DIGITAL ANNEX.

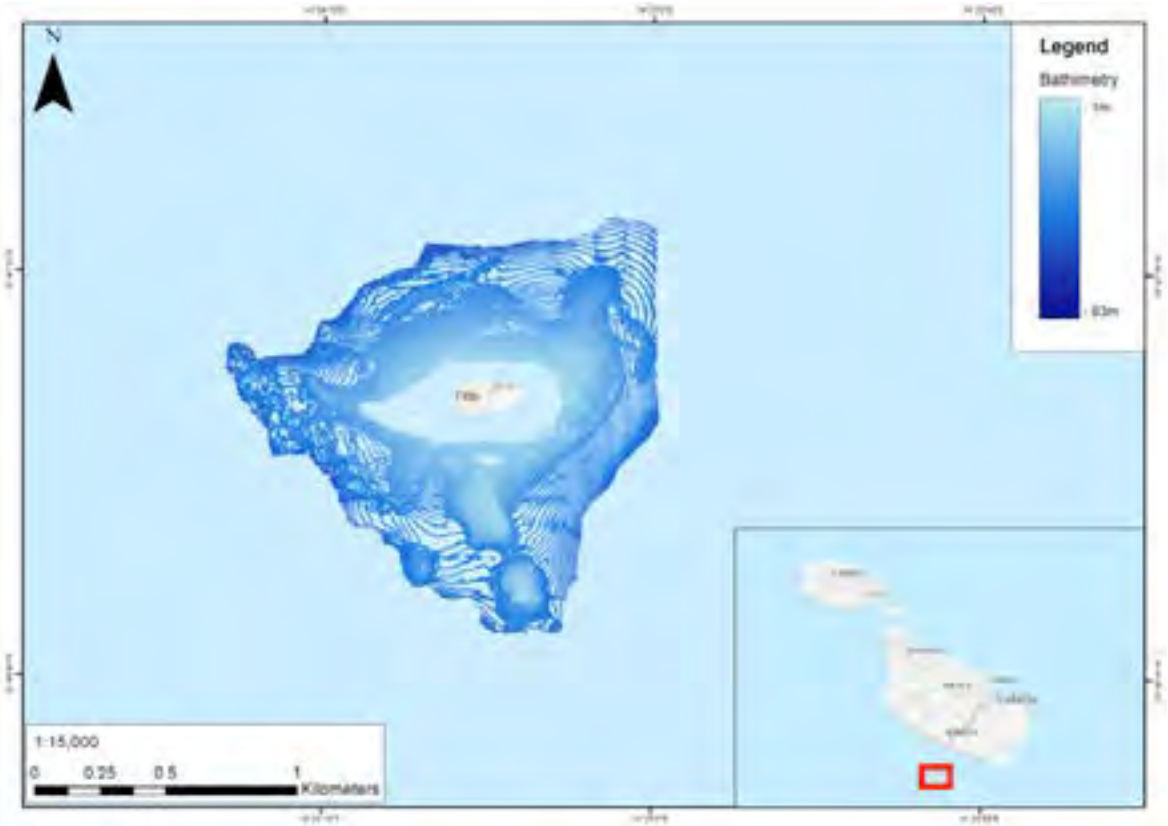


Figure 27

Morpho-bathymetry of the area of Fifla. The isobath lines are shown using a range of 1 m. The map in its original scale is available in APPENDIX A.

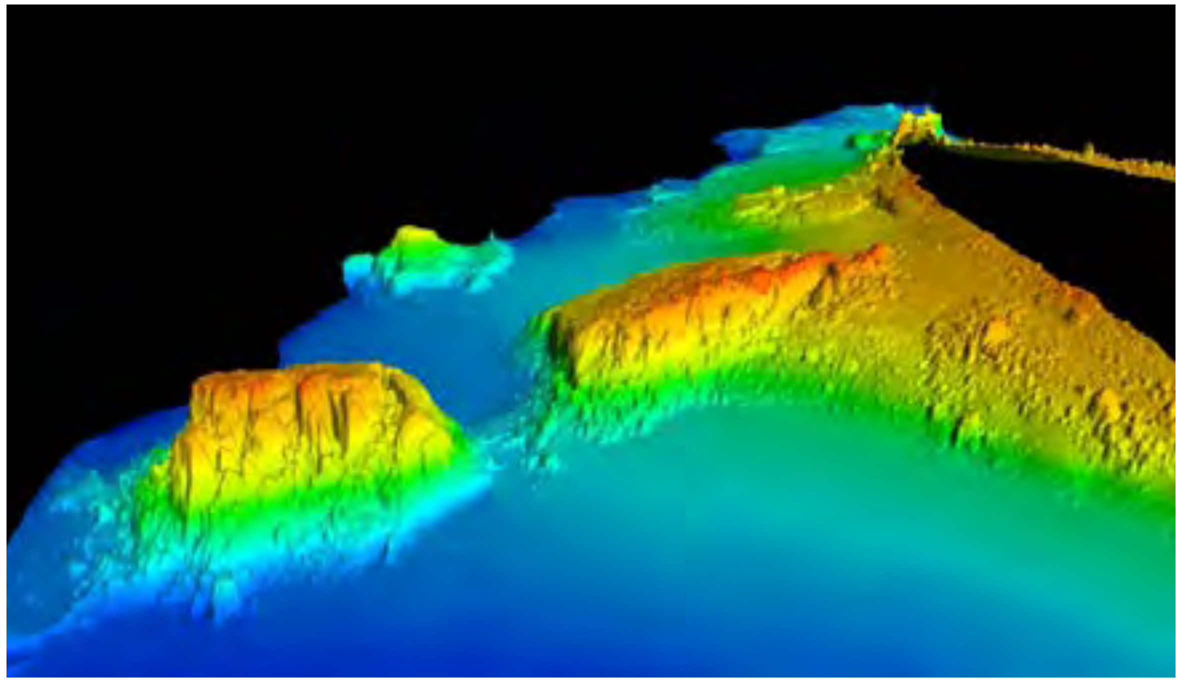


Figure 28

Example of the digital 3-D reconstruction of the area of Filfla.

5.2. Habitat characterisation

5.2.1. Visual observations with underwater towed camera

The analysis of the videos taken by the underwater towed camera confirmed the Side Scan Sonar results and interpretation in most cases, showing a qualitative discrete division among the habitats in the two sectors described in 5.1.1, namely:

- Very heterogenous seascape with abrupt changes in depth and characterised by crystal clear waters in the western to southwestern sector; and
- Quite homogeneous seascape gently sloping, often covered by *Posidonia oceanica* meadows and characterised by slightly more turbid water in the northern to eastern-southeastern sector.

All the observations carried out with underwater towed camera had the objective of ground truthing for designing the habitat maps.

Totally 18 transects were investigated by towed camera.

5.2.2. Sediment samplings with Van Veen grab

As previously described in 4.3.2, the seafloor in the study areas appeared cemented and hard in most sampling stations rather than a true soft bottom. However, in the cases where the sampling was successful, the following species were identified (Table 2).

Table 2
Macrobenthic species of soft bottom identified per sampling station.

Species/Taxon	Sampling stations			Frequency of occurrence [%]
	B3	B4	B6	
Cnidaria Anthozoa				
Edwardsia sp.	-	-	X	33
Mollusca Gastropoda				
Bittium latreillii	-	X	X	67
Bittium reticulatum	X	X	X	100
Cerithium vulgatum	-	X	-	33
Clanculus corallinus	-	-	X	33
Jujubinus exasperatus	-	-	X	33
Calliostoma conulus	-	-	X	33
Vexillum tricolor	-	-	X	33
Alvania cimex	-	X	-	33
Alvania lineata	-	-	X	33
Monophorus perversus	-	-	X	33
TRIPHORIDAE ind	-	-	X	33
Cerithiopsis minima	-	-	X	33
Cerithiopsis minima	-	-	X	33
Gibberula miliaria	-	-	X	33
Mollusca Bivalvia				
Chamelea gallina	X	-	-	33
Annelida Polychaeta				
CAPITELLIDAE ind	-	X	-	33
Pontogenia chrysocoma	-	X	-	33
Platynereis doumerilii	-	X	-	33
SYLLIDAE (Syllinae) ind	-	X	-	33
Glycera capitata	-	-	X	33
Lysidice ninetta	-	X	-	33
LUMBRINERIDAE ind	-	X	X	67
ONUPHIDAE ind	X	-	-	33
SPIONIDAE ind	-	-	X	33
Crustacea Amphipoda				
Eusirus longipes	-	X	-	33
Crustacea Decapoda				
Alpheus dentipes	-	X	-	33
Eualus cranchii	-	X	-	33
Necallianassa truncata	X	-	-	33
Cestopagurus timidus	-	X	-	33

Based on the species identified per sampling station, B6 (Filfla) appears to be the most biodiverse location, followed by B4 (Dwejra Bay). Ramla Bay (B3) shows the lowest species richness (Figure 29). While the first two are located in the western to southwestern sector, the latter is located in the northern to eastern-southeastern sector. Still, even if not very biodiverse, Ramla Bay resulted to host a community evenly composed in terms of species per group, if compared to the other two. The macrobenthic community of B4 is mainly composed by polychaetes, whereas B6 is largely dominated by gastropods (Figure 30). It is also worth noting that the sediment in Ramla Bay was rather cemented for which the collection of samples was very laborious.

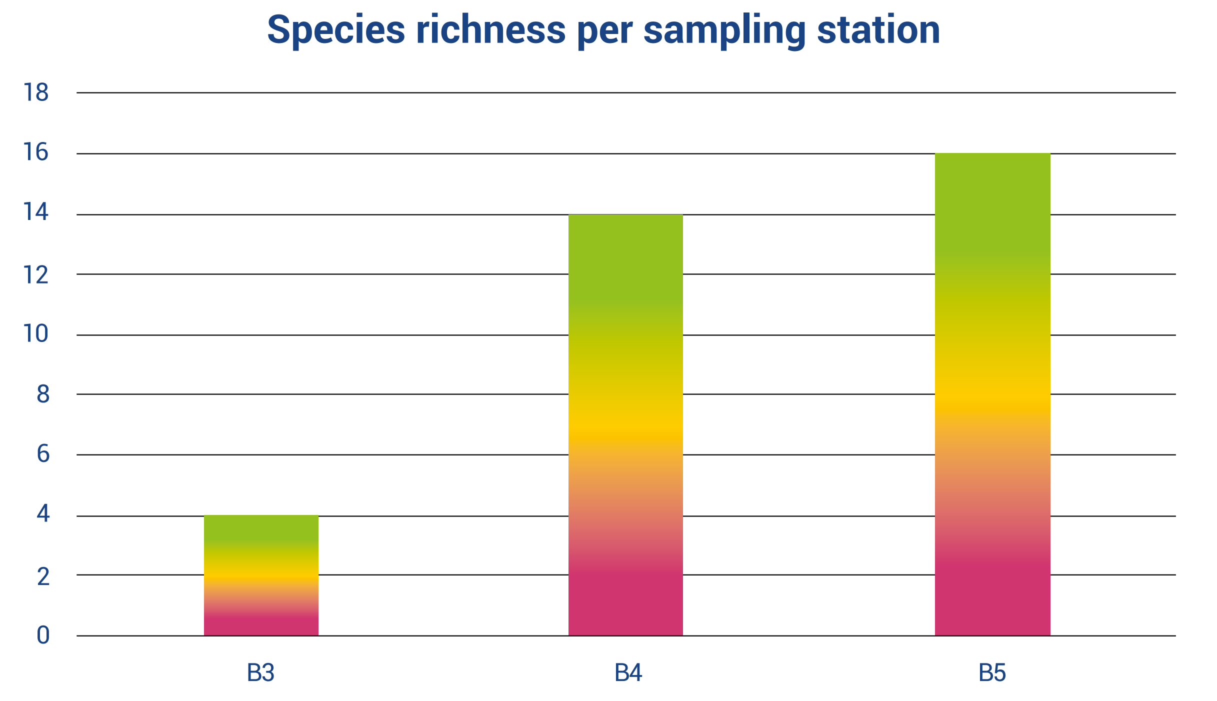


Figure 29
Macrobenthic species richness per sampling station.

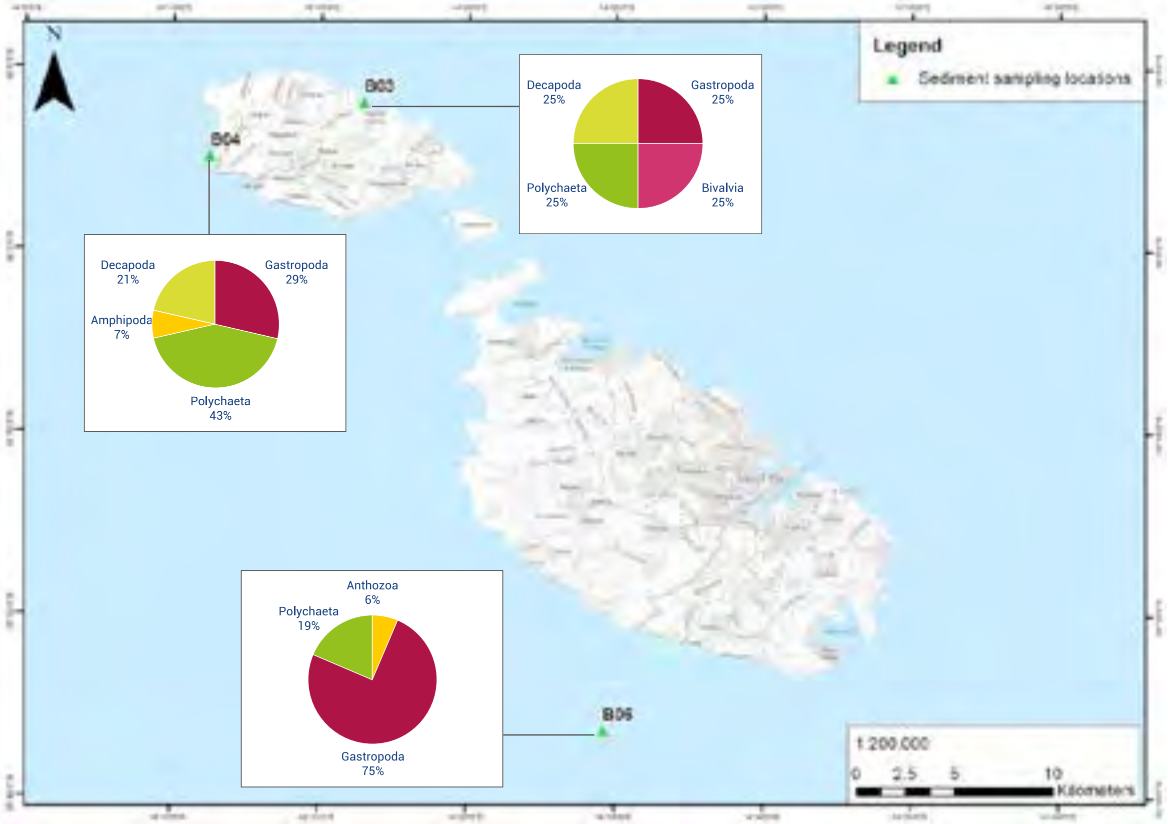


Figure 30

Macrobenthic community composition of soft bottom in terms of species per group in each sampling station.

Based on the results, the only species occurring in all the three station is the gastropod *Bittium reticulatum*, which is normally associated with seagrass meadows or other soft habitats with strong presence of algae.

The figure below shows an example of the species identification process carried out in laboratory with the use of a stereomicroscope.

Figure 31

Eualus cranchii, a species gathered in B4 (Dwejra).

In general, the identified *taxa* and species in all the three stations are typical of the infralittoral biocenoses of soft bottom, particularly sandy and detrital bottoms with limited presence of mud, also with presence of *P. oceanica* in the proximity. No species exclusive for a given biocenosis, as well as protected species or invasive species, were found.

5.2.3. Visual observations and photographic samplings taken during SCUBA dives

Visual observations, as well as qualitative photos taken during SCUBA dives confirmed the qualitative description of the seascapes as identified by the Side Scan Sonar (see 5.1.1) and towed camera (see 5.2.1).

For all the investigated sites, a total of 267 high quality photos were taken. All the photos are provided in digital version in DIGITAL ANNEX. A selection of 183 qualitive photos is available in a Photographic Atlas (APPENDIX E). In addition, a total of 83 laser-calibrated photos on standard surface of the hard substrates were taken in the western to southwestern sector (showing potential coralligenous assemblages) in 4 locations:

- Crocodile Rock (Dwejra);
- Ras il-Wardija (Dwejra);
- Ras ir-Raheb (Rdum); and
- Stork Rock (Filfla)[10].

10. A selection of 10 photos of the 30 taken within the initiation of the coralligenous monitoring network.

Ten photos per location were selected to be analysed in order to identify species and their cover percentage. The detailed results of such analyses are provided in APPENDIX F, whereas the species identified and their frequency of occurrence is reported in Table 3. All the laser-calibrated photos are available in high quality in the DIGITAL ANNEX.

Table 3

Macrobenthic species of hard bottom identified per diving location analysed.

Taxa/Species	Frequency of occurrence in each location [%]				Frequency of occurrence in the investigated area [%]
	D05 (Crocodile Rock)	D06 (Ras il-Wardija)	D09 (Ras ir-Raheb)	D08 (Stork Rock)	
Foraminifera					
Miniacina miniacea	30	30	20	-	75
Algae					
Amphiroa rigida	20	-	-	-	25
Acetabularia acetabulum	-	10	-	-	25
Amphiroa rigida	-	20	-	-	25
Brown algae felt	-	10	-	-	25
Brown algae n.d.	30	80	80	100	100
Carpomitra costata	30	-	-	-	25
Caulerpa cylindracea	10	60	-	-	50
Codium bursa	-	30	-	-	25
Cystoseira sp.	-	20	-	-	25
Dictyopteris cf. humilis	-	10	-	-	25
Dictyopteris polypodioides	-	30	-	50	50
Dictyota cf. implexa	-	40	-	-	25
Dictyota dichotoma	30	70	-	-	50
Encrusting Corallinaceae on other algae	90	100	20	100	100
Encrusting coralline algae	100	100	100	90	100
Filamentous green algae	-	40	-	-	25
Flabellia petiolata	100	100	30	90	100
Halimeda tuna	50	100	-	80	75
Halopteris sp.	-	60	-	30	50
Lithophyllum stictiforme	90	100	100	100	100
Mesophyllum expansum	80	80	100	100	100
Padina pavonia	10	10	-	-	50
Palmophyllum crassum	60	50	100	100	100
Peyssonnelia rubra	30	40	70	70	100
Peyssonnelia spp.	100	90	100	100	100
Peyssonnelia squamaria	40	40	30	-	75
Red algae with soft thallus	100	100	90	100	100
Sargassum sp.	-	20	-	10	50
Sphaerococcus coronopifolius	10	-	-	-	25
Sporochnus pedunculatus	10	30	-	-	50
Valonia sp.	30	-	20	20	75
Zanardinia typus	20	-	-	-	25
Zonaria tournefortii	10	-	20	10	75
Porifera					
Agelas oroides	80	50	100	70	100
Cliona schmidti	10	20	10	20	100
Cliona sp.	10	-	-	-	25
Cymbaxinella damicornis	-	10	50	50	75
Dendroxea sp.	40	20	90	-	75
Dyctionella incisa	-	10	-	-	25
Encrusting sponges	-	70	50	30	75
Haliclona mucosa	10	20	-	-	50
Hexadella racovitzai	10	-	-	-	25
Ircinia oros	10	-	-	-	25
Ircinia variabilis	-	10	-	-	25
Massive sponges n.d.	70	20	20	50	100
Phorbas fictitious	-	10	-	-	25
Pleraplysilla spinifera	10	-	-	10	50
Spirastrella cunctatrix	30	20	10	20	100
Terpios figax	10	-	10	-	50
Cnidaria					
Caryophyllia inornata	10	-	-	-	25
Cladopsammia rolandi	10	-	10	-	50
Leptopsammia pruvoti	60	30	80	-	75
Madracis pharensis	10	10	30	20	100
Myriapora truncata	-	-	-	10	25
Polychaeta					
Dyalichone sp.	10	-	30	-	50
Hermodice carunculata	40	-	60	10	75
Polychaeta n.d.	10	10	10	-	75
Protula sp.	-	10	-	-	25

Taxa/Species	Frequency of occurrence in each location [%]				Frequency of occurrence in the investigated area [%]
	D05 (Crocodile Rock)	D06 (Ras il-Wardija)	D09 (Ras ir-Raheb)	D08 (Stork Rock)	
Protula tubularia	30	-	10	-	50
Serpula vermicularis	-	-	10	-	25
Mollusca					
Peltodoris atromaculata	10	-	-	-	25
Felimare picta (juv.)	-	-	10	-	25
Phillidia flava	-	-	10	-	25
Bryozoa					
Adeonella calveti	-	20	80	-	50
Bryozoa n.d.	20	40	40	10	100
Hornera frondiculata	-	10	10	-	50
Myriapora truncata	60	70	60	30	100
Reteporella grimaldii	-	40	40	-	50
Schizomavella mamillata	30	50	60	-	75
Tunicata					
Aplydium sp.	-	-	10	-	25
Halocynthia papillosa	-	-	10	-	25
Echinodermata	-	-	10	-	25
Centrostephanus longispinus	-	-	10	-	25
Crustacea	-	-	10	-	25
Calcinus tubularis	-	-	10	-	25

Based on the species identified per sampling station, Dwejra appears to be the most biodiverse location, in particular D05 (Crocodile Rock), which shows the highest species richness, whereas D08 (Stork Rock, Fifla) appears to be the least biodiverse (Figure 32). However, qualitatively analysing the community composition, the evenest, in terms of species per group, appears to be D09 (Ras ir-Raheb), in the northern portion of Rdum. In that community, in fact, the vegetal biodiversity is about one third of the entire community, where the rest is mainly composed by animals (+ 2% of foraminifers), whose dominant group in terms of species richness are sponges. All the other three communities appear as composed by a richness of vegetal species with about the half of the community (Figure 33). This may suggest that D09 may host the most sciaphilous assemblage. However, by analysing the percentage cover of each species, the algae appear the dominant in abundance (see APPENDIX F).

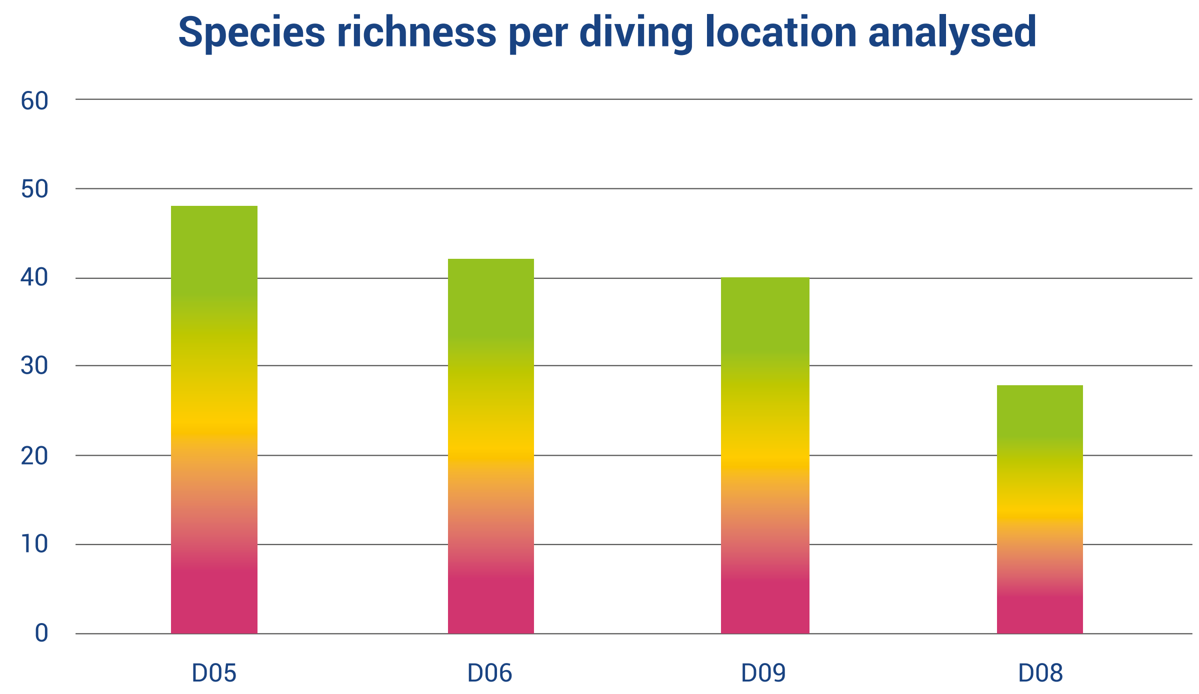


Figure 32

Macrobenthic species richness per diving location analysed.

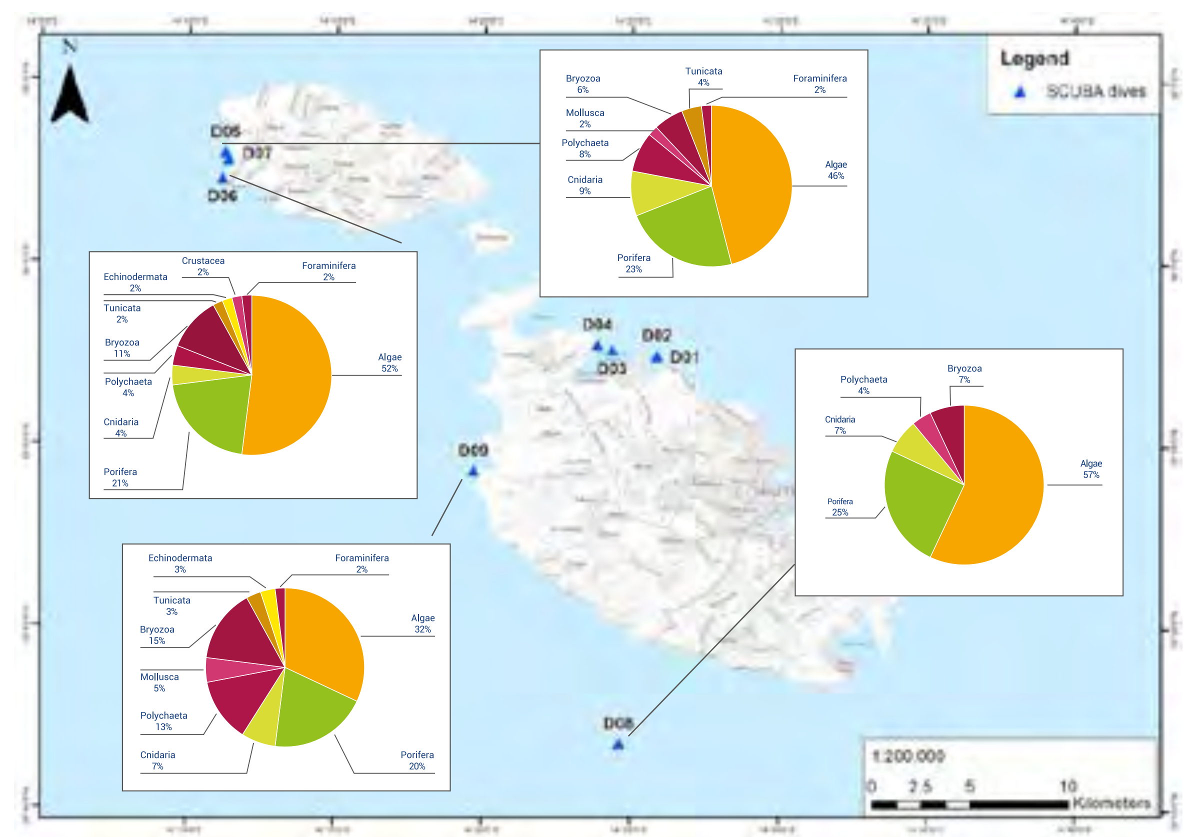


Figure 33

Macrobenthic community composition of hard bottom in terms of species per group in each diving location analysed.

In addition, it should be noted, that even from the physionomical point of view, none of the communities analysed looked like a true coralligenous biocenosis. All the assemblages, in fact, were lacking any erect or arborescent species (e.g. gorgonians) and showed a strong algal presence (Figure 34). The bryozoan *Myriapora truncata* was the most erect species observed (Figure 34). This suggests the communities to be more hemi-sciaphilous rather than true sciaphilous assemblages with dominance of animal species, both in terms of species richness and relative abundance (i.e. coverage), which is typical of the coralligenous biocenosis.

Figure 34

The coralligenous assemblages of (a) Crocodile Rock (Dwejra) and (b) Stork Rock (Filfla) showing a strong algal presence.

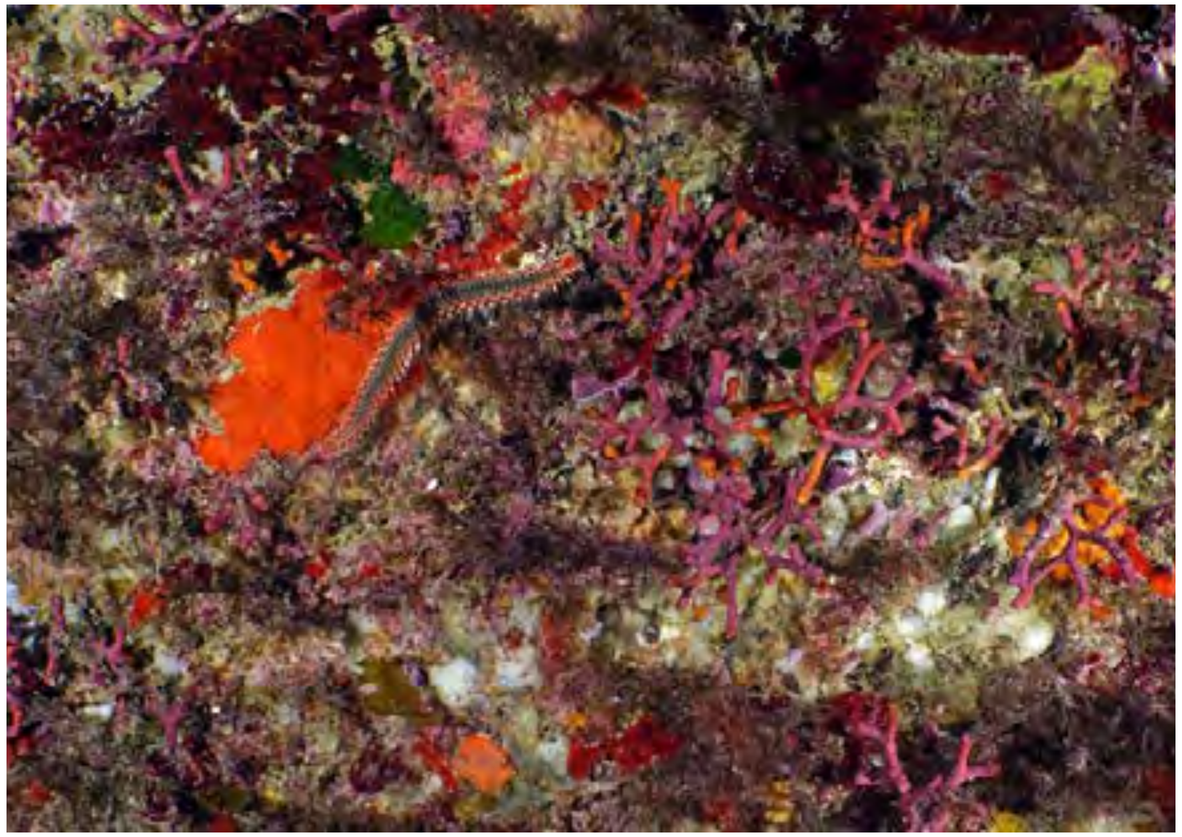


Figure 35

***Myriapora truncata* in the coralligenous assemblages of Ras ir-Raheb (Rdum), showing also the presence of *Hermodice carunculata*.**

Also, it is noteworthy to highlight that both the visual inspections and the analyses of the photos show an important presence of the non-native algae *Caulerpa cylindracea* in all the study areas (Figure 36) and the thermophilic polychaete *Hermodice carunculata* (Figure 34).

Figure 36

Caulerpa cylindracea in Dwejra (Crocodile Rock).

5.2.4. Habitat mapping

This section summarises the main outcomes derived from the interpretation of the geophysical data (SSS and MB) and results of the biological survey, especially the ground truthing conducted with underwater towed camera and SCUBA divers. The derived habitat maps are presented here with adequate dimensions for the ease of the reader. The maps in A4 format are reported in APPENDIX A, whereas files are available as GIS layers (detailed scale) in the DIGITAL ANNEX.

Based on the obtained results, a Standard Data Form (SDF) was filled in for the whole area investigated and reported in APPENDIX G.

5.2.4.1. Salini Bay

Salini Bay is situated in the north of Malta island. The Bay features 77% *Posidonia oceanica* coverage. The main biocenosis in this Bay is a mosaic of biocenosis of the *Posidonia oceanica* meadow and facies of dead matte. Posidonia forms meadows between 4 and 24 meters depth. Biocenosis of infralittoral algae is also present in the Bay, especially near the coastline. Soft bottom composed mainly by sand occupies the central portion of the Bay.

During SCUBA diving activity, at the depth of 24 meters, dead matte of Posidonia heavily eroded and muddy were observed (Figure 37), only few patches of Posidonia were alive. Brown algae and *Caulerpa cylindracea* colonized the dead mattes, the latter were also established on the sand. In Salini Bay the lower limit of the meadow is regressive. It is to be reported the presence of *Flabellia petiolata* and vertical form of *Penicillus capitatus* on the mattes (first reporting of Bilecenoglu *et al*., 2013) (Figure 38), and the wide spread presence of *Hermodice carunculata*.

Figure 37

Salini Bay - Dead matte of Posidonia oceanica eroded.

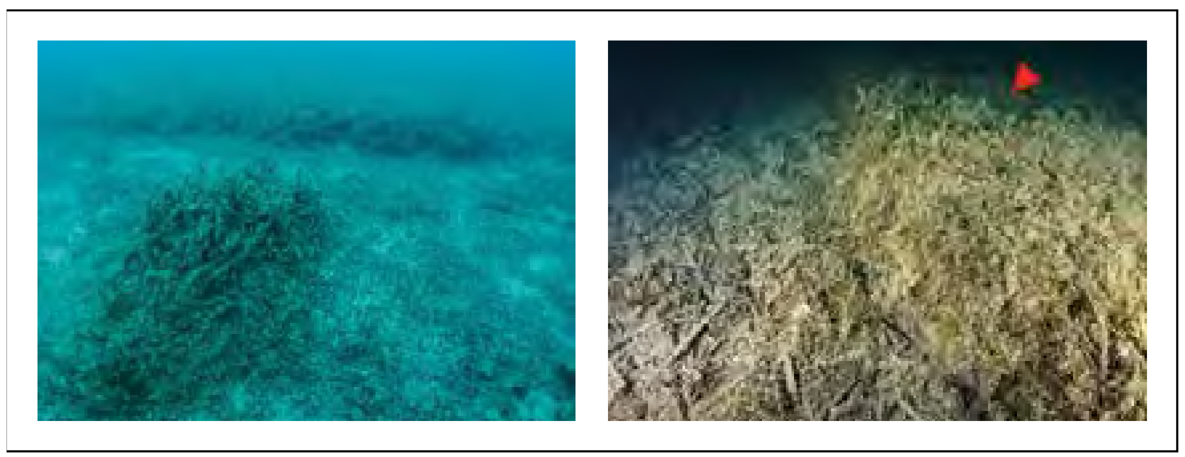


Figure 38

Salini Bay - *Posidonia oceanica* and *Caulerpa cylindracea* on the left; *Penicillus capitatus* on matte on the right (circled in red).

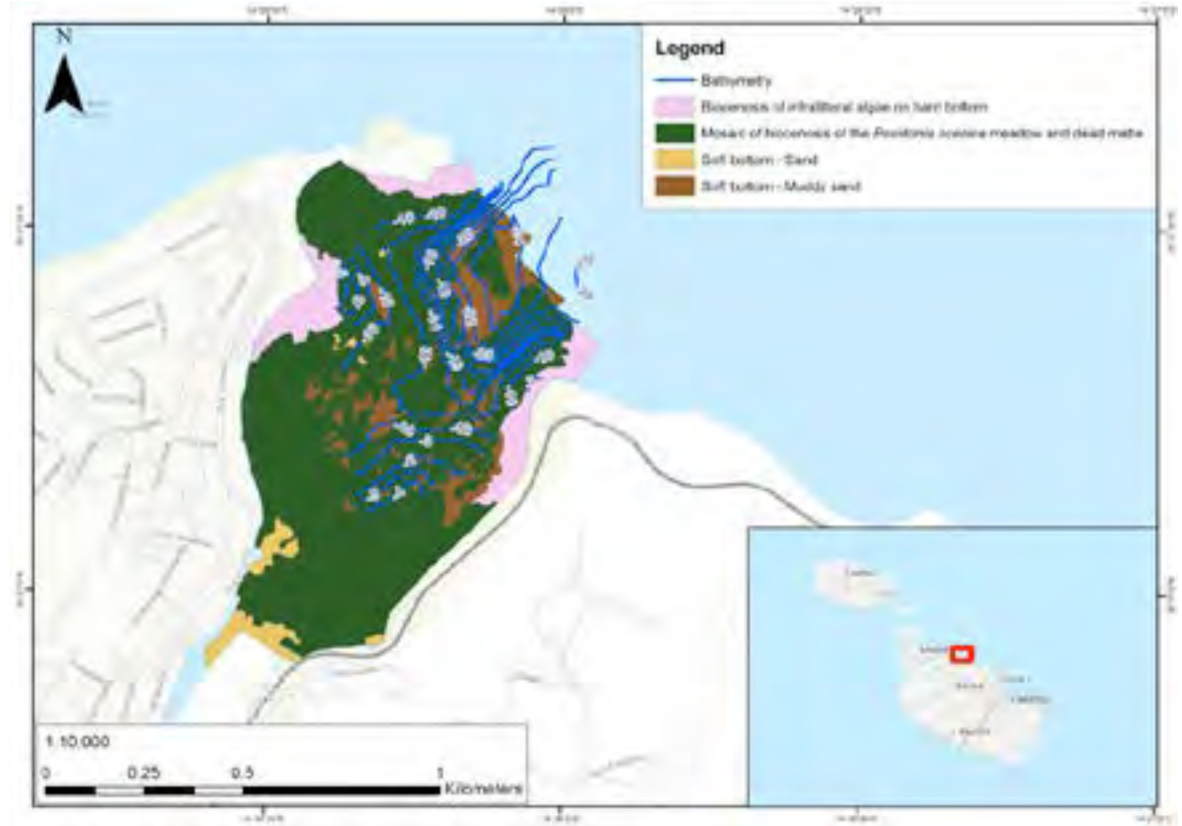


Figure 39

Salini Bay – Habitat map.

5.2.4.2. Saint Paul's Bay

In the Saint Paul's Bay a mosaic of biocenosis of the *Posidonia oceanica* meadow and dead matte covers the central part of the Bay alternating with soft bottom, mainly muddy. Along the coastline the presence of Posidonia is more continuous. Hard bottom colonized by photophilic algae is present in the outermost coastal portion of the Bay.

SCUBA diving survey investigated the hard bottom areas where collapsed rocks with articulated erosive forms was observed. Rocks are covered by brown algae felt (mainly *Dictyota dichotoma*, *Padina pavonica* and *Halopteris* sp.) and red algae. Along the lower midlittoral and in the poorly lit areas there are great abundance of *Astroides calycularis* (Figure 41), listed in Annex II of the SPA/BD Protocol. At depth between 15 and 17.4 meters rocks with photophilic community, belonging to the biocenosis of infralittoral algae, with few patches of *Posidonia oceanica* are present (Figure 42). The bottom is featured by erosive processes forming wells and other erosive structures. In interior well parts, typical sciophilous species, with predominance of *Peyssonnelia* spp., Corallinacea and *Zanardinia typus* colonize the substrata.

It is important to report the presence of *Lamprohaminoea ovalis*, an alien species (Mifsud, 2007) and *Hermodice carunculata*.

Figure 40

Saint Paul's Bay – erosive form in the Posidonia oceanica meadow.

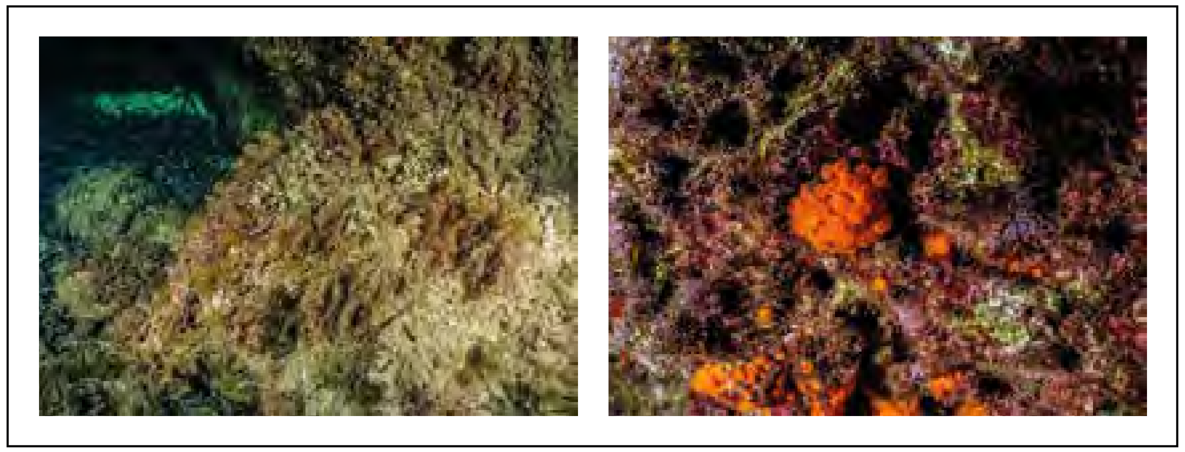


Figure 41

Saint Paul's Bay - Dictyota dichotoma, Padina pavonica and Halopteris sp. on the left; Astroides calycularis on the right.

Figure 42

Saint Paul's Bay - Patches of *Posidonia oceanica*.

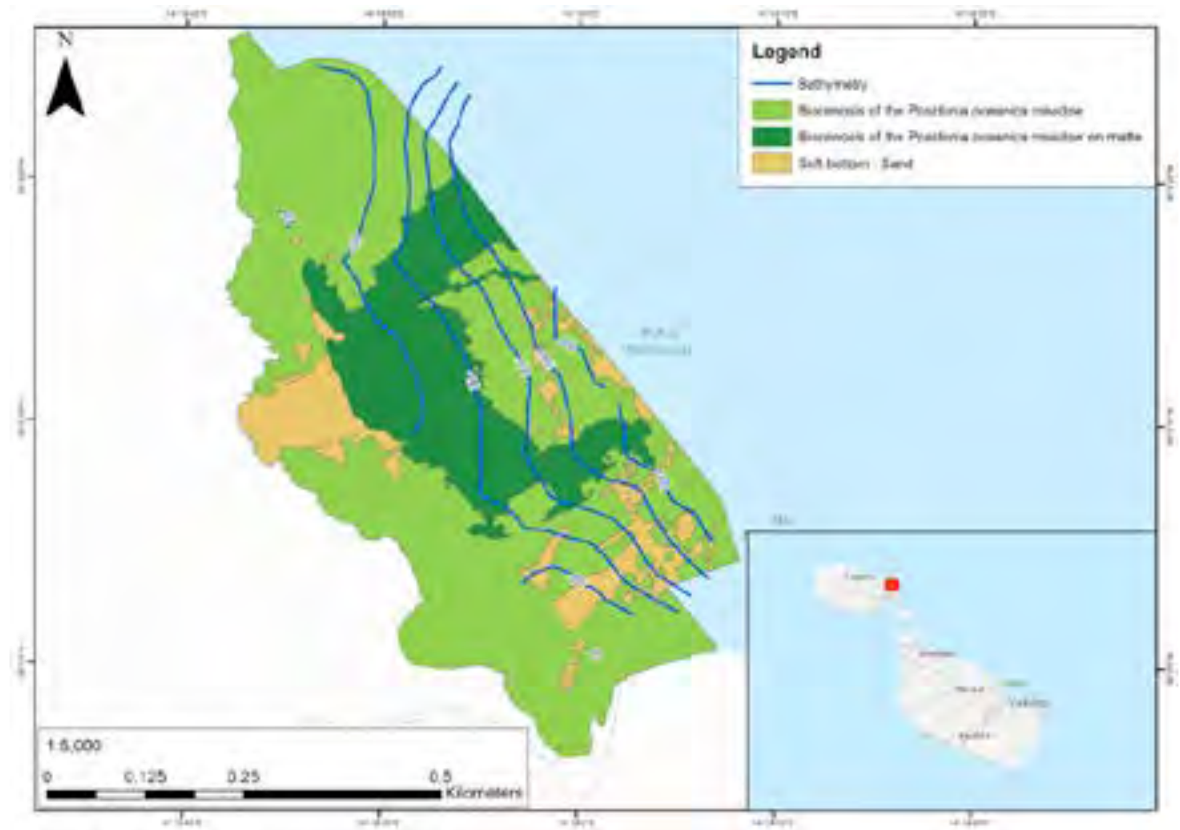


Figure 43

Dahlet Bay – Habitat map.

5.2.4.3. Mellieha Bay

The central part of Mellieha Bay is composed by soft bottom (muddy sand, 19%) and a mosaic of the biocenosis of the *Posidonia oceanica* meadow and dead matte (48%). Along the coastline, the study area is mainly made by hard bottom with presence of photophilic community, corresponding to the biocenosis of infralittoral algae, with patches of *Posidonia oceanica*. In Mellieha Bay there are two areas where is predominant *Posidonia oceanica* on mattes (18%) and a zone with Posidonia on sand (6%).

Figure 44

Mellieha Bay - Patches of Posidonia oceanica on different bottom typologies: rocks on the left-hand side and sand on the right-hand side.

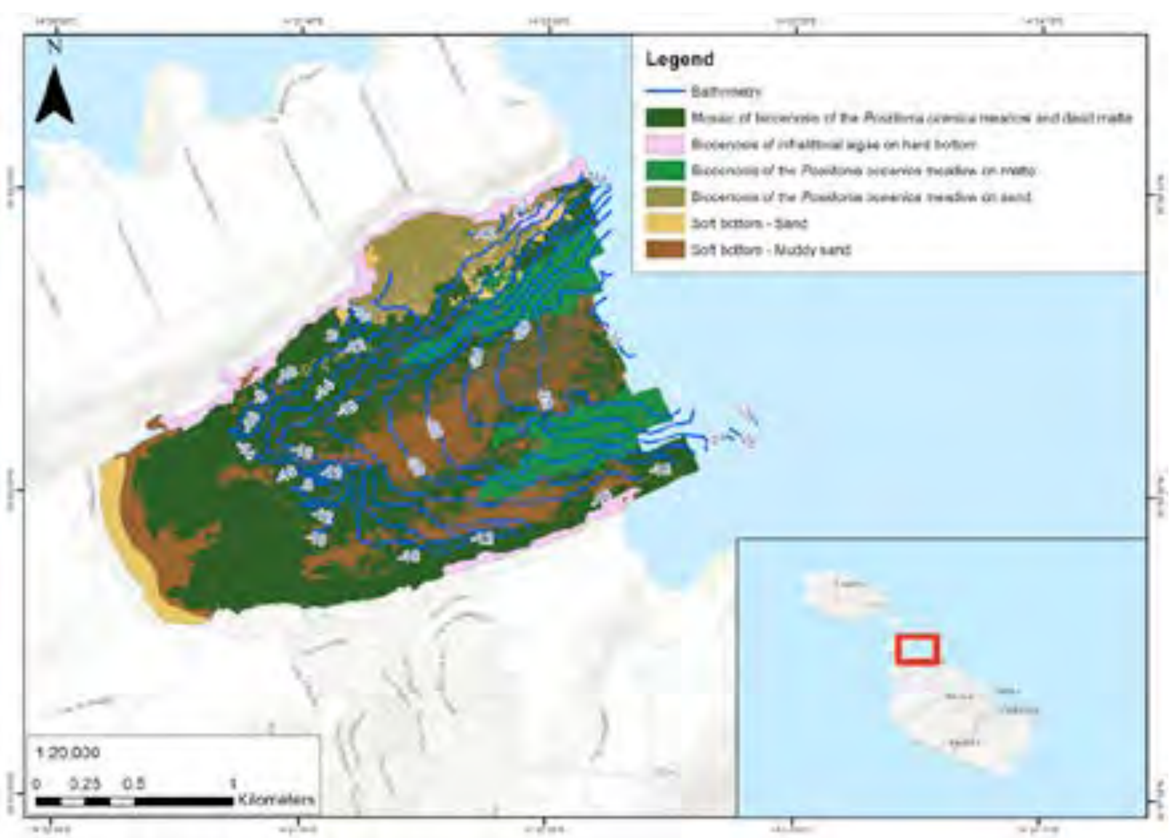


Figure 45

Mellieha Bay – Habitat map.

5.2.4.4. Dahlet Bay

Dahlet Bay, in northern part of Gozo Island, is characterized, in its central part, by the biocenosis of the *Posidonia meadow* on matte (22%) and sandy bottom (11%), with evident ripple marks (Figure 46). The rest of the Bay features the biocenosis of the *Posidonia oceanica* meadow partially on rocks (66%).

Figure 46

Dahlet Bay – Sandy bottom with ripple marks (snapshot taken from the underwater towed camera video).

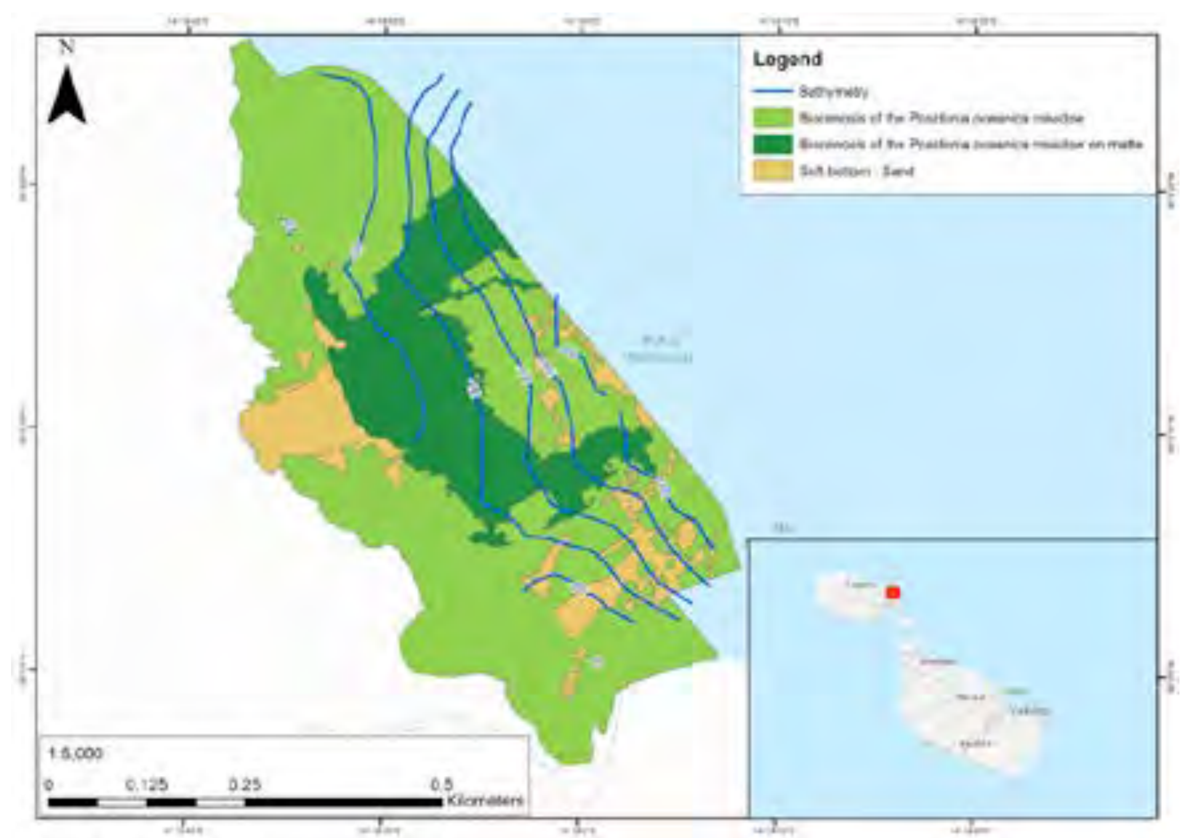


Figure 47

Dahlet Bay – Habitat map.

5.2.4.5. San Blas Bay

San Blas Bay, in the north of Gozo Island, is formed by soft bottom, composed by sand (10%) and muddy sand (30%), and biocenosis of the *Posidonia oceanica* meadow on rocks (45%). In the eastern part of the Bay, there is an area probably characterized by the biocenosis of the *Posidonia oceanica* on matte (16%).

Figure 48

San Blas Bay - Posidonia oceanica (snapshot taken from the underwater towed camera video).

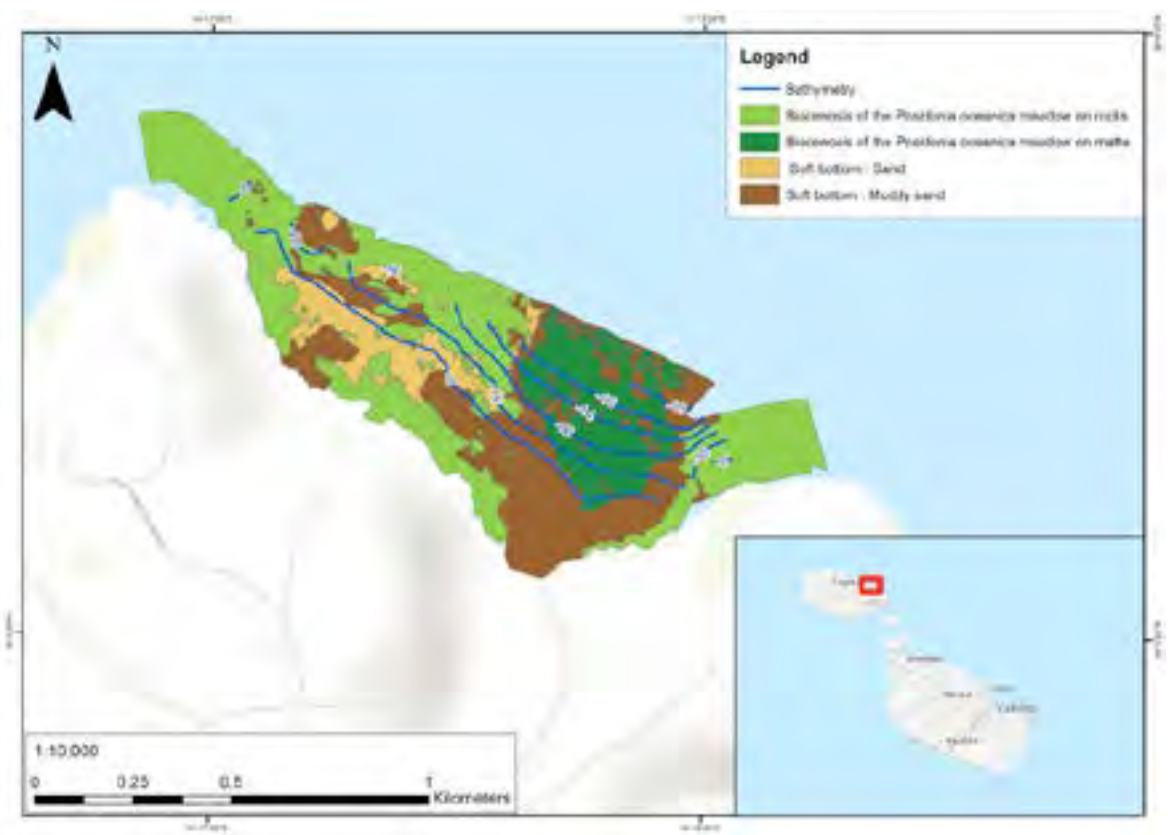


Figure 49

San Blas Bay – Habitat map.

5.2.4.6. Ramla Bay

In Ramla Bay study area it is possible to observe an alternation between rocks and soft bottom. The main biocenosis in this area is the biocenosis of the *Posidonia oceanica* meadow on rocks (60%). On sandy soft bottom there are evident ripple marks and in some areas there are visible organic debris. Towards the open sea, *Cymodocea nodosa* colonizes the sandy bottom. The association with *Cymodocea nodosa* on sandy bottom could indicate the biocenosis of well sorted fine sands (Figure 50).

Figure 50

Ramla Bay - Cymodocea nodosa on sand (snapshot taken from the underwater towed camera video).

Figure 51

Ramla Bay – Habitat map. The map in its original scale is available in APPENDIX A.

5.2.4.7. Dwejra Bay

Dwejra Bay is situated in the west side of Gozo Island. The coastline is characterized by the biocenosis of infralittoral algae (35%) on rocks; towards the open sea the rocks are substituted by soft bottom, mainly composed by detritic sediment (32%). In the detritic bottom are present frequently isolated rocky outcrops. Facies and associations of the coralligenous biocenosis in enclave are present in the in shaded areas of the rocky coastal zone. The invertebrate population consists mainly of sponges (Agelas oroides is very common). The alien species Caulerpa cylindracea and Asparagopsis taxiformis are also present (Navarro-Barranco et al., 2018) (Figure 52).

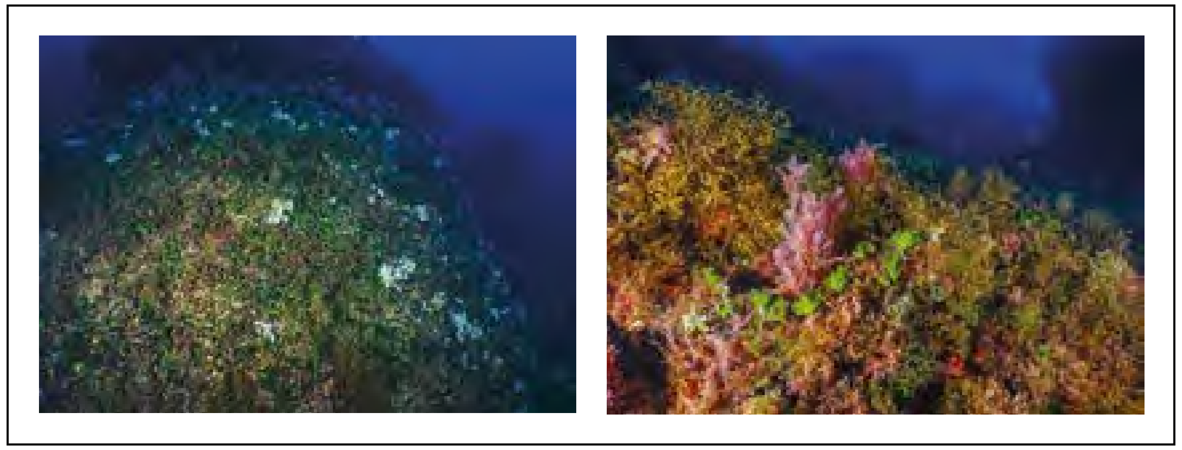


Figure 52

Dwejra Bay - Caulerpa cylindracea on the left; Asparagopsis taxiformis on the right.

The mosaic of biocenosis of the *Posidonia oceanica* meadow and dead matte colonized the main part of the Dwejra Bay (6%).

Crocodile Rock is a low rock and viewed from a certain angle this offshore rock looks like a crocodile. This offshore rock was investigated by SCUBA divers. The western marine crag is vertical until 40 meters depth. A rich population of brown algae, including Cystoseira spp., Sargassum acinarium, Dictiopteris cf. humilis and Sporochnus pedunculatus colonizes most of the rock. On the basis of the rock, the coralligenous biocenosis is present; the sea urchin Centrostephanus longispinus was observed. Hermodice carunculata and Caulerpa cylindracea are spread over all the Crocodile Rock (Figure 53).

Figure 53

Dwejra Bay - Brown and green algae on coralligenous on the left; Hermodice carunculata on the right.

In the south of Dwejra study area, during the SCUBA diving survey, rare patches of *Posidonia oceanica* was observed on rocks alternating with the biocenosis of infralittoral algae.

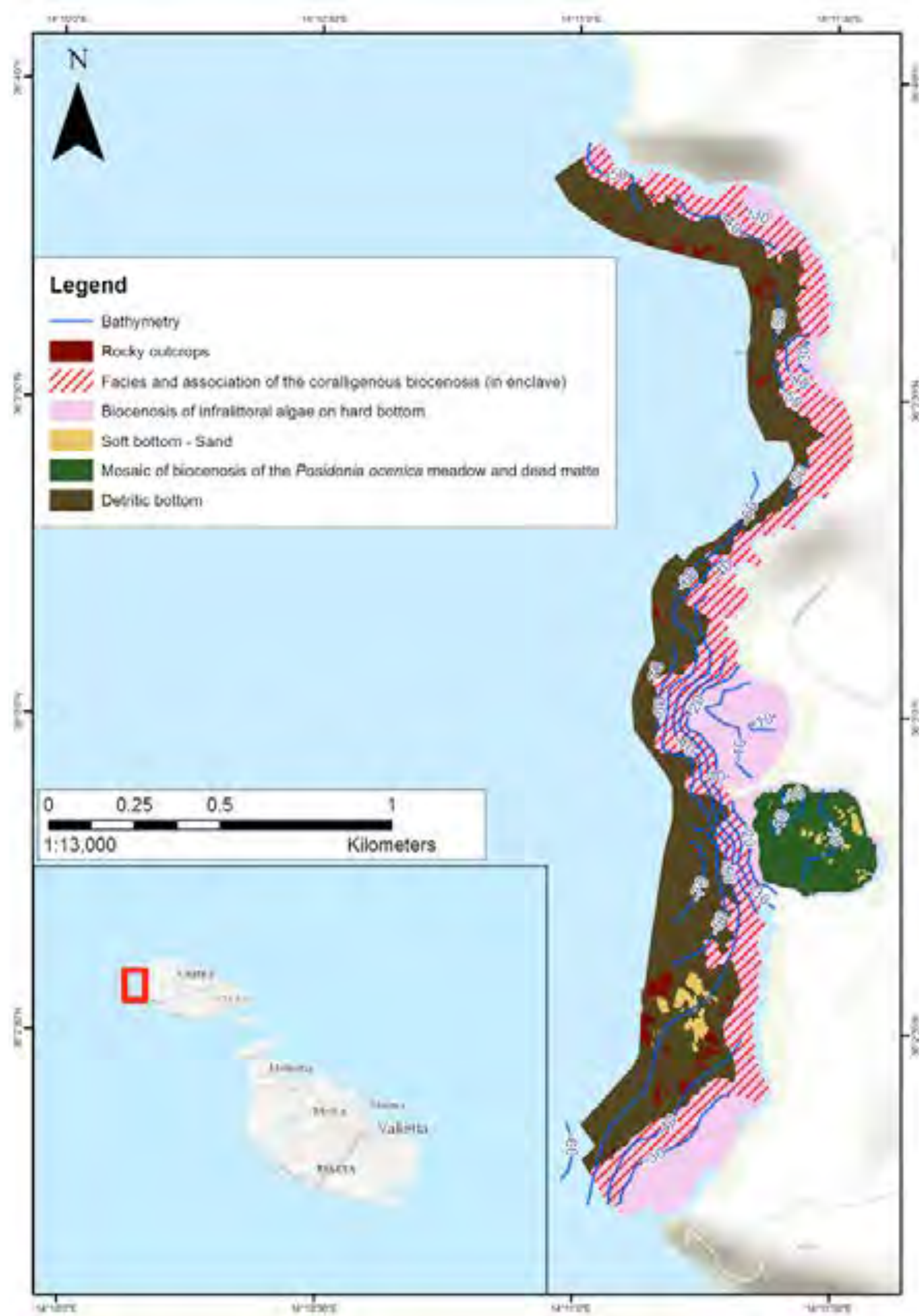


Figure 54

Dwejra – Habitat map.

5.2.4.8. Ponta Tal

Ponta Tal is situated in the southern part of Gozo Island. Along the coastline, the hard bottom with photophilic community (biocenosis of infralittoral algae, 48%) predominates; patches of *Posidonia oceanica* on rocks are also present (Figure 55). Proceeding towards the open sea the habitat shifts in a soft bottom, mainly formed by sand (4%) and detritic sediment (48%).

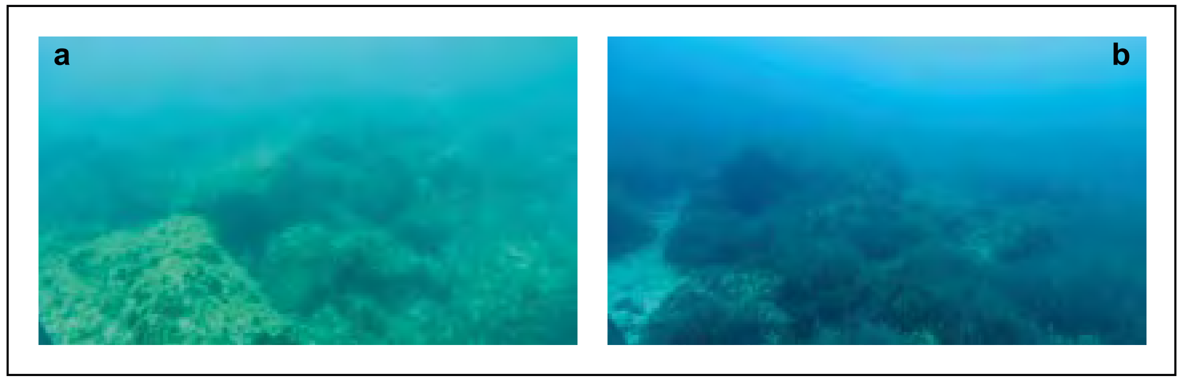


Figure 55
Ponta Tal – Hard bottom with (a) photophilic community and (b) patches of *Posidonia oceanica*.

Figure 56
Ponta Tal – Habitat map.

5.2.4.9. Filfla

The seafloor of Filfla is characterized by a relevant presence of rocks (60%); detritic bottom covers about the 40% of the study area. Rocks are mainly colonized by photophilous algae (biocenosis of infralittoral algae) with enclaves of coralligenous in the shadow zones.

The Stork Rock, located south to the Filfla island, was investigated by SCUBA divers. It is covered by brown algae e.g. *Cystoseira* spp., *Sargassum acinarium*, *Dictyopteris polypodioides* and *Dictyopteris humilis*. Facies and associations of coralligenous biocenosis in enclaves are distributed in the shadows zone. In this habitat, the presence *of Lythophyllum stictiforme* and *Halimeda tuna* have structural role. Erected forms are rare. Great abundance of *Centrostephanus longispinus*, and of sponge *Agelas oroides* characterizes this habitat (Figure 57). Everywhere is diffused the presence of *Hermodice carunculata*.

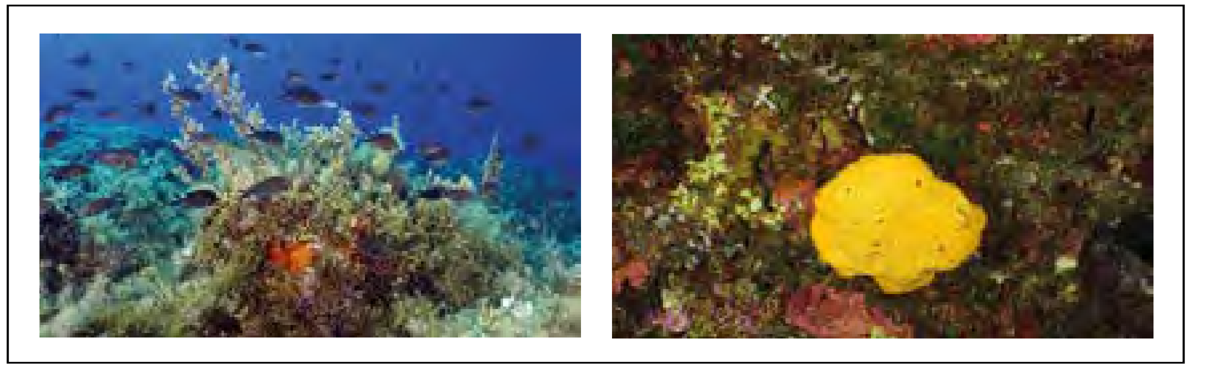


Figure 57
Filfla - Brown algae on the left; Agelas oroides on the right.

Figure 58
Filfla – Habitat map. The map in its original scale is available in APPENDIX A.

5.2.4.10. Rdum

Rdum study area corresponds to western and southern part of Malta Island. Along the coastline hard bottom is abundant; towards the open sea soft bottom prevails. In the western part, most of the hard bottom is covered by photophilic communities, attributable to the biocenosis of infralittoral algae (13%). Patches of *Posidonia oceanica* on rocks are also present (38%). Proceeding towards the open sea, the nature of substratum changes, becoming detritic sediment (48%), partially colonized by algae.

A SCUBA diving inspection carried out at Ras ir-Raheb, indicates the presence of marine crags and cliffs with terraces. Sparse patches of Posidonia oceanica are distributed in the midst of photophilic algae. On the base of crag, coralligenous species are present. The presence of Agelas oroides, Leptopsammia pruvoti and other organisms typical of biocenosis of coralligenous (e.g. encrusting sponges, Dendroxea sp. and the bryozoan Reteporella grimaldii), indicate that this habitat can be considered as facies and association of the coralligenous biocenosis (in enclave). Hermodice carunculata is very abundant (Figure 59).

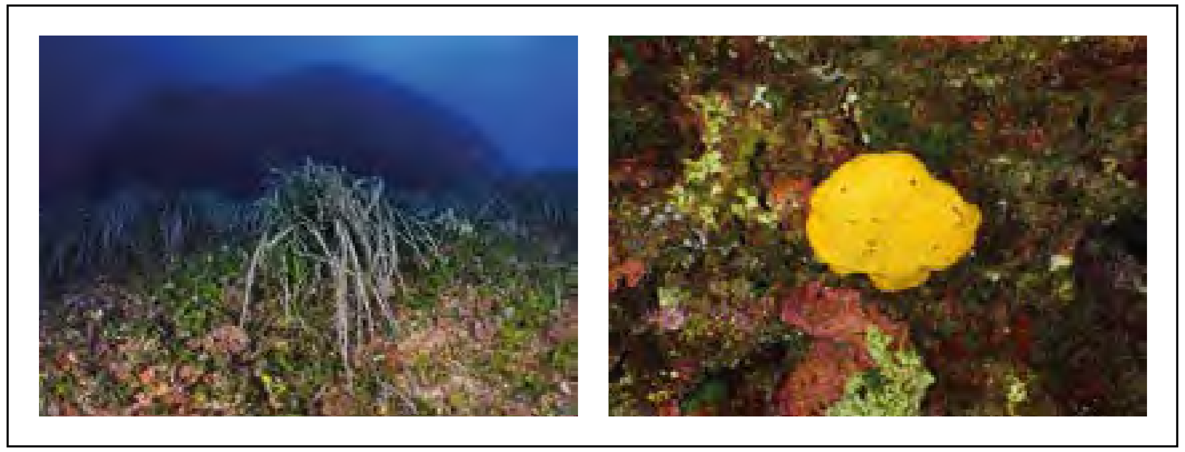


Figure 59

Rdum - Patches of *Posidonia oceanica* on the left; *Leptopsammia pruvoti* on the right.

In the southern part, like in the western, along the coastline hard bottom with photophilic communities (biocenosis of infralittoral algae, 10%) and mosaic of biocenosis of the *Posidonia oceanica* meadow and dead matte (33%) are dominant. Gradually, the component of hard bottom with rocky outcrop shifts into soft bottom partially colonized by *Posidonia oceanica* meadows. Towards open sea, detritic bottom is predominant (33%).

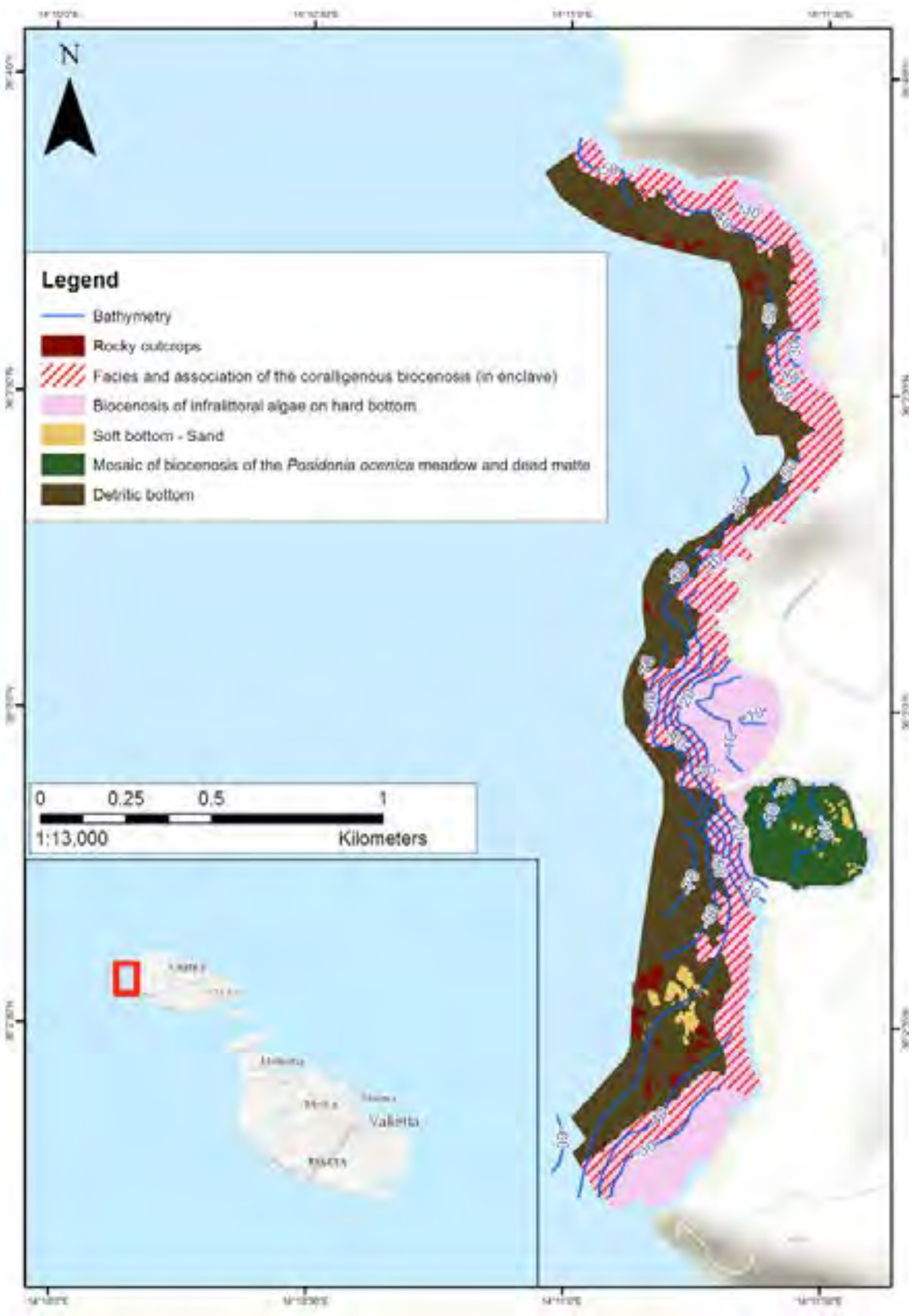


Figure 60

Rdum (nord) – Habitat map.

Figure 61

Rdum (center) – Habitat map.

Figure 62

Rdum (South) – Habitat map.

5.2.5. Signs of fishing and other human activities in the study areas

From the analyses of the sonograms provided by the Side Scan Sonar, some potential signs of anchoring were detected in Mellieha Bay and St. Paul's Bay (Figure 63). One of those signs was also confirmed by visual observations (Figure 64).

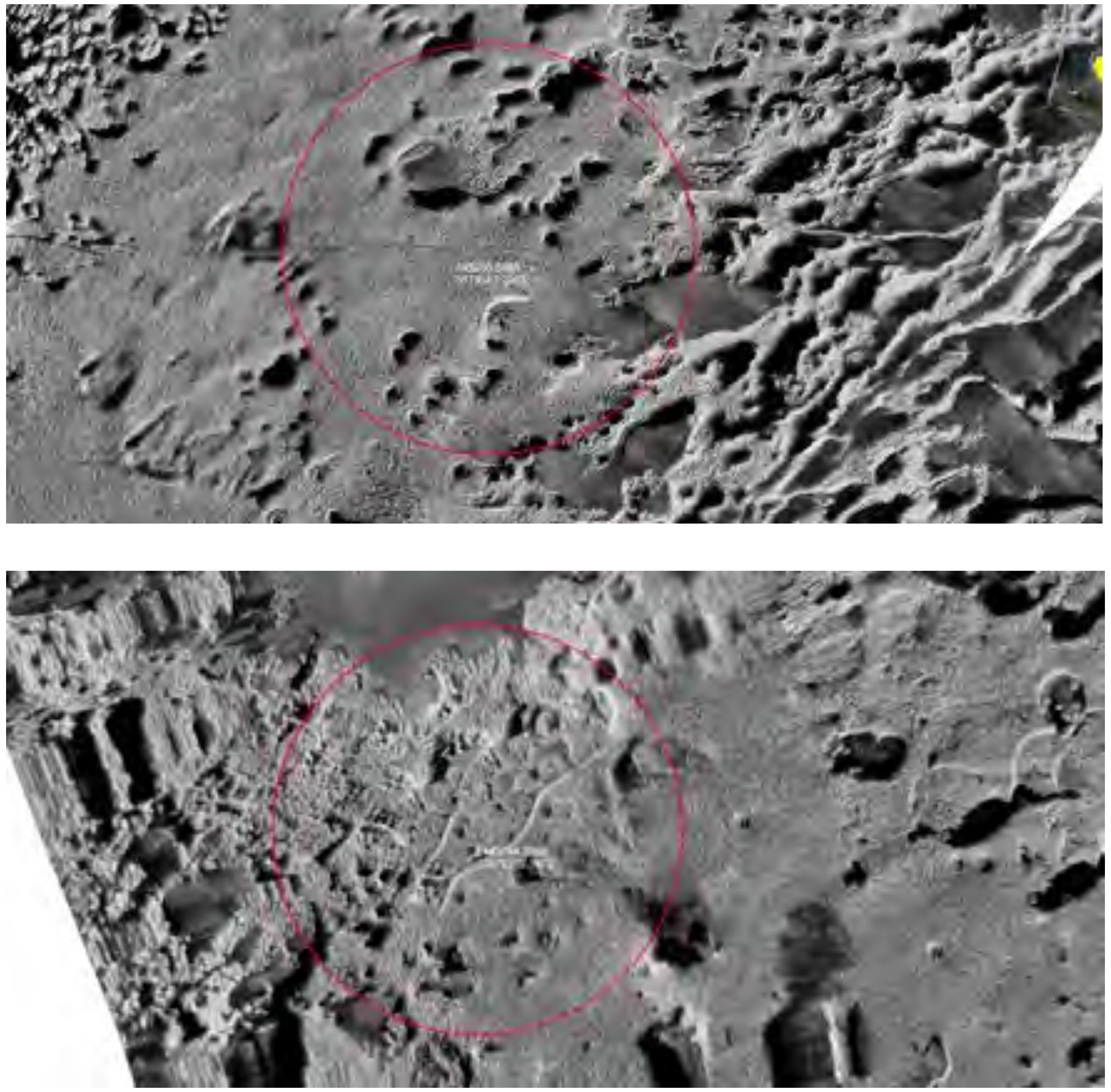


Figure 63
Potential signs of anchors (circled in red) in Mellieha Bay (a) and St. Paul's Bay (b).

Figure 64
Evident sign of anchoring confirmed by visual observation in St. Paul's Bay.

Also, the aquaculture cages mentioned in 3.3 were observed in Mellieha Bay and St. Paul's Bay (Figure 65 and Figure 66 respectively) and a wreck was found in the southern portion of Rdum, in proximity to Blue Grotto (Figure 67)

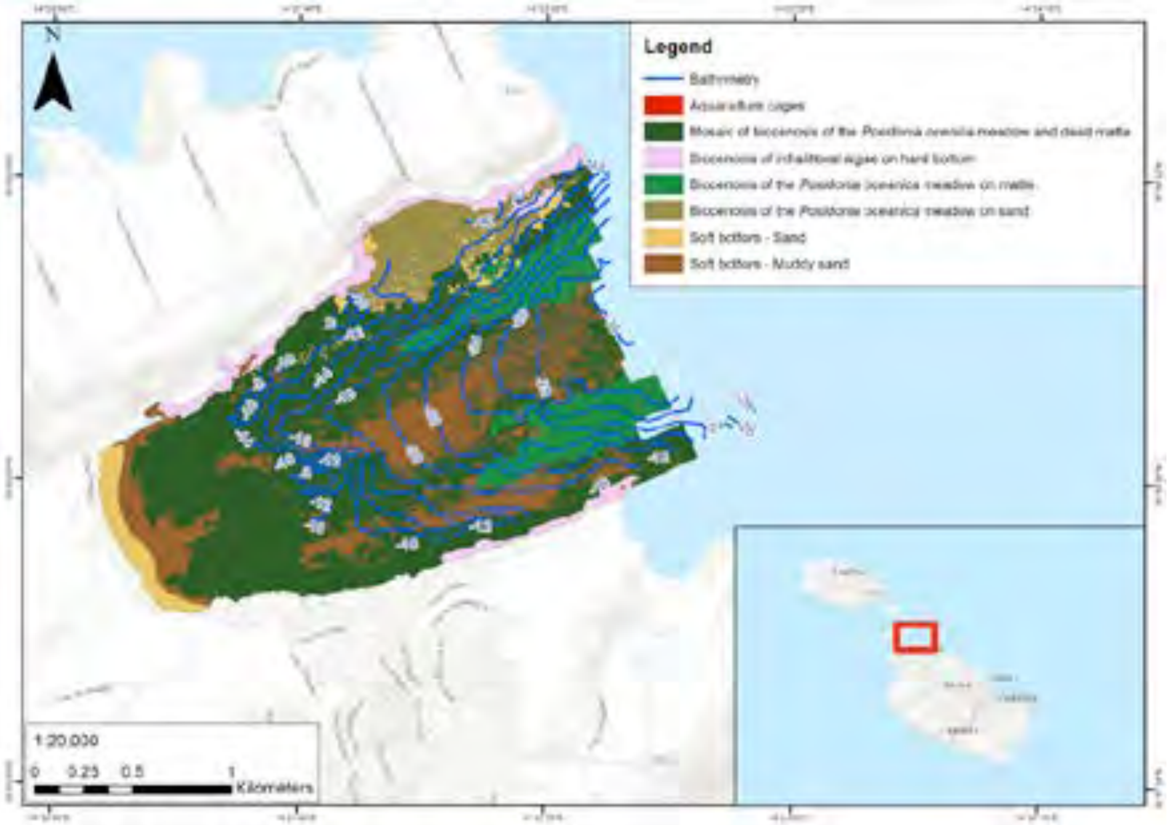


Figure 65

Aquaculture cages in Mellieha Bay (circled in red).

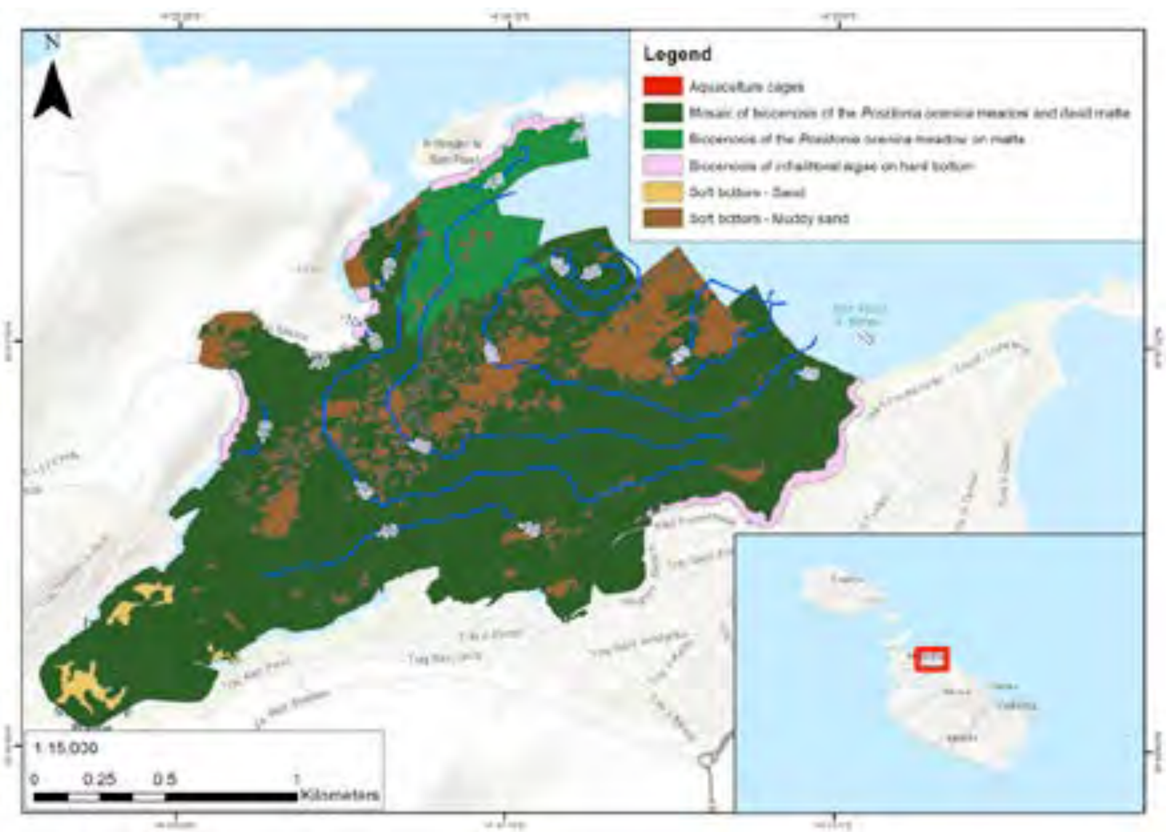


Figure 66

Aquaculture cages in St. Paul's Bay (circled in red).

Figure 67

Aquaculture cages in Mellieha Bay (circled in red).

Still, the most frequently observed signs of human activities were fishing gears (both active and abandoned). A selection of photos of the observed fishing gears are shown in the figures below. High quality photos reported in APPENDIX E also show all the fishing gears observed.

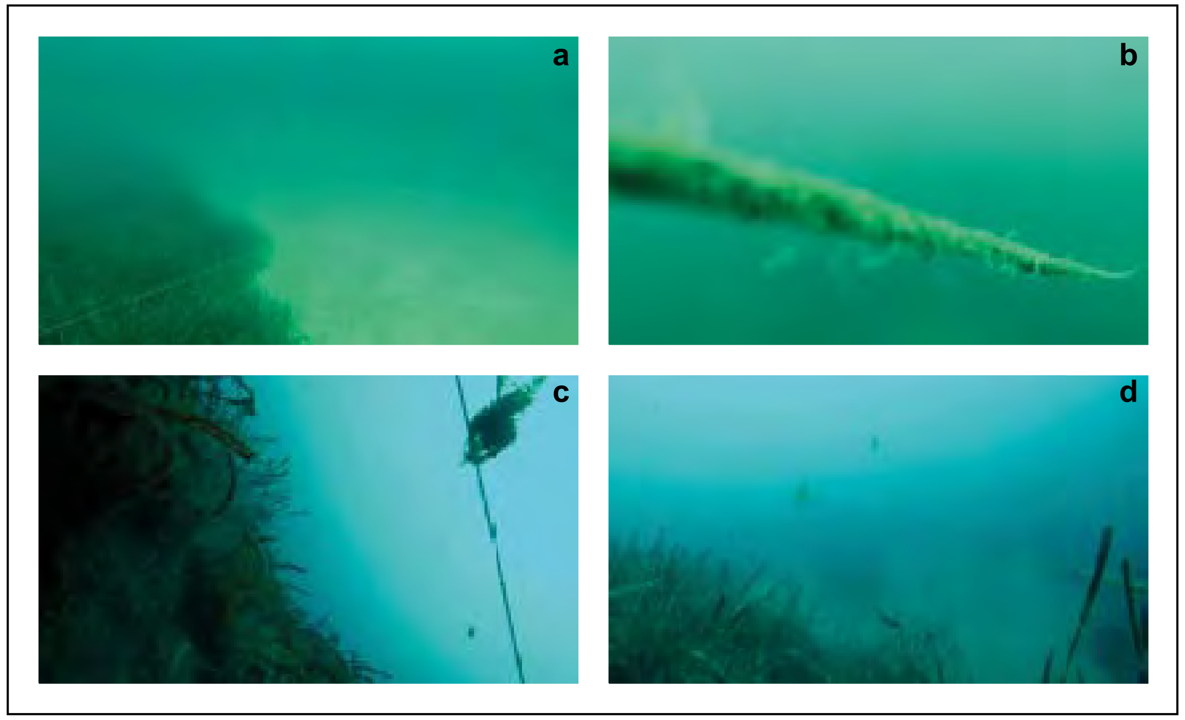


Figure 68

Fishing gears in Salini Bay (a), Saint Paul's Bay (b) and Mellieha Bay (c and d) observed by underwater towed camera.

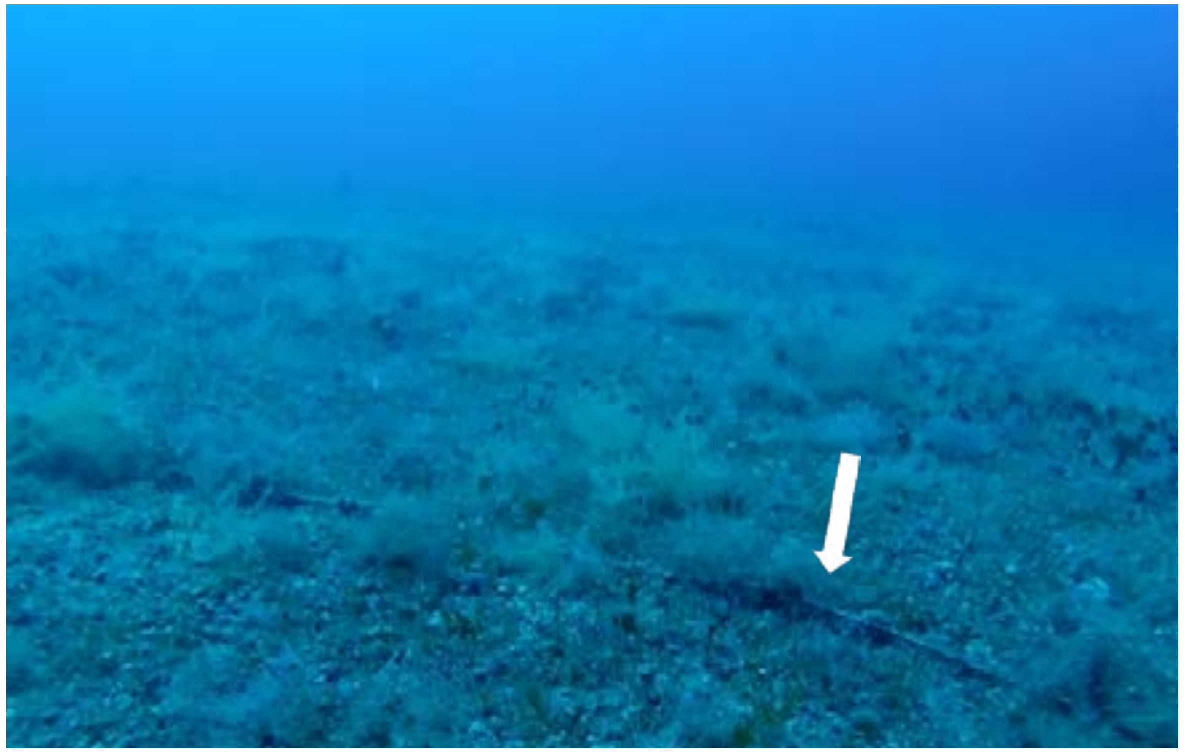


Figure 69
Fishing gear in Rdum (white arrow) in snapshot taken from the underwater towed camera video).

Figure 70
Fishing gear in Dwejra (white arrow).

Figure 71
Fishing gear in Dwejra (white arrow).

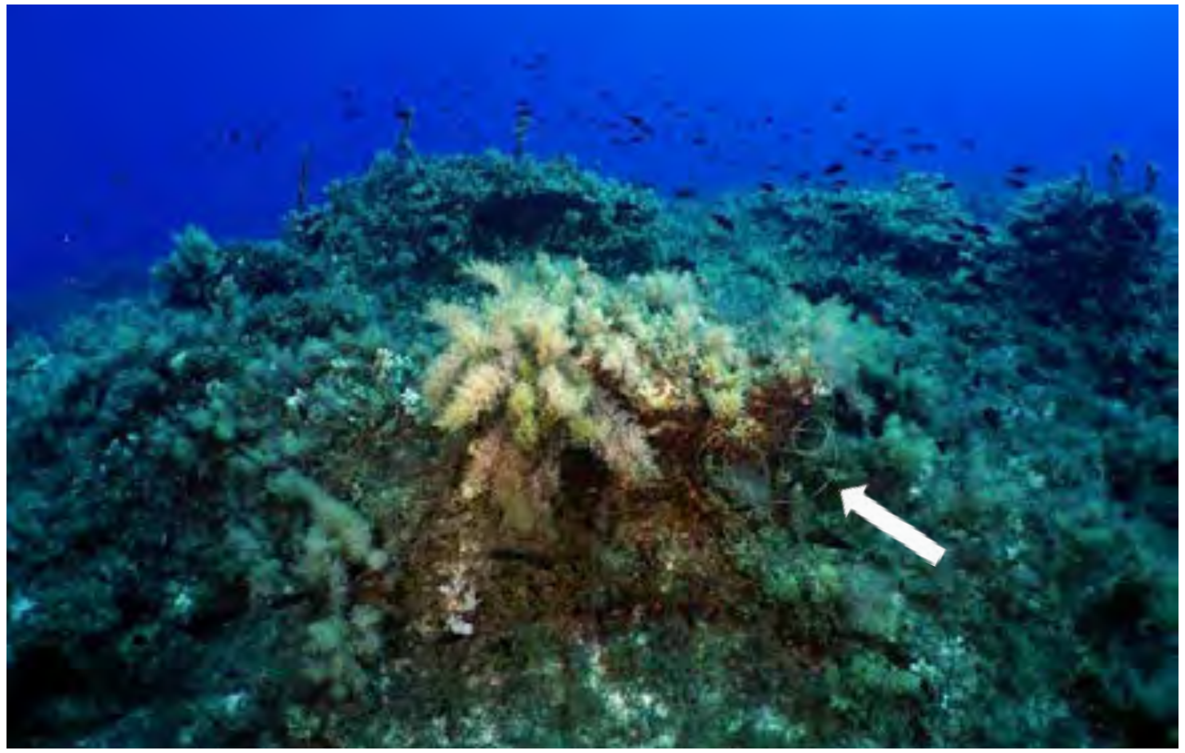


Figure 72
Fishing gear in Filfla (white arrow).

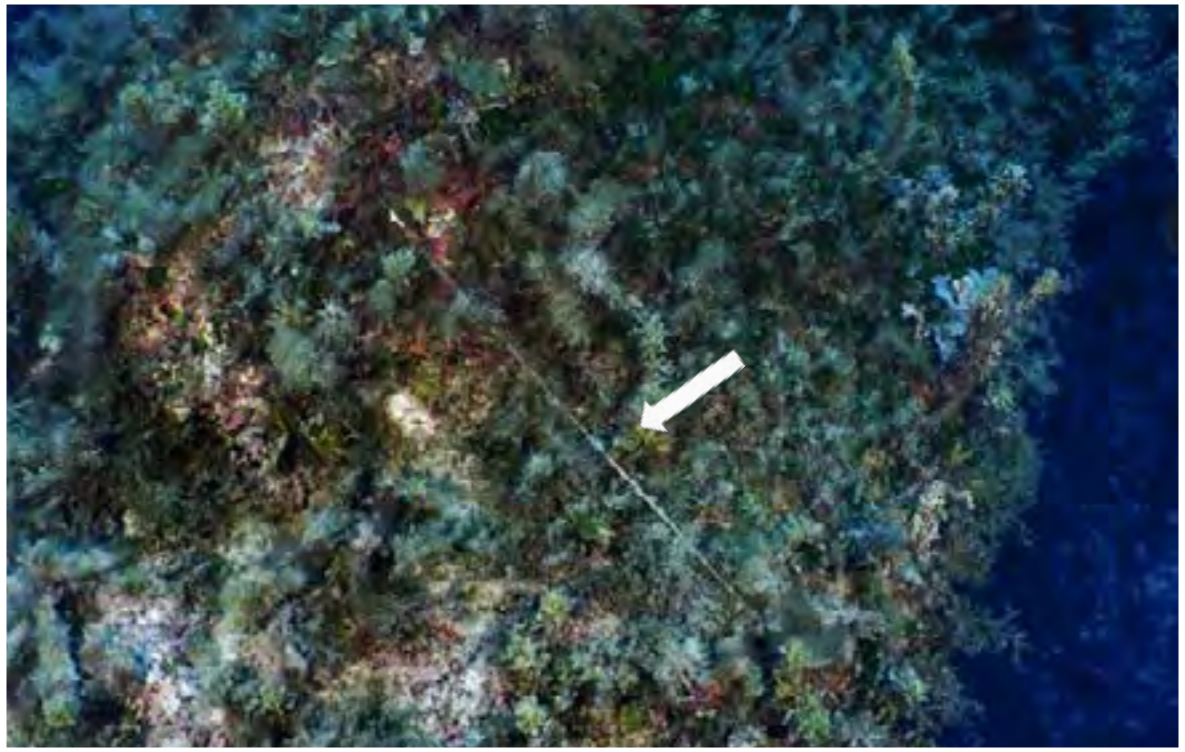


Figure 73
Fishing gear in Dwejra (white arrow).

Figure 74
Fishing net in Dwejra (white arrow).

In addition, the results of the fish counts and also SCUBA diver observations indicate a fish population reduced in size and diversity. The observed fish assemblages seem impacted by a relevant important fishing pressure. This is confirmed also by the results of the fishery study (Chapter 5.5). Especially recreational fishery contributes to the fishing pressure in the study area.

5.3. Initiation of monitoring networks

5.3.1. Monitoring network on Posidonia oceanica in Mellieha Bay

The rationale for choosing the meadow in Mellieha Bay is discussed in 4.4.1.

The meadow is located on soft bottom made by fine sand. The meadow shows a sharp lower limit characterised by heavy cover (> 25%), which can indicate a good status of the meadow itself. The mean density in correspondence to the limit is of about 650 shoots per m^2. Thus, according to Pergent et al. (1995), this can be classified as a dense meadow.

The table below presents all the parameters taken *in situ*, as well as the direction (in degrees) between a balise and the following one, in order to reconstruct the shape of the meadow. All the photos taken on field (i.e. balise to balise and taken from above) are retrievable in **DIGITAL ANNEX**.

Table 4
The main parameters of the meadow collected underwater.

Parameters \ Balise	01	02	03	04	05	06	07	08	09	10	11
Depth [m]	18.8	18.8	18.8	18.8	19	19	19	19.2	19.2	19.3	19.3
Balise to next balise direction	30°	120°	20°	110°	80°	60°	50°	60°	120°	50°	-
Coverage [%]	90	100	90	60	40	85	40	65	70	65	70
Density [shoots/m^2]	750	800	800	875	175	700	275	750	600	550	650
Plagiotropic rhizomes [%]	0	20	0	50	60	0	20	30	10	20	0
Exposure plagiotropic rhiz. [cm]	-	3	-	3	8	-	2	1	3	4	-
Exposure orthotropic rhiz. [cm]	1	2	2	1	3	2	1	3	2	2	2
Substrate	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS	FS
Type of limit	S+	S+	S+	S+	S+	S+	S+	S+	S+	S+	S+

FS = Fine sand; S+ = Sharp with heavy cover (> 25%)

Integrating the average shoot density in correspondence to the *balises* with the depth, this meadow can be considered even above the Mediterranean average status. Also, based on the average exposure of rhizomes, the meadow appears to be on sedimentary balance (Pergent et al. 1995).

The phenological analyses reported an average number of 6 leaves per shoot. On average about 3 adult leaves per shoot were found, whereas the average number of intermediate leaves was about 1 and so the juvenile leaves.

The adult leaves measured, on average, 48.88 cm in length, whereas the average foliar index of the meadow (calculated on both intermediary and adult leaves) was 154.84 cm^2 per shoot. This resulted in a Leaf Area Index (LAI) of 10.06 m^2/m^2. The average Coefficient A was 46.96%.

The main phenological parameters and their values are summarised in the table below.

Table 5
Main phenological parameters measured in the lower limit of Posidonia oceanica meadow.

Parameter	Adult	Intermediary
Average No. leaves	3	1
Average length [cm]	48.88	10.22
Average width [cm]	0.88	0.91
Average LAI [cm^2]	11.31	139.53
Average Coefficient A [%]	0	64.24

The lepidochronological analysis confirmed a vertical growth of the rhizomes with an average rate of 0.49 ± 0.22 cm/year and an average annual foliar production of 5.30 ± 1.61.

Also, most leaves showed an eroded apex, indicating a relatively moderate hydrodynamic activity and limited action of the herbivores in correspondence of the lower limit of the meadow.

The main lepidochronological parameters and their values are summarised in the table below and shown in Figure 75 and Figure 76.

All the raw measurements performed in laboratory to initiate the monitoring network on the posidonia meadow in Mellieha, as well as photos of shoots analysed for the lepidochronolgical analyses, are reported in the **DIGITAL ANNEX**.

Table 6
Main lepidochronological parameters measured in the lower limit of Posidonia oceanica meadow.

Scales		Stump		Flowers
Average length [cm]	2.52 ± 0.27	Average length [cm]	0.49 ± 0.22	0
Average No. scales	5.30 ± 1.61	Average weight [g p.s.]	0.0297 ± 0.0202	

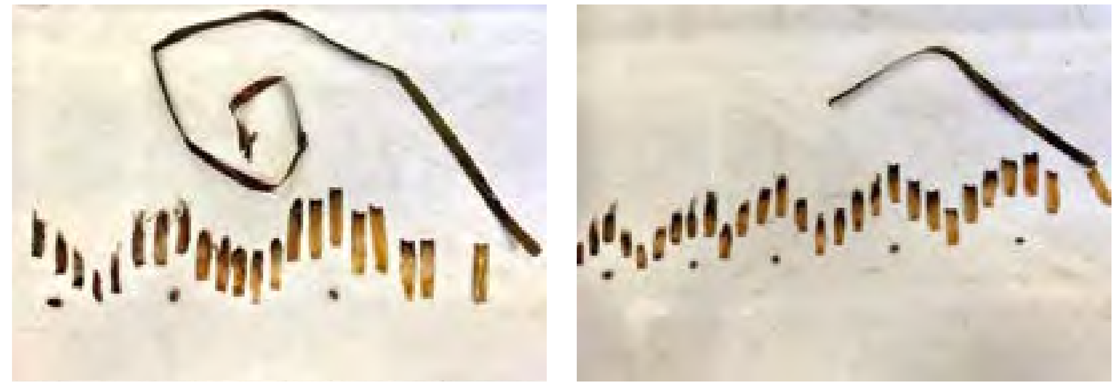


Figure 75
Example of shoots to be processed for the lepidochronological analyses; on the left-hand side is Shoot #3, while on the right-hand side is Shoot #9.

Figure 76
Leaves (on top) and rhizomes (on bottom) before being stoved (on the left-hand side) and after (right-hand side).

The grain size analyses performed of the sediment highlighted that, around the lower limit, very fine sands (0.063-0.125 mm) are the dominant sediment components (67.18%), with a presence of fine sand (0.125-0.250 mm) in 15.15% and clay and silt (< 0.063) accounting for 15.55%. The organic content of such sediment resulted of 95.0 ± 4.8 %. The laboratory testing reports (grain size and organic content of sediment) are provided in APPENDIX H.

According to the results of the analyses carried out both *in situ* and in laboratory and the indexes proposed by Pergent (2007), the status of the meadow in Mellieha Bay can be considered as generally good, where the light penetration seems to be the main limiting factor.

It is suggested to perform a monitoring every 3 years as a minimum.

5.3.2. Monitoring network on coralligenous assemblages at Filfla

According to the document RAC/SPA-UNEP/MAP (2014) elaborated within the MedMAP Project by Garrabou *et al.,* the coralligenous monitoring network aims to produce a series of useful information to elaborate and implement efficient measures for the habitat conservation, in particular: (i) estimate the conservation status of the habitat; (ii) assess the temporal trend of habitat changes; (iii) plan appropriate measures to minimize the impacts; (iv) assess the effect of selected measures and, if necessary, (v) re-fix strategy according to the monitoring results.

The periodicity of monitoring should be every 3 years as a minimum.

The layout and subtitles of the following sections was organized according to the methodology proposed in RAC/SPA-UNEP/MAP (2014).

5.3.2.1. Site features and area delimitation

Based on the results of geophysical survey (especially multibeam 3D rendering) and a preliminary SCUBA divers visual inspection, the Stork Rock (close to Fifla island) was identified as appropriate for the setting-up of the coralligenous monitoring station. Stork Rock is a submerged rock mass with bathymetries measuring 8-9 m in the highest part and 42-45 m at the base. A 3D image shoving the submarine morphology of the Stork Rock is available in Figure 77. The monitoring station was positioned under an easily recognizable arch in the western part of the Stork Rock at a depth between 26 m and 21 m depth. The monitoring station is positioned at the following coordinates: 14°24.654' and 35°46.823'.

The monitoring station is located in an about vertical wall that in some parts have also a slope of 120° creating shallows areas. In addition, the station is partially covered by an arc and therefore is characterized by an important shadow. This has favored the development of a sciaphilous fauna and flora.

The **temperature** recorded in the site (September 8, 2020) from the surface to 26 m depth was 24.9 °C along all the profile.

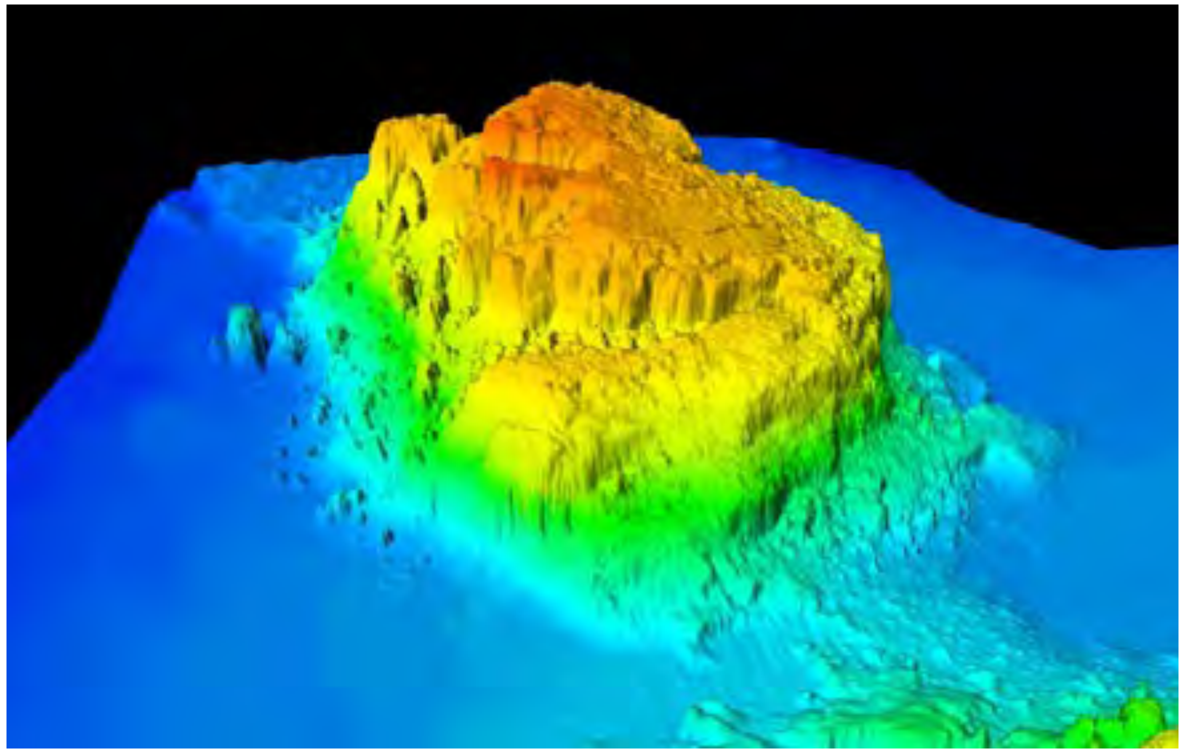


Figure 77

Detail of the morphology of the Stork Rock. The 3D image was produced by the Multibeam survey carried out within the present Study.

5.3.2.2. Habitat species/categories composition and abundance

Gorgonians were not found in Malta during the biological survey and according to the interviews carried out with local SCUBA divers, they are not present, at least within the bathymetry of 50 m. According to the observation carried out, also other arborescent species are not particularly spread in the hard bottom of Malta. The coralligenous monitoring station has been located in a shadow area where some species typical of coralligenous assemblages were present. Habitat complexity in the station is quite limited, especially because the absence of gorgonians and other arborescent and massive species.

In particular, the green algae *Palmophyllum crassum* and several red algae (e.g. *Lithophyllum stictiforme; Mesophyllum expansum; Peyssonnelia rubra*) are relatively abundant in the coralligenous monitoring station. Cnidarian (e.g. *Caryophyllia inornata, Leptopsammia pruvoti, Madracis pharensis*) briozoa like *Myriapora truncata* and the echinoderm *Centrostephanus longispinus* were also observed in the monitoring station. The complete list of the species observed by analysing the photoquadrats is available in Table 7 including the frequency of occurrence for each species. Other species present in the station, but not included in the photoquadrats are listed in Table 8.

The target species include both the species listed in Annex II and III of the SPA/BD Protocol and those indicated in other international Conventions (including the CITES) and Directives. The IUCN Mediterranean Status of the species observed, when available, is also reported. The algae of genus *Sargassum* and two species of Cnidaria (*Caryophyllia inornata* and *Madracis pharensis*) belong to the group of the target species according to the abovementioned criteria. The covering percentage of target group of species (Algae and Cnidaria) are reported in Table 9.

In APPENDIX I the images of all the photoquadrats and the list of observed species in each photoquadrat are available.

In general, in the rocky area surrounding the coralligenous monitoring station the sea urchin *Centrostephanus longispinus* is widespread, while the most common porifera is *Agelas oroides*. *Hermodice carunculata* is widespread everywhere. Finally, the presence of the coral *Cladopsammia rolandi*, always in association with *A. calycularis*, must be underlined.

Table 7
Frequency of occurrence of each species classified on the photoquadrats. The frequency for each unit is reported.

Taxa/Species	Frequency			IUCN Status (Mediterranean)	Legal status
	Unit 1 (%)	Unit 2 (%)	Unit 3 (%)		
Algae					
Encrusting coralline algae	*100*	*100*	*100*	-	-
Brown algae n.d.	*100*	*100*	*100*	-	-
Dictyopteris polypodioides	*60*	*40*	*30*	-	-
Encrusting Corallinaceae on other algae	*70*	*10*	*10*	-	-
Flabellia petiolata	*80*	*80*	*70*	-	-
Halimeda tuna	*70*	*20*	*60*	-	-
Halopteris sp.	*30*	*10*	*20*	-	-
Lithophyllum stictiforme	*100*	*90*	*100*	-	-
Mesophyllum expansum	*100*	*100*	*100*	-	-
Nereia filiformis	*10*	*0*	*0*	-	-
Palmophyllum crassum	*100*	*100*	*100*	-	-
Peyssonnelia rubra	*100*	*20*	*80*	-	-
Peyssonnelia spp.	*100*	*100*	*100*	-	-
Peyssonnelia squamaria	*0*	*0*	*10*	-	-
Pseudochlorodesmis furcellata	*0*	*0*	*20*	-	-
Red algae with soft thallus	*100*	*100*	*100*	-	-
Sargassum sp.	*10*	*0*	*10*	-	*Potentially in **SPA/BD Protocol** (Annex II)
Valonia sp.	*20*	*0*	*20*	-	-
Zonaria tournefortii	*20*	*30*	*20*	-	-
Porifera					
Agelas oroides	*40*	*60*	*100*	-	-
Cliona sp.	*0*	*10*	*0*	-	-
Cliona schmidti	*10*	*50*	*10*	-	-
Cymbaxinella damicornis	*10*	*90*	*20*	-	-
Encrusting sponges	*10*	*10*	*30*	-	-
Massive sponges n.d.	*50*	*40*	*40*	-	-
Pleraplysilla spinifera	*0*	*10*	*0*	-	-
Spirastrella cunctatrix	*0*	*0*	*30*	-	-
Cnidaria					
Caryophyllia inornata	*0*	*10*	*0*	*LC*	**CITES** (Appendix II)
Madracis pharensis	*0*	*0*	*60*	*DD*	**CITES** (Appendix II)
Polychaeta					
Hermodice carunculata	*0*	*20*	*0*	-	-
Polychaeta n.d.	*10*	*0*	*0*	-	-
Mollusca					
Felimida krohni	*0*	*0*	*10*	-	-
Felimare tricolor	*0*	*0*	*10*	-	-
Bryozoa					
Myriapora truncata	*70*	*70*	*30*	-	-
Bryozoa n.d.	*30*	*0*	*20*	-	-
Schizomavella mamillata	*10*	*0*	*10*	-	-
Tunicata					
Halocynthia papillosa	*0*	*0*	*10*	-	-

* Impossible to determinate species in field, as a precaution considerable in SPA/BD Protocol (Annex II)

IUCN Status DD= Data Deficient

Table 8
Other species not included in the photoquadrats observed in the coralligenous monitoring station.

Taxa/Species	IUCN Status (Mediterranean)	Legal status
Foraminifera		
Miniacina miniacea	-	-
Algae		
Amphiroa rigida	-	-
Brown algae felt	-	-
Caulerpa cylindracea	-	-
Cladophora sp.	-	-
Codium bursa	-	-
Cystoseira sp.	-	-
Dictyota cf. Implexa	-	-
Dictyota dichotoma	-	-
Padina pavonica	-	-
Phyllariopsis brevipes	-	-
Sporochnus pedunculatus	-	-
Halopteris scoparia	-	-
Zanardinia typus	-	-

Taxa/Species	IUCN Status (Mediterranean)	Legal status
Porifera		
Ircinia variabilis	-	-
Cnidaria		
Leptopsammia pruvoti	**LC**	**CITES** (Appendix II)
Cladopsammia rolandi	**DD**	**CITES** (Annex II)
Poliychaeta		
Protula tubularia	-	-
Serpula vermicularis	-	-
Bryozoa		
Reteporella grimaldii	-	-
Echinodermata		
Centrostephanus longispinus		**EU Habitats Directive** (Annex IV) **SPA/BD Protocol** (Annex II) **Bern Convention** (Annex II)

LC = Least Concern; DD = Data Deficient

Table 9
Photosampling - Quantitative cover data (calculated %) for target species (protected algae and protected corals).

Unit 1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	Average
Algae %	-	-	-	-	-	-	-	-	20	-	2.00
Cnidaria %	-	-	-	-	-	-	-	-	-	-	-
Unit 2	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**	**Average**
Algae %	-	-	-	-	-	-	-	-	-	-	-
Cnidaria %	-	-	-	-	-	-	-	0.5	-	-	0.05
Unit 3	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**3.10**	**Average**
Algae %	-	-	-	-	-	-	-	-	-	6	0.60
Cnidaria %	2	7	3	-	2	-	-	4	11	-	2.90

In different photoquadrats it was impossible to distinguish between Sargassum sp. and some species of Dictyopteris sp. It is possible the presence of poorly developed thalli of these species, but they are not included in the quantitative cover data.

5.3.2.3. Degree of complexity of the coralligenous habitat Basal layer and intermediate layers

The cover of the basal and intermediate layers was assessed by analysing the photoquadrats and assigning a value of cover to the two layers (basal and intermediate) for each photoquadrat.

According to the estimation, the **basal layer** covers 85.5%, 74,5% and the 64.5% of the analysed surface areas (Units 1, 2 and 3) corresponding to an average value (medium value between the three units) of **75% of the surface area**.

The **intermediate layer** occupies 15.5%, 25.5% and 35.5% of the surface corresponding to an average value of the **25% of the surface area**.

Table 10
Photosampling – Basal layer and intermediate layers estimation of the cover percentage.

Unit 1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	Average
Basal Layer %	95	100	95	95	100	95	95	80	55	45	85.5 %
Interm. Layer %	5	0	5	5	0	5	5	20	45	65	15,5 %
Unit 2	**2.1**	**2.2**	**2.3**	**2.4**	**2.5**	**2.6**	**2.7**	**2.8**	**2.9**	**2.10**	**Average**
Basal Layer %	95	90	80	80	95	75	90	80	30	30	74.5 %
Interm. Layer %	5	10	20	20	5	25	10	20	70	70	25.5 %
Unit 3	**3.1**	**3.2**	**3.3**	**3.4**	**3.5**	**3.6**	**3.7**	**3.8**	**3.9**	**3.10**	**Average**
Basal Layer %	60	80	50	60	85	75	50	60	85	40	64.5 %
Interm. Layer %	40	20	50	40	15	25	50	40	15	60	35.5 %

Erect layers

The estimation of the erect layer recorded during the 3 visual transects are reported in the table below.

Table 11
Data obtained with visual census for the erect layer assessment.

Transect	Depth	Category									
		M1	M2	M3	M4	M5	M6	M7	M8	M9	M10
TR1	18 m	1	1	1	1	1	1	1	1	1	1
TR2	21 m	1	1	1	1	1	1	1	1	1	1
TR3	22 m	1	2	1	1	2	1	1	1	1	2

Category 1 = No colonies per m2; Category 2 = 1-2 colonies per m2; Category 3: > 2 < 10 colonies per m2; Category 4 = 11-20 colonies per m2; Category 5 = >20 colonies per m2

According to the methodology (RAC/SPA-UNEP/MAP, 2014) the following scores are assigned for each category: Category 1 = 0; Category 2 = 1; Category 3 = 2; Category 4 = 3; Category =4.

The total scores per transect are the sum of the 10 scores defined for each square meter. According to the following scale the cover was defined for each transect: Total score value 0 – Cover = Null; total score value 1-10 – Cover = Low; Total score value 11-20 – Cover = Medium; Total score value >20 – Cover = High.

In the coralligenous monitoring station in Malta the erect layers obtained the following total scores: **TR1 = 0 (Null), TR2 = 0 (Null); TR3 = 3 (Low).**

All the obtained total scores correspond to "**Null cover of erect layers**" in two transects and "**Low cover of erect layers**" in one transect.

Considerations

According to the results obtained for the basal, intermediate and upper (erect) layers, in the coralligenous monitoring station, the degree of complexity of the habitat structure is quite low. This limited degree of complexity of the coralligenous in Malta was observed also in the other areas investigated during the biological survey and it is probably one features of the coralligenous in this zone. At greater depths, around 40 m, the complexity seems to increase a little, but it is always limited due to the limited presence of relevant intermediate layer and absence, or in any case limited presence, of erect layers (upper layer). Localized and with limited extension, in the rocky area below and around the coralligenous monitoring station have been found the facies at *Leptopsammia pruvoti, Madracis pharensis and Astroides calycularis*.

5.3.2.4. Bioconcretion – Cover of algal and animal builders

The cover of bioconcretion (encrusting calcareous algae and macroinvertebrates) contributing to the build-up of coralligenous outcrops, is indicated in the Table below. The estimation was made analysing the photoquadrats. The cover of the surface in each Unit (10 photoquadrats) of encrusting calcareous algae and animal builders ranges between a minimum average cover of 41% to a maximum (average cover) of 54% of the surface area**.**

Table 12
Cover (percentage) of bioconcretion in each quadrat.

Unit 1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	Average
Bioconcretion	40	65	60	50	50	60	70	55	55	30	**54%**
Unit 2	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	Average
Bioconcretion	60	55	45	35	30	35	35	30	35	50	**41%**
Unit 3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	Average
Bioconcretion	40	55	40	40	55	55	45	60	75	60	**53%**

5.3.2.5. Bioerosion – Abundance of bioeroders

The only bioeroder identified on the basis of the **photoquadrat** analysis is the sponge *Cliona* spp (present especially with the species *Cliona schmidti*). It is present in the 10% of the photoquadrats of Units 1 and 3 and in the 60% of the photoquadrats of Unit 2.

5.3.2.6. Bioerosion – Effect of bioeroders

Possible effects of bioeroders were observed in 27 of the 30 photoquadrats. When present, the area interested by probably grazing marks range from 3% to 45% of the surface area in photoquadrat 2.7 (Figure 78). Images of all the photoquadrats are available in **Appendix I**.

Table 13
Cover (percentage) of grazing marks in each quadrat.

Unit 1	1.1	1.2	1.3	1.4	1.5	1.6	1.7	1.8	1.9	1.10	Average
Cover % of Grazing marks	20	3	10	20	15	4	5	3	0	10	9%
Unit 2	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.9	2.10	Average
Cover % of Grazing marks	20	20	10	20	20	30	45	40	20	10	23%
Unit 3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	Average
Cover % of Grazing marks	20	5	0	8	25	5	0	3	5	3	7 %

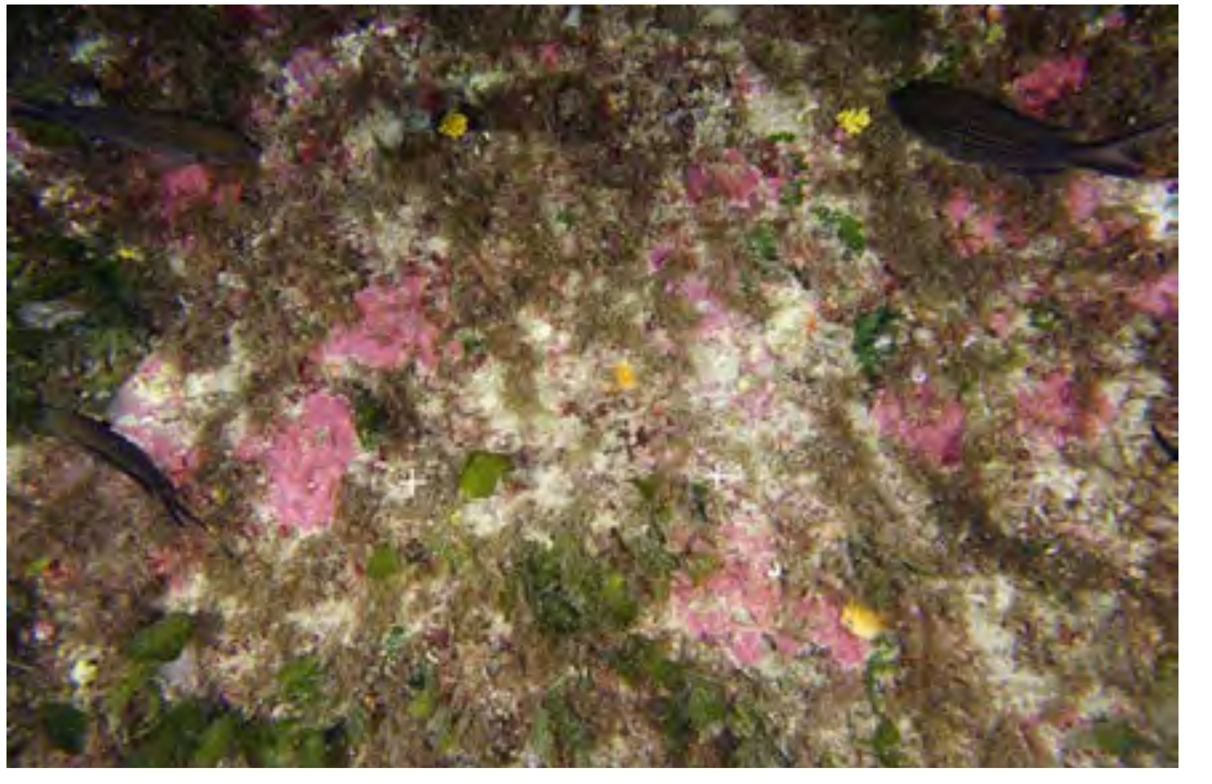


Figure 78
Photoquadrat 2.7; the probable grazing surface concerns about the 45% of the surface area.

5.3.2.7. Bioerosion – Abundance of macro-bioeroders

Totally 2 specimens of the sea urchins *Centrostephanus longispinus* (protected species and macro-bioeroder) were counted during the visual census along the three transects: one specimen was counted in the Transect 1 and one specimen in the Transect 3.

5.3.2.8. Fishing pressure

No fishing gears were observed in the monitoring station. Nevertheless, in the rocky areas surrounding the coralligenous monitoring station, several fishing lines and a piece of fishing net were observed.

5.3.2.9. Sedimentation

The monitoring station is an almost vertical cliff. Sedimentation seems **absent** in the photosampling of Unit 2 and only little sediment is observable in one photoquadrats of Unit 1 (Figure 79) and one of Unit 3. In conclusion the sedimentation is **very limited**; it seems to be related to the normal activity of suspensivorous organisms and doesn't seem to constitute a threat for the coralligenous community in the monitoring station.

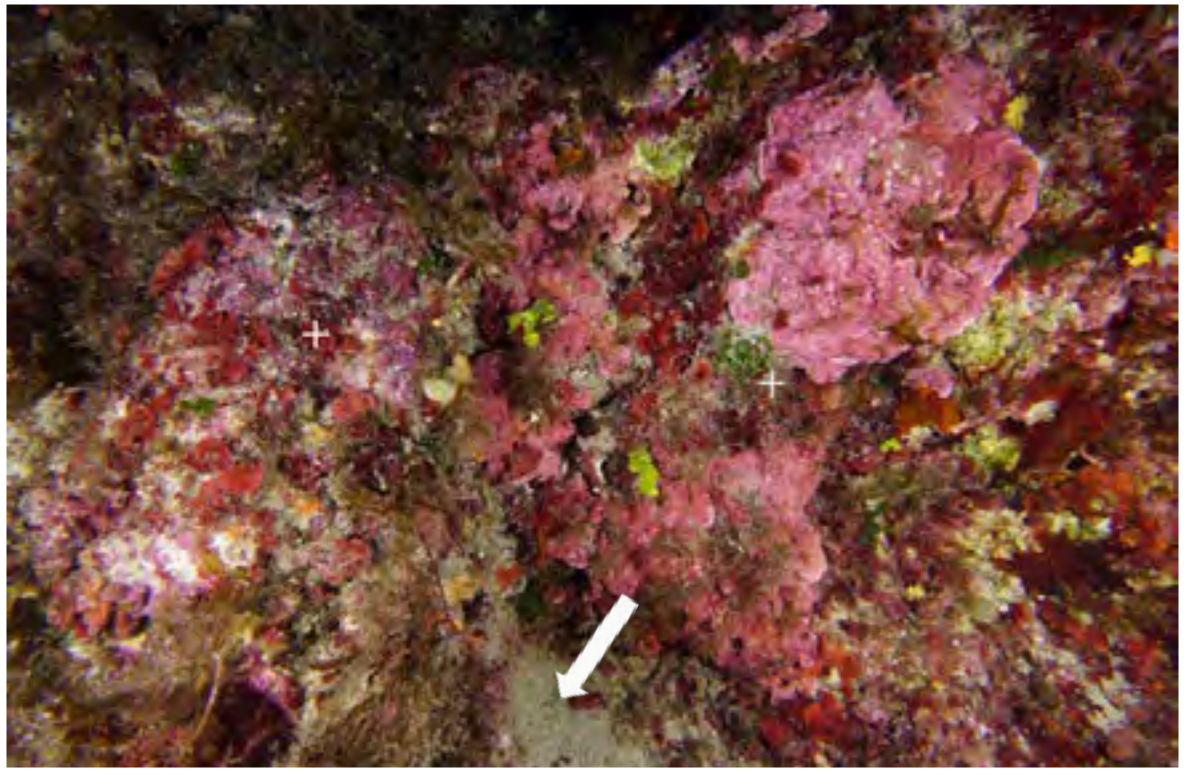


Figure 79
Sedimentation on the photoquadrats 1.2 of the Unit 1 indicated by the white arrow.

5.3.2.10. Conservation status of gorgonian population

Gorgonian colonies were **not present** in the coralligenous monitoring station and nor have been observed in all the other locations investigated during the biological mission. Therefore, the status of the gorgonian population was not assessed.

5.3.2.11. Mucilagenous aggregates

No mucilaginous aggregates were observed in the coralligenous monitoring station.

5.3.2.12. Invasive species

In the photoquadrats were not observed invasive species. Nevertheless, rocky outcrop near the coralligenous monitoring station presented *Caulerpa cylindracea*, an invasive species that has spread throughout the Mediterranean Sea since the early 1990s.

In addition, should be underlined the abundant presence in the area of the fireworm *Hermodice carunculata*. This species is not alien but native of Mediterranean Sea, in any case its distribution is changing and spreading, probably because of global change and rising of temperature of water. The possible ecological and economic impacts are not completely known (Righi, Prevedelli, & Simonini, 2020; Toso, et al., 2020).

5.4. Fish counts

We have to point out that the comments reported below about fish population have some important limitations, being based on observations and visual censuses conducted in a single month (September). It is known that in the Mediterranean Sea coastal fish assemblages are subject to significant seasonal variations. Major observations/counts and seasonal surveys were not compatible with the Project. However, even considering these limitations, the observations/counts on fish assemblages have offered interesting insights and information.

As discussed in 4.5, fish counts were performed in 4 diving locations (3 in Dwejra and 1 in Filfla), all characterised by similar habitats: hard bottom colonised by photophilic algae with enclaves of the coralligenous biocenosis (see 5.2.4). However, visual qualitative censuses were performed in all the diving locations of the study areas.

Results from only fish counts highlight a very limited fish biodiversity and relative size (see APPENDIX J) when compared to the other zones in the Mediterranean (especially the western basin). In all stations, *Chromis chromis* resulted as the most abundant species, as well as the only species showing juveniles. Such results are common for the Mediterranean. While the relative abundances appeared in line with other areas of the Mediterranean, both the species richness and the sized resulted lower. This can be possibly due to both a strong fishing pressure and natural ecological conditions, making the southern portion of the central Mediterranean basin poorer in demersal resources when compared to the northern part or the western basin.

Also, qualitative fish observations (presence/absence) were conducted also during other SCUBA diving activities.

Integrating the fish count operations and the visual observations of fish performed during other underwater activities (SCUBA dives), a total of 29 species were observed in the study areas. All species observed in each diving location are reported in Table 14.

Table 14
Fish species per diving location.

Species	Crocodile Rock – D6	Fungus Rock – D7	Ras il-Wardija – D5	D08	Salini Bay – D01	St. Paul's Bay – D04	Ras ir-Raheb – D9	Frequency [%]
Apogonidae								
Apogon imberbis	X	X	X	X	-	X	X	86
Atherinidae								
Atherina sp.	-	-	X	-	-	-	-	14
Blenniidae								

Species	Crocodile Rock – D6	Fungus Rock – D7	Ras il-Wardija – D5	D08	Salini Bay – D01	St. Paul's Bay – D04	Ras ir-Raheb – D9	Frequency [%]
Parablennius rouxi	-	-	-	-	-	X	-	14
Centracanthidae								
Spicara maena	X	-	-	-	-	-	-	14
Clupeidae								
Sardinella maderensis	-	X	-	-	-	-	-	14
Gobiidae								
Gobius cruentatus	X	-	-	-	-	-	-	14
Labridae								
Coris julis	X	X	X	X	X	X	X	100
Symphodus mediterraneus	X	-	-	X	-	-	X	43
Symphodus ocellatus	X	-	X	X	-	-	-	43
Symphodus roissali	-	-	-	X	-	-	-	14
Symphodus tinca	X	X	X	-	-	-	-	43
Thalassoma pavo	-	-	-	X	-	-	-	14
Moronidae								
Dicentrarchus labrax	-	-	X	-	-	-	-	14
Mullidae								
Mullus surmuletus	-	X	-	-	-	-	-	14
Pomacentridae								
Chromis chromis	X	X	X	X	-	X	X	86
Scaridae								
Sparisoma cretense	X	X	X	X	-	X	X	86
Scorpaenidae								
Scorpaena maderensis	X	-	X	X	-	-	X	57
Scorpaena notata	X	-	-	-	-	-	-	14
Serranidae								
Anthias anthias	X	X	-	-	-	-	-	29
Epinephelus marginatus	X	X	-	-	-	-	-	29

Species	Crocodile Rock – D6	Fungus Rock – D7	Ras il-Wardija – D5	D08	Salini Bay – D01	St. Paul's Bay – D04	Ras ir-Raheb – D9	Frequency [%]
Serranus cabrilla	-	X	X	X	X	-	X	71
Serranus scriba	X	-	X	X	-	X	X	71
Sparidae								
Boops boops	-	X	-	X	-	X	-	43
Diplodus annularis	X	-	-	-	-	-	-	14
Diplodus sargus	-	X	-	X	-	-	-	29
Diplodus vulgaris	X	-	X	X	-	X	-	57
Oblada melanura	-	X	-	X	-	-	-	29
Sarpa salpa	-	-	-	X	-	-	-	14
Tripterygiidae								
Trypterygion delaisi	X	-	X	-	-	X	-	43

Based on the species identified per sampling station, Dwejra appears to be the most biodiverse location, in particular D05 (Crocodile Rock), which shows the highest species richness, followed by D08 (Stork Rock, Fifla), whereas D01 (Salini Bay) appears to be the least biodiverse (Figure 80).

Qualitatively analysing the community composition, the evenest, in terms of number of species per family, appears to be D04 (St. Paul's Bay) and D09 (Ras ir-Raheb, Rdum), as shown in Figure 81. On the contrary, these two sites show limited species richness, when compared with the other sites. Only two species were observed in D01 (Salini Bay) where, surprisingly, no damselfish (*Chromis chromis*), a very common species, were observed. The reason for such situation is not clear but, for instance, based on the qualitative observation of the habitat made by divers and through towed camera (see 5.2.1 and 5.2.3), the *Posidonia oceanica* meadow appeared the mostly suffering, at least at present. This may be one of the causes, an in-depth study is recommended.

The rainbow wrasse (*Coris julis*) was the only species observed in all the sites. Together with the Labridae (which the wrasse belongs to), the Serranidae was the family observed in every surveyed location.

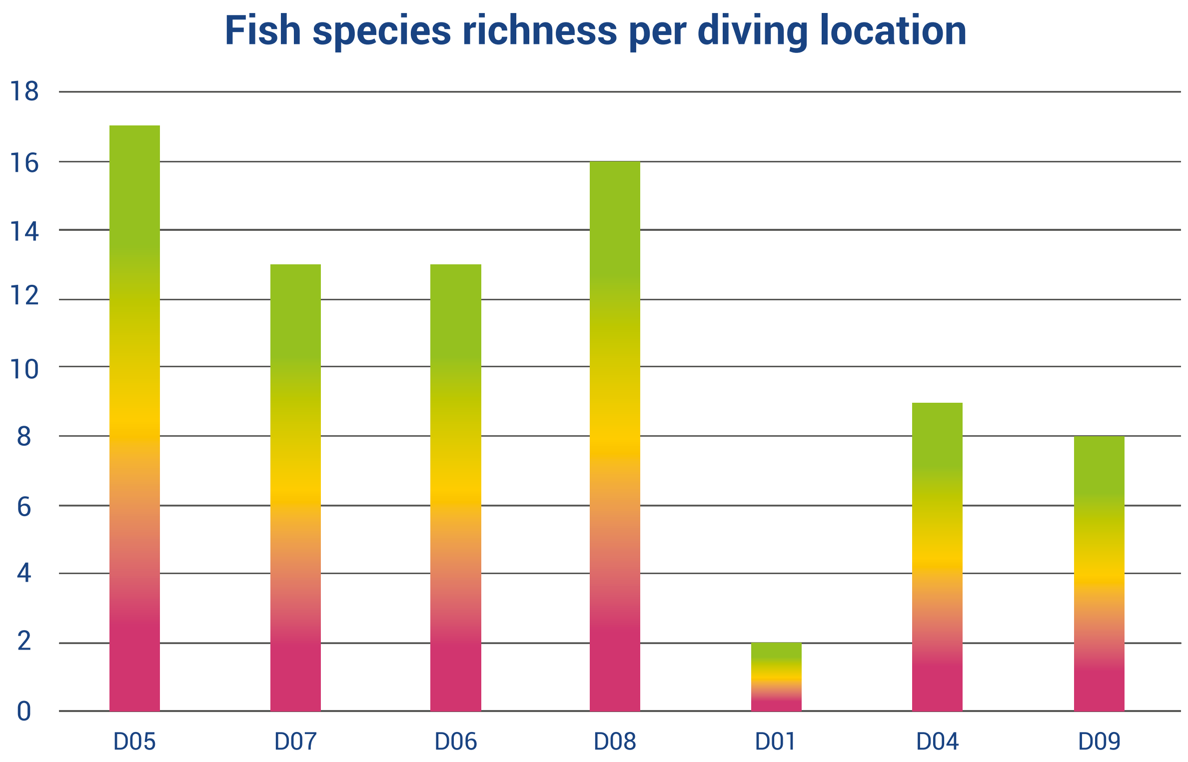


Figure 80

Fish species richness per diving location.

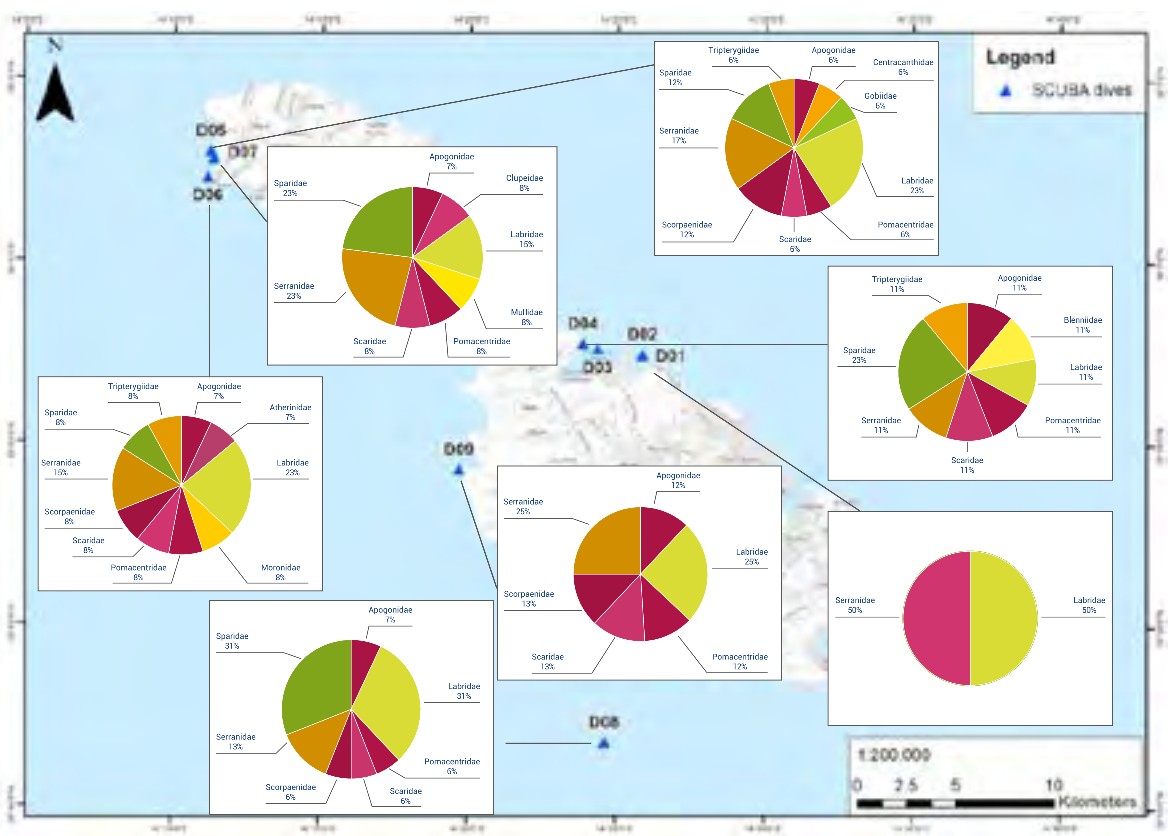


Figure 81

Fish community composition in terms of species per family in each diving location.

Finally, it is noteworthy to highlight that no protected fish species were recorded, except for the dusky grouper (*Epinephelus marginatus*), listed in Annex III of the SPA/BD Protocol and Annex III of the Bern Convention, as well as the strong presence of the thermophilic parrotfish (*Sparosoma cretense*, Figure 80), in every site apart from Salini Bay.

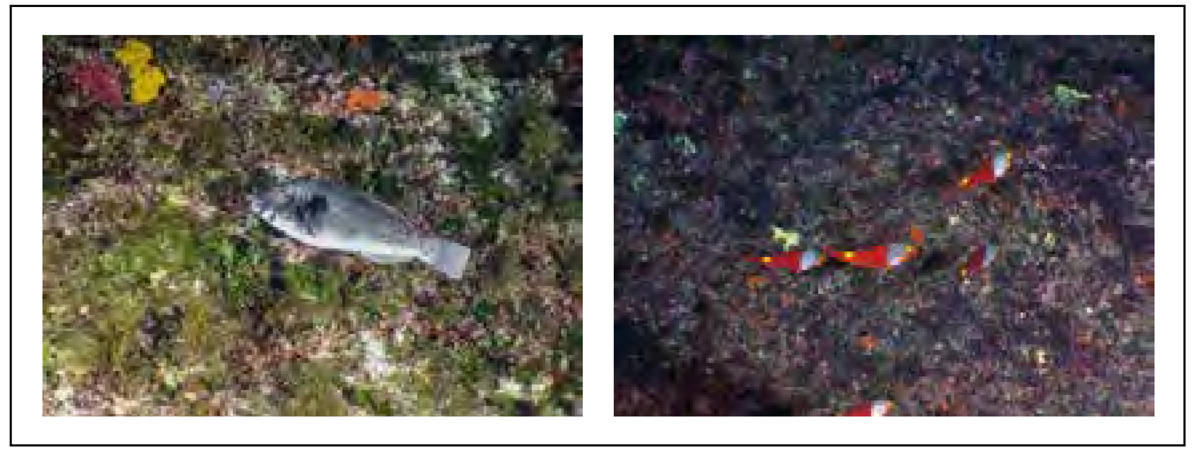


Figure 82

Parrotfish specimens observed in the study areas: a male observed at Filfa (on the left-hand side) and some females observed in Ras ir-Raheb (on the right-hand side).

5.5. Identification, quantification, spatial and temporal distribution of commercial and recreational fishing activities, and unauthorized fishing in the study areas

The fisheries in the study area constitute a relatively small sector, the social significance of which far outweighs its economic importance. Much of the fishing activity is based on traditional methods including the use of trolling lines, set nets, handlines, longlines, pots, traps and squid fishing (kulpara). It is operated on a small scale, producing small volumes of high-value products. The fishery is mainly artisanal and typical of the fisheries found in many Mediterranean countries. For the area MT104, three fishers were interviewed but stated that they did not fish in the study area and in this respect there are no results for MT104.

All vessels used for fishing are required by law (Malta Fishing Vessels Regulations L.425.07, 2004) to be licensed and registered in the Fishing Vessels Register (FVR). The FVR is divided into three main categories as follows: MFA (full-time commercial fishing vessels), MFB (part-time commercial fishing vessels) and MFC (non-commercial, i.e. recreational, fishing vessels). There is also another category "S" which is registered as a sport vessel, that also conduct recreational fishing and is licenced through Transport Malta. The term "full-time" is applied to fishers whose main income is derived entirely from fishing. It should be noted that fishing in Malta is mainly seasonal and consequently some of the full-time fishers own at least one small and one large vessel, which enables them to practice off-shore fishing during the calmer seasons (April – September) and coastal or inshore activities during the winter months. Approximately 26% of the fishing vessels in the Maltese archipelago are based in the fishing village of Marsaxlokk, while 16% are based on the island of Gozo. The rest are based in many different ports around the islands, with a homogenous fishing activity. The only area with a relatively higher fishing intensity is near the port of Marsaxlokk (Sterzmuller *et al.*, 2008).

5.5.1. General Characteristics of the vessels and fishing methods

For the study areas the population of vessels according to the MFA, MFB and MFC category is shown in Figure 83. From this basic information it is very clear that the population of vessels in the study areas, is characterized by the MFC category, hence recreational, with some MFB vessels, and some MFA vessels in the MT105 area. Following the field studies, it was confirmed that most of the activity in the study areas is recreational fishing (85% of the interviews were of the MFC category), and the vessels that operate commercially within the areas operate mostly outside of the boundaries of the study area and hence in more offshore and deeper waters. Furthermore, most of the commercial vessels in this respect are of the part-time category (MFB).

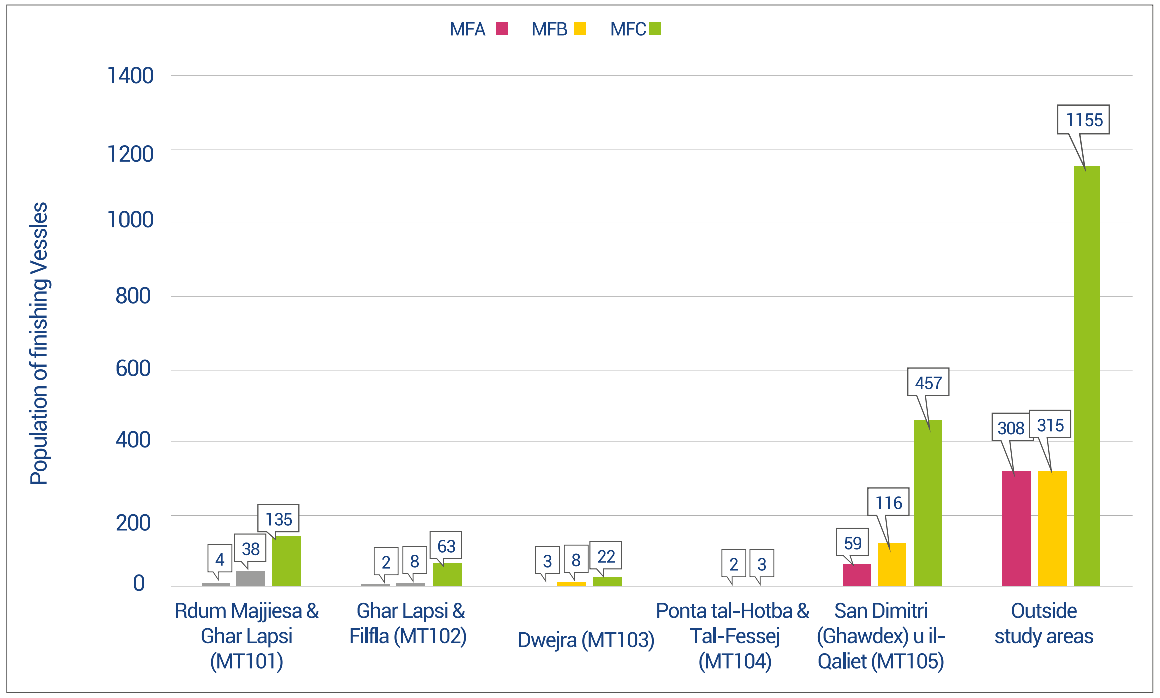


Figure 83

Population of vessels according to the Malta Fishing Fleet Vessel Register 2020 that have the home port based in the various study areas. The figure also shows the rest of the fleet which is based in home ports outside of the study area.

The main fishing activity in the study areas used different types of small-scale fishing gear throughout the year as shown in table 1. Most of the fishers interviewed (94%) fish during the day while 48% fish also during the night. The fishers practice mostly both summer (98%) and winter fishing (71%). For the recreational fishers, fishing is between 1-3 hours, 2-3 times per week and hence incurring lower costs and landing small quantities of catch. The fishers practice coastal fishing for a variety of demersal and pelagic species, including small tuna species and dolphinfish with trolling lines, squids using squid jigging, octopus using traps, and a variety of species of the Sparidae family using bottom longlines and handlines. Gill nets and trammel nest are used to catch a variety of demersal species. This gear was also identified to be used by recreational fishers, which is illegal according to Maltese law. All of the recreational fishers fish within the study areas in which their home port is based. The commercial fishers, both the MFA and MFB category, fish mostly outside the study areas with some fishing activity within the study area.

Table 15

Inventory of the various fishing gear types and practices, in the study areas, showing also the illegal fishing practices. *Flontin is a type of traditional handline using a lead weight and two hooks used to catch either demersal or bottom dwelling species.

Study Area	Fishing gear used (legal)	Illegal fishing gear
Rdum Majjiesa & Ghar Lapsi (MT101)	rod and line, bottom longlines, surface longlines, FAD for dolphinfish, pots and traps, squid fishing, gill and trammel nets, trolling, handline	Gill nets and trammel nets used by recreational vessels Harpoon fishing using SCUBA gear
Ghar Lapsi & Filfla (MT102)	rod and line, flontin*, bottom longlines, pots and traps, squid fishing, gill and trammel nets, trolling, handline, lampara	Gill nets and trammel nets used by recreational vessels Harpoon fishing using SCUBA gear
Dwejra (MT103)	rod and line, flontin*, bottom longlines, pots and traps, squid fishing, gill and trammel nets, trolling, handline,	Gill nets and trammel nets used by recreational vessels
Ponta tal-Ħotba & Tal-Fessej (MT104)	No information	No information
San Dimitri (Għawdex) u Il-Qaliet (MT105)	rod and line, bottom longlines, surface longlines, pots and traps, squid fishing, gill and trammel nets, trolling, handline,	Gill nets and trammel nets used by recreational vessels

Since most of the fishing activity in the areas is recreational the fishers fish in the same way throughout the year. For example, trolling which is the most common recreational fishing gear is done during all the seasons, the difference is mainly in the target species. For example, from August – December dolphinfish (*Coryphaena hippurus*) and small tunas like Little tunny (*Euthynnus spp.*) and Atlantic bonito (*Sarda sarda*) are the main target species.

Fishing for Demersal species is undertaken with different types of gears: gillnets and entangling nets, bottom longlines and traps. Different types of bottom gillnet and entangling nets are used. These are a) trammel net locally known as 'Parit'; b) the 'Xkitt' which is a gillnet; c) 'Xkatlar', a single mesh bottom gillnet. Their use is extended over the whole year. These gears are used both by day and night depending on the particular species being targeted, e.g. demersal species late evening and night, pelagic species during the day.

Bottom longlining and bottom handlining targets several species of Bream (Sparidae spp.), dentex (*Dentex dentex*), groupers (*Epinephelus* spp.) and common red porgy (*Pagrus pagrus*), with by-catches of dogfish (*Squalus* spp.) spotted dogfish (*Mustelus* spp.), skates and rays (*Raja* spp.). Usually these longlines are set in deep rocky areas. Different demersal set longlines are used in Malta, which target species of different sizes. The variations occur in the main line and the size of hooks.

Pots and traps are used to catch a wide range of demersal species and are constructed in different shapes and sizes according to the species being targeted. The material used to construct these traps also varies according to species. For species such as moray eel

(*Muraena helena*) and octopus (*Octopus vulgaris*) the material used is chicken wire netting, whilst for bogue (*Boops boops*), picarel (*Spicara* spp.) and similar species the material used is cane cut into fine strips or special reeds. By catches may include comber (*Serranus cabrilla*), Pandora (*Pagellus* spp.), squid (*Illex coindetti*), cuttlefish (*Sepia* spp.) and weaver (*Trachinus* spp.). Shapes vary according to the habitats of the targeted species, meaning that for demersal species the shape would be rectangular, whilst bell or pear shaped traps are used for mid-water species.

5.5.2. Catch and Effort data

From the questionnaire survey the average daily catch in kg was determined for both summer and winter. The effort data was determined as the hours fished per day and the number of trips per week. Based on this information the annual catch (kg) and effort (days at sea) of the sampled fishers per study area was estimated. Using the information from the fleet vessel register, that included the number of vessels by home port, the population of vessels by study area was determined as shown in Figure 83. In this respect the sample data of catch and effort was raised to the population of vessels and hence the annual catch and effort estimates for the whole study areas was obtained. It is to note that this was done only for the MFC category since enough replicates were available from the questionnaire (85% of the interviews). For the MFA and MFB category since these were rarely encountered in the study area the estimation of catch and effort was not reliable, due to the low number of replicates. Furthermore, these commercial categories fished mostly outside of the study areas. For the commercial category the catch and effort data were obtained from the DCF data that was supplied by the Department of fisheries. Using the catch and effort estimates, the Catch per Unit of Effort in kg per day was estimated. Figure 84 shows the estimated annual catch in the study areas and compared to the annual catch of the commercial small-scale fleet of the Maltese islands. The average of the last three years of data (2016, 2017, 2018) was used for the commercial category. This comparison is important as it clearly shows the low catches observed from the study areas.

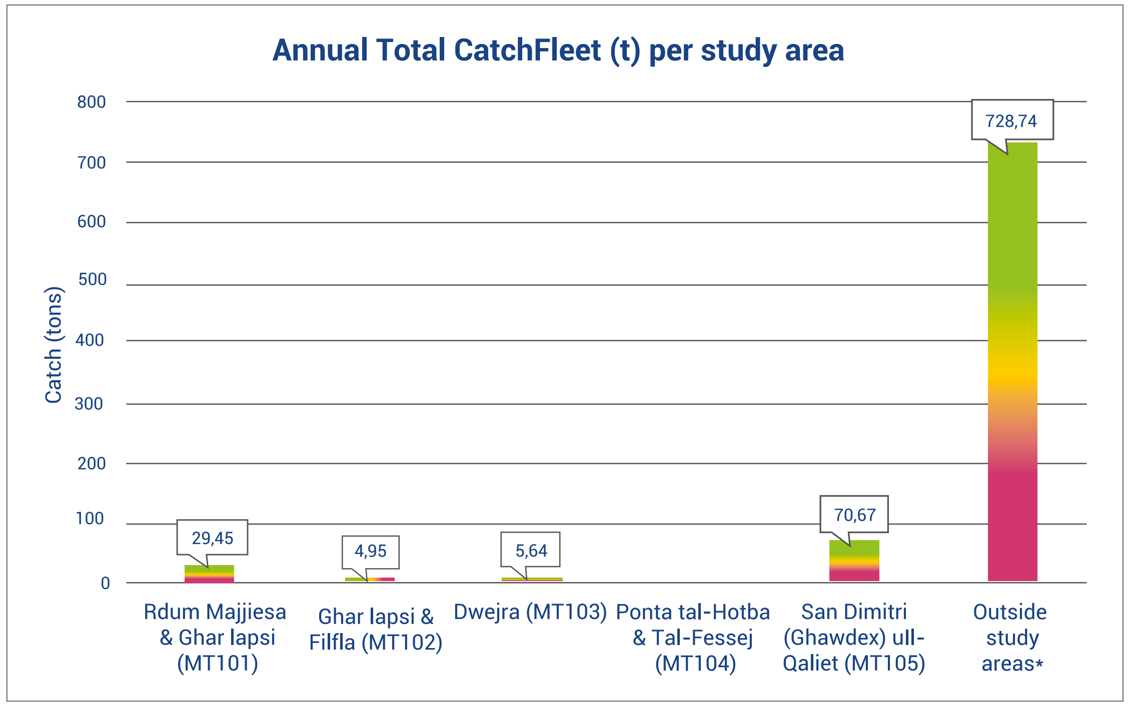


Figure 84

Annual catch data in tons inside the study area for 2019 when compared to the catch data from the commercial small-scale fleet which fishes outside the study areas. *mean data for 2016-2018.

An analysis of the effort data shows a remarkably different result (Figure 85). The effort inside the study areas is in general quite high relative to the catch data, especially for MT101 and MT 105, meaning that the small scale fleet is exerting a considerable amount of fishing pressure inside the study areas, when also considering the low number of vessels and smaller size of the MFC category compared to the rest of the fleet.

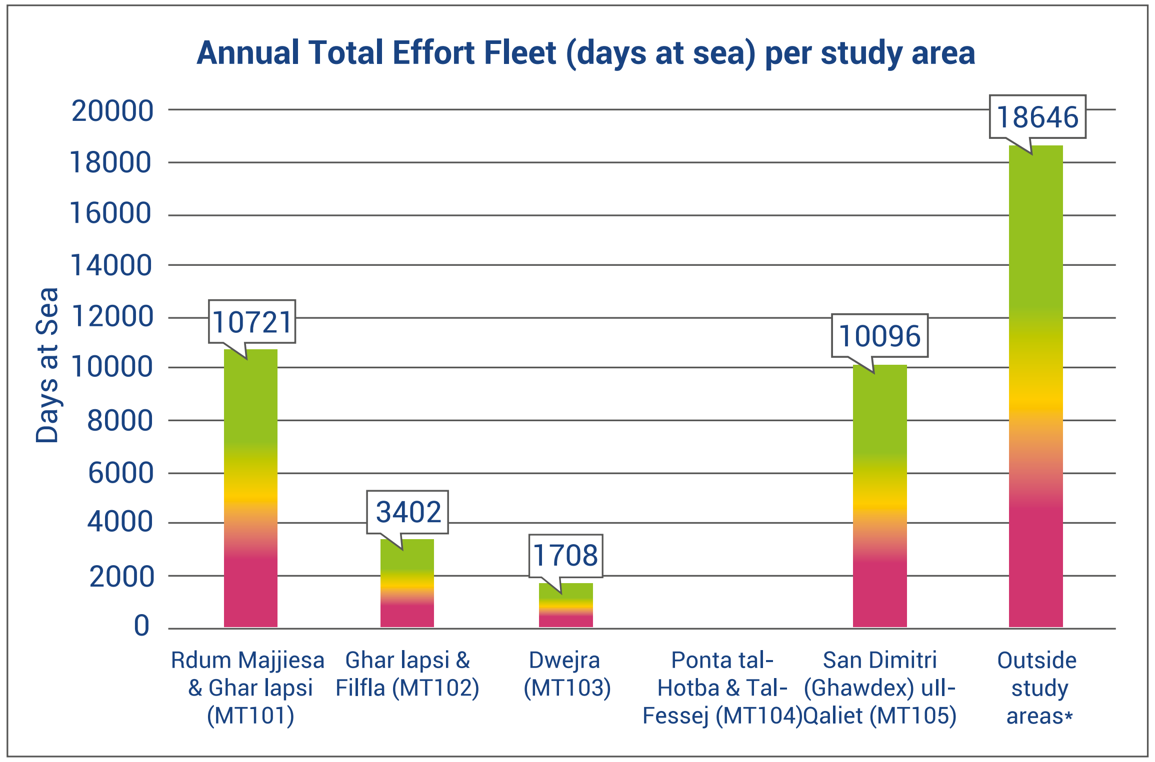


Figure 85

Annual effort data in days at sea inside the study area for 2019 when compared to the effort data from the commercial small-scale fleet which fishes outside the study areas. *mean data for 2016-2018.

Not surprisingly the CPUE estimates inside the study areas show a very low CPUE when compared to the areas outside (Figure 86). This shows that the intensity of fishing and fishing pressure inside the study areas is considerably high when compared to the areas outside, with high effort, reduced catches and hence low CPUE. Furthermore, this was also corroborated with other results, in that the commercial categories interviewed (MFA, MFB) fish outside the study areas, as the CPUE is higher. The recreational fishers can continue fishing inside the study areas with no considerable impact on their fishing activity even with a low CPUE as fishing is a leisure activity, and the objective is to go out fishing and potentially catch some fish. For the commercial categories the issues are quite different as like any other business, the fishers need to catch enough fish in order to make a profit.

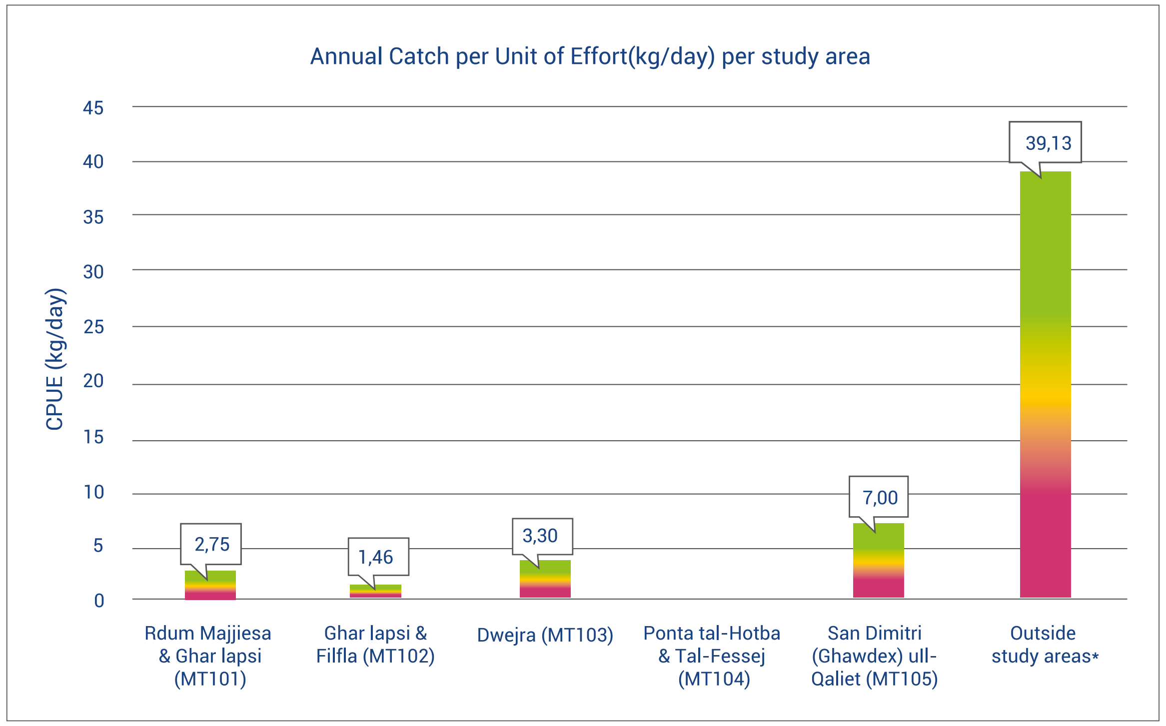


Figure 86

Annual CPUE in kg/day inside the study area for 2019 when compared to the CPUE data from the commercial small-scale fleet which fishes outside the study areas. *mean data for 2016-2018.

A summary of the total fishing effort and annual catch per unit in the study areas is represented in Figure 87

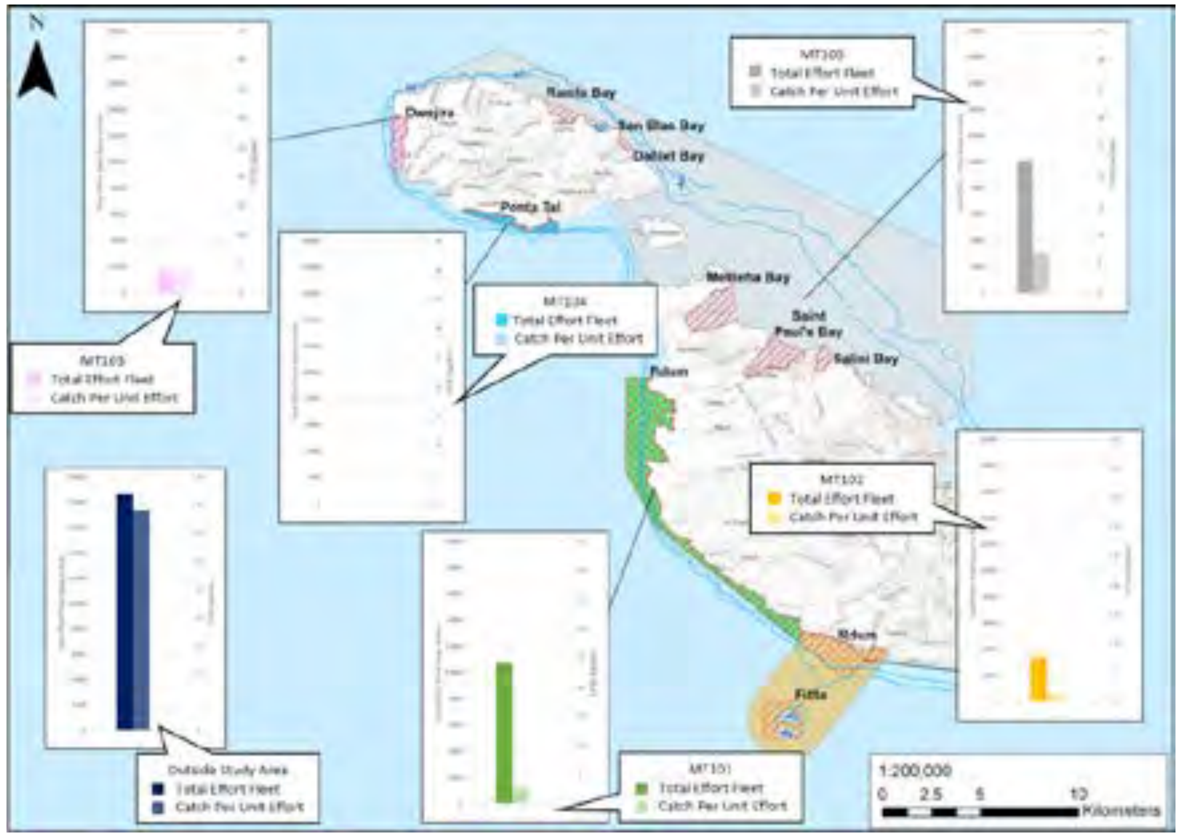


Figure 87
Summary of the total fishing effort and annual catch per unit in the study areas.

5.5.3. Fishers Attitudes and Perceptions

In general, the different categories of fishers had similar attitudes and perceptions towards the opinions when asked about the impact of fishing in the study areas. Most of the fishers (83%) think that the status of the catches has been decreasing in the past 10 years, with only 16% thinking that they have been stable and 1% increasing. The fishers attribute the decline due to a variety of factors, which are listed below. However, the main item which was being mentioned repeatedly by the fishers was the excessive use of nets (parit) and being laid close to the shoreline.

- Chemicals, oil, plastic, sea litter and pollution in general;
- Climate change;
- Overfishing;
- Trawling;
- Increase in recreational fishers;
- Too many fishers;
- Too much fishing using nets;
- Nets being laid close to the shore;
- Nets with too small mesh sizes;
- Harpoon fishing, including using SCUBA gear;

- Big wire traps;
- Technology and fish finders;
- Fish farms;
- Tourism;
- Dolphins.

When the fishers were asked if they think that overfishing affects catch, and size of the fish caught, and if the fishing gear can be harmful to the environment and marine habitats, 93% responded positively, which shows that there is a great awareness on the impact of fishing on fisheries resources and the marine environment. When asked which type of fishing gear is mostly responsible the main responses were also attributed to mainly nets and to some extent trawling. In these replies more explanation was given in relation to nets, that include the following effects:

- Mesh sizes of nets too small;
- Nets that catch small fish;
- Too many nets;
- Large nets;
- Nets too close to the shore;
- Nets being lost and continue to fish (ghost fishing);
- Nets get stuck with the bottom;
- There are cases that the net is left for 3 days, so it catches fish, that then die, and bring in lobsters and crabs .

When asked what could be done to manage overfishing and impacts on habitats most of the fishers mentioned that there should be much more enforcement and a set of proposals and management measures to control fishing with nets, including:

- Reduce the number of fishers using nets;
- Use bigger mesh sizes in nets;
- Enforcement on nets;
- Make a minimum distance from the coast where nets can fish;
- Make a closed season for nets;
- Stop net fishing forever;
- Nets should only be able to fish offshore;
- Limit amount of nets based on the size of the boat;
- Stop recreational fishers using nets;
- Big boats > 20ft should fish at least 5 miles from the coast;
- Enforcement of professional with nets, as there is competition on who throws the largest amount of nets.

When asked about if they were aware that the area, they fish is a marine protected area 69% answered negatively. This shows the lack of knowledge on the protection status of the study areas. The main reason of this could be because in the studies areas in effect there are no management measures and limitation to fishing, and hence no effective protection.

When asked about the setting up of No Take Zones, (NTZ) 76% agreed of the concept, however with some form of compromise. The fishers understood the importance of protection for fish reproduction, growth and to give the marine environment time and space to regenerate and increase the productivity of the area. Some comments with respect to the setting up of NTZs included to leave enough space for recreational fishers to fish, even from onshore, could be temporary or seasonal, and that proper enforcement must be present.

When asked about the impact of a protected area on the fishing activity the replies were mixed and depended on the type of regulations in place in the area. Most of the fishers stated that if the area is completely closed, they would stop fishing altogether, and would not go anywhere to fish and some of them mentioned that they would look for alternative areas. All of the fishers stated that they would continue to fish in the same way using the same fishing gears and practices. 58% of the fishers would have additional expenses if they had to fish in another area and would have about a 20% increase in overall expenses.

5.5.4. Interactions between marine habitats and fishing activities

As previously stated (see 5.5.2), most of the fishing effort is localized outside the study areas where the catches per unit effort are higher, potentially reducing the vulnerability of the surveyed habitats to fishing activities. Despite this, a high abundance of fishing gears was recorded in all surveyed sites where, especially recreational fishing is intense.

As shown in Figure 87 and more in detail in the figures below, the fishing activity performed inside the study areas appears as conducted mostly in sites characterised by posidonia meadows (MT101- north Rdum and MT105 – north-eastern bays including Mellieha, Saint Paul and Salini) and possibly gentle slopes (especially MT105), posing this habitat themselves in a situation of potential threat. However, such threat may be considered as not so much due to the fishing gears used (trawling is not performed in the study areas) rather than the anchoring of the vessels. This is probably especially important for the bays of Mellieha, Saint Paul and Salini while considering that the posidonia is mostly on rock in the MT101 (north Rdum) the impact of anchoring is limited in the Rdum area.

The Coralligenous is almost absent (or very limited present) in the areas subject to the most intense fishing activity and when present in other areas (e.g. MT103 – Dwejra) it is characterized by very limited presence of erect species and it is positioning in shaded zones protected by fishing gears. For these reasons the mechanical impacts on the coralligenous is limited.

The most important interactions between habitats and fishery is the removal of fish, which can potentially cause cascade effects also on habitats structure.

In addition, it is to note that an ongoing illegal fishing activity may be being conducted around the island of Fifla (MT102). The uncontrolled fishing activity in that area may especially impoverish the fish stock.

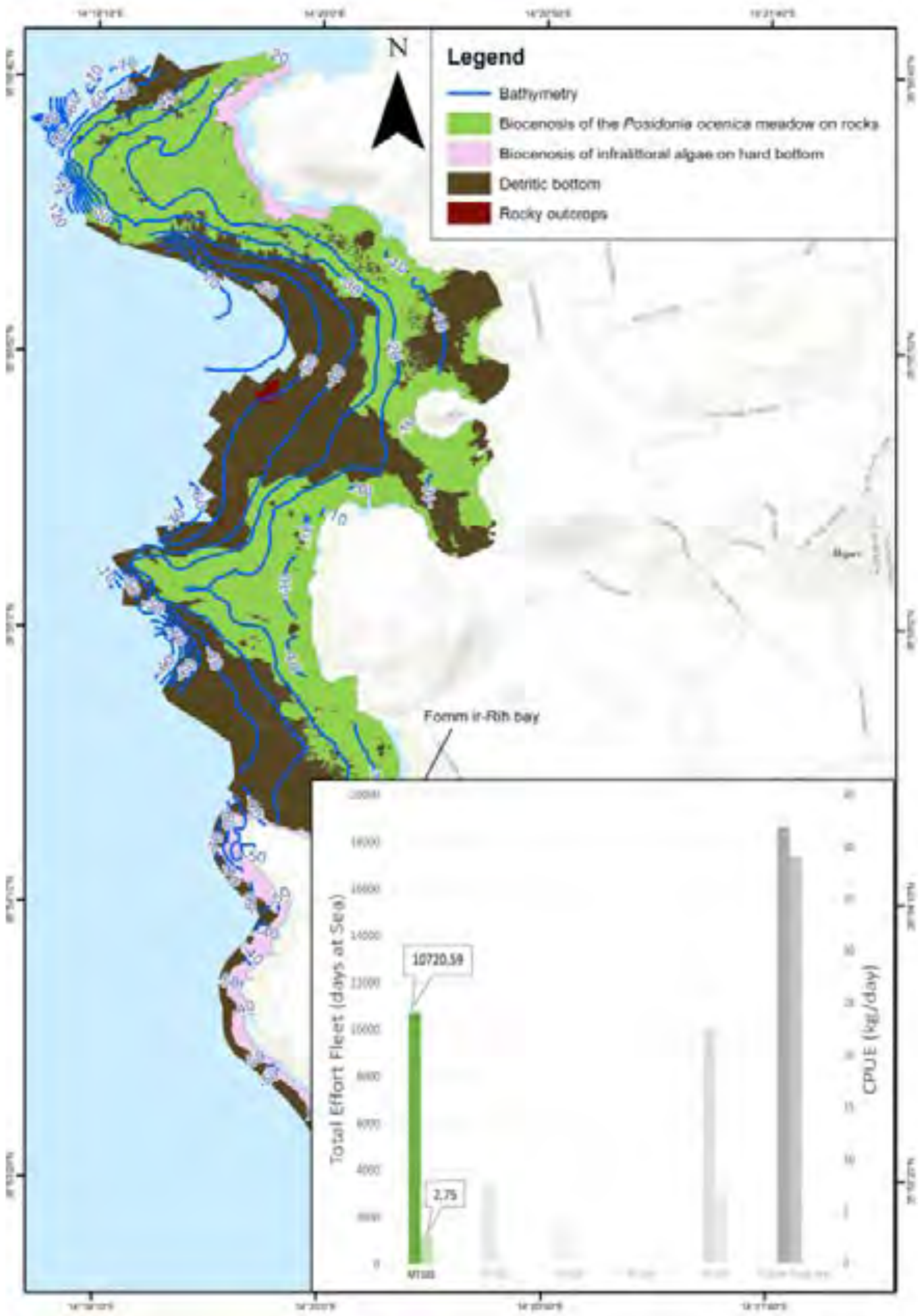


Figure 88

Total effort (darker bars) and CPUE (lighter bars) in relation to the habitat mapped in MT101 (north Rdum).

Figure 89

Total effort (darker bars) and CPUE (lighter bars) in relation to the habitat mapped in MT102 (south Rdum).

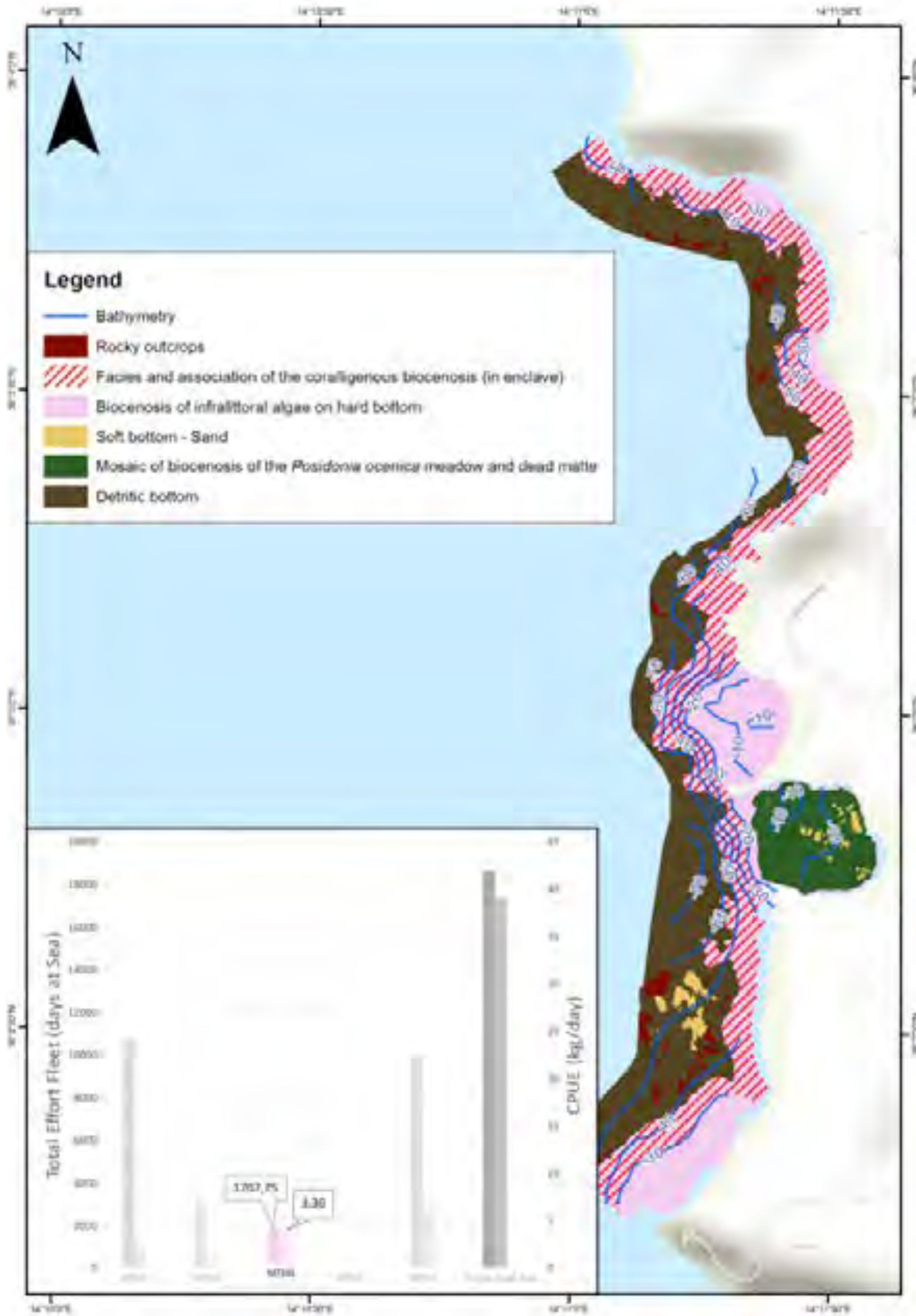


Figure 90

Total effort (darker bars) and CPUE (lighter bars) in relation to the habitat mapped in MT103 (Dwejra).

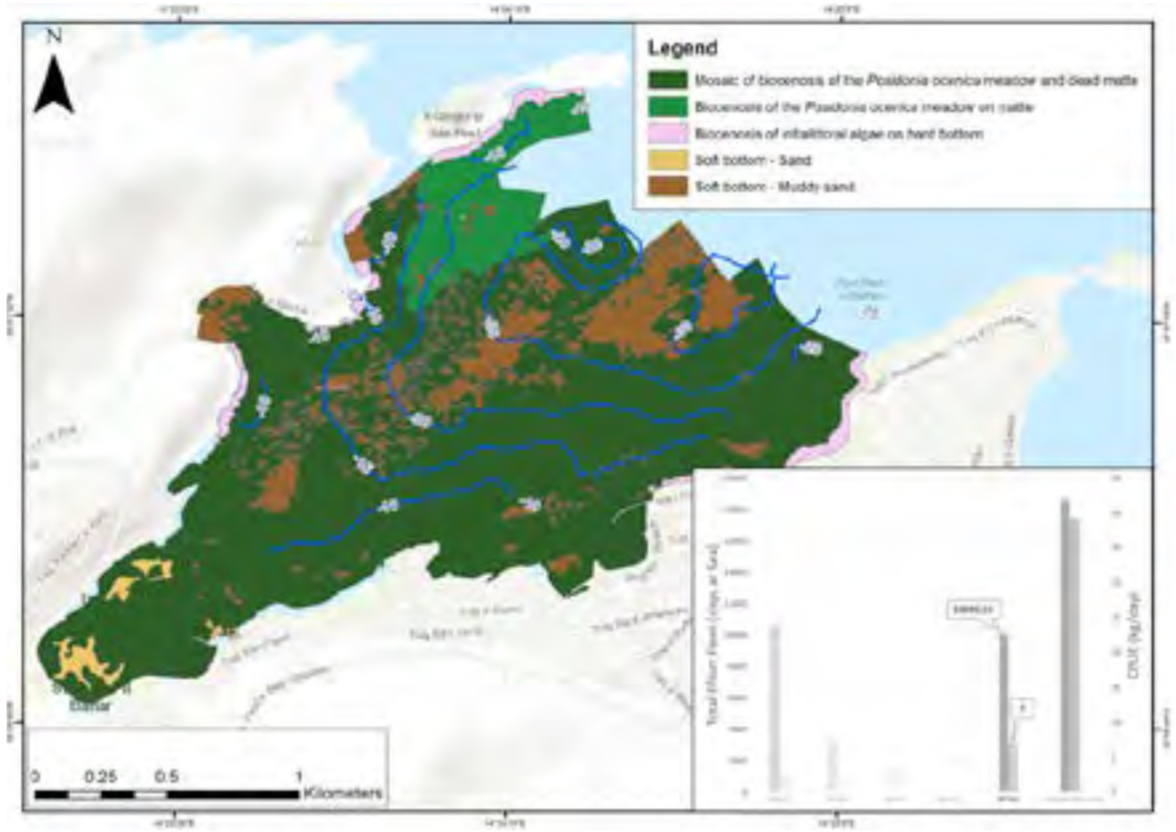


Figure 91

Total effort (darker bars) and CPUE (lighter bars) in relation to the habitat mapped in MT105 (the map shows St. Paul Bay which one of the 6 bays of this MT and is representative of the other bays).

6

6
CONCLUSIONS

This study allowed for outlining a baseline for the study areas (their status, existence and distribution of human pressures). This appears to be particularly important in identifying the existing potential main threats to the Maltese marine biodiversity in order to define the possible strategy for a sustainable management.

6.1. Baseline conditions of the Maltese archipelago

The study highlighted, at least for the areas investigated, a discrete division of the Maltese seascape in two main sectors: the northern to eastern-southeastern sector and the western to southwestern sector, appearing very different in heterogeneity, substrate, and habitat typologies. The human presence along the Maltese shoreline also seems to reflect this discrete division, with high density of cities, buildings and moored boats in the northern to eastern-southeastern sector. The western to southwestern sector appeared less anthropized.

The habitats recorded in all the study areas are listed in Table 16, and can be summarised as follows:

- Soft bottoms, mainly sandy, gently sloping, with very few hard substrates in the northern to eastern-southeastern sector; and
- Rocky substrates interrupted by soft bottoms, mainly detritic, with abrupt changes in depth in the western to southwestern sector.

Table 16
Total extent of the observed marine habitats in all the study areas.

Habitat	Total area [km^2]	Coverage percentages [%]
Association with Cymodocea nodosa	0.02	0.10
Biocenosis of infralittoral algae on hard bottom	3.63	14.11
Biocenosis of the Posidonia oceanica meadow	0.20	0.79
Biocenosis of the Posidonia oceanica meadow on matte	1.20	4.65
Biocenosis of the Posidonia oceanica meadow on rocks	4.76	18.49
Biocenosis of the Posidonia oceanica meadow on sand	0.26	0.99
Detritic bottom	6.43	24.98
Facies and association of the coralligenous biocenosis (in enclave)	0.85	3.30
Mosaic of biocenosis of the Posidonia ocenica meadow and dead matte	5.06	19.65
Potential mosaic of soft bottoms and dead matte	0.01	0.03
Rocky outcrops	0.04	0.14
Soft bottom - Muddy sand	1.54	5.96
Soft bottom - Potential detritic bottom	0.75	2.92
Soft bottom - Sand	1.00	3.88

As shown in Table 16, two Priority Habitats according to the SPA/BD Protocol were recorded within the study areas: the *Posidonia oceanica* meadows and the coralligenous biocenoses. The discrete division between two sectors is reflected in the distribution of these habitats too: *P. oceanica* meadows were mainly distributed in the northern to eastern-southeastern sector, where the coralligenous biocenoses (even in enclave) appeared absent, being mainly distributed in the western to southwestern sector.

The *P. oceanica* meadows are the most common habitat in the northern to eastern-southeastern sector, which reflects the normal situation for the Mediterranean Sea, where Posidonia meadows are the climax habitat of the infralittoral soft bottoms. These meadows were less frequent in the western to southwestern sector, but still they were recorded as the dominant infralittoral habitat in the few bays present and where the bottom slopes more gently, also colonising rocky substrates. This may reflect particular hydrodynamic conditions, where the bays may be a shelter where the substrate may have evolved to favour the colonisation by *P. oceanica*.

Among the observed meadows, the ones located in the northern to eastern-southeastern sector of the island of Malta (i.e. Salini Bay, St. Paul's Bay and Mellieha Bay) show more signs of sufferance (i.e. regression), or at least past regressions. This is particularly evident by sediment strips entering the bays and giving the meadows a U-shape parallel to the shoreline, where the middle of the bay is colonised by bare sediment even if the depth and the sediment itself may be considered compatible with the presence of *Posidonia ocenanica*. Also, in all the three bays, most of the living Posidonia is not in a situation of whole meadow, but in a mosaic with dead matte. However, it is to note that, based on the results of the initiation of the monitoring network for *Posidonia oceanica* (see 5.3.1), the meadow in Mellieha may have found a condition of balance, appearing at present in good status. Based on these data and observation, the regression of the meadow appears to be a past event.

The situation is generally different in the bays of the northern to eastern-southeastern sector of the island of Gozo, where *Posidonia oceanica* appears in most cases in conditions of whole meadows. It is noteworthy, however, that Gozo is generally less anthropized than Malta and that the depth in the bays of Gozo is significantly lower than that of the bays in the island of Malta. On the other hand, Posidonia meadows in the western to southwestern sector, even if less frequent, appear healthier, considering that they seem to colonise all the substrates (mainly rocky substrates) sloping more gently (such as happens in the few bays of the sector) at depths compatible with its life (i.e. up to 30-40 m). The only exception is in San Lorenzo Bay, where the *Posidonia oceanica* is found in mosaic with dead matte. The Bay is strongly frequented by touristic boats and vessels used for recreational purposes, anchoring everywhere in the Bay. The current presence of Posidonia in the whole Bay, however, even if patched with dead matte, may be index that the plant is still healthy (or, at least, that the plant resists) and that a proper management may favour a recolonisation.

For what concerns the coralligenous assemblages, the Maltese seascapes and waters seem not to have the ecological conditions to host important coralligenous biocenoses with erect forms (at least within the isobath of -50 m). Coralligenous assemblages in Malta, in fact, are mostly found in enclaves in the biocenosis of the infralittoral algae, with rather hemi-sciaphilous species and never show important arborescent or erect forms. This can be explained by the clarity of waters in the western to southwestern sector (coralligenous assemblages are absent in the northern to eastern-southeastern sector), allowing for a strong presence of photophilic algae up to 45-50 m of depth. The water temperature may also play a key role, as proven by the high density of *Hermodice carunculata*, a known thermophilic species. It is to note that the absence of a true coralligenous biocenosis within the isobath of -50 m does not mean a complete absence of the true coralligenous around the Maltese archipelago. Due to the aforementioned conditions, this biocenosis may be simply recovered at depths higher than 50 m.

The coralligenous assemblages investigated does not show high impacts due to human activities: the trawler fishing fleet of Malta does not operate in the study areas (see 5.5)

and, even if abandoned fishing gears and lines where observed (artisanal and especially recreational fishery), no mechanical impacts due to fishing gears were observed in the coralligenus habitat. The main reasons are both (i) absence (or very limited presence) of erect species in the Maltese coralligenous assemblage; and (ii) positioning in shaded zones, protected by fishing gears thanks to the morphology of the rocks.

A strong presence of the non-native alga *Caulerpa racemosa* var. *cylindracea* in all the coralligenous assemblages, as well as in all the other infralittoral rocky areas and in part of the detritic bottoms, deserves to be underlined.

As previously mentioned, for both key habitats (*Posidonia oceanica* meadows and coralligenous assemblages), a monitoring network was initiated. This will allow to early detect evolutions (both positive or negative) of the habitats in order to understand the causes and set up the most adequate management measures to stop or reduce a possible regression, as well as to favour and optimise a possible progression.

In addition to the above key habitats, photophilic algae may be considered to constitute a very important habitat in all the study areas, especially in the western to southwestern sector, where it is widely distributed. Photophilic algae cover rocks, in alternation with *Posidonia oceanica* on the most sheltered areas (i.e. bays), from very shallow waters up to 40-50 meters depth. This is the predominant habitat on hard substrates within the study areas, showing sometimes important associations with *Sargassum* ssp. and *Cystoseira* ssp., both protected species listed in the SPA/BD Protocol.

Finally, a significant presence of rocky outcrops was detected by the Side Scan Sonar in the northern and southern portions of Dwejra. Those outcrops appear as structures ranging from few meters to hundreds of meters and emerge from detritic soft bottoms, potentially acting as local hotspot of biodiversity. These outcrops, located at about 50 m depth, would deserve further studies and could be colonized by a more structured coralligenous then the shallower coralligenous in enclaves. Thanks to the investigations carried out within this Study, these rocky outcrops have now all been identified and mapped.

6.2. Potential existing threats

According to the results of the geophysical and biological surveys and of the fishery study conducted, the following considerations about potential threats can be made.

- The dominant habitat on hard substrates is constituted by infralittoral algae communities which are not very sensitive to the mechanical impacts of recreational fishing gears. Also, Posidonia meadows are not particularly sensitive to these typologies of gears (lines and nets). Trawling, which is known to have a strong impact on Posidonia meadows, is not carried out within the study areas.
- Anchoring seems to be the cause of some mechanical impacts on Posidonia meadows (fragmentation), especially in the northern bays (Mellieha, Saint Paul and Salini) and in the San Lorenzo Bay in the south-western coast.
- In the three northern bays (Mellieha, Saint Paul and Salini), Posidonia meadows seem suffering also from anthropization of the coast (e.g. water turbidity; possible discharges), nevertheless, according to the results of the *Posidonia oceanica* analysis conducted in the Mellieha Bay (within the set-up of the

monitoring network), at present the meadows in the Bay does not show evidences of regression. The impact due to coastal development has probably occurred in the past and the present extension of the meadows is, now, in balance with the environmental conditions.

- The presence of aquaculture cages in the bays of St. Paul and Mellieha (see 5.2.5) may contribute to threat the marine habitats of the bays by eutrophication. However, based on the photomosaics provided by the Side Scan Sonar and the visual observations, at present, there are no evidences of ongoing impacts potentially directly caused by the aquaculture cages (at least in their proximity, since the approach to the cages is forbidden). *Posidonia oceanica*, which is known to be strongly affected by eutrophication is, in fact, recorded in proximity of the cages. However, additional in-depth studies (also measuring the currents in the bays) may tell more about the presence of possible ongoing impacts caused by those aquaculture cages.
- Although in Malta a high number of alien species is reported (21 alien species, especially in MT0000105), during the field activity only two alien species were observed: the algae *Caulerpa cylindracea* and *Asparagopsis taxiformis*. *Caulerpa cylindracea* was present in all study areas, whereas *Asparagopsis taxiformis* was reported only in Dwejra (MT0000103). A detailed list of alien species in Malta has been created within the MSFD Initial Assessment (MSFD, 2012) and has been reported in the Report "*Phase I - Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta - Final Report – Report N° 19126259/12415 – November 2019*".
- The abundant presence of the non-native alga *Caulerpa cylindracea* in all the study areas could represent a threat. According to the observation conducted, *C. cylindracea* is often present also on the detritic bottom (at least till 40 - 45 m depth) where the alga forms a sort of net that covers the sediment, making it more compact and altering its mechanical properties. This could have an impact on the habitat (e.g. limiting the possibility of digging into the sediment for some species and altering the species composition of this habitat).
- In addition, it is noteworthy the great presence of *Hermodice carunculata* and *Sparisoma cretense* observed in all the study areas, both native to the Mediterranean Sea, but typical of warmer waters. These species are, in fact, amongst the indicators of the process of 'meridionalization' of the basin and, by expanding their distribution ranges and increasing their abundances in given areas, they might show invasive behavior (Bianchi et al., 2018; Ventura et al., 2019; Righi et al., 2020; Toso et al., 2020).
- Fishing pressure inside the study areas is strong, as confirmed by the low CPUE and visual observations (both limited size and diversity of fish assemblages and physical presences of abandoned fishing gears) and seems to have a relevant impact on fish assemblages: low average size, limited presence of species target of fishing (e.g. grouper) and low CPUE. This fishing pressure is especially due to recreational fishing.
- Despite the fishing pressure, no signs of mechanical damages were recorded on the coralligenous assemblages. This is due to both the typology of the coralligenous assemblages (characterized by the absence or very limited presence of erect forms) and the localization of the coralligenous assemblages (in shaded zones, protected by rocky morphology). As stated in the previous sections, trawling (which is known as one of the most impacting fishing activity) is not performed in the study area. It is forbidden and also limited thanks to the morphology of the bottom (mainly rocky), that prevents this activity to be carried out.

6.3. Possible management actions

The cartography prepared in the scope of this study, along with the biological observations and the results of the study on fishery, in particular the "Fishers Attitudes and Perceptions" (see 5.5.3), allow to make some recommendations for management of the study areas.

- Installation of mooring ballasts in the sites of Mellieha, Saint Paul and Salini (MT101) and in San Lorenzo Bay within Dwejra study area (west side of Gozo Island MT103).
- Monitoring and control of discharges and coastal activities in the bays of Mellieha, Saint Paul and Salini (MT101) to avoid further regressions of Posidonia meadows. The Posidonia monitoring network initiated in Mellieha Bay can constitute an excellent tool for monitoring the status of the meadow in a very sensitive zone.
- As control and management measures, reduction of the pressure of recreational fisheries in all the areas and especially in the bays of Mellieha, Saint Paul and Salini (MT101) and Rdum study area (MT 105).
- Stricter controls on fishing in Filfla. The presence of numerous lines during the surveys indicates the existence of fishing activities that bypass controls, probably recreational fishing.
- Among the most suitable areas for the creation of an MPA there is probably the Dwejra Bay area (MT103), in the west coast of the island of Gozo, mostly because of the presence of rocky outcrops that emerge on the detrital seabed, especially in the northern and southern zones of the study area. Dweira Bay encompasses also other relevant hotspots of biodiversity (e.g. Crocodile Rock). Filfla (MT 102) constitutes another area hosting key habitats and of special interest also for its positioning and morphology of the seafloor (see Appendix D). Both areas represent excellent sites for the creation of MPAs. The available habitat maps can constitute a first basis for defining a zonation of the areas.
- In addition to the abovementioned monitoring of the Posidonia meadow within Mellieha Bay, the coralligenous monitoring network initiated in Filfla needs to be continued (annual frequency if possible or at least every three years). The rocky outcrops mapped in the Dwejra Bay may represent interesting hotspot of biodiversity and needs further biological investigation (e.g. species inventory).

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SPA/RAC WORKING AREAS

SPA/ RAC, the UNEP/ MAP ***Specially Protected Areas Regional Activity Centre****, was created in 1985 to assist the Contracting Parties to the Barcelona Convention (21 Mediterranean contries and the European Union) in implementing the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol).*

POST-2020 SAPBIO

Strategic Action Programme for the Conservation of Biodiversity and Sustainable Management of Natural Resources in the Mediterranean Region

Marine turtles

Cetaceans

Mediterranean Monk Seal

Cartilaginous fishes
(Chondrichtyans)

Marine and coastal bird species
Listed in Annex II of the Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean

SPAMI

Specially Protected Areas of Mediterranean Importance

Specially Protected Areas

Monitoring

Coralligenous and other calcareous bio-concretions

Marine vegetation

Dark Habitats
Habitats and species associated with seamounts, underwater caves and canyons, aphotic hard beds and chemo-synthetic phenomena

Species introduction and invasive species

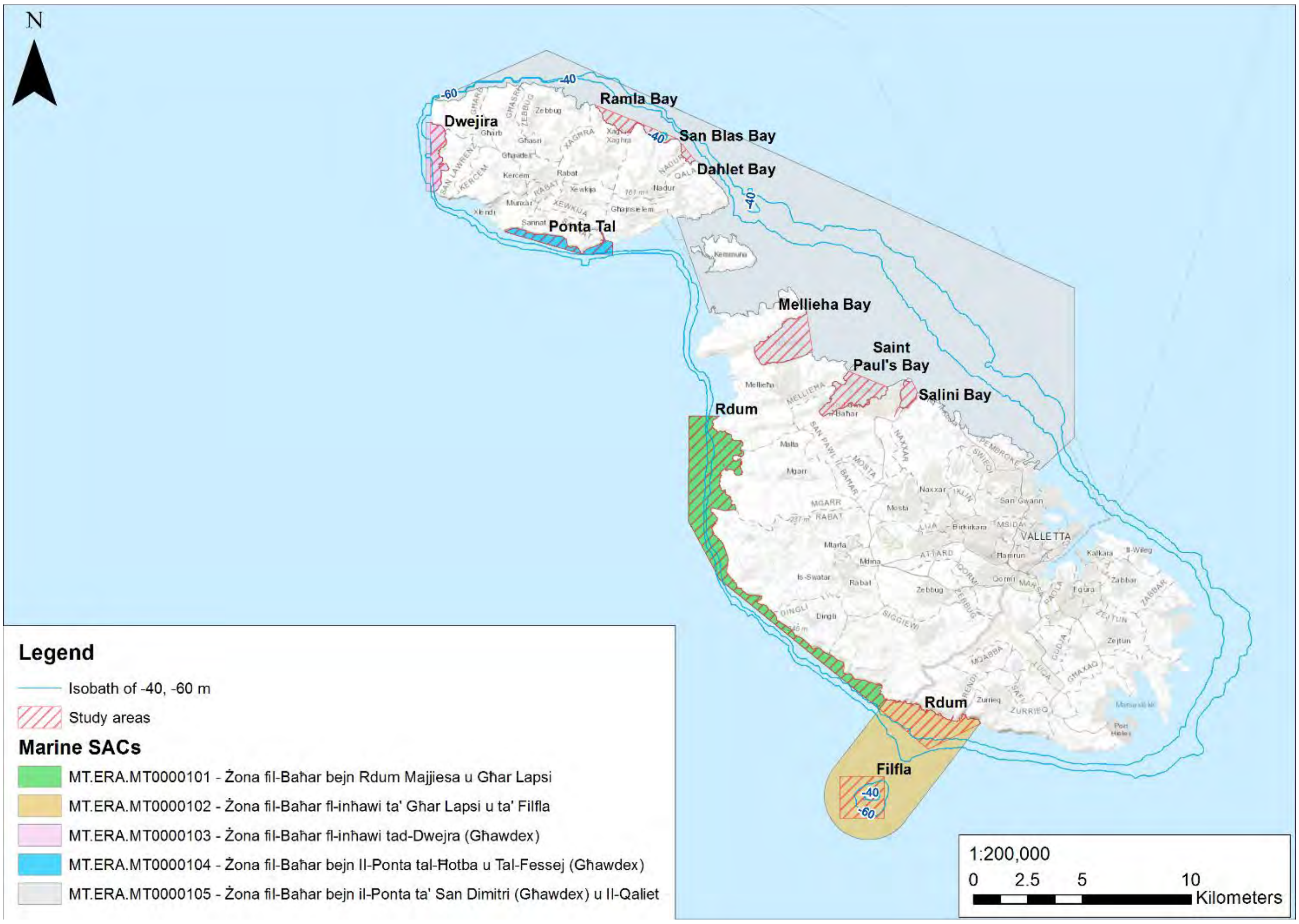
APPENDICES

APPENDIX A	Cartographic appendix
APPENDIX B	Fishing activity questionnaire
APPENDIX C	Letter for the Federation of the Recreational Fishing Co-operatives
APPENDIX D	3-D reconstructions of Filfla
APPENDIX E	Photographic Atlas
APPENDIX F	Results of the lasercalibrated photo analyses
APPENDIX G	Standard Data Form
APPENDIX H	Laboratory testing reports
APPENDIX I	Photos and results of the initiation of the monitoring networks
APPENDIX J	Results of the fish counts
DIGITAL ANNEX	Data provided in digital format in annex to this document

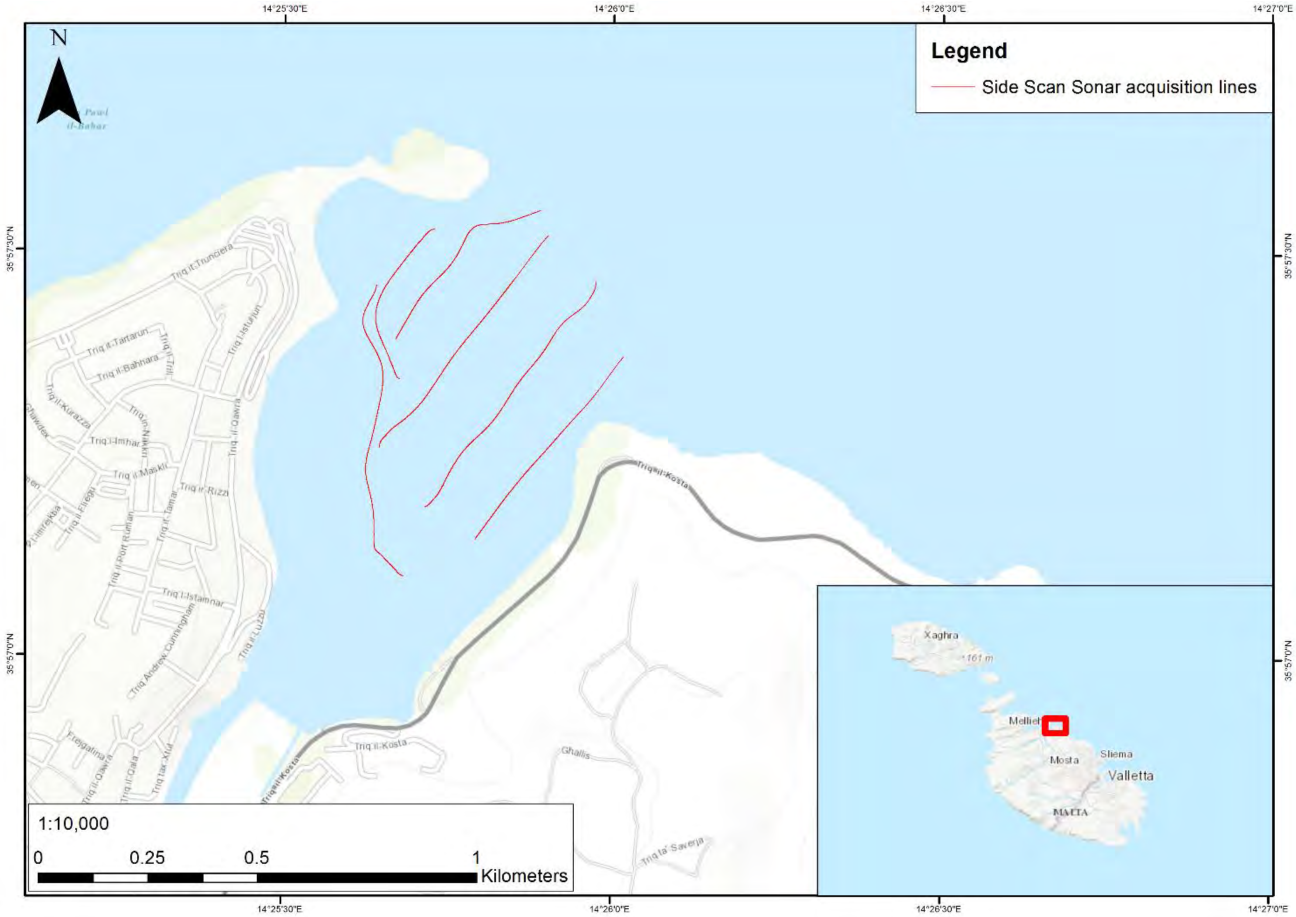
APPENDIX A

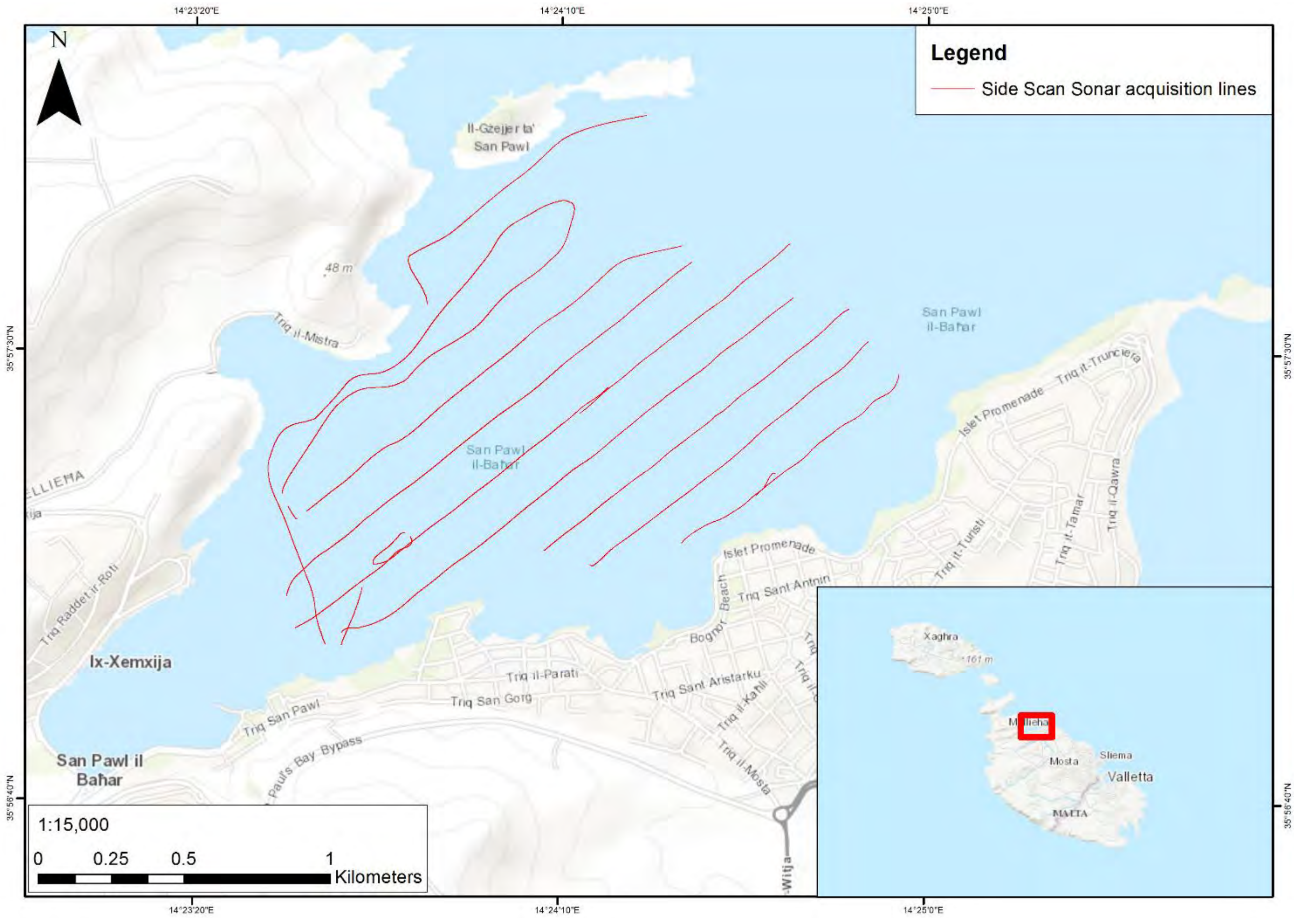
Cartographic appendix

The study areas considered in the Study



Side San Sonar acquisition lines

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14°24'10"E
14°25'0"E
35°57'30"N
35°56'40"N
N
Legend
Side Scan Sonar acquisition lines
Il-Gzejjer ta' San Pawl
48 m
Triq il-Mistra
San Pawl il-Baħar
Islet Promenade
Triq it-Trunciera
Triq il-Qawra
Triq it-Tamar
Triq it-Turisti
Triq Sant Antnin
Bognor Beach
Triq Raddet ir-Roti
Ix-Xemxija
Triq il-Parati
Triq San Ġorġ
Triq Sant Aristarku
Triq il-Kaħli
Triq San Pawl
St Paul's Bay Bypass
Triq il-Mosta
San Pawl il Baħar
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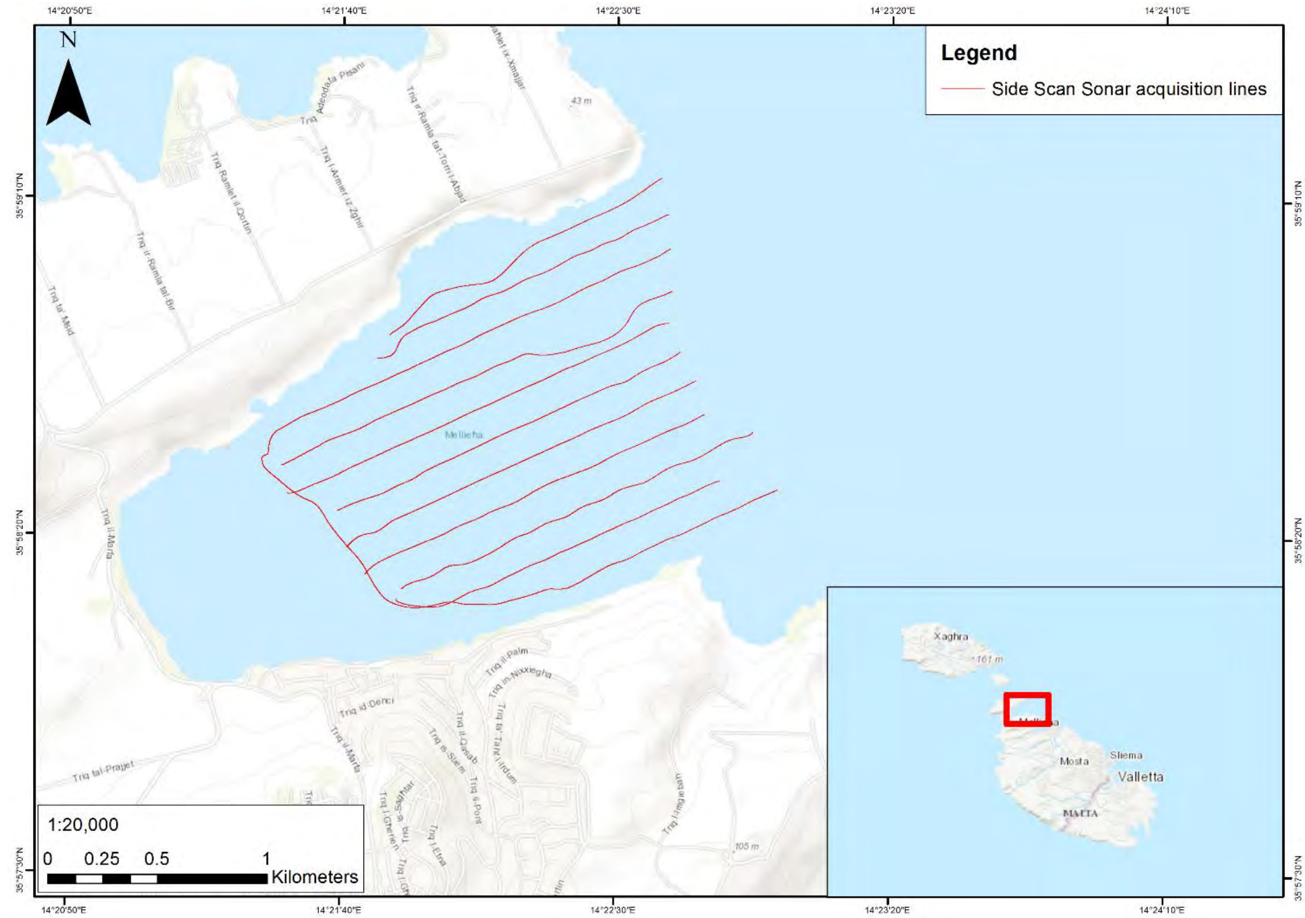
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA


Legend
Side Scan Sonar acquisition lines
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0 0.25 0.5 1
Kilometers
14°20'50"E
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14°22'30"E
14°23'20"E
14°24'10"E
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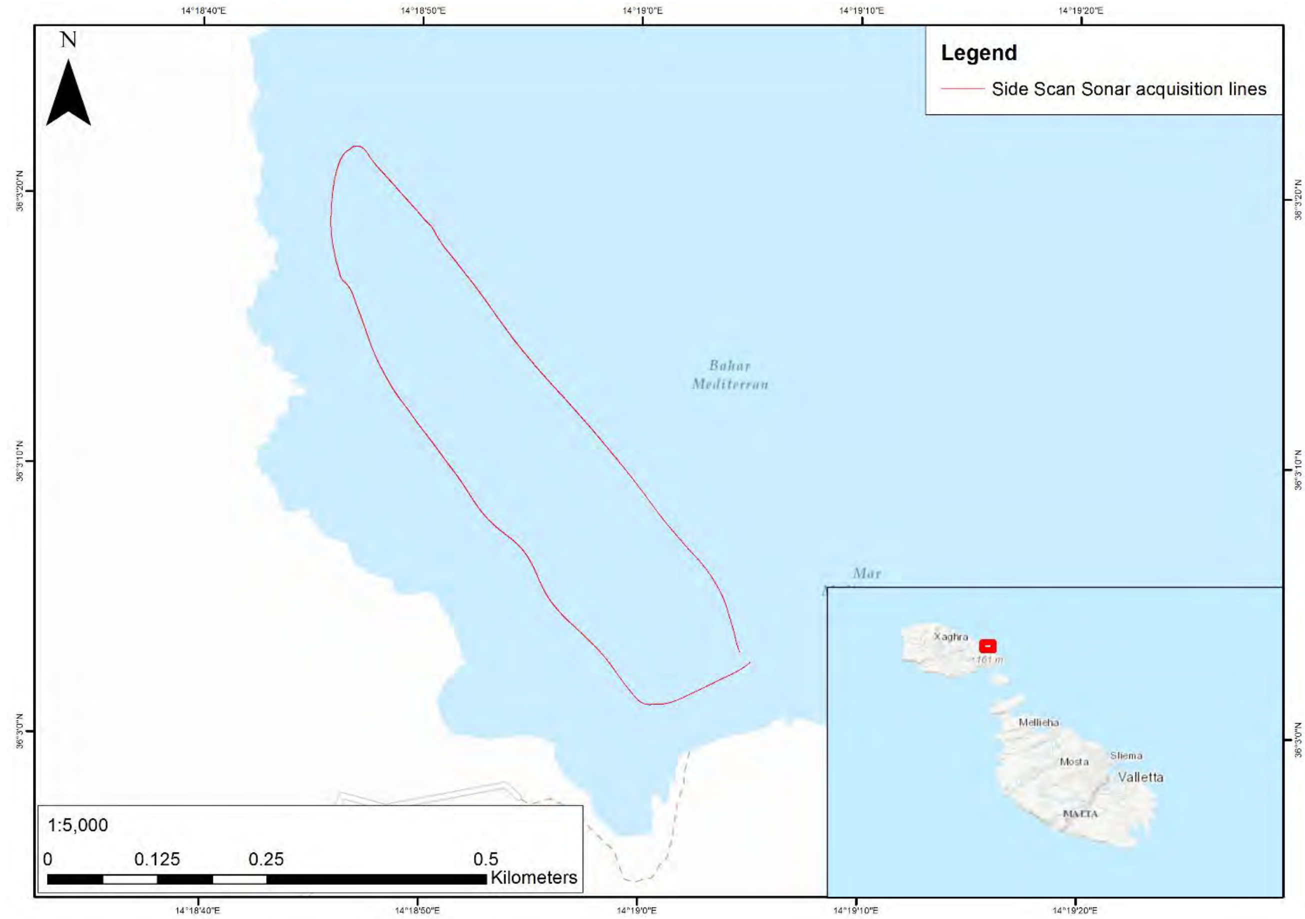
35°58'20"N
35°57'30"N
Mellieha
Xaghra
Mosta
Sliema
Valletta
MALTA


Legend
Side Scan Sonar acquisition lines
N
Bahar Mediterran
Mar
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
1:5,000
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Kilometers
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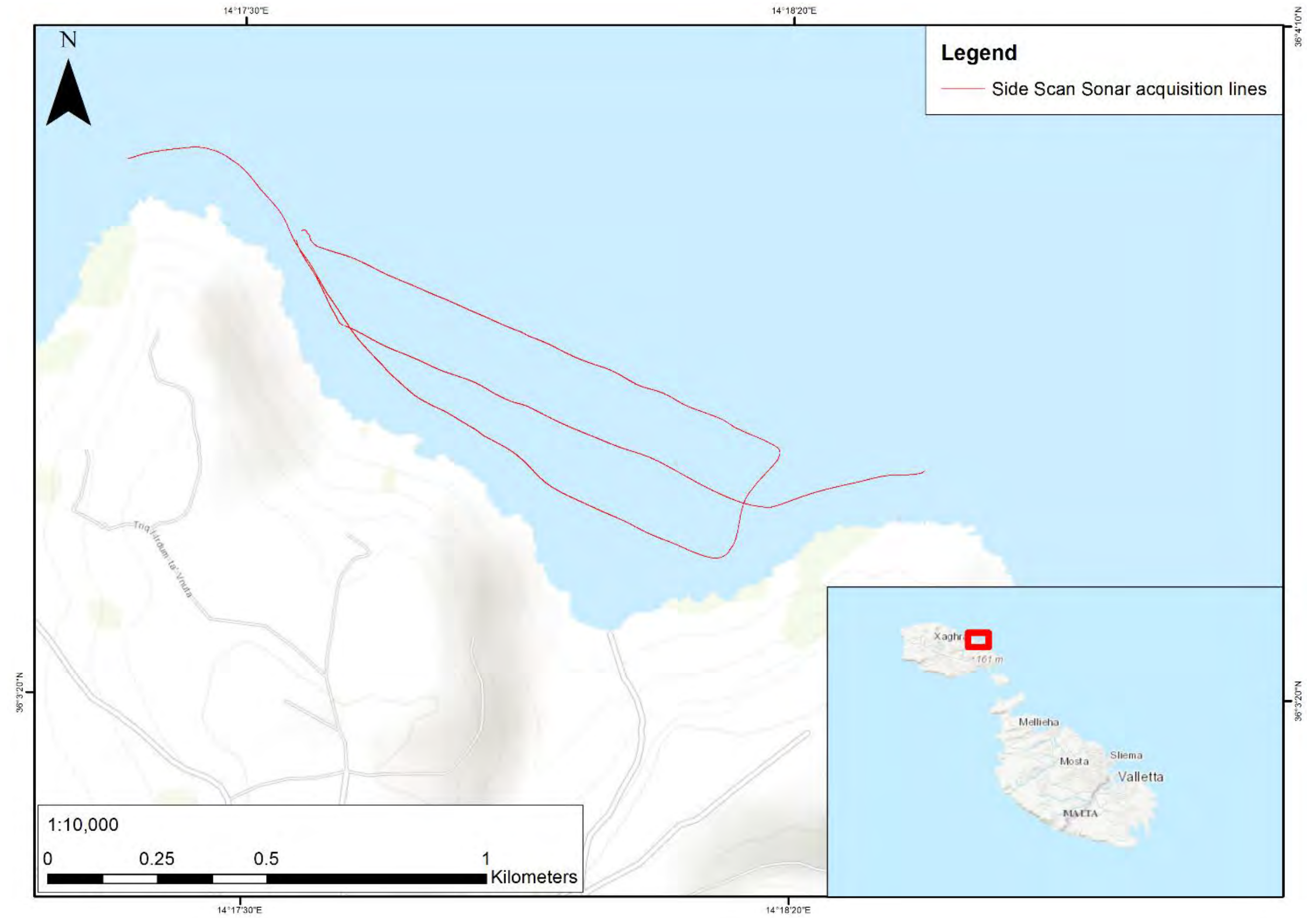
N
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Side Scan Sonar acquisition lines
1:10,000
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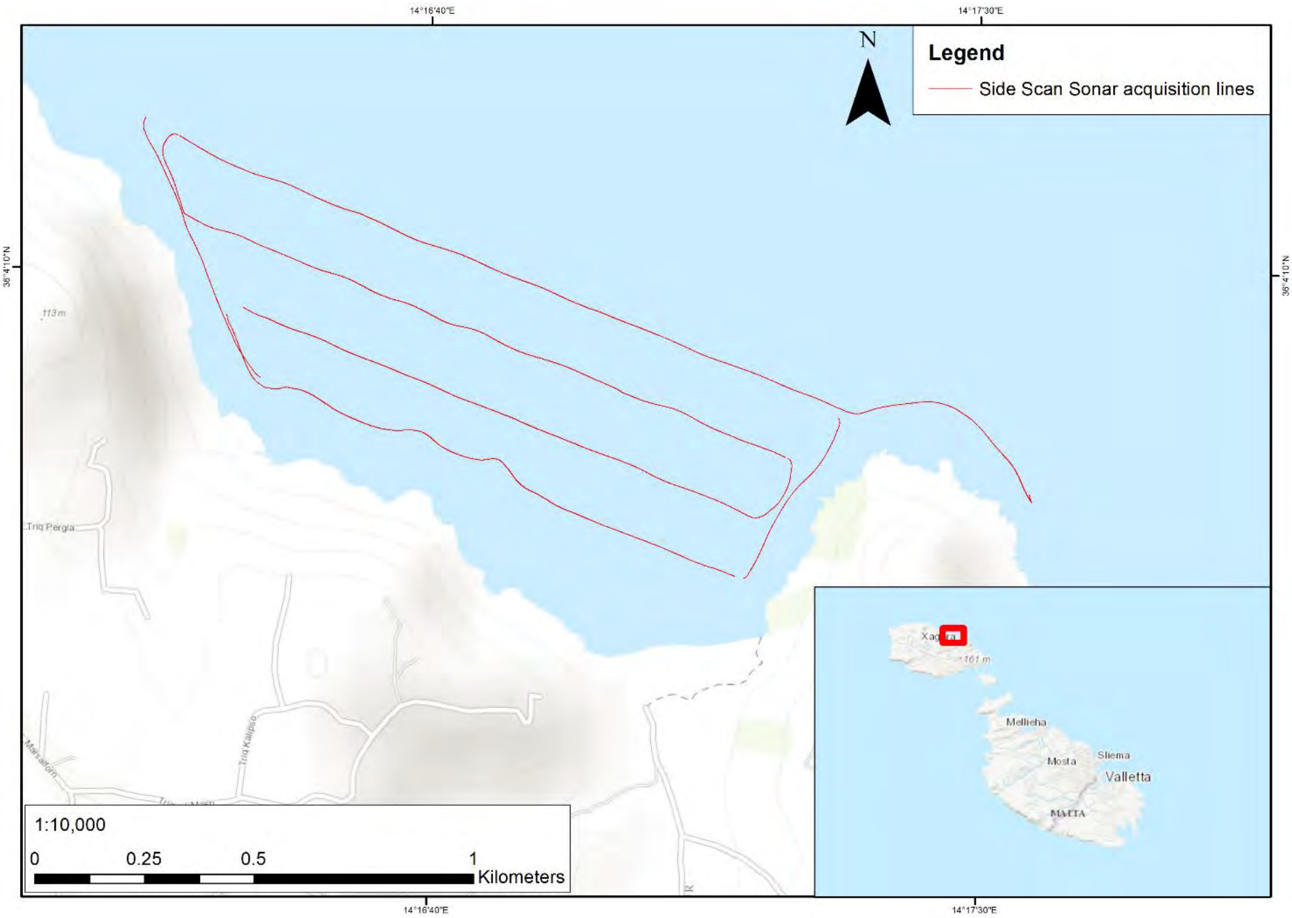
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA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Side Scan Sonar acquisition lines
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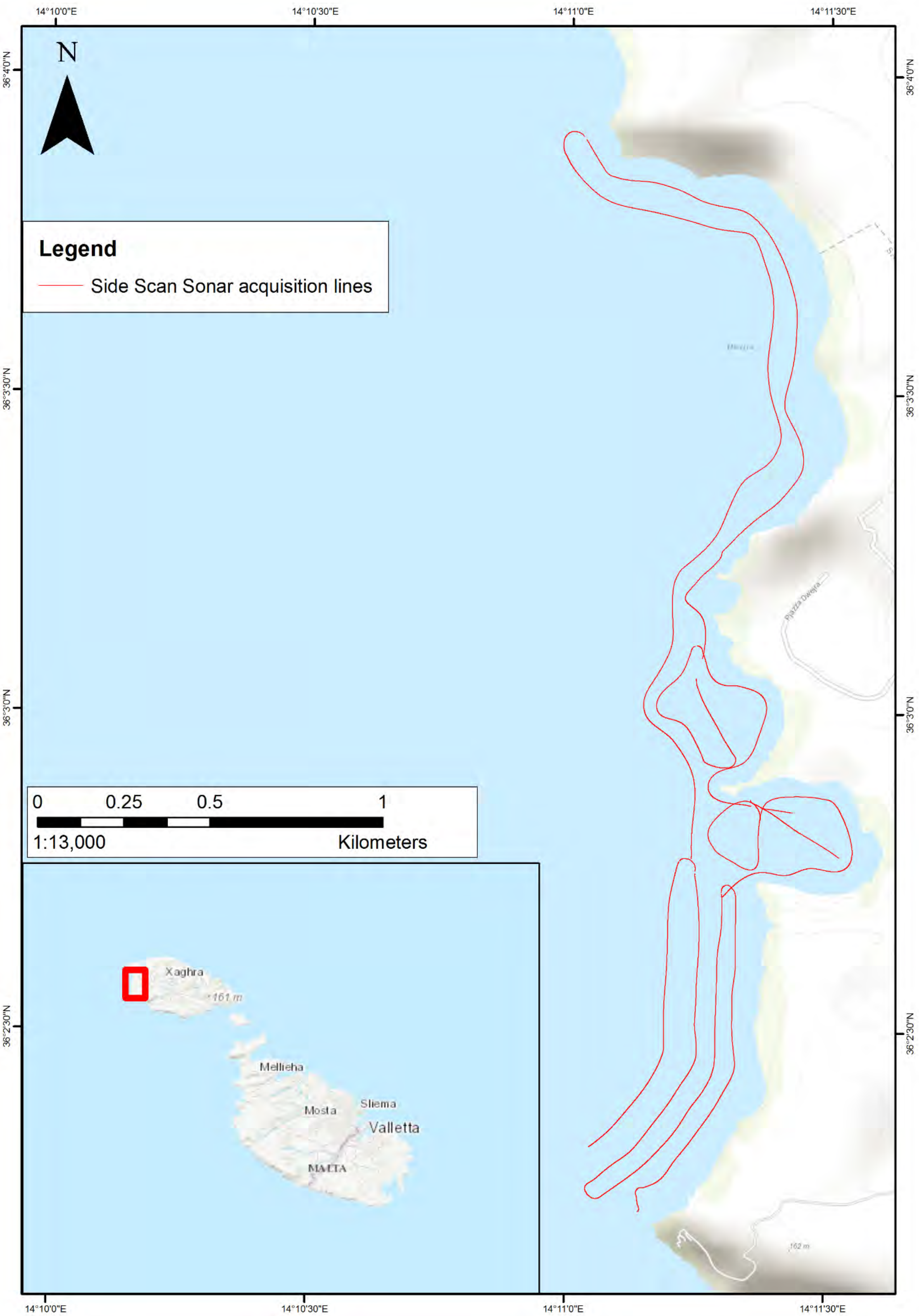
Triq Pergla
Valletta
Mellieha
Mosta
Sliema
1:10,000
0 0.25 0.5 1
Kilometers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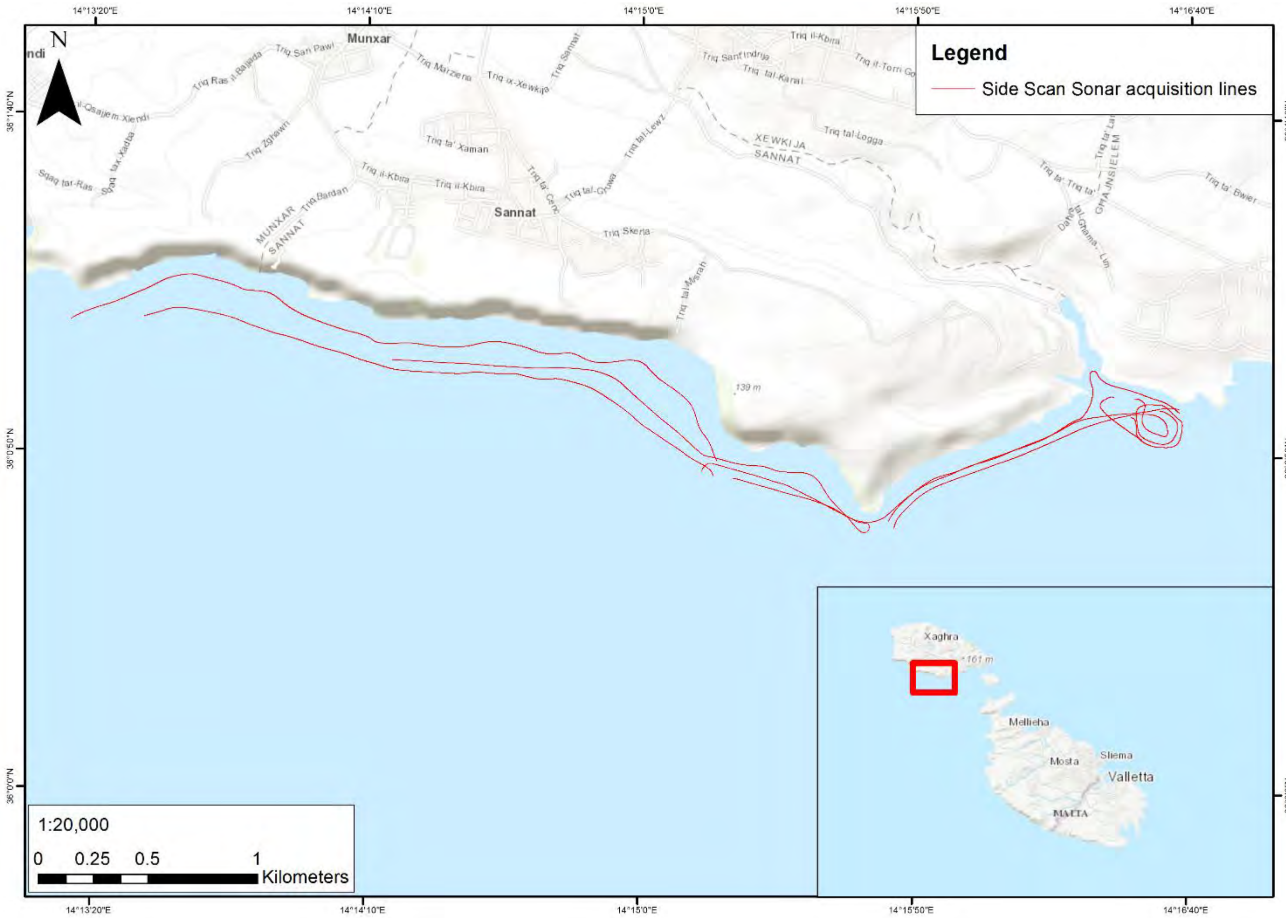
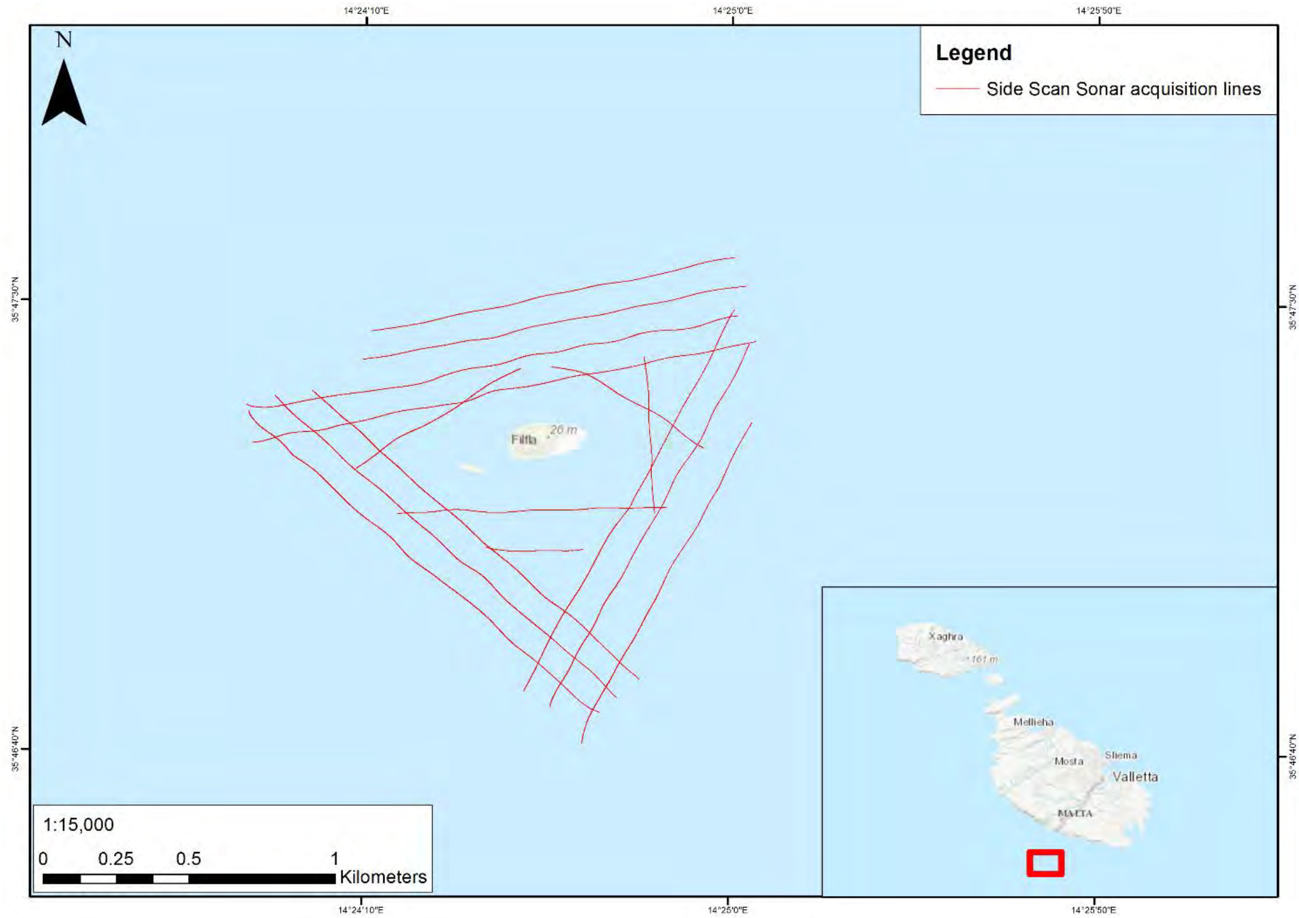
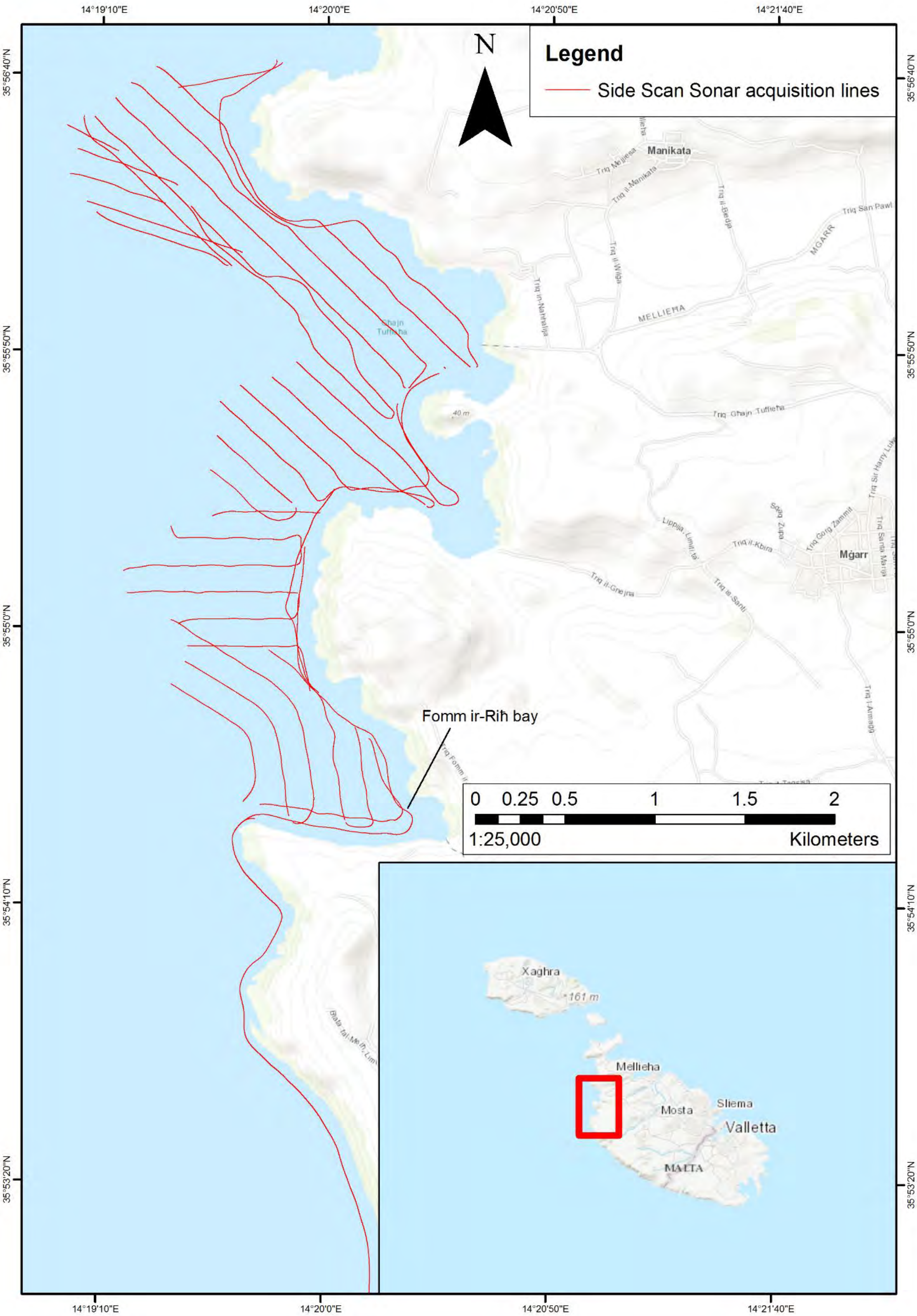
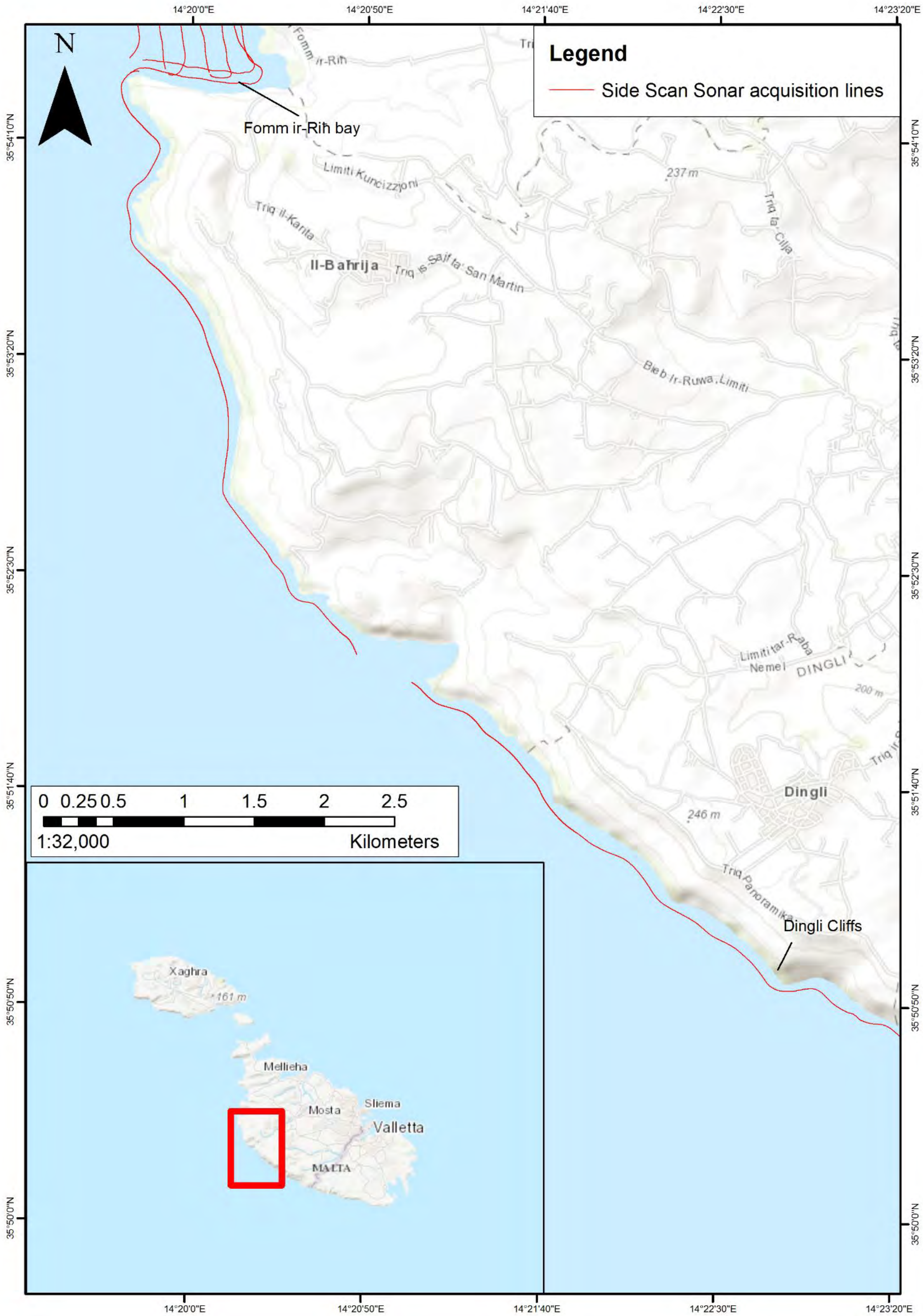
36°4'0"N
36°3'30"N
36°3'0"N
36°2'30"N
N
Legend
Side Scan Sonar acquisition lines
0
0.25
0.5
1
1:13,000
Kilometers
Xaghra
161 m
Mellieha
Mosta
Sliema
Valletta
MALTA
162 m


Legend
Side Scan Sonar acquisition lines
N
Munxar
Sannat
XEWKIJA SANNAT
MUNXAR SANNAT
1:20,000
0 0.25 0.5 1
Kilometers
14°13'20"E
14°14'10"E
14°15'0"E
14°15'50"E
14°16'40"E
36°1'40"N
36°0'50"N
36°0'0"N
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA


N
Legend
Side Scan Sonar acquisition lines
Filfla
20 m
1:15,000
0 0.25 0.5 1
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
14°24'10"E
14°25'0"E
14°25'50"E
35°47'30"N
35°46'40"N


14°19'10"E
14°20'0"E
14°20'50"E
14°21'40"E
35°56'40"N
35°55'50"N
35°55'0"N
35°54'10"N
35°53'20"N
N
Legend
Side Scan Sonar acquisition lines
Manikata
Mġarr
MELLIEHA
Fomm ir-Riħ bay
0 0.25 0.5 1 1.5 2
1:25,000
Kilometers
Xaghra
161 m
Mellieha
Mosta
Sliema
Valletta
MALTA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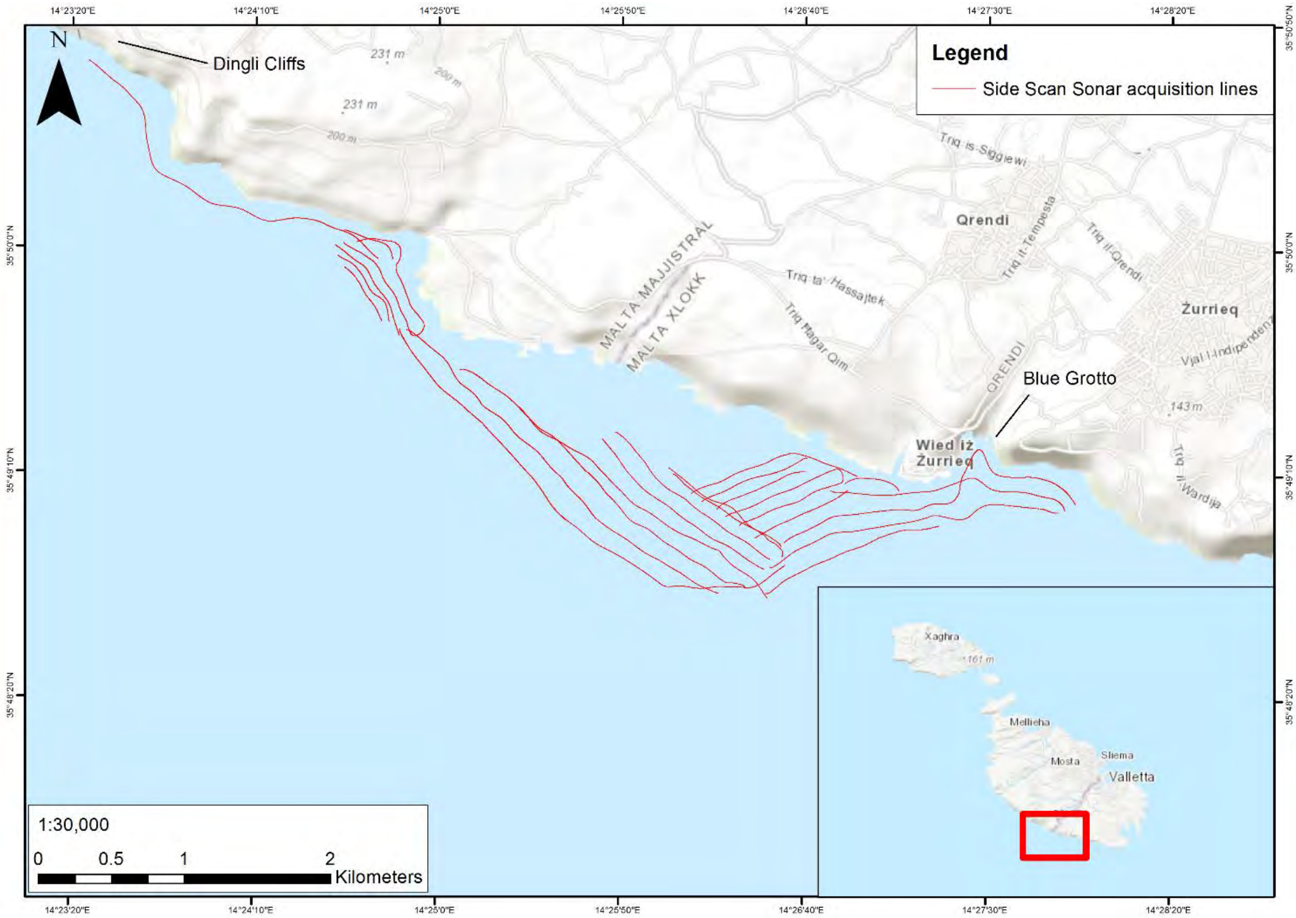
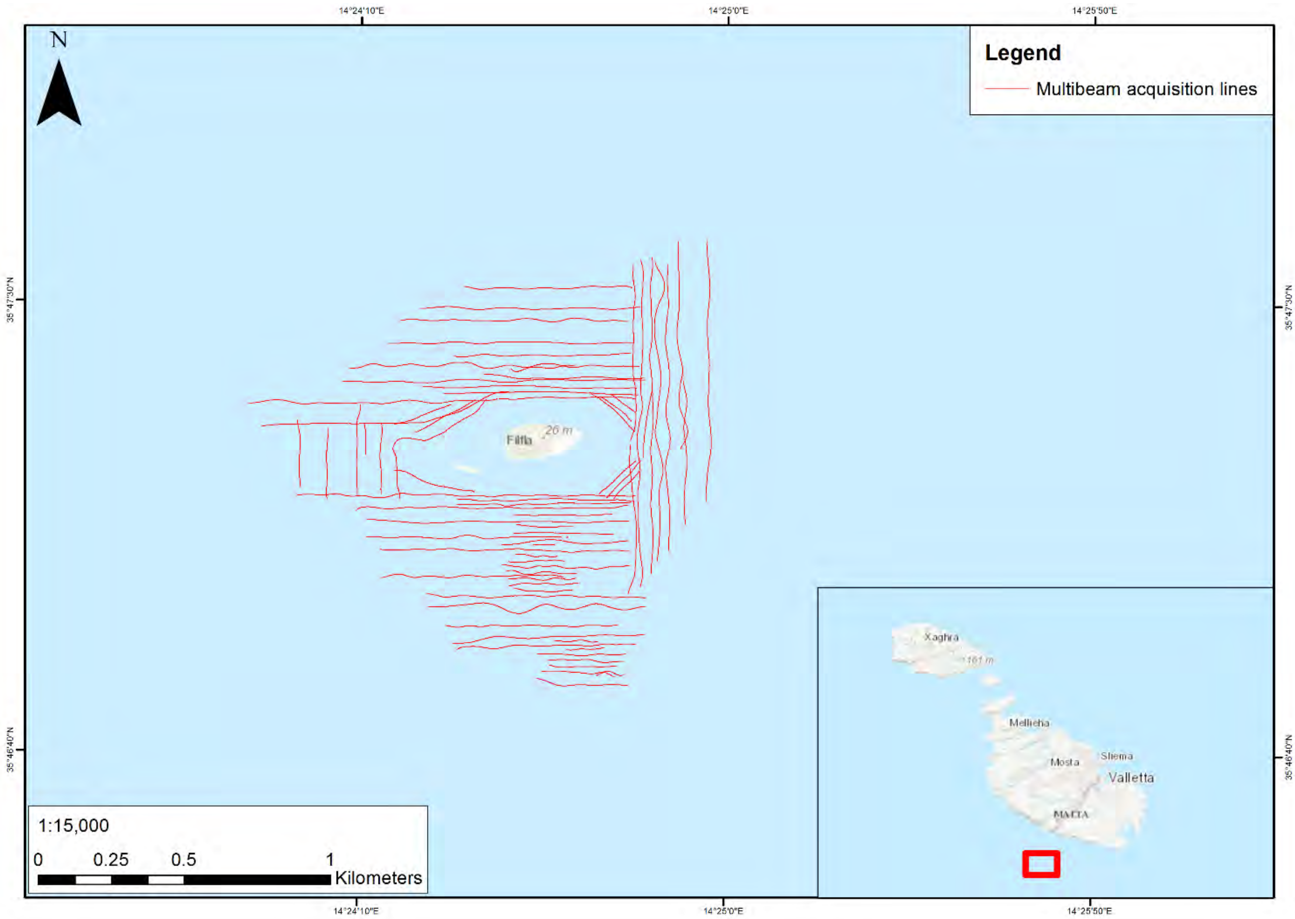
14°23'20"E
35°54'10"N
35°53'20"N
35°52'30"N
35°51'40"N
35°50'50"N
35°50'0"N
N
Legend
Side Scan Sonar acquisition lines
Fomm ir-Riħ bay
Limiti Kunċizzjoni
Triq il-Karita
Il-Baħrija
Triq is-Sajf ta' San Martin
237 m
Triq ta' Ċilja
Bieb ir-Ruwa, Limiti
Limiti tar-Raba Nemel
DINGLI
200 m
Dingli
246 m
Triq Panoramika
Dingli Cliffs
0 0.25 0.5 1 1.5 2 2.5
1:32,000
Kilometers
Xaghra
161 m
Mellieha
Mosta
Sliema
Valletta
MALTA

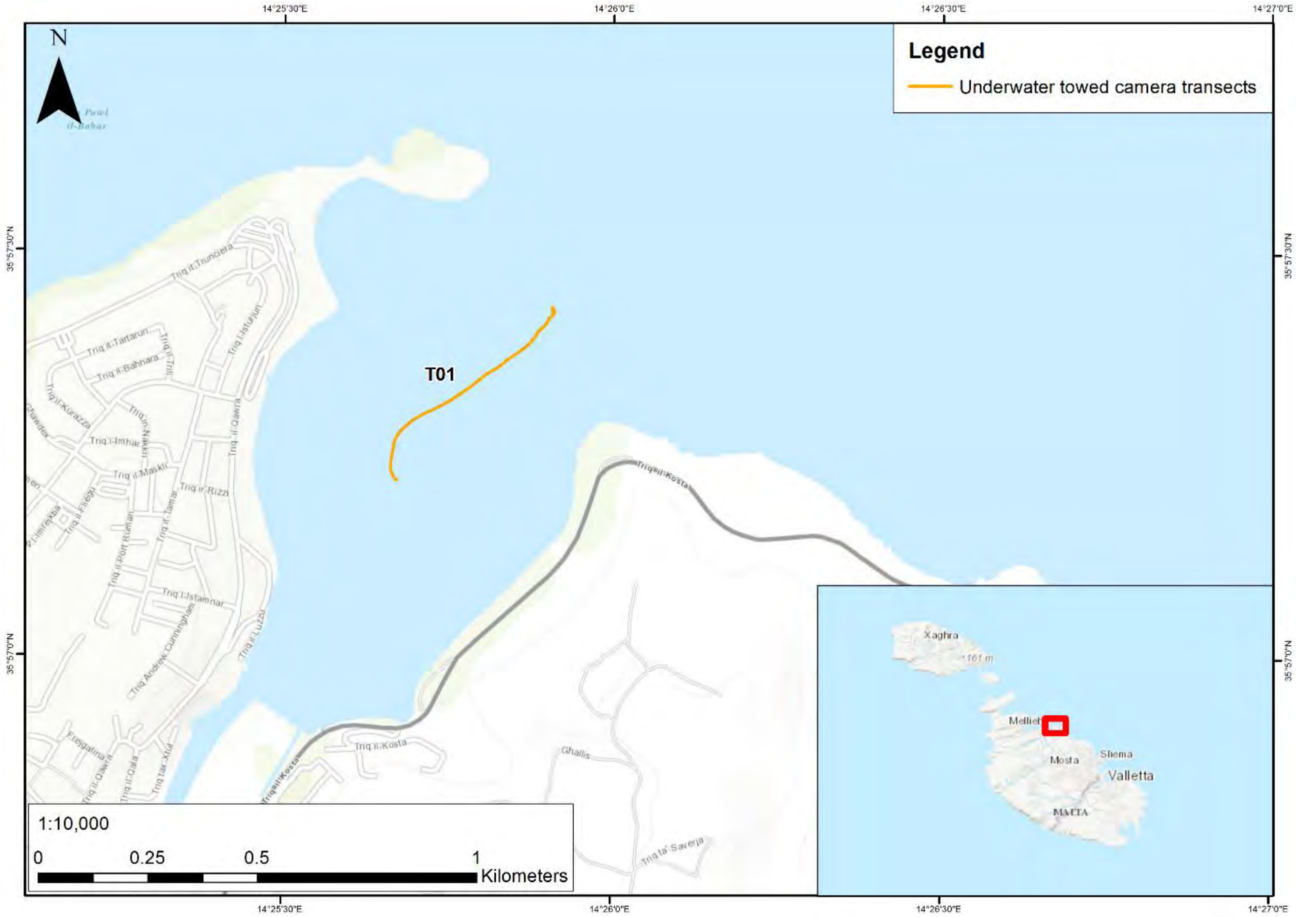


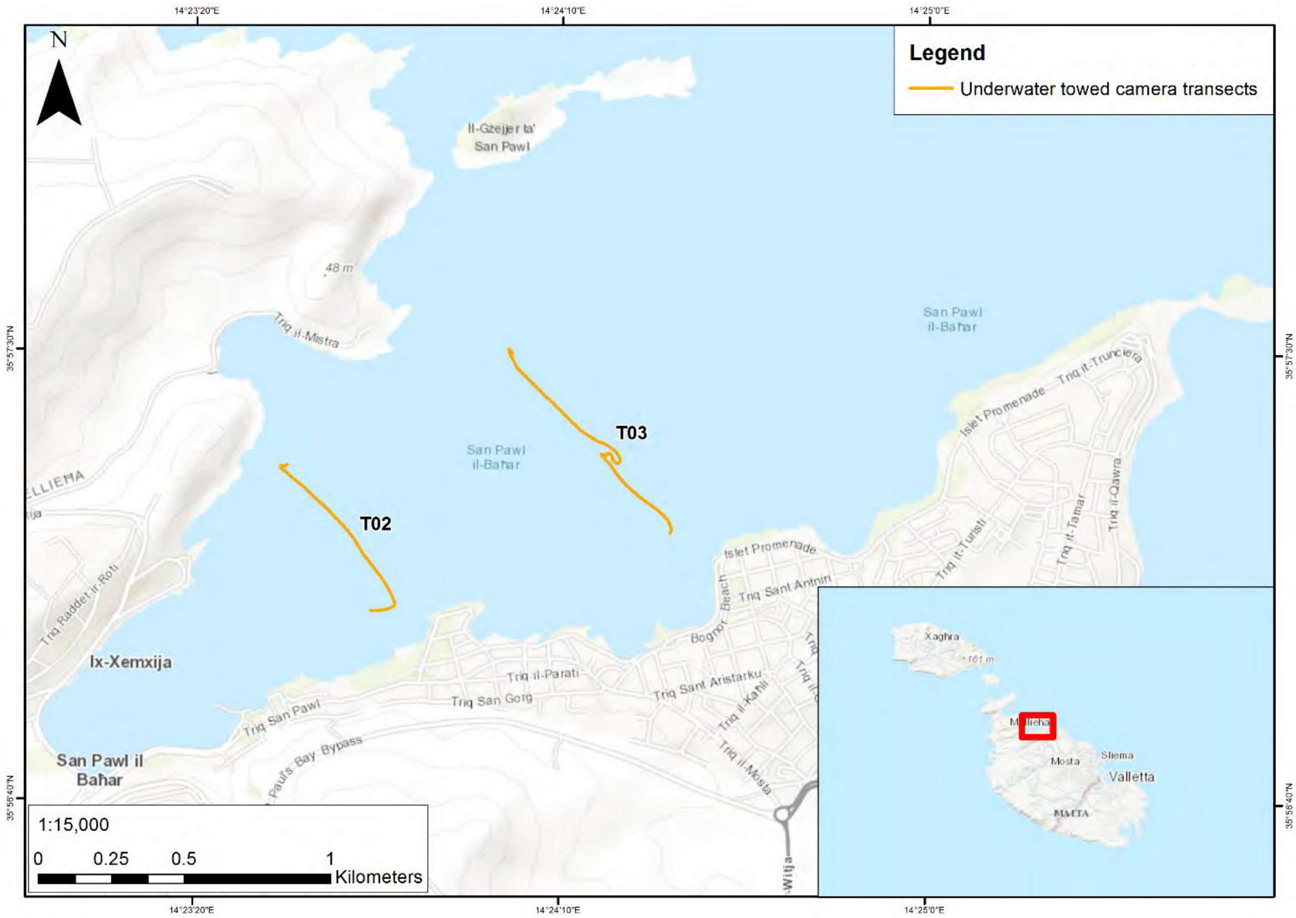
Legend
Side Scan Sonar acquisition lines
Dingli Cliffs
Blue Grotto
Qrendi
Żurrieq
Wied iż Żurrieq
1:30,000
0 0.5 1 2 Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta

Multibeam acquisition lines

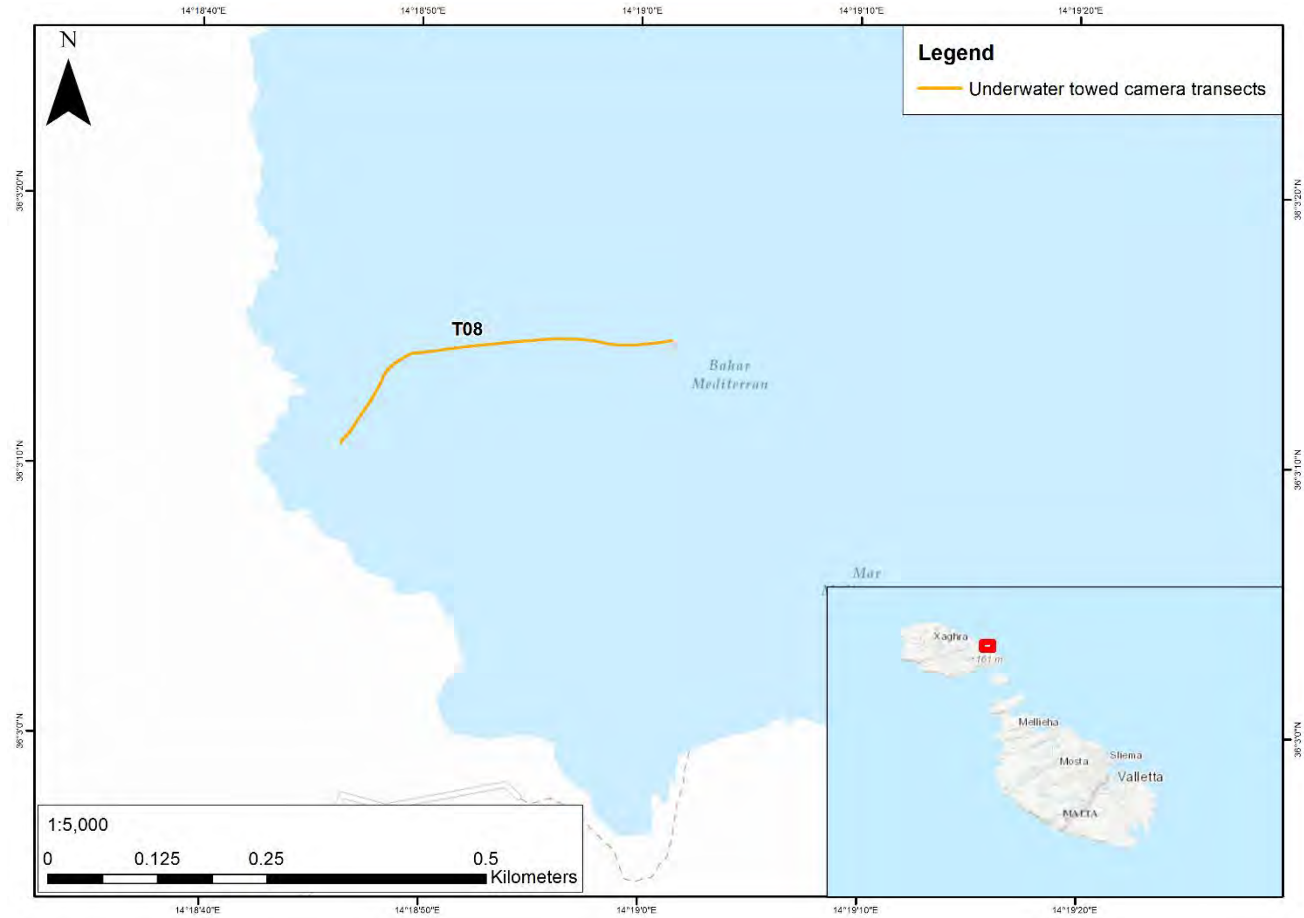


Underwater towed camera transects

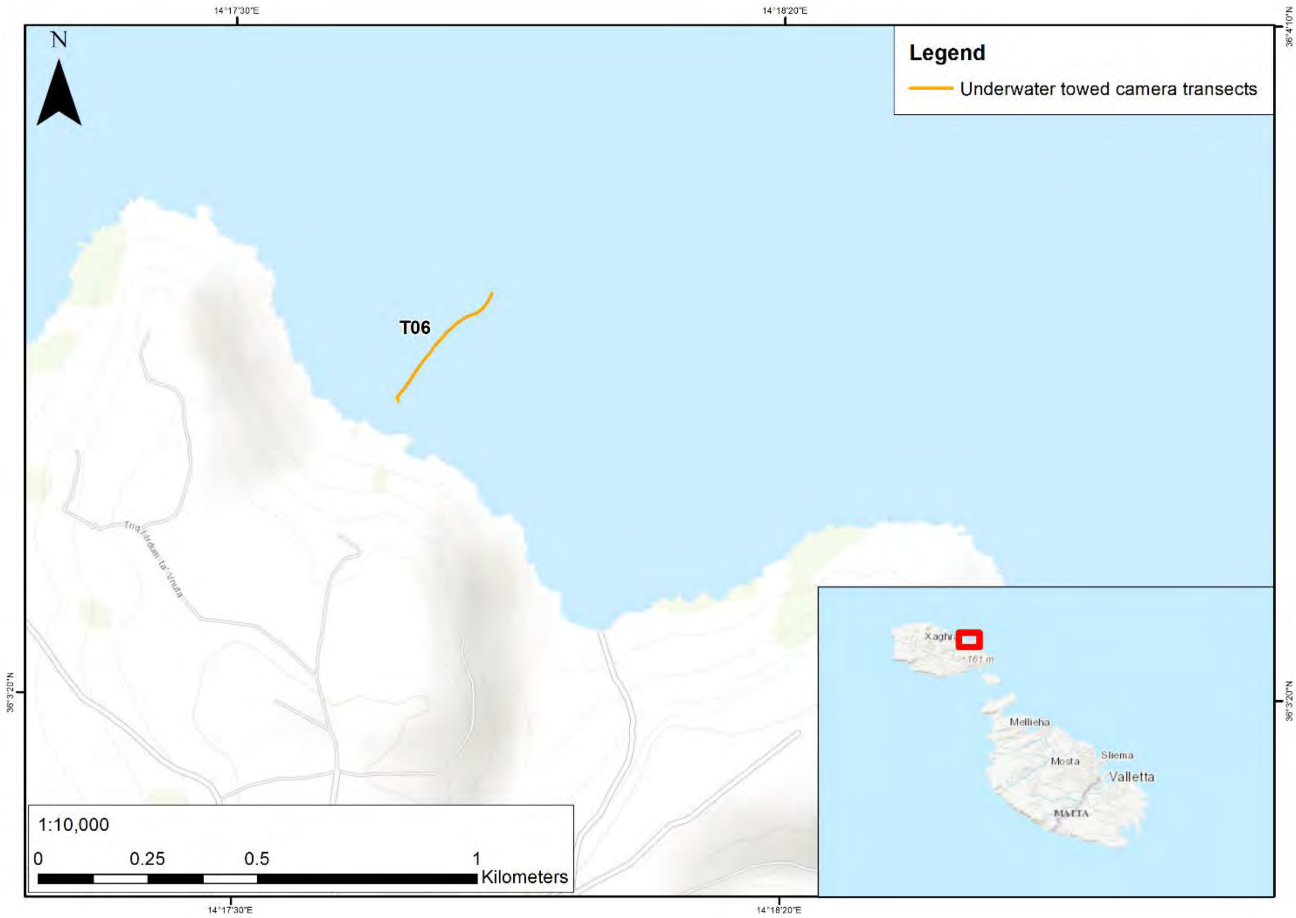



14°23'20"E
14°24'10"E
14°25'0"E
35°57'30"N
35°56'40"N
N
Legend
Underwater towed camera transects
Il-Gzejjer ta' San Pawl
48 m
Triq il-Mistra
San Pawl il-Bahar
T03
T02
Islet Promenade
Triq it-Trunciera
Triq il-Qawra
Triq it-Tamar
Triq it-Turisti
Triq Sant Antnin
Bognor Beach
Triq Raddet ir-Roti
Ix-Xemxija
Triq il-Parati
Triq San Gorg
Triq Sant Aristarku
Triq il-Kahli
Triq il-Mosta
Triq San Pawl
St Paul's Bay Bypass
San Pawl il Bahar
Xaghra
Mosta
Sliema
Valletta
MALTA
1:15,000
0 0.25 0.5 1
Kilometers

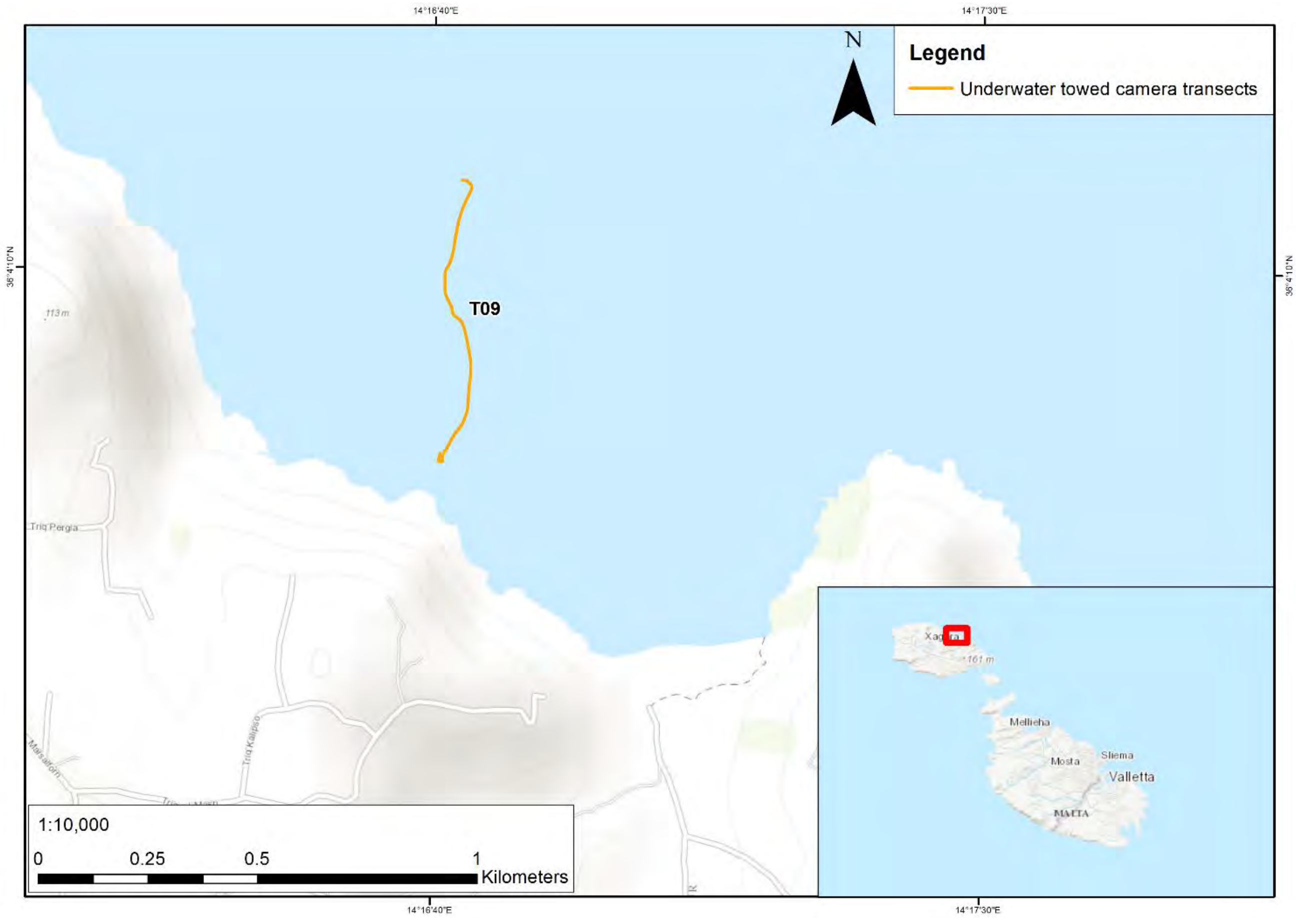

Legend
Underwater towed camera transects
T05
T04
Mellieha
Xaghra
Mosta
Sliema
Valletta
MALTA
1:20,000
0 0.25 0.5 1 Kilometers
14°20'50"E
14°21'40"E
14°22'30"E
14°23'20"E
14°24'10"E
35°59'10"N
35°58'20"N
35°57'30"N



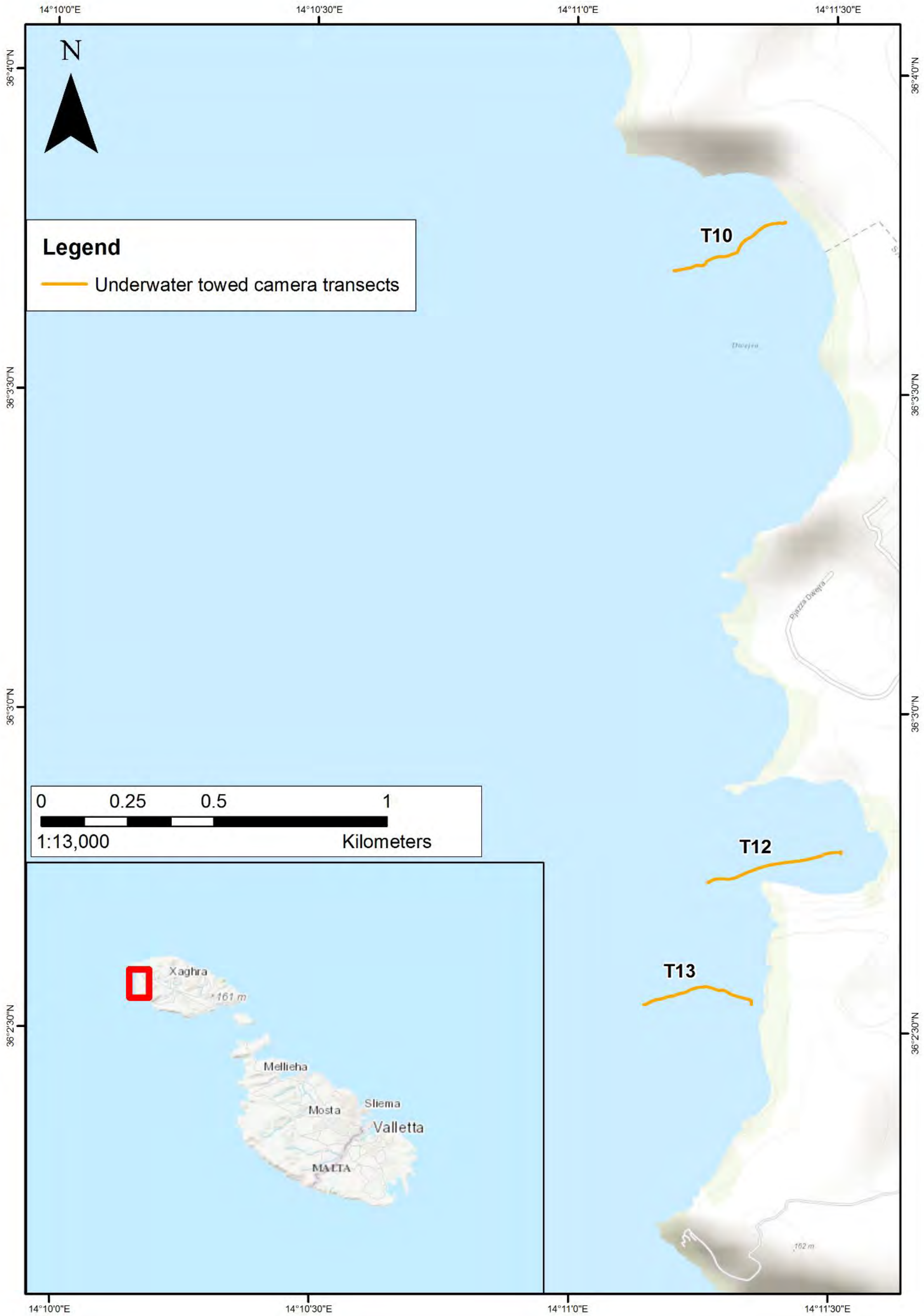
Legend
Underwater towed camera transects
N
T08
Bahar Mediterran
Mar
Xagħra
Mellieħa
Mosta
Sliema
Valletta
MALTA
1:5,000
0 0.125 0.25 0.5
Kilometers
14°18'40"E
14°18'50"E
14°19'0"E
14°19'10"E
14°19'20"E
36°3'20"N
36°3'10"N
36°3'0"N



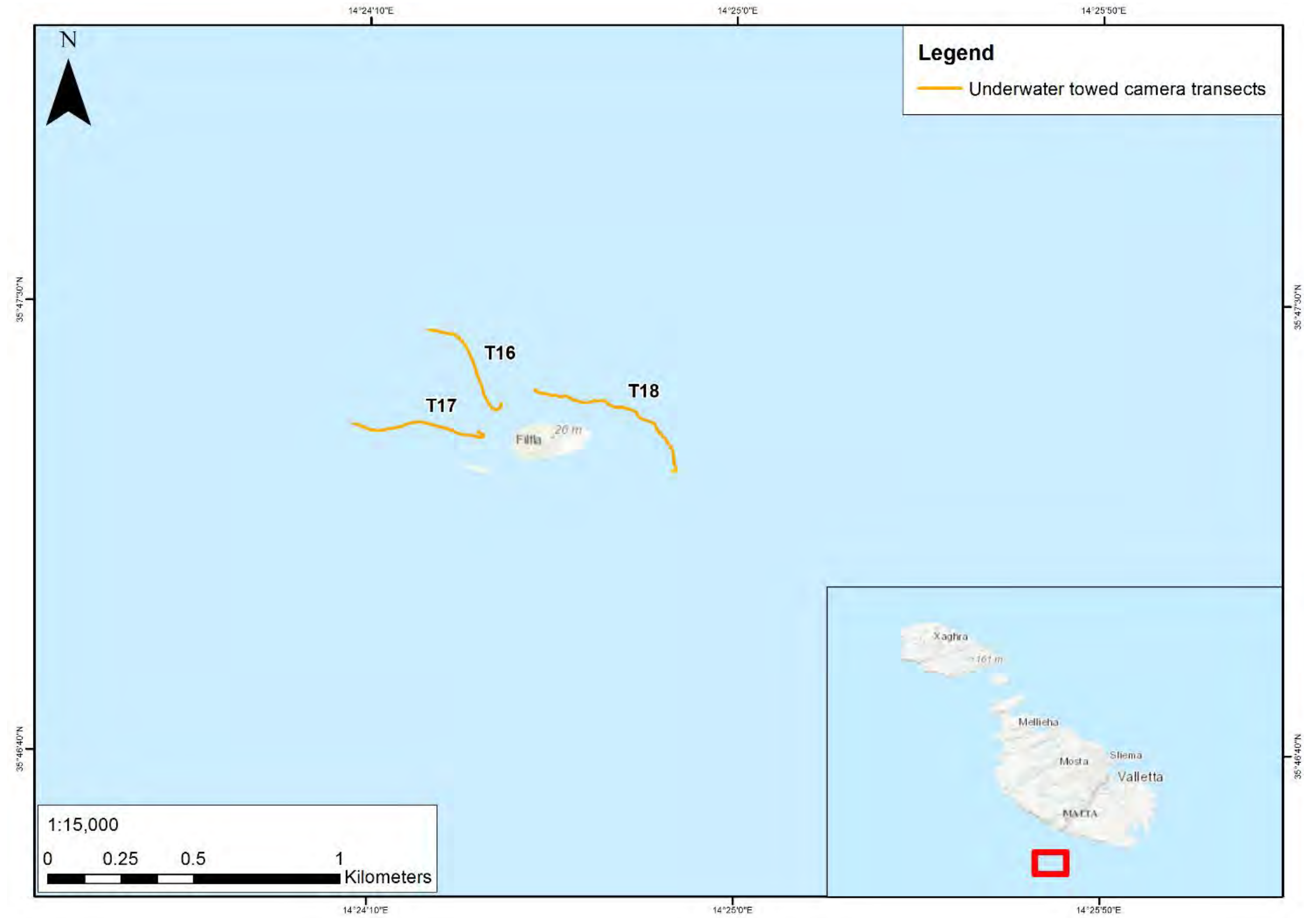
Legend
Underwater towed camera transects
T06
N
1:10,000
0
0.25
0.5
1
Kilometers
14°17'30"E
14°18'20"E
36°3'20"N
36°4'10"N
Mellieha
Mosta
Sliema
Valletta
MALTA

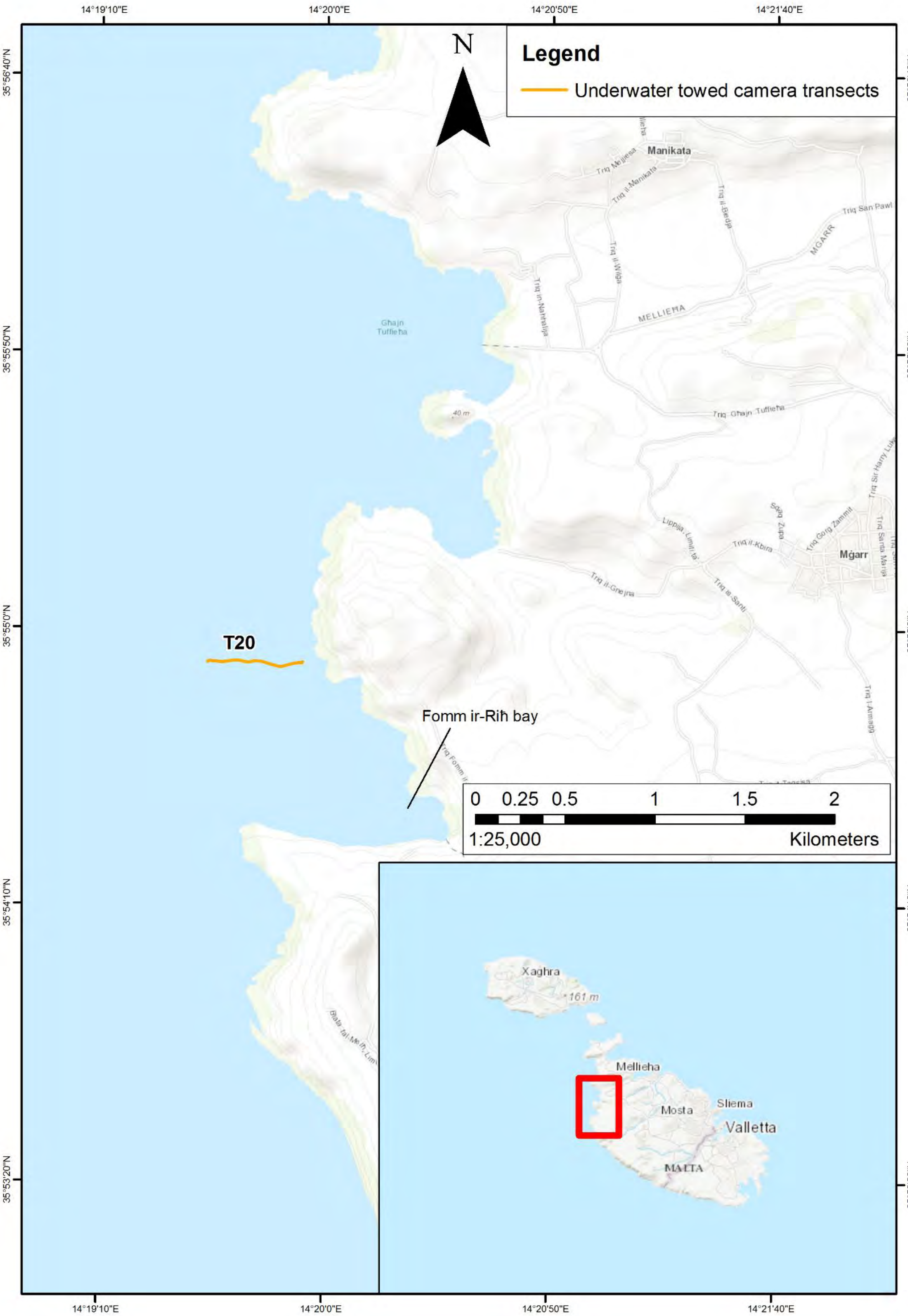


14°16'40"E
14°17'30"E
36°4'10"N
N
Legend
Underwater towed camera transects
T09
Triq Pergla
1:10,000
0
0.25
0.5
1
Kilometers
Mellieha
Mosta
Sliema
Valletta
MALTA


14°10'0"E
14°10'30"E
14°11'0"E
14°11'30"E
36°4'0"N
36°3'30"N
36°3'0"N
36°2'30"N
N
Legend
Underwater towed camera transects
T10
T12
T13
0
0.25
0.5
1
1:13,000
Kilometers
Xaghra
161 m
Mellieha
Mosta
Sliema
Valletta
MALTA
Piazza Dwejra


Legend
Underwater towed camera transects
T14
T15
Munxar
Sannat
1:20,000
0 0.25 0.5 1
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
14°13'20"E
14°14'10"E
14°15'0"E
14°15'50"E
14°16'40"E
36°1'40"N
36°0'50"N
36°0'0"N

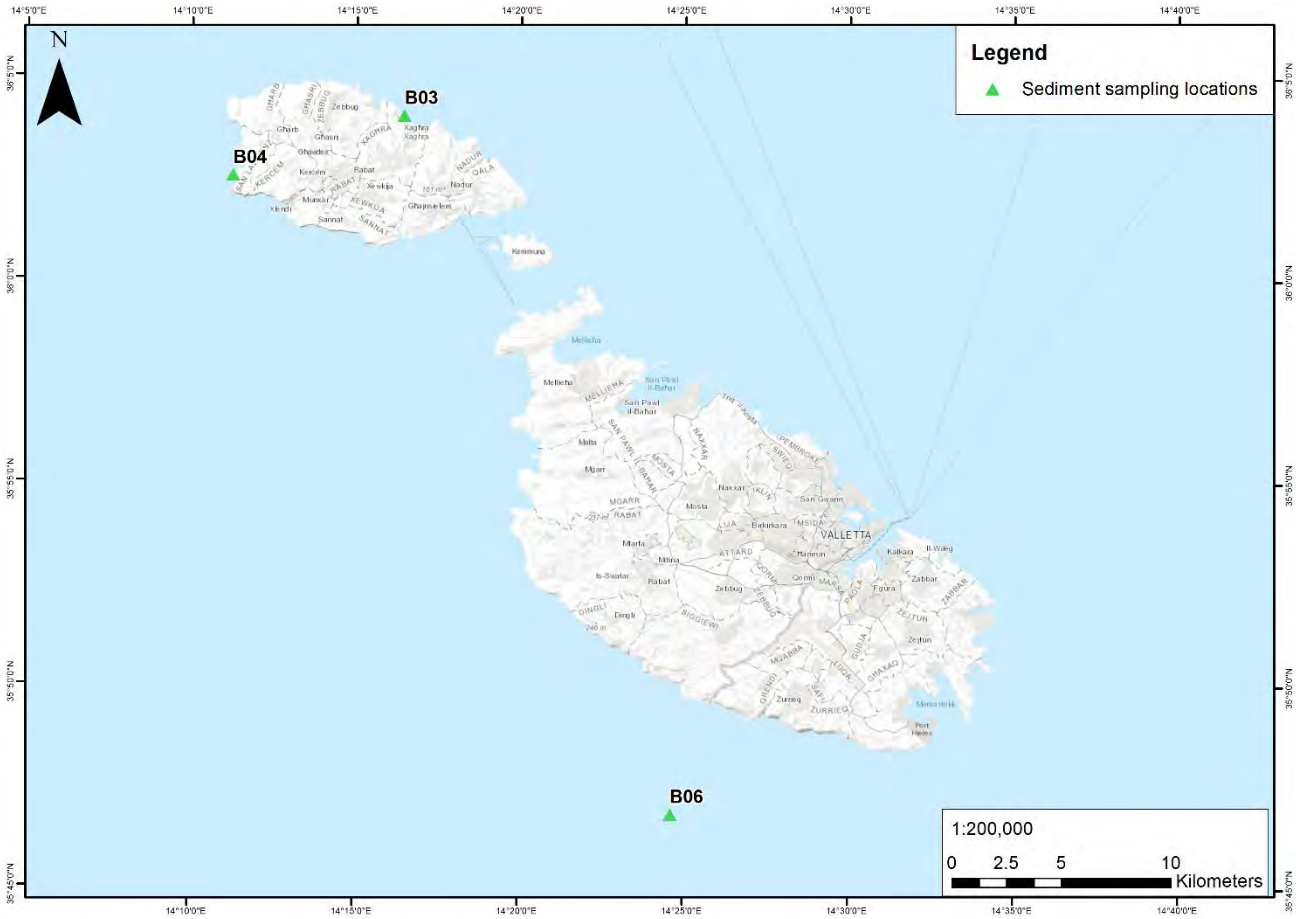

14°24'10"E
14°25'0"E
14°25'50"E
N
Legend
Underwater towed camera transects
T16
T17
T18
Filfla
20 m
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
1:15,000
0 0.25 0.5 1
Kilometers



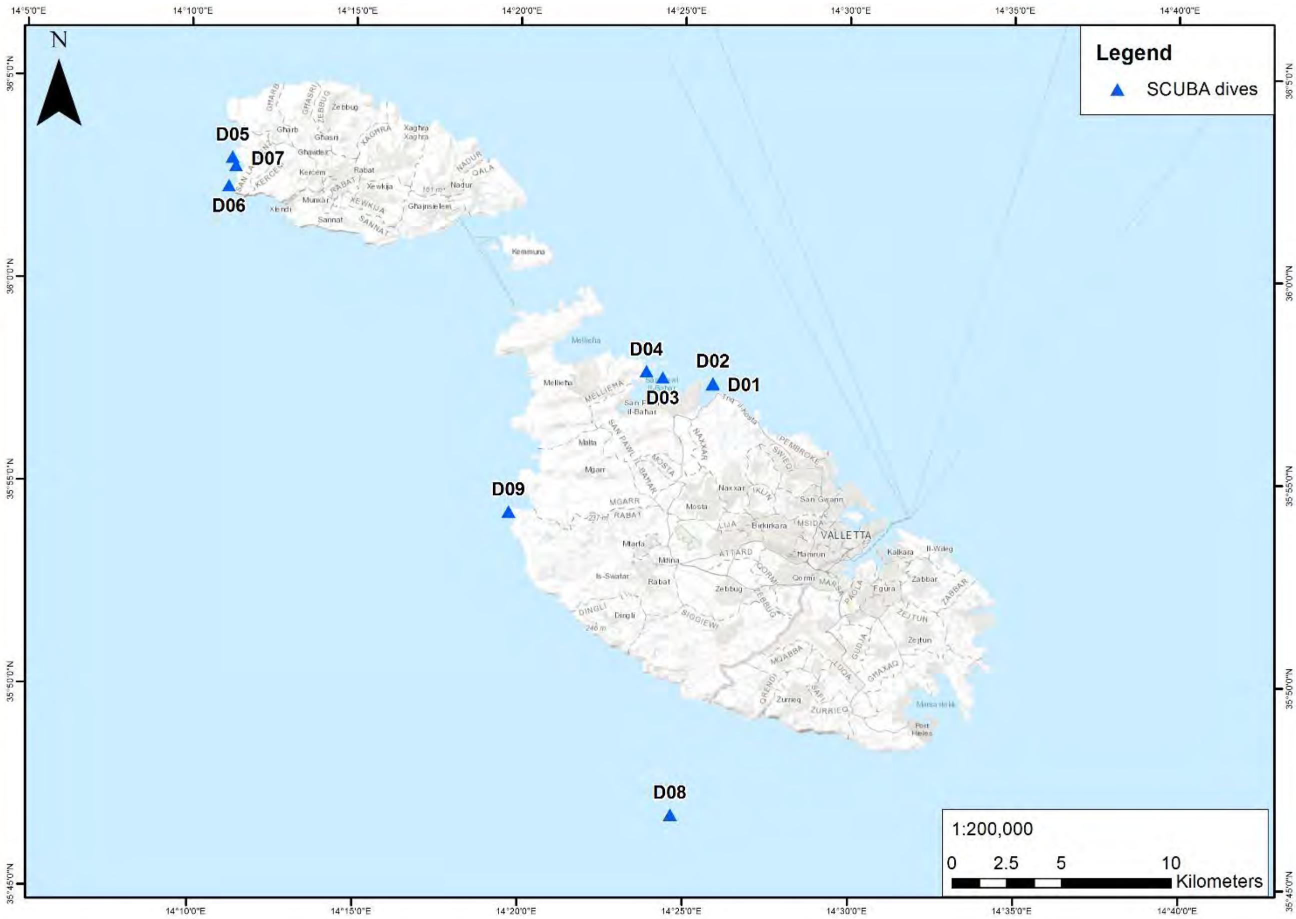
Legend
Underwater towed camera transects
N
T20
Fomm ir-Rih bay
Manikata
Mgarr
MELLIEHA
Triq Ghajn Tuffieha
Ghajn Tuffieha
40 m
0 0.25 0.5 1 1.5 2
1:25,000
Kilometers
14°19'10"E
14°20'0"E
14°20'50"E
14°21'40"E
35°56'40"N
35°55'50"N
35°55'0"N
35°54'10"N
35°53'20"N
Xaghra
161 m
Mellieha
Mosta
Sliema
Valletta
MALTA


Legend
Underwater towed camera transects
Dingli Cliffs
T19
Qrendi
Żurrieq
Blue Grotto
Wied iż Żurrieq
MALTA MAJJISTRAL
MALTA XLOKK
Xaghra
Mellieha
Mosta
Sliema
Valletta
1:30,000
0 0.5 1 2 Kilometers
N

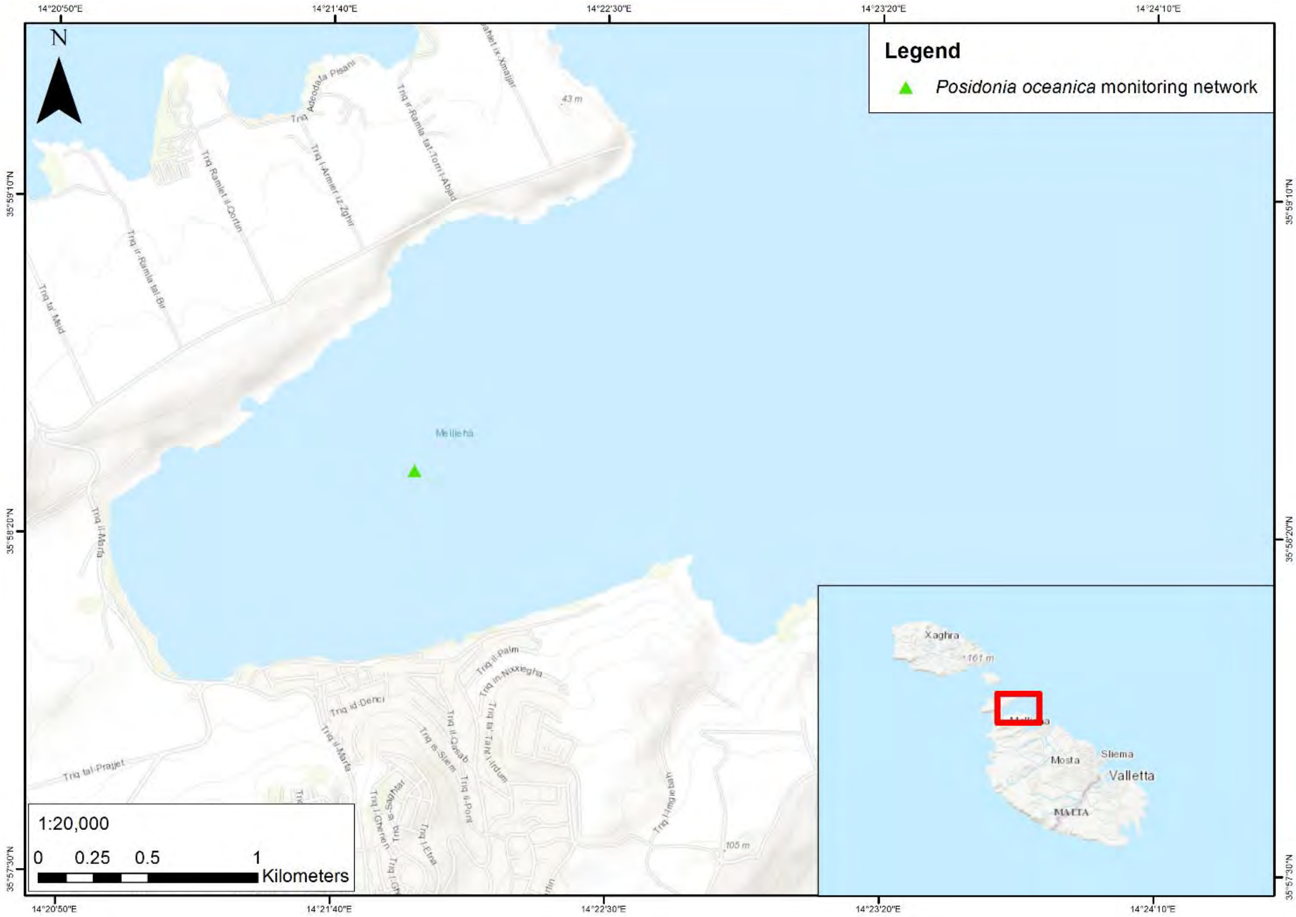
Sediment sampling locations



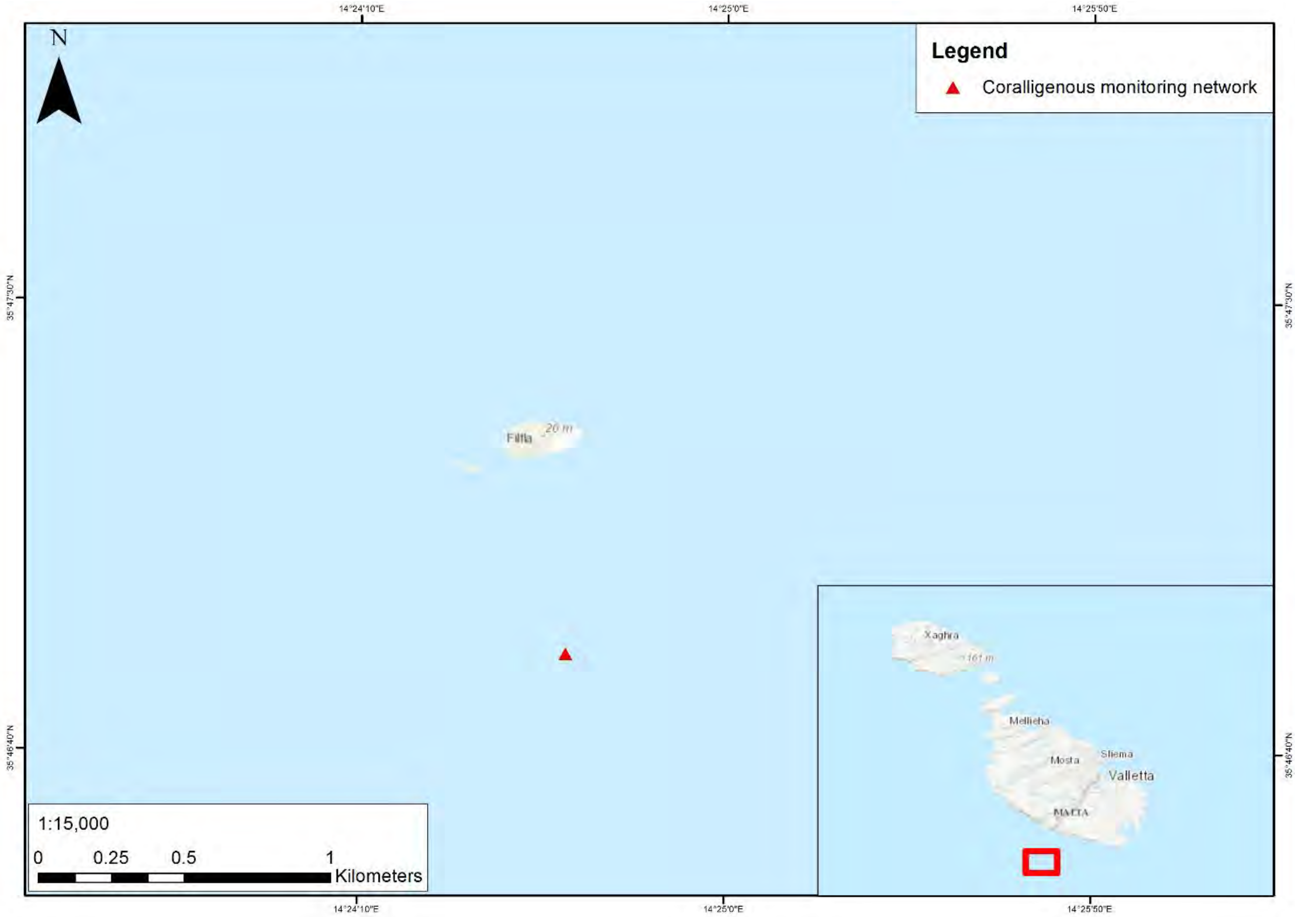
SCUBA dives


Legend
SCUBA dives
D01
D02
D03
D04
D05
D06
D07
D08
D09
VALLETTA
1:200,000
0 2.5 5 10
Kilometers
N

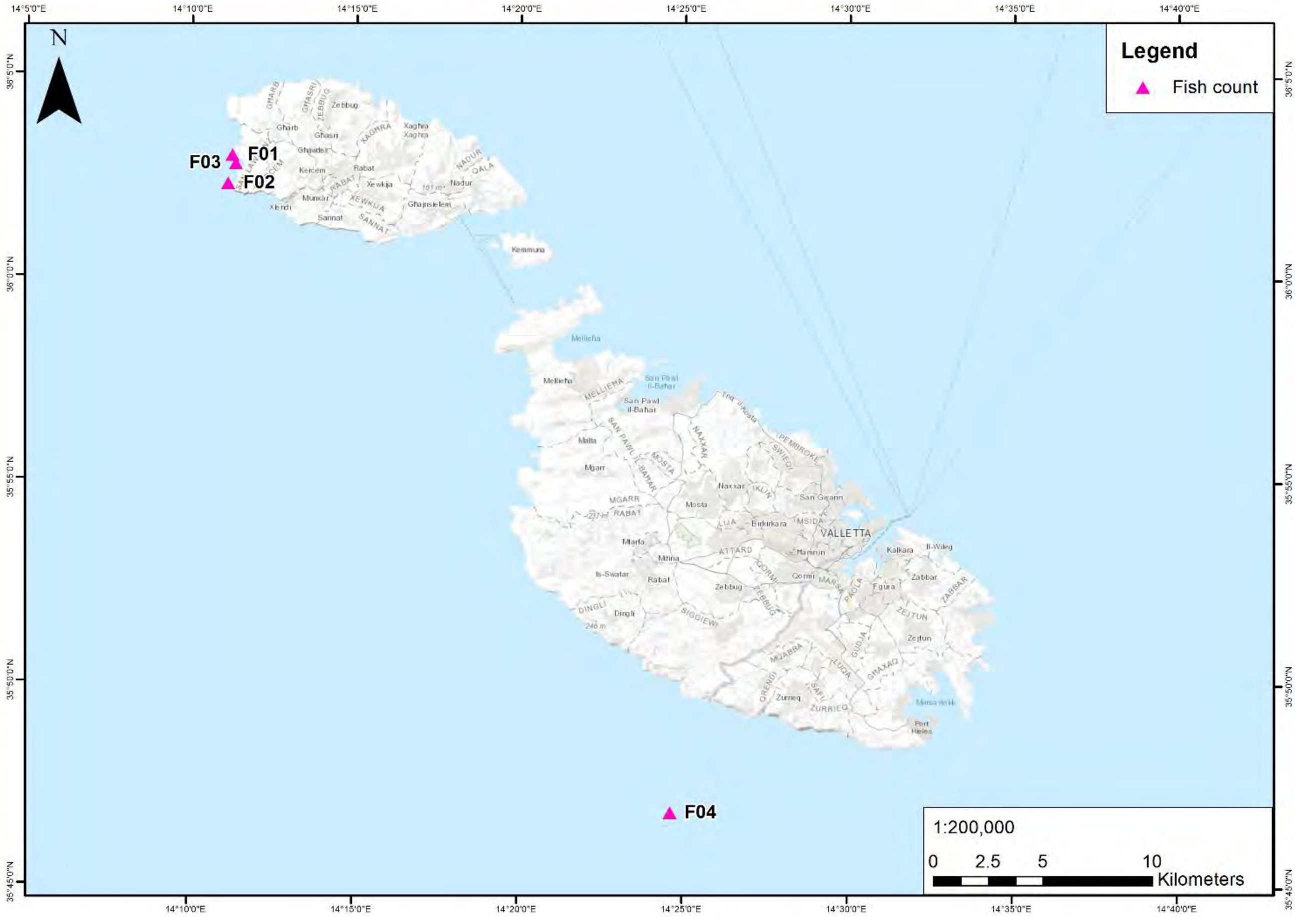
***Posidonia oceanica* monitoring network**



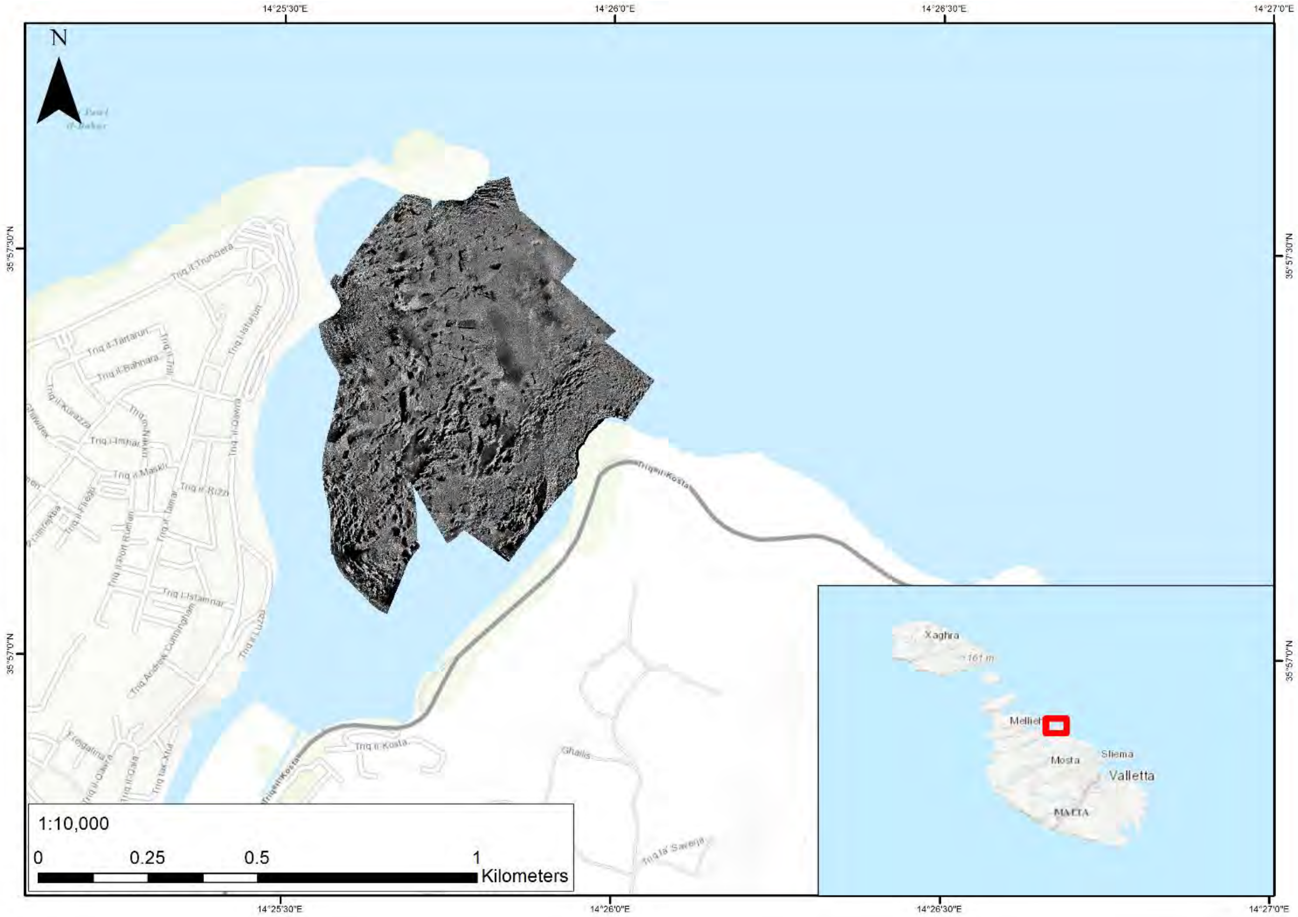
Coralligenous monitoring network

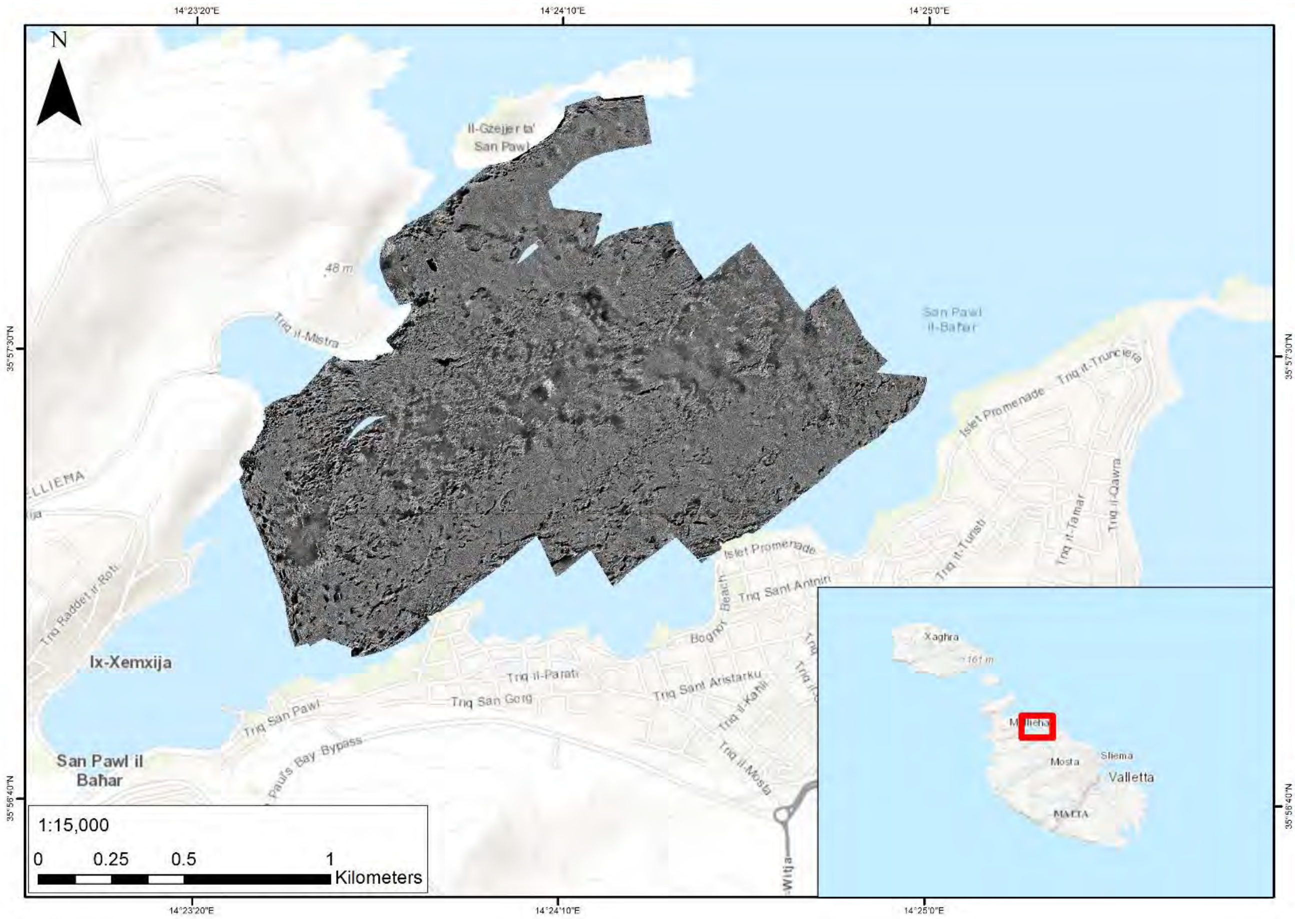


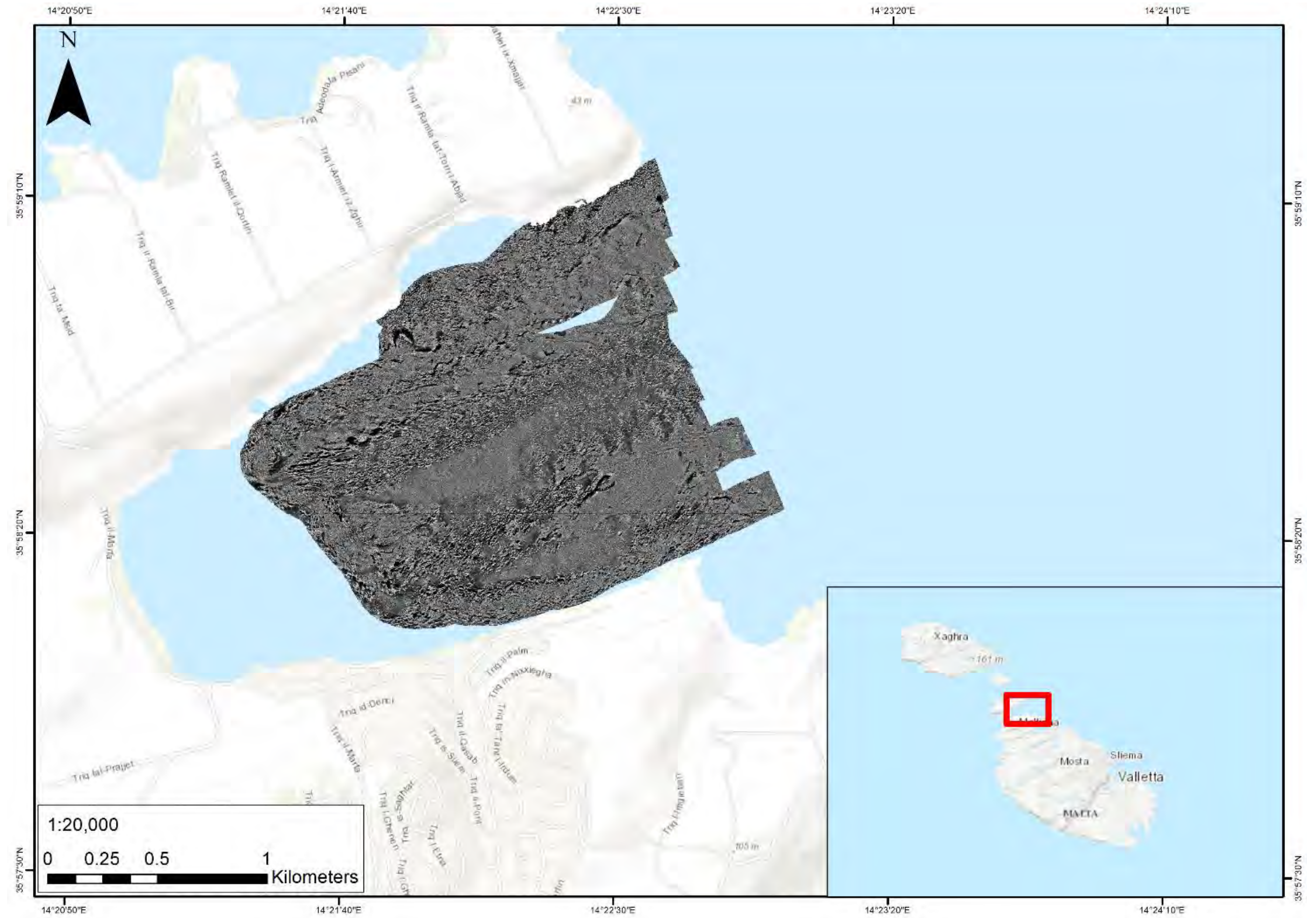
Fish count


Legend
Fish count
F01
F02
F03
F04
1:200,000
0 2.5 5 10
Kilometers
VALLETTA

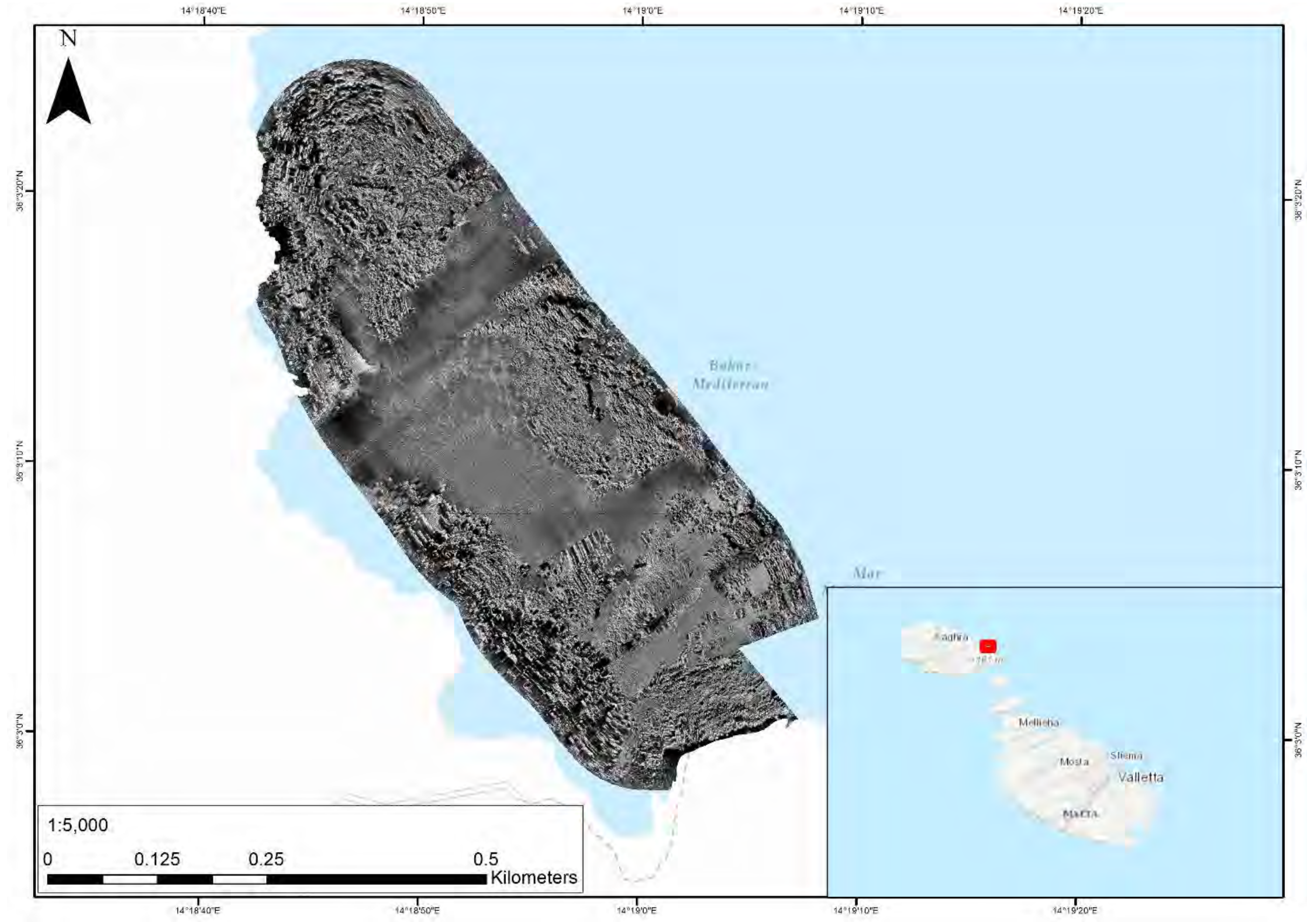
Side Scan Sonar photomosaics

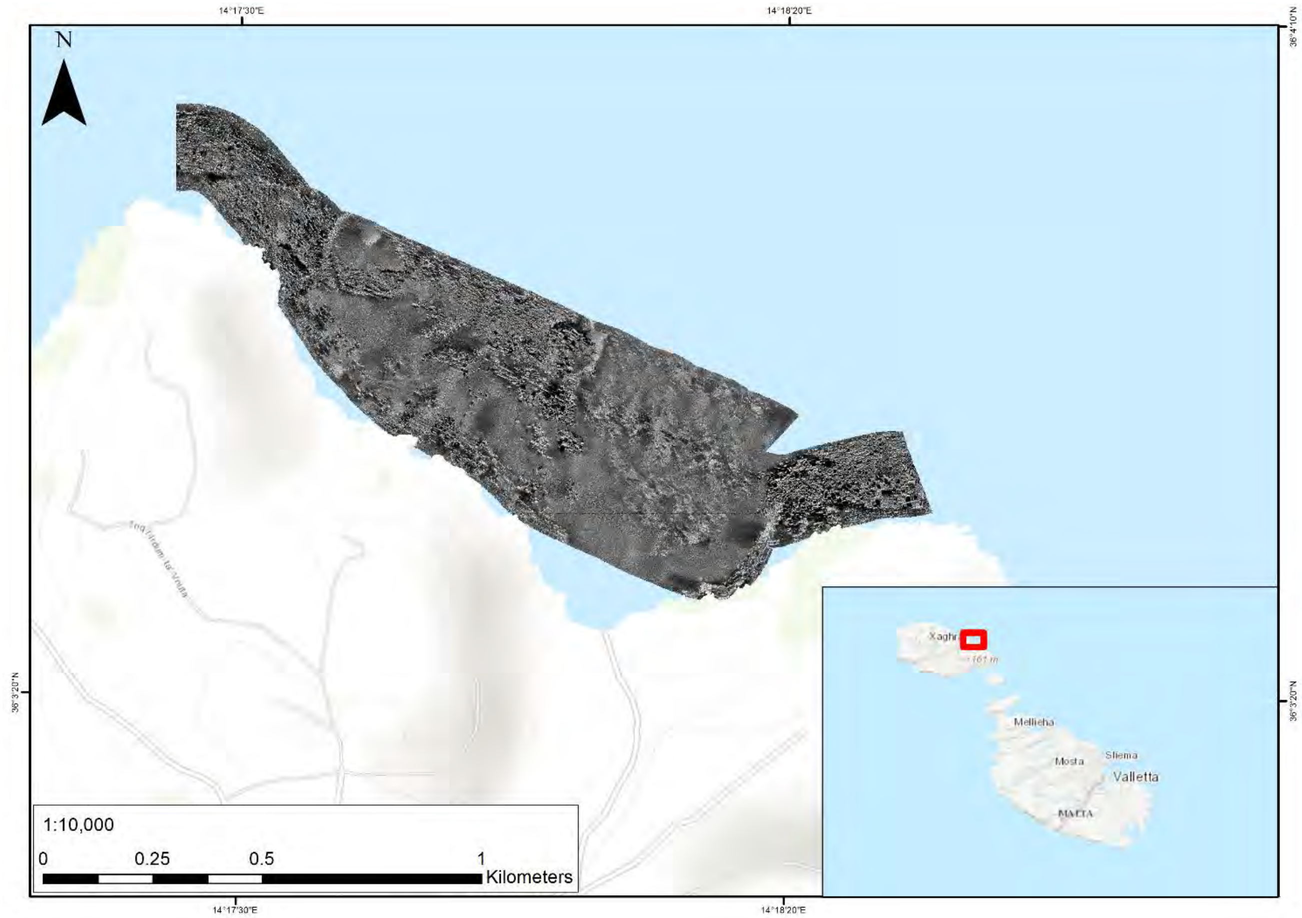


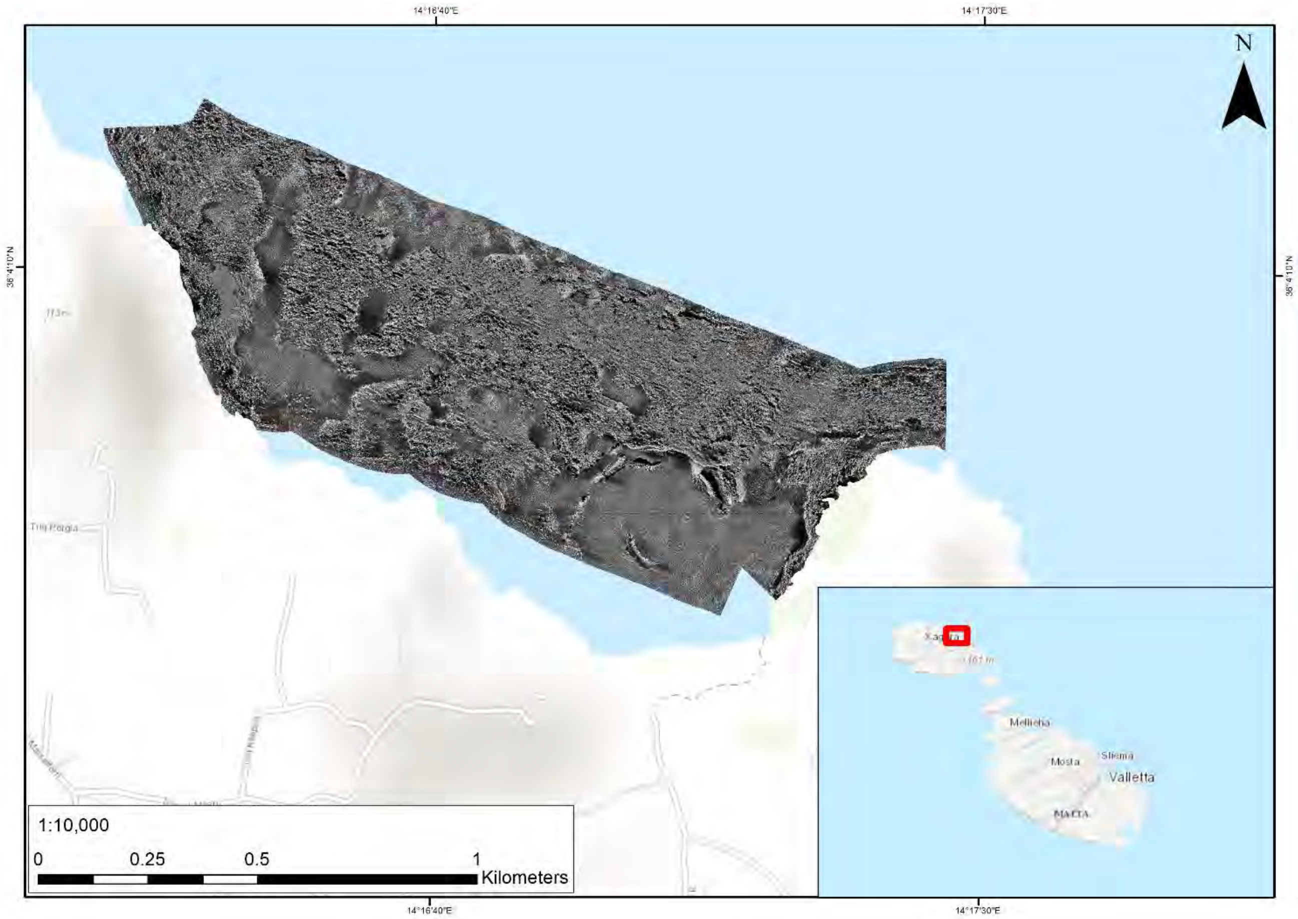

N
Il-Gzejjer ta' San Pawl
San Pawl il-Baħar
Islet Promenade
Triq it-Trunciera
Triq il-Mistra
Ix-Xemxija
San Pawl il Baħar
Triq San Pawl
Triq San Ġorġ
Triq il-Parati
Triq Sant Aristarku
Triq Sant Antnin
Bognor Beach
St Paul's Bay Bypass
Triq il-Mosta
Triq it-Turisti
Triq it-Tamar
Triq il-Qawra
Triq Raddet ir-Roti
Wiżja
1:15,000
0 0.25 0.5 1 Kilometers
14°23'20"E
14°24'10"E
14°25'0"E
35°57'30"N
35°56'40"N
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA

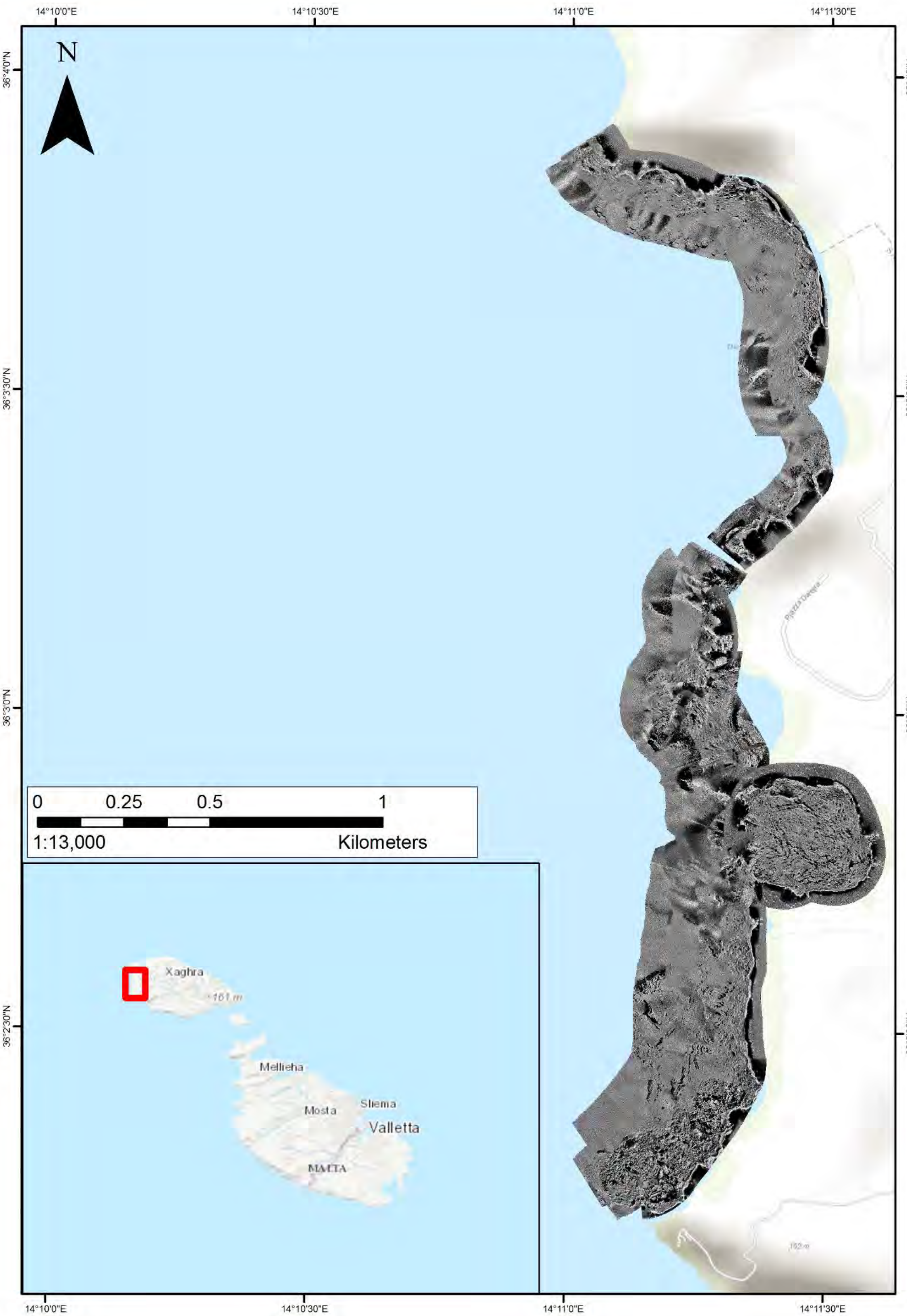


14°20'50"E
14°21'40"E
14°22'30"E
14°23'20"E
14°24'10"E
35°59'10"N
35°58'20"N
35°57'30"N
N
1:20,000
0 0.25 0.5 1
Kilometers
Xaghra
Mosta
Sliema
Valletta
MALTA

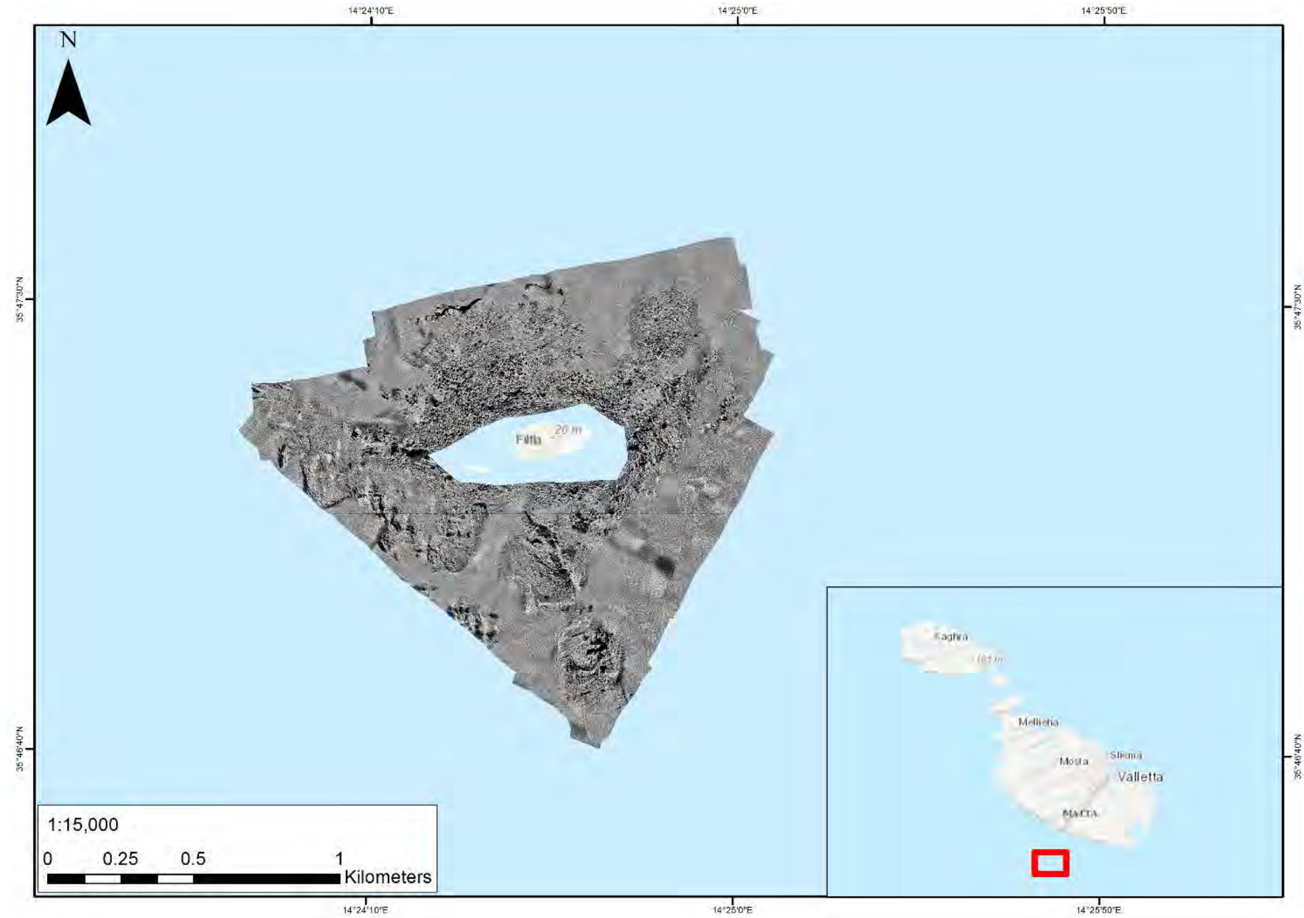

N
Bahar Mediterran
Mar
1:5,000
0 0.125 0.25 0.5
Kilometers
Mellieha
Mosta
Sliema
Valletta
MALTA

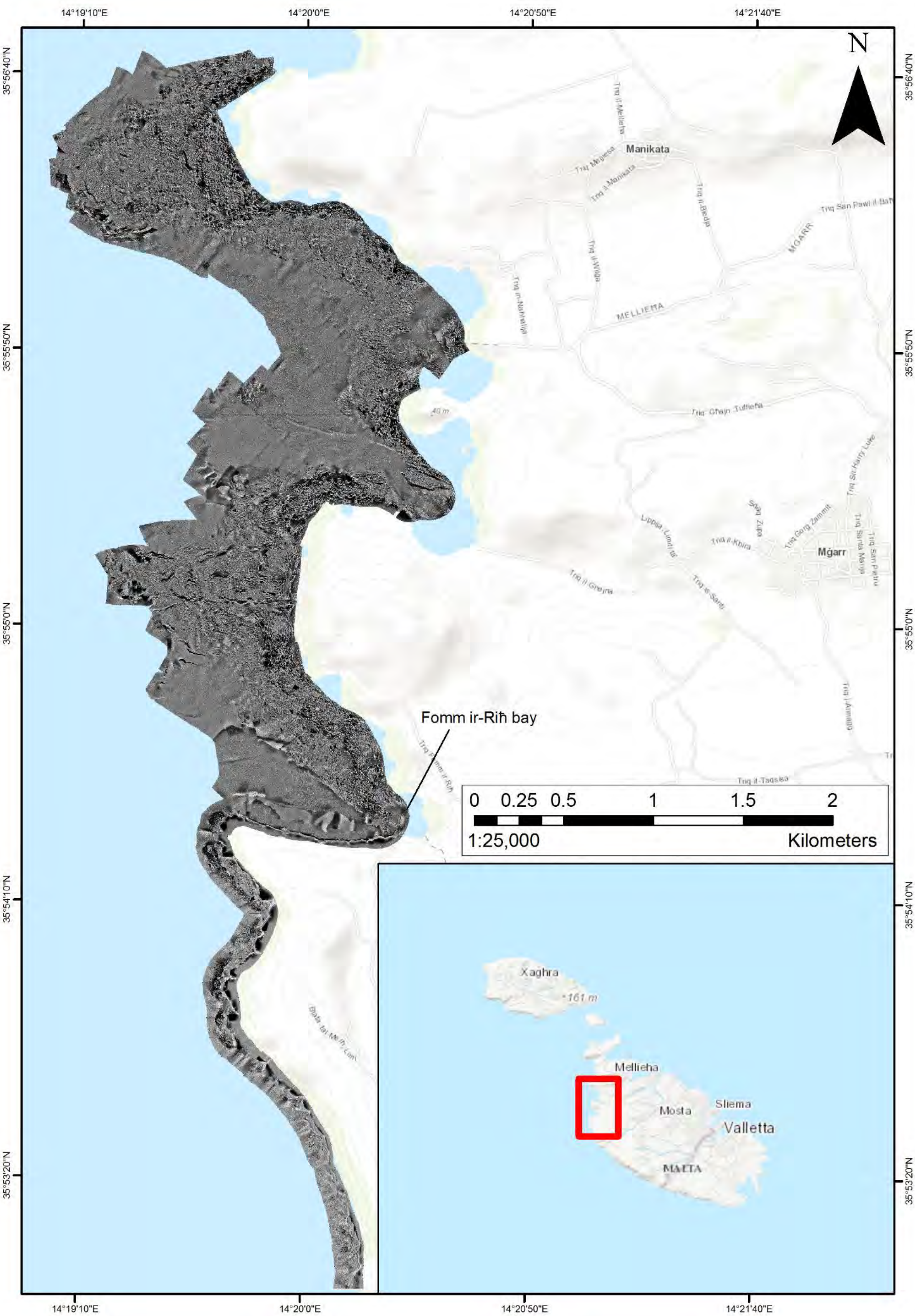

14°17'30"E
14°18'20"E
36°4'10"N
36°3'20"N
N
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
1:10,000
0 0.25 0.5 1
Kilometers

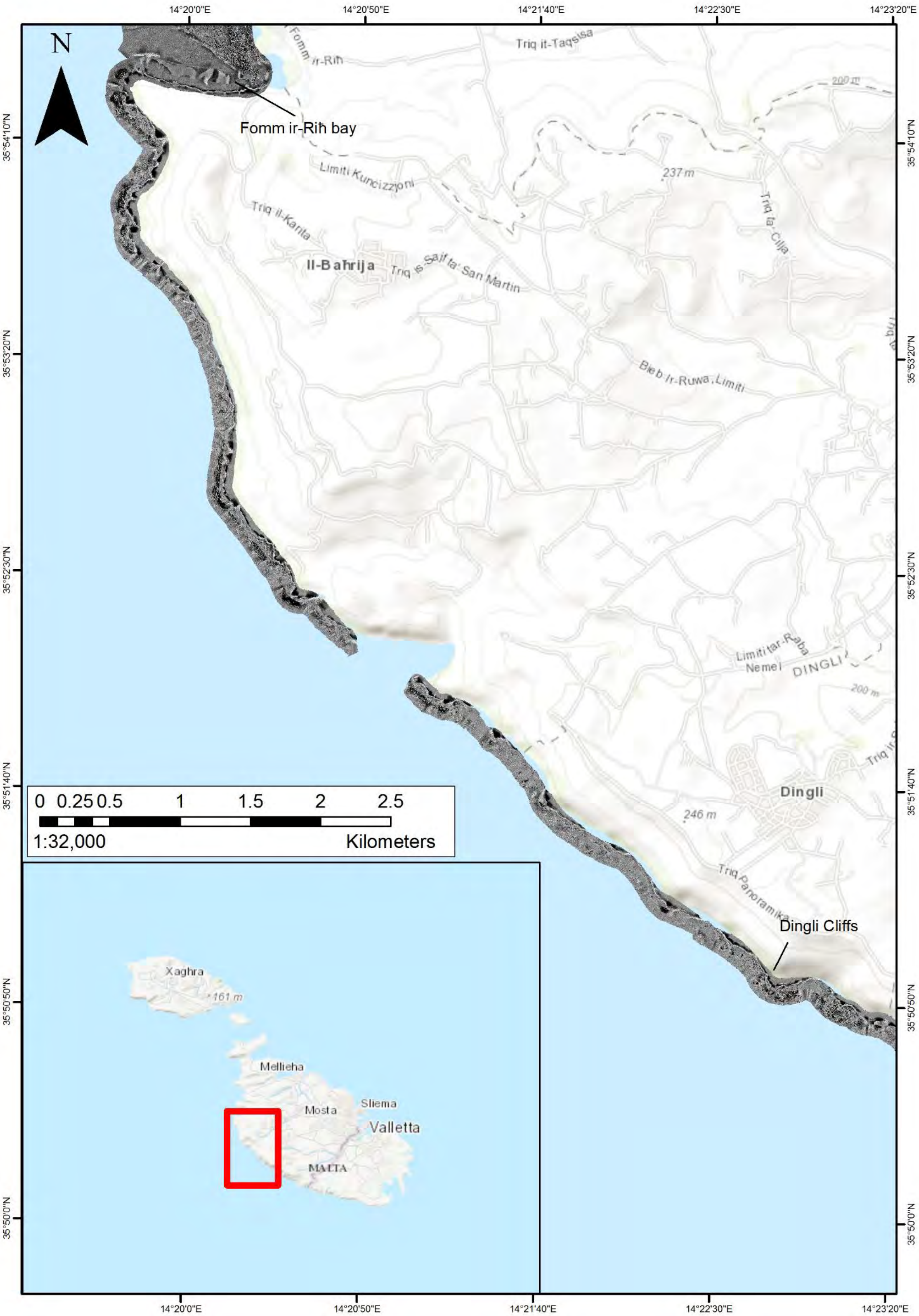

14°16'40"E
14°17'30"E
N
36°4'10"N
1:10,000
0 0.25 0.5 1
Kilometers
Mellieha
Mosta
Sliema
Valletta
MALTA


14°10'0"E
14°10'30"E
14°11'0"E
14°11'30"E
36°4'0"N
36°3'30"N
36°3'0"N
36°2'30"N
N
0
0.25
0.5
1
1:13,000
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA

Munxar
Sannat
L-Imrejżbiet
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
1:20,000
0 0.25 0.5 1
Kilometers
14°13'20"E
14°14'10"E
14°15'0"E
14°15'50"E
14°16'40"E


N
14°24'10"E
14°25'0"E
14°25'50"E
35°47'30"N
35°46'40"N
Filfla
1:15,000
0 0.25 0.5 1
Kilometers
Valletta

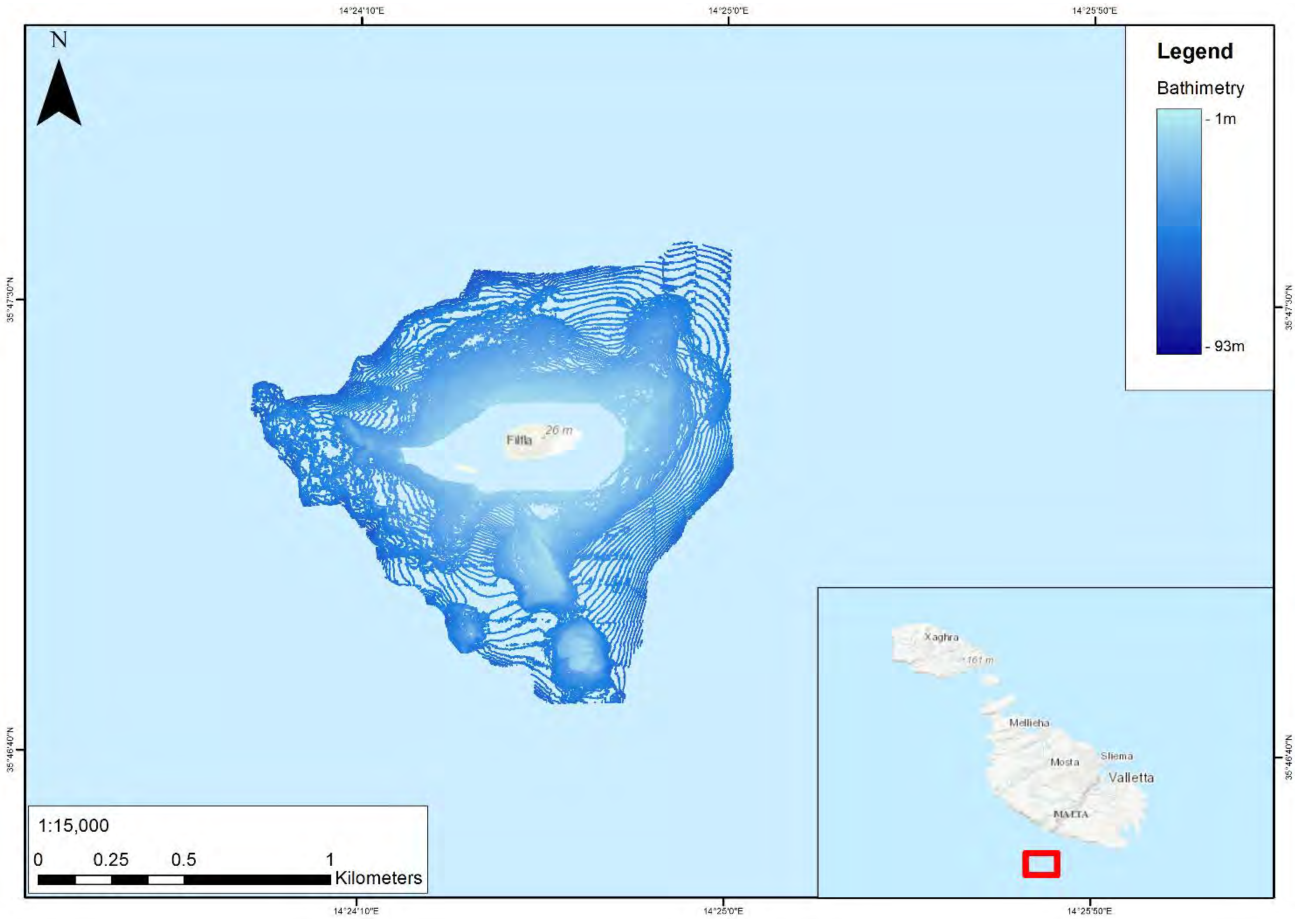

14°19'10"E
14°20'0"E
14°20'50"E
14°21'40"E
35°56'40"N
35°55'50"N
35°55'0"N
35°54'10"N
35°53'20"N
N
Manikata
Mgarr
MELLIEHA
Fomm ir-Rih bay
0 0.25 0.5 1 1.5 2
1:25,000
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA



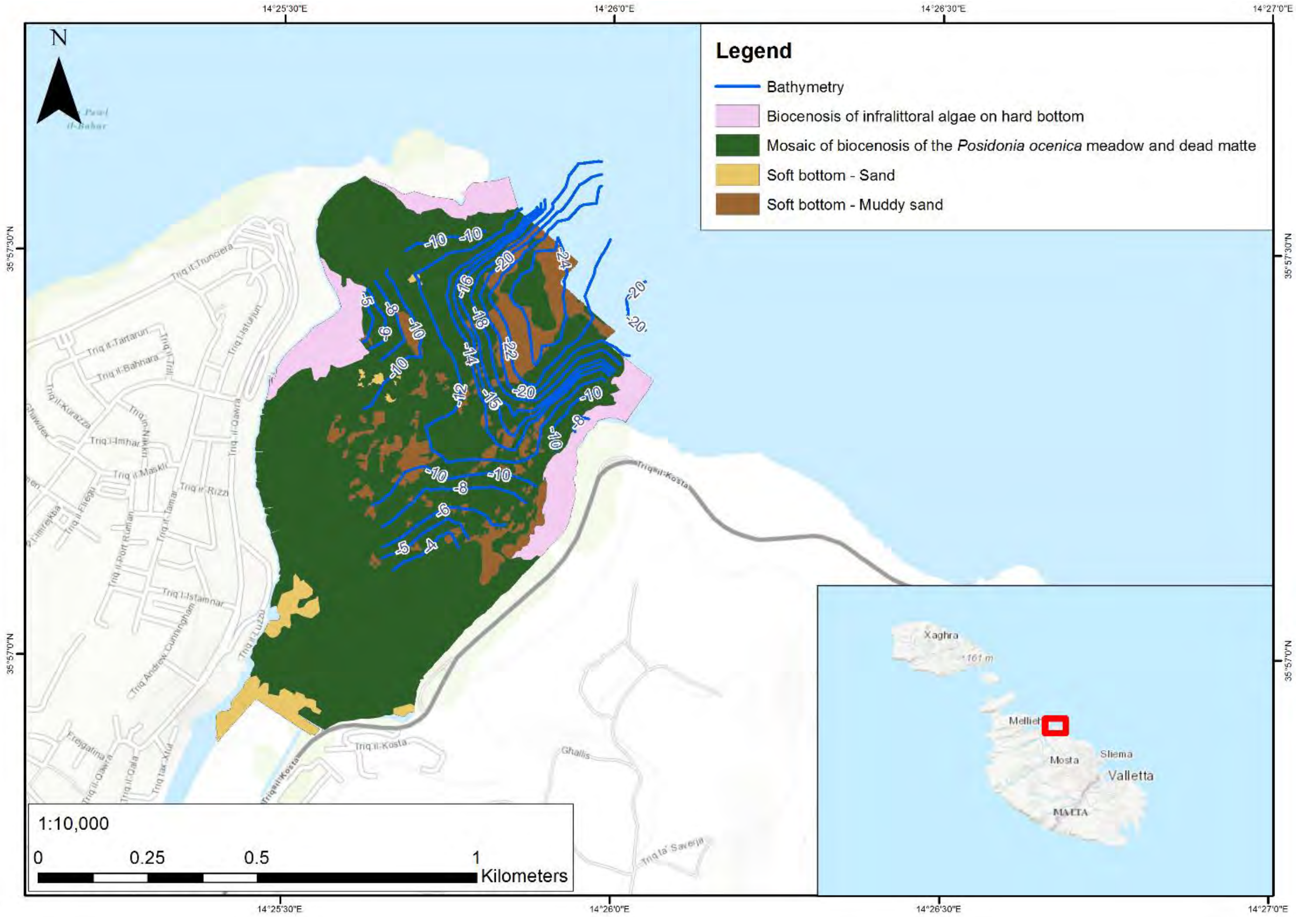
14°20'0"E
14°20'50"E
14°21'40"E
14°22'30"E
14°23'20"E
35°54'10"N
35°53'20"N
35°52'30"N
35°51'40"N
35°50'50"N
35°50'0"N
N
Fomm ir-Riħ bay
Triq it-Taqsisa
200 m
237 m
Limiti Kunċizzjoni
Triq il-Karita
Il-Baħrija
Triq is-Saif ta' San Martin
Triq ta' Ċilja
Bieb ir-Ruwa, Limiti
Limiti tar-Raba Nemei
DINGLI
200 m
Dingli
246 m
Triq Panoramika
Dingli Cliffs
0 0.25 0.5 1 1.5 2 2.5
1:32,000
Kilometers
Xaghra
161 m
Mellieha
Mosta
Sliema
Valletta
MALTA

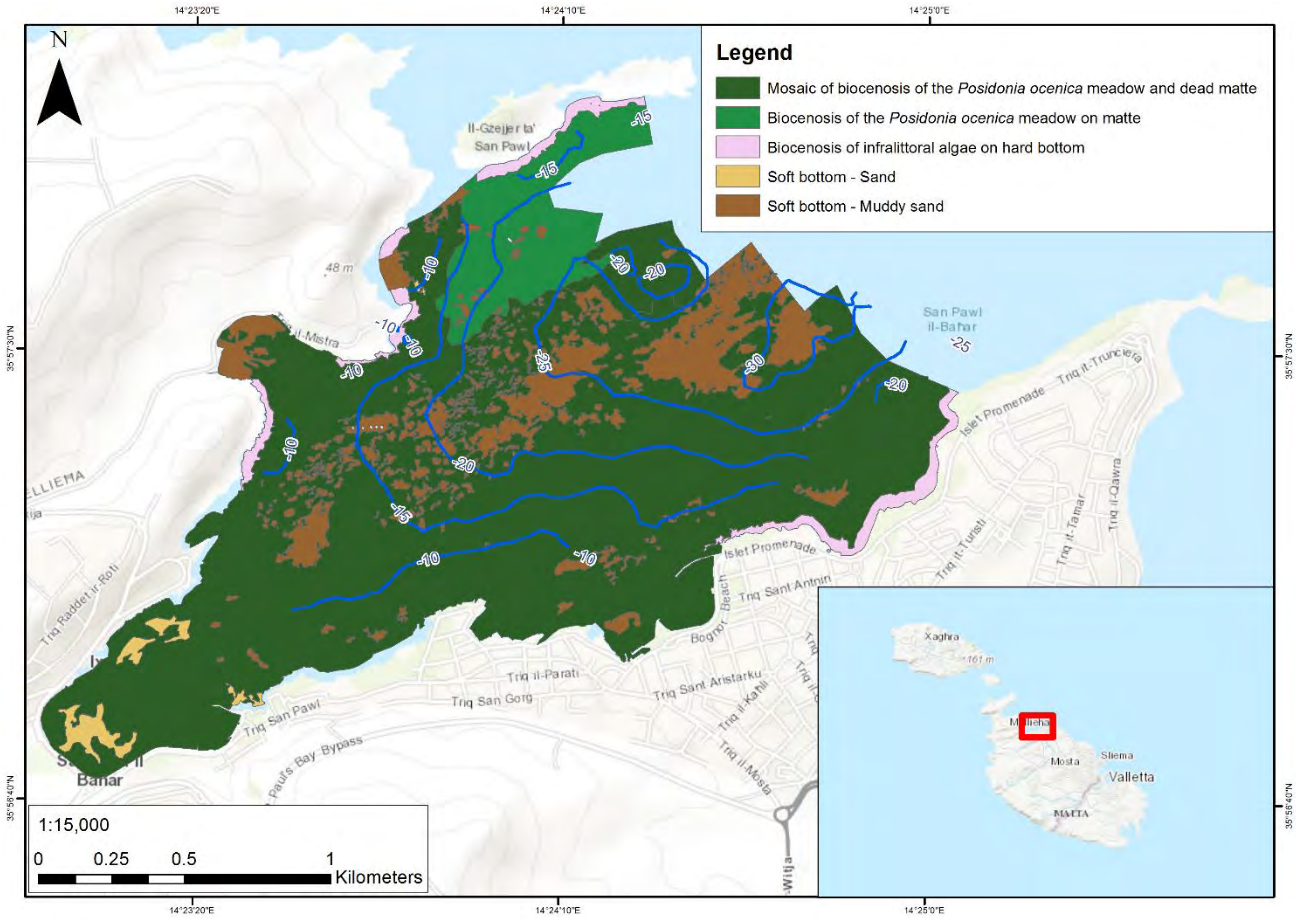
Dingli Cliffs
Blue Grotto
Mqabba
Qrendi
Żurrieq
Wied Żurrieq
MALTA MAJJISTRAL
MALTA XLOKK
Triq is-Siggiewi
Triq ta' Hassajtek
Triq Hagar Qim
Triq il-Tempesta
Triq il-Qrendi
Triq il-Wardija
231 m
143 m
1:30,000
0 0.5 1 2
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta

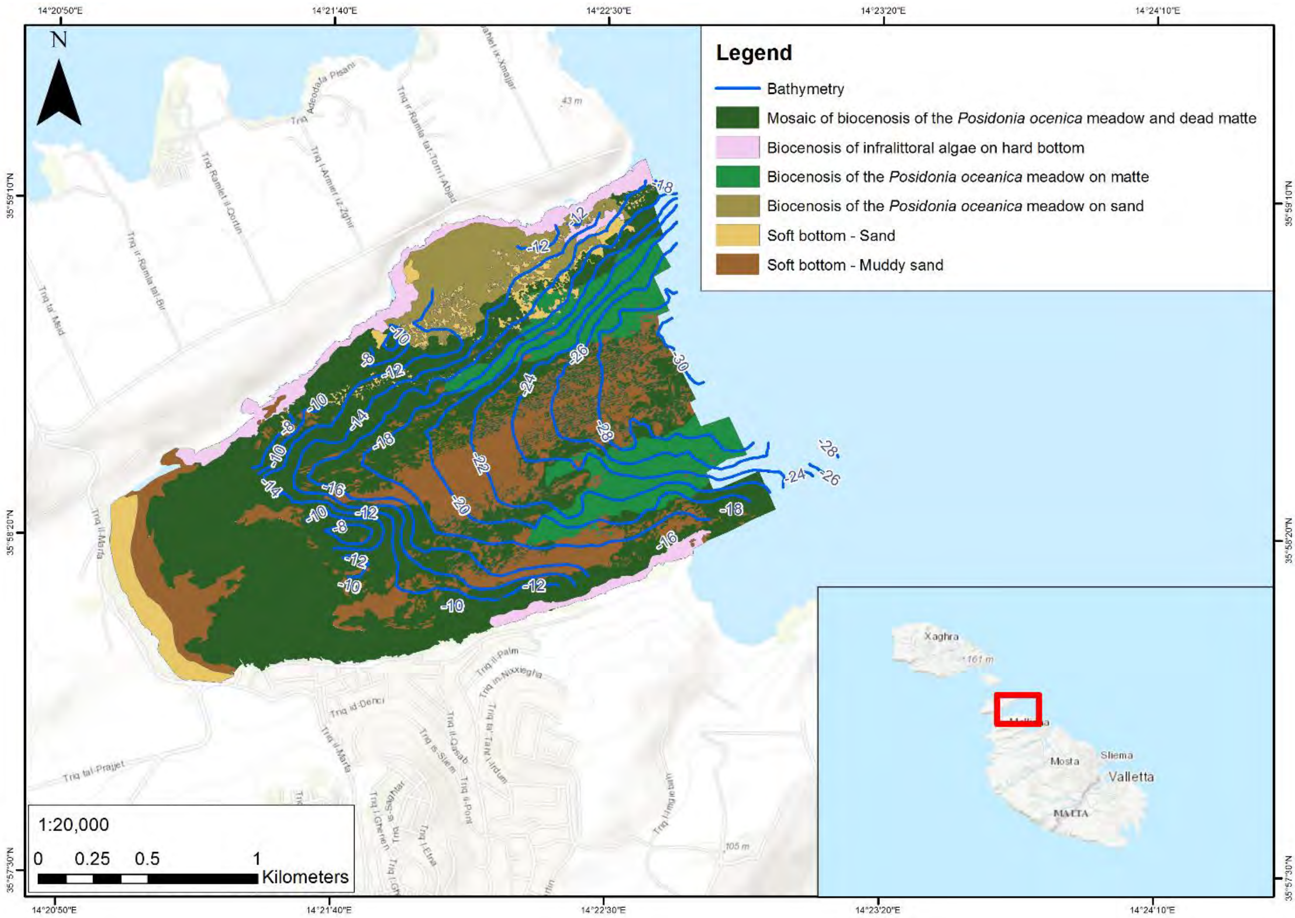
Morpho-bathymetric survey with Multibeam Echosounder

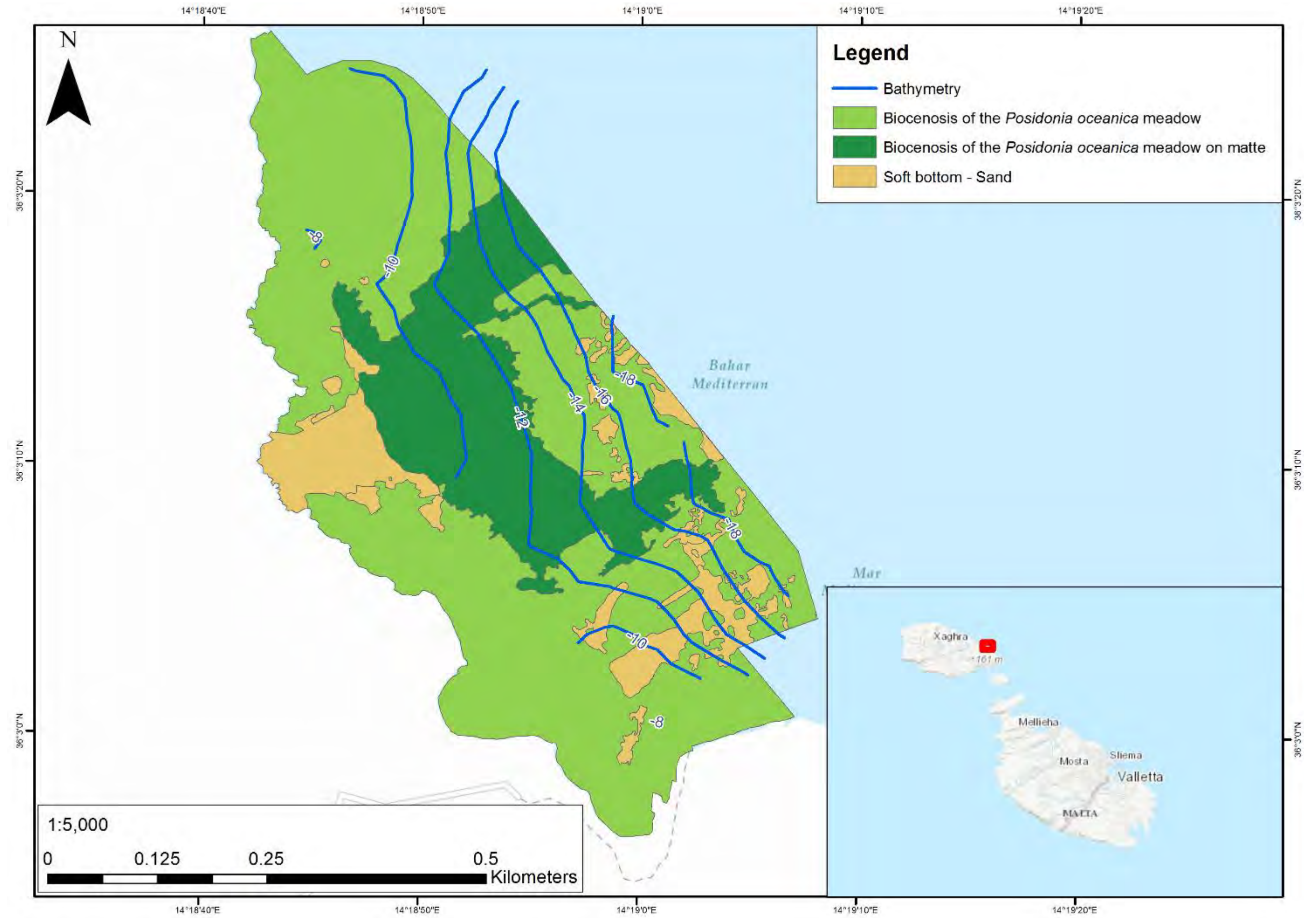


Habitat maps

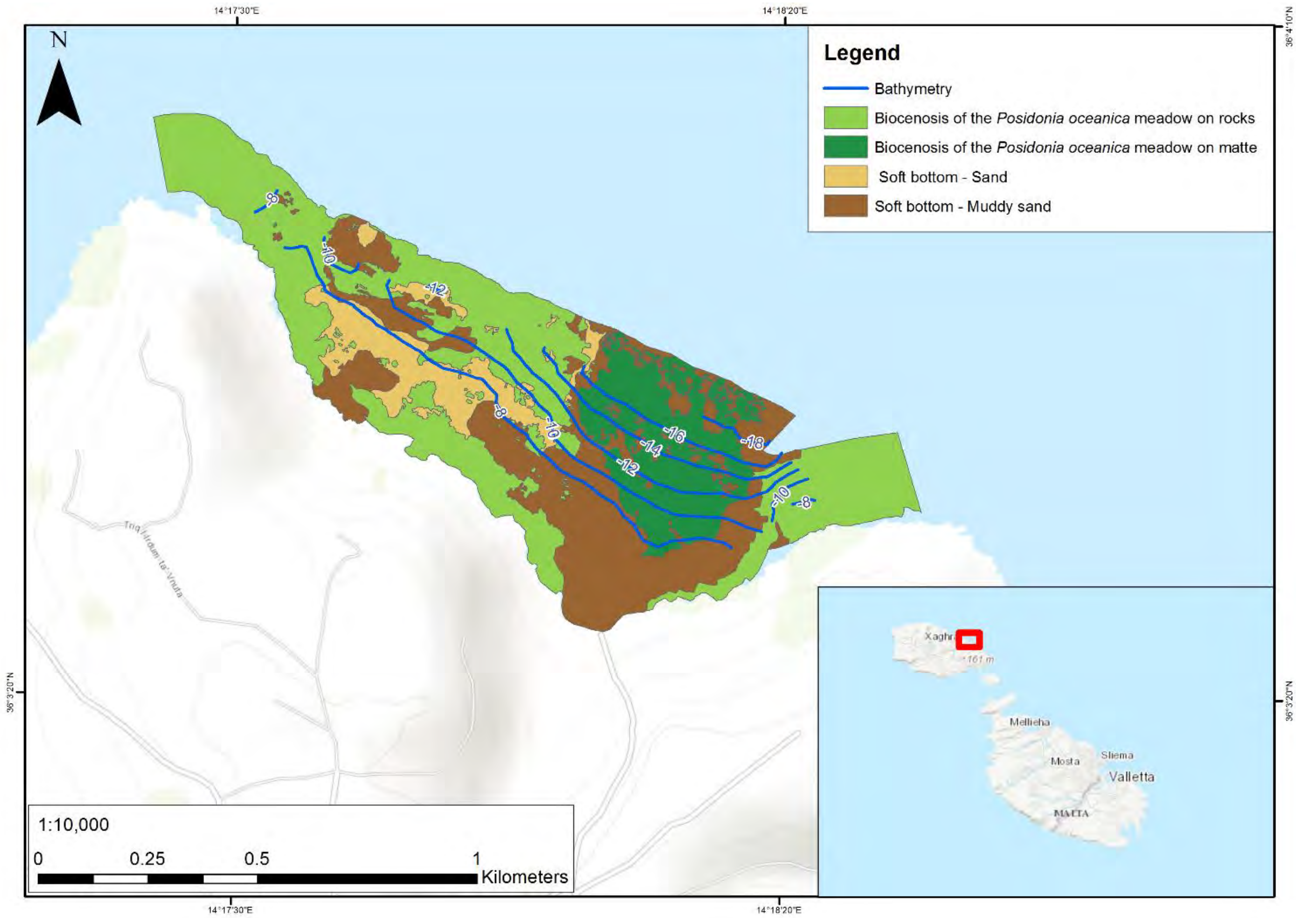


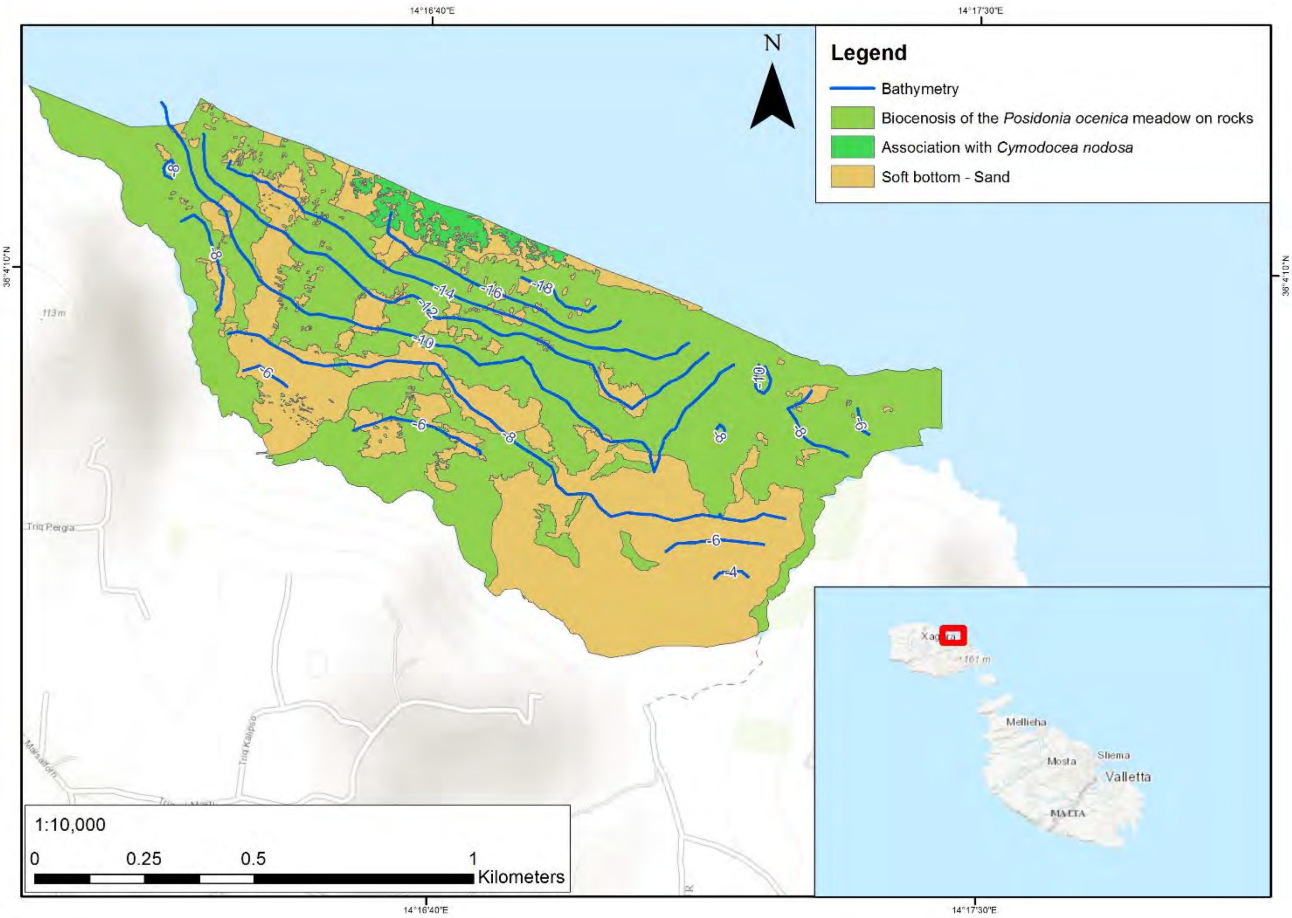

Legend
Mosaic of biocenosis of the Posidonia ocenica meadow and dead matte
Biocenosis of the Posidonia ocenica meadow on matte
Biocenosis of infralittoral algae on hard bottom
Soft bottom - Sand
Soft bottom - Muddy sand
1:15,000
0 0.25 0.5 1
Kilometers
N

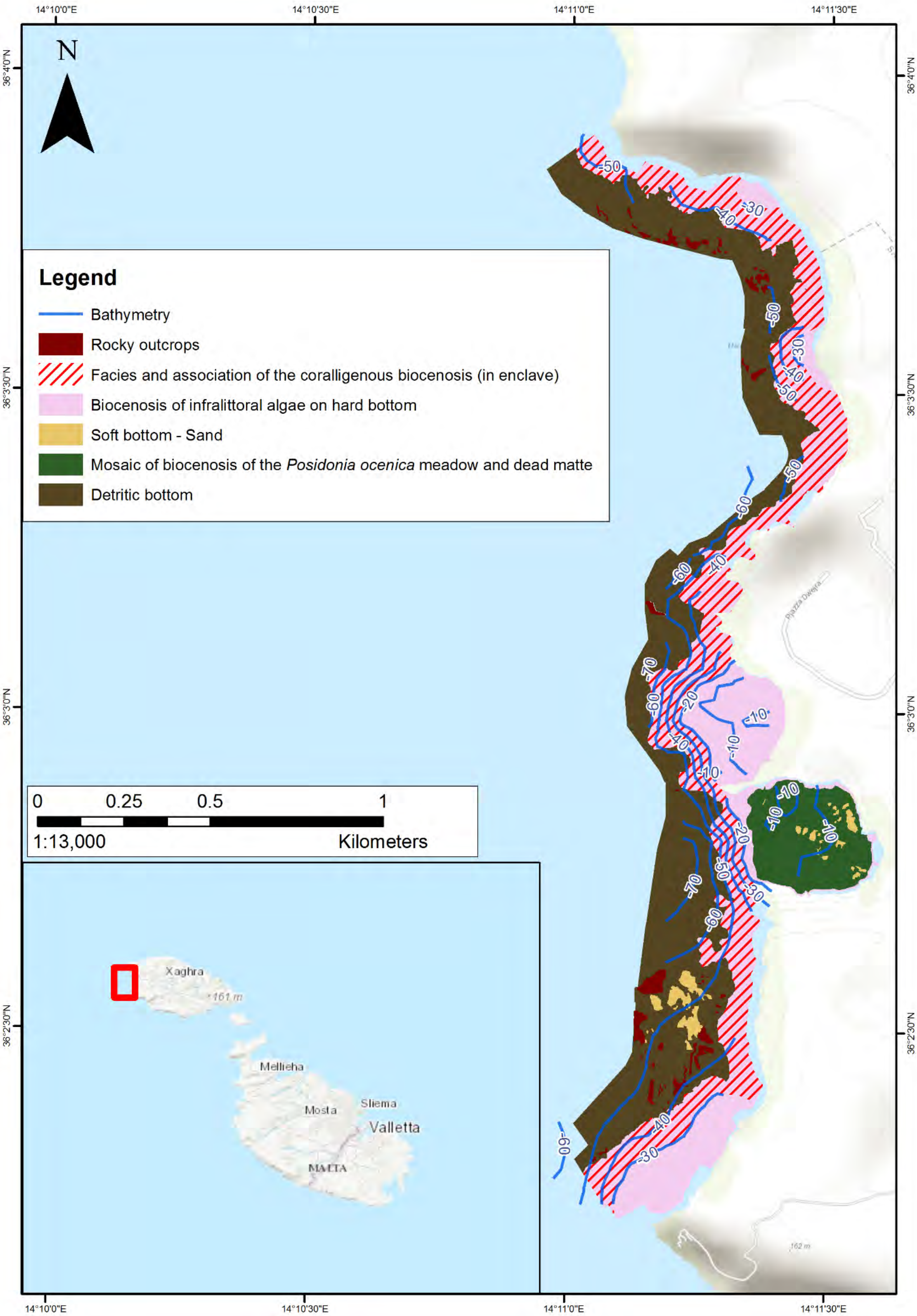

Legend
Bathymetry
Mosaic of biocenosis of the Posidonia ocenica meadow and dead matte
Biocenosis of infralittoral algae on hard bottom
Biocenosis of the Posidonia oceanica meadow on matte
Biocenosis of the Posidonia oceanica meadow on sand
Soft bottom - Sand
Soft bottom - Muddy sand
N
1:20,000
0 0.25 0.5 1
Kilometers
14°20'50"E
14°21'40"E
14°22'30"E
14°23'20"E
14°24'10"E
35°59'10"N
35°58'20"N
35°57'30"N
Xaghra
Mosta
Sliema
Valletta
MALTA



Legend
Bathymetry
Biocenosis of the Posidonia oceanica meadow
Biocenosis of the Posidonia oceanica meadow on matte
Soft bottom - Sand
Bahar Mediterran
Mar
Xaghra
Mellieħa
Mosta
Sliema
Valletta
MALTA
1:5,000
0 0.125 0.25 0.5
Kilometers
N
14°18'40"E
14°18'50"E
14°19'0"E
14°19'10"E
14°19'20"E
36°3'20"N
36°3'10"N
36°3'0"N


N
Legend
Bathymetry
Biocenosis of the *Posidonia oceanica* meadow on rocks
Biocenosis of the *Posidonia oceanica* meadow on matte
Soft bottom - Sand
Soft bottom - Muddy sand
-8
-10
-12
-14
-16
-18
1:10,000
0 0.25 0.5 1
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA


14°16'40"E
14°17'30"E
36°4'10"N
N
Legend
Bathymetry
Biocenosis of the *Posidonia ocenica* meadow on rocks
Association with *Cymodocea nodosa*
Soft bottom - Sand
-18
-16
-14
-12
-10
-8
-6
-4
Triq Pergla
Mellieha
Mosta
Sliema
Valletta
MALTA
1:10,000
0
0.25
0.5
1
Kilometers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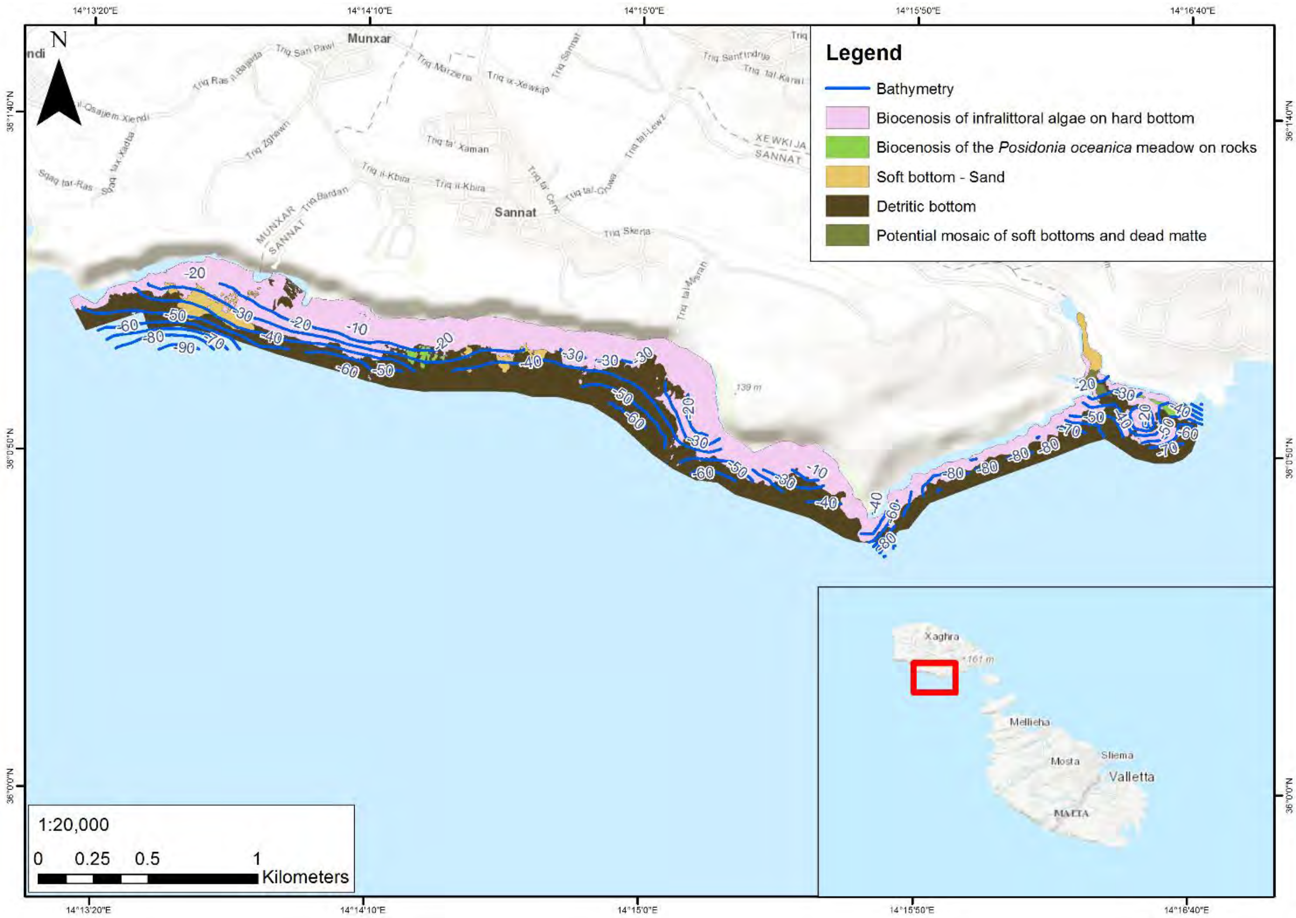
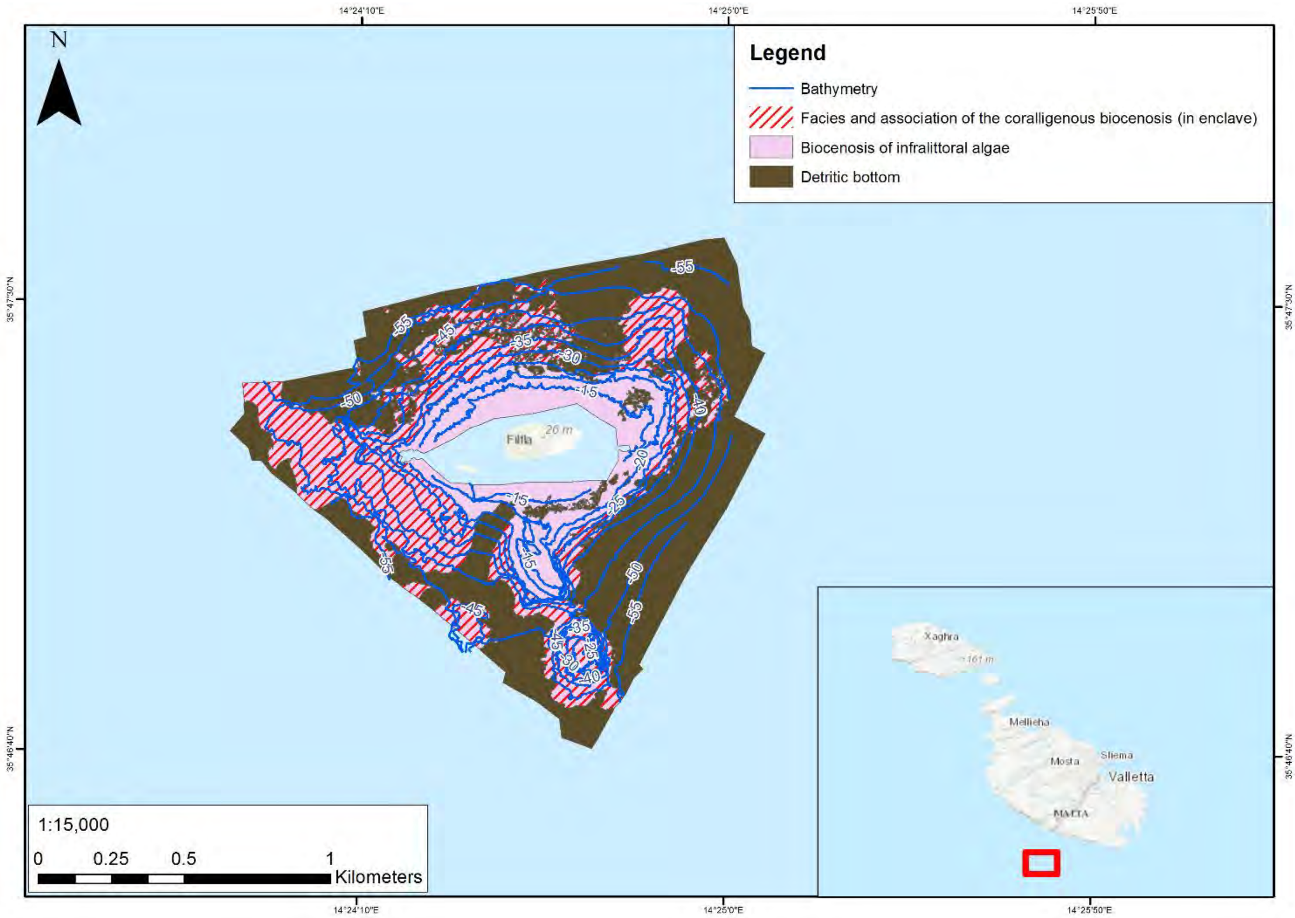
14°10'30"E
14°11'0"E
14°11'30"E
36°4'0"N
36°3'30"N
36°3'0"N
36°2'30"N
N
Legend
Bathymetry
Rocky outcrops
Facies and association of the coralligenous biocenosis (in enclave)
Biocenosis of infralittoral algae on hard bottom
Soft bottom - Sand
Mosaic of biocenosis of the *Posidonia ocenica* meadow and dead matte
Detritic bottom
0 0.25 0.5 1
1:13,000
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
-50
-30
-40
-60
-70
-20
-10


Legend
Bathymetry
Biocenosis of infralittoral algae on hard bottom
Biocenosis of the Posidonia oceanica meadow on rocks
Soft bottom - Sand
Detritic bottom
Potential mosaic of soft bottoms and dead matte
1:20,000
0 0.25 0.5 1
Kilometers
Munxar
Sannat
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
14°13'20"E
14°14'10"E
14°15'0"E
14°15'50"E
14°16'40"E
36°1'40"N
36°0'50"N
36°0'0"N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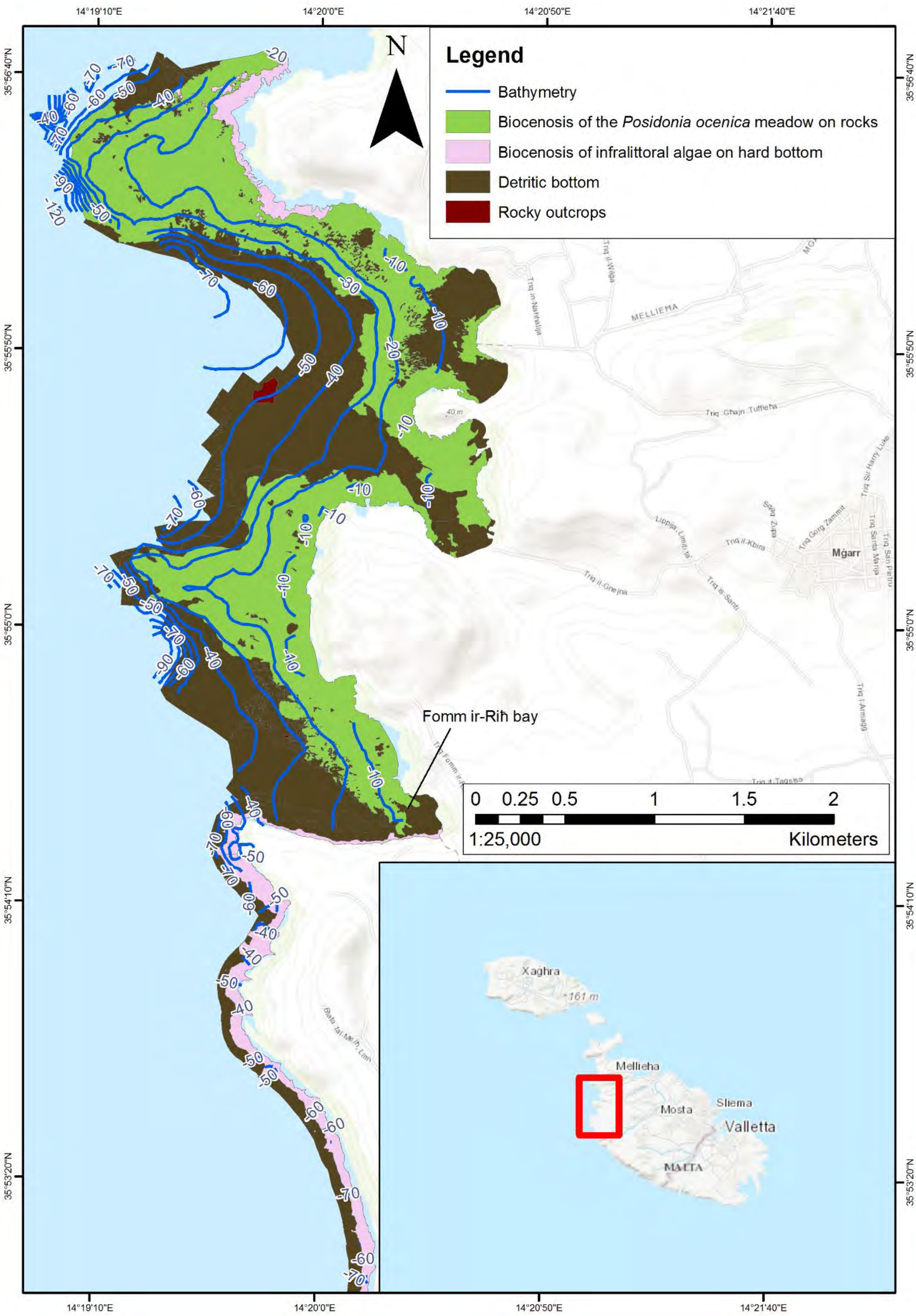
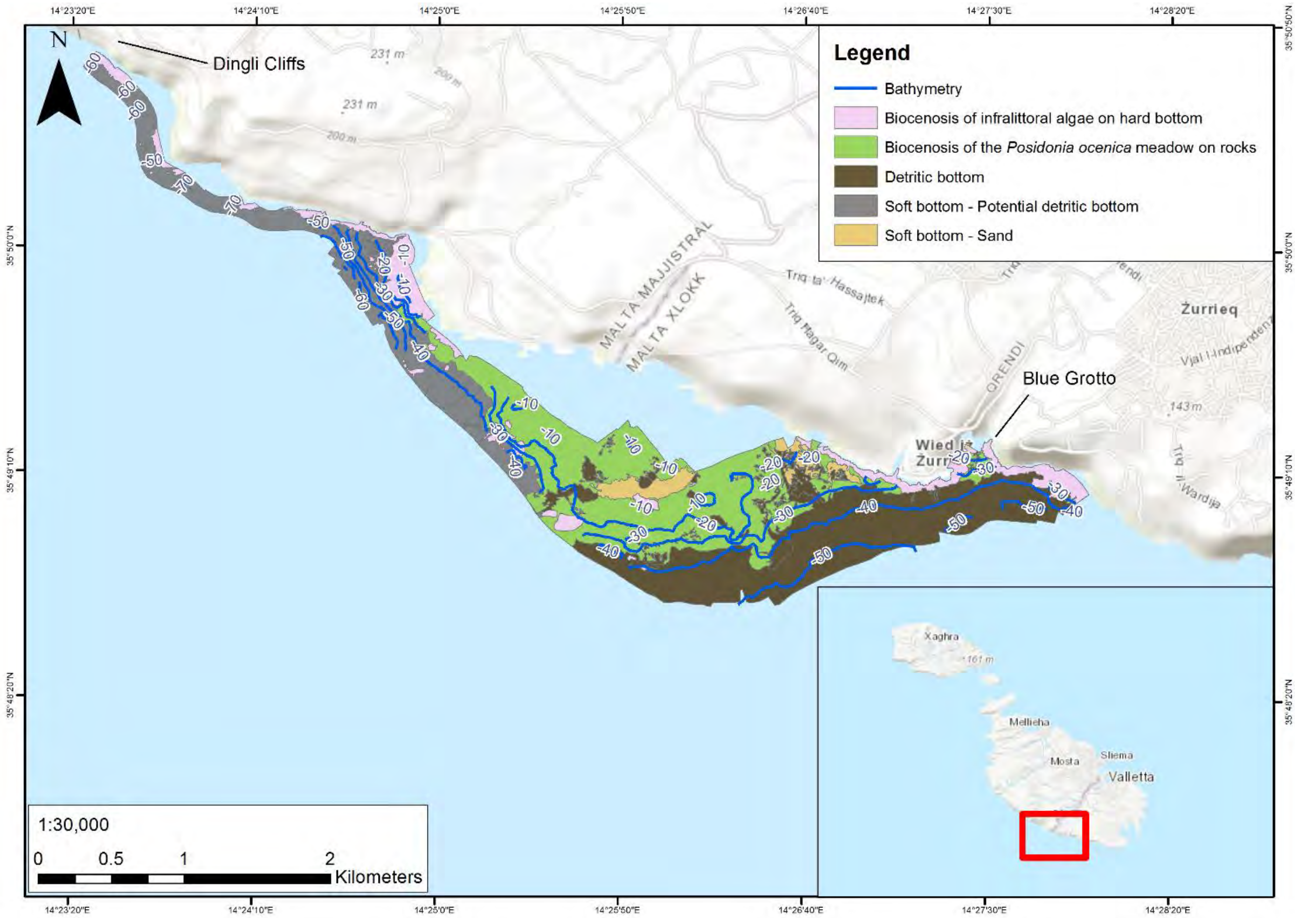
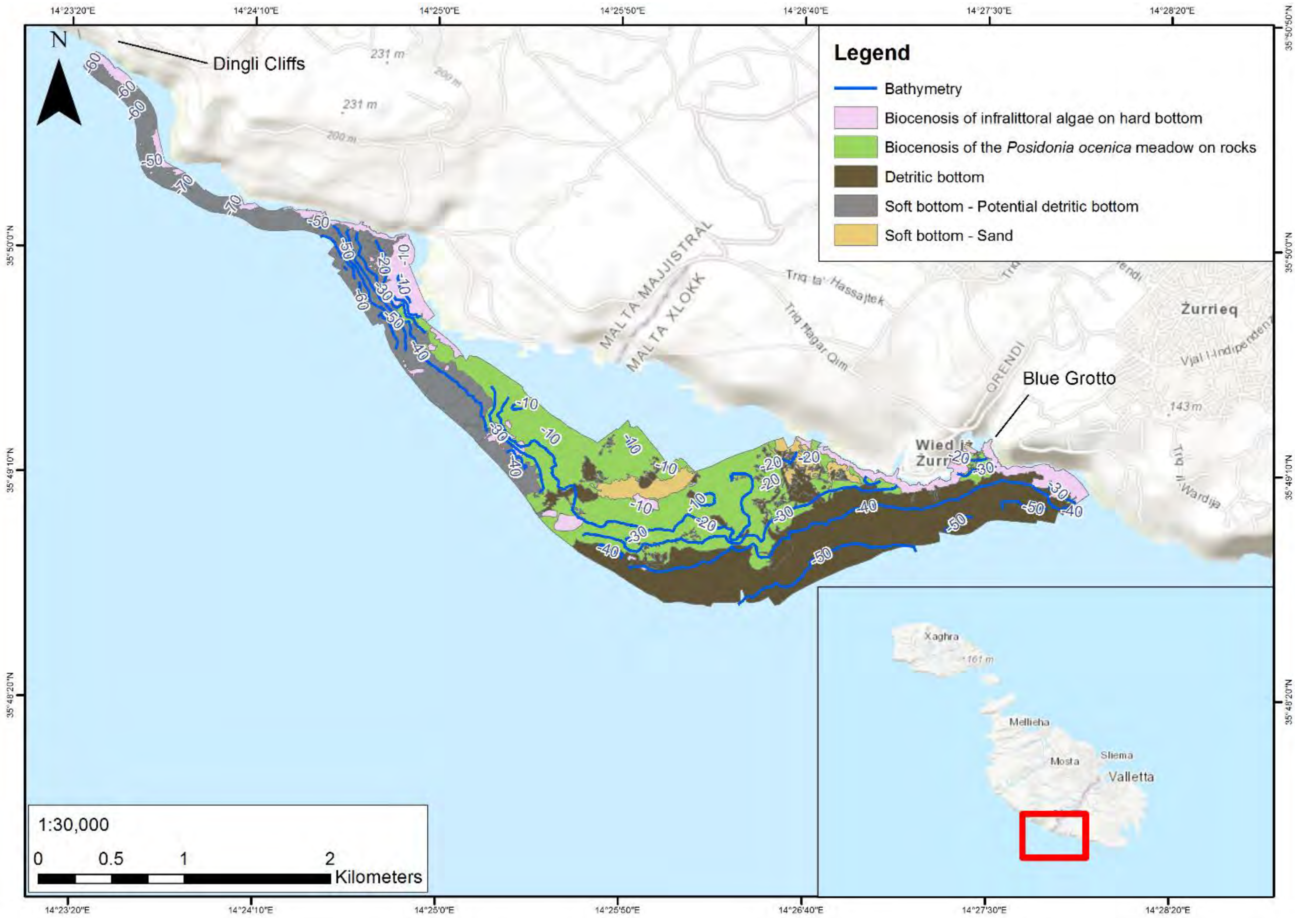
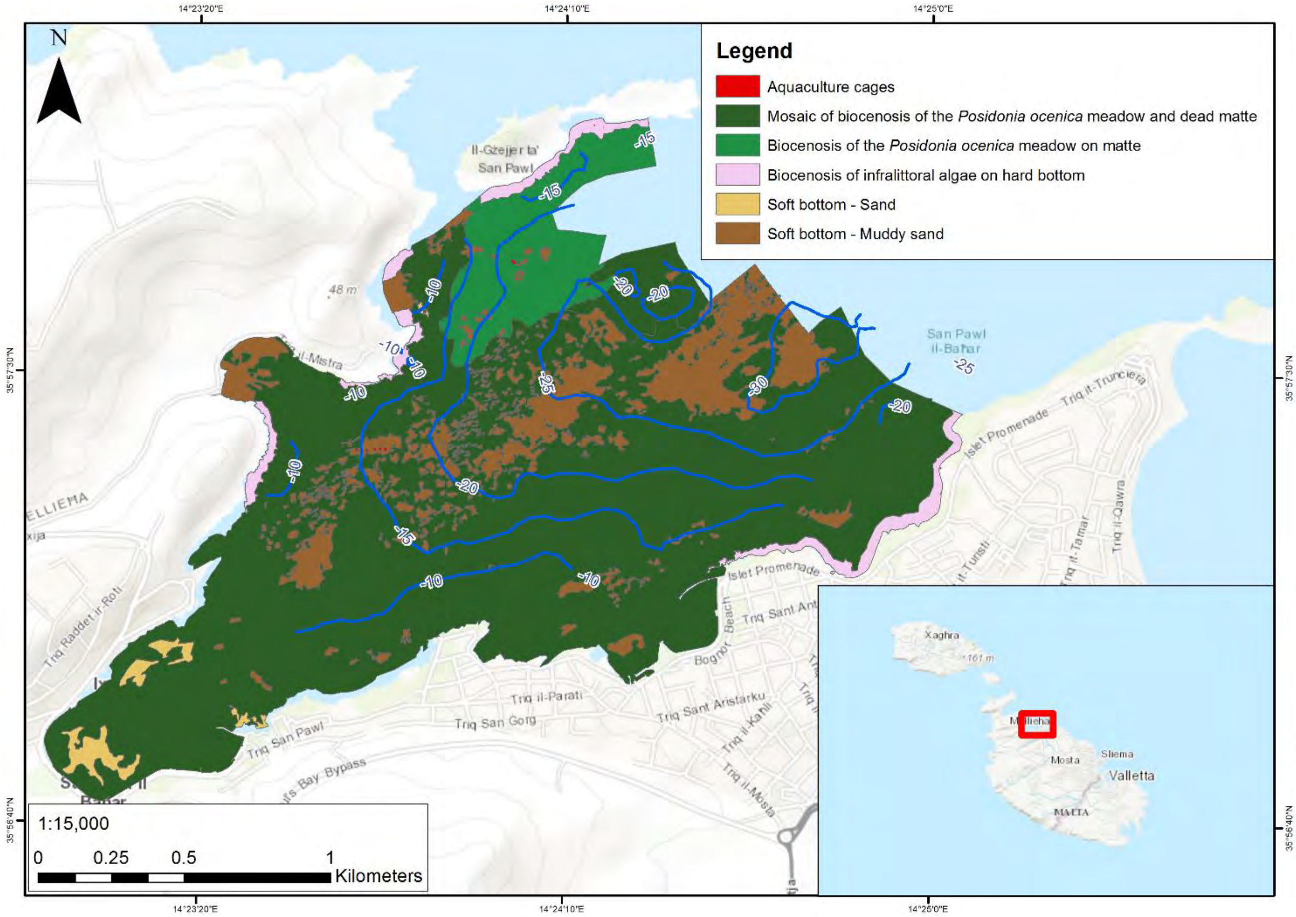
14°25'0"E
14°25'50"E
35°47'30"N
35°46'40"N
N
Legend
Bathymetry
Facies and association of the coralligenous biocenosis (in enclave)
Biocenosis of infralittoral algae
Detritic bottom
Filfla
20 m
-55
-45
-35
-30
-15
-50
-20
-25
-40
1:15,000
0 0.25 0.5 1
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA

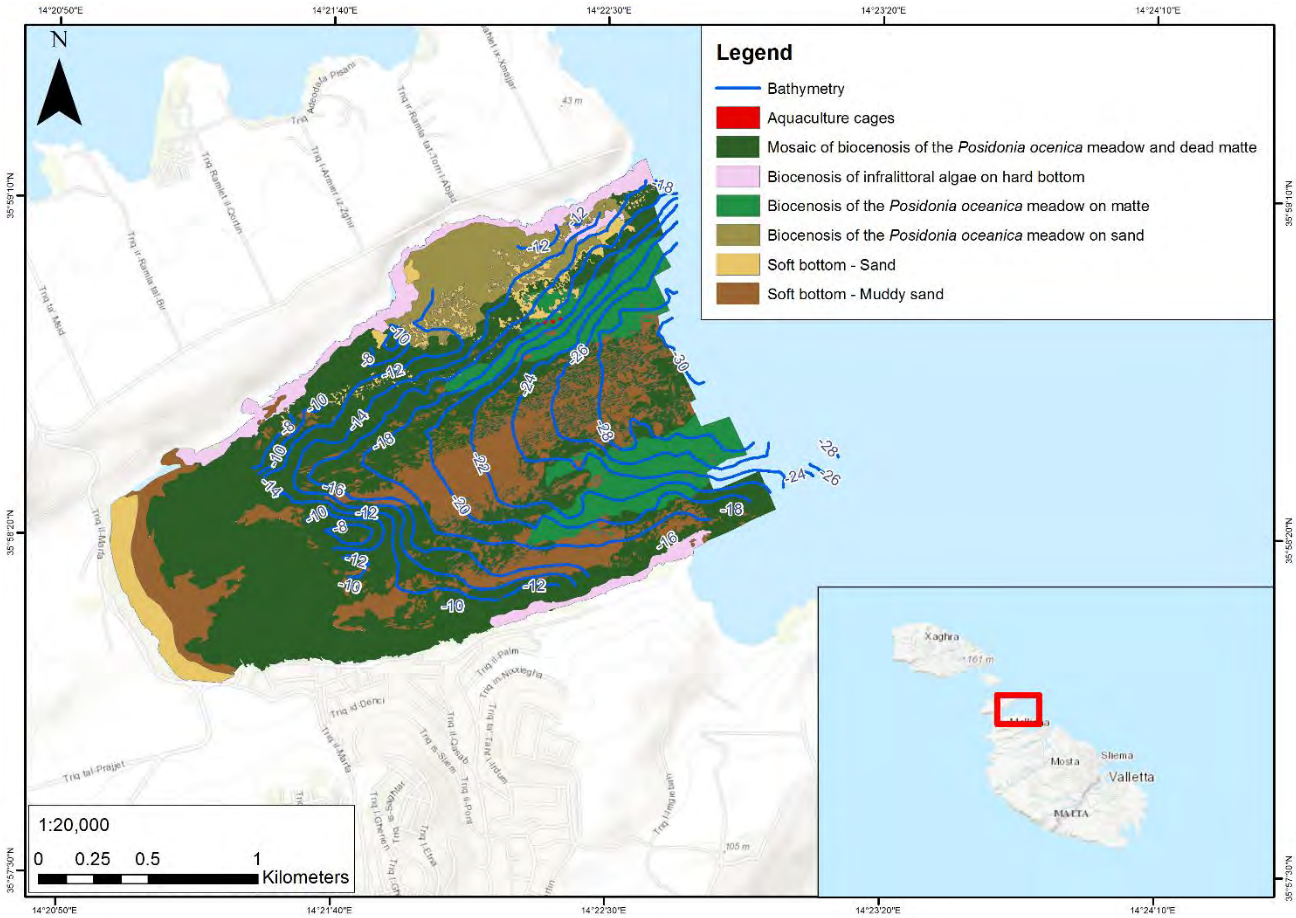

Legend
Bathymetry
Biocenosis of the Posidonia ocenica meadow on rocks
Biocenosis of infralittoral algae on hard bottom
Detritic bottom
Rocky outcrops
N
Fomm ir-Rih bay
0 0.25 0.5 1 1.5 2
1:25,000
Kilometers
14°19'10"E
14°20'0"E
14°20'50"E
14°21'40"E
35°56'40"N
35°55'50"N
35°55'0"N
35°54'10"N
35°53'20"N
Xaghra
Mellieha
Mosta
Sliema
Valletta
MALTA
Mgarr


Legend
Bathymetry
Biocenosis of infralittoral algae on hard bottom
Biocenosis of the *Posidonia ocenica* meadow on rocks
Detritic bottom
Soft bottom - Potential detritic bottom
Soft bottom - Sand
Dingli Cliffs
Blue Grotto
Wied iz-Zurrieq
Zurrieq
MALTA MAJJISTRAL
MALTA XLOKK
ORENDI
Xaghra
Mellieha
Mosta
Sliema
Valletta
1:30,000
0 0.5 1 2 Kilometers
N

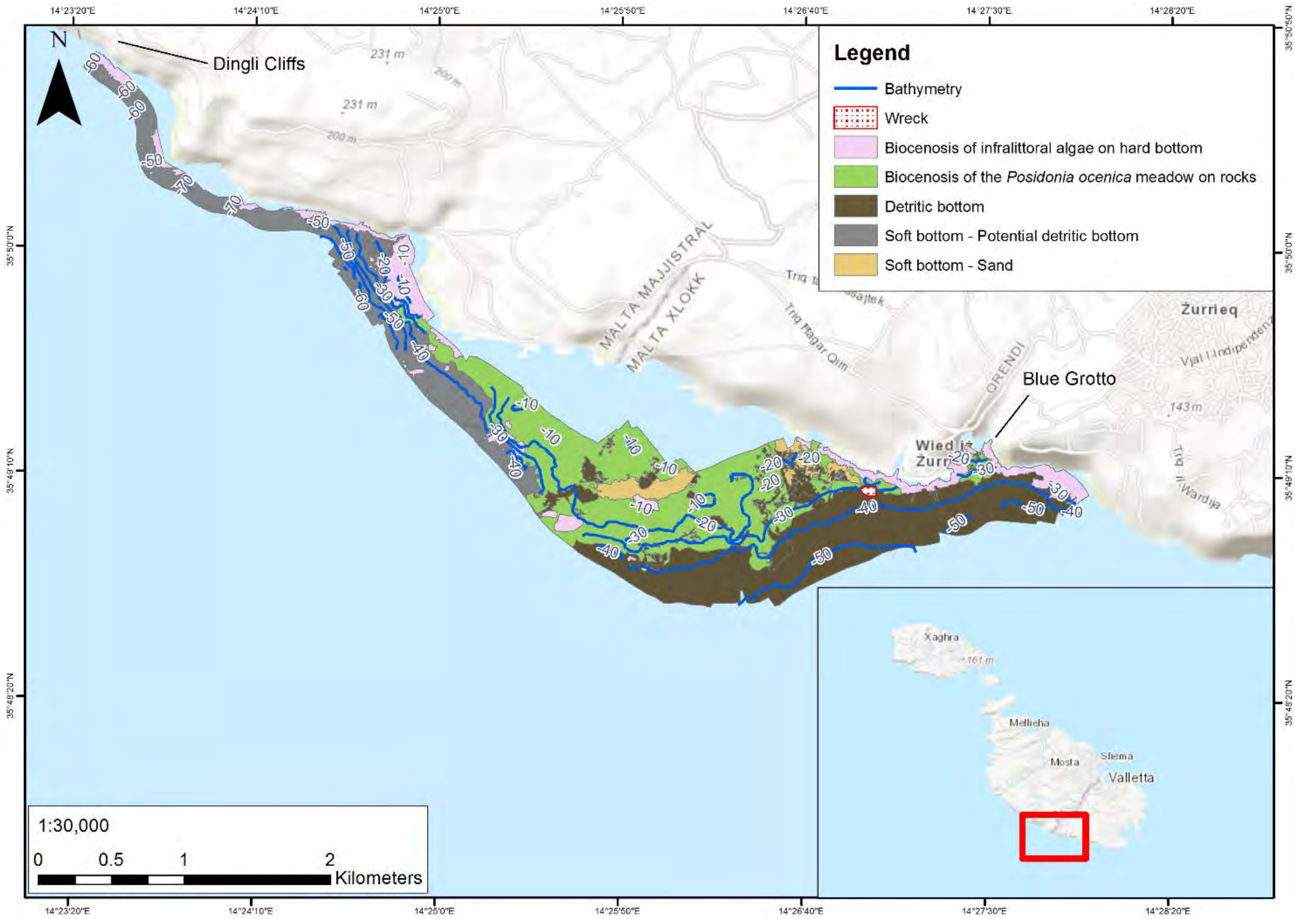

Legend
Bathymetry
Biocenosis of infralittoral algae on hard bottom
Biocenosis of the *Posidonia ocenica* meadow on rocks
Detritic bottom
Soft bottom - Potential detritic bottom
Soft bottom - Sand
Dingli Cliffs
Blue Grotto
N
1:30,000
0 0.5 1 2 Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta
Żurrieq

Aquaculture cages




Legend
Bathymetry
Aquaculture cages
Mosaic of biocenosis of the Posidonia ocenica meadow and dead matte
Biocenosis of infralittoral algae on hard bottom
Biocenosis of the Posidonia oceanica meadow on matte
Biocenosis of the Posidonia oceanica meadow on sand
Soft bottom - Sand
Soft bottom - Muddy sand
1:20,000
0 0.25 0.5 1 Kilometers
N
Valletta
Mosta
Sliema
Xaghra

Wreck


Dingli Cliffs
Legend
Bathymetry
Wreck
Biocenosis of infralittoral algae on hard bottom
Biocenosis of the Posidonia ocenica meadow on rocks
Detritic bottom
Soft bottom - Potential detritic bottom
Soft bottom - Sand
Blue Grotto
Żurrieq
1:30,000
0 0.5 1 2
Kilometers
Xaghra
Mellieha
Mosta
Sliema
Valletta

APPENDIX B

Fishing activity questionnaire

1) Home Port: ________________

2) Activity type: a) Full-time (MFA) b) Part-time (MFB) c) Recreational (MFC or S)

3) Number of trips per week (average): _________________

4) Average duration per trip (hr/days): _______________________

5) Night or day? _____________________________

6) Fishing gears used ___________________________

7) Daily average catch (kg): Summer _______________ Winter ________________

8) Do you fish within the five areas and in the immediate vicinity? Yes / No

(indicate points on map)

9) In those areas, what is the quantity of fish and the income? _______kg _________Eur

10) What is the annual percentage income carried exclusively by catches within the areas and in the immediate vicinity? _________________________%

11) What is the catch status in the areas and in the immediate vicinity in the past 10 years?

a) Increasing b) Stable c) Decreasing

12) (If decreasing), Why do you think is that?

____

13) Do you think that overfishing affects catch, and size of the fish caught? Yes / No

14) Can fishing gear be harmful to the environment and marine habitats? Yes / No

15) Which type of fishing gear? and in what way?

____

16) (If yes) What can be done in your opinion to manage these problems (overfishing and impacts on habitats)?

____

17) Are you aware that the area you fish is a marine protected area? Yes / No

18) Would you be in favour of some No Take Zones in the areas where you fish? Yes / No

Can you give a reason? ____

19) Do you think that the protected areas could affect the way you fish? (e.g. gear, place)

Yes / No Explain ____

20) Where do you fish as an alternative to these areas?

(indicate area on map)

21) In those areas, what is the quantity of fish and the income? _______kg _________Eur

22) What is the annual percentage income carried exclusively by catches outside the areas? ____________________%

23) Would you have an increase in expenses (fishing gear, fuel, licenses, etc.) if you are not allowed to fish in the protected areas? Yes / No

24) How much do you estimate your costs would increase? ________________________%

Iż-Żoni Kostali Protetti magħżulin bi qbil mal-ERA, jinkludu:

MT101 - Żona fil-Baħar bejn Rdum Majjiesa u Għar Lapsi

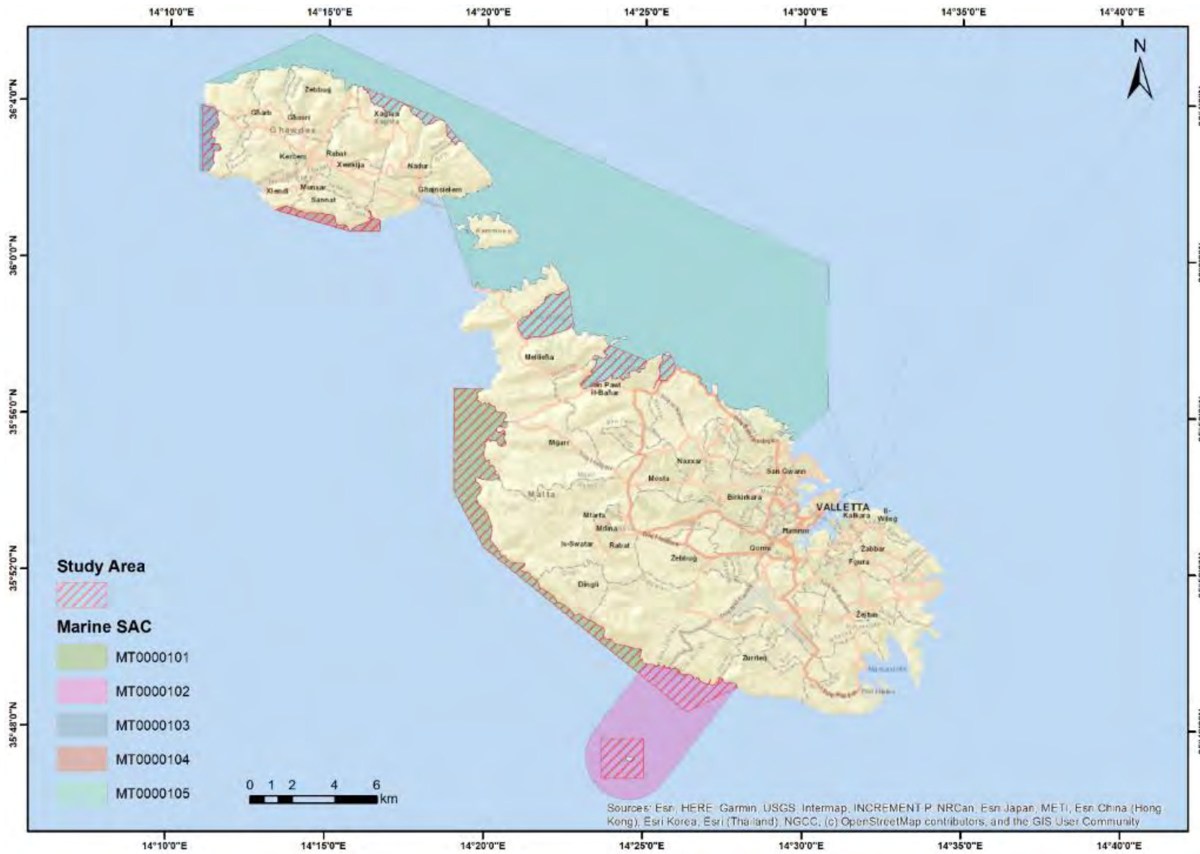
MT102 - Żona fil-Baħar fl-inħawi ta' Għar Lapsi u ta' Filfla

MT103 - Żona fil-Baħar fl-inħawi tad-Dwejra (Għawdex)

MT104 - Żona fil-Baħar bejn Il-Ponta tal-Ħotba u Tal-Fessej (Għawdex)

MT105 - Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u Il-Qaliet

L-istampa ta' hawn taħt turi l-post taż-Żoni tal-Baħar Protetti identifiikati li sa jkunu investigati bħala parti mill-proġett:



APPENDIX C

Letter for the Federation of the Recreational Fishing Co-operatives

28/11/2019 Reference No. RAC001

Ministry for the Environment,
Sustainable Development and Climate Change
Department of Fisheries and Aquaculture
Government Farm Għammieri,
Triq L-Ingiered,
Marsa, Malta
Tel: (+356) 2292 6800
Email: infofisheries.mesdc@gov.mt

Għaqda Koperattiva tas-Sajd Limitata
Id-Dwana
Xatt is-Sajjieda
M'Xlokk ZTN09
Tel: 21681826, 21682525, 21650962, 21653826
Fax: 21681826, 21688555, 21653826
Email: maltafishermencoop@hotmail.com

Koperattiva Nazzjonali Tas-Sajd Limited
Address: Dar is-Sajjieda, Xatt is-Sajjieda, M'Xlokk
Tel: 21688391; 21659391
Fax: 21652132
E-mail: fishcoop@maltanet.net

Federazzjoni ta l-Ghaqdiet tas-Sajjieda Dillettanti Malta
Postal Address: P.O.Box 475, Valleta
Email: f.gh.s.d.malta@gmail.com

MEDKEYHABITATS II PROJECT - FIELD SURVEY - QUESTIONNAIRES TO FISHERMEN

Within the framework of its assistance activities to Contracting Parties to the Barcelona Convention and through the "Mapping of marine Key habitats and assessing their vulnerability to fishing activities in the Mediterranean" project (Medkeyhabitats II project), SPA/RAC is collaborating with the Environment and Resources Authority (ERA) in the implementation of the activities identified in common agreement with the Maltese SPA/RAC National Focal Point.

Golder Associates Srl (www.golder.com) based in Turin (Italy)was appointed from UN RAC/SPA office to map some Maltese marine key habitats in the context of the MedKeyHabitats II program (www.rac-spa.org/medkeyhabitats2).

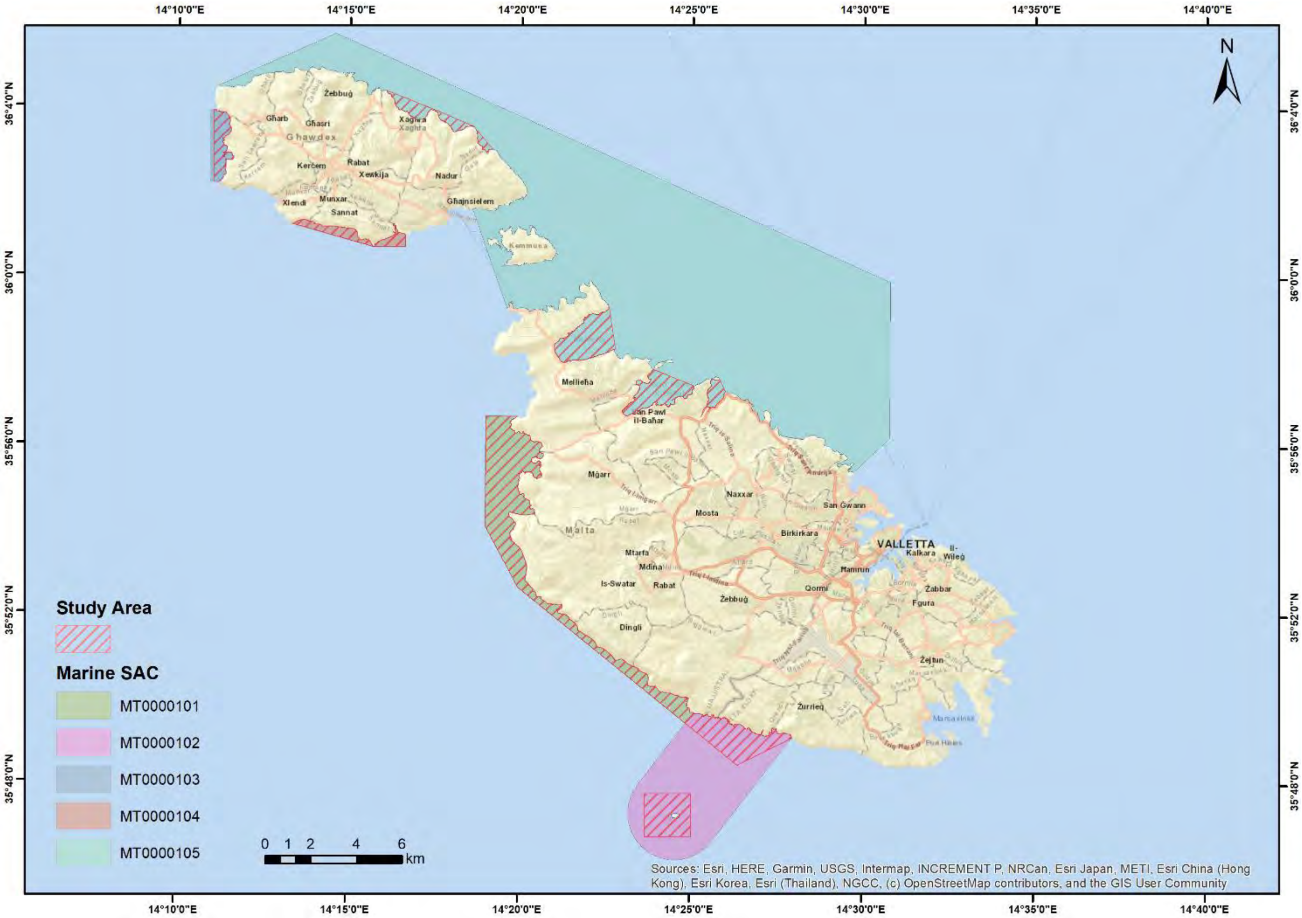
These activities intend also to help the development of Marine and Coastal Protected Areas (MPAs) in Malta, through the support of the MedKeyHabitats II project actions to address adequate technical support and capacity building for the planning and proper management of protected areas in the country.

In Malta five Natura 2000 sites have been selected by mutual agreement with ERA, which include:

- MT101 - Żona fil-Baħar bejn Rdum Majjiesa u Għar Lapsi

- MT102 - Żona fil-Baħar fl-inħawi ta' Għar Lapsi u ta' Filfla
- MT103 - Żona fil-Baħar fl-inħawi tad-Dwejra (Għawdex)
- MT104 - Żona fil-Baħar bejn Il-Ponta tal-Ħotba u Tal-Fessej (Għawdex)
- MT105 - Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u Il-Qaliet

The figure below shows the position of the areas that will be investigated as part of the project:



A Fisheries survey using questionnaires will be conducted that covers the five areas. The objectives of the questionnaire will be to assess the perceptions and knowledge of fishermen and of the authorities concerned. This survey will cover the MFA, MFB and MFC type vessels.

During the next months selected fishermen will be contacted to participate in this survey. It would be much appreciated if, as far as possible, you could assist in gathering such information, by informing the fisheries community about the project. To this end, I propose to meet to allow myself and Golder's Fisheries Expert to provide further information about the project. Golder will be responsible for carrying out the surveys and I will assist as required. The aim is to keep the survey questionnaire as short as possible, without taking too much time from the fishermen. The survey will be conducted in Maltese unless otherwise requested by participants.

Thanks in advance.

Kind regards,

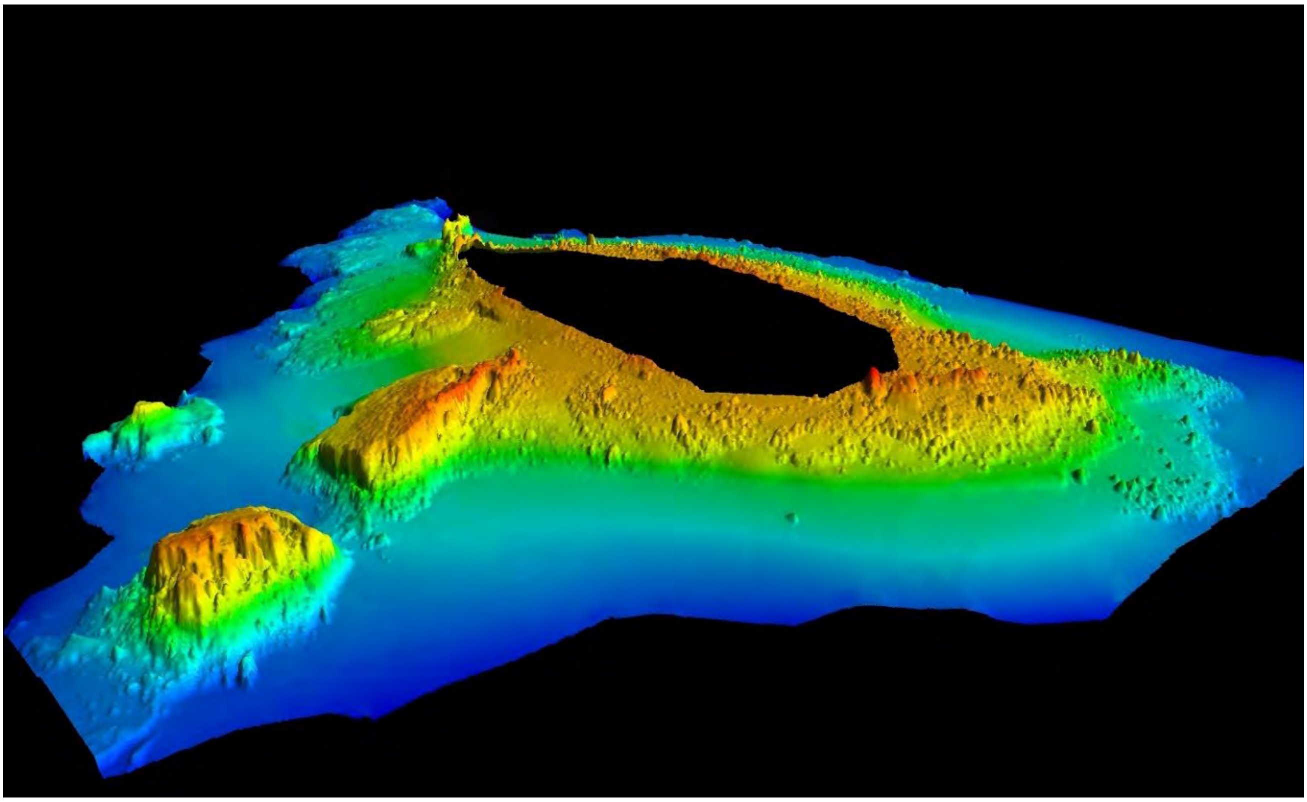
Krista Farrugia

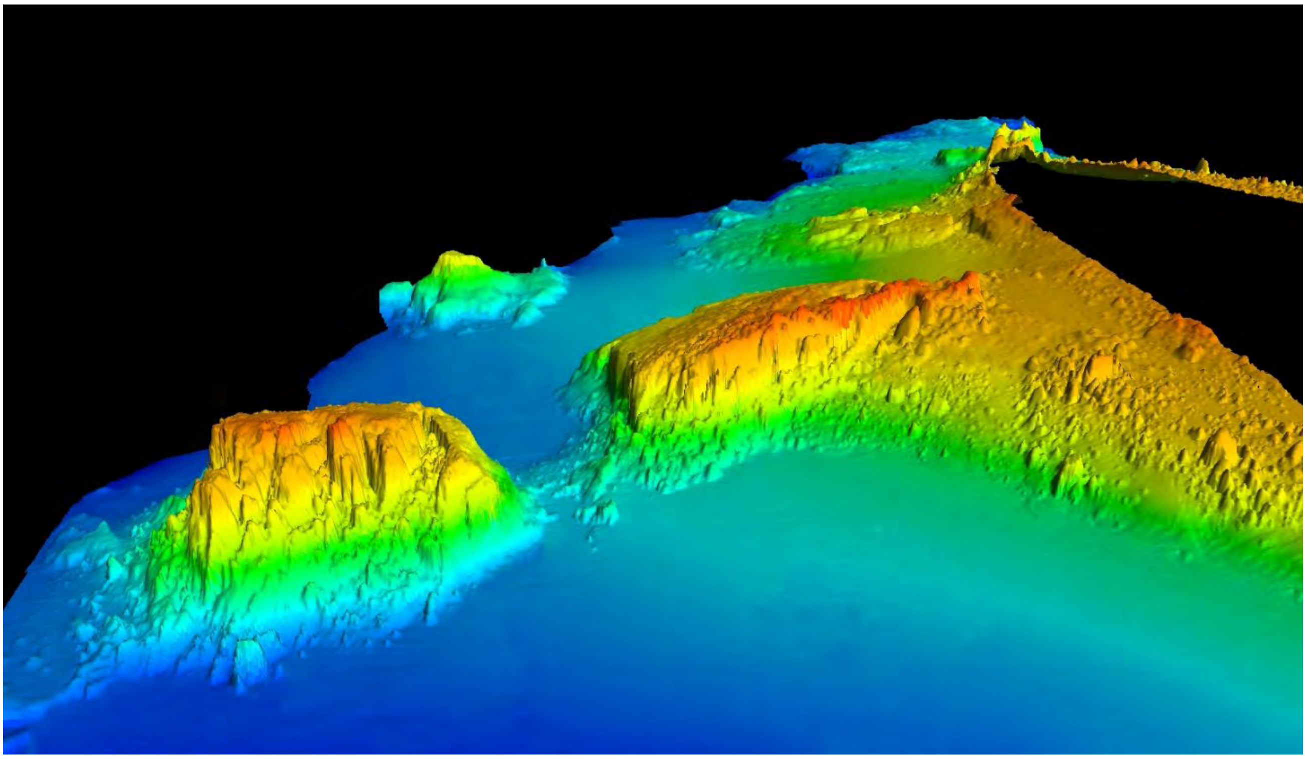
National Coordinator of MedKeyHabitats II for Malta

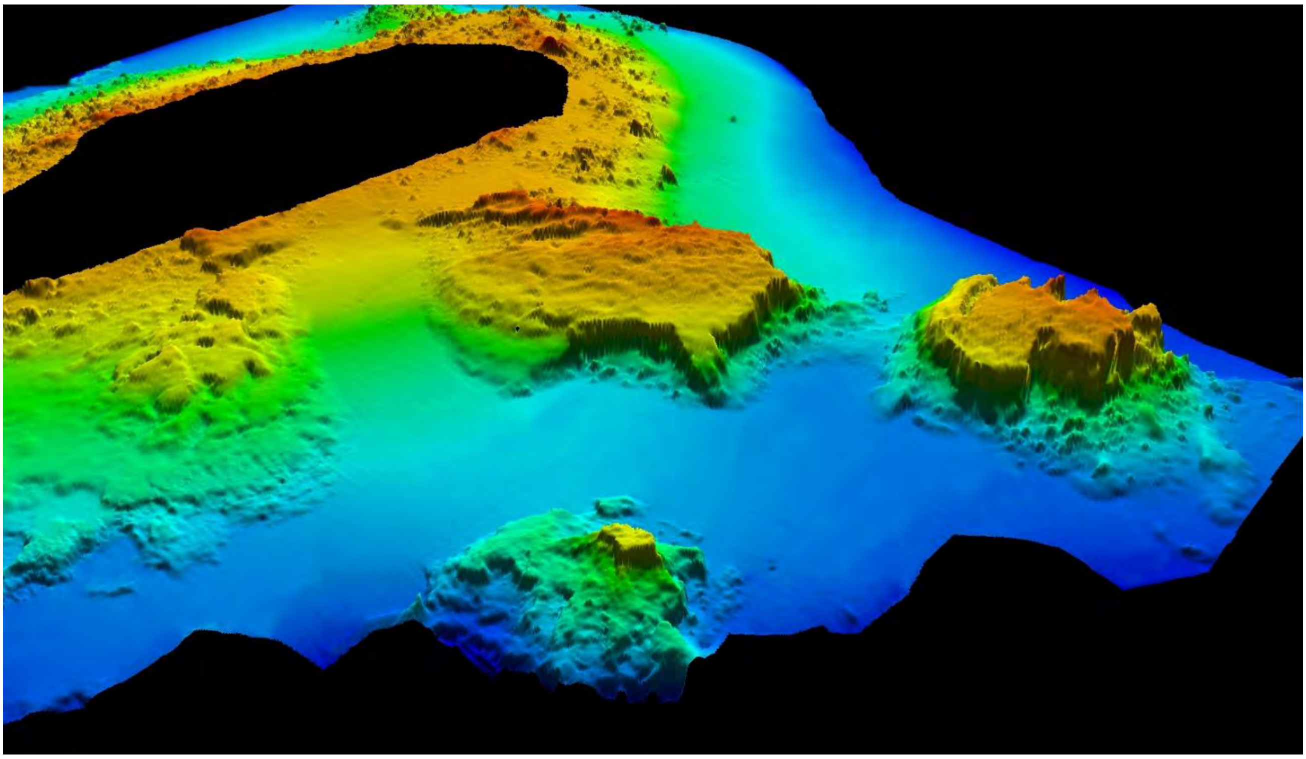
APPENDIX D

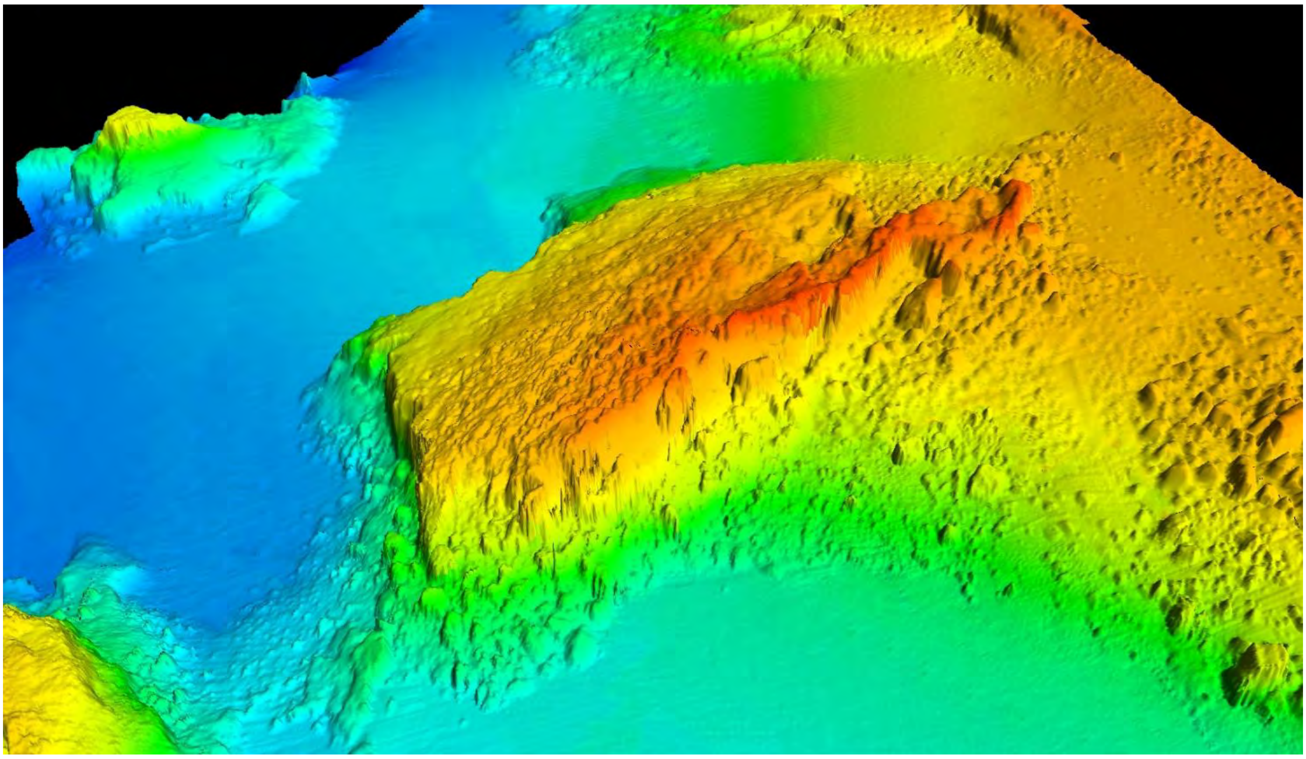
3-D reconstructions of Filfla

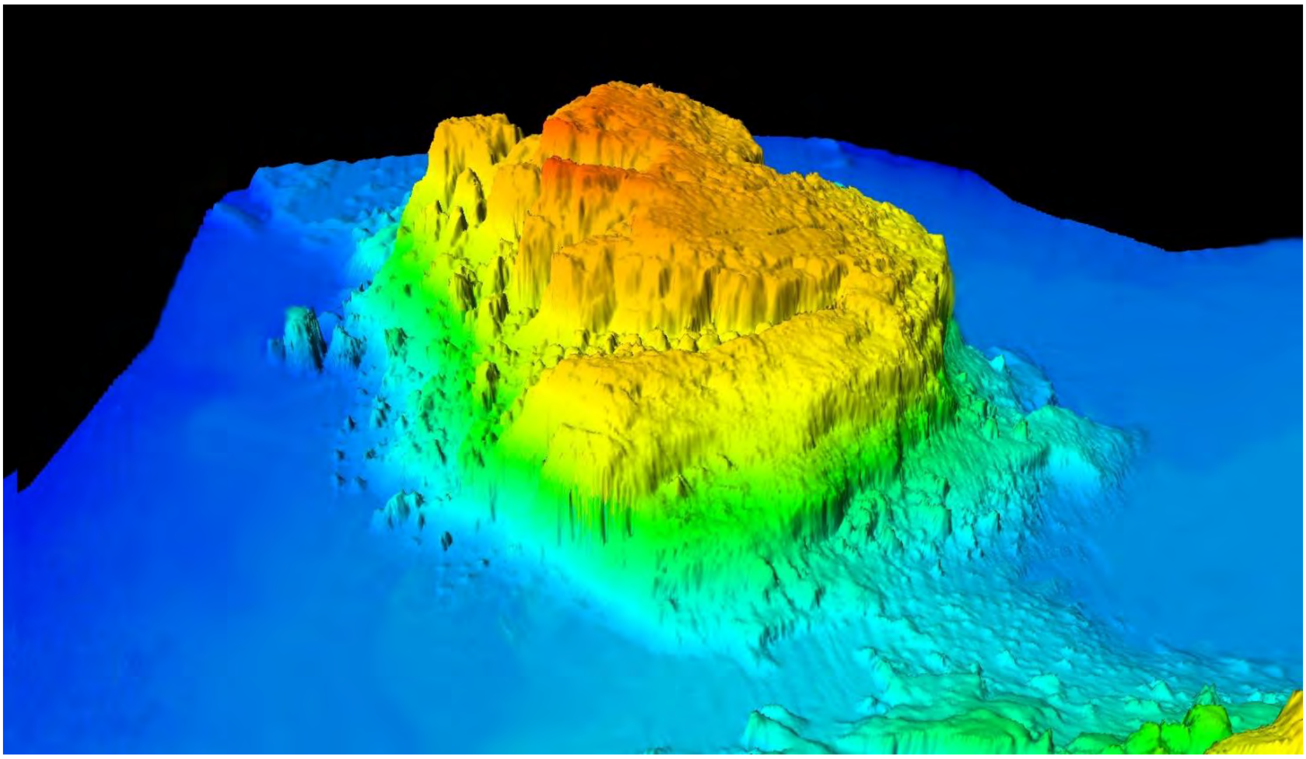
Filfla

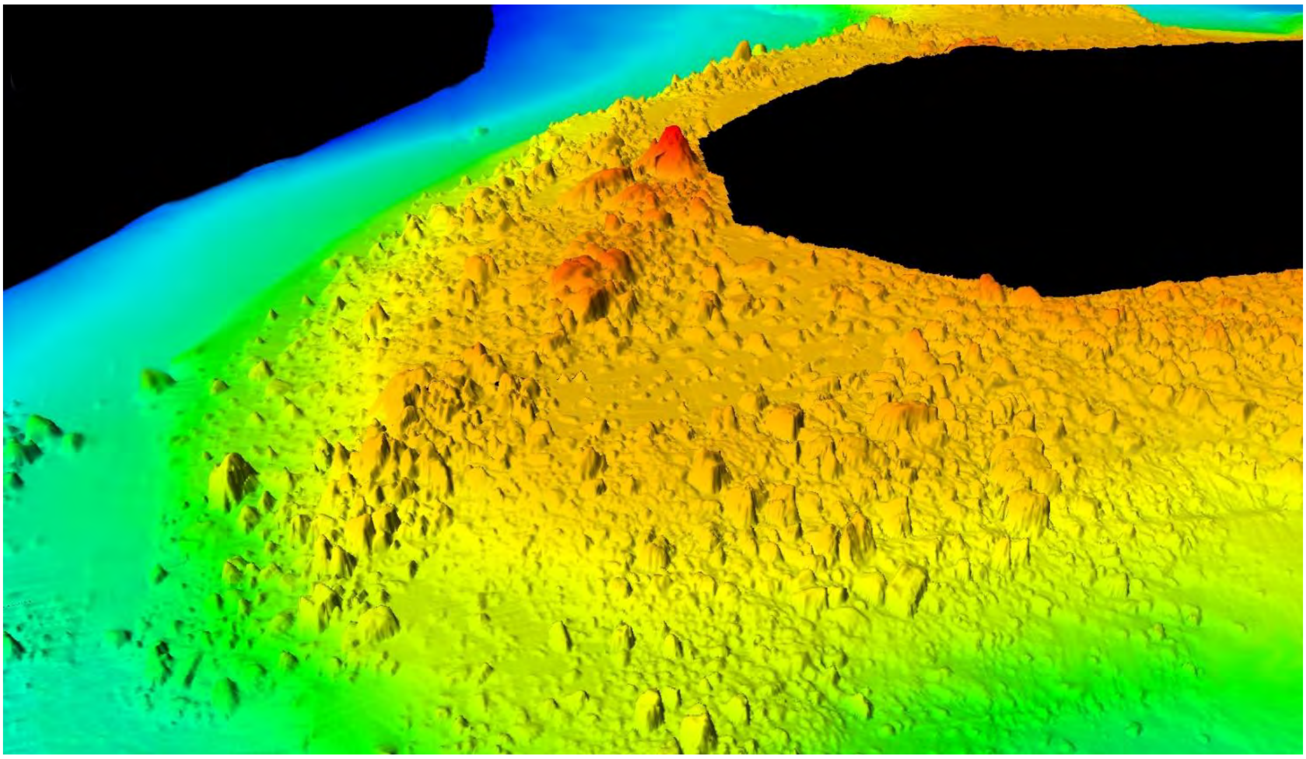


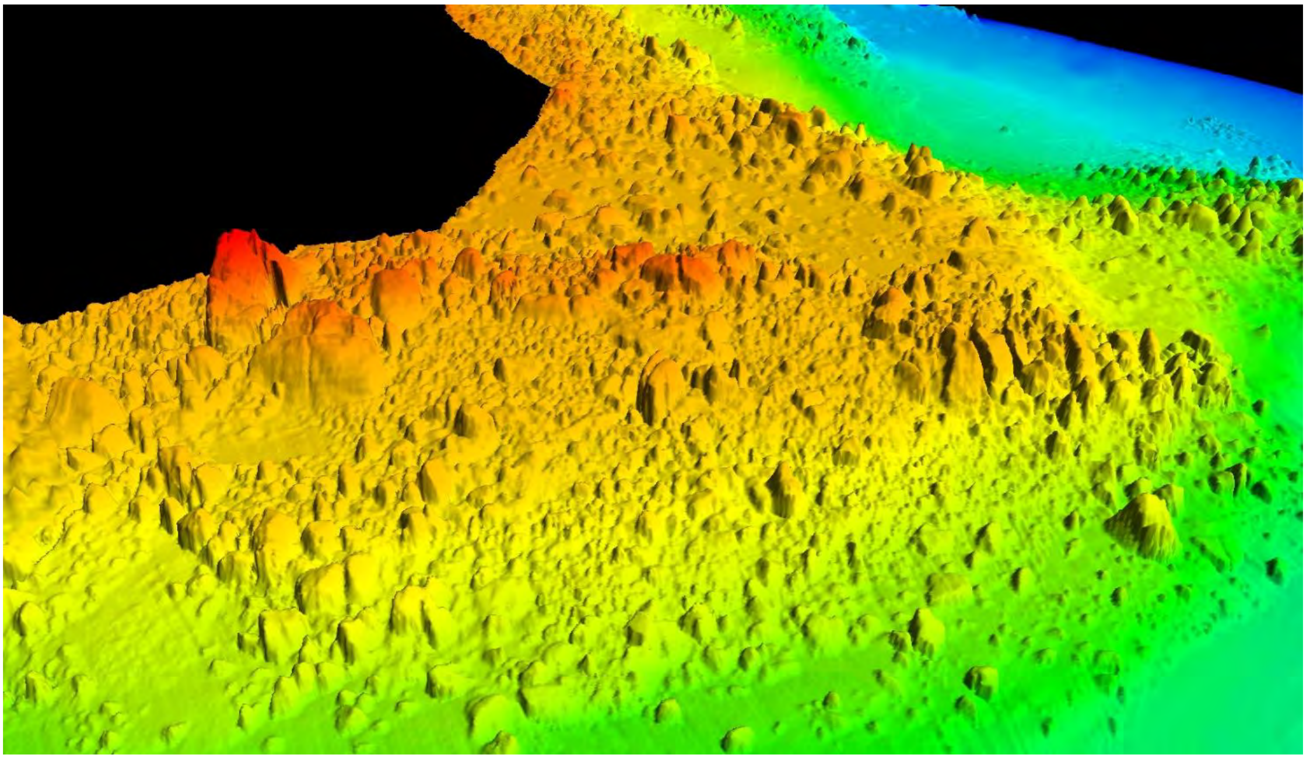


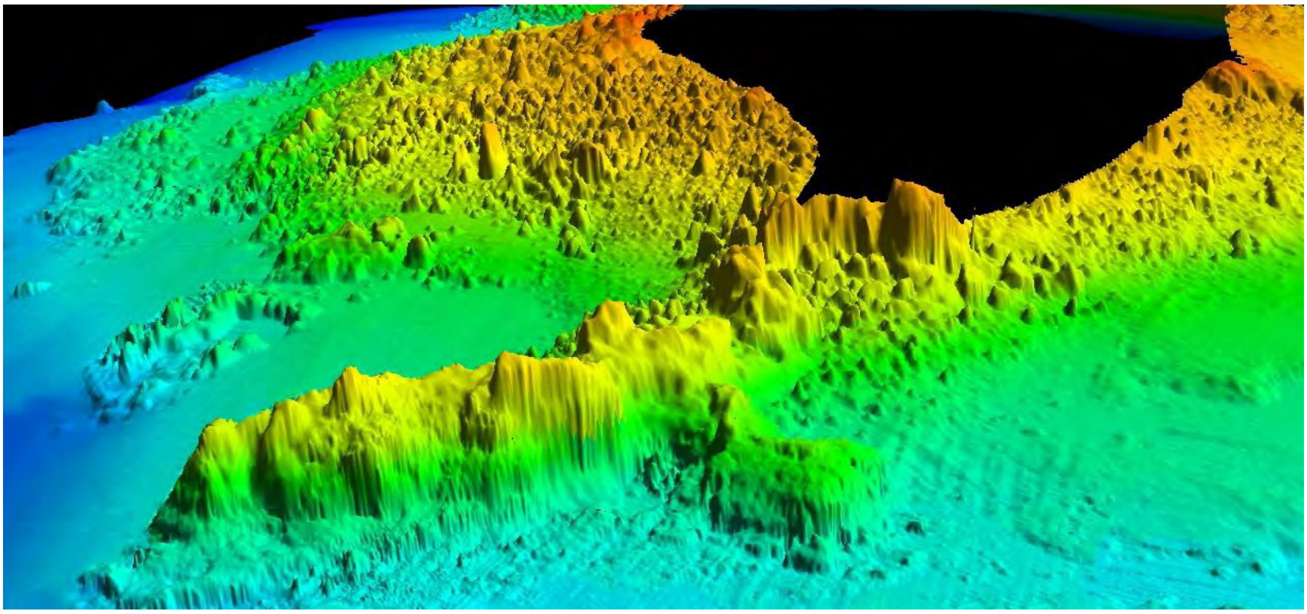


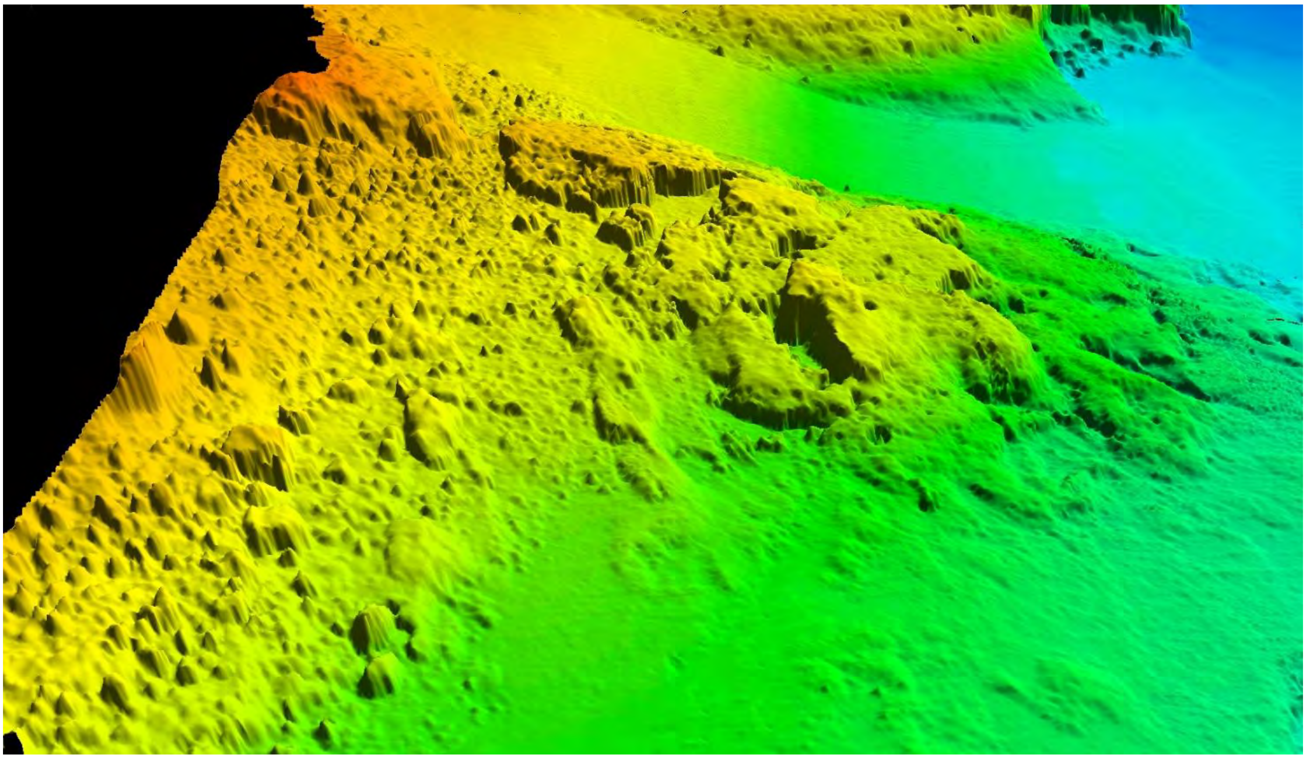








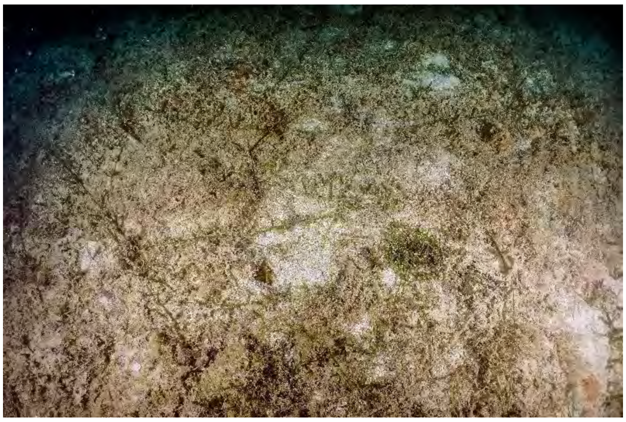




APPENDIX E

Photographic Atlas

Salini Bay



Caulerpa cylindracea

Posidonia oceanica and *Caulerpa cylindracea*

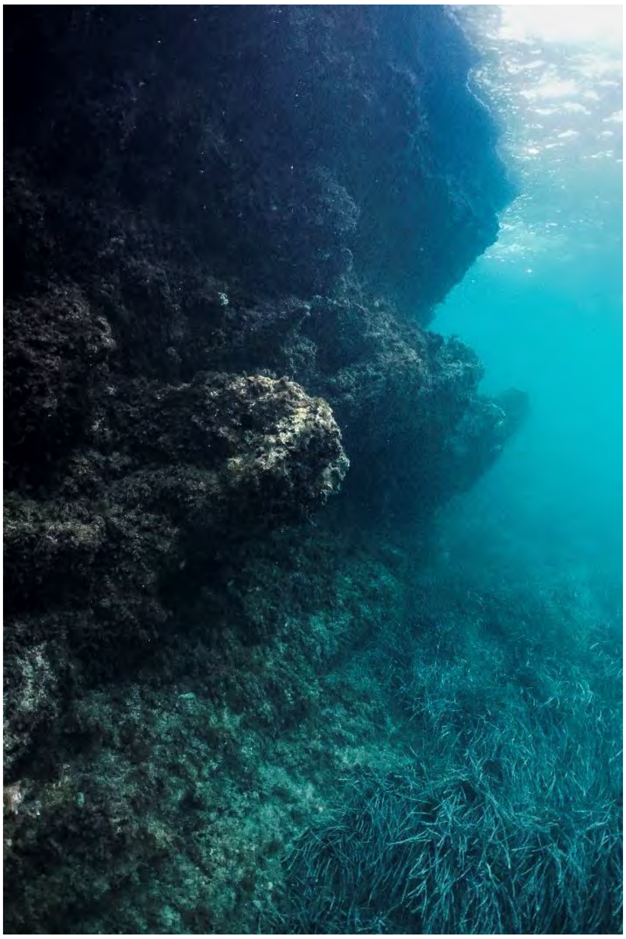
Salini Bay - Panoramic photo

Saint Paul’s Bay

Astroides calycularis

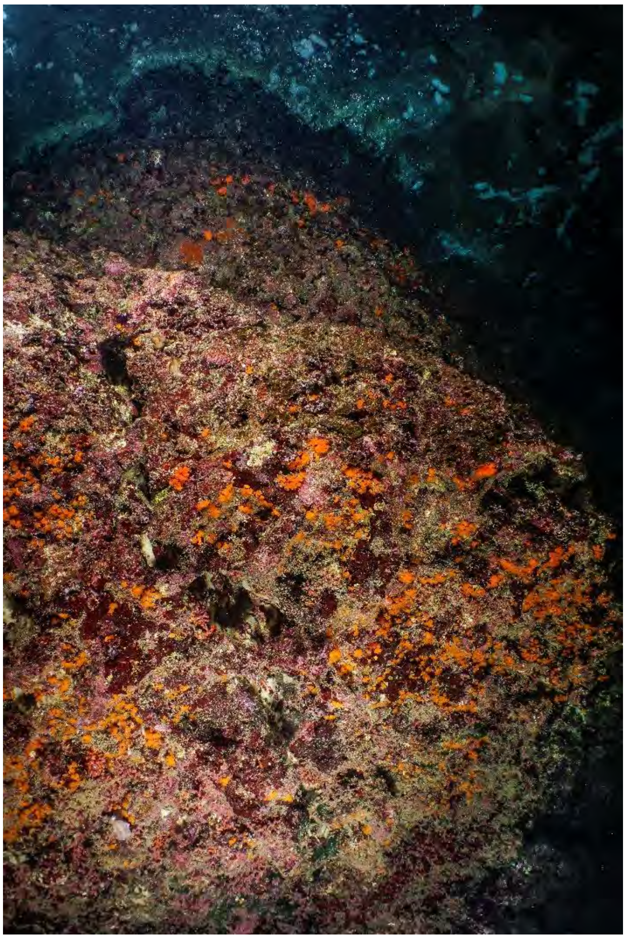
Crag base

Chondrosia reniformis (circled in white)



Underwater crag

Erosive forms



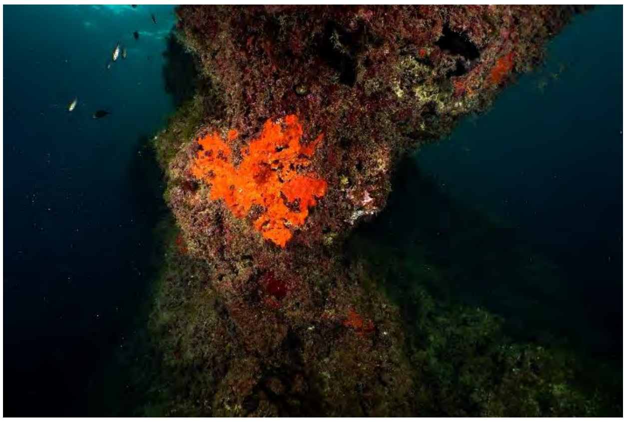
Lower intertidal zone

Halopteris sp., *Padina* sp., *Dictyota* sp.

Lower intertidal zone

Intertidal zone #1

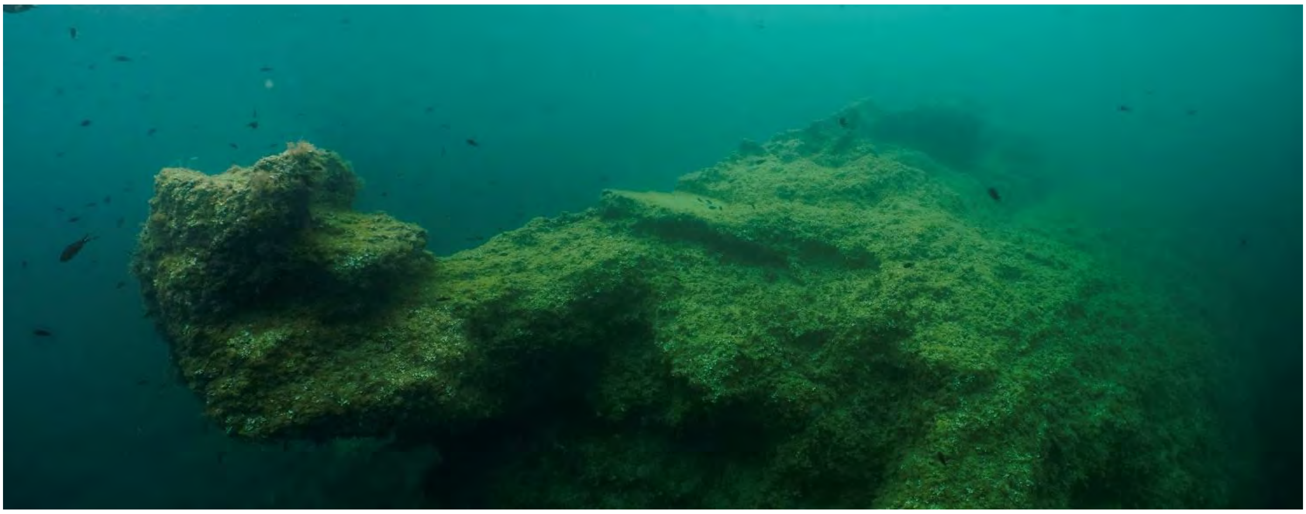
Intertidal zone #2



Spirastrella cunctatrix

St. Paul’s Bay – Crag base

St. Paul’s Bay - Crag panoramic photo



St. Paul’s Bay - Crag panoramic photo #1

St. Paul’s Bay - Crag panoramic photo #2

St. Paul’s Bay - Crag panoramic photo #3

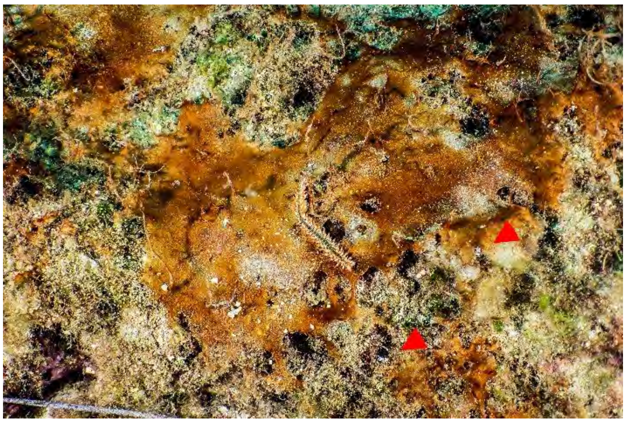
St. Paul's Bay - Crag panoramic photo (cave)

Dasycladus vermicularis

Hermodice carunculata

Internal well #1

Internal well #2



Lamprohaminoea ovalis

Maja crispata

Octopus vulgaris

Petrosia ficiformis

Erosive wells

Erosive wells #1

Erosive wells #2

Spongia officinalis

Well

Hermodice carunculata and *Padina pavonica*

Meadow - Sign of anchoring

St. Paul's Bay – Panoramic photo

St. Paul’s Bay – Panoramic photo #1

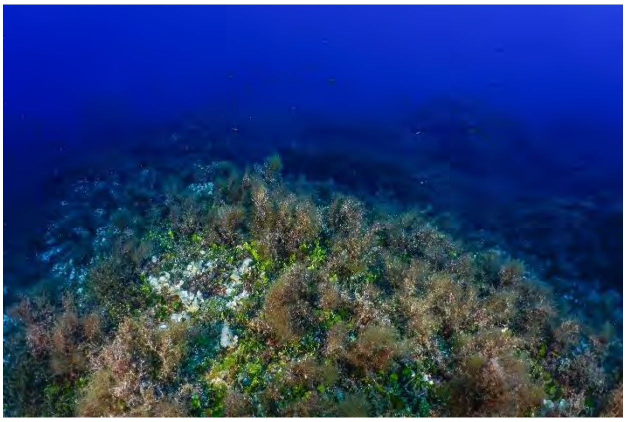
St. Paul’s Bay – Panoramic photo #2

St. Paul’s Bay – Panoramic photo #3

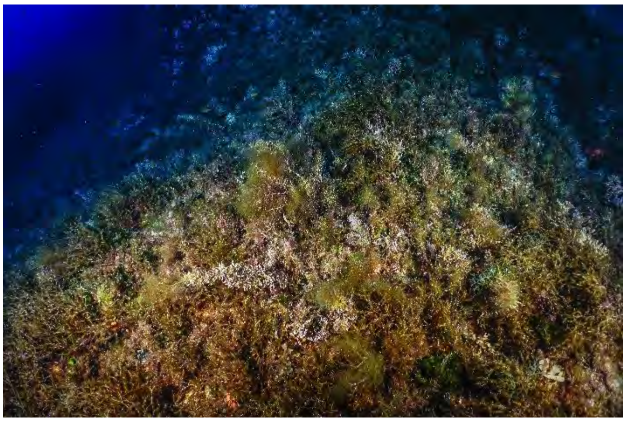
Ras il-Wardija - Dwejra Bay

Asparagopsis taxiformis

Caulerpa cylindracea and fishing line



Cystoseira sp.

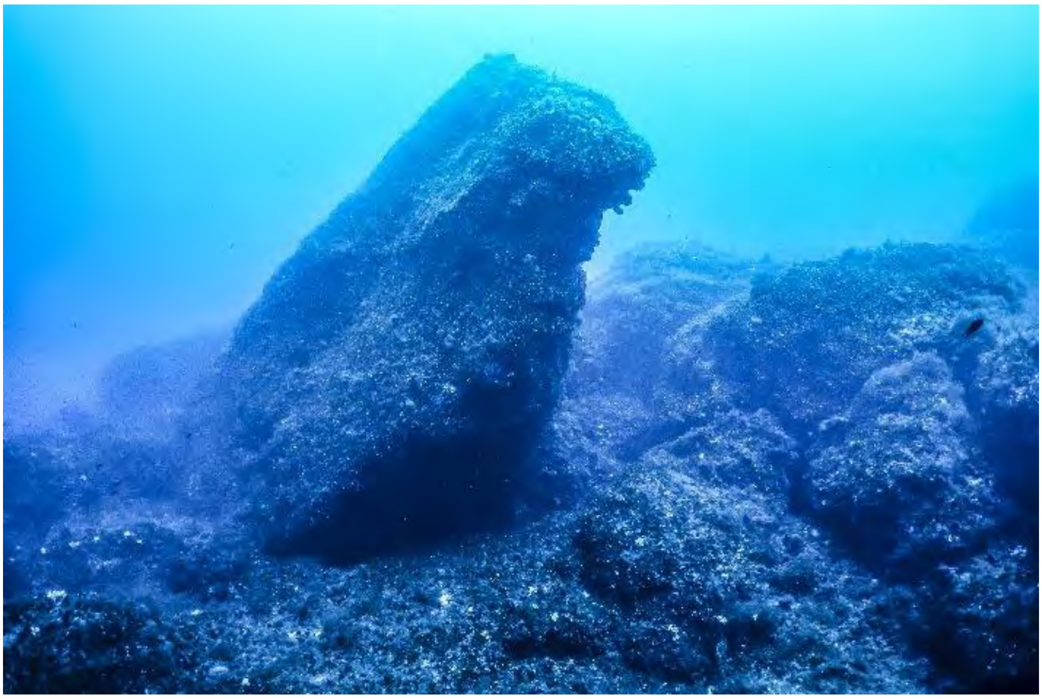


Cystoseira sp. and *Sargassum acinarium*

Fishing line

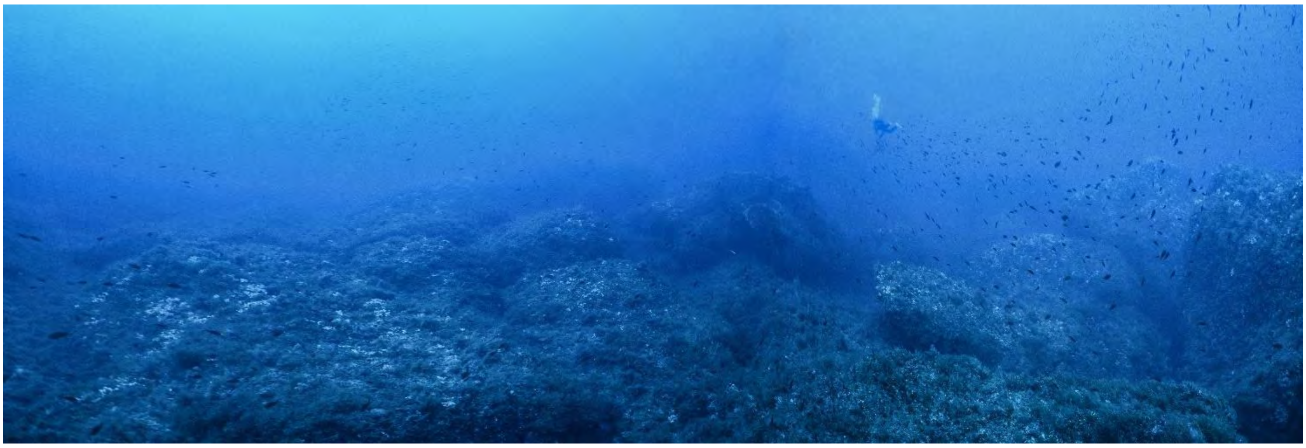
Sciaphilous habitat and *Atherina* sp.

Sciaphilous habitat

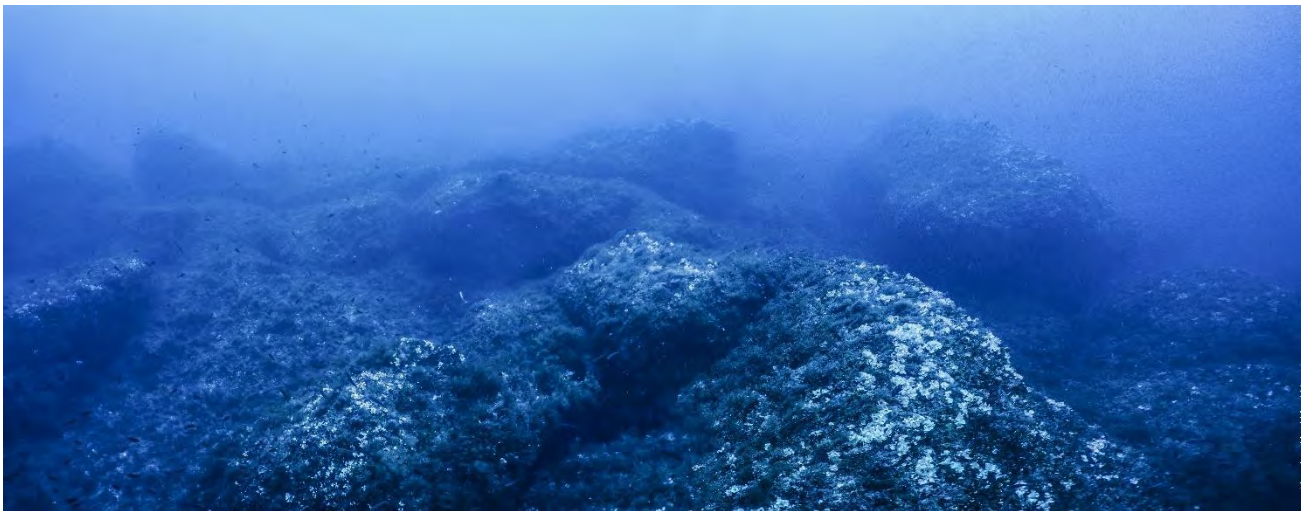


Dwejra - SCUBA dive

Dwejra- Panoramic photo #1



Dwejra- Panoramic photo #2



Dwejra- Panoramic photo #3

Dwejra- Panoramic photo #4

Dwejra- Panoramic photo #5 and fishing net

Crocodile Rock – Dwejra Bay

Brown algae

Brown and green algae on coralligenous

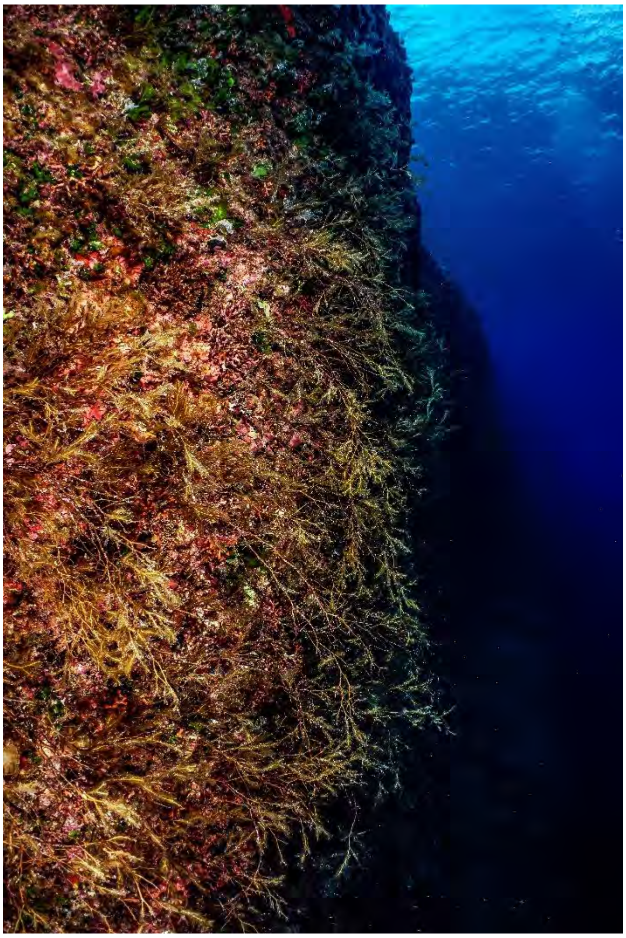
Caulerpa cylindracea

Chondrosia reniformis

Codium bursa and *Cystoseira* spp.

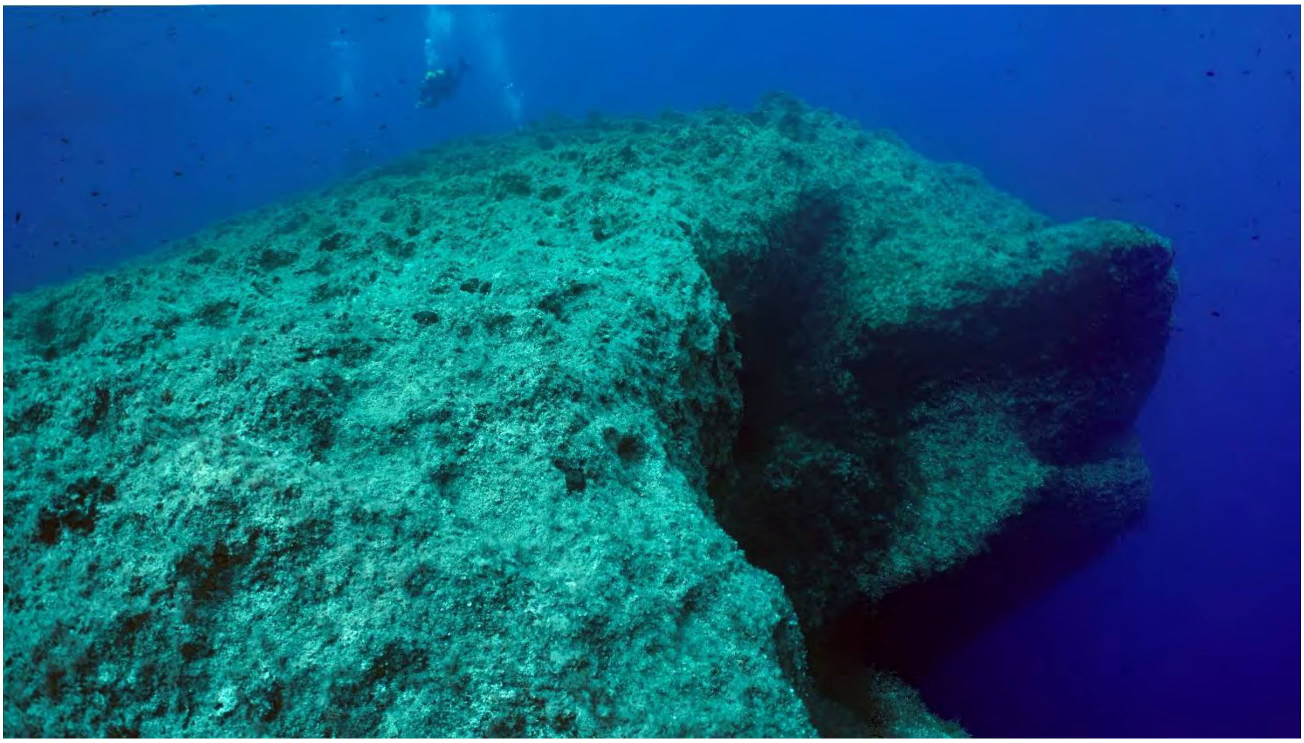
Drop off

Algae and coralligenous



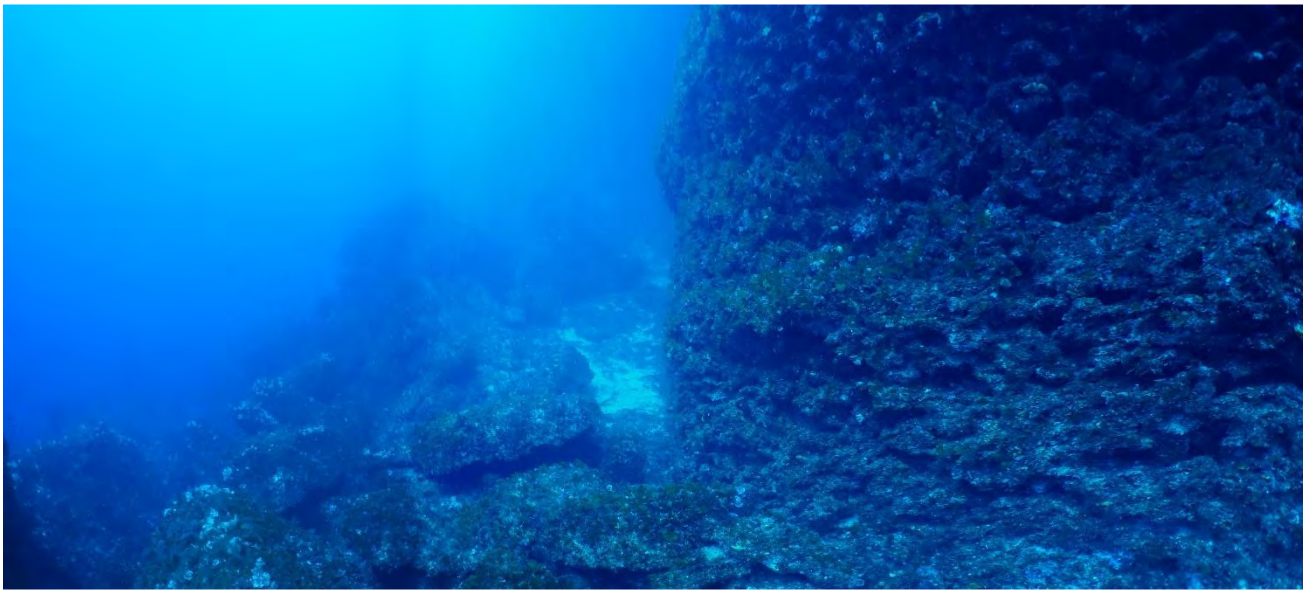
Dictyopteris humilis

Crocodile Rock - Panoramic photo #1

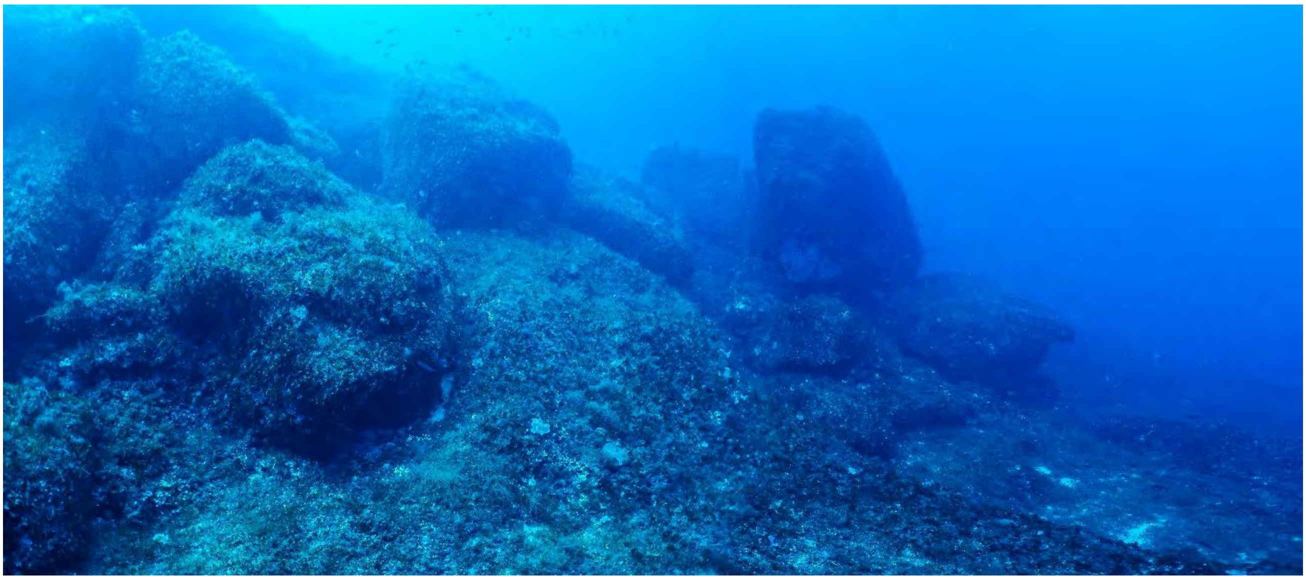


Crocodile Rock - Panoramic photo #2

Crocodile Rock - Panoramic photo #3



Crocodile Rock - Panoramic photo #4 – Crag base



Crocodile Rock - Panoramic photo #5

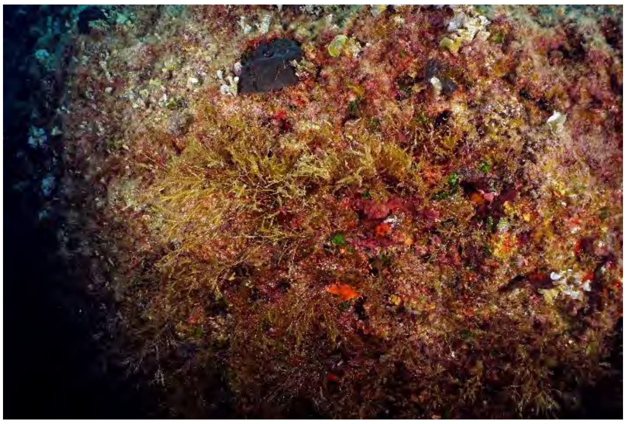
Cystoseira cauloidi

Dictyopteris polypodioides

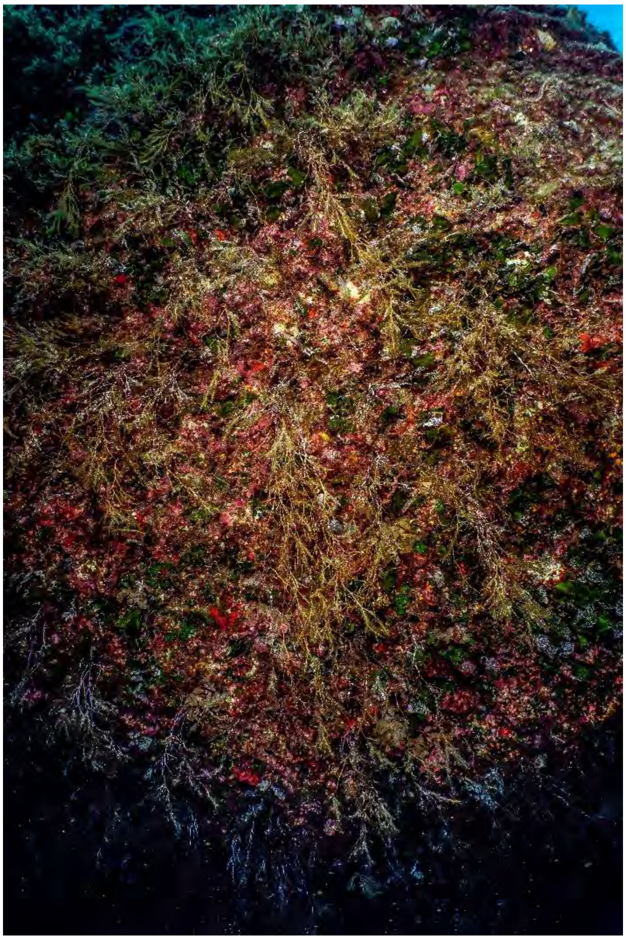
Flabellia petiolata, *Caulerpa cylindracea* and sponges

Erosive forms

Hermodice carunculata



Ircinia variabilis



Dictyopteris humilis #1

Crag edge

Paracentrotus lividus

Petrosia ficiformis

Phorbas tenacior

Phyllariopsis brevipes and *Dictyopteris polypodioides*

Sporochnus cf. *pedunculatus*

Scalarispongia scalaris

Sporochnus cf. *pedunculatus* #1

Visual census

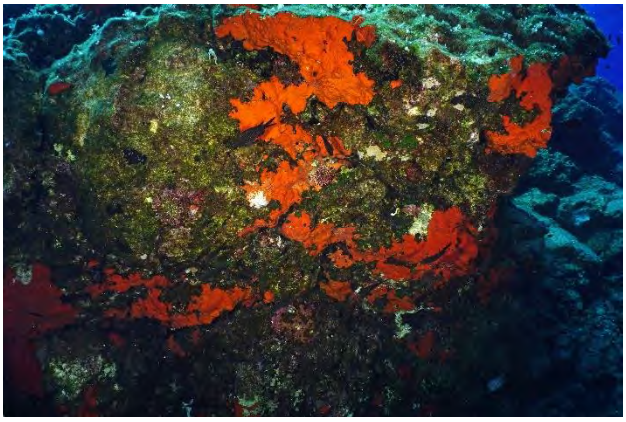
Sargassum acinarium

Sporochnus pedunculatus and *Phyllariopsis brevipes*

Zonaria torneforti

Filfla

Agelas oroides



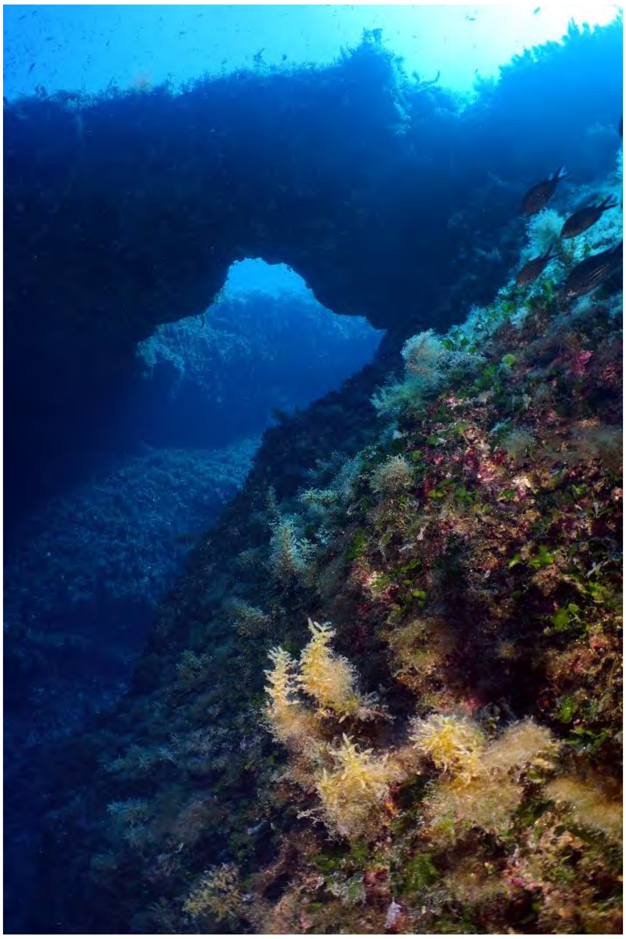
Sciophilous habitat

Sciophilous habitat and fishing line

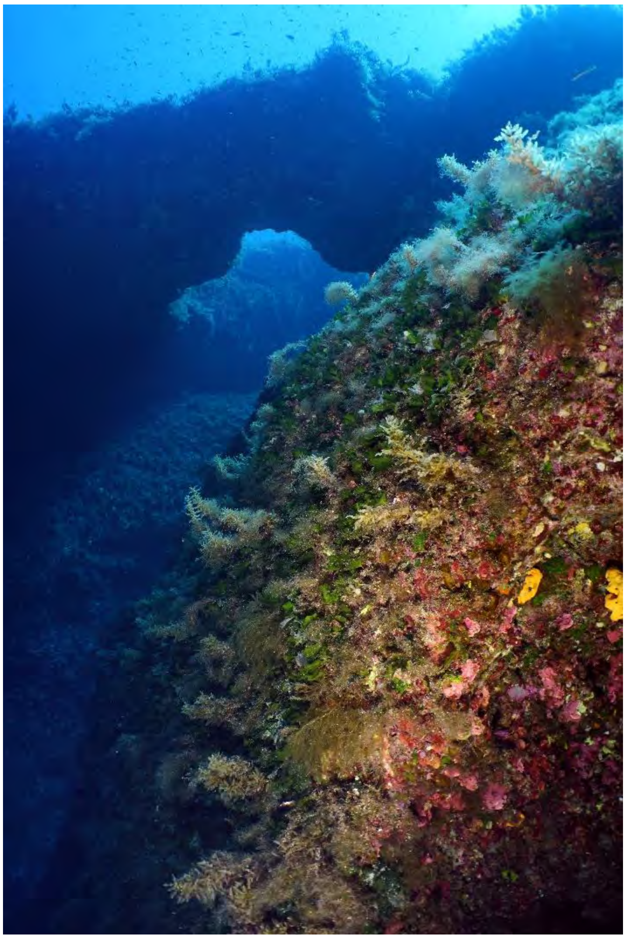
Arch

Astroides calycularis

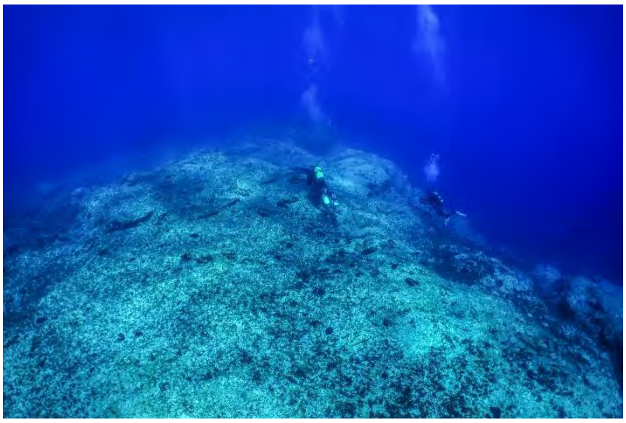
Astroides calycularis #1



Arch #1



Arch #2



Summit barren

Summit barren #1

Summit barren #2

Barren and *Chromis chromis*

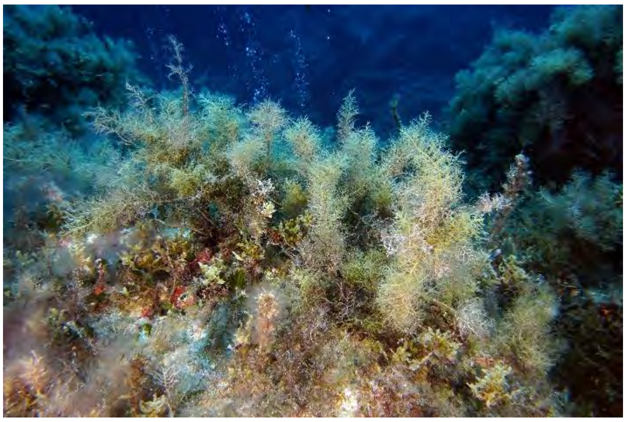
Chromis chromis and fishing line

Centrostephanus longispinus

Centrostephanus longispinus #1

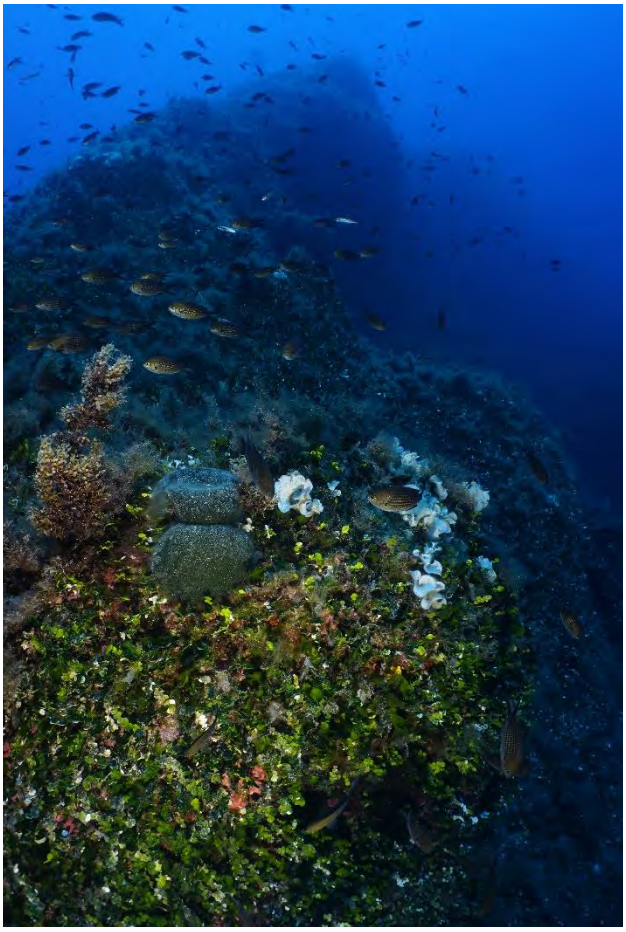
Cladopsammia rolandi

Cystoseira sp. #1

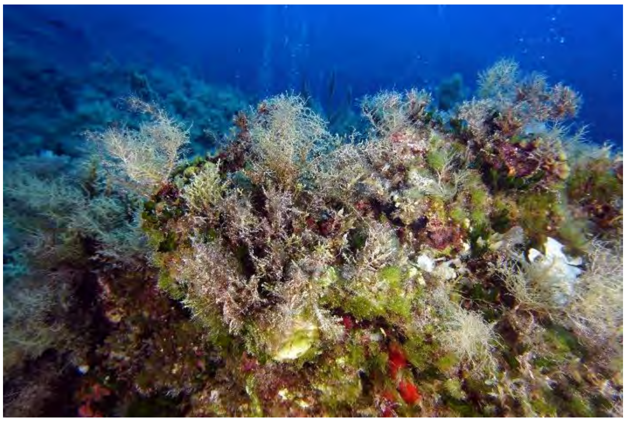


Cystoseira sp. #2

Astroides calycularis #2



Codium bursa



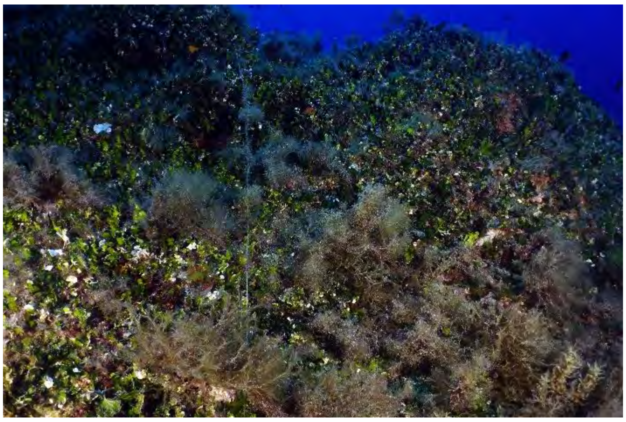
Cystoseira spp. #1

Cystoseira spp. #2

Dictyopteris cf. *humilis*

Wall

Wall #1



Fishing line

Fishing line #1

Fishing line #2

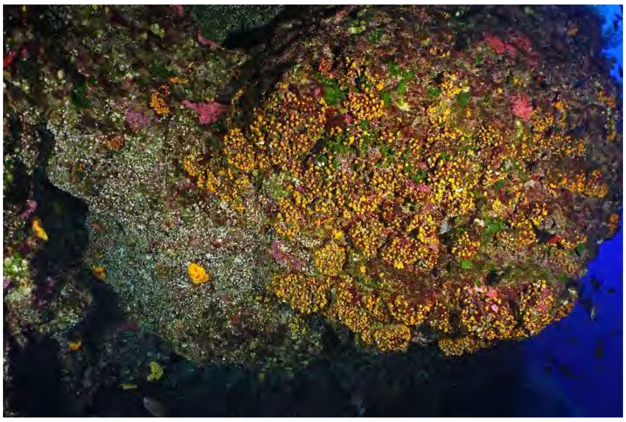
Leptopsammia pruvoti

Madracis pharensis

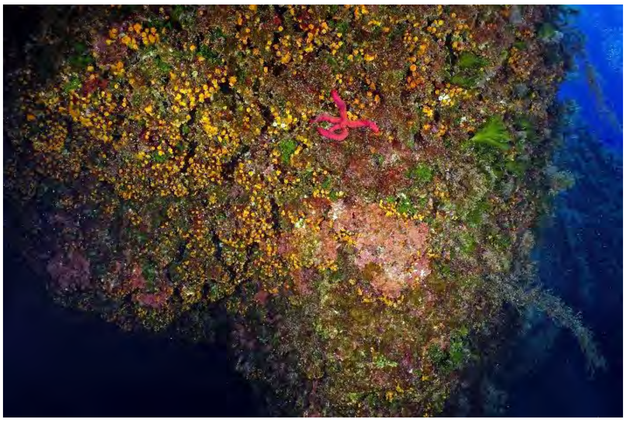
Madracis pharensis #1

Madracis pharensis #2

Madracis pharensis #3



Madracis pharensis #4



Ophidiaster ophidianus

Palmophyllum crassum

Sarcotragus spinosulus

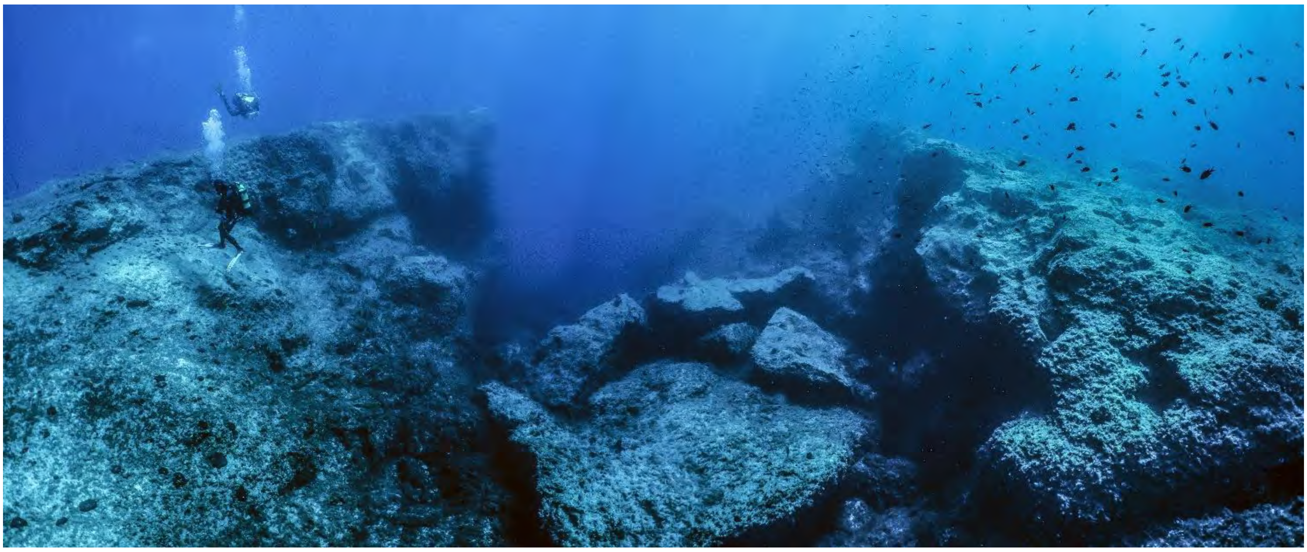
Sargassum sp. and *Myriapora* sp.

Arch #3

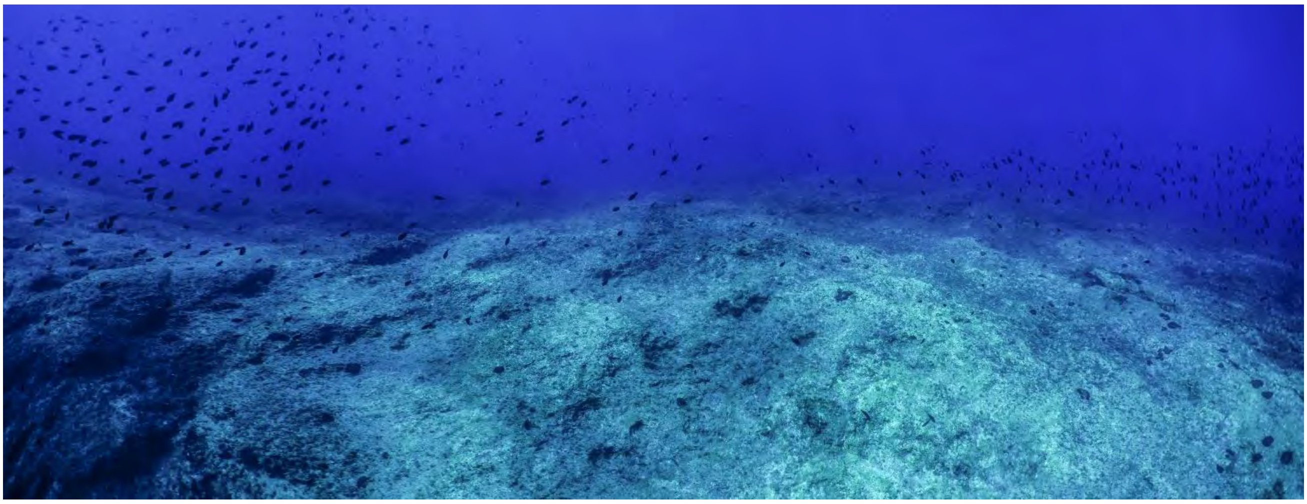
Abandoned net

Filfla – Panoramic photo #1

Filfla – Panoramic photo #2



Filfla – Panoramic photo #3



Filfla – Panoramic photo #4

Filfla – Panoramic photo #5

Filfla – Panoramic photo #6

Brown algae

Sparisoma cretense (females)

Sparisoma cretense (males)

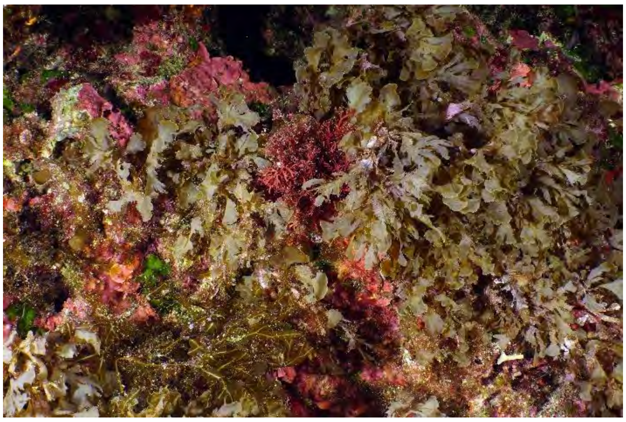
Sparisoma cretense (male)

Sparisoma cretense (male and females)

Sparisoma cretense (male) #1

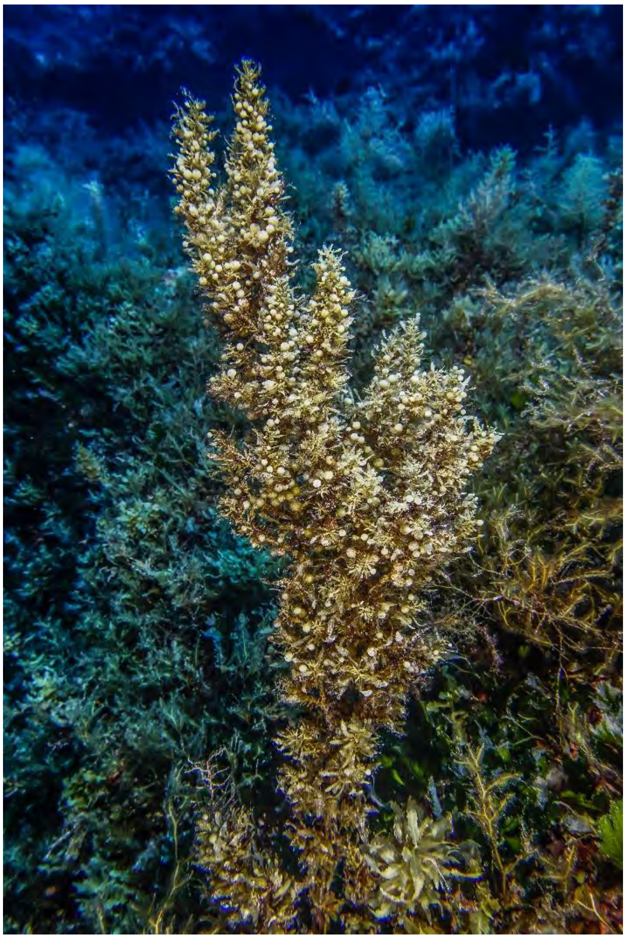
Sparisoma cretense and plateau

Sparisoma cretense and plateau #1



Spaerococcus coronopifolius and *Zonaria tourneforti*

Sporochnus pedunculatus #1

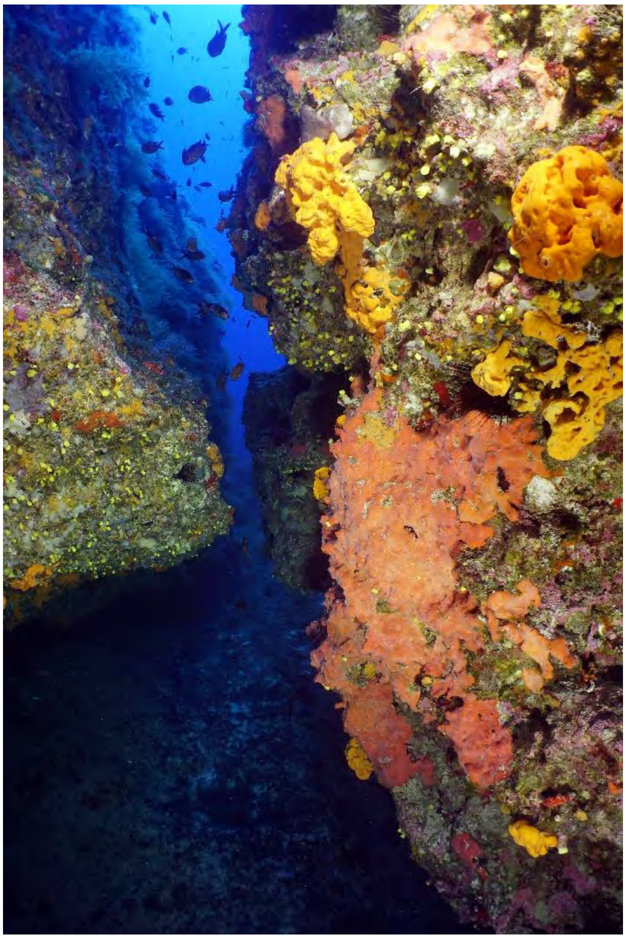


Sargassum acinarium

Sporochnus pedunculatus #2

Suffering sponges

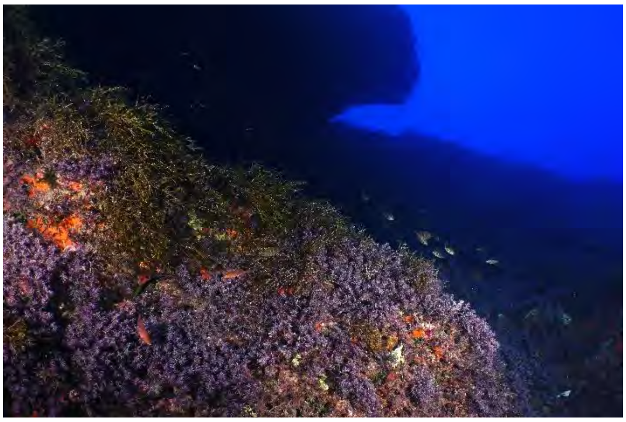
Sporochnus pedunculatus #3



Sponges

Stork Rock top

Ras ir-Raheb – Rdum



Brown algae on wall

Brown and green algae

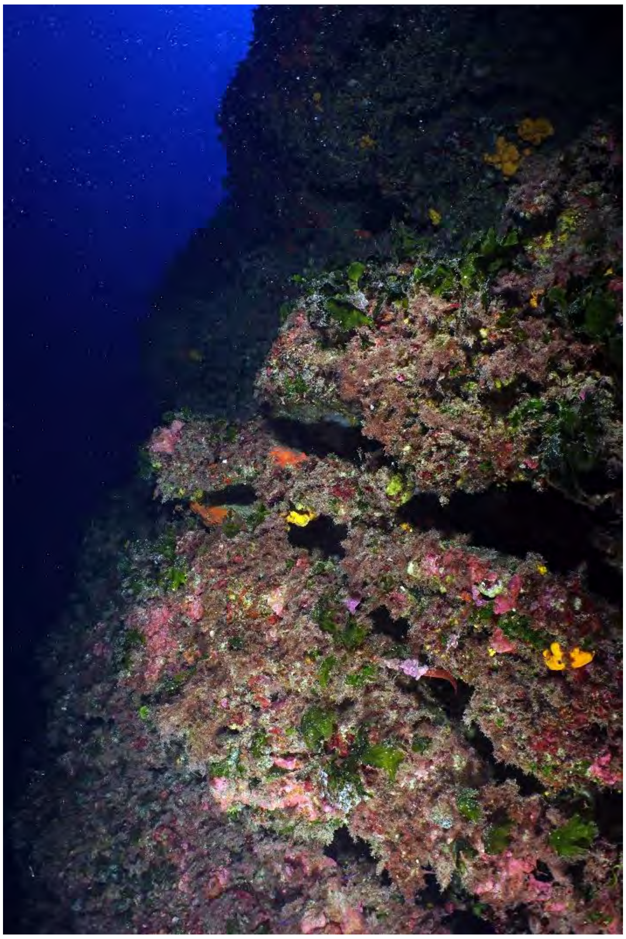
Red algae

Agelas oroides and *Madracis pharensis*

Cave – Dark habitat #1

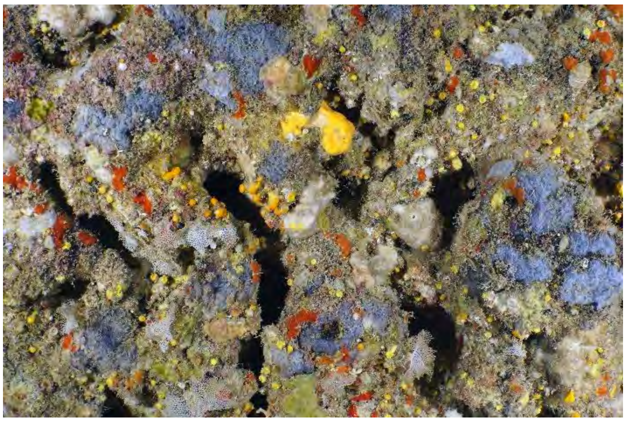
Cave – Dark habitat #2

Arch



Coralligenous on wall

Cave – Dark habitat #3



Cave – Dark habitat #4

Cave – Dark habitat #5

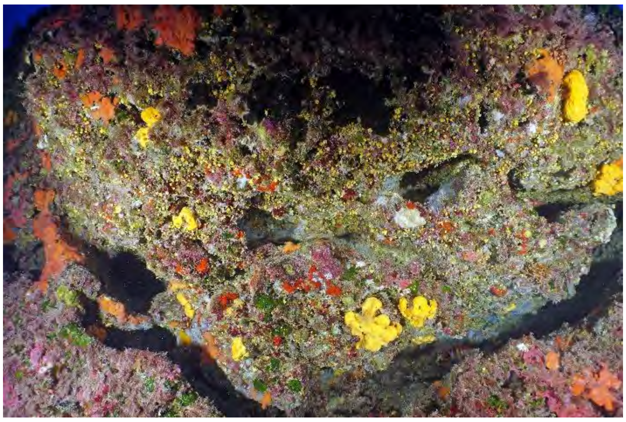
Cave – Dark habitat #6

Cave

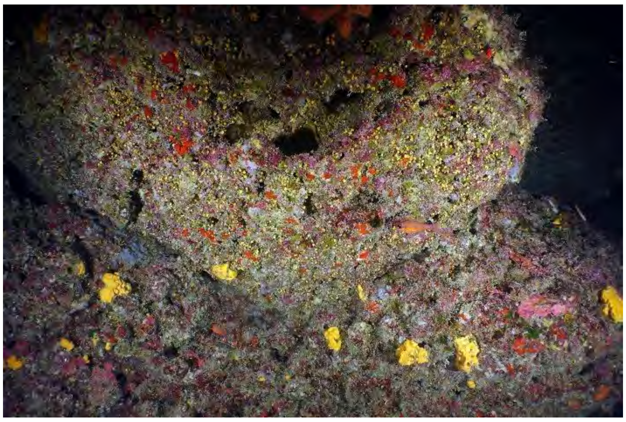
Cave – Dark habitat

Halopteris sp.

Hermodice carunculata



Leptosammia pruvoti



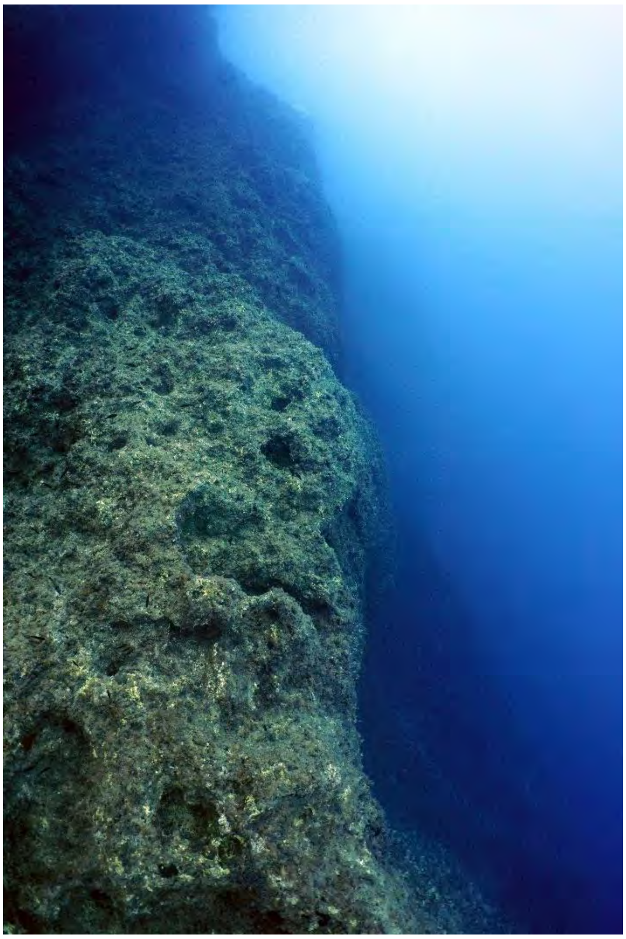
Leptosammia pruvoti and *Cladopsammia* sp.

Muffler in erosion

Mesophyllum expansum

Myriapora truncata

Myriapora truncate #1

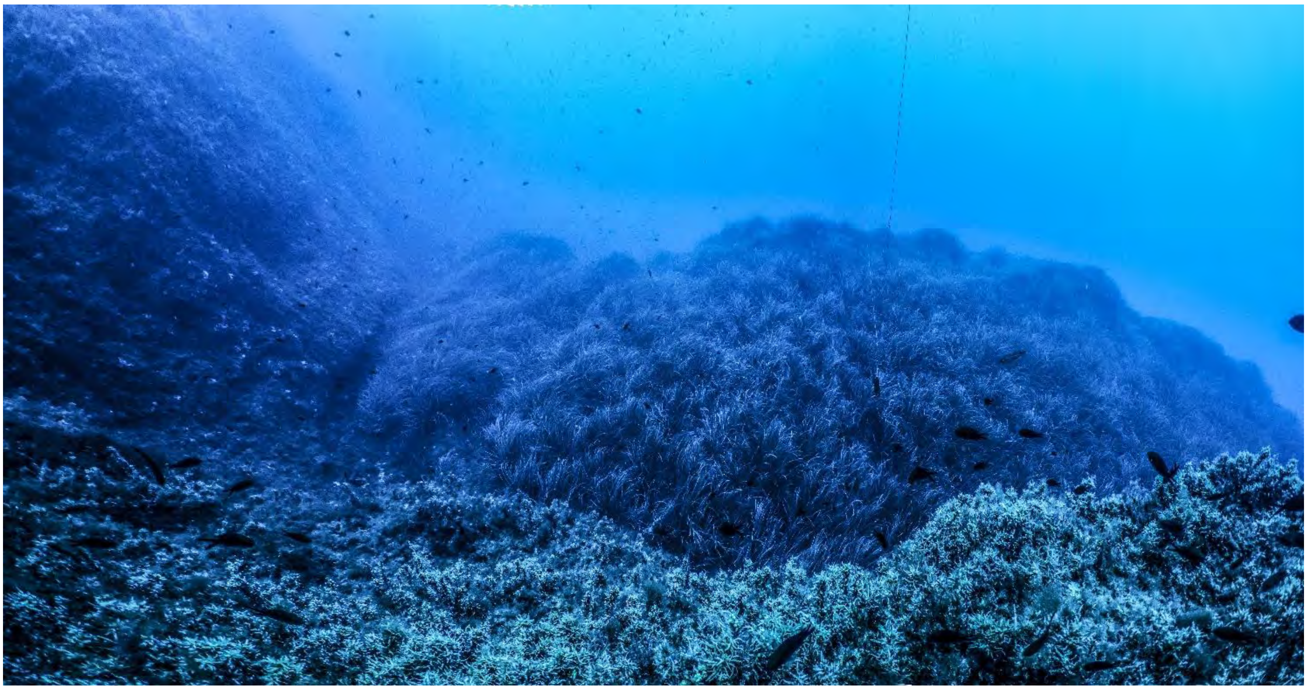


Ras ir-Raheb - Wall

Ras ir-Raheb – Outside cave

Ras ir-Raheb – Cave

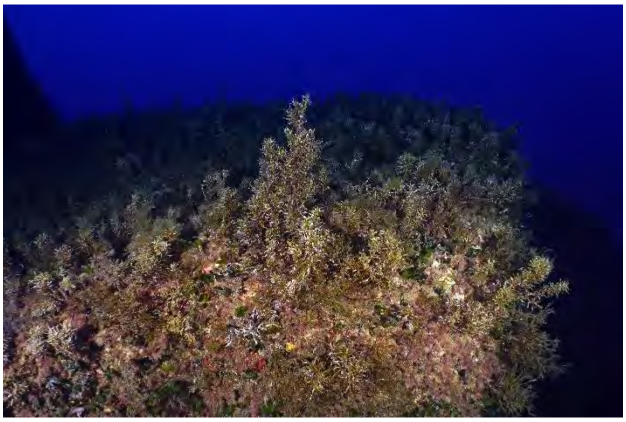
Ras ir-Raheb – Little cave



Ras ir-Raheb – Plateau with *Posidonia oceanica*

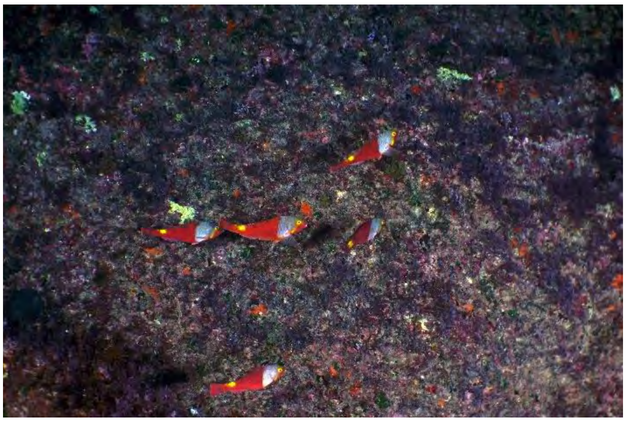
Ras ir-Raheb – Exit cave

Reteporella grimaldii



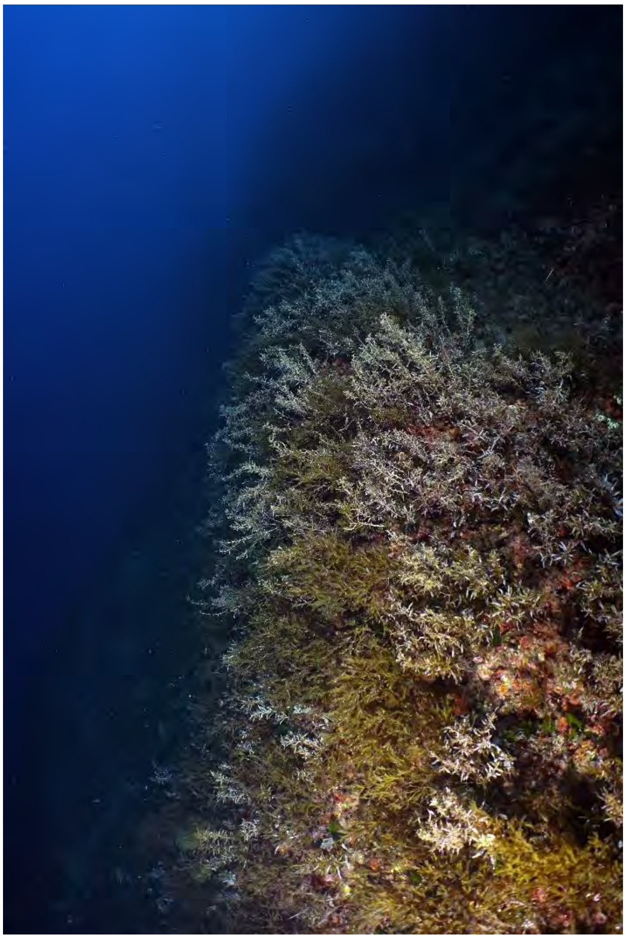
Sargassum acinarium

Sargassum acinarium #1

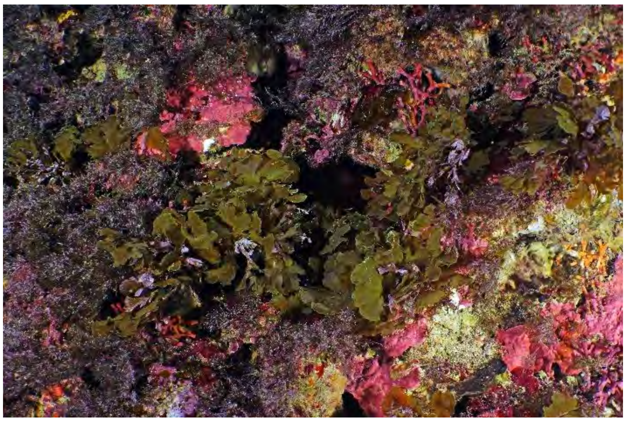


Sparisoma cretense (females)

Cave



Sargassum acinarium and *Dictyopteris humilis*



Zonaria tourneforti

Posidonia oceanica on rock plateau

APPENDIX F

Results of the laser-calibrated photo analyses

Crocodile Rock (Dwejra Bay)

Crocodile_2

137 x 92 cm

Algae: Encrusting Corallinaceae on other algae (9%), Encrusting coralline algae (2%), *Flabellia petiolate* (9%), *Halimeda tuna* (3%), *Lithophyllum stictiforme*(15%), *Peyssonnelia rubra* (8%), *Peyssonnelia* spp. (2%), *Peyssonnelia squamaria* (13%), Red algae with soft thallus (8%), *Valonia* sp. (1%), *Zonaria tournefortii* (5%).

Porifera: *Agelas oroides* (10%), Massive sponges n.d. (3%), *Spirastrella cunctatrix* (9%).

Tunicata: *Halocynthia papillosa* (3%).

Crocodile_5

97 x 64 cm

Algae: *Amphiroa rigida* (6%), *Dictyota dichotoma* (3%), Encrusting Corallinaceae on other algae (3%), Encrusting coralline algae (4%), *Flabellia petiolata* (16%), *Halimeda tuna* (5%), *Lithophyllum stictiforme*(11%), *Mesophyllum expansum* (6%), *Padina pavonia* (11%), *Peyssonnelia* spp.(5%), *Peyssonnelia squamaria* (7%), Red algae with soft thallus (3%), *Zanardinia typus* (6%).

Porifera: *Agelas oroides* (6%), *Dendroxea* sp. (3%), Massive sponges n.d. (3%).

Polychaeta: *Dyalichone* sp. (No. 1), *Hermodice carunculate* (No. 1).

Crocodile_7

100 x 67 cm

Algae: *Amphiroa rigida* (3%), *Dictyota dichotoma* (6%), Encrusting Corallinaceae on other algae (3%), Encrusting coralline algae (2%), *Flabellia petiolata* (18%), *Halimeda tuna* (1%), *Lithophyllum stictiforme*(9%), *Mesophyllum expansum* (8%), *Palmophyllum crassum* (8%), *Peyssonnelia* spp. (6%), *Peyssonnelia squamaria* (7%), Red algae with soft thallus (4%), *Zanardinia typus* (4%).

Porifera: *Agelas oroides* (3%), Massive sponges n.d. (10%).

Cnidaria: *Leptopsammia pruvoti* (1%).

Bryozoa: *Myriapora truncata* (2%), *Schizomavella mamillata* (4%).

Tunicata: *Aplydium* sp. (1%).

Crocodile_coralligeno9

107 x 72 cm

Algae: *Carpomitra costata* (5%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (1%), *Flabellia petiolata* (42%), *Halimeda tuna* (2%), *Lithophyllum stictiforme*(17%), *Mesophyllum expansum* (9%), *Peyssonnelia* spp. (8%), Red algae with soft thallus (2%), *Valonia* sp. (1%).

Porifera: *Agelas oroides* (7%), Massive sponges n.d. (3%).

Bryozoa: *Myriapora truncata* (1%).

Crocodile_coralligeno10

103 x 69 cm

Algae: *Carpomitra costata* (13%), *Caulerpa racemosa* var. *cylindracea* (11%), *Dictyota dichotoma* (5%), Encrusting Corallinaceae on other algae (1%), Encrusting coralline algae (2%), *Flabellia petiolata* (16%), *Halimeda tuna* (6%), *Peyssonnelia* spp. (7%), Red algae with soft thallus (2%), *Sporochnus pedunculatus* (33%), *Valonia* sp. (2%).

Mollusca: *Peltodoris atromaculata* (No. 1).

Crocodile_coralligeno14

107 x 72 cm

Algae: Encrusting Corallinaceae on other algae (1%), Encrusting coralline algae (2%), *Flabellia petiolata* (28%), *Lithophyllum stictiforme*(17%), *Mesophyllum expansum* (5%), *Palmophyllum crassum* (3%), *Peyssonnelia rubra* (2%), *Peyssonnelia* spp. (2%), *Peyssonnelia squamaria* (2%), Red algae with soft thallus (8).

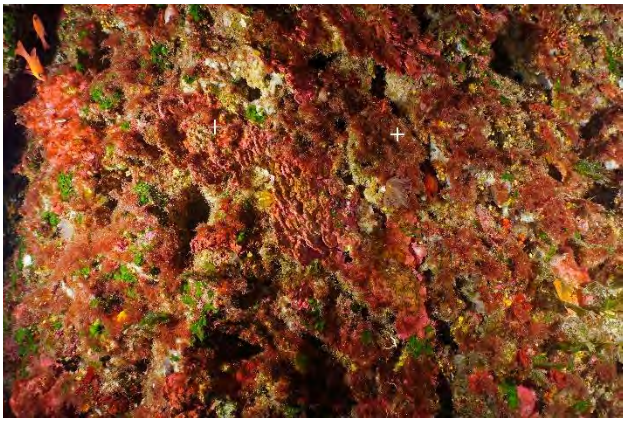
Porifera: *Agelas oroides* (7%), *Cliona* sp. (2%), *Ircinia oros* (9%), Massive sponges n.d. (3%).

Cnidaria: *Leptopsammia pruvoti* (2%).

Polychaeta: *Hermodice carunculata* (No. 3)

Tunicata: *Halocynthia papillosa* (3%).

Crocodile_coralligeno16



114 x 76 cm

Foraminifera: *Miniacina miniacea* (1%).

Algae: Encrusting Corallinaceae on other algae (3%), Encrusting coralline algae (3%), *Flabellia petiolata* (4%), *Lithophyllum stictiforme* (17%), *Mesophyllum expansum* (15%), *Palmophyllum crassum* (10%), *Peyssonnelia rubra* (7%), *Peyssonnelia* spp. (5%), Red algae with soft thallus (4%).

Porifera: *Dendroxea* sp. (2%), *Haliclona mucosa* (5%), Massive sponges n.d. (3%).

Cnidaria: *Cladopsammia rolandi* (1%), *Leptopsammia pruvoti* (4%).

Polychaeta: Polychaeta n.d. (2%), *Protula tubularia* (5%).

Bryozoa: Bryozoa n.d. (3%), *Myriapora truncata* (3%).

Tunicata: *Halocynthia papillosa* (3%).

Crocodile_coralligeno20

114 x 76 cm

Algae: Brown algae n.d. (2%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (3%), *Flabellia petiolata* (5%), *Lithophyllum stictiforme* (4%), *Mesophyllum expansum* (9%), *Palmophyllum crassum* (11%), *Peyssonnelia* spp. (9%), Red algae with soft thallus (1%).

Porifera: *Agelas oroides* (11%), *Cliona schmidti* (12%), *Dendroxea* sp. (4%), *Spirastrella cunctatrix* (14%).

Cnidaria: *Leptopsammia pruvoti* (7%).

Polychaeta: *Hermodice carunculata* (No. 1), *Protula tubularia* (1%).

Bryozoa: *Myriapora truncata* (2%), *Schizomavella mamillata* (1%).

Crocodile_coralligeno21

118 x 79 cm

Foraminifera: *Miniacina miniacea* (1%).

Algae: Brown algae n.d. (8%), Encrusting Corallinaceae on other algae (1%), Encrusting coralline algae (11%), *Flabellia petiolata* (11%), *Lithophyllum stictiforme* (10%), *Mesophyllum expansum* (9%), *Palmophyllum crassum* (10%), *Peyssonnelia* spp. (7%), Red algae with soft thallus (3%), *Sphaerococcus coronopifolius* (3%).

Porifera: *Agelas oroides* (9%), *Dendroxea* sp. (3%), *Hexadella racovitzai* (1%), *Spirastrella cunctatrix* (7%), *Terpios fugax* (1%).

Cnidaria: *Caryophyllia inornata* (1%), *Leptopsammia pruvoti* (3%), *Madracis pharensis* (2%).

Polychaeta: *Hermodice carunculata* (No. 1), *Protula tubularia* (1%).

Bryozoa: Bryozoa n.d. (2%), *Myriapora truncata* (1%), *Reteporella grimaldii* (2%).

Tunicata: *Halocynthia papillosa* (1%).

Crocodile_coralligeno24

123 x 82 cm

Foraminifera: *Miniacina miniacea* (1%).

Algae: Brown algae n.d. (2%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (8%), *Flabellia petiolata* (19%), *Lithophyllum stictiforme* (24%), *Mesophyllum expansum* (9%), *Palmophyllum crassum* (3%), *Peyssonnelia* spp. (4%), Red algae with soft thallus (10%).

Porifera: *Agelas oroides* (8%), Massive sponges n.d. (3%), *Pleraplysilla spinifera* (2%).

Cnidaria: *Leptopsammia pruvoti* (3%).

Bryozoa: *Myriapora truncata* (1%).

Tunicata: *Halocynthia papillosa* (1%).

Ras il-Wardija (Dwejra Bay)

Dwejra_coralligeno2

105 x 70 cm

Algae: *Acetabularia acetabulum* (1%), Brown algae felt (11%), Brown algae n.d. (6%), *Caulerpa racemosa* var. *cylindracea* (18), *Codium bursa* (4%), *Dictyota* cf. *Implexa* (2%), *Dictyota dichotoma* (5%), Encrusting Corallinaceae on other algae (3%), Encrusting coralline algae (4%), *Flabellia petiolata* (14%), *Halimeda tuna* (3%), *Lithophyllum stictiforme* (6%), *Peyssonnelia* spp. (3%), Red algae with soft thallus (4%), *Sargassum* sp. (5%), *Sporochnus pedunculatus* (11%).

Dwejra_coralligeno3

115 x 77 cm

Algae: Brown algae n.d. (1%), *Caulerpa racemosa* var. *cylindracea* (2%), *Dictyota* cf. *implexa* (5%), *Dictyota dichotoma* (1%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (2%), *Flabellia petiolata* (12%), *Halimeda tuna* (11%), *Lithophyllum stictiforme* (9%), *Mesophyllum expansum* (7%), *Peyssonnelia* spp. (3%), Red algae with soft thallus (2%), *Sporochnus pedunculatus* (17%).

Porifera: Encrusting sponges (2%).

Bryozoa: *Adeonella calveti* (3%), *Myriapora truncata* (1%), *Reteporella grimaldii* (9%).

Tunicata: *Halocynthia papillosa* (11%).

Dwejra_coralligeno4

115 x 77 cm

Algae: *Amphiroa rigida* (3%), Brown algae n.d. (13%), *Caulerpa racemosa* var. *cylindracea* (10%), *Dictyota* cf. *implexa* (2%), *Dictyota dichotoma* (6%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (1%), *Flabellia petiolata* (13%), *Halimeda tuna* (9%), *Lithophyllum stictiforme* (17%), *Mesophyllum expansum* (10%), *Peyssonnelia* spp. (4%), Red algae with soft thallus (1%).

Porifera: *Spirastrella cunctatrix* (7%).

Bryozoa: *Myriapora truncata* (1%), *Reteporella grimaldii* (1%).

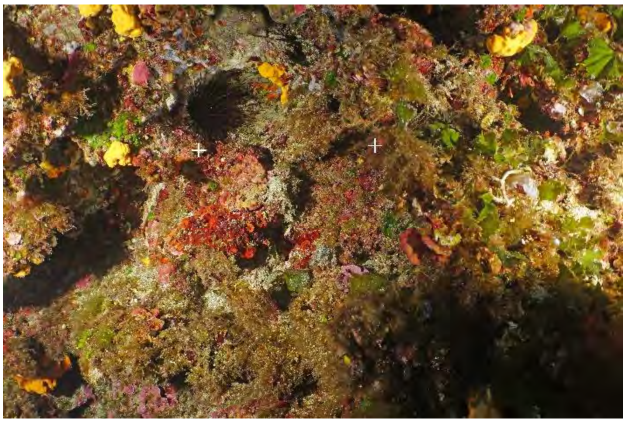
Dwejra_coralligeno5

107 x 72 cm

Algae: Brown algae n.d. (5%), *Dictyota dichotoma* (2%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (1%), Filamentous green algae (10%), *Flabellia petiolata* (17%), *Halimeda tuna* (18%), *Lithophyllum stictiforme* (11%), *Mesophyllum expansum* (8%), *Peyssonnelia* spp. (4%), Red algae with soft thallus (1%), *Sporochnus pedunculatus* (3%).

Porifera: *Spirastrella cunctatrix* (18%).

Dwejra_coralligeno7



87 x 58 cm

Algae: Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (2%), Filamentous green algae (9%), *Flabellia petiolata* (10%), *Halimeda tuna* (2%), *Halopteris* sp. (2%), *Lithophyllum stictiforme* (8%), *Mesophyllum expansum* (6%), *Palmophyllum crassum* (8%), *Peyssonnelia rubra* (7%), *Peyssonnelia* spp. (6%), *Peyssonnelia squamaria* (6%), Red algae with soft thallus (2%).

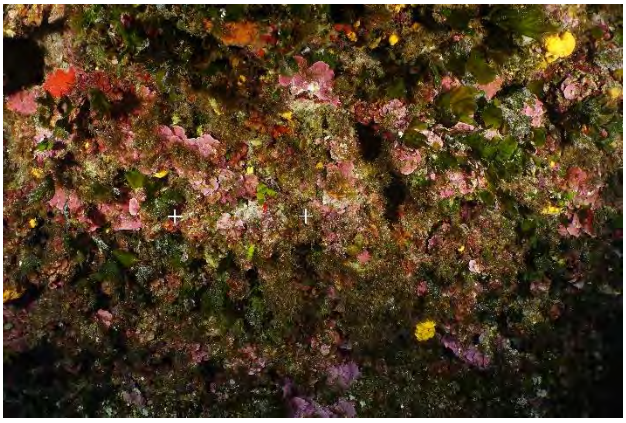
Porifera: *Agelas oroides* (11%), *Cliona schmidti* (6%), *Dendroxea* sp. (1%), Encrusting sponges (2%).

Cnidaria: *Leptopsammia pruvoti* (1%).

Bryozoa: *Myriapora truncata* (2%), *Schizomavella mamillata* (3%).

Echinodermata: *Centrostephanus longispinus* (4%).

Dwejra_coralligeno9



118 x 79 cm

Algae: *Dictyopteris polypodioides* (1%), Encrusting Corallinaceae on other algae (1%), Encrusting coralline algae (1%), *Flabellia petiolata* (13%), *Halimeda tuna* (3%), *Halopteris* sp. (14%), *Lithophyllum stictiforme* (16%), *Mesophyllum expansum* (10%), *Palmophyllum crassum* (1%), *Peyssonnelia rubra* (6%), *Peyssonnelia* spp. (2%), *Peyssonnelia squamaria* (5%), Red algae with soft thallus (1%).

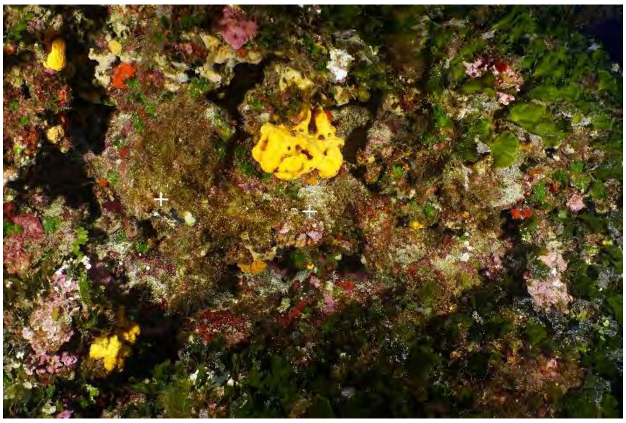
Porifera: *Agelas oroides* (9%), *Dyctionella incisa* (6%), Encrusting sponges (2%).

Cnidaria: *Leptopsammia pruvoti* (1%).

Bryozoa: *Adeonella calveti* (2%), Bryozoa n.d. (1%), *Myriapora truncata* (1%), *Reteporella grimaldii* (1%), *Schizomavella mamillata* (1%).

Echinodermata: *Centrostephanus longispinus* (1%).

Dwejra_coralligeno10



103 x 69 cm

Foraminifera: Miniacina miniacea (2%).

Algae: Brown algae n.d. (4%), Encrusting Corallinaceae on other algae (2%), Encrusting coralline algae (2%), *Flabellia petiolata* (15%), *Halimeda tuna* (4%), *Halopteris* sp. (3%), *Lithophyllum stictiforme* (10%), *Mesophyllum expansum* (7%), *Palmophyllum crassum* (6%), *Peyssonnelia rubra* (5%), *Peyssonnelia* spp. (4%), Red algae with soft thallus (1%).

Porifera: *Agelas oroides* (9%), *Cliona schmidti* (3%), Encrusting sponges (3%), *Haliclona mucosa* (4%), Massive sponges n.d. (3%), *Phorbas fictitious* (5%).

Cnidaria. *Leptopsammia pruvoti* (1%).

Polychaeta: Polychaeta n.d. (1%), *Protula* sp. (1%).

Bryozoa: Bryozoa n.d. (1%), *Myriapora truncata* (1%), *Schizomavella mamillata* (1%).

Dwejra_coralligeno11

93 x 62 cm

Algae: Brown algae n.d. (2%), *Caulerpa racemosa* var. *cylindracea* (10%), *Codium bursa* (11%), *Cystoseira* sp. (5%), *Dictyopteris* cf. *humilis* (1%), *Dictyopteris polypodioides* (12%), *Dictyota* cf. *implexa* (2%), *Dictyota dichotoma* (1%), Encrusting Corallinaceae on other algae (3%), Encrusting coralline algae (3%), *Flabellia petiolata* (8%), *Halimeda tuna* (4%), *Halopteris* sp. (13%), *Lithophyllum stictiforme* (2%), *Padina pavonia* (11%), *Peyssonnelia squamaria* (1%), Red algae with soft thallus (2%), *Sargassum* sp. (6%).

Porifera: Encrusting sponges (3%).

Dwejra_coralligeno12

96 x 63 cm

Foraminifera: Miniacina miniacea (1%).

Algae: Brown algae n.d. (3%), *Caulerpa racemosa* var. *cylindracea* (6%), *Codium bursa* (1%), *Cystoseira* sp. (2%), *Dictyopteris polypodioides* (1%), *Dictyota dichotoma* (2%), Encrusting Corallinaceae on other algae (1%), Encrusting coralline algae (2%), Filamentous green algae (4%), *Flabellia petiolata* (8%), *Halimeda tuna* (3%), *Halopteris* sp. (3%), *Lithophyllum stictiforme* (10%), *Mesophyllum expansum* (6%), *Palmophyllum crassum* (9%), *Peyssonnelia* spp. (4%), Red algae with soft thallus (2%).

Porifera: *Agelas oroides* (11%), *Dendroxea* sp. (3%), Encrusting sponges (2%), Massive sponges n.d. (1%).

Cnidaria: Madracis pharensis (2%).

Bryozoa: Bryozoa n.d. (3%), *Myriapora truncata* (5%), *Schizomavella mamillata* (3%).

Echinodermata: *Centrostephanus longispinus* (2%).

Dwejra_coralligeno14

100 x 67 cm

Algae: *Amphiroa rigida* (1%), Brown algae n.d. (2%), *Caulerpa racemosa* var. *cylindracea* (1%), *Dictyota dichotoma* (4%), Encrusting Corallinaceae on other algae (1%), Encrusting coralline algae (1%), Filamentous green algae (3%), *Flabellia petiolata* (13%), *Halimeda tuna* (4%), *Halopteris* sp. (7%), *Lithophyllum stictiforme* (16%), *Mesophyllum expansum* (7%), *Palmophyllum crassum* (6%), *Peyssonnelia rubra* (5%), *Peyssonnelia* spp. (4%), *Peyssonnelia squamaria* (5%), Red algae with soft thallus (2%).

Porifera: *Agelas oroides* (6%), *Cymbaxinella damicornis* (1%), Encrusting sponges (2%), *Haliclona mucosa* (1%), *Ircinia variabilis* (1%).

Bryozoa: Bryozoa n.d. (1%), *Hornera frondiculata* (1%), *Myriapora truncata* (2%), *Reteporella grimaldii* (1%), *Schizomavella mamillata* (1%).

Crustacea: *Calcinua tubularis* (No. 1).

Ras ir-Raheb (Rdum)

Ras_ir-Raheb_Coralligeno1

141 x 94 cm

Algae: Encrusting coralline algae (2%), Encrusting Corallinaceae on other algae (2%), *Flabellia petiolata* (8%), *Lithophyllum stictiforme* (18%), *Mesophyllum expansum* (7%), *Palmophyllum crassum* (5%), *Peyssonnelia rubra* (7%), *Peyssonnelia* spp. (6%), *Peyssonnelia squamaria* (6%), Red algae with soft thallus (3%), *Zonaria tournefortii* (4%).

Porifera: *Agelas oroides* (6%), *Dendroxea* sp. (3%), Encrusting sponges (6%).

Cnidaria: Leptopsammia pruvoti (4%).

Polychaeta: *Hermodice carunculata* (No. 1), *Protula tubularia* (2%).

Bryozoa: Bryozoa n.d. (3%), *Myriapora truncata* (5%), *Schizomavella mamillata* (2%).

Ras_ir-Raheb_Coralligeno2

142 x 95 cm

Algae: Brown algae n.d. (8%), Encrusting coralline algae (4%), *Flabellia petiolata* (8%), *Lithophyllum stictiforme* (12%), *Mesophyllum expansum* (6%), *Palmophyllum crassum* (6%), *Peyssonnelia rubra* (9%), *Peyssonnelia* spp. (5%), *Peyssonnelia squamaria* (6%), Red algae with soft thallus (5%), *Zonaria tournefortii* (9%).

Porifera: *Agelas oroides* (10%), *Dendroxea* sp. (5%).

Polychaeta: *Hermodice carunculata* (No. 1).

Tunicata: *Halocynthia papillosa* (5%).

Ras_ir-Raheb_Coralligeno3

129 x 86 cm

Algae: Brown algae n.d. (6%), Encrusting Corallinaceae on other algae (5%), Encrusting coralline algae (6%), *Flabellia petiolata* (4%), *Lithophyllum stictiforme* (18%), *Mesophyllum expansum* (7%), *Palmophyllum crassum* (4%), *Peyssonnelia rubra* (8%), *Peyssonnelia* spp. (6%), Red algae with soft thallus (5%).

Porifera: Agelas oroides (14%), Massive sponges n.d. (8%).

Cnidaria: *Leptopsammia pruvoti* (4%).

Bryozoa: *Adeonella calveti* (3%).

Tunicata: *Halocynthia papillosa* (2%).

Ras_ir-Raheb_Coralligeno5

135 x 90 cm

Algae: Brown algae n.d. (7%), Encrusting coralline algae (6%), *Lithophyllum stictiforme* (14%), *Mesophyllum expansum* (6%), *Palmophyllum crassum* (11%), *Peyssonnelia rubra* (12%), *Peyssonnelia* spp. (8%), Red algae with soft thallus (2%), *Valonia* sp. (2%).

Porifera: Agelas oroides (14%), Dendroxea sp. (1%), Spirastrella cunctatrix (6%).

Polychaeta: Hermodice carunculata (No. 1), Polychaeta n.d. (1%).

Mollusca: *Phillidia flava* (No.1).

Bryozoa: *Adeonella calveti* (1%), *Myriapora truncata* (1%), *Reteporella grimaldii* (1%), *Schizomavella mamillata* (3%).

Ras_ir-Raheb_Coralligeno6

141 x 94 cm

Algae: Brown algae n.d. (10%), Encrusting coralline algae (6%), *Lithophyllum stictiforme* (17%), *Mesophyllum expansum* (12%), *Palmophyllum crassum* (7%), *Peyssonnelia* spp. (7%), Red algae with soft thallus (6%), *Valonia* sp. (4%).

Porifera: *Agelas oroides* (9%), *Cymbaxinella damicornis* (6%), *Dendroxea* sp. (4%).

Cnidaria: *Leptopsammia pruvoti* (3%).

Bryozoa: Bryozoa n.d. (5%), *Adeonella calveti* (4%).

Ras_ir-Raheb_Coralligeno9

135 x 94 cm

Algae: Brown algae n.d. (7%), Encrusting coralline algae (4%), *Lithophyllum stictiforme* (20%), *Mesophyllum expansum* (8%), *Palmophyllum crassum* (4%), *Peyssonnelia rubra* (10%), *Peyssonnelia* spp. (9%), Red algae with soft thallus (4%).

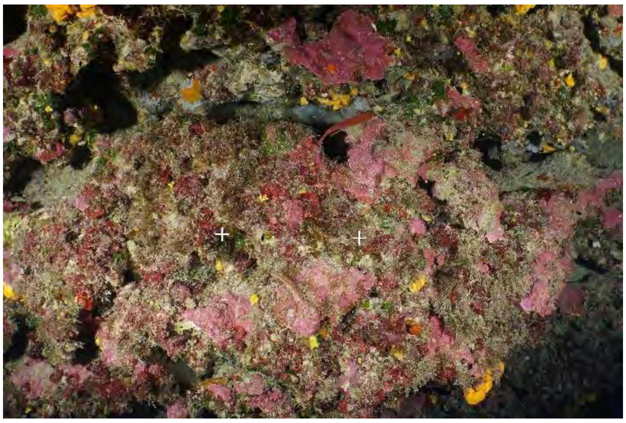
Porifera: *Agelas oroides* (12%), *Cliona schmidti* (3%), *Cymbaxinella damicornis* (3%), *Dendroxea* sp. (2%), Encrusting sponges (4%).

Cnidaria: *Leptopsammia pruvoti* (3%), *Madracis pharensis* (1%).

Bryozoa: *Adeonella calveti* (1%), *Myriapora truncata* (1%), *Schizomavella mamillata* (3%).

Echinodermata: *Centrostephanus longispinus* (1%).

Ras_ir-Raheb_Coralligeno10



113 x 75 cm

Algae: Brown algae n.d. (7%), Encrusting coralline algae (3%), *Lithophyllum stictiforme* (17%), *Mesophyllum expansum* (8%), *Palmophyllum crassum* (7%), *Peyssonnelia rubra* (8%), *Peyssonnelia* spp. (5%), *Peyssonnelia squamaria* (6%), Red algae with soft thallus (4%).

Porifera: *Agelas oroides* (8%), *Cymbaxinella damicornis* (3%), *Dendroxea* sp. (4%), Encrusting sponges (4%).

Cnidaria: Leptopsammia pruvoti (2%).

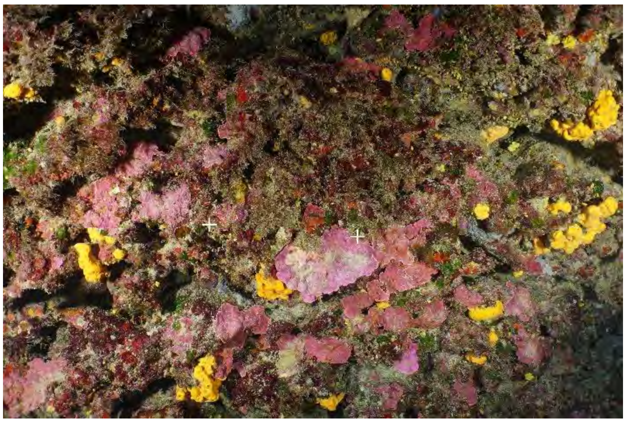
Polychaeta: *Dyalichone* sp. (1%), *Hermodice carunculata* (No. 1).

Bryozoa: *Adeonella calveti* (2%), Bryozoa n.d. (2%), *Schizomavella mamillata* (3%).

Echinodermata: *Centrostephanus longispinus* (4%).

Foraminifera: Miniacina miniacea (1%).

Ras_ir-Raheb_Coralligeno11



105 x 70 cm

Algae: Brown algae n.d. (7%), Encrusting coralline algae (3%), *Lithophyllum stictiforme* (16%), *Mesophyllum expansum* (13%), *Palmophyllum crassum* (4%), *Peyssonnelia rubra* (8%), *Peyssonnelia* spp. (9%), Red algae with soft thallus (4%).

Porifera: *Agelas oroides* (13%), *Cymbaxinella damicornis* (2%), *Dendroxea* sp. (3%), Encrusting sponges (4%), *Terpios figax* (1%).

Cnidaria: *Leptopsammia pruvoti* (4%), *Madracis pharensis* (2%).

Polychaeta: *Dyalichone* sp. (1%).

Bryozoa: *Adeonella calveti* (1%), *Myriapora truncata* (1%), *Reteporella grimaldii* (2%), *Schizomavella mamillata* (2%).

Tunicata: *Halocynthia papillosa* (1%).

Ras_ir-Raheb_Coralligeno12

103 x 69 cm

Foraminifera: Miniacina miniacea (1%).

Algae: Encrusting coralline algae (4%), *Lithophyllum stictiforme* (12%), *Mesophyllum expansum* (6%), *Palmophyllum crassum* (5%), *Peyssonnelia* spp. (8%).

Porifera: *Agelas oroides* (18%), *Cymbaxinella damicornis* (10%), *Dendroxea* sp. (4%), Massive sponges n.d (6%).

Cnidaria: *Cladopsammia rolandi* (4%), *Leptopsammia pruvoti* (5%).

Polychaeta: *Hermodice carunculata* (No. 1).

Bryozoa: *Adeonella calveti* (3%), Bryozoa n.d. (2%), *Hornera frondiculata* (1%), *Myriapora truncata* (4%), *Reteporella grimaldii* (3%).

Tunicata: Halocynthia papillosa (1%).

Echinodermata: Centrostephanus longispinus (1%).

Ras_ir-Raheb_Coralligeno14

114 x 76 cm

Algae: Brown algae n.d. (3%), Encrusting coralline algae (7%), *Lithophyllum stictiforme* (11%), *Mesophyllum expansum* (10%), *Palmophyllum crassum* (6%), *Peyssonnelia* spp. (9%), Red algae with soft thallus (2%).

Porifera: *Agelas oroides* (12%), *Dendroxea* sp. (9%), Encrusting sponges (7%).

Cnidaria: *Leptopsammia pruvoti* (6%), *Madracis pharensis* (3%).

Polychaeta: *Dyalichone* sp. (1%), *Hermodice carunculata* (1%), *Serpula vermicularis* (1%).

Mollusca: *Felimare picta* (juv.) (1%).

Bryozoa: *Adeonella calveti* (3%), *Myriapora truncata* (3%), *Reteporella grimaldii* (1%), *Schizomavella mamillata* (1%).

Tunicata: *Halocynthia papillosa* (2%).

Echinodermata: *Centrostephanus longispinus* (1%).

Star Rock (Filfla)

Filfla_coralligeno1_03

86 x 58 cm

Algae: Brown algae n.d. (8%), Encrusting Corallinaceae on other algae (5%), Encrusting coralline algae (4%), *Flabellia petiolata* (6%), *Halimeda tuna* (3%), *Lithophyllum stictiforme* (15%), *Mesophyllum expansum* (7%), *Palmophyllum crassum* (5%), *Peyssonnelia rubra* (7%), *Peyssonnelia* spp. (8%), Red algae with soft thallus (5%), *Valonia* sp. (1%), *Zonaria tournefortii* (6%).

Porifera: *Agelas oroides* (8%), *Cymbaxinella damicornis* (2%), Encrusting sponges (4%), Massive sponges n.d. (4%).

Bryozoa: *Myriapora truncata* (2%).

Filfla_coralligeno1_05

80 x 54 cm

Algae: Brown algae n.d. (18%), Encrusting coralline algae (2%), *Flabellia petiolata* (7%), *Halimeda tuna* (5%), *Halopteris* sp. (4%), *Lithophyllum stictiforme* (12%), *Mesophyllum expansum* (11%), *Palmophyllum crassum* (3%), *Peyssonnelia rubra* (14%), *Peyssonnelia* spp. (10%), Red algae with soft thallus (3%).

Porifera: *Cliona schmidti* (4%), Massive sponges n.d. (5%).

Bryozoa: Bryozoa n.d. (1%), *Myriapora truncata* (1%).

Filfla_coralligeno1_07

90 x 60 cm

Algae: Brown algae n.d. (10%), *Dictyopteris polypodioides* (4%), Encrusting Corallinaceae on other algae (4%), Encrusting coralline algae (5%), *Flabellia petiolata* (13%), *Halimeda tuna* (2%), *Lithophyllum stictiforme* (10%), *Mesophyllum expansum* (10%), *Palmophyllum crassum* (3%), *Peyssonnelia rubra* (12%); *Peyssonnelia* spp. (10%), Red algae with soft thallus (5%), *Valonia* sp. (1%).

Porifera: *Agelas oroides* (11%).

Filfla_coralligeno1_09

71 x 48 cm

Algae: Brown algae n.d. (10%), Encrusting Corallinaceae on other algae (4%), Encrusting coralline algae (1%), *Flabellia petiolata* (14%), *Halimeda tuna* (7%), *Halopteris* sp. (3%), *Lithophyllum stictiforme* (19%), *Mesophyllum expansum* (9%), *Palmophyllum crassum* (1%), *Peyssonnelia rubra* (11%), *Peyssonnelia* spp. (8%), Red algae with soft thallus (2%), *Sargassum* sp. (11%).

Filfla_coralligeno2_04

85 x 56 cm

Algae: Brown algae n.d. (14%), *Dictyopteris polypodioides* (3%), Encrusting coralline algae (6%), *Flabellia petiolata* (11%), *Lithophyllum stictiforme* (8%), *Mesophyllum expansum* (9%), *Palmophyllum crassum* (9%), *Peyssonnelia rubra* (5%), *Peyssonnelia* spp. (7%), Red algae with soft thallus (9%).

Porifera: *Cymbaxinella damicornis* (6%), *Pleraplysilla spinifera* (5%).

Polychaeta: *Hermodice carunculata* (No. 1).

Bryozoa: *Myriapora truncata* (5%).

Filfla_coralligeno2_06

96 x 63 cm

Algae: Brown algae n.d. (9%), Encrusting coralline algae (6%), *Flabellia petiolata* (15%); *Halimeda tuna* (4%), *Lithophyllum stictiforme* (16%), *Mesophyllum expansum* (15%), *Palmophyllum crassum* (5%), *Peyssonnelia* spp. (13%), Red algae with soft thallus (3%).

Porifera: *Agelas oroides* (9%), *Cymbaxinella damicornis* (1%), Encrusting sponges (4%).

Filfla_coralligeno2_10

78 x 52 cm

Algae: Brown algae n.d. (8%), *Dictyopteris polypodioides* (9%), Encrusting coralline algae (2%), *Flabellia petiolata* (19%), *Halopteris* sp. (3%), *Lithophyllum stictiforme* (11%), *Mesophyllum expansum* (10%), *Palmophyllum crassum* (3%), *Peyssonnelia* spp. (12%), Red algae with soft thallus (3%).

Porifera: *Agelas oroides* (12%), *Cymbaxinella damicornis* (4%), Massive sponges n.d. (4%).

Filfla_coralligeno3_01

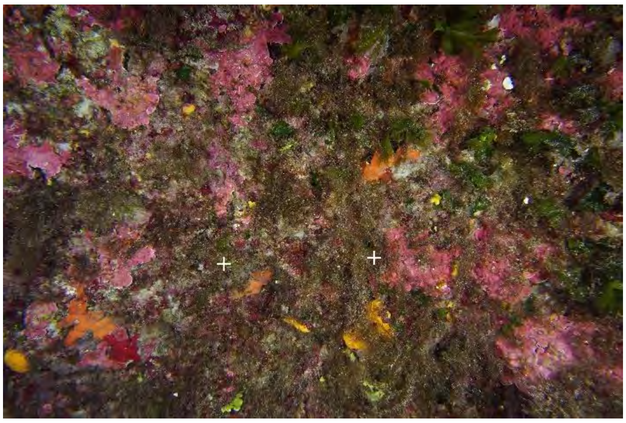
92 x 61 cm

Algae: Brown algae n.d. (10%), *Dictyopteris polypodioides* (2%), Encrusting coralline algae (3%), *Halimeda tuna* (4%), *Lithophyllum stictiforme* (11%), *Mesophyllum expansum* (9%), *Palmophyllum crassum* (4%), *Peyssonnelia rubra* (9%), *Peyssonnelia* spp. (5%), Red algae with soft thallus (8%).

Porifera: *Agelas oroides* (12%), *Cliona schmidti* (3%), Encrusting sponges (1%), *Spirastrella cunctatrix* (17%).

Cnidaria: *Madracis pharensis* (2%).

Filfla_coralligeno3_06

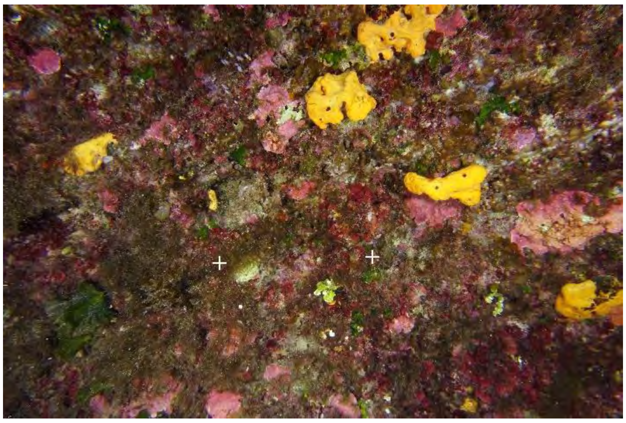


103 x 69 cm

Algae: Brown algae n.d. (10%), Encrusting coralline algae (5%), *Flabellia petiolata* (10%), *Halimeda tuna* (2%), *Lithophyllum stictiforme* (18%), *Mesophyllum expansum* (7%), *Palmophyllum crassum* (4%), *Peyssonnelia* spp. (13%), Red algae with soft thallus (5%).

Porifera: *Agelas oroides* (7%), *Cymbaxinella damicornis* (10%), Massive sponges n.d. (6%), *Spirastrella cunctatrix* (3%).

Filfla_coralligeno3_08



101 x 67 cm

Algae: Brown algae n.d. (2%), *Dictyopteris polypodioides* (4%), Encrusting coralline algae (2%), *Flabellia petiolata* (5%), *Halimeda tuna* (4%), *Lithophyllum stictiforme* (15%), *Mesophyllum expansum* (8%), *Palmophyllum crassum* (7%), *Peyssonnelia rubra* (16%), *Peyssonnelia* spp. (7%), Red algae with soft thallus (1%).

Porifera: *Agelas oroides* (19%), Massive sponges n.d. (5%).

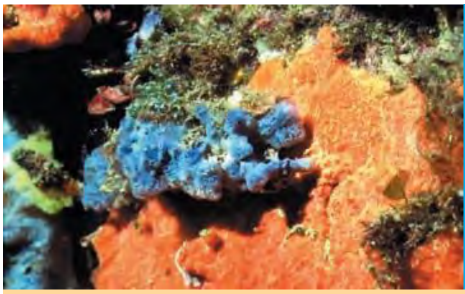
Cnidaria: Madracis pharensis (3%).

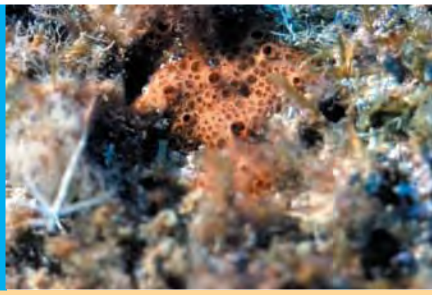
Bryozoa: Myriapora truncate (2%).

APPENDIX G

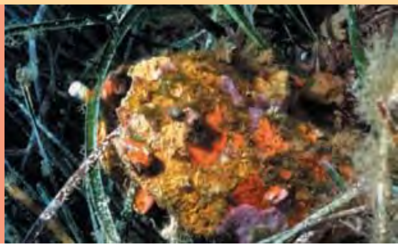
Standard Data Form

UNITED NATIONS ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN
REGIONAL ACTIVITY CENTRE FOR SPECIALLY PROTECTED AREAS
(RAC/SPA)





STANDARD DATA-ENTRY FORM (SDF) FOR NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST - MT0000101



UNEP
RAC/SPA-TUNIS, 2002

1. SITE IDENTIFICATION

1.1. SITE CODE

M	T	0	0	0	0	1	0	1

1.2. IDENTIFICATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	0	9

1.3. COMPILATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	1	1

1.4. UPDATE

Y	Y	Y	Y	M	M

1.5. RESPONDENT(S):

1.6. SITE NAME:

Żona fil-Baħar bejn Rdum Majjiesa u Għar Lapsi

2. SITE LOCATION

2.1. SITE CENTRE LOCATION:

LONGITUDE: E 14 20 41 (W/E (Greenwich))

LATITUDE: 35 52 13

2.2. AREA (ha):

Terrestrial area:						,		
Marine area:			7	1	2	,	4	9
TOTAL AREA:			7	1	2	,	4	9

2.3. SITE LENGTH(Km):

			,			

2.4. ALTITUDE/DEPTH (m):

	+/- MINIMUM	MAXIMUM	MEAN
Altitude:			
Depth:	0	-50	

2.5. ADMINISTRATIVE REGION:

CODE	REGION NAME	%COVER

Marine area not covered by a NUTS-region	

3. ECOLOGICAL INFORMATION

3.1. GENERAL SITE CHARACTER:

	% cover
COASTAL AREAS	
Coastal wetlands (lagoons, estuaries, deltas, salt works)	
Salt marshes	
Coastal sand dunes, Sand beaches, Shingle beaches	
Sea cliffs and Rocky shores	
Mud flats and Sand flats	
Scrub, Maquis and Garrigue, Phrygana	
Forests	
Agricultural land	
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	
MARINE AREAS	
Hard beds	X
Rocks	X
Muds	
Sands	
Gravels	
Stones and pebbles	X
Seagrass meadows	X
Caves	
Other Sea bottom areas	X

Other site characteristics:

Along the coastline hard bottom is abundant and covered by photophilic communities, attributable to the biocenosis of infralittoral algae. Patches of *Posidonia oceanica* on rocks are also present. Moving offshore, the nature of the substrate changes, becoming detritic sediment, partially colonized by algae.
A SCUBA diving inspection carried out at Ras ir-Raheb, indicates the presence of marine crags and cliffs with terraces. Sparse patches of *Posidonia oceanica* are distributed in the midst of photophilic algae. On the base of crag, species typical of the coralligenous are present: this habitat can be considered as facies and association of the coralligenous biocenosis (in enclave).

Percentage* cover for the habitats for which a biocenosis was not attributable:

Rocky outcrops: 0,2%
Detritic bottom: 43%
Soft bottom – Potential detritic bottom: 7%

Percentage* cover for the biocenosis are reported in the follow page.

* Percentage is calculated with reference to the investigated area (see “*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*”, MedKeyHabitats II Project n°6/2019_SPA RAC).

3.2. HABITAT types present on the site and their assessment :

3.2.a. MARINE HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE				%COVER		REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS			VULNERABILITY		
III	5	1		3	4	A	B	C	D	A	B	C	A	B	C	A	B	C
III	6	1		1	5	A	B	C	D	A	B	C	A	B	C	A	B	C
III	6	1	35			A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C
						A	B	C	D	A	B	C	A	B	C	A	B	C

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3.2.b. COASTAL AND WETLAND HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS		
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C

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3.2.c. SURFACES COVERED BY OTHER HABITAT TYPES:

CODE	%COVER
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3.3. SPECIES

covered by the Reference List of Species for the selection of sites to be included in the national inventories of natural sites of conservation interest

and

their assessment:

3.3.a. MARINE FAUNA SPECIES included in the reference list of species:

CODE				NAME	POPULATION					SITE ASSESSMENT											
					RESIDENT		MIGRATORY														
					Breeding	Non-breed	Breeding	Wintering	Staging	Population				Conservation			Endemism		Role of site		
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C

Please copy page if necessary

3.3.b. MARINE FLORA SPECIES included in the reference list of species:

CODE				NAME	POPULATION	SITE ASSESSMENT			
						Population	Conservation	Endemism	Role of site
2	2	7	6	*Posidonia oceanica*		A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C
						A B C D	A B C	Y N	A B C

Please copy page if necessary

3.3.c. COASTAL FAUNA SPECIES included in the reference list of species:

CODE				NAME	POPULATION					SITE ASSESSMENT			
					RESIDENT		MIGRATORY			Population	Conservation	Endemism	Isolation
					Breeding	Non-breed	Breeding	Wintering	Staging				
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C
										A B C D	A B C	Y N	A B C

Please copy page if necessary

3.3.d. COASTAL FLORA SPECIES included in the reference list of species:

CODE	NAME	POPULATION	SITE ASSESSMENT			
			Population	Conservation	Endemism	Isolation
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C

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3.4. Other Important Species of Flora and Fauna:

B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION
						X	*Miniacina miniacea*		A B C D
						X	*Amphiroa rigida*		A B C D
						X	*Codium bursa*		A B C D
						X	*Cystoseira* sp.		A B C D
						X	*Dictyopteris polypodioides*		A B C D
						X	*Dictyota* cf. *implexa*		A B C D
						X	*Flabellia petiolata*		A B C D
						X	*Halimeda tuna*		A B C D
						X	*Halopteris* sp.		A B C D
						X	*Lithophyllum stictaeforme*		A B C D
						X	*Mesophyllum expansum*		A B C D
						X	*Padina pavonia*		A B C D
						X	*Palmophyllum crassum*		A B C D
						X	*Peyssonnelia rubra*		A B C D
						X	*Peyssonnelia* spp.		A B C D
						X	*Peyssonnelia squamaria*		A B C D
						X	*Sargassum* sp.		A B C D
						X	*Valonia* sp.		A B C D
						X	*Zonaria tournefortii*		A B C D
					X		*Agelas oroides*		A B C D
					X		*Chondrosia reniformis*		A B C D
					X		*Cliona schmidti*		A B C D
					X		*Cymbaxinella damicornis*		A B C D
					X		*Dendroxea* sp.		A B C D
					X		*Hexadella racovitzai*		A B C D
					X		*Spirastrella cunctatrix*		A B C D
					X		*Terpios fugax*		A B C D
					X		*Astroides calycularis*		A B C D
					X		*Caryophyllia inornata*		A B C D
					X		*Cladopsammia rolandi*		A B C D
					X		*Leptopsammia pruvoti*		A B C D
					X		*Madracis pharensis*		A B C D
					X		*Paracyathus pulchellus*		A B C D
					X		*Dyalichone* sp.		A B C D
					X		*Hermodice carunculata*		A B C D
					X		*Protula tubularia*		A B C D
					X		*Serpula vermicularis*		A B C D
					X		*Felimare tricolor*		A B C D
					X		*Felimida krohni*		A B C D
					X		*Gastrochaena dubia*		A B C D
					X		*Phyllidia flava*		A B C D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

3.4. Other Important Species of Flora and Fauna:

GROUP B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION			
					X		*Adeonella calveti*		A	B	C	D
					X		*Frondipora verrucosa*		A	B	C	D
					X		*Myriapora truncata*		A	B	C	D
					X		*Reptadeonella violacea*		A	B	C	D
					X		*Reteporella grimaldii*		A	B	C	D
					X		*Schizomavella mamillata*		A	B	C	D
					X		*Halocynthia papillosa*		A	B	C	D
					X		*Centrostephanus longispinus*		A	B	C	D
					X		*Echinaster sepositus*		A	B	C	D
					X		*Hacelia attenuata*		A	B	C	D
				X			*Apogon imberbis*		A	B	C	D
				X			*Chromis chromis*		A	B	C	D
				X			*Coris julis*		A	B	C	D
				X			*Scorpaena maderensis*		A	B	C	D
				X			*Serranus cabrilla*		A	B	C	D
				X			*Serranus scriba*		A	B	C	D
				X			*Sparisoma cretense*		A	B	C	D
				X			*Symphodus mediterraneus*		A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
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									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

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4. SITE DESCRIPTION

4.1. QUALITY AND IMPORTANCE:

The biocenosis of infralittoral algae is extremely rich as regards the species inhabiting it. Facies and associations of the coralligenous biocenosis in enclave are present in the in shaded areas of the rocky coastal zone.
Photophilic algae cover rocks, in alternation with *Posidonia oceanica* on the most sheltered areas (i.e. bays), from very shallow waters up to 40-50 meters depth. This is the predominant habitat on hard substrates within the study areas, showing sometimes important associations with *Sargassum* ssp. and *Cystoseira* ssp., both including protected species listed in the SPA/BD Protocol.

4.2. CONSERVATION STATUS:

Special Areas of Conservation (SAC, Council Directive 92/42/EEC of 21 May 1992).

4.3. VULNERABILITY:

The main potential threats to *Posidonia oceanica* are linked to coastal development, to pleasure boating (anchoring), and to the exploiting of living resources (trawling, fish farming).
Coralligenous assemblages in Malta are mostly found in enclaves in biocenosis the infralittoral algae, with rather hemi-sciaphilous species and never show important arborescent or erect forms.
The coralligenous assemblages investigated does not show high impacts due to human activities.
In both cases, the most frequently observed signs of human activities were fishing gears (both active and abandoned).

4.4. SITE DESIGNATION (remarks concerning quantitative data below):

The presence of rocky outcrops was detected by the Side Scan Sonar in the northern portion of Rdum. Those outcrops appear as structures ranging from few meters to hundreds of meters and emerge from detritic soft bottoms, potentially acting as local hotspot of biodiversity. The rocky outcrops area could need further biological investigation (e.g. species inventory).

4.5. OWNERSHIP:

Public

4.6. DOCUMENTATION:

Borg, J.A.; Dimech, M. & Schembri, P.J. 2004. Report on a survey of the marine infralittoral benthic habitats in the Dwejra/Qawra area (Gozo, Maltese Islands) made in August – September 2004. Survey commissioned by Nature Trust and the Malta Environment and Planning Authority.

Borg, J., Mallia, A., Pirotta, K., Shembri, P., & Vassallo, A. (1997). A Preliminary Report on the Marine Macrobenthos and the Demersal Fish Fauna of the Island of Filfla (Maltese islands, Central mediterranean). The Central Mediterranean Naturalist, 2(4), p. 136-151.

Fisheries Control Directorate, 2013. Fisheries Management Plan. Fisheries Control Directorate, Ministry for the Environment, Sustainable Development and Climate Change. Department of Fisheries and Aquaculture, Marsa, Malta.

Francour P., Ganteaume A., Poulain P., 1999. Effects of boat anchoring in Posidonia oceanica seagrass beds in the Port-Cros National Park (north-western Mediterranean Sea). Aquatic Conservation Marine and Freshwater Ecosystems, 9(4): 391-400.

MEPA – Malta Environment and Planning Authority, 2006b. State of the Environment Report 2005. Sub-report 4: Land: 16pp.

UNEP-MAP-RAC/SPA,2008. Action plan for the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea. Tunis: Ed. RAC/SPA. 1–21 p.

4.7. HISTORY:

Date	Field Changed	Description

5. SITE PROTECTION STATUS AND RELATION WITH OTHER SITES:

5.1. DESIGNATION TYPES at National and sub-national level:

CODE	%COVER	CODE	%COVER	CODE	%COVER

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or sub-national level:

TYPE CODE	SITE NAME	OVERLAP TYPE	OVERLAP %COVER

designated at the International level:

TYPE	SITE CODE (if appropriate)	SITE NAME	OVERLAP TYPE	OVERLAP %COVER
World Heritage Site:				
Biosphere Reserve:				
Ramsar Convention:				
Biogenetic Reserve:				
Eurodiploma Site:				
Barcelona Convention - SPA:				
Barcelona Convention - SPAMI:				
Natura2000-Special Protection Area:				
Natura2000-Special Area for Conser	MT0000101	Żona fil-Baħar bejn Rdum Majjiesa u Għar Lapsi		
Bern Convention: Emerald site				
Other:				

6. HUMAN ACTIVITIES IN AND AROUND THE SITE

6.1. IMPACTS / ACTIVITIES AND PROPORTION OF THE SURFACE AREA OF THE SITE AFFECTED:

IMPACTS AND ACTIVITIES WITHIN THE SITE:

CODE			INTENSITY			% OF SITE			INFLUENCE		
2	2	0	A						+	0	-
2	9	0							+	0	-
9	5	4		B					+	0	-
									+	0	-
									+	0	-
									+	0	-

CODE			INTENSITY			% OF SITE			INFLUENCE		
			A	B	C				+	0	-
			A	B	C				+	0	-
			A	B	C				+	0	-
			A	B	C				+	0	-
			A	B	C				+	0	-
			A	B	C				+	0	-

IMPACTS AND ACTIVITIES AROUND THE SITE:

CODE			INTENSITY			INFLUENCE			CODE			INTENSITY			INFLUENCE		
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-

6.2. SITE MANAGEMENT:

BODY(IES) RESPONSIBLE FOR THE SITE MANAGEMENT AND OTHER INSTITUTIONS INVOLVED:

Maltese Environment and Resources Authority (ERA)
Specially Protected Areas Regional Activity Centre (SPA/RAC)

SITE MANAGEMENT AND PLANS:

7. MAP OF THE SITE

- **Physical map:**

NATIONAL MAP NUMBER	SCALE	PROJECTION

REFERENCE TO AVAILABILITY OF BOUNDARIES IN DIGITISED FORM

- **Map of designated sites described in 5:**

Habitat map are available in the APPENDIX A of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

- **Aerial photograph(s) included:**

☐ YES ☒ NO

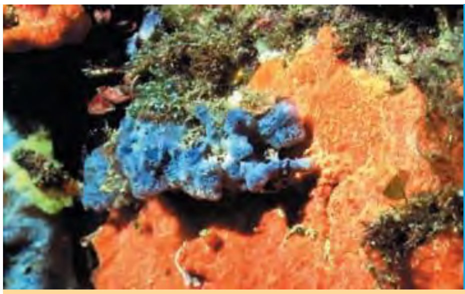
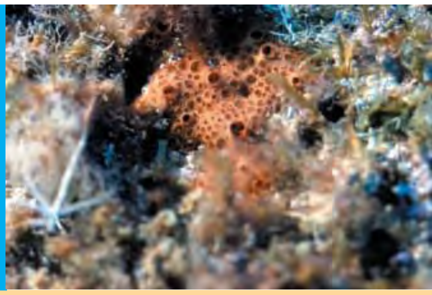
NUMBER	AREA	SUBJECT	COPYRIGHT	DATE

8. SLIDES

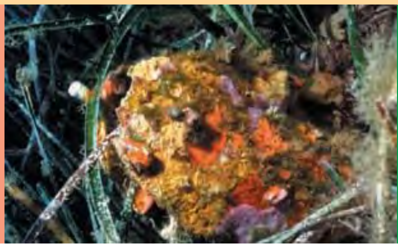
NUMBER	PLACE	SUBJECT	COPYRIGHT	DATE

Several photographs corresponding to habitats, seascapes and species were taken during the MedKeyHabitat surveys. Photos are available in the APPENDIX E of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

UNITED NATIONS ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN
REGIONAL ACTIVITY CENTRE FOR SPECIALLY PROTECTED AREAS
(RAC/SPA)

STANDARD DATA-ENTRY FORM (SDF) FOR NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST IN MT0000102




UNEP
RAC/SPA-TUNIS, 2002

1. SITE IDENTIFICATION

1.1. SITE CODE

M	T	0	0	0	0	1	0	2

1.2. IDENTIFICATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	0	9

1.3. COMPILATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	1	1

1.4. UPDATE

Y	Y	Y	Y	M	M

1.5. RESPONDENT(S):

1.6. SITE NAME:

Żona fil-Baħar fl-inħawi ta' Għar Lapsi u ta' Filfla

2. SITE LOCATION

2.1. SITE CENTRE LOCATION:

LONGITUDE

E 14 25 26

W/E (Greenwich)

LATITUDE

35 48 14

2.2. AREA (ha):

Terrestrial area:	,
Marine area:	538,47
TOTAL AREA:	538,47

2.3. SITE LENGTH(Km):

,

2.4. ALTITUDE/DEPTH (m):

	+/- MINIMUM	MAXIMUM	MEAN
Altitude:			
Depth:	0	-50	

2.5. ADMINISTRATIVE REGION:

CODE	REGION NAME	%COVER

Marine area not covered by a NUTS-region	

3. ECOLOGICAL INFORMATION

3.1. GENERAL SITE CHARACTER:

	% cover
COASTAL AREAS	
Coastal wetlands (lagoons, estuaries, deltas, salt works)	
Salt marshes	
Coastal sand dunes, Sand beaches, Shingle beaches	
Sea cliffs and Rocky shores	
Mud flats and Sand flats	
Scrub, Maquis and Garrigue, Phrygana	
Forests	
Agricultural land	
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	
MARINE AREAS	
Hard beds	X
Rocks	X
Muds	
Sands	X
Gravels	
Stones and pebbles	X
Seagrass meadows	X
Caves	
Other Sea bottom areas	X

Other site characteristics:

The site is composed by the island of Filfla and the respective shoreline in the island of Malta.
The seafloor of Filfla is characterized by a relevant presence of rocks and detritic sediment. Rocks are mainly colonised by photophilic algae (biocenosis of infralittoral algae) with enclaves of coralligenous in the shaded zones.
On the seafloor corresponding to the island of Malta, the shallowest waters are generally characterised by hard bottom with photophilic communities (biocenosis of infralittoral algae) and *Posidonia oceanica* meadow in mosaic with dead matte. Gradually, the component of hard bottom with rocky outcrops shifts into soft bottom partially colonised by *Posidonia oceanica* meadows. Moving offshore, detritic bottom becomes predominant.

Percentage* cover for the habitats for which a biocenosis was not attributable:

Detritic bottom: 40%
Soft bottom – Sand: 3%
Soft bottom – Potential detritic bottom: 4%

Percentage* cover for the biocenosis are reported in the follow page.

* Percentage is calculated with reference to the investigated area (see "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*", MedKeyHabitats II Project n°6/2019_SPA RAC).

3.2. HABITAT types present on the site and their assessment :

3.2.a. MARINE HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE				%COVER			REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS			VULNERABILITY		
III	5	1			2	4	A	B	C	D	A	B	C	A	B	C	A	B	C
III	6	1			1	9	A	B	C	D	A	B	C	A	B	C	A	B	C
III	6	1	35		1	0	A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C
							A	B	C	D	A	B	C	A	B	C	A	B	C

Please copy page if necessary

3.2.b. COASTAL AND WETLAND HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS		
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C

Please copy page if necessary

3.2.c. SURFACES COVERED BY OTHER HABITAT TYPES:

CODE	%COVER
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3.3. SPECIES

covered by the Reference List of Species for the selection of sites to be included in the national inventories of natural sites of conservation interest

and

their assessment:

3.3.a. MARINE FAUNA SPECIES included in the reference list of species:

CODE				NAME	POPULATION					SITE ASSESSMENT											
					RESIDENT		MIGRATORY			Population				Conservation			Endemism		Role of site		
					Breeding	Non-breed	Breeding	Wintering	Staging												
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C

Please copy page if necessary

3.3.b. MARINE FLORA SPECIES included in the reference list of species:

CODE	NAME	POPULATION	SITE ASSESSMENT: Population	SITE ASSESSMENT: Conservation	SITE ASSESSMENT: Endemism	SITE ASSESSMENT: Role of site
2 2 7 6	*Posidonia oceanica*		A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C

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3.3.c. COASTAL FAUNA SPECIES included in the reference list of species:

CODE				NAME	POPULATION					SITE ASSESSMENT											
					RESIDENT		MIGRATORY			Population				Conservation			Endemism		Isolation		
					Breeding	Non-breed	Breeding	Wintering	Staging												
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C

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3.3.d. COASTAL FLORA SPECIES included in the reference list of species:

CODE				NAME	POPULATION	SITE ASSESSMENT											
						Population				Conservation			Endemism		Isolation		
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C

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3.4. Other Important Species of Flora and Fauna:

B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION
						X	*Miniacina miniacea*		A B C D
						X	*Cladophora* sp.		A B C D
						X	*Codium bursa*		A B C D
						X	*Cystoseira* sp.		A B C D
						X	*Dictyopteris* cf. *humilis*		A B C D
						X	*Dictyopteris polypodioides*		A B C D
						X	*Dictyota dichotoma*		A B C D
						X	*Flabellia petiolata*		A B C D
						X	*Halimeda tuna*		A B C D
						X	*Halopteris* sp.		A B C D
						X	*Lithophyllum stictaeforme*		A B C D
						X	*Mesophyllum expansum*		A B C D
						X	*Padina pavonia*		A B C D
						X	*Palmophyllum crassum*		A B C D
						X	*Peyssonnelia rubra*		A B C D
						X	*Peyssonnelia* spp.		A B C D
						X	*Peyssonnelia squamaria*		A B C D
						X	*Pseudochlorodesmis furcellata*		A B C D
						X	*Sargassum* sp.		A B C D
						X	*Sphaerococcus coronopifolius*		A B C D
						X	*Sporochnus pedunculatus*		A B C D
						X	*Stypocaulon scoparium*		A B C D
						X	*Valonia* sp.		A B C D
						X	*Zonaria tournefortii*		A B C D
					X		*Agelas oroides*		A B C D
					X		*Chondrosia reniformis*		A B C D
					X		*Clathrina coriacea*		A B C D
					X		*Cliona schmidti*		A B C D
					X		*Cliona* sp.		A B C D
					X		*Crella pulvinar*		A B C D
					X		*Cymbaxinella damicornis*		A B C D
					X		*Dendroxea* sp.		A B C D
					X		*Haliclona mucosa*		A B C D
					X		*Ircinia oros*		A B C D
					X		*Ircinia variabilis*		A B C D
					X		*Petrosia ficiformis*		A B C D
					X		*Pleraplysilla spinifera*		A B C D
					X		*Sarcotragus spinosulus*		A B C D
					X		*Spirastrella cunctatrix*		A B C D
					X		*Terpios fugax*		A B C D
					X		*Astroides calycularis*		A B C D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

3.4. Other Important Species of Flora and Fauna:

GROUP B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION
					X		*Caryophyllia inornata*		A B C D
					X		*Cladopsammia rolandi*		A B C D
					X		*Leptopsammia pruvoti*		A B C D
					X		*Madracis pharensis*		A B C D
					X		*Paracyathus pulchellus*		A B C D
					X		*Phyllangia americana mouchezi*		A B C D
					X		*Scleractinia* n.d.		A B C D
					X		*Dyalichone* sp.		A B C D
					X		*Hermodice carunculata*		A B C D
					X		*Protula* sp.		A B C D
					X		*Protula tubularia*		A B C D
					X		*Serpula vermicularis*		A B C D
					X		*Felimare tricolor*		A B C D
					X		*Felimida krohni*		A B C D
					X		*Thuridilla hopei*		A B C D
					X		*Adeonella calveti*		A B C D
					X		*Myriapora truncata*		A B C D
					X		*Schizomavella mamillata*		A B C D
					X		*Halocynthia papillosa*		A B C D
					X		*Microcosmus sabatieri*		A B C D
					X		*Centrostephanus longispinus*		A B C D
					X		*Ophidiaster ophidianus*		A B C D
				X			*Apogon imberbis*		A B C D
				X			*Chromis chromis*		A B C D
				X			*Coris julis*		A B C D
				X			*Diplodus vulgaris*		A B C D
				X			*Sarpa salpa*		A B C D
				X			*Scorpaena maderensis*		A B C D
				X			*Serranus cabrilla*		A B C D
				X			*Serranus scriba*		A B C D
				X			*Sparisoma cretense*		A B C D
				X			*Symphodus mediterraneus*		A B C D
				X			*Symphodus roissali*		A B C D
				X			*Thalassoma pavo*		A B C D
									A B C D
									A B C D
									A B C D
									A B C D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

4. SITE DESCRIPTION

4.1. QUALITY AND IMPORTANCE:

The biocenosis of infralittoral algae is extremely rich as regards the species inhabiting it. Facies and associations of the coralligenous biocenosis in enclave are present in the in shaded areas of the rocky coastal zone.

The *Posidonia oceanica* meadow is deemed to be the most important habitat in the Mediterranean both by its extent and the part it plays (I) at the ecological level, (II) at the sedimentary level and (III) at the economic level. It is also an excellent indicator of the overall quality of the natural environment and intervenes in mitigating climate change (imprisoning big amounts of carbon within the matte).

4.2. CONSERVATION STATUS:

Special Areas of Conservation (SAC, Council Directive 92/42/EEC of 21 May 1992).

Potentially suitable area for the creation of a MPA (Marine Protected Area).

4.3. VULNERABILITY:

Coralligenous assemblages in Malta are mostly found in enclaves in biocenosis the infralittoral algae, with rather hemi-sciaphilous species and never show important arborescent or erect forms. The coralligenous assemblages investigated does not show high impacts due to human activities, maybe only because of the absence of erect forms where fishing gear can get stuck.

Despite the interdiction of carrying out activities linked with fishing, the heavy presence of abandoned fishing gears may suggest the important presence of an illegal fishing activity around the island of Fifla.

4.4. SITE DESIGNATION (remarks concerning quantitative data below):

The island of Filfla, was a target practice area for the US and English Navy until the ‘80s. Since 1987 the area around the island had experienced some degree of protection due to the G.N. 473 of 1987 and the Local Notice to Mariners 16 of 1987 which prohibited berthing and navigation of any craft within an area of one nautical mile of radius off Filfla, as well as swimming, carrying out underwater activities and any other activities connected with fishing and trawling.

4.5. OWNERSHIP:

Public

4.6. DOCUMENTATION:

AIS Environmental Limited., 2006. Marine Scientific Surveys around Filfla for its Conservation. 2006. Reports from AIS Environmental Limited for the Maltese Environmental Protection Agency. Structural Funds Project for Malta – 2004-2006. Project Part –financed by the European Union - European Regional Development Fund - ERDF Project – Co-financing rate 73 %

AIS Environmental Ltd. & Malta Environment and Planning Authority. 2006. Marine Scientific Surveys around Filfla for its conservation. Acoustic and Video Report, September 2006. Structural Funds Programme Malta 2004 – 2006.

Borg, J.A.; Dimech, M. & Schembri, P.J. 2004. Report on a survey of the marine infralittoral benthic habitats in the Dwejra/Qawra area (Gozo, Maltese Islands) made in August – September 2004. Survey commissioned by Nature Trust and the Malta Environment and Planning Authority.

Borg, J., Mallia, A., Pirotta, K., Shembri, P., & Vassallo, A. (1997). A Preliminary Report on the Marine Macrobenthos and the Demersal Fish Fauna of the Island of Filfla (Maltese islands, Central mediterranean). The Central Mediterranean Naturalist, 2(4), p. 136-151.

Fisheries Control Directorate, 2013. Fisheries Management Plan. Fisheries Control Directorate, Ministry for the Environment, Sustainable Development and Climate Change. Department of Fisheries and Aquaculture, Marsa, Malta.

Francour P., Ganteaume A., Poulain P., 1999. Effects of boat anchoring in Posidonia oceanica seagrass beds in the Port-Cros National Park (north-western Mediterranean Sea). Aquatic Conservation Marine and Freshwater Ecosystems, 9(4): 391-400.

Garrabou, J., Kipson, S., Kaleb, S., Kruzic, P., Jaklin, A., Zuljevic, A., . . . Zupan, D. (2014). Monitoring Protocol for Reefs – Coralligenous community. Tunis: MedMPAnet Project.

MEPA – Malta Environment and Planning Authority, 2006b. State of the Environment Report 2005. Sub-report 4: Land: 16pp.

UNEP-MAP-RAC/SPA,2008. Action plan for the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea. Tunis: Ed. RAC/SPA. 1–21 p.

4.7. HISTORY:

Date	Field Changed	Description

5. SITE PROTECTION STATUS AND RELATION WITH OTHER SITES:

5.1. DESIGNATION TYPES at National and sub-national level:

CODE	%COVER	CODE	%COVER	CODE	%COVER

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or sub-national level:

TYPE CODE	SITE NAME	OVERLAP TYPE	OVERLAP %COVER

designated at the International level:

TYPE	SITE CODE (if appropriate)	SITE NAME	OVERLAP TYPE	OVERLAP %COVER
World Heritage Site:				
Biosphere Reserve:				
Ramsar Convention:				
Biogenetic Reserve:				
Eurodiploma Site:				
Barcelona Convention - SPA:				
Barcelona Convention - SPAMI:				
Natura2000-Special Protection Area:				
Natura2000-Special Area for Conser	MT0000102	Żona fil-Baħar fl-inħawi ta' Għar Lapsi u ta' Filfla		
Bern Convention: Emerald site				
Other:				

6. HUMAN ACTIVITIES IN AND AROUND THE SITE

6.1. IMPACTS / ACTIVITIES AND PROPORTION OF THE SURFACE AREA OF THE SITE AFFECTED:

IMPACTS AND ACTIVITIES WITHIN THE SITE:

CODE			INTENSITY			% OF SITE			INFLUENCE			CODE			INTENSITY			% OF SITE			INFLUENCE		
2	2	0	A						+	0	-				A	B	C				+	0	-
2	9	0							+	0	-				A	B	C				+	0	-
7	3	0			C				+	0	-				A	B	C				+	0	-
9	5	4		B					+	0	-				A	B	C				+	0	-
									+	0	-				A	B	C				+	0	-
									+	0	-				A	B	C				+	0	-

IMPACTS AND ACTIVITIES AROUND THE SITE:

CODE			INTENSITY			INFLUENCE			CODE			INTENSITY			INFLUENCE		
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-

6.2. SITE MANAGEMENT:

BODY(IES) RESPONSIBLE FOR THE SITE MANAGEMENT AND OTHER INSTITUTIONS INVOLVED:

Maltese Environment and Resources Authority (ERA)
Specially Protected Areas Regional Activity Centre (SPA/RAC)

SITE MANAGEMENT AND PLANS:

A monitoring network for the coralligenous assemblages was initiated in 2020 in Stork Rock (Filfla, 14°24.654’ N, 35°46.823’ E)in compliance with the protocol proposed by Garrabou et al., 2014 and with the deployment of an underwater temperature logger set to record temperature every 2 hours for 9 years.

7. MAP OF THE SITE

- **Physical map:**

NATIONAL MAP NUMBER	SCALE	PROJECTION

REFERENCE TO AVAILABILITY OF BOUNDARIES IN DIGITISED FORM

- **Map of designated sites described in 5:**

Habitat map are available in the APPENDIX A of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

- **Aerial photograph(s) included:**

☐ YES ☒ NO

NUMBER	AREA	SUBJECT	COPYRIGHT	DATE

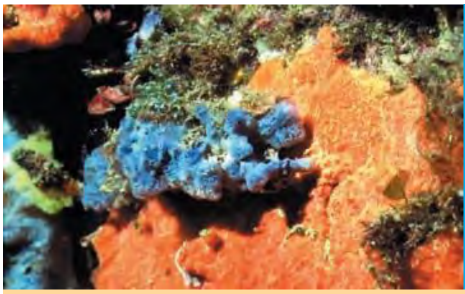
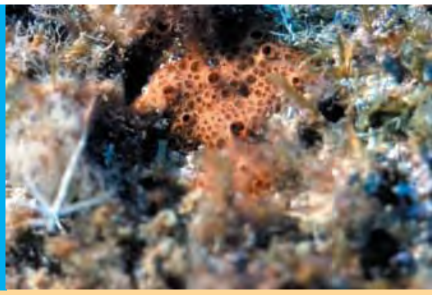
8. SLIDES

NUMBER	PLACE	SUBJECT	COPYRIGHT	DATE

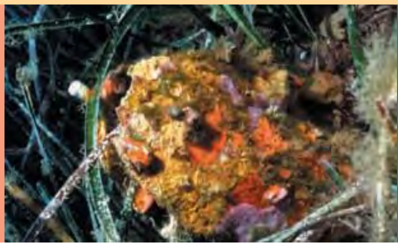
Several photographs corresponding to habitats, seascapes and species were taken during the MedKeyHabitat surveys. Photos are available in the APPENDIX E of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

UNEP

UNITED NATIONS ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN
REGIONAL ACTIVITY CENTRE FOR SPECIALLY PROTECTED AREAS
(RAC/SPA)

STANDARD DATA-ENTRY FORM (SDF) FOR NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST IN MT0000103




UNEP
RAC/SPA-TUNIS, 2002

1. SITE IDENTIFICATION

1.1. SITE CODE

M	T	0	0	0	0	1	0	3

1.2. IDENTIFICATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	0	9

1.3. COMPILATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	1	1

1.4. UPDATE

Y	Y	Y	Y	M	M

1.5. RESPONDENT(S):

1.6. SITE NAME:

Żona fil-Baħar fl-inħawi tad-Dwejra (Għawdex)

2. SITE LOCATION

2.1. SITE CENTRE LOCATION:

LONGITUDE: E 14 11 13 (W/E (Greenwich))

LATITUDE: 36 03 08

2.2. AREA (ha):

Terrestrial area:						,		
Marine area:			1	3	7	,	1	8
TOTAL AREA:			1	3	7	,	1	8

2.3. SITE LENGTH(Km):

			,				

2.4. ALTITUDE/DEPTH (m):

	+/-	MINIMUM				MAXIMUM				MEAN			
Altitude:													
Depth:					0		-	5	0				

2.5. ADMINISTRATIVE REGION:

CODE	REGION NAME	%COVER
	Marine area not covered by a NUTS-region	

3. ECOLOGICAL INFORMATION

3.1. GENERAL SITE CHARACTER:

	% cover
COASTAL AREAS Acetabularia acetabulum	
Coastal wetlands (lagoons, estuaries, deltas, salt works)	
Salt marshes	
Coastal sand dunes, Sand beaches, Shingle beaches	
Sea cliffs and Rocky shores	
Mud flats and Sand flats	
Scrub, Maquis and Garrigue, Phrygana	
Forests	
Agricultural land	
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	
MARINE AREAS	
Hard beds	X
Rocks	X
Muds	
Sands	X
Gravels	X
Stones and pebbles	
Seagrass meadows	X
Caves	
Other Sea bottom areas	X

Other site characteristics:

Dwejra Bay is located in the west side of Gozo Island. The shallowest waters are generally characterized by the biocenosis of infrallitoral algae on rocks. Moving offshore, rocks are substituted by soft bottom, mainly composed by detritic sediment. The most sheltered zones (Dwejra Bay and San Lorenzo Bay) are mainly colonised by the biocenosis of the *Posidonia oceanica* meadow in mosaic with dead matte.

Percentage* cover for the habitats for which a biocenosis was not attributable:

Rocky outcrops: 2%
Soft bottom – Sand: 1%
Detritic Bottom: 32%

Percentage* cover for the biocenoses are reported in the follow page.

* Percentage is calculated with reference to the investigated area (see "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*", MedKeyHabitats II Project n°6/2019_SPA RAC).

3.2. HABITAT types present on the site and their assessment :

3.2.a. MARINE HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY	RELATIVE SURFACE	CONSERVATION STATUS	VULNERABILITY
III 5 1	6	A B C D	A B C	A B C	A B C
III 6 1	3 5	A B C D	A B C	A B C	A B C
III 6 1 35	2 3	A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C
		A B C D	A B C	A B C	A B C

Please copy page if necessary

3.2.b. COASTAL AND WETLAND HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS		
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C

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3.2.c. SURFACES COVERED BY OTHER HABITAT TYPES:

CODE	%COVER
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.	

3.3. SPECIES

covered by the Reference List of Species for the selection of sites to be included in the national inventories of natural sites of conservation interest

and

their assessment:

3.3.a. MARINE FAUNA SPECIES included in the reference list of species:

CODE	NAME	POPULATION: RESIDENT Breeding	RESIDENT Non-breed	MIGRATORY Breeding	MIGRATORY Wintering	MIGRATORY Staging	SITE ASSESSMENT: Population	Conservation	Endemism	Role of site
3 0 1 1	*Paracentrotus lividus*						A B C D	A B C	Y N	A B C
3 0 2 1	*Epinephelus marginatus*						A B C D	A B C	Y N	A B C
3 0 0 7	*Spongia officinalis*						A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C

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3.3.b. MARINE FLORA SPECIES included in the reference list of species:

CODE	NAME	POPULATION	SITE ASSESSMENT: Population	Conservation	Endemism	Role of site
2 2 7 6	*Posidonia oceanica*		A B C D	A B C	Y N	A B C
	Sargassum acinarium		A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C

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3.3.c. COASTAL FAUNA SPECIES included in the reference list of species:

CODE	NAME	POPULATION					SITE ASSESSMENT			
		RESIDENT		MIGRATORY			Population	Conservation	Endemism	Isolation
		Breeding	Non-breed	Breeding	Wintering	Staging				
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C

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3.3.d. COASTAL FLORA SPECIES included in the reference list of species:

CODE				NAME	POPULATION	SITE ASSESSMENT											
						Population				Conservation			Endemism		Isolation		
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C

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3.4. Other Important Species of Flora and Fauna:

B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION
						X	*Miniacina miniacea*		A B C D
						X	*Acetabularia acetabulum*		A B C D
						X	*Amphiroa rigida*		A B C D
						X	*Anadyomene stellata*		A B C D
						X	*Asparagopsis taxiformis*		A B C D
						X	*Carpomitra costata*		A B C D
						X	*Caulerpa racemosa* var. *cylindracea*		A B C D
						X	*Cladophora* sp.		A B C D
						X	*Codium bursa*		A B C D
						X	*Cystoseira* sp.		A B C D
						X	*Dictyopteris* cf. *humilis*		A B C D
						X	*Dictyopteris polypodioides*		A B C D
						X	*Dictyota* cf. *implexa*		A B C D
						X	*Dictyota dichotoma*		A B C D
						X	*Flabellia petiolata*		A B C D
						X	*Halimeda tuna*		A B C D
						X	*Halopteris* sp.		A B C D
						X	*Lithophyllum stictiforme*		A B C D
						X	*Mesophyllum expansum*		A B C D
						X	*Padina pavonia*		A B C D
						X	*Palmophyllum crassum*		A B C D
						X	*Peyssonnelia rubra*		A B C D
						X	*Peyssonnelia* spp.		A B C D
						X	*Peyssonnelia squamaria*		A B C D
						X	*Phyllariopsis brevipes*		A B C D
						X	*Sargassum* sp.		A B C D
						X	*Sphaerococcus coronopifolius*		A B C D
						X	*Sporochnus pedunculatus*		A B C D
						X	*Valonia* sp.		A B C D
						X	*Zanardinia typus*		A B C D
						X	*Zonaria tournefortii*		A B C D
						X	*Agelas oroides*		A B C D
					X		*Chondrosia reniformis*		A B C D
					X		*Clathrina coriacea*		A B C D
					X		*Cliona rhodensis*		A B C D
					X		*Cliona schmidti*		A B C D
					X		*Cliona* sp.		A B C D
					X		*Crambe crambe*		A B C D
					X		*Crella pulvinar*		A B C D
					X		*Cymbaxinella damicornis*		A B C D
					X		*Dendroxea* sp.		A B C D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

3.4. Other Important Species of Flora and Fauna:

B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION
					X		*Haliclona fulva*		A B C D
					X		*Haliclona mucosa*		A B C D
					X		*Hexadella racovitzai*		A B C D
					X		*Ircinia oros*		A B C D
					X		*Ircinia variabilis*		A B C D
					X		*Petrosia ficiformis*		A B C D
					X		*Phorbas fictitious*		A B C D
					X		*Phorbas tenacior*		A B C D
					X		*Pleraplysilla spinifera*		A B C D
					X		*Scalarispongia scalaris*		A B C D
					X		*Spirastrella cunctatrix*		A B C D
					X		*Terpios fugax*		A B C D
					X		*Caryophyllia inornata*		A B C D
					X		*Cladopsammia rolandi*		A B C D
					X		*Leptopsammia pruvoti*		A B C D
					X		*Madracis pharensis*		A B C D
					X		*Paracyathus pulchellus*		A B C D
					X		*Phyllangia americana mouchezi*		A B C D
					X		*Dyalichone* sp.		A B C D
					X		*Hermodice carunculata*		A B C D
					X		*Protula* sp.		A B C D
					X		*Protula tubularia*		A B C D
					X		*Serpula vermicularis*		A B C D
					X		*Adeonella calveti*		A B C D
					X		*Hornera frondiculata*		A B C D
					X		*Myriapora truncata*		A B C D
					X		*Reteporella grimaldii*		A B C D
					X		*Schizomavella mamillata*		A B C D
					X		*Aplidium* sp.		A B C D
					X		*Halocynthia papillosa*		A B C D
					X		*Pycnoclavella communis*		A B C D
					X		*Centrostephanus longispinus*		A B C D
					X		*Hacelia attenuata*		A B C D
					X		*Sphaerechinus granularis*		A B C D
					X		*Calcinua tubularis*		A B C D
					X		*Dardanus calidus*		A B C D
				X			*Anthias anthias*		A B C D
				X			*Apogon imberbis*		A B C D
				X			*Atherina* sp.		A B C D
				X			*Chromis chromis*		A B C D
				X			*Coris julis*		A B C D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

3.4. Other Important Species of Flora and Fauna:

GROUP							SCIENTIFIC NAME	POPULATION	MOTIVATION			
B	M	A	R	F	I	P						
				X			*Diplodus annularis*		A	B	C	D
				X			*Diplodus vulgaris*		A	B	C	D
				X			*Gobius cruentatus*		A	B	C	D
				X			*Scorpaena maderensis*		A	B	C	D
				X			*Scorpaena notata*		A	B	C	D
				X			*Serranus cabrilla*		A	B	C	D
				X			*Serranus scriba*		A	B	C	D
				X			*Sparisoma cretense*		A	B	C	D
				X			*Spicara maena*		A	B	C	D
				X			*Symphodus mediterraneus*		A	B	C	D
				X			*Symphodus ocellatus*		A	B	C	D
				X			*Tripterygion delaisi*		A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

4. SITE DESCRIPTION

4.1. QUALITY AND IMPORTANCE:

The biocenosis of infralittoral algae is extremely rich as regards to the species inhabiting it. Facies and associations of the coralligenous biocenosis in enclave are present in the in shaded areas of the rocky coastal zone. Photophilic algae cover rocks, in alternation with *Posidonia oceanica* on the most sheltered areas (i.e. bays), from very shallow waters up to 40-50 meters depth. This is the predominant habitat on hard substrates within the site, showing sometimes important associations with *Sargassum* ssp. and *Cystoseira* ssp., both including protected species listed in the SPA/BD Protocol.

4.2. CONSERVATION STATUS:

Special Areas of Conservation (SAC, Council Directive 92/42/EEC of 21 May 1992).

Potentially suitable area for the creation of a MPA (Marine Protected Area).

4.3. VULNERABILITY:

San Lorenzo Bay, where *Posidonia oceanica* is found in mosaic with dead matte, is strongly frequented by touristic boats and vessels used for recreational purposes, anchoring everywhere in the Bay. The current presence of Posidonia in the whole Bay, however, even if patched with dead matte, may be index that the plant is still healthy (or, at least, that the plant resists) and that a proper management may favour a recolonisation.
The most frequently observed signs of human activities were fishing gears (both active and abandoned).

4.4. SITE DESIGNATION (remarks concerning quantitative data below):

A significant presence of rocky outcrops was detected by the Side Scan Sonar in the northern and southern portions of Dwejra. Those outcrops appear as structures ranging from few meters to hundreds of meters and emerge from detritic soft bottoms, potentially acting as local hotspots of biodiversity. The rocky outcrops area could need further biological investigations (e.g. species inventory).

4.5. OWNERSHIP:

Public

4.6. DOCUMENTATION:

Borg, J.A.; Dimech, M. & Schembri, P.J. 2004. Report on a survey of the marine infralittoral benthic habitats in the Dwejra/Qawra area (Gozo, Maltese Islands) made in August – September 2004. Survey commissioned by Nature Trust and the Malta Environment and Planning Authority.

Fisheries Control Directorate, 2013. Fisheries Management Plan. Fisheries Control Directorate, Ministry for the Environment, Sustainable Development and Climate Change. Department of Fisheries and Aquaculture, Marsa, Malta.

Francour P., Ganteaume A., Poulain P., 1999. Effects of boat anchoring in Posidonia oceanica seagrass beds in the Port-Cros National Park (north-western Mediterranean Sea). Aquatic Conservation Marine and Freshwater Ecosystems, 9(4): 391-400.

MEPA – Malta Environment and Planning Authority, 2006b. State of the Environment Report 2005. Sub-report 4: Land: 16pp.

UNEP-MAP-RAC/SPA,2008. Action plan for the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea. Tunis: Ed. RAC/SPA. 1–21 p.

4.7. HISTORY:

Date	Field Changed	Description

5. SITE PROTECTION STATUS AND RELATION WITH OTHER SITES:

5.1. DESIGNATION TYPES at National and sub-national level:

CODE	%COVER	CODE	%COVER	CODE	%COVER

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or sub-national level:

TYPE CODE	SITE NAME	OVERLAP TYPE	OVERLAP %COVER

designated at the International level:

TYPE	SITE CODE (if appropriate)	SITE NAME	OVERLAP TYPE	OVERLAP %COVER
World Heritage Site:				
Biosphere Reserve:				
Ramsar Convention:				
Biogenetic Reserve:				
Eurodiploma Site:				
Barcelona Convention - SPA:				
Barcelona Convention - SPAMI:				
Natura2000-Special Protection Area:				
Natura2000-Special Area for Conser	MT0000103	Żona fil-Baħar fl-inħawi tad-Dwejra		
Bern Convention: Emerald site				
Other:				

6. HUMAN ACTIVITIES IN AND AROUND THE SITE

6.1. IMPACTS / ACTIVITIES AND PROPORTION OF THE SURFACE AREA OF THE SITE AFFECTED:

IMPACTS AND ACTIVITIES WITHIN THE SITE:

CODE	INTENSITY	% OF SITE	INFLUENCE	CODE	INTENSITY	% OF SITE	INFLUENCE
2 2 0	A		+ 0 -		A B C		+ 0 -
2 9 0	B		+ 0 -		A B C		+ 0 -
6 9 0			+ 0 -		A B C		+ 0 -
9 5 4	B		+ 0 -		A B C		+ 0 -
			+ 0 -		A B C		+ 0 -
			+ 0 -		A B C		+ 0 -

IMPACTS AND ACTIVITIES AROUND THE SITE:

CODE	INTENSITY	INFLUENCE	CODE	INTENSITY	INFLUENCE
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -

6.2. SITE MANAGEMENT:

BODY(IES) RESPONSIBLE FOR THE SITE MANAGEMENT AND OTHER INSTITUTIONS INVOLVED:

Maltese Environment and Resources Authority (ERA)
Specially Protected Areas Regional Activity Centre (SPA/RAC)

SITE MANAGEMENT AND PLANS:

7. MAP OF THE SITE

- **Physical map:**

NATIONAL MAP NUMBER	SCALE	PROJECTION

REFERENCE TO AVAILABILITY OF BOUNDARIES IN DIGITISED FORM

- **Map of designated sites described in 5:**

Habitat map are available in the APPENDIX A of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

- **Aerial photograph(s) included:**

☐ YES ☒ NO

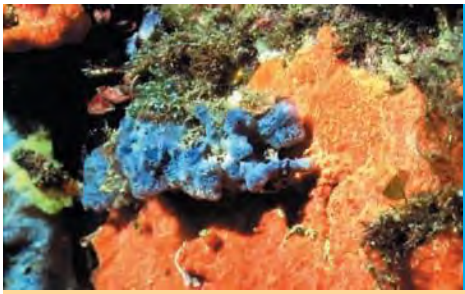
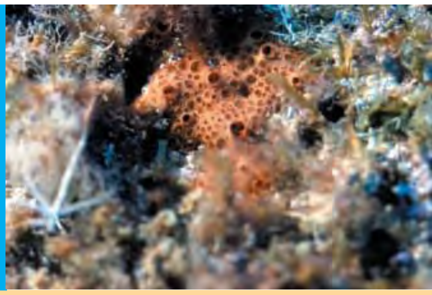
NUMBER	AREA	SUBJECT	COPYRIGHT	DATE

8. SLIDES

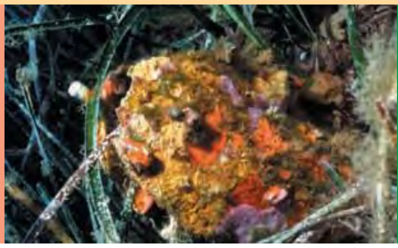
NUMBER	PLACE	SUBJECT	COPYRIGHT	DATE

Several photographs corresponding to habitats, seascapes and species were taken during the MedKeyHabitat surveys. Photos are available in the APPENDIX E of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

UNITED NATIONS ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN
REGIONAL ACTIVITY CENTRE FOR SPECIALLY PROTECTED AREAS
(RAC/SPA)

STANDARD DATA-ENTRY FORM (SDF) FOR NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST IN MT0000104




UNEP
RAC/SPA-TUNIS, 2002

1. SITE IDENTIFICATION

1.1. SITE CODE

M	T	0	0	0	0	1	0	4

1.2. IDENTIFICATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	0	9

1.3. COMPILATION DATE

Y	Y	Y	Y	M	M
2	0	2	0	1	1

1.4. UPDATE

Y	Y	Y	Y	M	M

1.5. RESPONDENT(S):

1.6. SITE NAME:

Żona fil-Baħar bejn Il-Ponta tal-Ħotba u Tal-Fessej (Għawdex)

2. SITE LOCATION

2.1. SITE CENTRE LOCATION:

LONGITUDE: E 14 15 21
W/E (Greenwich)

LATITUDE: 36 00 48

2.2. AREA (ha):

Terrestrial area:	,
Marine area:	149,95
TOTAL AREA:	149,95

2.3. SITE LENGTH(Km): ,

2.4. ALTITUDE/DEPTH (m):

	+/- MINIMUM	MAXIMUM	MEAN
Altitude:			
Depth:	0	-50	

2.5. ADMINISTRATIVE REGION:

CODE	REGION NAME	%COVER
	Marine area not covered by a NUTS-region	

3. ECOLOGICAL INFORMATION

3.1. GENERAL SITE CHARACTER:

	% cover
COASTAL AREAS	
Coastal wetlands (lagoons, estuaries, deltas, salt works)	
Salt marshes	
Coastal sand dunes, Sand beaches, Shingle beaches	
Sea cliffs and Rocky shores	
Mud flats and Sand flats	
Scrub, Maquis and Garrigue, Phrygana	
Forests	
Agricultural land	
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	
MARINE AREAS	
Hard beds	X
Rocks	X
Muds	
Sands	X
Gravels	X
Stones and pebbles	
Seagrass meadows	X
Caves	
Other Sea bottom areas	X

Other site characteristics:

Ponta Tal is located in the southern part of the island of Gozo. Hard bottom with photophilic community (biocenosis of infralittoral algae) predominates; patches of *Posidonia oceanica* on rocks are also present. Offshore the habitat shifts in a soft bottom, mainly formed by sand and detritic sediment.

Percentage* cover for the habitats for which a biocenosis was not attributable:

Soft bottom – Sand: 4%
Detritic bottom: 47%

Percentage* cover for the biocenosis are reported in the follow page.

* Percentage is calculated with reference to the investigated area (see "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*", MedKeyHabitats II Project n°6/2019_SPA RAC).

3.2. HABITAT types present on the site and their assessment :

3.2.a. MARINE HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY		RELATIVE SURFACE	CONSERVATION STATUS	VULNERABILITY
III 5 1	1	A B C	D	A B C	A B C	A B C
III 6 1	4 8	A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C

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3.2.b. COASTAL AND WETLAND HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS		
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C
		A	B	C	D	A	B	C	A	B	C

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3.2.c. SURFACES COVERED BY OTHER HABITAT TYPES:

CODE	%COVER

3.3. SPECIES

covered by the Reference List of Species for the selection of sites to be included in the national inventories of natural sites of conservation interest

and

their assessment:

3.3.a. MARINE FAUNA SPECIES included in the reference list of species:

CODE				NAME	POPULATION					SITE ASSESSMENT											
					RESIDENT		MIGRATORY			Population				Conservation			Endemism		Role of site		
					Breeding	Non-breed	Breeding	Wintering	Staging												
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C

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3.3.b. MARINE FLORA SPECIES included in the reference list of species:

CODE				NAME	POPULATION	SITE ASSESSMENT											
						Population				Conservation			Endemism		Role of site		
2	2	7	6	*Posidonia oceanica*		A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C

Please copy page if necessary

3.3.c. COASTAL FAUNA SPECIES included in the reference list of species:

CODE	NAME	POPULATION: RESIDENT		POPULATION: MIGRATORY			SITE ASSESSMENT: Population	SITE ASSESSMENT: Conservation	SITE ASSESSMENT: Endemism	SITE ASSESSMENT: Isolation
		Breeding	Non-breed	Breeding	Wintering	Staging				
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C

Please copy page if necessary

3.3.d. COASTAL FLORA SPECIES included in the reference list of species:

CODE				NAME	POPULATION	SITE ASSESSMENT											
						Population				Conservation			Endemism		Isolation		
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C

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3.4. Other Important Species of Flora and Fauna:

GROUP							SCIENTIFIC NAME	POPULATION	MOTIVATION			
B	M	A	R	F	I	P						
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

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4. SITE DESCRIPTION

4.1. QUALITY AND IMPORTANCE:

All the rocky substrata of the infralittoral stage where the conditions of the stage prevail are covered with different facies of the biocenosis of photophilous algae, an extremely rich population.

4.2. CONSERVATION STATUS:

Special Areas of Conservation (SAC, Council Directive 92/42/EEC of 21 May 1992).

4.3. VULNERABILITY:

The biocenosis of infralittoral algae on hard bottom includes associations that are very sensitive to pollution; it is also very sensitive to the quantity of suspended matter. The ichthyofauna living at the level of this biocenosis is diverse and rich; it is thus subject to heavy pressure from commercial and leisure fishing.
The most frequently observed signs of human activities were fishing gears (both active and abandoned).

4.4. SITE DESIGNATION (remarks concerning quantitative data below):

4.5. OWNERSHIP:

Public

4.6. DOCUMENTATION:

Borg, J.A.; Dimech, M. & Schembri, P.J. 2004. Report on a survey of the marine infralittoral benthic habitats in the Dwejra/Qawra area (Gozo, Maltese Islands) made in August – September 2004. Survey commissioned by Nature Trust and the Malta Environment and Planning Authority.

Fisheries Control Directorate, 2013. Fisheries Management Plan. Fisheries Control Directorate, Ministry for the Environment, Sustainable Development and Climate Change. Department of Fisheries and Aquaculture, Marsa, Malta.

Francour P., Ganteaume A., Poulain P., 1999. Effects of boat anchoring in Posidonia oceanica seagrass beds in the Port-Cros National Park (north-western Mediterranean Sea). Aquatic Conservation Marine and Freshwater Ecosystems, 9(4): 391-400.

MEPA – Malta Environment and Planning Authority, 2006b. State of the Environment Report 2005. Sub-report 4: Land: 16pp.

UNEP-MAP-RAC/SPA,2008. Action plan for the conservation of the coralligenous and other calcareous bio-concretions in the Mediterranean Sea. Tunis: Ed. RAC/SPA. 1–21 p.

4.7. HISTORY:

Date	Field Changed	Description

5. SITE PROTECTION STATUS AND RELATION WITH OTHER SITES:

5.1. DESIGNATION TYPES at National and sub-national level:

CODE	%COVER	CODE	%COVER	CODE	%COVER

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or sub-national level:

TYPE CODE	SITE NAME	OVERLAP TYPE	OVERLAP %COVER

designated at the International level:

TYPE	SITE CODE (if appropriate)	SITE NAME	OVERLAP TYPE	OVERLAP %COVER
World Heritage Site:				
Biosphere Reserve:				
Ramsar Convention:				
Biogenetic Reserve:				
Eurodiploma Site:				
Barcelona Convention - SPA:				
Barcelona Convention - SPAMI:				
Natura2000-Special Protection Area:				
Natura2000-Special Area for Conser	MT0000104	Żona fil-Baħar bejn Il-Ponta tal-Ħotba u Tal-Fessej		
Bern Convention: Emerald site				
Other:				

6. HUMAN ACTIVITIES IN AND AROUND THE SITE

6.1. IMPACTS / ACTIVITIES AND PROPORTION OF THE SURFACE AREA OF THE SITE AFFECTED:

IMPACTS AND ACTIVITIES WITHIN THE SITE:

CODE			INTENSITY			% OF SITE			INFLUENCE			CODE			INTENSITY			% OF SITE			INFLUENCE		
2	2	0	A						+	0	-				A	B	C				+	0	-
2	9	0		B					+	0	-				A	B	C				+	0	-
9	5	4		B					+	0	-				A	B	C				+	0	-
									+	0	-				A	B	C				+	0	-
									+	0	-				A	B	C				+	0	-
									+	0	-				A	B	C				+	0	-

IMPACTS AND ACTIVITIES AROUND THE SITE:

CODE			INTENSITY			INFLUENCE			CODE			INTENSITY			INFLUENCE		
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-
			A	B	C	+	0	-				A	B	C	+	0	-

6.2. SITE MANAGEMENT:

BODY(IES) RESPONSIBLE FOR THE SITE MANAGEMENT AND OTHER INSTITUTIONS INVOLVED:

Maltese Environment and Resources Authority (ERA)
Specially Protected Areas Regional Activity Centre (SPA/RAC)

SITE MANAGEMENT AND PLANS:

7. MAP OF THE SITE

- **Physical map:**

NATIONAL MAP NUMBER	SCALE	PROJECTION

REFERENCE TO AVAILABILITY OF BOUNDARIES IN DIGITISED FORM

- **Map of designated sites described in 5:**

Habitat map are available in the APPENDIX A of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

- **Aerial photograph(s) included:**

☐ YES ☒ NO

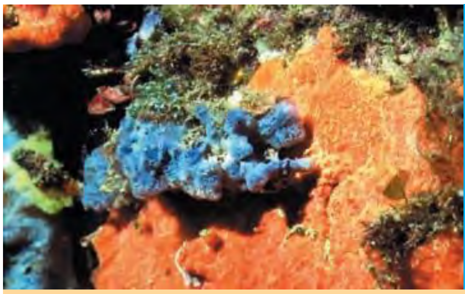
NUMBER	AREA	SUBJECT	COPYRIGHT	DATE

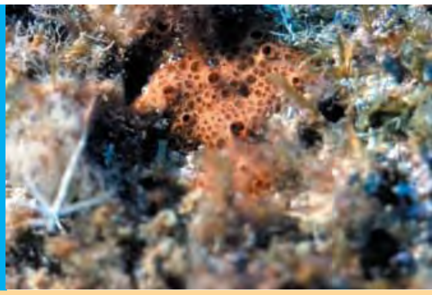
8. SLIDES

NUMBER	PLACE	SUBJECT	COPYRIGHT	DATE

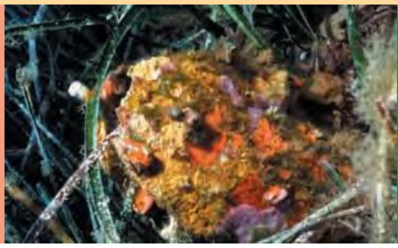
Several photographs corresponding to habitats, seascapes and species were taken during the MedKeyHabitat surveys. Photos are available in the APPENDIX E of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

UNITED NATIONS ENVIRONMENT PROGRAMME
MEDITERRANEAN ACTION PLAN
REGIONAL ACTIVITY CENTRE FOR SPECIALLY PROTECTED AREAS
(RAC/SPA)





STANDARD DATA-ENTRY FORM (SDF) FOR NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST IN MT0000105



UNEP
RAC/SPA-TUNIS, 2002

1. SITE IDENTIFICATION

1.1. SITE CODE

M T 0 0 0 0 1 0 5

1.2. IDENTIFICATION DATE

2 0 2 0 0 9

Y Y Y Y M M

1.3. COMPILATION DATE

2 0 2 0 1 1

Y Y Y Y M M

1.4. UPDATE

Y Y Y Y M M

1.5. RESPONDENT(S):

1.6. SITE NAME:

Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u Il-Qaliet

2. SITE LOCATION

2.1. SITE CENTRE LOCATION:

LONGITUDE

E 1 4 | 2 1 | 4 7

W/E (Greenwich)

LATITUDE

3 6 | 0 1 | 1 5

2.2. AREA (ha):

Terrestrial area:	,
Marine area:	1 0 3 7 , 0 4
TOTAL AREA:	1 0 3 7 , 0 4

2.3. SITE LENGTH(Km):

,

2.4. ALTITUDE/DEPTH (m):

	+/- MINIMUM	MAXIMUM	MEAN
Altitude:			
Depth:	0	- 3 0	

2.5. ADMINISTRATIVE REGION:

CODE	REGION NAME	%COVER

Marine area not covered by a NUTS-region	

3. ECOLOGICAL INFORMATION

3.1. GENERAL SITE CHARACTER:

	% cover
COASTAL AREAS	
Coastal wetlands (lagoons, estuaries, deltas, salt works)	
Salt marshes	
Coastal sand dunes, Sand beaches, Shingle beaches	
Sea cliffs and Rocky shores	
Mud flats and Sand flats	
Scrub, Maquis and Garrigue, Phrygana	
Forests	
Agricultural land	
Other land (including Towns, Villages, Roads, Waste places, Mines, Industrial sites)	
MARINE AREAS	
Hard beds	X
Rocks	X
Muds	
Sands	X
Gravels	
Stones and pebbles	
Seagrass meadows	X
Caves	X
Other Sea bottom areas	X

Other site characteristics:

The *Posidonia oceanica* meadows are the most common habitat in this site, which reflects the normal situation for the Mediterranean Sea, where Posidonia meadows are the climax habitat of the infralittoral soft bottoms. Among the observed meadows, the ones located in the bays of the island of Malta (i.e. Salini Bay, St. Paul's Bay and Mellieha Bay) are not in a situation of whole meadow, but in a mosaic with dead matte, whereas in the ones of the island of Gozo (i.e. Ramla Bay, Dahlet Bay, San Blas Bay) *Posidonia oceanica* appears in most cases in conditions of whole meadows. Only in Ramla Bay, offshore was observed the association with *Cymodocea nodosa* on sandy bottom.

Percentage* cover for the habitats for which a biocenosis was not attributable:

Soft bottom – Sand: 7,7%
Soft bottom – Muddy sand: 14,8%

Percentage* cover for the biocenosis are reported in the follow page.

* Percentage is calculated with reference to the investigated area (see "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*", MedKeyHabitats II Project n°6/2019_SPA RAC).

3.2. HABITAT types present on the site and their assessment :

3.2.a. MARINE HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY		RELATIVE SURFACE	CONSERVATION STATUS	VULNERABILITY
III 5 1	7 3, 7	A B C	D	A B C	A B C	A B C
III 6 1	3, 5	A B C	D	A B C	A B C	A B C
III 2 2	0, 2	A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C
		A B C	D	A B C	A B C	A B C

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3.2.b. COASTAL AND WETLAND HABITAT TYPES AS FROM THE REFERENCE LIST OF MARINE AND COASTAL HABITAT TYPES FOR THE SELECTION OF SITES TO BE INCLUDED IN THE NATIONAL INVENTORIES OF NATURAL SITES OF CONSERVATION INTEREST:

CODE	%COVER	REPRESENTATIVITY				RELATIVE SURFACE			CONSERVATION STATUS		
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C
.		A	B	C	D	A	B	C	A	B	C

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3.2.c. SURFACES COVERED BY OTHER HABITAT TYPES:

CODE	%COVER
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3.3. SPECIES

covered by the Reference List of Species for the selection of sites to be included in the national inventories of natural sites of conservation interest

and

their assessment:

3.3.a. MARINE FAUNA SPECIES included in the reference list of species:

CODE				NAME	POPULATION: RESIDENT		POPULATION: MIGRATORY			SITE ASSESSMENT: Population				Conservation			Endemism		Role of site		
					Breeding	Non-breed	Breeding	Wintering	Staging												
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C
										A	B	C	D	A	B	C	Y	N	A	B	C

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3.3.b. MARINE FLORA SPECIES included in the reference list of species:

CODE	NAME	POPULATION	SITE ASSESSMENT Population	Conservation	Endemism	Role of site
2276	*Posidonia oceanica*		A B C D	A B C	Y N	A B C
2278	*Cymodocea nodosa*		A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C
			A B C D	A B C	Y N	A B C

Please copy page if necessary

3.3.c. COASTAL FAUNA SPECIES included in the reference list of species:

CODE	NAME	POPULATION					SITE ASSESSMENT			
		RESIDENT		MIGRATORY			Population	Conservation	Endemism	Isolation
		Breeding	Non-breed	Breeding	Wintering	Staging				
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C
							A B C D	A B C	Y N	A B C

Please copy page if necessary

3.3.d. COASTAL FLORA SPECIES included in the reference list of species:

CODE				NAME	POPULATION	SITE ASSESSMENT											
						Population				Conservation			Endemism		Isolation		
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C
						A	B	C	D	A	B	C	Y	N	A	B	C

Please copy page if necessary

3.4. Other Important Species of Flora and Fauna:

B	M	A	R	F	I	P	SCIENTIFIC NAME	POPULATION	MOTIVATION
						X	*Miniacina miniacea*		A B C D
						X	*Amphiroa rigida*		A B C D
						X	*Caulerpa racemosa* var. *cylindracea*		A B C D
						X	*Cladophora* sp.		A B C D
						X	*Corallina elongata*		A B C D
						X	*Dasycladus vermicularis*		A B C D
						X	*Dictyota* cf. *implexa*		A B C D
						X	*Dictyota dichotoma*		A B C D
						X	*Flabellia petiolata*		A B C D
						X	*Halimeda tuna*		A B C D
						X	*Halopteris* sp.		A B C D
						X	*Jania rubens*		A B C D
						X	*Padina pavonia*		A B C D
						X	*Palmophyllum crassum*		A B C D
						X	*Penicillus capitatus*		A B C D
						X	*Peyssonnelia rubra*		A B C D
						X	*Peyssonnelia* spp.		A B C D
						X	*Peyssonnelia squamaria*		A B C D
						X	*Valonia* sp.		A B C D
						X	*Zanardinia typus*		A B C D
						X	*Zonaria tournefortii*		A B C D
					X		*Chondrosia reniformis*		A B C D
					X		*Cliona celata*		A B C D
					X		*Cliona viridis*		A B C D
					X		*Dysidea fragilis*		A B C D
					X		*Ircinia variabilis*		A B C D
					X		*Petrosia ficiformis*		A B C D
					X		*Phorbas fictitious*		A B C D
					X		*Scalarispongia scalaris*		A B C D
					X		*Spirastrella cunctatrix*		A B C D
					X		*Spongia officinalis*		A B C D
					X		*Terpios fugax*		A B C D
					X		*Astroides calycularis*		A B C D
					X		*Arenicola* spp.		A B C D
					X		*Dyalichone* sp		A B C D
					X		*Hermodice carunculata*		A B C D
					X		*Protula tubularia*		A B C D
					X		*Serpula vermicularis*		A B C D
					X		*Elysia timida*		A B C D
					X		*Felimare tricolor*		A B C D
					X		*Gastrochaena dubia*		A B C D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

3.4. Other Important Species of Flora and Fauna:

GROUP							SCIENTIFIC NAME	POPULATION	MOTIVATION			
B	M	A	R	F	I	P						
					X		Lamprohaminoea ovalis		A	B	C	D
					X		Octopus vulgaris		A	B	C	D
					X		Thuridilla hopei		A	B	C	D
					X		Myriapora truncata		A	B	C	D
					X		Microcosmus sabatieri		A	B	C	D
					X		Echinaster sepositus		A	B	C	D
					X		Arbacia lixula		A	B	C	D
					X		Maja crispata		A	B	C	D
				X			Coris julis		A	B	C	D
				X			Apogon imberbis		A	B	C	D
				X			Boops boops		A	B	C	D
				X			Chromis chromis		A	B	C	D
				X			Diplodus annularis		A	B	C	D
				X			Diplodus vulgaris		A	B	C	D
				X			Parablennius rouxi		A	B	C	D
				X			Serranus cabrilla		A	B	C	D
				X			Serranus scriba		A	B	C	D
				X			Sparisoma cretense		A	B	C	D
				X			Tripterygion delaisi		A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
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									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D
									A	B	C	D

(M = Mammals, B = Birds, R = Reptiles, A = Amphibians, F = Fishes, I = Invertebrates, P = Plants)

Please copy page if necessary

4. SITE DESCRIPTION

4.1. QUALITY AND IMPORTANCE:

The *Posidonia oceanica* meadow is deemed to be the most important habitat in the Mediterranean both by its extent and the part it plays (I) at the ecological level, (II) at the sedimentary level and (III) at the economic level. It is also an excellent indicator of the overall quality of the natural environment and intervenes in mitigating climate change (imprisoning big amounts of carbon within the matte).

4.2. CONSERVATION STATUS:

Special Areas of Conservation (SAC, Council Directive 92/42/EEC of 21 May 1992).

4.3. VULNERABILITY:

The main potential threats to *Posidonia oceanica* are linked to coastal development, to pleasure boating (anchoring), and to the exploiting of living resources (trawling, fish farming). From the analyses of the sonograms provided by the Side Scan Sonar, some potential signs of anchoring were detected in Mellieha Bay and St. Paul's Bay. One of those signs was also confirmed by visual observations.

Aquaculture cages were observed in Mellieha Bay and St. Paul's Bay. Their presence may contribute to threat the marine habitats of the bays by eutrophication. However, at present, there are no evidences of ongoing impacts potentially directly caused by the aquaculture cages.

One of the most frequently observed signs of human activities were fishing gears (both active and abandoned).

4.4. SITE DESIGNATION (remarks concerning quantitative data below):

Among the observed meadows, the ones located in the island of Malta (i.e. Salini Bay, St. Paul's Bay and Mellieha Bay) show more signs of sufferance (i.e. regression), or at least past regressions. This is particularly evident by sediment strips entering the bays and giving the meadows a U-shape parallel to the shoreline, where the middle of the bay is colonised by bare sediment even if the depth and the sediment itself may be considered compatible with the presence of *Posidonia ocenanica*. Also, in all the three bays, most of the living Posidonia is not in a situation of whole meadow, but in a mosaic with dead matte. The situation is generally different in the bays of the island of Gozo, where *Posidonia oceanica* appears in most cases in conditions of whole meadows. It is noteworthy, however, that Gozo is generally less anthropized than Malta and that the depth in the bays of Gozo is significantly lower than that of the bays in the island of Malta.

4.5. OWNERSHIP:

Public

4.6. DOCUMENTATION:

Diaz-Almela E., Marbà N., Duarte C.M., 2006. Consequences of Mediterranean warming events in seagrass (*Posidonia oceanica*) flowering records. *Global Change Biology*, 13: 224-235.

Fisheries Control Directorate, 2013. Fisheries Management Plan. Fisheries Control Directorate, Ministry for the Environment, Sustainable Development and Climate Change. Department of Fisheries and Aquaculture, Marsa, Malta.

Francour P., Ganteaume A., Poulain P., 1999. Effects of boat anchoring in *Posidonia oceanica* seagrass beds in the Port-Cros National Park (north-western Mediterranean Sea). *Aquatic Conservation Marine and Freshwater Ecosystems*, 9(4): 391-400.

MEPA – Malta Environment and Planning Authority, 2006b. State of the Environment Report 2005. Sub-report 4: Land: 16pp.

Pergent, G. (2007). Protocol for the setting up of Posidonia meadows monitoring systems. RAC/SPA - TOTAL Corporate Foundation for Biodiversity and the Sea.

Sánchez Lizaso J.L., Guillén Nieto J.E. & Ramos Esplá A.A., 1990. The regression of *Posidonia oceanica* meadows in El Campello (Spain). *Rapp. Comm. int. Mer Médit.* 32 (1) B-I 10:7.

Vu M.T., Lacroix Y., Nguyen V.T., 2017. Investigating the impacts of the regression of Posidonia oceanica on hydrodynamics and sediment transport in Giens Gulf. *Ocean Engineering*, 146: 70-86.

4.7. HISTORY:

Date	Field Changed	Description

5. SITE PROTECTION STATUS AND RELATION WITH OTHER SITES:

5.1. DESIGNATION TYPES at National and sub-national level:

CODE	%COVER	CODE	%COVER	CODE	%COVER

5.2. RELATION OF THE DESCRIBED SITE WITH OTHER SITES:

designated at National or sub-national level:

TYPE CODE	SITE NAME	OVERLAP TYPE	OVERLAP %COVER

designated at the International level:

TYPE	SITE CODE (if appropriate)	SITE NAME	OVERLAP TYPE	OVERLAP %COVER
World Heritage Site:				
Biosphere Reserve:				
Ramsar Convention:				
Biogenetic Reserve:				
Eurodiploma Site:				
Barcelona Convention - SPA:				
Barcelona Convention - SPAMI:				
Natura2000-Special Protection Area:				
Natura2000-Special Area for Conser	MT0000105	Żona fil-Baħar bejn il-Ponta ta' San Dimitri (Għawdex) u Il-Qaliet		
Bern Convention: Emerald site				
Other:				

6. HUMAN ACTIVITIES IN AND AROUND THE SITE

6.1. IMPACTS / ACTIVITIES AND PROPORTION OF THE SURFACE AREA OF THE SITE AFFECTED:

IMPACTS AND ACTIVITIES WITHIN THE SITE:

CODE	INTENSITY	% OF SITE	INFLUENCE	CODE	INTENSITY	% OF SITE	INFLUENCE
2 2 0	A		+ 0 -		A B C		+ 0 -
2 9 0	B		+ 0 -		A B C		+ 0 -
6 9 0	B		+ 0 -		A B C		+ 0 -
9 5 4	B		+ 0 -		A B C		+ 0 -
			+ 0 -		A B C		+ 0 -
			+ 0 -		A B C		+ 0 -

IMPACTS AND ACTIVITIES AROUND THE SITE:

CODE	INTENSITY	INFLUENCE	CODE	INTENSITY	INFLUENCE
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -
	A B C	+ 0 -		A B C	+ 0 -

6.2. SITE MANAGEMENT:

BODY(IES) RESPONSIBLE FOR THE SITE MANAGEMENT AND OTHER INSTITUTIONS INVOLVED:

Maltese Environment and Resources Authority (ERA)
Specially Protected Areas Regional Activity Centre (SPA/RAC)

SITE MANAGEMENT AND PLANS:

A monitoring network for a *Posidonia oceanica* meadow was initiated in 2020 in Melieha Bay (35°58.4921' N, 14°21.9182' E) in compliance with the protocol proposed by Pergent et al., 2007.

7. MAP OF THE SITE

- **Physical map:**

NATIONAL MAP NUMBER	SCALE	PROJECTION

REFERENCE TO AVAILABILITY OF BOUNDARIES IN DIGITISED FORM

- **Map of designated sites described in 5:**

Habitat map are available in the APPENDIX A of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

- **Aerial photograph(s) included:**

☐ YES ☒ NO

NUMBER	AREA	SUBJECT	COPYRIGHT	DATE

8. SLIDES

NUMBER	PLACE	SUBJECT	COPYRIGHT	DATE

Several photographs corresponding to habitats, seascapes and species were taken during the MedKeyHabitat surveys. Photos are available in the APPENDIX E of the report of Phase III prepared by Golder in 2020 titled "*Mapping of marine key habitats and assessing their vulnerability to fishing activities in Malta*" (MedKeyHabitats II Project n°6/2019_SPA RAC).

APPENDIX H

Laboratory testing reports

MERIEUX NutriSciences

CHELAB S.R.L.

Granulometria per setacciatura

Identificazione interna campione	226888_01
Operatore	AO

CURVA GRANULOMETRICA COMPLESSIVA	% SUL SECCO	Incertezza di misura %
Passante a 5mm	**100,00**	**0,00**
Passante a 2mm	**99,91**	**0,09**
Passante a 1mm	**99,77**	**0,15**
Passante a 0,5mm	**99,58**	**0,20**
Passante a 0,25mm	**97,90**	**0,44**
Passante a 0,125mm	**82,73**	**1,16**
Passante a 0,063mm	**15,55**	**1,11**

CHELAB S.R.L.

CLASSI GRANULOMETICHE	% SUL SECCO
Ghiaia fine 4-8mm	**0,00**
Ghiaia molto fine 2-4mm	**0,09**
Sabbia molto grossa 1-2mm	**0,14**
Sabbia grossa 0,5-1mm	**0,19**
Sabbia media 0,25-0,5mm	**1,68**
Sabbia fine 0,125-0,25mm	**15,17**
Sabbia molto fine 0,063-0,125mm	**67,18**
Limo e Argilla < 0,063mm	**15,55**

Dal confronto fra i dati sopra riportati e le specifiche tessiturali USDA e del metodo ISO 14688-2:2017 il campione risulta essere riconducibile a	**Terreno Sabbioso**

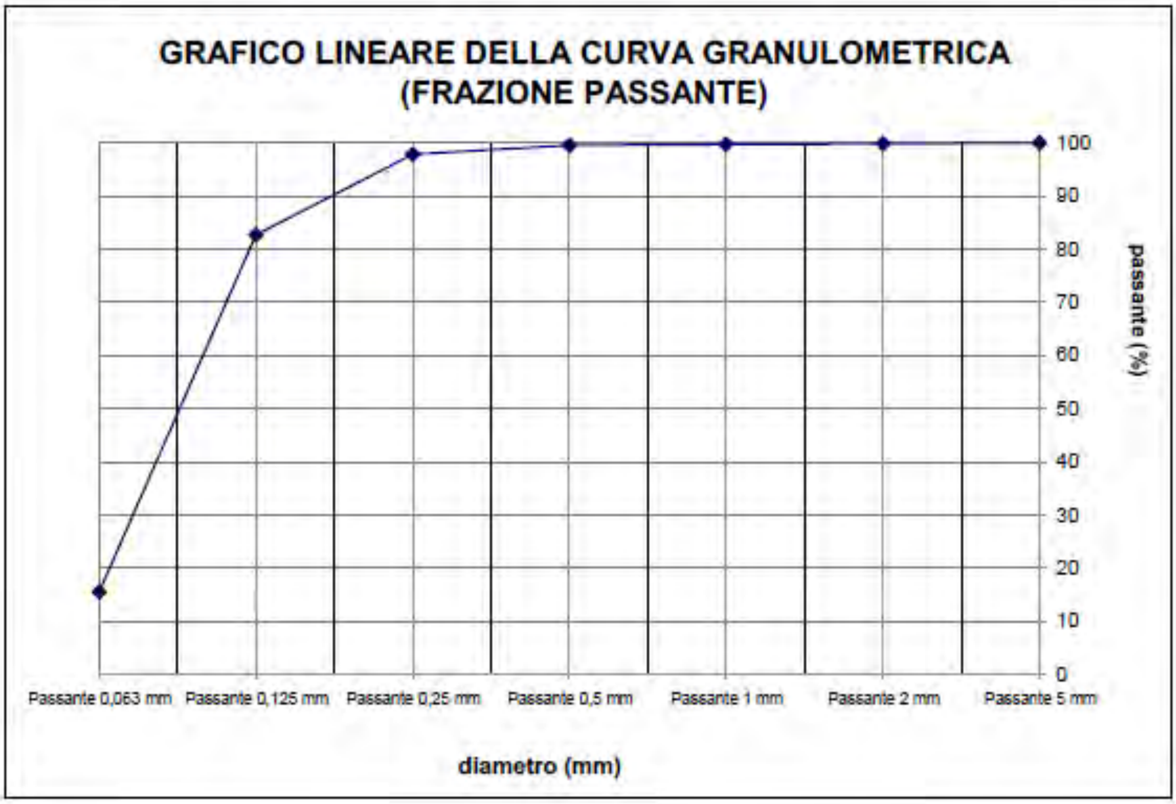


GRAFICO A TORTA DELLE CLASSI GRANULOMETRICHE SECONDO WENTWORTH

MERIEUX NutriSciences
CHELAB S.R.L.

Spett.le
GOLDER ASSOCIATES SRL
VIA BANFO, 43
10100 TORINO TO
Fax +39 (011) 856950

11/11/2020

Gentile Cliente,

Vi inviamo ¤ il(i) rapporto(i) di prova, ¤ relazione(i) seguente(i):

Customer SmpName: Sedimento Posidonia Lab ID: 01/226888 Report n°: 1082691/20

Cogliamo l'occasione per porgerVi i nostri più cordiali saluti e Vi ringraziamo per aver collaborato con noi.

CHELAB S.r.l

Responsabile
prove chimiche e biologiche

ORDINE DEI CHIMICI DEL PIEMONTE e VALLE D'AOSTA
NERVA MARIO CARLO
Iscrizione 2237 Sez. A
CHIMICO

CHELAB S.R.L.

LAB N° 0094 L

RAPPORTO DI PROVA n° 1082691/20

Cliente	GOLDER ASSOCIATES SRL
Indirizzo	VIA BANFO, 43 10100 TORINO (TO)
Prime Contractor	GOLDER ASSOCIATES SRL
Progetto/Contratto	19126259
Base/Sito	-
Matrice	Sedimento
Data ricevimento	02-nov-20
Identificazione del Cliente	Sedimento Posidonia
Identificazione interna	01 / 226888 RS: VO20SR0009941 INT: VO20IN0012244 QC Type N
Data emissione Rapporto di Prova	11-nov-20
Data Prelievo	10-set-20
Procedura di Campionamento	A cura del Committente ref verbale COC_226888

Parametro Analizzato	Valore e IM	UM	MDL	R %	Data Analisi Inizio Fine
Residui a diverse temperature					
Metodo di Prova CNR IRSA 2 Q 64 Vol 2 1984					
0 A residuo a 550°C	95,0 ± 4,8	%	0,80		06/11/20 - 06/11/20

* = Prova non accreditata da ACCREDIA. 0 = Prova eseguita presso stazione permanente, I = Prova eseguita presso stazione temporanea II = Prova eseguita presso stazione mobile, III = Prova eseguita fuori stazione
A = Prova eseguita presso il Laboratorio di Volpiano (TO) 10088, Corso Europa 600/A - ITALIA.
B = Prova eseguita presso il Laboratorio di Sannazzaro De' Burgondi (PV) 27039, Via E.Mattei, 46 - ITALIA.
C = Prova eseguita presso il Laboratorio di Uta (CA) c/o CACIP - 6 Strada Ovest snc (Loc. Macchiareddu) - ITALIA.
E = Prova eseguita in campo - Sede Settimo Torinese (TO) 10036, Via Pietro Nenni, 75 - ITALIA
FE = Prova eseguita presso il Laboratorio di Ferrara (FE) 44100, Piazzale G. Donegani, 12 - ITALIA.
S = Prova eseguita presso Laboratorio Terzo in subappalto.
RE = Prova eseguita presso il Laboratorio di Resana (TV) 31023, Via Castellana, 118A - ITALIA, con riferimento ad accreditamento ACCREDIA n° 0051 L
PL = Prova eseguita presso il Laboratorio di Priolo Gargallo (SR) 96010, Contrada Biggemi - ITALIA, con riferimento ad accreditamento ACCREDIA n° 0953 L.

Il numero di contrassegno dei parametri indica la categoria nella quale rientrano le prove oggetto dell'Accreditamento ACCREDIA di questo Laboratorio. L'accreditamento ACCREDIA costituisce un indice di competenza tecnica e gestionale del Laboratorio e non costituisce una garanzia rilasciata da ACCREDIA sulle singole prestazioni eseguite dal Laboratorio. In caso di alterazione del campione il laboratorio declina ogni responsabilità sui risultati che possono essere influenzati dallo scostamento nel caso il cliente chieda comunque l'esecuzione dell'analisi. Nel caso il campionamento non sia stato effettuato dal personale del laboratorio i risultati ottenuti si considerano riferiti al campione così come ricevuto e il laboratorio declina la propria responsabilità sui risultati calcolati considerando i dati di campionamento forniti dal Cliente. Il nome e i recapiti del cliente sono sempre forniti dal cliente. MDL=LOD: limite di rilevabilità, definito come la concentrazione minima misurata di una sostanza che può essere rilevata con una probabilità del 99% che sia distinguibile dai risultati del bianco del metodo. RL=LOQ: limite di quantificazione, definito come la concentrazione del punto più basso della curva di taratura, corretta per i fattori di scala (pesate, diluizioni) relativi alla Norma o Procedura richiamata; '<x' o '>x' indicano rispettivamente un valore inferiore o superiore al campo di misura della prova. L'incertezza di misura (IM) espressa, è l'incertezza estesa calcolata utilizzando un fattore di copertura pari a 2 e livello di confidenza 95%. Per la determinazione delle fibre aerodisperse si definiscono i limiti fiduciari, superiore (LFS) e inferiore (LFI) ad un livello di confidenza del 95%. Se non diversamente specificato le prove microbiologiche quantitative (esclusi MPN) su matrici ambientali liquide e solide sono eseguite su singola replica e due volumi consecutivi e l'incertezza di misura viene espressa come limite fiduciario superiore e inferiore ad un limite di confidenza del 95% conformemente alla ISO 8199:2018. I parametri preceduti dal simbolo ' - ' derivano da calcolo. R%=Recupero: i recuperi contrassegnati da '#' non sono stati utilizzati nei calcoli. Se non diversamente specificato, le sommatorie sono calcolate mediante il criterio Lower Bound (L.B.). Qualora sia presente una specifica (limiti di legge o specifiche cliente) con cui sono stati confrontati i risultati analitici, i valori esposti in grassetto indicano un risultato fuori da tale specifica. Se non diversamente specificato i giudizi di conformità/non conformità eventualmente riportati si riferiscono ai parametri analizzati e si basano sul confronto del valore con i valori di riferimento senza considerare l'intervallo di confidenza della misura o l'incertezza associata al risultato.

CHELAB S.R.L.

LAB N° 0094 L

Informazioni Aggiuntive

Si rimanda all'allegato del presente RdP n 1082691/20

Informazioni fornite dal cliente

Campionato da: Committente
Descrizione: Sedimento Posidonia
Luogo Prelievo: -
Data campionamento: 10/09/2020
Metodo campionamento: A cura del Committente ref verbale COC_226888
Ora campionamento:

Responsabile
prove chimiche e biologiche

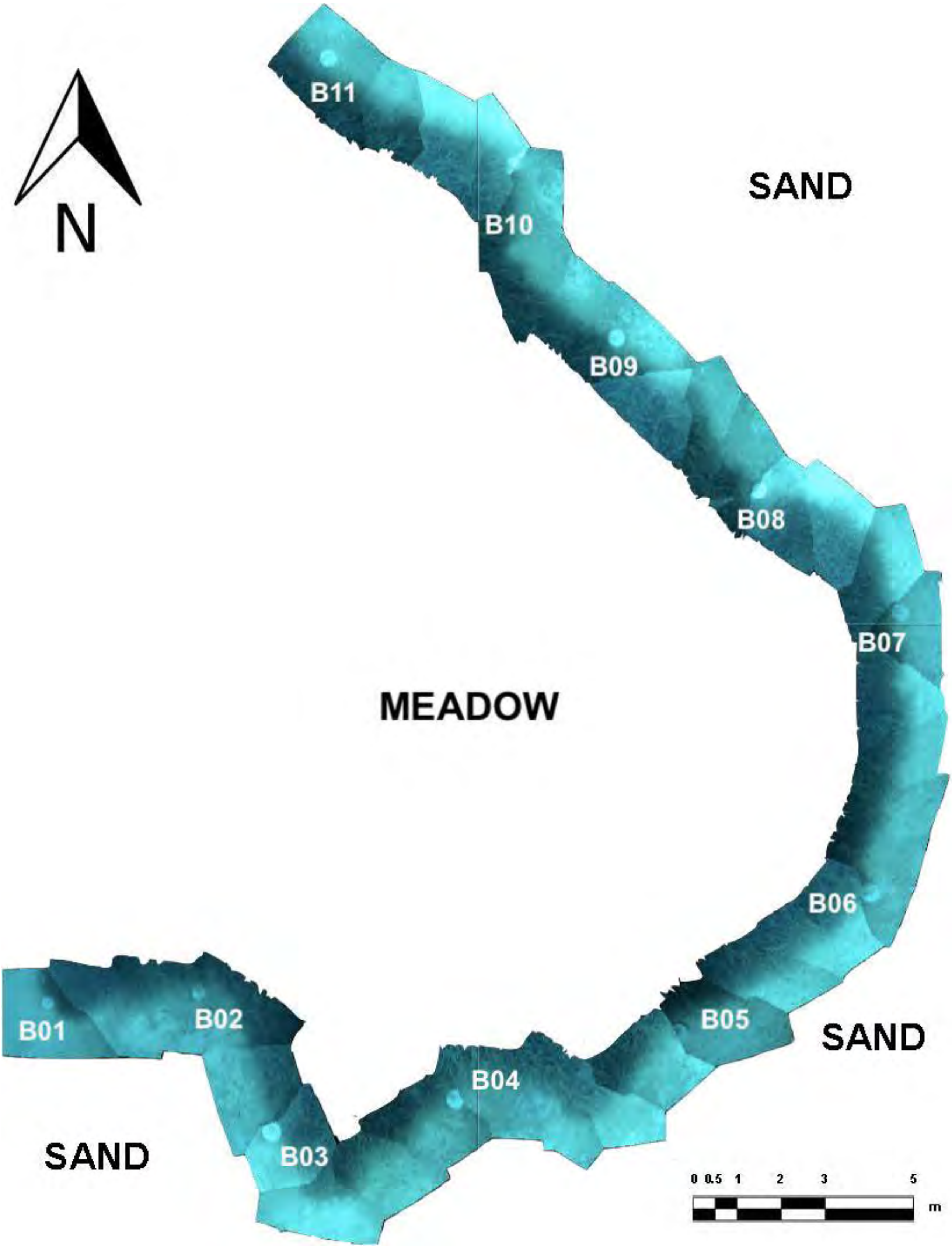
ORDINE DEI CHIMICI DEL PIEMONTE e VALLE D'AOSTA
Dott. NERVA MARIO CARLO
N. Iscrizione 2257 Sez. A
CHIMICO

FINE RAPPORTO DI PROVA

APPENDIX I

Photos and results of the initiation of the monitoring networks

Reconstruction of the lower limit of the meadow for the initiation of the monitoring network of Posidonia

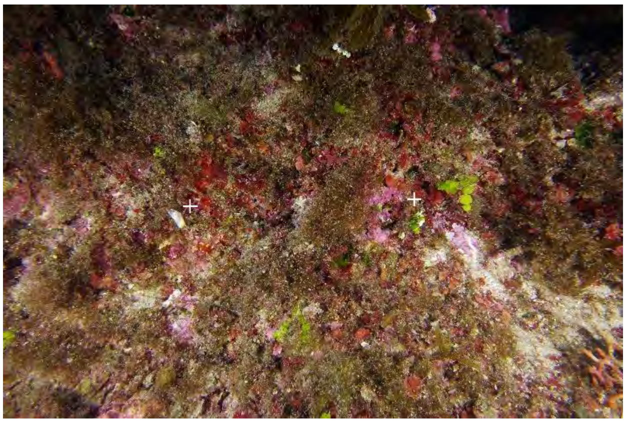

N
B11
B10
SAND
B09
B08
B07
MEADOW
B06
B01
B02
B05
SAND
B04
SAND
B03
0 0.5 1 2 3 5
m

Results of the laser-calibrated photo analyses for the initiation of the coralligenous monitoring network

Monitoring network on coralligenous assemblages at Filfla

Unit 1

Filfla_coralligeno1_01



69 x 46 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno1_02

69 x 46 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus, *Zonaria tournefortii*.

Porifera: Massive sponges n.d.

Bryozoa: *Myriapora truncata*, *Schizomavella mamillata*.

Filfla_coralligeno1_03

86 x 58 cm

Algae: Brown algae n.d., Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum, Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus, *Valonia* sp., *Zonaria tournefortii*.

Porifera: *Agelas oroides*, *Cymbaxinella damicornis*, Encrusting sponges n.d., Massive sponges n.d.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno1_04

78 x 52 cm

Algae: Brown algae n.d., Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, Massive sponges n.d.

Bryozoa: Bryozoa n.d., *Myriapora truncata*.

Filfla_coralligeno1_05

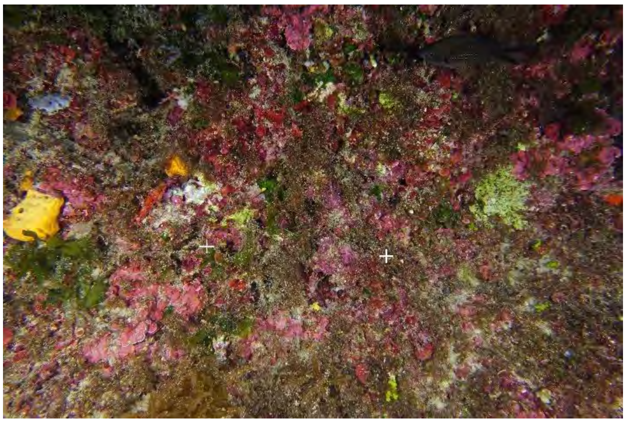
80 x 54 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Halopteris* sp., *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Cliona schmidti*, Massive sponges n.d.

Bryozoa: Bryozoa n.d., *Myriapora truncata*.

Filfla_coralligeno1_06



86 x 58 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, Massive sponges n.d.

Polychaeta: Polychaeta n.d.

Bryozoa: Bryozoa n.d., *Myriapora truncata*.

Filfla_coralligeno1_07

90 x 60 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus, *Valonia* sp.

Porifera: *Agelas oroides*.

Filfla_coralligeno1_08

84 x 56 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno1_09

71 x 48 cm

Algae: Brown algae n.d., Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Halopteris* sp., *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus, *Sargassum* sp.

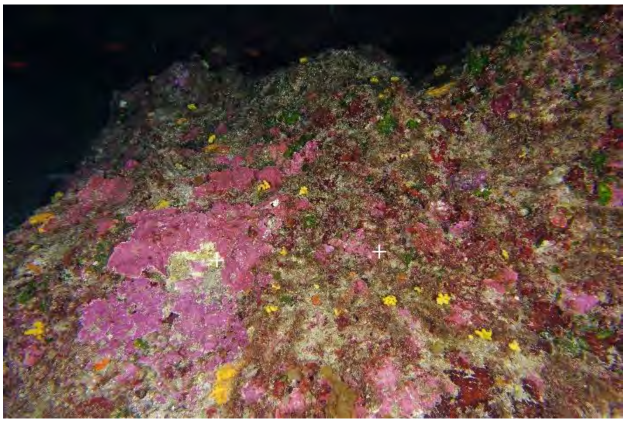
Filfla_coralligeno1_10

67 x 44 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Halopteris* sp., *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Nereia filiformis*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Unit 2

Filfla_coralligeno2_01



95 x 64 cm

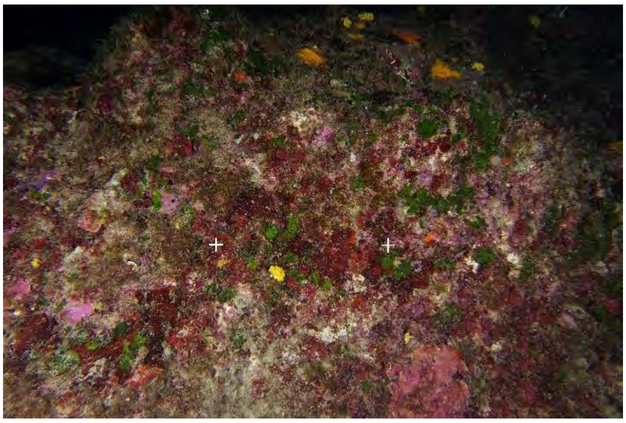
Algae: Brown algae n.d., Encrusting coralline algae, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus, *Zonaria tournefortii*.

Porifera: *Agelas oroides*, *Cliona schmidti*, *Cymbaxinella damicornis*, Massive sponges n.d.

Polychaeta: *Hermodice carunculata*.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno2_02



90 x 60 cm

Algae: Brown algae n.d., Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Cliona schmidti*, *Cymbaxinella damicornis*, Massive sponges n.d.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno2_03

97 x 64 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus, *Zonaria tournefortii*.

Porifera: *Agelas oroides*, *Cliona schmidti*, *Cymbaxinella damicornis*, Massive sponges n.d.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno2_04

83 x 56 cm

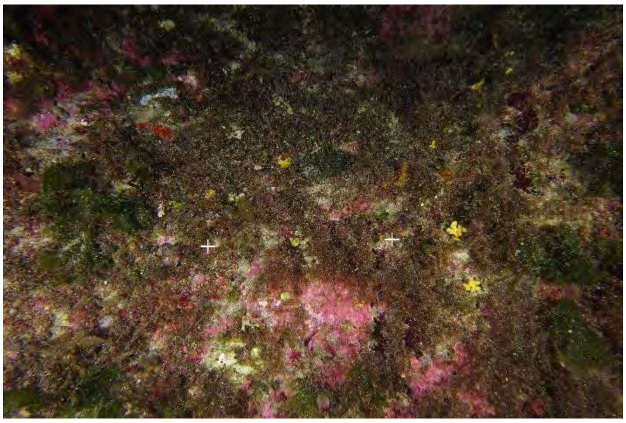
Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Cymbaxinella damicornis*, *Pleraplysilla spinifera*.

Polychaeta: *Hermodice carunculata*.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno2_05



84 x 57 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus, *Zonaria tournefortii*.

Porifera: *Cliona schmidti*, *Cymbaxinella damicornis*.

Bryozoa: *Myriapora truncata*.

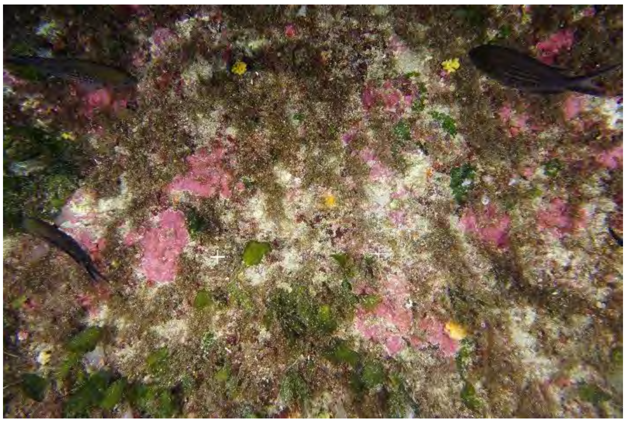
Filfla_coralligeno2_06

96 x 63 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, *Cymbaxinella damicornis*.

Filfla_coralligeno2_07



96 x 63 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, *Cymbaxinella damicornis*, Encrusting sponges n.d.

Filfla_coralligeno2_08

94 x 62 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Flabellia petiolata, Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Cliona* sp.

Cnidaria: *Caryophyllia inornata*.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno2_09

80 x 54 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, *Cliona schmidti*, *Cymbaxinella damicornis*.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno2_10

78 x 52 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Flabellia petiolata*, *Halopteris* sp., *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, *Cymbaxinella damicornis*, Massive sponges n.d.

Unit 3

Filfla_coralligeno3_01

92 x 61 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, Peyssonnelia rubra, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, *Cliona schmidti*, Encrusting sponges n.d., *Spirastrella cunctatrix*.

Bryozoa: *Madracis pharensis*.

Filfla_coralligeno3_02

90 x 60 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, Encrusting sponges n.d.

Bryozoa: *Madracis pharensis*.

Filfla_coralligeno3_03

80 x 54 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Halopteris* sp., *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*.

Mollusca: *Felimida krohni*.

Filfla_coralligeno3_04

70 x 46 cm

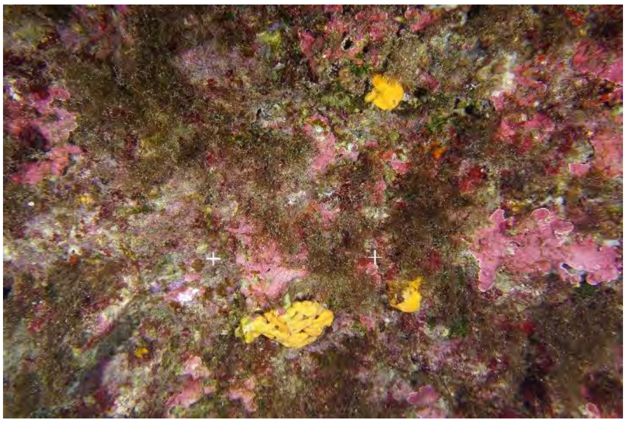
Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Halopteris* sp., *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus, *Valonia* sp.

Porifera: *Agelas oroides*, *Cymbaxinella damicornis*, Massive sponges n.d.

Bryozoa: Bryozoa n.d., *Myriapora truncata*.

Tunicata: *Halocynthia papillosa*.

Filfla_coralligeno3_05



96 x 63 cm

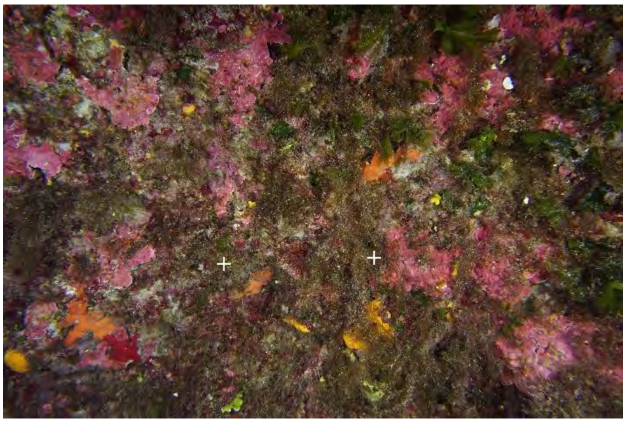
Algae: Brown algae n.d., Encrusting coralline algae, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*.

Cnidaria: *Madracis pharensis*.

Bryozoa: *Schizomavella mamillata*.

Filfla_coralligeno3_06

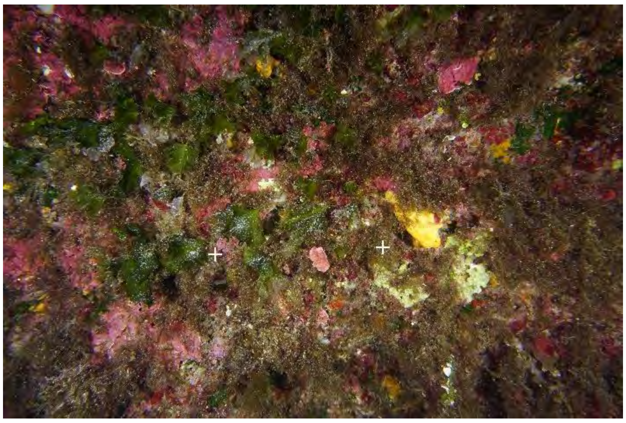


103 x 69 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, *Cymbaxinella damicornis*, Massive sponges n.d., *Spirastrella cunctatrix*.

Filfla_coralligeno3_07



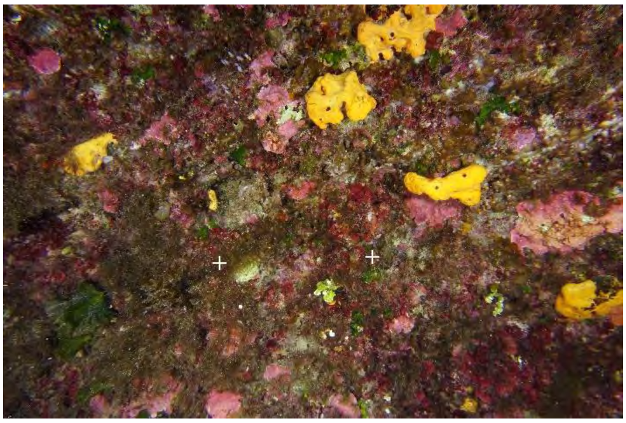
93 x 62 cm

Algae: Brown algae n.d., Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, Encrusting sponges n.d.

Bryozoa: Bryozoa n.d.

Filfla_coralligeno3_08



101 x 67 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Flabellia petiolata*, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., Red algae with soft thallus.

Porifera: *Agelas oroides*, Massive sponges n.d.

Cnidaria: *Madracis pharensis*.

Bryozoa: *Myriapora truncata*.

Filfla_coralligeno3_09

100 x 66 cm

Algae: Brown algae n.d., *Dictyopteris polypodioides*, Encrusting coralline algae, *Halimeda tuna*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., *Peyssonnelia squamaria*, *Pseudochlorodesmis furcellata*, Red algae with soft thallus, *Valonia* sp., *Zonaria tournefortii*.

Porifera: *Agelas oroides*, Massive sponges n.d., *Spirastrella cunctatrix*.

Cnidaria: *Madracis pharensis*.

Mollusca: *Felimare tricolor*.

Filfla_coralligeno3_10

89 x 60 cm

Algae: Brown algae n.d., Encrusting Corallinaceae on other algae, Encrusting coralline algae, *Flabellia petiolata*, *Lithophyllum stictiforme*, *Mesophyllum expansum*, *Palmophyllum crassum*, *Peyssonnelia rubra*, *Peyssonnelia* spp., *Pseudochlorodesmis furcellata*, Red algae with soft thallus, *Sargassum* sp., *Zonaria tournefortii*.

Porifera: *Agelas oroides*.

Bryozoa: *Myriapora truncata*.

APPENDIX J

Results of the fish counts

Species	Crocodile Rock			Fungus Rock			Ras il-Wardija			Filfla		
	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults
Apogonidae												
Apogon imberbis						1						2
Clupeidae												
Sardinella maderensis						1					1	
Labridae												
Coris julis		2	3-5		2	6-10		2	3-5		6-10	6-10
Symphodus mediterraneus												1
Symphodus ocellatus									1			1
Symphodus tinca			3-5			1			1			
Thalassoma pavo											6-10	6-10
Moronidae												

Species	Crocodile Rock			Fungus Rock			Ras il-Wardija			Filfla		
	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults
Dicentrarchus labrax									2			
Mullidae												
Mullus surmuletus						1						
Pomacentridae												
Chromis chromis	31-50	11-30	>101		11-30	61-100	61-100	11-30	>101		11-30	>101
Scaridae												
Sparisoma cretense			3-5			2			1			6-10
Serranidae												
Anthias anthias						6-10						
Epinephelus marginatus						1						
Serranus cabrilla					1	2					3-5	6-10

Species	Crocodile Rock			Fungus Rock			Ras il-Wardija			Filfla		
	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults	Juv.	Sub-ad.	Adults
Serranus scriba									3-5		1	3-5
Sparidae												
Boops boops						2						11-30
Diplodus sargus						2					1	2
Diplodus vulgaris			2						3-5			3-5
Oblada melanura						11-30						31-50
Sarpa salpa												6-10

UN environment programme

Mediterranean Action Plan
Barcelona Convention

SPA / RAC
The Mediterranean Biodiversity Centre

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