



MedMPAnet^{project}

SYNTHESIS REPORT OF THE ECOLOGICAL CHARACTERIZATION OF THE MARINE AREAS OF ENFEH PENINSULA, RAS CHEKAA AND RAOUCHEH CAVE IN LEBANON



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The MedMPAnet Project is implemented in the framework of the UNEP/MAP-GEF MedPartnership, with the financial support of EC, AECID and FFEM.



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AND RAOUCHEH CAVE IN LEBANON

MedMPAnet project

Regional Project for the Development of a
Mediterranean Marine and Coastal Protected
Areas (MPAs) Network through the boosting
of MPA creation and management

Study required and financed by:

MedMPAnet^{project}

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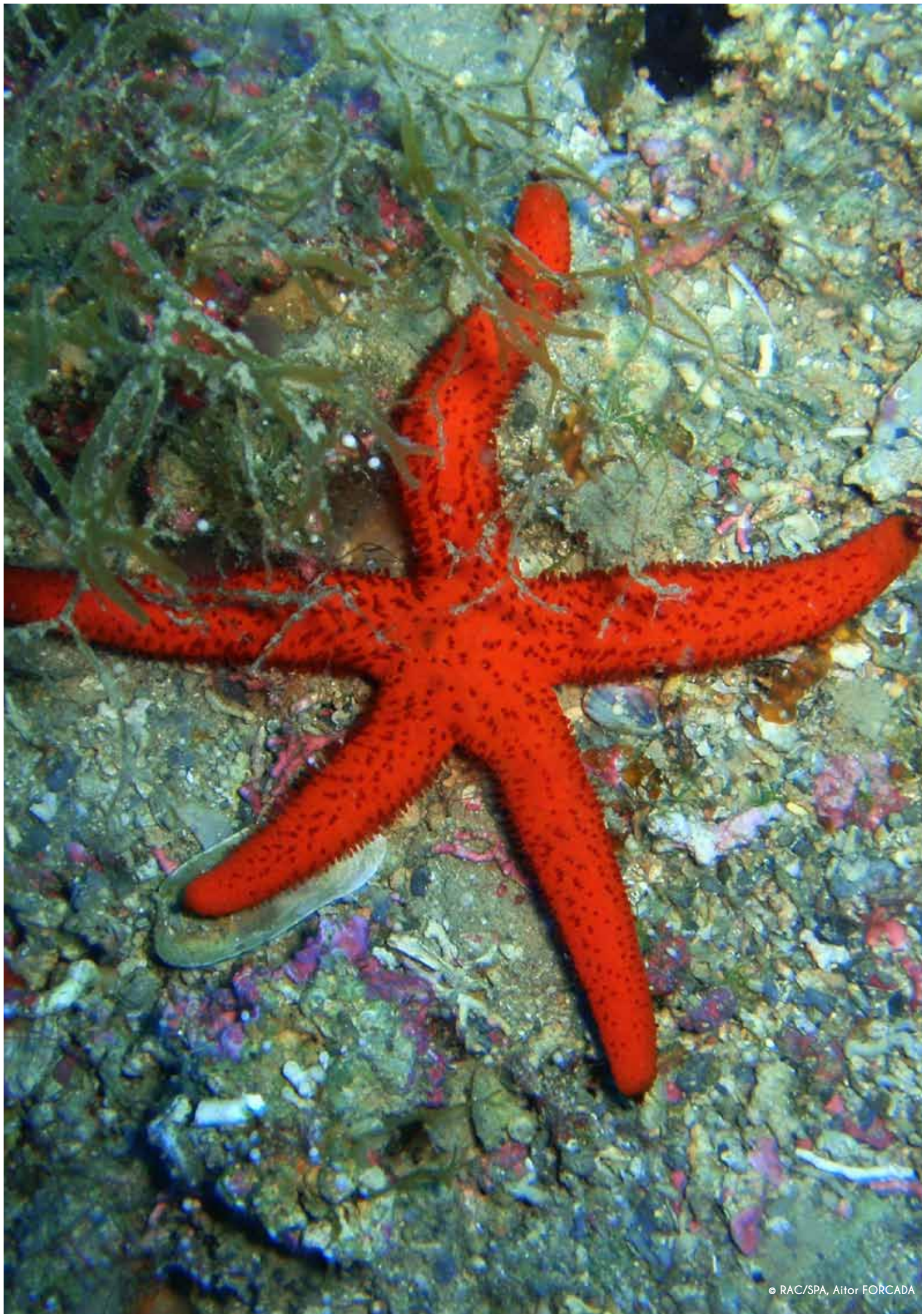
Foreword

The present document is an integral part of the MedMPAnet Project whose general objective is to enhance the effective conservation of regionally important coastal and marine biodiversity features, through the creation of an ecologically coherent MPA network in the Mediterranean region', as required by the Barcelona Convention's Protocol concerning Specially Protected Areas and Biological Diversity in the Mediterranean (SPA/BD Protocol).

The MedMPAnet project is part of the MedPartnership GEF full size project "Strategic Partnership for the Mediterranean Sea Large Ecosystem" led by UNEP. It is implemented by the Regional Activity Centre for Specially Protected Areas (UNEP/MAP-RAC/SPA) with financial support of the European Commission (EC), the Spanish Agency for International Cooperation to Development (AECID) and the French Global Environment Facility (FFEM).

The project activities aim at assisting the participating countries to implement the prioritized elements of the Strategic Action Programme for The Conservation of Biological Diversity (SAP BIO) in The Mediterranean Region (SAP-BIO) through the provision of a series of enabling activities at national, sub-regional and regional levels. With regards Lebanon, the project activities were outlined in consultation with the national authorities represented by the Ministry of State for Environment Affairs.

I. SUMMARY OF THE LEBANON ASSIGNMENT (June 2012)



1. INTRODUCTION

The Barcelona Convention and its Protocol on Specially Protected Areas and Biological Diversity (SPA/BD Protocol) in the Mediterranean recommends giving the highest priority to promoting the management of the marine areas that are to be protected and to identifying sites that contain fragile, threatened or rare habitats, in order to set up Marine Protected Areas to protect:

- representative types of coastal and marine ecosystems, of a size that will guarantee their long-term viability and conserve their biodiversity;
- habitats that are endangered within their natural area of distribution in the Mediterranean or that have a reduced natural distribution area as a result of regression or because the area is itself is restricted;
- habitats that are critical for the survival, reproduction and restoration of threatened, endangered or endemic species of flora or fauna;
- sites of particular importance because of their scientific, aesthetic, cultural or educational interest.

This is the context of this MedMPAnet project, which is part of the greater Med-GEF 'Strategic Partnership for the Greater Marine Ecosystem of the Mediterranean Sea' Partnership, commissioned by UNEP and carried out by the Regional Activity Centre for Specially Protected Areas with the financial support of the European Commission (EC), the Spanish International Cooperation Agency for Development (AECID), and the French World Environment Fund (FGEF).

The overall aim of the project is to protect important biodiversity at national, Mediterranean and international level and to promote economic development based on the sustainable management of marine and coastal natural resources.

In this project, Lebanon is one of the beneficiary countries. After consultation with the Ministry of the Environment and two visits to Lebanon (February and June 2011), a field assignment (June 2012) was suggested, with the following aims:

- speedy valorization of the marine natural habitats along the coast of the suggested areas (Enfeh, Chekaa and Raoucheh), for better appraisal
- characterization of the ecology of threatened habitats with recommendations for possible development.

To supplement and enrich knowledge of this important Mediterranean area, the project's main aims are to discover the distribution of the main marine habitats and set up tools for monitoring the state of heritage species,

enabling the effects of those protection and management strategies adopted to be judged. Thus, the assignment's objectives were:

- to explore the suggested areas (between 0 and 50 metres down), locating and generally mapping the habitats;
- to craft an updated inventory of the biodiversity of species and habitats, mainly targeting species with heritage value;
- to characterize the habitats, mainly those that are to be protected, and define their conservation status.

This information will enable an Action Plan to be elaborated for the Enfeh-Ras Chekaa areas and the cliff-caves of Raoucheh. This Action Plan will include protection measures (Marine Protected Areas, natural monuments), suggestions for the rational management of fisheries (units, periods, areas and depths, fishing methods, species), as well as an awareness and education strategy for users of the marine and coastal area.

The study was done in June 2012 with extensive exploration of the Enfeh and Ras Chekaa areas, followed by one-off dives to identify habitats (also for Raoucheh). The present report brings together data from the assignment with a first ecological characterization of the area, and makes recommendations for the possible development of the sites being studied.

Another aim is to collect as much information as possible on the marine fauna and flora of these interesting parts of Lebanon's coast, especially about the exotic species that have successfully established themselves here, and to press on with the inventorying of the biodiversity of this very special part of the Mediterranean.

Also, the aim is to spot the specific nature of the associations and facies that are a feature of this sector and to show how they differ from other parts of the Mediterranean. This obviously requires drawing our attention to the absence of certain species and the presence of others, especially on the Levantine coast, due to either natural causes (such as higher temperature and salinity) or to human-origin causes (the Levantine basin's communication with the Red Sea via the Suez Canal, the discharge into the sea of waste water and solid waste).

Becoming aware of the particular forms of harm caused to the coastal environment by human activities (industry, fishing, sewers, human frequentation, etc.) should help towards reflection as to what can still be protected in a natural state.



2. REPORT ON THE ASSIGNMENT

2.1. Areas prospected

The prospected areas (Fig. 1) lie all around the Enfeh peninsula (between 0 and 47 meters down); along the Ras-Chekaa coast up to the port of Selaata (between 0 and 46 metres down); and the Raoucheh cave (0-4 meters down).



Figure 1. Location of the prospected areas (Maritime chart INT 3606-7255)

2.2. Chronogram

The assignment lasted eleven days (18 to 28 June 2012) as is shown in Table 1. The length of work was a 9- to 10-hour day, from 6.30 to 7 a.m. (leaving the hotel) until 5 to 6 p.m. (return to the hotel). Every day was a working day.

Table 1. Distribution of activities/day during the assignment

Activities/days (June 2012)	18	19	20	21	22	23	24	25	26	27	28
Work meetings	X										X
Work area of Enfeh		X	X			X					
Work area of Chekaa			X	X	X		X	X	X		
Work area of Raoucheh										X	

2.3. Staff

Seven research divers took part in the assignment (Table 2). For maximum efficiency of safety and time, the team was split up into two groups: coastal habitats (0-15 meters down) and deep water habitats (10-50 metres down).

Table 2. Affiliation and tasks of participants in the June 2012 assignment in Lebanon

Noun	Organism	Task
BITAR, Ghazi	Lebanese University	Benthos, habitats
EL SHAER, Heni	IUCN	GIS, benthos
FORCADA, Aitor	University of Alicante	fishs, cartography
OCAÑA, Oscar L.	Muséum Mer Ceuta	Benthos, habitats
RAMOS, Alfonso A.	University of Alicante	Benthos, habitats
SGHAIER, Yassine R.	RAC/SPA	Benthos, habitats
VALLE, Carlos	University of Alicante	fishs, cartography

We must mention the excellent collaboration of both the staff from the Lebanese National Centre for Marine Research (Gaby Kalaf, Milad Fakhri and Elie Tarek) for logistical and technical back-up, and the crew of the Lebanese CNRS oceanographic boat 'Cana', not forgetting the efficient help of the sailor, Toffic, who owns the traditional fishing boat 'Abou Nassif'.

2.4. Stations

Forty stations were prospected (See Annex I): 15 in Enfeh, 23 in Chekaa and 2 in Raoucheh. According to sector, the depths were between 0 and 47 metres. Also, hydrological profiles were drawn on the oceanographic boat in the charge of Milad Fakhri (Table 3).

Table 3. Hydrology stations

Locality	Date	Latitude N	Longitude E	Depth
Front Chekaa	25.06.12	34° 18,849'	35° 39,355'	160m
Front Chekaa	«	34° 18,864'	35° 39,632'	60m
Front Chekaa	«	34° 18,873'	35° 39,854'	40m
Front Chekaa	26.06.12	34° 19,099'	35° 39,454'	99m
Front Chekaa	«	34° 19,176'	35° 39,733'	65m
Front Enfeh	«	34° 20,783'	35° 43,044'	22m
Front Enfeh	«	34° 20,867'	35° 42,422'	50m
Front Beirut	27.06.12	33° 53,367'	35° 27,469'	47m
Front Beirut	«	33° 53,004'	35° 28,116'	28m

2.5. Material and methods

All the stations were prospected by aqualung diving, except four stations where no aqualung was used. In all, 82 dives were made, 9 of these without aqualung, which represents about 65 hours of work underwater.

Each researcher brought his own diving material, GPS and underwater camera; bottles, of 15 and 18 litres, and sinkers were provided by the CNRM. Also, the University of Alicante provided a hydroplane and measuring tapes

for the visual counting of fishes.

The workplace was reached on board the oceanographic boat 'Cana' (Fig. 2). Once in the area, the researchers moved to the diving site using the inflatable dinghy of the oceanographic boat and the 'Abou Nassif' traditional fishing boat belonging to the fisherman Toffic from Batroun (Fig. 3).



Figure 2. The CNRS oceanographic boat 'Cana'



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Figure 3. The boats used for diving: Toffic's traditional fishing boat (left) and the 'Cana' inflatable dinghy (right)

The methods of observation used differ according to type of dive and objective (mapping, characterization of habitats, fish counts).

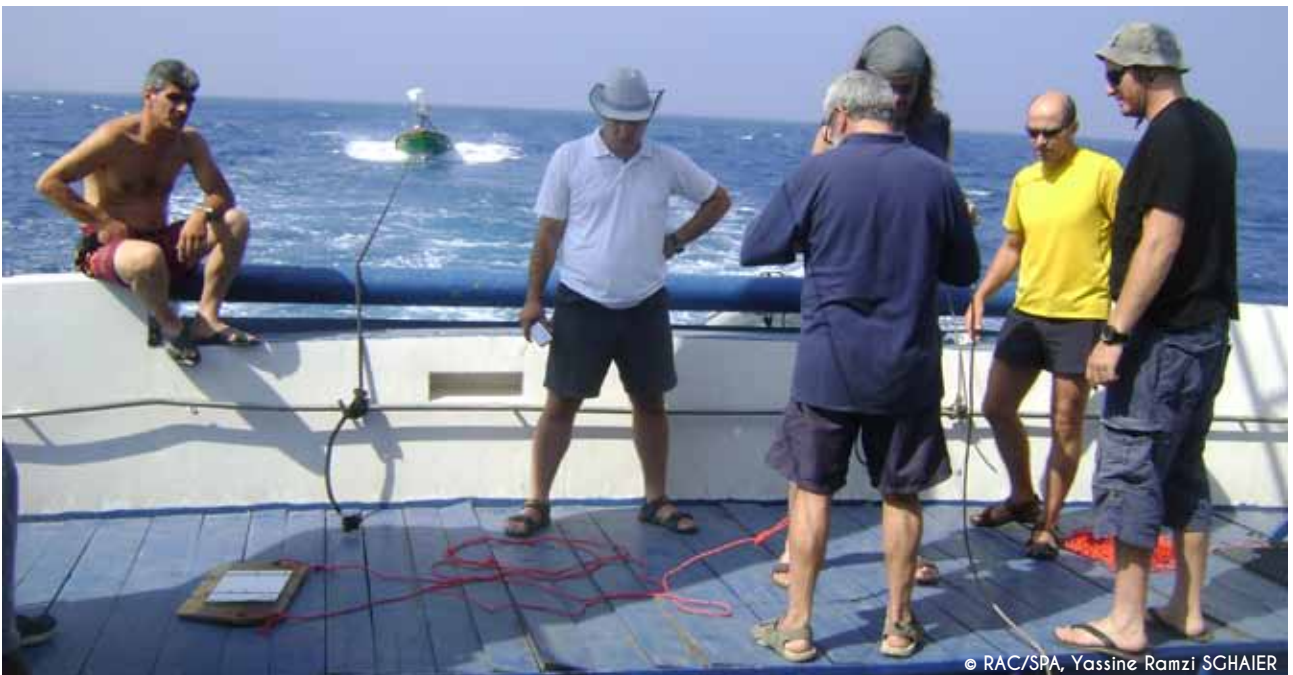
a) Mapping

The seabed was mapped using a hydroplane that allowed extensive exploration of the concerned area (Ramos-Esplá, 1984). It had a 100-meter rope and a 3-meter chain and was pulled by the inflatable dinghy (Fig. 4). Once the diver was on the bottom, he recorded on a plastic plate his observations as to the populations encountered. Aboard the inflatable, one person sailed the boat while two others noted position (using a GPS), depth (a hand-held echo sounder), time check and the diver's safety. The GPS data was downloaded later on a computer.



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Figure 4. a. Diver with hydroplane at the end of a transect



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Figure 4. b. Hydroplane preparation and use

b) Observations and characterization of habitats

Using one-off dives, and taking underwater photographs and noting down depth, type of seabed, fauna and flora on a plastic plate and polyester paper.

A few species about which there were doubts were collected to be identified on board the boat. Each station was located using GPS.

To characterize the *Cymodocea nodosa* lawn (fascicule density), 40 cm by 40 cm quadrants were marked off (Fig. 5).

c) Visual fish counts

Using dives to count fish is an excellent bioindicator to assess and make best use of the protection/exploitation effect (Bayle & Ramos, 1993). The methodology adopted is standardised (Harmelin-Vivien *et al.*, 1985). Indeed, the dives are made at a given depth of between 0 and 15 meters (transects with measuring tape).

The method (Fig. 6) involves using measuring tape to cover a distance (trajectories lying parallel to the coast) 50 meters long by 1 to 5 meters wide (according to visibility) and noting the species of fish encountered, the number of individuals of each species, roughly their size and the type/complexity of the seabed. Usually, the transects were of 200 sq.m. (50m x 4m) with six replicas per station.



Figure 5. Counting *Cymodocea nodosa* fascicules with a 40 cm by 40 cm quadrant



Figure 6. Visual counting of fish per transect using a measuring tape

d) Processing the samples

On board, the specimens collected were placed in bowls filled with seawater to be defined, observed using a low power stereo microscope, photographed (Fig. 7) and / or anaesthetised and set in 10% formalin in seawater for consideration and study in the laboratory.

e) Hydrology

To round off the information on the marine ecosystem, hydrological profiles were made on board the oceanographic boat 'Cana' using a TCD (Fig. 8) and the water transparency was noted using a Secchi disk.

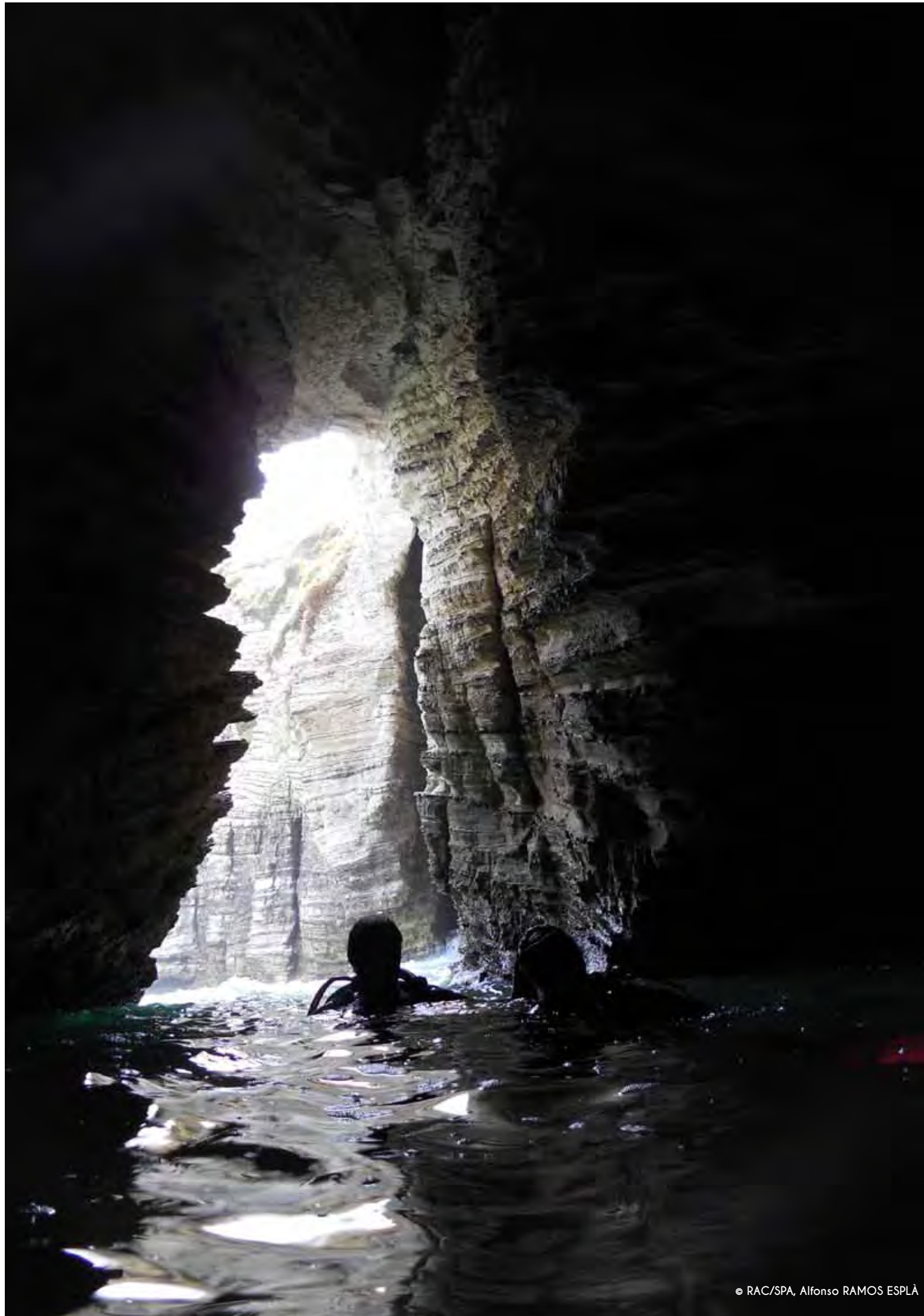


Figure 7. Photography aboard the oceanographic boat of the Lessepsian gastropod *Murex forskoelii*



Figure 8. Launching the TCD off the stern of the oceanographic boat 'Cana'

II. DRAFT SYNTHETIC REPORT OF ECOLOGICAL CHARACTERIZATION WITH RECOMMENDATIONS ON THE MANAGEMENT OUTLINES OF THE STUDY AREAS



1. INTRODUCTION

The present document has been prepared following the schedule for implementation that signals the output of a draft synthetic report of ecological characterization along with recommendations on the management outlines of the study areas, in the “Technical fiche of the mission to be carried out in Lebanon in June 2012”. This report represents the synthetic information about the mission carried out in the Lebanon on 18-29 June 2012 about the littoral and sublittoral surveys (0-47m depth) as a previous part of the study of the Enfeh-Ras Chekaa and Raoucheh as possible marine protected areas.

The expected outputs of the mission have been:

- Rapid natural habitat assessment (phytobenthos and zoobenthos) along all the coastal and marine parts of the concerned areas, for their better assessment.
- Inventory of species (mainly, of patrimonial and fisheries interest), and mapping of benthic habitats.
- Ecological characterization, human impacts and previous evaluation of the zones, with recommendations of the management outlines of the studied areas.



Figure 9. Studied area: (E) Enfeh (NE north, SE south); (E-C) sector between Enfeh and Ras Chekaa; (RC) Ras Chekaa (NRC north, CRC centre, SRC south). Image from Google-Earth



2. DELIMITATION OF THE AREAS

In order to accomplish the study by a rational planning, and according to topographic and human pressure features, the prospected areas (Enfeh, Ras Chekaa and Raoucheh) have been divided in fourth zones (to north – south, Fig. 9):

- Enfeh zone (E)
- Enfeh-El Heri zone (E-C)
- Ras-Chekaa zone (RC)
- Raoucheh zone (Ra)

a) Enfeh (Fig. 10)

Low rocky shore peninsula, with a fishery village located in the southern part of the area and a small port at the north. The peninsula is covered with the remains of Phoenician historical settlements; and the area presents a relatively low tourism pressure with small-scale fisheries (trammels, traps). It has divided in two sectors (north and south).

b) Sector between Enfeh and El Heri (Fig. 11)

The coast is low rocky and sandy shore, with some small beaches. The zone is very populated (local and touristic inhabitants) with the Chekaa village. They are industrial (cement factory), commercial (cement harbour), touristic (bating, sunning, boating, small ports) and small-scale fishery (trammels, traps) activities.

This zone is subject to a high hyper-sedimentation impact, located sewage points, and a shore construction pressure.

c) Ras Chekaa (Fig. 12)

The coast is mainly high rocky shore with cliffs, caves and some creeks. The area is surrounded by an industrial zone (at the south) and a tourist resort (at the north), but it still has a high degree of wilderness in its both terrestrial and marine components. No permanent settlements are present in the zone, only the industrial (iron factory) and commercial (harbour) activities in the south sector, with the tourism activities (sportive harbour, apartment rents) in the north.

They are small-scale fisheries (trammels, traps and net-traps) around the zone, mainly in the north sector. The main impact is the hyper-sedimentation coming from the Selaata harbour (mineral transport). The zone has been divided in three sectors: El Heri (north), Hannouch (centre) et Selaata (south).



Figure 10. North of the Enfeh peninsula



Figure 11. Sector between Enfeh and El Heri, with the cement factory (left) and touristic area (right)



Figure 12. North-west part of Ras-Chekaa

d) Raoucheh (Fig. 13)

This site is located near the coast of Beirut City. It represents a high rocky shore with cliffs and caves, and a high human pressure (sewage, fishery, solid wastes). This area has a very high aesthetic and landscape value and it has been identified as priority site because the urgent need to protect it through the control of the discharge of sewerage and solid wastes and the regulation of access and anchoring of boats.



Figure 13. Raoucheh

3. EVALUATION OF THE HABITATS

One of the most important parts to establish MPAs is the inventory, characterization and the mapping of the marine habitats.

3.1. Biocenosis, associations and facies

According with the types of marine habitat for the selection of sites to be included in the national inventories of natural sites of conservation interest (UNEP/MAP-

RAC/SPA, 1998; Bellan-Santini *et al.*, 2002), the observed biocenosis in the different zones of the studied area (0-47m depth) appear in the table 4.

These habitats – structural and functionally depending on their complexity and heterogeneity, as so as the human impacts - harbour a different diversity of species, some of them with high ecological (key-stone species), patrimonial (vulnerable and endangered species) and/or economical value.

Table 4. Biocenosis (B), associations (A) and facies (F) of the studied area. Zones (according with the fig. 1). Representativeness: (+++) high; (++) middle; (+) low; (-) not observed

BIOCENOSIS/ASSOCIATIONS-FACIES	RAC/SPA code	NE	SE	NRC	CRC	SRC	Ra
SUPRALITTORAL (>0m)	I						
B. supralittoral rock	I.4.1	+++	+++	+++	+++	+++	+++
MEDIOLITTORAL (>0m)	II						
B. upper mediolittoral rock	II.4.1	+++	+++	+++	+++	+++	+++
A. <i>Nemalion helminthoides</i>	II.4.1.3	+++	+++	+++	+++	+++	+++
A. <i>Lithophyllum papillosum</i>	II.4.1.4	+++	+++	+++	+++	+++	+++
F. <i>Chthamalus</i> (<i>Ch. stellatus</i> , <i>Ch. montagui</i>)	-	+++	+++	+++	+++	+++	+++
B. lower mediolittoral rock	II.4.2	+++	+++	+++	+++	+++	+++
A. <i>Enteromorpha compressa</i>	II.4.2.6	+++	+++	+++	+++	+++	+++
A. <i>Neogoniolithon brassica-florida</i> with Vermets	II.4.2.8	+++	+++	++	+++	+	+
A. <i>Parviphycus tenuissimus</i> (Gelidial)	II.4.2.9	+++	+++	+++	+++	+++	+++
B. mediolittoral caves	II.4.3	+	+++		+++	+	+++
A. <i>Phymatolithon lenormandii</i> and <i>Hildenbrandia</i>	II.4.3.1	+	+++		+++	+	+++
INFRALITTORAL (0-31m)	III						
B. muddy sands	III.2.3	+++	+++	+++	+++	+++	+++
A. <i>Cymodocea nodosa</i>	III.2.3.4	+++	+++	+++	-	-	-
A. <i>Caulerpa prolifera</i>	III.2.3.6	-	+	-	-	-	++
B. infralittoral algae	III.6.1	+++	+++	+++	+++	+++	+++
F. overgrazing with encrusting algae	III.6.1.1	+++	+++	+++	+++	+++	+++
F. Vermetids	III.6.1.3	+++	+++	++	+++	+	+
F. <i>Brachidontes pharaonis</i>	III.6.1.4.	+++	+++	+++	+++	+++	+++
A. Corallinales (<i>Corallina</i> , <i>Amphiroa</i> , <i>Jania</i>)	III.6.1.5	+++	+++	+++	+++	+++	+++
A. <i>Lobophora variegata</i>	III.6.1.12	++	++	+	++	+	-
A. <i>Sargassum vulgare</i>	III.6.1.20	++	++	++	+++	+	-
A. <i>Colpomenia sinuosa</i>	III.6.1.22	+++	+++	-	+++	-	-
A. <i>Stypocaulon scoparium</i>	III.6.1.23	++	++	-	++	-	-
A. <i>Pterocladia capillacea</i> and <i>Ulva</i> spp.	III.6.1.26	++	+++	-	-	-	+++
A. <i>Schottera nicaensis</i>	III.6.1.29	-	+++	-	-	-	++
A. <i>Peyssonnelia rubra</i> and <i>Peyssonnelia</i> spp.	III.6.1.34	-	+++	-	+++	-	++
F-A coralligenous (in enclave)	III.6.1.35	-	+++	-	+++	-	+++
F. <i>Chama pacifica</i> with <i>Spondylus spinosus</i>	-	+++	+++	+	+++	+++	++
CIRCALITTORAL (0-48m)	IV						
B. muddy detritic bottom	IV.2.1	-	-	-	+++	+++	-
A. <i>Flabellia petiolata</i> and <i>Caulerpa scapelliformis</i>	-	-	-	-	+++	++	-
B. coastal detritic bottom	IV.2.2	-	-	-	+++	-	-
Maerl facies (<i>Lithothamnion corallioides</i>)	IV.2.2.2	-	-	-	++	-	-
A. <i>Arthrocladia villosa</i>	IV.2.2.4	-	-	-	+++	-	-
B. coarse sands-fine gravels, bottom currents	IV.2.4				+++		
B. coralligenous	IV.3.1	-	++	-	+++	-	++
A. <i>Cystoseira dubia</i>	IV.3.1.3	-	-	-	++	-	-
B. semi-dark caves	IV.3.2	-	+++	-	+++	-	+++
BATHYAL	V						
B. caves and ducts in total darkness	V.3.2	-	-	-	+++	-	-

3.2. Ecological evaluation of the habitats

For the evaluation of the habitats, we have followed the UNEP/MAP (1998) valorization, adapting the values to the observed biocenosis, associations and facies to the studied area (table 5).

Table 5. Classification of the Enfeh, Ras Chekaa and Raoucheh. Criteria: (Ec) economic value; (As) aesthetic value; (PV) patrimonial value; (R) rarity; (S) species richness; (V) vulnerability. Classification (CI): (P) priority habitat; (AH) another habitats. Evaluation: (3) high value; (2) medium value; (1) low value. (modified of UNEP/MAP, 1998)

HABITAT	S	V	PV	R	As	Ec	CI
Hard bottoms							
B. supralittoral rock	1	1	1	1	1	1	AH
B. upper mediolittoral rock							
- A. <i>Nemalion helminthoides</i>	1	1	1	1	1	1	1
- A. <i>Lithophyllum papillosum</i>	1	1	1	1	1	1	AH
B. lower mediolittoral rock							
- A. <i>Enteromorpha compressa</i>	1	1	1	1	1	1	AH
- A. <i>Neogoniolithon brassica-florida</i> with Vermets	2	3	3	2	2	1	P
- A. <i>Parviphycus tenuissimus</i> (Gelidial)	2	1	1	1	1	1	AH
B. mediolittoral caves	3	3	3	3	3	2	P
B. infralittoral algae							
- F. overgrazing with encrusting algae	1	1	1	1	1	1	AH
- F. Vermetids	2	3	3	2	2	1	P
- F. Brachidontes pharaonis	1	1	1	1	1	1	AH
- A. Corallinales (<i>Corallina</i> , <i>Amphiroa</i> , <i>Jania</i>)	2	1	1	1	1	1	AH
- A. <i>Lobophora vaiegata</i>	2	1	1	1	1	1	AH
- A. <i>Sargassum vulgare</i>	3	2	3	2	3	2	P
- A. <i>Colpomenia sinuosa</i>	2	1	1	1	2	1	AH
- A. <i>Stypocaulon scoparium</i>	2	1	1	1	2	1	AH
- A. <i>Pterocladia capillacea</i> and <i>Ulva</i> spp.	1	1	1	1	1	1	AH
- A. <i>Schottera nicaeensis</i>	2	2	2	2	2	1	P
- A. <i>Peyssonnelia</i> spp.	2	2	2	2	2	1	P
- F-A coralligenous (infralittoral enclave)	3	3	3	3	3	2	P
- F. <i>Chama pacifica</i> with <i>Spondylus spinosus</i>	2	1	1	1	1	2	AH
Soft bottoms							
B. muddy sands							
- A. <i>Cymodocea nodosa</i>	2	3	3	2	2	2	P
- A. <i>Caulerpa prolifera</i>	1	1	1	2	2	1	AH
B. muddy detritic bottom							
- A. <i>Flabellia petiolata</i> and <i>Caulerpa scapelliformis</i>	2	1	2	3	2	2	P
B. coastal detritic bottom							
- Maerl facies	3	3	3	3	3	2	P
- A. <i>Arthrocladia villosa</i>	3	2	2	2	2	2	P
B. coarse sands and fine graveles, bottom currents							
	2	2	1	2	1	1	AH
B. coralligenous							
- A. <i>Cystoseira dubia</i>	3	3	3	3	3	3	P
B. semi-dark caves							
	3	3	3	3	3	2	P
B. caves and ducts in total darkness							
	3	3	3	3	3	1	P



4. MARINE PROTECTED AREAS, ZONING AND MANAGEMENT

To establishing the zoning and management to the future marine protected areas, a part of the habitats and aesthetic values, it is necessary to evaluate the present uses of the zones, with the human impacts and possible threats. That is fundamental, since the success or failure of the MPA depends of the control of the different human pressures, mainly fishing and tourism (Ramos-Esplá, 2009).

4.1. Uses, impacts and/or threats

The studied area is subject to the different uses and activities (industry, commercial, artisanal and sportive fisheries, tourism, littoral urbanization, local population; table 6), that means a variety of impacts and, subsequently, subject to possible threats.

Table 6: Uses and threats of the considered areas. Zones: (NE) North Enfeh; (SE) South Enfeh; (E-C) Enfeh – Chekaa; (NRC) North Ras Chekaa; (CRC) Centre of Ras Chekaa; (SRC) South Ras Chekaa. Impact: (+++) very important; (++) more or less important; (+) not important

Impacts/Threats	NE	SE	E-C	NRC	CRC	SRC	Ra
Littoral urbanisation	++	+++	+++	++	-	+	+++
Professional fishing	+++	+++	+++	+++	++	+	+++
Shore angling	+++	+++	+++	+++	++	+	+++
Spearfishing	+++	+++	+++	+++	+++	++	+++
Lost nets (ghost fishing)	++	++	+	++	+++	+++	+
Trampling	+++	+++	+++	+++	++	+	+
Bait and shell-fish collecting	+++	+++	+++	+++	++	+	+++
Mooring	+	++	+++	+++	+	+	+
Solid wastes	+++	+++	+++	+++	+	+	+++
Sewage discharge	++	+++	+++	++	+	+	+++
Hyper-sedimentation	++	+++	+++	++	++	+++	+

4.2. Evaluation of the zones

Taking in consideration the variety of habitats and aesthetic importance, as to as the human impacts, the table 7 shows the valorization of the different zones.

Table 7. Evaluation of the different zones in function with the habitats, fishery interest, aesthetic value and human pressure. Evaluation: (3) high; (2) medium; (1) low

Zone	Habitats	Fishery Interest	Aesthetic Value	Human impacts	Evaluation
NE	2	2	2	2	2
SE	3	2	2	2	2
E-C	1	1	1	3	1
NRC	2	2	2	2	2
CRC	3	3	3	1	3
SRC	3	2	2	3	2
Ra	3	2	3	3	3

4.3. Possible zoning

The protected-managed area would be between northern Enfeh and Ras Selaata (southern of Ras Chekaa), about 2 km to the shore and following the isobathic limit of 50m depth. Although the Enfeh-Chekaa and South of Ras Chekaa sectors are very problematic (pollutant industries, commercial harbours), it is necessary to integrate them in the management plan of the future MPA.

The area Enfeh-Ras Chekaa could be divided in three zones with different uses (Fig. 14; table 8):

- **Protected zone** (integral): No uses, only visitors and educational-research activities. Centre of Ras Chekaa (CRC zone)
- **Buffer zone** (partially protected): Restricted uses (mainly fishing with selective methods). Enfeh peninsula (NE and SE); North and South of Ras Chekaa (NRC, SRC). Control of the littoral urbanization.
- **Peripheral zone** (or multi-use zone): All of the actual uses, but take measures to minimize the pollution by sewage and hyper-sedimentation.

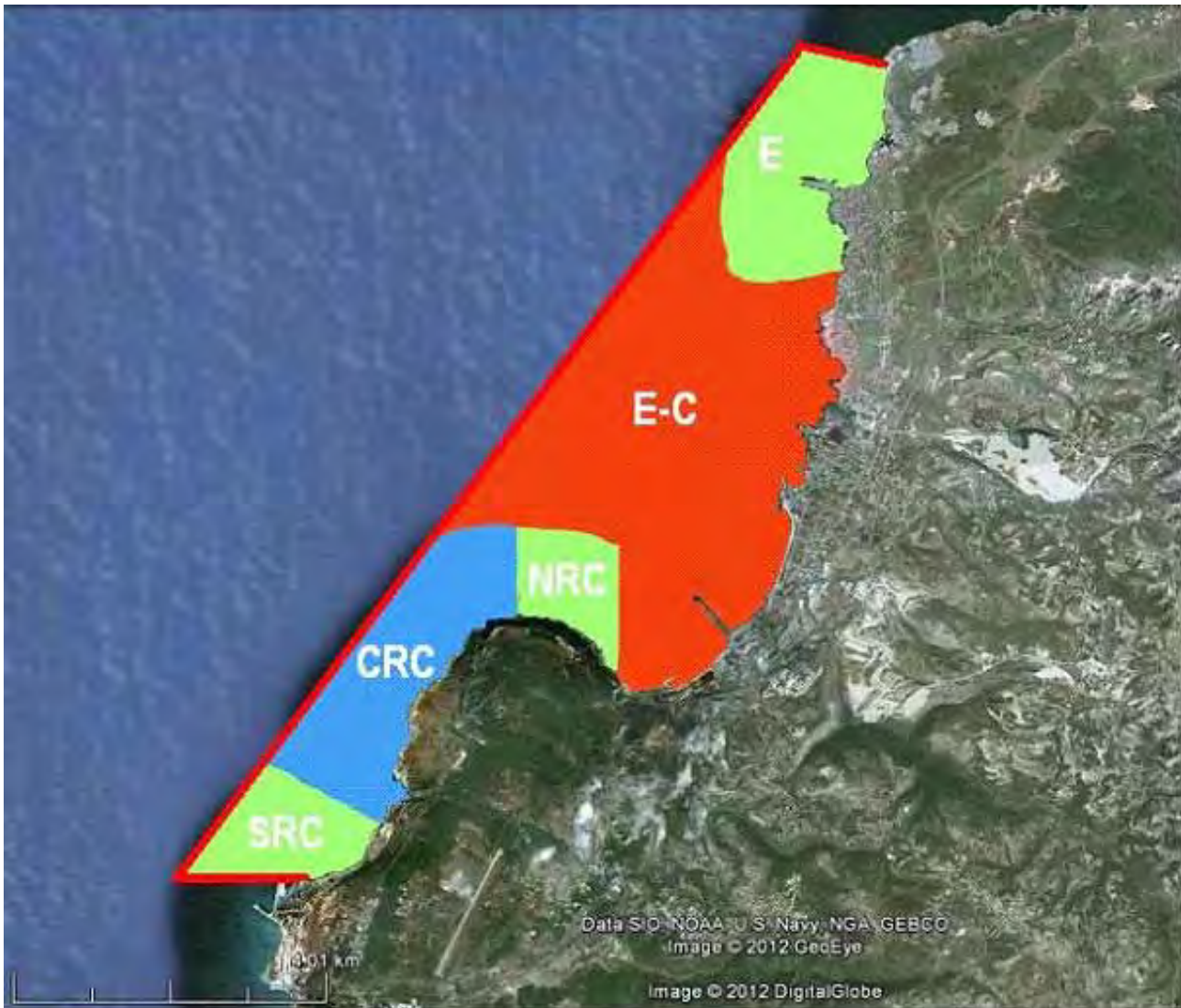


Figure 14. Proposed marine protected area Enfeh-Ras Chekaa and possible zoning: core area (blue), buffer area (green) and multi-use or peripheral area (red). Zones: (E) Enfeh; (E-C) Enfeh-El Heri; (NRC) North Ras Chekaa; (CRC) Centre Ras Chekaa ; (SRC) South Ras Chekaa (image from Google Earth).

The case of Raoucheh merit a particular consideration, apart from the high aesthetic value (high rocky shore, forming a creek with two large pinnacles of rock and littoral caves), as natural monument or a special protected area :

- i) presence of the littoral caves for the monk seals

(*Monachus monachus*), frequently, two individuals have been seen in the area the last years);

- ii) presence of new species in the caves (e.g. a new *Aplysina* sp., *Euryspongia raouchensis*);
- iii) an important population of bats (*Chiroptera* spp.).

4.4. Management measures

To avoid as far as possible the human impacts in a MPA, it is necessary to consider management planning through the zoning of the protected area. The management and zoning may resolve some conflicts between users of the coastal zone (selective/no selective fishing methods, professional/sportive fishing, Scuba diving / spear-fishing) and to make protection compatible with the rational exploitation of the area.

In this sense, the 'Protocol concerning Specially Protected Areas and Biological Diversity (SPA/BD Protocol) in the Mediterranean' (Barcelona Convention, 1995) mentions in the article 7-1 that: 'The Parties shall, in accordance with the rules of international law, adopt planning, management, supervision and monitoring measures for the SPAs. Later (art. 7-2), it indicates the measures that should be included for each SPA. The table 8 summarises the possible uses and management measures.

Table 8. Possible uses and management measures of the different zones in the area Enfeh-Ras Chekaa and Raoucheh.

Uses/Zones	NE	SE	E-C	NRC	CRC	SRC	Ra
Littoral urbanisation	(2)	(2)	(1)	(2)	(0)	(2)	(0)
Industry	(0)	(0)	(3)	(0)	(0)	(3)	(0)
Commercial ports	(0)	(0)	(2)	(0)	(0)	(2)	(0)
Sportive ports	(0)	(0)	(2)	(2)	(0)	(0)	(0)
Boating	(0)	(0)	(1)	(1)	(0)	(1)	(1)
Mooring	(0)	(0)	(4)	(0)	(0)	(4)	(0)
Professional fishing	(5)	(5)	(1)	(5)	(0)	(5)	(5)
Shore angling	(6)	(6)	(1)	(6)	(0)	(6)	(6)
Spearfishing	(6)	(6)	(1)	(6)	(0)	(0)	(0)
Tourism, visitors	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Beaching/swimming	(1)	(1)	(1)	(1)	(0)	(1)	(0)
Snorkelling	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Scuba diving	(1)	(1)	(1)	(1)	(7)	(1)	(7)
Research/education	(1)	(1)	(1)	(1)	(1)	(1)	(1)
Aquaculture (inshore cages)	(0)	(0)	(1)	(0)	(0)	(0)	(0)
Sewage dumping	(0)	(0)	(8)	(0)	(0)	(8)	(0)
Dredging	(0)	(0)	(9)	(0)	(0)	(9)	(0)

Legend of notes (in brackets)

- (0) Forbidden
- (1) Permitted
- (2) Coastal Zone management (more than 100m to shore-line)
- (3) Permitted, but to put anti-pollution filters. Control of the mineral discharges (avoid sediment-mineral spread).
- (4) Permitted in determinate zones (to establish)
- (5) Permitted with gear restrictions (no monofilament nets)
- (6) Permitted with license
- (7) By permit
- (8) Sewage treatment by depuration plant (all of the area); control of the ballast waters.
- (9) With measures to avoid the sediment spread



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Annexes

Annex 1. Stations of the Lebanon mission (June 2012). Observers: (Af) Aitor Forcada; (Ar) Alfonso Ramos; (C) Carlos Valle; (G) Ghazi Bitar; (H) Hani El-Shaer; (O) Oscar Ocaña; (Y) Yassine Shaier. Methodology: (F) by foot; (Hy) hydroplane; (Sc) scuba diving; (Sk) snorkeling.

Annex 2. Species observed in the different stations (N = 39), (OS) other stations in the areas. Semi-quantitative abundance: (1) less abundant; (2) abundant; (3) very abundant. Other stations (OS): (E) Enfeh; (F) trammel fishery; (Ra) Raoucheh; (RC) Ras Chekaa; (RS) Ras Selaata.

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Nº	Code	Locality	Date	Depth	Latitude N	Longitude E	Latitude N	Longitude E	Observers	Meth.	Observations
1	E-1	Enfeh	19.06.12	0-8m	34° 21,701'	35° 43,551'	34° 21,667'	35° 43,741'	G,H,Y	Sk	Rock with <i>Stypocaulon scoparium</i> facies
2	E-2	Enfeh	19.06.12	0-3m	34° 21,658'	35° 43,732'			H,Y	Sk	Muddy sand with <i>Cymodocea nodosa</i> meadow
3	E-3	N-Enfeh	19.06.12	20-23m	34° 22,101'	35° 43,734'	34° 22,194'	35° 43,975'	Ar	Hy	Muddy sand <i>Cymodocea nodosa</i> very rare
4	E-4	N-Enfeh	19.06.12	21-31m	34° 22,300'	35° 43,574'	34° 21,988'	35° 43,642'	C	Hy	Muddy sand with pebbles
5	E-5	N-Enfeh	19.06.12	29-34m	34° 22,182'	35° 43,484'	34° 22,191'	35° 43,542j	Af	Hy	Muddy sand with boulders
6	E-6	NW-Enfeh	19.06.12	11-33m	34° 21,986'	35° 43,327'	34° 21,715'	35° 43,728'	O	Hy	Muddy sand with boulders
7	E-7	Enfeh	20.06.12	0-6m	34° 21,664'	35° 43,733'	34° 21,719'	35° 44,037'	G,H,Y	Sc	Muddy sand, <i>Cymodocea nodosa</i> , rock and boulders
8	E-8	W-Enfeh	20.06.12	25-40m	34° 21,817'	35° 43,179'	34° 21,834'	35° 43,492'	Ar	Hy	Muddy sand
9	E-9	SW-Enfeh	20.06.12	8-47m	34° 21,631'	35° 42,938'	34° 21,611'	35° 43,424'	C	Hy	Muddy sand and rocks
10	E-10	S-Enfeh	20.06.12	12-29m	34° 21,479'	35° 43,107'	34° 21,374'	35° 43,690'	O	Hy	Muddy sand
11	E-11	S-Enfeh	20.06.12	4-29m	34° 21,242'	35° 43,104'	34° 21,169'	35° 43,708'	Af	Hy	Muddy sand, rock and boulders
12	C-1	Beach Ras Chekaa	20.06.12	8-15m	34° 19,007'	35° 42,218'	34° 18,660'	35° 42,549'	Ar	Hy	Muddy sand
13	C-2	N-Ras Chekaa	20.06.12	20-22m	34° 18,228'	35° 41,942'	34° 18,881'	35° 41,323	C	Hy	Muddy sand, at the end with pebbles
14	C-3	El Heri (N-Ras Chek.)	21.06.12	0-5m	34° 18,699'	35° 41,740'	34° 18,837'	35° 40,281'	G,Y	Sk	Bare rock with <i>Ganonema farinosum</i>
15	C-4	W-Cape Ras Chekaa	21.06.12	15-30m	34° 19,136'	35° 40,179'	34° 18,842'	35° 41,010'	O	Hy	Sandy detritic, pebbles, rock
16	C-5	SW-Cape Ras Chekaa	21.06.12	22-35m	34° 18,986'	35° 40,098'	34° 18,642'	35° 40,735'	Af	Hy	Sandy detritic, pebbles, rock
17	C-6	S-Capa Ras Chekaa	21.06.12	31-32m	34° 18,753'	35° 39,900'	34° 18,809'	35° 39,951	Ar	Hy	Sandy detritic, smooth rock, entangled hydroplane
18	C-7	S-Cape Ras Chekaa	21.06.12	10-46m	34° 18,866'	35° 39,843'	34° 18,489'	35° 40,561'	C	Hy	Coastal detritic with maerl, pebbles, smooth rock
19	C-8	S-Ras Chekaa	21.06.12	6-43m	34° 18,464'	35° 39,714'	34° 18,026'	35° 40,007'	O	Hy	Coastal detritic with maerl, pebbles, blocks, rock
20	C-9	Hannouch	21.06.12	22-30m	34° 18,151'	35° 39,451'	34° 17,669'	35° 40,029'	Af	Hy	Smooth rock with blocks and canals
21	C-10	El Heri (N-Ras Chek.)	22.06.12	0-12m	34° 17,881'	35° 40,174'	34° 18,194'	35° 40,281'	G,H,Y	Sc	Rock wirh <i>Corallina</i> et <i>Jania</i>
22	C-11	Front Port Chekaa	22.06.12	0-8m	34° 18,384''	35° 42,271'	34° 18,568'	35° 42,735'	H,Y	Sc	Sand, <i>Cymodocea nodosa</i> meadow

N°	Code	Locality	Date	Depth	Latitude N	Longitude E	Latitude N	Longitude E	Observers	Meth.	Observations
23	C-12	N-Port Selaata	22.06.12	18-40m	34° 17,408'	35° 39,650'	34° 17,223'	35° 39,826'	O	Hy	Muddy sand
24	C-13	NW-Cape Ras Chekaa	22.06.12	28-44m	34° 19,909'	35° 41,295'	34° 19,170'	35° 41,211'	C	Hy	Muddy sand, smooth rock
25	E-12	Enfeh	23.06.12	0-4m	34° 21,634'	35° 43,831'	34° 21,657'	35° 43,880'	G,H,Y	Sc	Midlittoral caves, littoral rock
26	E-13	SW-Enfeh	23.06.12	8-24m	34° 21,676'	35° 43,181'			Ar,Af,O,C	Sc	Rock with <i>Chama</i>
27	E-14	S-Enfeh	23.06.12	10-15m	34° 21,187'	35° 43,597'			Ar,Af,O,C	Sc	Rock, boulders
28	C-14	Crique de Hannouch	24.06.12	0-12m	34° 18,254'	35° 40,321'	34° 18,481'	35° 40,576'	G,H,Y	Sc	Rock with <i>Corallina</i> et <i>Jania</i>
29	C-15	SW-Ras Chekaa	24.06.12	42-44m	34° 18,464'	35° 39,714'			Ar,Af,O,C	Sc	Coastal detritic with maerl
30	C-16	Front Hannouch	24.06.12	20-25m	34° 18,199'	35° 39,949'			Ar,Af,O,C	Sc	Rock with <i>Chama</i>
31	C-17	Ras Chekaa	25.06.12	0-12m	34° 18,517'	35° 40,625'	34° 18,733'	35° 40,833'	G,H,Y	Sc	Rock with <i>Corallina</i> et <i>Jania</i>
32	C-18	SW-Ras Chekaa	25.06.12	42-44m	34° 18,464'	35° 39,714'			Ar,Af,O,C	Sc	Coastal detritic with maerl
33	C-19	Grotte Chack El Hatab	25.06.12	0-5m	34° 17,641'	35° 40,267'			G,H,Y,Ar,Af,O,C	Sc	Cave, littoral rock
34	C-20	Ras Chekaa	26.06.12	0-8m	34° 18,859'	35° 41,178'			G,H,Y	F, Sc	Littoral rock
35	C-21	SW-Ras Chekaa	26.06.12	32-33m	34° 18,753'	35° 39,900'			Ar,Af,O,C	Sc	Coastal detritic with smooth rock
36	C-22	Front Chekaa	26.06.12	11m	34° 19,045'	35° 42,40.5'			Af,C,O	Sc	Water surgences, muddy sand
37	C-23	El Heri	26.06.12	0-2m	34° 18,833'	35° 41,230'			G,O,Ar	Sk	Littoral rock, boulders
38	R-1	Grotte Raoucheh	27.06.12	0-6m	33° 53,316'	35° 28,165'			G,O,Ar,C,Af	Sc	Cave, littoral rock

Annex 2. Species observed in the different stations (N = 39), (OS) other stations in the areas. Semi-quantitative abundance: (1) less abundant; (2) abundant; (3) very abundant. Other stations (OS): (E) Enfeh; (F) trammel fishery; (Ra) Raoucheh; (RC) Ras Chekaa; (RS) Ras Selaata.

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
MACROALGAE																				
Chlorophyta																				
<i>Bryopsis plumosa</i> C.Agardh, 1823	2													2						
<i>Caulerpa prolifera</i> (Forsskål) J.V.Lamouroux, 1809								2		1										
* <i>Caulerpa scalpelliformis</i> (R.Brown ex Turner) C.Agardh, 1817																			3	
<i>Cladophora</i> sp.																				
* <i>Cladophoropsis modonensis</i> (Kützinger) Reinbold, 1905	2																			
<i>Codium bursa</i> (Olivi) C.Agardh, 1817																				
* <i>Codium fragile</i> (Suringar) Hariot, 1889																				
<i>Codium taylorii</i> P.C.Silva, 1960	3													3						
<i>Dasycladus vermicularis</i> (Scopoli) Krasser, 1898																				
<i>Flabellia petiolata</i> (Turra) Nizamuddin, 1987																			3	
<i>Ulva compressa</i> Linnaeus, 1753 (= <i>Enteromorpha compressa</i>)																				
<i>Ulva intestinalis</i> Linnaeus, 1753 (= <i>Enteromorpha intestinalis</i>)																				
<i>Ulva</i> sp.	3													3						
<i>Valonia utricularis</i> (Roth) C.Agardh, 1823																				
Phaeophyta																				
<i>Arthrocladia villosa</i> (Hudson) Duby, 1830					2										3	3	3	3	3	
<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès & Solier, 1851	3					3					3			3						2
<i>Cystoseira compressa</i> (Esper) Gerloff & Nizamuddin, 1975	1																			
<i>Cystoseira dubia</i> Valiante																				
<i>Dictyota dichotoma</i> (Hudson) J.V.Lamouroux, 1809														1						

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Dictyota linearis</i> (C.Agardh) Greville, 1830					1						2				3	3	3			
<i>Hydroclathrus clathratus</i> (C.Agardh) M.A.Howe, 1920																				
<i>Lobophora variegata</i> (J.V.Lamouroux) Womersley ex E.C.Oliveira, 1977	1													1						
* <i>Padina boergesenii</i> Allender & Kraft, 1983 or <i>P. antillarum</i> (= <i>P. tetrastomatica</i>)	2								3		2				3	3	3	3		2
<i>Padina pavonica</i> (Linnaeus) Thivy, 1960	2													2	2	2				
<i>Ralfsia verrucosa</i> (J.E.Areschoug) J.E.Areschoug, 1845																				
<i>Sargassum</i> cf. <i>hornschuchii</i> C.Agardh, 1820															3					
<i>Sargassum vulgare</i> C.Agardh, 1820	2			1										2						
<i>Sphacelaria</i> sp.																				
<i>Stypocaulon scoparium</i> (Linnaeus) Kützing, 1843	3													2						
<i>Stypopodium schimperi</i> (Buchinger ex Kützing) Verlaque & Boudouresque, 1991	2																	2		
<i>Taonia atomaria</i> (Woodward) J.Agardh, 1848																				
Rhodophyta																				
* <i>Acanthophora nayadiformis</i> (Delile) Papenfuss, 1968	2																			
<i>Amphiroa cryptarthrodia</i> Zanardini, 1844																				
<i>Amphiroa rigida</i> J.V.Lamouroux, 1816	2										3			2						3
<i>Bonnemaisonia asparagoides</i> (Woodward) C.Agardh, 1822																				
<i>Botryocladia botryoides</i> (Wulfen) Feldmann, 1941																				
<i>Chylocladia verticillata</i> (Lightfoot) Bliding, 1928																		3		
<i>Ceramium virgatum</i> Roth, 1797 (= <i>C. rubrum</i>)	3																			
<i>Ceramium</i> sp.																				
Ceramiales sp.																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Corallina elongata</i> J.Ellis & Solander, 1786	3													3						
* <i>Galaxaura rugosa</i> (J.Ellis & Solander) J.V.Lamouroux, 1816	2										3			2						
* <i>Ganonema farinosum</i> (J.V.Lamouroux) K.C.Fan & Yung C.Wang, 1974 (= <i>Liagora farinosa</i>)	3													3						
<i>Gracillaria</i> sp.											2									
<i>Halymenia floresia</i> (Clemente) C. Agardh, 1807																				
<i>Hildenbrandia rubra</i> (Sommerfelt) Meneghini, 1841																				
<i>Hypnea musciformis</i> (Wulfen) J.V.Lamouroux, 1813	2																			
* <i>Hypnea cornuta</i> (Kützting) J.Agardh, 1851 (= <i>H. spinella</i>)																				
<i>Jania rubens</i> (Linnaeus) J.V.Lamouroux, 1816	3													3						
<i>Lithophyllum incrustans</i> Philippi, 1837	3				3									3						
<i>Lithophyllum papillosum</i> Zanardini ex Hauck, 1885																				
<i>Lithophyllum stictaeforme</i> (J.E.Areschoug) Hauck, 1877 (= <i>Pseudolithophyllum expansum</i>)																				
<i>Lithophyllum</i> sp.																				
<i>Mesophyllum alternans</i> (Foslie) Cabioch & Mendoza, 1998 (= <i>M. lichenoides</i>)	1													1						
<i>Neogoniolithon brassica-florida</i> (Harvey) Setchell & L.R.Mason, 1943	2													2						
<i>Neogoniolithon mamillosum</i> (Hauck) Setchell & L.R.Mason, 1943											3									
<i>Osmundaria volubilis</i> (Linnaeus) R.E.Norris, 1991																				
<i>Palisada perforata</i> (Bory de Saint-Vincent) K.W.Nam, 2007 (= <i>Laurencia papillosa</i>)	2													3						
<i>Parviphycus tenuissimus</i> (Feldmann & Hamel) B.Santelices, 2004 (= <i>Gelidiella pannosa</i>)	3																			
<i>Peyssonnelia</i> spp.																				
<i>Phymatolithon calcareum</i> (Pallas) W.H.Adey & D.L.McKibbin, 1970																				
<i>Phymatolithon lenormandii</i> (J.E.Areschoug) W.H.Adey, 1966																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Plocamium cartilagineum</i> (Linnaeus) P.S.Dixon, 1967	1																			
<i>Pterocliadiella capillacea</i> (S.G.Gmelin) Santelices & Hommersand, 1997														1						
<i>Schottera nicaeensis</i> (J.V. Lamouroux ex Duby) Guiry & Hollenberg, 1975																				
<i>Sebdenia</i> sp. ?																				
<i>Solieria filiformis</i> (Kützing) P.W.Gabrielson, 1985																				
<i>Spongites fruticulosa</i> Kützing, 1841																	1	3	3	
Magnoliophyta																				
<i>Cymodocea nodosa</i>	1		1		1	1		1	1	1	1	1								
* <i>Halophila stipulacea</i> (Forsskål) Ascherson, 1867																				
INVERTEBRATA																				
Porifera																				
<i>Acanthella acuta</i> Schmidt, 1862																				
<i>Aplysina aerophoba</i> Nardo, 1833	2				1			2	2											2
<i>Aplysina</i> sp.																				
<i>Axinella damicornis</i> (Esper, 1794)																				
<i>Axinella</i> sp. (≈ <i>A. polypoides</i>)																				
<i>Calcarea</i> spp. (<i>Sycetusa</i> , <i>Vosmaeropsis</i>)	1													1						
<i>Chondrilla nucula</i> Schmidt, 1862																				
<i>Chondrosia reniformis</i> Nardo, 1847	2													2						
<i>Cinachyrella levantiniensis</i> Vacelet et al, 2007																				
<i>Ciocalypta carballoi</i> Vacelet et al, 2007 (= <i>Coelocaplypta carballoi</i>)																				
<i>Clathrina clathrus</i> (Schmidt, 1864)																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Clathrina</i> cf. <i>coriacea</i> (Montagu, 1818)																				
<i>Clathrina rubra</i> Sará, 1958																				
<i>Cliona viridis</i> (Schmidt, 1862)																				
<i>Cliona parenzani</i> Corriero & Scalera, 1997	2													2						
<i>Crambe crambe</i> (Schmidt, 1862)	2													2			3		2	
<i>Cymbaxinella</i> sp.																		2		2
<i>Diplastella</i> sp.																				
<i>Euryspongia raouchensis</i> Vacelet et al., 2007																				
<i>Gastrophanella phoeniciensis</i> Perez et al., 2004																				
<i>Ircinia</i> sp.															3					
<i>Geodia</i> sp. (= <i>Isops</i>).																				
<i>Microscleroderma lamina</i> Perez et al., 2004																				
<i>Mycale</i> (<i>Carmia</i>) <i>sanguinea</i> Tsumamal, 1969																				
<i>Mycale</i> sp.																				
<i>Myrmekioderma spelaeum</i> (Pulitzer-Finali, 1983)																				
<i>Niphates toxifera</i> Vacelet et al, 2007	2														2	2	2			
<i>Aplysilla sulfurea</i> ? Schulze, 1878																				
<i>Petrosia</i> (<i>Petrosia</i>) <i>ficiformis</i> (Poiret, 1789)																				
<i>Phorbas tenacior</i> (Topsent, 1925)																				
<i>Phorbas topsenti</i> Vacelet & Perez, 2008 (= <i>P. paupertas</i>)	1													1						
<i>Placospongia decorticans</i> (Hanitsch, 1895)																				
<i>Sarcotragus fasciculatus</i> (Pallas, 1766) (= <i>Ircinia fasciculata</i>)	1													1						

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Sarcotragus spinosulus</i> Schmidt, 1862	1													1						1
<i>Spirastrella cunctatrix</i> Schmidt, 1868																				
<i>Spongia (Spongia) officinalis</i> Linnaeus, 1759																				
<i>Sycon</i> sp.	1													1						
<i>Terpios granulosa</i> Bergquist, 1967																				
Cnidaria																				
Hydrozoa																				
<i>Aglaophenia kirchenpaueri</i> ? (Heller, 1868)																				
<i>Aglaophenia octodonta</i> ? Heller, 1868																				
<i>Aglaophenia</i> sp.														2					3	
<i>Eudendrium carneum</i> Clarke, 1882																				
<i>Eudendrium glomeratum</i> Picard, 1952																				
<i>Eudendrium</i> sp.																				
* <i>Macrorhynchia philippina</i> Kirchenpauer, 1872	1													1						
<i>Pennaria disticha</i> (Goldfuss, 1820) (= <i>Halocordyle disticha</i>)	2													2						
Plumularidae sp.																				
<i>Sertularella</i> sp.																				
Anthozoa																				
<i>Actinia schmidti</i> Sole-Cava & Thorpe, 1997																				
<i>Cerianthus</i> sp.										2										
<i>Madracis pharensis</i> (Heller, 1868)																				
* <i>Oculina patagonica</i> de Angelis, 1908														1						

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Phylangia americana mouchezii</i> (Lacaze-Duthiers, 1897)																				
<i>Polycyathus muelleræ</i> (Abel, 1959)																				
Polychaeta																				
<i>Ditrupa arietina</i> (O. F. Müller, 1776)						3														
<i>Filograna</i> sp.																				
<i>Hermodice carunculata</i> (Pallas, 1766)	3							1						3				3		
Nereidae indet.	1																			
<i>Protula</i> sp.																				
Sabellidae sp.																				
* <i>Spirobranchus kraussii</i> (Baird, 1865) (= <i>Pomatoleios kraussii</i>)																				
* <i>Spirobranchus lamarcki</i> (Quatrefages, 1866) (= <i>Pomatoceros lamarckii</i>)	2													2						
* <i>Spirobranchus tetraceros</i> (Schmarda, 1861)																				
<i>Sabella spallanzanii</i> (Gmelin, 1791) (= <i>Spirographis spallanzani</i>)																				
Spirorbidae sp.																				
Crustacea																				
Cirripedia																				
* <i>Balanus trigonus</i> Darwin, 1854	1													1						
<i>Chthmalus montagui</i> Southward, 1976	3													3						
<i>Chthamalus stellatus</i> (Poli, 1795)	3													3						
<i>Perforatus perforatus</i> (Bruguière, 1789) (= <i>Balanus perforatus</i>)	3													3					2	
Isopoda																				
<i>Ligia italica</i> Fabricius, 1798																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Decapoda																				
* <i>Atergatis roseus</i> (Rüppell, 1830) (tests)	1													1						
<i>Calcinus tubularis</i> (Linnaeus, 1767)																				
* <i>Charybdis (Charybdis) hellerii</i> (A. Milne-Edwards, 1867)	2													2						
<i>Clibanarius erythropus</i> (Latreille, 1818)	3													3						
<i>Dardanus calidus</i> (Risso, 1827)																				
<i>Diogenes pugilator</i> (Roux, 1829)			3			3		1				3								
<i>Eriphia verrucosa</i> (Forskål, 1775) (= <i>E. spinifrons</i>)	1													1						
Galatheidae sp.																				
<i>Maja goltziana</i> d'Oliveira, 1888																				
* <i>Myra fugax</i> (Fabricius, 1798) (tests)			1																	
<i>Pachygrapsus marmoratus</i> (Fabricius, 1787)	1													1						
<i>Pagurus anachoretus</i> Risso, 1827																				
* <i>Percnon gibbesi</i> (H. Milne-Edwards, 1853)														2						
<i>Pilumnus hirtellus</i> (Linnaeus, 1761)																				
Mollusca																				
Polyplacophora																				
<i>Acanthochitona fascicularis</i> (Linnaeus, 1767)	1													1						
<i>Chiton (Rhyssoplax) olivaceus</i> Spengler, 1797																				
Gastropoda																				
* <i>Cerithium scabricum</i> Philippi, 1848	3													3						
<i>Columbella rustica</i> (Linnaeus, 1758)	2													2						

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
* <i>Conomurex persicus</i> (Swainson, 1821) (= <i>Strombus persicus</i>)	3		3			1		1		3	3	1		3						
<i>Conus ventricosus</i> Gmelin, 1791 (= <i>C. mediterraneus</i>)	1																			
<i>Dendropoma petraeum</i> (Monterosato, 1884)	2													2						
* <i>Echinolittorina punctata</i> (Gmelin, 1791)	3													3						
* <i>Elysia grandifolia</i> Kelaart, 1857																				
* <i>Ergalatax junionae</i> Houart, 2008 (= <i>E. obscura</i>)	3													3						
<i>Erosaria spurca</i> (Linnaeus, 1758) (shells)																				
<i>Euthria cornea</i> (Linnaeus, 1758) (= <i>Buccinulum corneum</i>)																				
<i>Flabellina affinis</i> (Gmelin, 1791)																				
* <i>Fusinus verrucosus</i> (Gmelin, 1791) (= <i>F. marmoratus</i>)	1																			
<i>Gibbula</i> spp.																				
* <i>Goniobranchus annulatus</i> (Eliot, 1904) (= <i>Chromodoris annulatus</i>)																				
<i>Hexaplex trunculus</i> (Linnaeus, 1758) (= <i>Murex trunculus</i>)	1													1						
* <i>Hypselodoris infucata</i> Rüppell & Leuckart, 1831	1																			
* <i>Infundibulops erithreus</i> (Brocchi, 1821) (= <i>Trochus erythraeus</i>)	1																			
<i>Luria lurida</i> (Linnaeus, 1758) (shell)																				
<i>Melarhaphe neritoides</i> (Linnaeus, 1758)	2													2						
* <i>Murex (Murex) forskoehlii</i> Röding, 1798			2	2																
* <i>Nassarius circumcinctus</i> (A. Adams, 1852)			1																	
<i>Patella caerulea</i> Linnaeus, 1758	3													3						
<i>Patella rustica</i> Linnaeus, 1758	3													3						
<i>Patella ulyssiponensis</i> Gmelin, 1791	3													3						

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Phorcus articulatus</i> (Lamarck, 1822) (= <i>Osilinus articulatus</i>)																				
<i>Phorcus turbinatus</i> (Born, 1778) (= <i>Osilinus turbinatus</i>)	2													2						
* <i>Purpuradusta gracilis</i> (Gaskoin, 1849)																				
* <i>Rhinoclavis kochi</i> (Philippi, 1848)			3			3		3				3								
<i>Semicassis granulata undulata</i> (Gmelin, 1791) (= <i>Phalium undulatum</i>) (shells)										3										
<i>Serpulorbis arenarius</i> (Linnaeus, 1767)	1													1						
* <i>Thaisella scacellum</i> (Gmelin, 1791) (= <i>Thais scacellum</i>)																				
Bivalvia																				
<i>Acanthocardia tuberculata</i> (Linnaeus, 1758) (shells)												2								
* <i>Brachidontes pharaonis</i> (P. Fischer, 1870)	3													3						
* <i>Chama pacifica</i> Broderip, 1835	3										3			3	3					3
<i>Ctena decussata</i> (O. G. Costa, 1829) (shells)																				
* <i>Gafrarium pectinatum</i> (Linnaeus, 1758)																				
<i>Glycymeris nummaria</i> (Linnaeus, 1758) (<i>G. insubrica</i>) (shells)								1												
* <i>Lioberus agglutinans</i> (Cantraine, 1835) (= <i>Amygdalum agglutinans</i>)																				
* <i>Malleus regula</i> Forsskål, 1775 (= <i>Malvifundus regulus</i>)	3													2						
Ostreidae sp.														2						
* <i>Pinctada imbricata radiata</i> (Leach, 1814)	1													1						
<i>Pinna carnea</i> Gmelin, 1791 (= <i>P. pernula</i>)	1																			
* <i>Spondylus spinosus</i> Schreibers, 1793	2													2						
<i>Striarca lactea</i> (Linnaeus, 1758)																				
<i>Venus verrucosa</i> Linnaeus, 1758																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Cephalopoda																				
<i>Octopus vulgaris</i> Cuvier, 1797																				
<i>Sepia officinalis</i> Linnaeus, 1758																				
Bryozoa																				
<i>Adeonella pallasii</i> (Heller, 1867)																				
<i>Margaretta cereoides</i> (Ellis & Solander, 1786)	3																			
<i>Reteporella grimaldii</i> (Jullien, 1903) (= <i>Sertella septentrionalis</i>)																				
<i>Schizoporella errata</i> (Waters, 1878)	2													2						
<i>Schizoretopora hassi</i> Harmelin, Bitar, Zibrowius, 2007																				
Echinodermata																				
Asteroidea																				
<i>Coscinasterias tenuispina</i> (Lamarck, 1816)																				
<i>Echinaster (Echinaster) sepositus</i> (Retzius, 1783)																1	1		1	1
Ophiuroidea																				
* <i>Ophiactis</i> sp. (<i>O. parva</i> or <i>savignyi</i>)														1						
<i>Ophiomyxa pentagona</i> (Lamarck, 1816)																				
Echinoidea																				
<i>Arbacia lixula</i> (Linnaeus, 1758)	1																			
<i>Brissus unicolor</i> (Leske, 1778) (tests)																				
<i>Echinoardium mediterraneum</i> (Forbes, 1844) (tests)										2										
<i>Paracentrotus lividus</i> (Lamarck, 1816)	1													1						
Holothuroidea																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Holothuria (Panningothuria) forskali</i> Delle Chiaje, 1823	1													1						
<i>Holothuria (Platyperona) sanctori</i> Delle Chiaje, 1823																				
<i>Holothuria (Holothuria) tubulosa</i> Gmelin, 1791	1																			
* <i>Synaptula reciprocans</i> (Forskal, 1775)	2																	1		
Ascidacea																				
<i>Ascidia</i> cf. <i>mentula</i> Müller, 1776																				
<i>Botrylloides leachii</i> (Savigny, 1816)																				
<i>Cystodytes dellechiajei</i> (Della Valle, 1877) (green)																				
<i>Cystodytes dellechiajei</i> (Della Valle, 1877) (violet)																				
Didemnidae spp.	2													2						
* <i>Herdmania momus</i> (Savigny, 1816)	2		2					2						2						
* <i>Microcosmus</i> cf. <i>exasperatus</i> Heller, 1878						1														
* <i>Phallusia nigra</i> Savigny, 1816	2													2						
Polyclinidae sp.																				
<i>Pycnoclavella</i> sp.																				
<i>Pyura dura</i> (Heller, 1877)																				
* <i>Symplegma brakenhielmi</i> (Michaelsen, 1904)																				
ICHTHYOFAUNA																				
Elasmobranchii																				
<i>Dasyatis pastinaca</i> (Linnaeus, 1758)									1							1	1			
<i>Gymniura altavella</i> (Linnaeus, 1758)				1																
Actinopterygii																				

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Apogon imberbis</i> (Linnaeus, 1758)																				
* <i>Apogonichthyoides nigripinnis</i> (Cuvier, 1828) (= <i>Apogon nigripinnis</i>)			3										1							
Atherinidae sp.	3													3	3					
* <i>Atherinomorus lacunosus</i> (Forster, 1801)	3													3						
<i>Belona belone</i> (Linnaeus, 1761)														1						
Blennidae spp.														1						
<i>Boops boops</i> (Linnaeus, 1758)	3								3					3						
<i>Bothus podas</i> (Delaroche, 1809)	1		1			1														
<i>Chromis chromis</i> (Linnaeus, 1758)	3								3		3			3	2				3	
<i>Coris julis</i> (Linnaeus, 1758)	2								2					2		2	2	2		
<i>Dactylopterus volitans</i> (Linnaeus, 1758)																				
<i>Diplodus cervinus</i> (Lowe, 1838)									1					1						
<i>Diplodus sargus</i> (Linnaeus, 1758)	3								1					3						
<i>Diplodus vulgaris</i> (Geoffroy Saint-Hilaire, 1817)														2						2
* <i>Enchelycore anatina</i> (Lowe, 1841)																				
<i>Epinephelus costae</i> (Steindachner, 1878)									1		1								1	
<i>Epinephelus marginatus</i> (Lowe, 1834)	1								1					1						
<i>Gobius bucchichi</i> Steindachner, 1870																				
<i>Gobius cobitis</i> Pallas, 1814																				
<i>Gobius geniporus</i> Valenciennes, 1837									1											
<i>Gobius vittatus</i> Vinciguerra, 1883																				
<i>Gobius</i> sp.	1																			

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
<i>Labrus merula</i> Linnaeus, 1758																				2
<i>Lipophrys nigriceps</i> (Vinciguerra, 1883)																				
<i>Lithognathus mormyrus</i> (Linnaeus, 1758)	2																			
Mugilidae spp.	2																			
<i>Mullus surmuletus</i> Linnaeus, 1758	2																	2		
<i>Muraena helena</i> Linnaeus, 1758									1						2			1		1
<i>Mycteroperca rubra</i> (Bloch, 1793)	1											1		1						
<i>Oblada melanura</i> (Linnaeus, 1758)	3													3						
<i>Pagellus acarne</i> (Risso, 1827)			2																	
<i>Pagellus erythrinus</i> (Linnaeus, 1758)																				
* <i>Pempheris vanicolensis</i> Cuvier, 1831	3		1											3						
<i>Pomadasys incisus</i> (Bowdich, 1825)																				
<i>Pomatoschistus</i> sp.						2						2								
* <i>Pseudocaranx dentex</i> (Bloch & Schneider, 1801)																				
* <i>Sargocentron rubrum</i> (Forsskål, 1775)	2								1		2			2	2			3		3
* <i>Scorpaena maderensis</i> Valenciennes, 1833	1													1						
<i>Scorpaena porcus</i> Linnaeus, 1758																				
<i>Scorpaena scrofa</i> Linnaeus, 1758																				
<i>Serranus cabrilla</i> (Linnaeus, 1758)				1	1											1	2	1		
<i>Serranus hepatus</i> (Linnaeus, 1758)			1	3																
<i>Serranus scriba</i> (Linnaeus, 1758)														2						
* <i>Siganus luridus</i> (Rüppell, 1829)	2								3					2				2		2

STATIONS/SPECIES	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
* <i>Siganus rivulatus</i> Forsskål, 1775	3								3					3				3	3	2
<i>Sparisoma cretense</i> (Linnaeus, 1758)	3								3					3		2		3	3	2
* <i>Sphyraena chrysotaenia</i> Klunzinger, 1884	2													2						
* <i>Stephanolepis diaspros</i> Fraser-Brunner, 1940			1							1		1		1	1	1				
<i>Symphodus ocellatus</i> Forsskål, 1775																				
<i>Symphodus tinca</i> (Linnaeus, 1758)																				
<i>Thalassoma pavo</i> (Linnaeus, 1758)	3								2		2			3				2		
* <i>Torquigener flavimaculosus</i> Hardy & Randall, 1983			1														1			
<i>Tripterygion melanurus</i> Guichenot, 1850														1						
* <i>Upeneus moluccensis</i> (Bleeker, 1855)																				
* <i>Upeneus pori</i> Ben-Tuvia & Golani, 1989	1																			
<i>Xyrichtys novacula</i> (Linnaeus, 1758)										1			1					1		

STATIONS/SPECIES	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	OS
MACROALGAE																			
Chlorophyta																			
<i>Bryopsis plumosa</i> C.Agardh, 1823																	2		
<i>Caulerpa prolifera</i> (Forsskål) J.V.Lamouroux, 1809			3																
* <i>Caulerpa scalpelliformis</i> (R.Brown ex Turner) C.Agardh, 1817												3							
<i>Cladophora</i> sp.																	2		
* <i>Cladophoropsis modonensis</i> (Kützinger) Reinbold, 1905					2			2											
<i>Codium bursa</i> (Olivi) C.Agardh, 1817												1							
* <i>Codium fragile</i> (Suringar) Hariot, 1889																			Ra
<i>Codium taylorii</i> P.C.Silva, 1960	2				2			2			2							3	
<i>Dasycladus vermicularis</i> (Scopoli) Krasser, 1898																	1		
<i>Flabellia petiolata</i> (Turra) Nizamuddin, 1987				3								3							
<i>Ulva compressa</i> Linnaeus, 1753 (= <i>Enteromorpha compressa</i>)																	3		
<i>Ulva intestinalis</i> Linnaeus, 1753 (= <i>Enteromorpha intestinalis</i>)					3														
<i>Ulva</i> sp.					3								2				2	3	
<i>Valonia utricularis</i> (Roth) C.Agardh, 1823																	1		
Phaeophyta																			
<i>Arthrocladia villosa</i> (Hudson) Duby, 1830									3			2			3				
<i>Colpomenia sinuosa</i> (Mertens ex Roth) Derbès & Solier, 1851																			
<i>Cystoseira compressa</i> (Esper) Gerloff & Nizamuddin, 1975																	1		
<i>Cystoseira dubia</i> Valiante												2							
<i>Dictyota dichotoma</i> (Hudson) J.V.Lamouroux, 1809								1	2										

STATIONS/SPECIES	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	OS
<i>Dictyota linearis</i> (C.Agardh) Greville, 1830						3									2				
<i>Hydroclathrus clathratus</i> (C.Agardh) M.A.Howe, 1920							3												
<i>Lobophora variegata</i> (J.V.Lamouroux) Womersley ex E.C.Oliveira, 1977					1			1			1			1					
* <i>Padina boergesenii</i> Allender & Kraft, 1983 or <i>P. antillarum</i> (= <i>P. tetrastomatica</i>)						3													
<i>Padina pavonica</i> (Linnaeus) Thivy, 1960					2	2	3												
<i>Ralfsia verrucosa</i> (J.E.Areschoug) J.E.Areschoug, 1845																	2		
<i>Sargassum</i> cf. <i>hornschurchii</i> C.Agardh, 1820																			
<i>Sargassum vulgare</i> C.Agardh, 1820					1		1											3	
<i>Sphacelaria</i> sp.																		2	
<i>Stypocaulon scoparium</i> (Linnaeus) Kützing, 1843	2				3													2	
<i>Styopodium schimperi</i> (Buchinger ex Kützing) Verlaque & Boudouresque, 1991						3			1										
<i>Taonia atomaria</i> (Woodward) J.Agardh, 1848																			E
Rhodophyta																			
* <i>Acanthophora nayadiformis</i> (Delile) Papenfuss, 1968					2													1	
<i>Amphiroa cryptarthrodia</i> Zanardini, 1844							1												
<i>Amphiroa rigida</i> J.V.Lamouroux, 1816	2				2		3	3			2			2				2	
<i>Bonnemaisonia asparagoides</i> (Woodward) C.Agardh, 1822						3													
<i>Botryocladia botryoides</i> (Wulfen) Feldmann, 1941									2										
<i>Chylocladia verticillata</i> (Lightfoot) Bliding, 1928																			
<i>Ceramium virgatum</i> Roth, 1797 (= <i>C. rubrum</i>)																			
<i>Ceramium</i> sp.																		3	
Ceramiales sp.												3							

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Corallina elongata</i> J.Ellis & Solander, 1786	3				3			3			3		3	3			3	3	
* <i>Galaxaura rugosa</i> (J.Ellis & Solander) J.V.Lamouroux, 1816					2		2												
* <i>Ganonema farinosum</i> (J.V.Lamouroux) K.C.Fan & Yung C.Wang, 1974 (= <i>Liagora farinosa</i>)					3												3		
<i>Gracillaria</i> sp.																			
<i>Halymenia floresia</i> (Clemente) C. Agardh, 1807										1									
<i>Hildenbrandia rubra</i> (Sommerfelt) Meneghini, 1841					3													3	
<i>Hypnea musciformis</i> (Wulfen) J.V.Lamouroux, 1813																			
* <i>Hypnea cornuta</i> (Kützting) J.Agardh, 1851 (= <i>H. spinella</i>)																		2	
<i>Jania rubens</i> (Linnaeus) J.V.Lamouroux, 1816	3				3	3	3	3			3		3				3		
<i>Lithophyllum incrustans</i> Philippi, 1837					3		3	3			3			3			3	3	
<i>Lithophyllum papillosum</i> Zanardini ex Hauck, 1885																		2	
<i>Lithophyllum stictaeforme</i> (J.E.Areschoug) Hauck, 1877 (= <i>Psudolithophyllum expansum</i>)													3						
<i>Lithophyllum</i> sp.														2					
<i>Mesophyllum alternans</i> (Foslie) Cabioch & Mendoza, 1998 (= <i>M. lichenoides</i>)					1			1			1	2	1		2				
<i>Neogoniolithon brassica-florida</i> (Harvey) Setchell & L.R.Mason, 1943					2														
<i>Neogoniolithon mamillosum</i> (Hauck) Setchell & L.R.Mason, 1943						3	2								2				
<i>Osmundaria volubilis</i> (Linnaeus) R.E.Norris, 1991																			RS
<i>Palisada perforata</i> (Bory de Saint-Vincent) K.W.Nam, 2007 (= <i>Laurencia papillosa</i>)					2													3	
<i>Parviphycus tenuissimus</i> (Feldmann & Hamel) B.Santelices, 2004 (= <i>Gelidiella pannosa</i>)																		3	
<i>Peyssonnelia</i> spp.							3				2		3	2	2				
<i>Phymatolithon calcareum</i> (Pallas) W.H.Adey & D.L.McKibbin, 1970									2			2							
<i>Phymatolithon lenormandii</i> (J.E.Areschoug) W.H.Adey, 1966					3												2	2	

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Plocamium cartilagineum</i> (Linnaeus) P.S.Dixon, 1967													3						
<i>Pterocladia capillacea</i> (S.G.Gmelin) Santelices & Hommersand, 1997					3													3	
<i>Schottera nicaeensis</i> (J.V. Lamouroux ex Duby) Guiry & Hollenberg, 1975					3													2	
<i>Sebdenia</i> sp. ?									1										
<i>Solieria filiformis</i> (Kützting) P.W.Gabrielson, 1985																	1		
<i>Spongites fruticulosa</i> Kützting, 1841				2					3			3			1				
Magnoliophyta																			
<i>Cymodocea nodosa</i>																			
* <i>Halophila stipulacea</i> (Forsskål) Ascherson, 1867																			RC
INVERTEBRATA																			
Porifera																			
<i>Acanthella acuta</i> Schmidt, 1862													1	1					
<i>Aplysina aerophoba</i> Nardo, 1833						3	2			1				2					
<i>Aplysina</i> sp.																		3	
<i>Axinella damicornis</i> (Esper, 1794)										1									
<i>Axinella</i> sp. (≈ <i>A. polypoides</i>)													2	3					
<i>Calcarea</i> spp. (<i>Sycetusa</i> , <i>Vosmaeropsis</i>)	1				3			1			1		2	1				3	
<i>Chondrilla nucula</i> Schmidt, 1862								2									1		
<i>Chondrosia reniformis</i> Nardo, 1847	2				3			2			2		3	2			2	3	
<i>Cinachyrella levantiniensis</i> Vacelet et al, 2007						1								1					
<i>Ciocalypta carballoi</i> Vacelet et al, 2007 (= <i>Coelocaplypta carballoi</i>)																			RS
<i>Clathrina clathrus</i> (Schmidt, 1864)					2														

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Clathrina</i> cf. <i>coriacea</i> (Montagu, 1818)					2													2	
<i>Clathrina rubra</i> Sará, 1958					1														
<i>Cliona viridis</i> (Schmidt, 1862)					3	3													
<i>Cliona parenzani</i> Corriero & Scalera, 1997	2				2			2			2			2			2		
<i>Crambe crambe</i> (Schmidt, 1862)	2				3	3	3	2	2	3	2	3	2	2	3		2	2	
<i>Cymbaxinella</i> sp.									1	2		1	1	1					
<i>Diplastella</i> sp.													1						
<i>Euryspongia raouchensis</i> Vacelet et al., 2007																		2	
<i>Gastrophanella phoeniciensis</i> Perez et al., 2004													3					2	
<i>Ircinia</i> sp.					2	1			1										
<i>Geodia</i> sp. (= <i>Isops</i>).					?								1						
<i>Microscleroderma lamina</i> Perez et al., 2004													3						
<i>Mycale (Carmia) sanguinea</i> Tsumamal, 1969					1			1			1		1						
<i>Mycale</i> sp.									2	1									
<i>Myrmekioderma spelaeum</i> (Pulitzer-Finali, 1983)													1						
<i>Niphates toxifera</i> Vacelet et al, 2007					2	2	2	3			2								
<i>Aplysilla sulfurea</i> ? Schulze, 1878																		1	
<i>Petrosia (Petrosia) ficiformis</i> (Poiret, 1789)					2		1			2	1		2	1				2	
<i>Phorbas tenacior</i> (Topsent, 1925)	1										1		1						
<i>Phorbas topsenti</i> Vacelet & Perez, 2008 (= <i>P. paupertas</i>)	1				2	2	2	1		2	1	1	1	1			1	2	
<i>Placospongia decorticans</i> (Hanitsch, 1895)													1						
<i>Sarcotragus fasciculatus</i> (Pallas, 1766) (= <i>Ircinia fasciculata</i>)	1				1			1			1		1	1					

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Sarcotragus spinosulus</i> Schmidt, 1862	1				2	1		1			1		1	1	1		1		
<i>Spirastrella cunctatrix</i> Schmidt, 1868													1						
<i>Spongia (Spongia) officinalis</i> Linnaeus, 1759					1								1					1	
<i>Sycon</i> sp.	1					1		1			1		1	1	2		1	1	
<i>Terpios granulosa</i> Bergquist, 1967					1								2	1	1			2	
Cnidaria																			
Hydrozoa																			
<i>Aglaophenia kirchenpaueri</i> ? (Heller, 1868)															2				
<i>Aglaophenia octodonta</i> ? Heller, 1868																		2	
<i>Aglaophenia</i> sp.														2					
<i>Eudendrium carneum</i> Clarke, 1882						2													
<i>Eudendrium glomeratum</i> Picard, 1952																			
<i>Eudendrium</i> sp.	2					3			3	2	2			2	2			2	
* <i>Macrorhynchia philippina</i> Kirchenpauer, 1872	1										1		1	1					
<i>Pennaria disticha</i> (Goldfuss, 1820) (= <i>Halocordyle disticha</i>)	2										2		3	2			2	3	
Plumularidae sp.									3										
<i>Sertularella</i> sp.																		2	
Anthozoa																			
<i>Actinia schmidti</i> Sole-Cava & Thorpe, 1997					1														
<i>Cerianthus</i> sp.																			
<i>Madracis pharensis</i> (Heller, 1868)									2		1		2	1					
* <i>Oculina patagonica</i> de Angelis, 1908	1																1		

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Phylangia americana mouchezii</i> (Lacaze-Duthiers, 1897)											1		2	1				3	
<i>Polycyathus muelleræ</i> (Abel, 1959)					1								2					3	
Polychaeta																			
<i>Ditrupa arietina</i> (O. F. Müller, 1776)																			
<i>Filograna</i> sp.																		2	
<i>Hermodice carunculata</i> (Pallas, 1766)	3				3			3			3	1	2	3				2	
Nereidae indet.																			
<i>Protula</i> sp.														2					
Sabellidae sp.																		1	
* <i>Spirobranchus kraussii</i> (Baird, 1865) (= <i>Pomatoleios kraussii</i>)																		2	
* <i>Spirobranchus lamarcki</i> (Quatrefages, 1866) (= <i>Pomatoceros lamarckii</i>)	2						2	2					1	2	2				
* <i>Spirobranchus tetraceros</i> (Schmarda, 1861)	2																		
<i>Sabella spallanzanii</i> (Gmelin, 1791) (= <i>Spirographis spallanzani</i>)											1								
Spirorbidae sp.																		3	
Crustacea																			
Cirripedia																			
* <i>Balanus trigonus</i> Darwin, 1854	1				1			1			1		1	1	2				
<i>Chthamalus montagui</i> Southward, 1976	3				3			3			3		3	3				3	
<i>Chthamalus stellatus</i> (Poli, 1795)					3													3	
<i>Perforatus perforatus</i> (Bruguère, 1789) (= <i>Balanus perforatus</i>)	3				3	2		3			3		3	3				3	
Isopoda																			
<i>Ligia italica</i> Fabricius, 1798																		3	

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
Decapoda																			
* <i>Atergatis roseus</i> (Rüppell, 1830) (tests)					1						1		1						
<i>Calcinus tubularis</i> (Linnaeus, 1767)						3													
* <i>Charybdis (Charybdis) hellerii</i> (A. Milne-Edwards, 1867)					2			2			2		2						
<i>Clibanarius erythropus</i> (Latreille, 1818)					3		2	3						3			3		
<i>Dardanus calidus</i> (Risso, 1827)																			RS
<i>Diogenes pugilator</i> (Roux, 1829)																			
<i>Eriphia verrucosa</i> (Forskål, 1775) (= <i>E. spinifrons</i>)					1			1									1		
Galatheididae sp.																			
<i>Maja goltziana</i> d'Oliveira, 1888																			F
* <i>Myra fugax</i> (Fabricius, 1798) (tests)																			
<i>Pachygrapsus marmoratus</i> (Fabricius, 1787)					1												1		
<i>Pagurus anachoretus</i> Risso, 1827													1	1					
* <i>Percnon gibbesi</i> (H. Milne-Edwards, 1853)																			
<i>Pilumnus hirtellus</i> (Linnaeus, 1761)					1						1	1							
Mollusca																			
Polyplacophora																			
<i>Acanthochitona fascicularis</i> (Linnaeus, 1767)	1				1														
<i>Chiton (Rhyssoplax) olivaceus</i> Spengler, 1797																	1		
Gastropoda																			
* <i>Cerithium scabricum</i> Philippi, 1848	3				3						3			3			3		
<i>Columbella rustica</i> (Linnaeus, 1758)	2				2			2			2								

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
* <i>Conomurex persicus</i> (Swainson, 1821) (= <i>Strombus persicus</i>)	3				3	3		3		2	3		2	3			3	3	
<i>Conus ventricosus</i> Gmelin, 1791 (= <i>C. mediterraneus</i>)																	1		
<i>Dendropoma petraeum</i> (Monterosato, 1884)					2												2		
* <i>Echinolittorina punctata</i> (Gmelin, 1791)					3												3		
* <i>Elysia grandifolia</i> Kelaart, 1857					1														
* <i>Ergalatax junionae</i> Houart, 2008 (= <i>E. obscura</i>)	3				3			3			3		3	3			3	1	
<i>Erosaria spurca</i> (Linnaeus, 1758) (shells)											1								
<i>Euthria cornea</i> (Linnaeus, 1758) (= <i>Buccinum corneum</i>)																			
<i>Flabellina affinis</i> (Gmelin, 1791)						3													
* <i>Fusinus verrucosus</i> (Gmelin, 1791) (= <i>F. marmoratus</i>)	1				1												1		
<i>Gibbula</i> spp.																	2		
* <i>Goniobranchus annulatus</i> (Eliot, 1904) (= <i>Chromodoris annulatus</i>)															1				
<i>Hexaplex trunculus</i> (Linnaeus, 1758) (= <i>Murex trunculus</i>)	1				1			1			1								
* <i>Hypselodoris infucata</i> Rüppell & Leuckart, 1831					1														
* <i>Infundibulops erithreus</i> (Brocchi, 1821) (= <i>Trochus erythraeus</i>)	1				1						1			1			1		
<i>Luria lurida</i> (Linnaeus, 1758) (shell)											1								
<i>Melarhappe neritoides</i> (Linnaeus, 1758)					2												2		
* <i>Murex (Murex) forskoehlii</i> Röding, 1798	1							1											
* <i>Nassarius circumcinctus</i> (A. Adams, 1852)																			
<i>Patella caerulea</i> Linnaeus, 1758					3												2		
<i>Patella rustica</i> Linnaeus, 1758	3				3												3		
<i>Patella ulyssiponensis</i> Gmelin, 1791	3				3												3		

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Phorcus articulatus</i> (Lamarck, 1822) (= <i>Osilinus articulatus</i>)																			
<i>Phorcus turbinatus</i> (Born, 1778) (= <i>Osilinus turbinatus</i>)	2				2												2		
* <i>Purpuradusta gracilis</i> (Gaskoin, 1849)											1								
* <i>Rhinoclavis kochi</i> (Philippi, 1848)																			
<i>Semicassis granulata undulata</i> (Gmelin, 1791) (= <i>Phalium undulatum</i>) (shells)																			
<i>Serpulorbis arenarius</i> (Linnaeus, 1767)																			
* <i>Thaisella scacellum</i> (Gmelin, 1791) (= <i>Thais scacellum</i>)								1											
Bivalvia																			
<i>Acanthocardia tuberculata</i> (Linnaeus, 1758) (shells)																			
* <i>Brachidontes pharaonis</i> (P. Fischer, 1870)	3				3			3			3		3				3	3	
* <i>Chama pacifica</i> Broderip, 1835	3				3	3	3	3		3	3		3	3			3	1	
<i>Ctena decussata</i> (O. G. Costa, 1829) (shells)																			
* <i>Gafrarium pectinatum</i> (Linnaeus, 1758)											1								
<i>Glycymeris nummaria</i> (Linnaeus, 1758) (<i>G. insubrica</i>) (shells)																			
* <i>Lioberus agglutinans</i> (Cantraine, 1835) (= <i>Amygdalum agglutinans</i>)								1											
* <i>Malleus regula</i> Forsskål, 1775 (= <i>Malvifundus regulus</i>)	2				2		2	2		2	2		2	2	2			2	
Ostreidae sp.								2						3				2	
* <i>Pinctada imbricata radiata</i> (Leach, 1814)	1				1			1		1	1							1	
<i>Pinna carnea</i> Gmelin, 1791 (= <i>P. pernula</i>)															1				
* <i>Spondylus spinosus</i> Schreibers, 1793	2				2	2	2	2		1	2		2	2			1	1	
<i>Striarca lactea</i> (Linnaeus, 1758)									2			2							
<i>Venus verrucosa</i> Linnaeus, 1758					1														

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
Cephalopoda																			
<i>Octopus vulgaris</i> Cuvier, 1797					2					1	1								
<i>Sepia officinalis</i> Linnaeus, 1758																			RS
Bryozoa																			
<i>Adeonella pallasii</i> (Heller, 1867)									1										
<i>Margaretta cereoides</i> (Ellis & Solander, 1786)					2		2					2						3	
<i>Reteporella grimaldii</i> (Jullien, 1903) (= <i>Sertella septentrionalis</i>)					1						1	2	2						
<i>Schizoporella errata</i> (Waters, 1878)	2				2	1		2			2	2	2						
<i>Schizoretopora hassi</i> Harmelin, Bitar, Zibrowius, 2007													1	1				2	
Echinodermata																			
Asteroidea																			
<i>Coscinasterias tenuispina</i> (Lamarck, 1816)												1							
<i>Echinaster (Echinaster) sepositus</i> (Retzius, 1783)						2						1							
Ophiuroidea																			
* <i>Ophiactis</i> sp. (<i>O. parva</i> or <i>savignyi</i>)																			
<i>Ophiomyxa pentagona</i> (Lamarck, 1816)													1						
Echinoidea																			
<i>Arbacia lixula</i> (Linnaeus, 1758)					1		2						1						
<i>Brissus unicolor</i> (Leske, 1778) (tests)						1				1									
<i>Echinoardium mediterraneum</i> (Forbes, 1844) (tests)																			
<i>Paracentrotus lividus</i> (Lamarck, 1816)					1		2						1	1			1		
Holothuroidea																			

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Holothuria (Panningothuria) forskali</i> Delle Chiaje, 1823																			
<i>Holothuria (Platyperona) sanctori</i> Delle Chiaje, 1823											1								
<i>Holothuria (Holothuria) tubulosa</i> Gmelin, 1791													1						
* <i>Synaptula reciprocans</i> (Forsk., 1775)					1														
Ascidacea																			
<i>Ascidia cf. mentula</i> Müller, 1776												1							
<i>Botrylloides leachii</i> (Savigny, 1816)					1														
<i>Cystodytes dellechiajei</i> (Della Valle, 1877) (green)	1											1						1	
<i>Cystodytes dellechiajei</i> (Della Valle, 1877) (violet)	1				1								1					3	
Didemnidae spp.	2				3	2	2	2	2			2	3	2			2	3	
* <i>Herdmania momus</i> (Savigny, 1816)	2				2		2	2	3			2	2	2			1	3	
* <i>Microcosmus cf. exasperatus</i> Heller, 1878																			
* <i>Phallusia nigra</i> Savigny, 1816	2				2		2						2	2			2	3	
Polyclinidae sp.									2										
<i>Pycnoclavella</i> sp.																		1	
<i>Pyura dura</i> (Heller, 1877)																		3	
* <i>Symplegma brakenhielmi</i> (Michaelsen, 1904)													1					2	
ICHTHYOFAUNA																			
Elasmobranchii																			
<i>Dasyatis pastinaca</i> (Linnaeus, 1758)					1														
<i>Gymniura altavella</i> (Linnaeus, 1758)																			
Actinopterygii																			

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Apogon imberbis</i> (Linnaeus, 1758)	1				1	1		1					1	1					
* <i>Apogonichthyoides nigripinnis</i> (Cuvier, 1828) (= <i>Apogon nigripinnis</i>)					1														
Atherinidae sp.			3										3						
* <i>Atherinomorus lacunosus</i> (Forster, 1801)																			
<i>Belona belone</i> (Linnaeus, 1761)																			
Blennidae spp.																			
<i>Boops boops</i> (Linnaeus, 1758)																			
<i>Bothus podas</i> (Delaroche, 1809)																			
<i>Chromis chromis</i> (Linnaeus, 1758)	3				3	3	2	3			3		3	3					
<i>Coris julis</i> (Linnaeus, 1758)	2				2	3	2	2	2	2	2	2	2	2	3		3		
<i>Dactylopterus volitans</i> (Linnaeus, 1758)																			F
<i>Diplodus cervinus</i> (Lowe, 1838)											1								
<i>Diplodus sargus</i> (Linnaeus, 1758)	3				3	2	1	3			3		3	3			2		
<i>Diplodus vulgaris</i> (Geoffroy Saint-Hilaire, 1817)	2				2			2			2			2			2		
* <i>Enchelycore anatina</i> (Lowe, 1841)																			Ra
<i>Epinephelus costae</i> (Steindachner, 1878)						1													
<i>Epinephelus marginatus</i> (Lowe, 1834)	1				1	1		1			1		1	1			1		
<i>Gobius bucchichi</i> Steindachner, 1870										2	1								
<i>Gobius cobitis</i> Pallas, 1814					1														
<i>Gobius geniporus</i> Valenciennes, 1837									1			2			2				
<i>Gobius vittatus</i> Vinciguerra, 1883												1			1				
<i>Gobius</i> sp.																			

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
<i>Labrus merula</i> Linnaeus, 1758																			
<i>Lipophrys nigriceps</i> (Vinciguerra, 1883)					1														
<i>Lithognathus mormyrus</i> (Linnaeus, 1758)					2		1												
Mugilidae spp.					2														
<i>Mullus surmuletus</i> Linnaeus, 1758					2		2							2					
<i>Muraena helena</i> Linnaeus, 1758					1	1		1			1								
<i>Mycteroperca rubra</i> (Bloch, 1793)	1				1	2		1			1		1						
<i>Oblada melanura</i> (Linnaeus, 1758)	3				3			3			3		3						
<i>Pagellus acarne</i> (Risso, 1827)																			
<i>Pagellus erythrinus</i> (Linnaeus, 1758)																			F
* <i>Pempheris vanicolensis</i> Cuvier, 1831	3				3			3			3		3	3				3	
<i>Pomadasys incisus</i> (Bowdich, 1825)					1	1							1						
<i>Pomatoschistus</i> sp.																			
* <i>Pseudocaranx dentex</i> (Bloch & Schneider, 1801)													2						
* <i>Sargocentron rubrum</i> (Forsskål, 1775)	2				2	2	1	2		3	2		2	2					
* <i>Scorpaena maderensis</i> Valenciennes, 1833	1				1	1	1	1		1	1		1	1				1	
<i>Scorpaena porcus</i> Linnaeus, 1758					1			1					1						
<i>Scorpaena scrofa</i> Linnaeus, 1758																			F
<i>Serranus cabrilla</i> (Linnaeus, 1758)						2	1		2		1	2		1	2				
<i>Serranus hepatus</i> (Linnaeus, 1758)												2			1				
<i>Serranus scriba</i> (Linnaeus, 1758)					2	1	2	2						2					
* <i>Siganus luridus</i> (Rüppell, 1829)	2					2		2			2		1	2			1		

STATIONS/SPECIES	21	22	23	24	25	27	28	29	30	31	32	33	34	35	36	37	38	39	OS
* <i>Siganus rivulatus</i> Forsskål, 1775	3					3		3			3		2	3			2		
<i>Sparisoma cretense</i> (Linnaeus, 1758)	3				3	2		3		2	3		3	3			2		
* <i>Sphyraena chrysotaenia</i> Klunzinger, 1884					2														
* <i>Stephanolepis diaspros</i> Fraser-Brunner, 1940	1					1											1		
<i>Symphodus ocellatus</i> Forsskål, 1775										1									
<i>Symphodus tinca</i> (Linnaeus, 1758)					1														
<i>Thalassoma pavo</i> (Linnaeus, 1758)	3				3	2	2	3		2	3		3	3			3		
* <i>Torquigener flavimaculosus</i> Hardy & Randall, 1983						2	1			1					2				
<i>Tripterygion melanurus</i> Guichenot, 1850	1				1						1						1	2	
* <i>Upeneus moluccensis</i> (Bleeker, 1855)					1														
* <i>Upeneus pori</i> Ben-Tuvia & Golani, 1989																			
<i>Xyrichtys novacula</i> (Linnaeus, 1758)																			

Remark: Station 26 was deleted

**Regional Activity Centre
for Specially Protected Areas (RAC/SPA)**

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