

# CIGESMED



## PROJECT INTERIM REPORT

### PERIODIC REPORT: 1<sup>ST</sup> INTERIM REPORT

**Period covered:** from 01.03.2013 to 28.02.2014

**Project acronym:** CIGESMED

**Project title:** Coralligenous based Indicators to evaluate and monitor the "Good Environmental Status" of the Mediterranean coastal waters

**Grant Agreement number:**

- FR - CNRS - ANR convention n° 12-SEAS-0001-01
- FR - LIGAMEN - ANR convention n° 12-SEAS-0001-02
- FR - IFREMER - ANR convention n° 12-SEAS-0001-03
- GR - GSRT - 12SEAS-12-C2
- TR - Tübitak contract n° 112Y393

**Name, title and organisation of the project's coordinator:**

Jean-Pierre Féral, Centre National de la Recherche Scientifique, IMBE: Institut Méditerranéen de Biodiversité et d'Ecologie marine et continentale

**Tel:** (33) 4 91 04 16 14

**E-mail:** jean-pierre.feral@imbe.fr

**Project website address:** <http://www.cigesmed.eu/>



## WORK PACKAGE 1:

# MANAGEMENT, COORDINATION & REPORTING

WORK PACKAGE LEADER: JEAN-PIERRE FÉRAL (CNRS-IMBE)

PARTNERS CONTRIBUTING: HCMR; LIGAMEN

## PROJECT OBJECTIVES FOR THE PERIOD

The main objectives of WP1 during the first year of CIGESMED implementation were to oversee the administration, financial, operational management, and overall implementation of the project; to organize and administer consortium networking and governance, including supporting relevant bodies; and to establish the Committee of External Advisors

## WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

### TASK 1.1: MANAGERIAL STRUCTURE [M1-M36].

#### REVISION OF CIGESMED DESCRIPTION OF WORK

Following remarks sent in the reports from the International Scientific Evaluation Committee SEAS-ERA meeting 3<sup>rd</sup> Sept 2012, CIGESMED description of work was revised in order to achieve the 'Very Good' ranking. This revision followed advices set out in the project assessment by the International Scientific Evaluation Committee SEAS-ERA and was communicated to SEAS-ERA on the 16<sup>th</sup> of April 2013.

#### ADMINISTRATIVE OBLIGATIONS

Due to the financial scheme of the EraNet program, each partner had to meet its national funding agency administrative requirement. CNRS validated the French budget which was validated by the French funding agency ANR. HCMR had to submit a technical annex to the Greek GSRT for approval. Each partner signed a funding convention with its national agency registered under the following references:

- FR - CNRS - ANR convention n° 12-SEAS-0001-01
- FR - LIGAMEN - ANR convention n° 12-SEAS-0001-02
- FR - IFREMER - ANR convention n° 12-SEAS-0001-03
- GR - GSRT - 12SEAS-12-C2
- TR - Tübitak contract n° 112Y393

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## CONSORTIUM AGREEMENT

Preparation and negotiation of the Consortium Agreement (CA) was carried out. The CA establishes rights, responsibilities, and liabilities of partners, overall legal and contractual management of the project, provisions for conflict management, also including recommendations for equality / gender aspects, and open access principles. The CA negotiations were finalized on month 1 (April 2013) of the project and signed by all partners. CIGESMED CA is attached in [annex1](#).

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## STEERING COMMITTEE

The steering committee (SC) is made up of the general coordinator, the national coordinators and the work package leaders. The SC is responsible for all practical decision making, strategic planning and implementation of CIGESMED consortium. All SC meetings are chaired by the general coordinator.

The members are:

- Christos ARVANITIDIS; HCMR, national coordinator for Greece, WP 5 co-leader and WP 7 leader
- Anne CHENUIL; IMBE, WP 4 leader
- Melih Ertan ÇINAR ; EGE, national coordinator for Turkey, WP 2 leader
- Romain DAVID ; IMBE, WP 6 co-leader
- Emilie EGEE; IMBE, project manager
- Jean-Pierre FERAL ; IMBE, general coordinator (WP 1), WP 5 co-leader
- Anthony FREMAUX, LIGAMEN, WP 6 co-leader
- Drosos KOUTSOUBAS ; NMPZ
- Stéphane SARTORETTO ; IFREMER, WP3 leader

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## SUBCONTRACTING

Commitment between the coordinator (CNRS-IMBE) and its subcontractor the NATIONAL MARINE PARK OF ZAKYNTHOS (NMPZ) was also made up. With this commitment and upon CNRS's request, NMPZ agrees to undertake the provision of a service entitled: "Coralligenous survey in the North-East Mediterranean" to evaluate the benthic populations of coralligen in Zakynthos area through visual census, image processing and quadrats methods, to investigate their basic demographic characteristics, evaluate the main threats and disturbances considering the species, assess biotic and abiotic factors influencing coralligenous habitat, evaluate necrosis of benthic key and implement a monitoring plan through recurrent photographic sampling. NMPZ commits to test coralligen quality indexes/indicators, to develop a database for species and habitats, to produce maps, to evaluate globally and in an integrated way the coralligen communities and to efficiently protect and manage them. Furthermore within the citizens participative concept, the NMPZ commits to contribute to develop, at the local and national level, a network (citizen science

network) involving the main stakeholders, in order to ensure a long term and efficient protection, to sensitize the different users of the marine area and to resolve potential conflicts of interests between them. The progress activity report for NMPZ first year of activities is attached in [annex 2](#) to this interim report.

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## KICK OFF MEETING & FIRST GENERAL ASSEMBLY

CIGESMED kick-off meeting was held from April 2013, 17<sup>th</sup> to 19<sup>th</sup> in Crete at the Hellenic Centre for Marine Research, in the seminar room of the Institute of Marine Biology, Biotechnology and Aquaculture. 24 participants representing each of the 5 partners as well as the NMPZ were present. The agenda, published on CIGESMED website (<http://www.cigesmed.eu/-Kickoff-meeting-2013->), provided specific slots for each WP and also for work-groups (WG) intended to define common methods, protocols, sites of study, data management. For each WP, the PowerPoint presentation as well as the conclusion report of the KoM is published on CIGESMED website <[www.cigesmed.eu/-Kickoff-meeting-reporting-](http://www.cigesmed.eu/-Kickoff-meeting-reporting-)>.

The first general assembly addressed some important points such as the consortium agreement which purpose is to specify the relationship among the parties with respect to the project, in particular concerning the organization of the work between the parties, the management of the project and the rights and obligations of the parties. This meeting also summed up details on the reporting form and tempo, CIGESMED dashboard, communication lists and time line.

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## SECOND GENERAL ASSEMBLY

The second GA will be hosted by EGE partner and be held in Izmir from May 6<sup>th</sup> to 9<sup>th</sup>. One month before its tenure, 30 participants of the 3 countries are registered to date. Members of the Committee of External Advisors have also been invited to participate. Similarly to the KoM, the agenda, will provide specific slots for each WP and also for work-groups.

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## COMMITTEE OF EXTERNAL ADVISORS (CEA)

As many consortium dealing with a very broad topic, CIGESMED need advice in fields outside of its expertise and geographic coverage. CIGESMED is a SeasEra project, a call which was eligible only to three Mediterranean countries, France Greece and Turkey, yet the coralligenous habitat and scientists are found beyond those limits. As soon as in its very first phase, CIGESMED decided to create an advisory committee, partly standing alone, but also subcommittees and ad hoc working groups to bring additional needed expert insight into a field. The goal is to extend our circle of contacts and perhaps developing new business, getting new perspectives and ideas.

The CIGESMED advisory committee is not a governing authority. It will: Assist the governance and the coordination of the project

- Communicate and upgrade the impact of the different networks
- Perpetuate the observation system



The CEA includes scientists, stakeholders and policy-makers who will meet at an annual basis. It aims at providing advice on all aspects of the execution of the project to ensure CIGESMED to meet its objectives and to prepare future proposals. The chairman will be elected to run the CEA, ensure effective meetings and act as an intermediary between the SC and the advisers. The committee should present an annual written plan of action that includes a formal evaluation of the committee's activities and accomplishments each year (members duties). The CEA members will sign an agreement. They will serve 2 years (renewable). Vacancies on the committee will be filled by co-optation. The first formal meeting of the CEA will be discussed in the second general assembly and planned for autumn 2014.

Still in construction, the CEA is today composed of 9 personalities listed below with their relevant activities regarding CIGESMED <<http://www.cigesmed.eu/-Committee-of-External-Advisors-CEA->>:

- Enric BALLESTEROS SEGARRA, Spain, CEAB-Centre d'Estudis Avançats, Departamento de Ecologia Marina
- Angel BORJA, Spain, AZTI-tecnalia, FP7-DEVOTES
- Denis COUVET, France, MNHN, CESCO Centre d'Ecologie et de Sciences de la Conservation
- Joaquim GARRABOU, Spain, Institut de Ciències del Mar, ICM-MEDRECOVER
- Xavier LE ROUX, France, INRA, BIODIVERSA
- Paula MOSCHELLA, Monaco, CIESM-The Mediterranean Science Commission, Tropical Signals Program
- Anna OCCIPINTI, Italy, Università degli Studi di Pavia, Laboratorio de Ecologia
- Samuel ROBERT, France, laboratory « Étude des Structures, des Processus d'Adaptation et des Changements de l'Espace », OHM littoral méditerranéen
- Georgios TSOUNIS, Germany, ZMT, Department of infrastructure

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## MAPPING OF PARTNERS COMPETENCIES

The mapping of Partners competencies correspond to the deliverable D1.1.1. of the project. A beta version is operational since June 2013 but improvements are still needed (see WP6 "Developing the mapping algorithm" section).

A Knowledge Tree (KT) is the dynamic mapping of human capital brought by the members of an organization generated via the web with a mapping algorithm. The tree is based on expressions of interests and skills of all individuals who carry this capital. An essential function of the mapping, is to visualize the contribution of each individual to common capital. Everyone can see its unique position compared to others in terms of commonalities and differences. A KT therefore, allows a global vision of human capital, while providing visibility and a possible recognition of each individual contribution. In the trunk of the tree, we see the most shared resources in the community, and in the branches, the differences, specific to an individual or a group.

During CIGESMED's kickoff meeting, we organized a "Knowledge Tree" workshop according to this specific approach of KT. The first step was to identify and name the skills and competencies

needed for the CIGESMED project with comprehensible terms, accessible to all the participants (Tab. 1).

Table 1: Competencies examples and their codification used by the KT algorithm,

Competence	Code
Develop a state of the art of marine descriptors and metrics	4111
Develop a state of the art of marine indicators	4111
Practice scientific diving	4423
Establish a list of reference species	4421
Design a photo data collection protocol	1453
Design a summarization/indexation system for data visualization	1413
Design a data intercalibration method	1413
... to be extended as needed	

The objectives of this competencies identification process were to list the problems to be solved during the CIGESMED's project, i.e. necessary competencies to ensure project success; check the gaps and avoid forgetting required competencies and facilitate the CIGESMED project dissemination.

A competence is identified by using a combination of four criteria referring to the code:

- A type of Action: Do what?
- A type of necessary Mean: With what?
- A type of Finality: For what purpose?
- A type of Deliverable: For what result?

During the kickoff meeting, the " Knowledge Tree " workshop, and each CIGESMED's partner produced his own Web page with two tabs:

- A short personal presentation, such as in social networks.
- The profile of the competencies which he would like to be asked for in the CIGESMED framework.

To highlight the authenticity of the registered competence a descriptive field can be filled with stories of experiences for each of his own competencies.

The KT algorithm generates automatically a KT from the individual competencies profiles. In a tree (Fig. 1), each brick or leaf represents a competence, i.e. a block or area of expertise, and indicates the presence of at least one person. It allows access to all documents already produced by people about this precise competence.

Figure 1: Knowledge tree interface: A/ a competence is selected in yellow on the tree, here “analyses the characteristics of habitats”, and on the right panel, people sharing this competence appear.

B/ a person is selected in yellow on the left panel, here “Jean Pierre Féral”, and on the tree, each of the competencies of this person is highlighted in yellow. On the right panel, partners sharing at least one of this competencies appear.

2133 Analyze the characteristics of habitats

Partners	Needs	Resources
Aikaterini VASILEIADOU,		
Christina PAVLOUDI,		
Christos ARVANITIDIS,		
Eva CHATZINIKOLAOU,		
Jean-Pierre FERAL,		
Kleoniki KEKLIKOGLOU,		
Maria SALOMIDI,		
Maria SINI,		
Melih ÇINAR,		
Nafsika PAPAGEORGIOU,		
Romain DAVID,		
Şermin AÇIK ÇINAR,		

Partners	Needs	Resources
Jean-Pierre FERAL,		
Melih ÇINAR,		
Christina PAVLOUDI,		
Maria SALOMIDI,		
Eva CHATZINIKOLAOU,		
Nafsika PAPAGEORGIOU,		
Christos ARVANITIDIS,		
Romain DAVID,		
Kleoniki KEKLIKOGLOU,		
Maria SINI,		
Sarah FAULWETTER,		
Şermin AÇIK ÇINAR,		
Aikaterini VASILEIADOU,		
Dimitris POURSANIDIS,		
Yiannis ISSARIS,		
Christine PERGENT-MART...		
Christian MARSCHAL,		
Didier AURELLE,		
Drosos KOUTSOUBAS,		
Ferah KOCAK,		
Kerem BAKIR,		

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## TASK 1.2 WORK AND INFORMATION FLOW [M1-M36]

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### DASHBOARD

Concise interim reports have been set up at a bi-annual frequency in order to ensure that the official reporting proceed smoothly. An excel file Dashboard was designed as a diary journal to register actions undertaken by each partners in each WPs. Disseminations and training activities related to CIGESMED as well as deliverable progress are also registered in this document.

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### STAKEHOLDER ENGAGEMENT

WP5 leader synchronized the Greek teams actions in order launch WP5 action to engage stakeholders, policy makers and other potential user groups for the sustainability of the project. Meetings addressed information about CIGESMED and potential activities of stakeholders that could be integrated in the project in order to engage as many interested parties as possible.

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### TRAINING

Besides its research activities, CIGESMED also evolved as a tool for training-by-research of young scientist. In the first year CIGESMED funding allowed to initiate four PhD thesis (two in France and two in Turkey) and to carry out six master thesis:

- Phd supervised by IMBE & IFREMER: **Selman Sakher** (university Algerian): Spatio-temporal variability of bioconstructed circalittoral ecosystems on the northern and southern shores of the Mediterranean basin (Algerian fellowship).
- Phd supervised by IMBE: **Romain David** (Aix-Marseille University): Ecological state of some facies of the Mediterranean coralligenous / methods of implementation of a network of a multi-criteria follow-up at the scale of the French Mediterranean shore and the organization of the various systems of information collection.
- Phd supervised by EGE: **Alper Evcen**: Sponge species distributed in the Levantine and Aegean Seas.
- Phd supervised by EGE: **Senem Onen**: Determination of protection efficiency of the Fethiye-Göçek Specially Protected Area by phtographic methods.
- Master training at IMBE: **Zinovia Erga**: (University of the Aegean) Genetic Structure of Lithophylum species complex, bio-constructor of the coralligenous, a typical Mediterranean ecosystem. Inferences on the connectivity at different spatial scales and ecological facies influences (Greek-French fellowship).
- Master training at IMBE: **Dorian Guillemain**: Light determination and study, an essential factor influencing variability in community repartition and species association in the coralligenous habitat.
- Master training at IMBE: **Laure Thierry De Ville D'Avray** : Coralligen population study across habitat profiles via spatial variability characterization: from sample & photo analysis to results

- Master training at IMBE : **Sophie Dubois** : Genetic Structure of the bryozoan *Myriapora truncat*, bio-constructor of the coralligenous, a typical Mediterranean ecosystem. Inferences on the connectivity at different spatial scales and ecological facies influences.
- Master training at IMBE : **Walid Elguerrabi** : underwater photography database management.
- Master training at EGE **Çağdaş Çelik**.

## PROGRESS OF WP1 DELIVERABLES

Deliverable N°	Title	Delivery month	Deliverable progress (%)										Action taken to date	REMAIN TO DO	
			10	20	30	40	50	60	70	80	90	100			
D1.1.1	CIGESMED map of competences	1	10											Competency list completed; creation of the ontology;	Improve interface ergonomomy
D1.1.2	Consortium agreement negotiation	6	100											CA Final version signed on June 2013 by all partners	
D1.1.3a	Annual progress report	12	100											To be presented at SeasEra Palma de Mallorca April 2014	
D1.1.3b	Annual progress report	24													
D1.1.3c	Final progress report	36													

## WORK PACKAGE 2:

# CORALLIGEN ASSESSMENT AND THREATS

WORK PACKAGE LEADER: MELIH ERTAN ÇINAR (EGE)

PARTNERS CONTRIBUTING: CNRS; HCMR; IFREMER; NMPZ

### WORK PACKAGE OBJECTIVES FOR THE PERIOD

Within the framework of CIGESMED, there are five objectives of WP2;

1. Assessing the coralligenous megabenthic assemblages (habitats) by means of observation, photographic/video surveys;
2. Investigating basic demographic characteristics of key erect associated species populations and disturbances and threats;
3. Assessing biotic (i.e. alien species) and abiotic factors affecting the coralligenous habitats;
4. Quantifying necrosis of gorgonians and other key benthic species and;
5. Establishing a monitoring plan through repetitive photographic samplings.

Within the first year of the project, the main goals were to select study sites for coralligenous assemblages in three countries (Turkey, France and Greece) and to determine a tentative list of coralligenous species that will be used in assessing good environmental status of this proliferating, unique habitat of the Mediterranean Sea. To reach these goals, diving were made in each country and the sites and tentative list of the species have been determined.

The other objectives have also been considered within one year. At sampling sites along the coast of Turkey, repetitive photo-quadratic samples were made and almost all photographs were analyzed by using the software PhotoQuad® (Trygonis & Sini, 2012) (Objectives 1 and 5). At each study site in Turkey, environmental variables (temperature, salinity, secchi disc depth, dissolved oxygen, nutrients, pH) were measured at different depths (0.5 m, 15 m and 25 m) to assess abiotic factors influencing the community structures of coralligenous (objective 3). In addition, sedimentation, which is known to have adverse effects on coralligenous formations (Piazzi et al., 2012), was determined in photo-quadratic samples. Biotic factors such as invasive alien and bio-eroder species (grazers and borers) were also encountered by direct observations (i.e. sea urchins) or via photo-quadratic analyses (Objective 3). At some places, bleaching was observed in some coralline algae. This phenomenon was photographed and quantified by using the software PhotoQuad (Objective 4). The baseline of monitoring the coralligenous habitat is also being developed (Objective 5).

## WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

### TASK 2.1. CHOICE OF THE SITES AND THE SPECIES [MARCH 2013 – MAY 2013]

#### CHOICE OF THE SITES

Site selections for the study of coralligenous assemblages have been completed for three countries (Turkey, Greece and France) involved in the project CIGESMED

Two bays located in the Aegean (Ildir Bay) and Levantine (Fethiye Bay) Seas were selected on the coasts of Turkey. In the bays, well-developed coralligenous formations have been encountered, thanks to two large projects previously implemented in the areas. In Ildir Bay, intensive fish farming (sea bream, sea bass, bluefin tuna) are being done for a long time and benthic habitats in some areas near farming have been largely deteriorated. Choice of sites in this bay was made, considering the distance to the pollution sources (Fig. 1a). In Fethiye Bay, stations were selected according to the proximity to pollution sources (F3), the diving intensity (F2) and the remoteness to any organic inputs (F1) (Fig. 1b). In Greece, many attempts to find suitable coralligenous formations in the islands Crete and Zakynthos, and Korinthiakos Gulf yielded 3 CIGESMED stations (Fig. 1c). In France, seven stations were chosen to examine coralligenous formations in the Gulf of Lions, near Marseille (Figure 1d).

#### CHOICE OF THE SPECIES

The species list is indicated in [annex 4](#) and has been derived from the field observations (Turkey, Greece and France) performed within the year 2013 and the analysis of photo-quadrates (Turkey). The list provided by French colleagues has been constructed by both compiling species inhabiting coralligenous structures on the Mediterranean coast of France from the literature and the field observations. The list contains a total of 267 species belonging to 11 systematic groups and will be updated according to the results of the field works and photo analysis to be performed during the project duration.



Figure 1. Map showing the location of sampling stations : a) in Ildir Bay in the Aegean Sea(left); b) in Fethiye Bay in the Levantine Sea (right); c) in Greece (Aegean and Ionian Seas); d)in France (Lion gulf)



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## TASK 2.2. EASY METHODS FOR BIODIVERSITY AND GOOD HEALTH ASSESSMENTS [APRIL 2013 – FEBRUARY 2015]

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### PHOTOQUADRATE METHODS

A non-destructive method, namely photoquadrate, was selected to allow a rapid assessment of biodiversity of the coralligenous habitat. Despite some disadvantages (i.e. difficulties in identifying specimens from photographs), this method gives promising results quickly if local biota are relatively well known. It is also a good tool to monitor changes in benthic communities due to anthropogenic impacts and climate changes. As coralligenous formations are very fragile and grow slowly, selecting a method that does not destruct coralligenous species, especially erect forms, is crucial.

During the kick-off meeting held in Crete in 2013, this methodology was discussed. One discussion was made regarding the size of the quadrate to be utilized in the different basins of the Mediterranean. It was decided that if coralligenous habitat contains large erect forms such as gorgonians, the frame size should be larger (40 x 40 cm in dimension). In the eastern Mediterranean, especially in the south Aegean Sea and Levantine Sea, where gorgonians are absent or rare, usage of the frame size of 25 x 25 cm was advised.

Coralligenous assemblages at two depths (15 and 25 m depths) will be studied, considering a horizontal line of 10 m. At each depth of stations, 5 random-selected photographs was/will be considered for the analysis of photoquadrates. Although, there are some softwares that have been developed for the estimation of surface areas that species occupy within the quadrate, the software, namely PhotoQuad®, that can be freely downloaded at <http://www.mar.aegean.gr/sonarlab/photoquad/index.php>, was recommended during the kick-off meeting in Crete. This software was designed to facilitate fast, standardized, and comparative analysis of digital benthic images, through the integration of multiple processing methods into a single, layer-based platform.

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## TASK 2.3. COMPARISONS OF IMAGE PROCESSING AND ANALYSIS OF BENTHIC QUADRAT METHODS AND ADAPTATION [AUGUST 2013 – FEBRUARY 2016]

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### IMAGE ANALYSES

At stations in Ildir and Fethiye Bays, several underwater photographs were taken in September and October, 2013, at two depths (15 and 25 m depths) by using the photoquadratic system. After elimination of the unsharp/blurred photographs 5 were randomly selected, coded and then analyzed by using the software photoquad. For applying this process, several meetings were made at Faculty of Fisheries, Ege University and experts responsible for the main taxonomic groups were gathered together for this aim. The steps in the analysis were:

- to determine species and species's borders within the quadrat according to expert's judgment. If a difficulty occurred in determining the species taxonomic position of a specimen/canopy from the picture, it was given as "sp." in the list;
- to determine area/areas on which sediment deposition intensively accumulated. This is important, because sedimentation was known to affect the coralligenous community directly. The cover percentage of sedimentation could be used in the index to be developed to assess the GES of this habitat;
- to encounter burrows of bioeroder species. Some species such as *Rocellaria dubia* and *Lithophaga lithophaga* have characteristic burrows that can be identified from the picture. The data could also be used for the development of index, because the density of bioeroder species increases with increasing organic loads;
- to ascertain areas of algal bleaching within the quadrat. The data could also be used for the development of index.

All photographs (60) taken from sampling sites in Turkey were analyzed. In Ildır Bay, the dominant algae and animal species were *Mesophyllum alternans*, *Caulerpa racemosa* var. *cylindracea*, *Crambe crambe*, *Cliona celata* and *Agales oroides* at 15 m depths. Sediment accounted for maximally 9% of the total area. Almost in all photographic quadrates, algal bleaching was encountered; frequently in *Mesophyllum alternans*, rarely in *Lithothamnion* sp.. *Peyssonnelia squamaria*, *Mesophyllum alternans*, *Crambe crambe*, and *Mesophyllum lichenoides* covered major areas in quadrates at 25 m depths. Sediment covered maximally 57% of the total area. In Fethiye Bay, *Peyssonnelia squamaria*, *Mesophyllum alternans* and *Crambe crambe* dominated the coralligenous habitat at 15 m depth. The percentage of sediment coverage within quadrates ranged from 2% to 32%. Algal bleaching was almost encountered in all quadrates and comprised 16% of total surface of *Mesophyllum alternans*. At 25 m depths, *Peyssonnelia squamaria*, *Mesophyllum alternans*, *M. expansum*, *Pedobesia simplex* and *Agales oroides* covered major areas in quadrates. Sediment coverage is high on coralligenous habitat, ranging from 21% to 59%. Algal bleaching was encountered in some quadrates.

The photo-quadrat analysis revealed some factors that might adversely affect the coralligenous formations. These threats can be classified as;

- 1) sediment deposition;
- 2) invasive alien species;
- 3) factors (i.e. increased temperature?) causing algal bleaching; and
- 4) bioeroder species.

## TASK 2.4. CONTRIBUTION TO THE ASSESSMENT OF INJURIES AND WELL LIVING OF CORALLIGENOUS [JUNE 2014 - FEBRUARY 2016]

### ALGAL BLEACHING

In the first field work held in Autumn 2012 in Ildir and Fethiye Bays, bleaching was frequently recorded in many species, considerably in *Lithophyllum stictaeforme* and *Peyssonnelia squamaria* at station F2. It was observed at station F2 that large surfaces of some thallus of *L. stictaeforme* were totally bleached and covered by an epiphytic green alga. Although bleaching was also observed at other stations, the magnitude of bleaching at station F2 is not comparable.

Of 20 photographs taken at F1 and C1, 14 samples had algal bleaching. Algal bleaching was more frequent at 15 m than 25 m depths. The high percentages of algal bleaching were encountered at station F1. Bleaching was observed in three species *Mesophyllum alternans*, *M. expansum* and *Lithothamnion* sp. At station F1, half of the species cover had been subjected to bleaching. At other stations (especially at F2), other species such as *Lithophyllum stictaeforme* were also exposed to strong bleaching.

### PROGRESS OF WP2 DELIVERABLES

Deliverable N°	Title	Delivery month	Deliverable progress (%)										Action taken to date		
			10	20	30	40	50	60	70	80	90	100			
D2.2.1	Assessing and monitoring of biodiversity and of major impact, including environmental variables	24	100												List of field sites agreed & List of species or groups of species per sites under study (month 03)
D2.4.1	Elements susceptible to help the construction of indicators, version 1	24													
D2.3.1	Testing and comparisons through dedicated software of image processing and analysis of 2D benthic quadrat samples.	36													
D2.4.1	Elements susceptible to help the construction of indicators, version 2	36													

## WORK PACKAGE 3:

# INDICATORS DEVELOPMENT AND TEST

WORK PACKAGE LEADER: STEPHANE SARTORETTO (IFREMER)

PARTNERS CONTRIBUTING: CNRS; EGE; IFREMER; HCMR; NMPZ

## WORK PACKAGE OBJECTIVES FOR THE PERIOD

This work package is based on the methodology developed in the program INDEX-COR launching in 2011. This program associates IFREMER and AAMP (Agency for the Protected Marine Areas) for the definition of an Index allowing the evaluation of state of Coralligenous bottoms: the INDEX-COR method.

The WP3 of CIGESMED ERA-NET program used this method. The objectives are:

- 1- the improvement of INDEX-COR in French coasts areas,
- 2- the adaptation of this method in the east basin of Mediterranean,
- 3- the comparison of INDEX-COR index with other methods used to evaluate the conservation states of the benthic communities of coralligenous bottom.

The first year of the CIGESMED program was mainly devoted to the first objective.

## WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

As mentioned previously, this first year was devoted to the first task of the WP3. But, we took the opportunity of a collaboration with a researcher (Giulia Gatti) coming from the Genova University (Italy) to begin the third task (comparison RVA method/INDEX-COR).

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### TASK 3.1: TEST OF A NEW INDEX OF CONSERVATION STATE OF CORALLIGENOUS BOTTOMS [APRIL 2013 – FEBRUARY 2015].

This first task is in progress according to the planning built. The work were performed in collaboration with: (i) the CNRS-IMBE (Romain David), (ii) the CSIC-Blanès (Joaquim Garrabou and Kiké Ballesteros), (iii) the Genova University (Nike Bianchi and Giulia Gatti). In complement of the INDEX-COR program (IFREMER-AAMP), we have focused our work on:

- ↪ the definition of method for data acquisition in the field (material, procedure, person, diving constraints),
- ↪ the test on INDEX-COR protocol on sites in PACA region (from Marseilles to Toulon),

- ↪ the stability of the two first metrics (M1-ESEI<sup>1</sup>- and M2-RSO<sup>2</sup>) included in INDEX-COR formula,
- ↪ the treatment of images by PhotoQuad.

For the first point, the methodology is now fixed. At the same depth, same orientation and homogenous facies, two transects of 15m long are randomly put on the bottoms for the acquisition of data. Concerning the diving procedure, the team is composed by two SCUBA divers and an open circuit self-contained compressed air diving apparatus is used. The first one is a "photographer-diver" in charge of photographies (15 per transect) and videos (1 per transect). The second one is a "observer-diver" in charge of the installation of the transects, the characterization of the site (depth, orientation, environmental conditions, slope,...) and notes about the benthic species present. For each dive (two transects), the time needing 25 to 30 minutes. According to the depth considered, extending from -10 to -50m, a decompression procedure with oxygen is used (no more than 20min at -6m with pure oxygen - MT 92 tables). The total time of dive (acquisition of data and decompression procedures) do not usually exceed 50min.

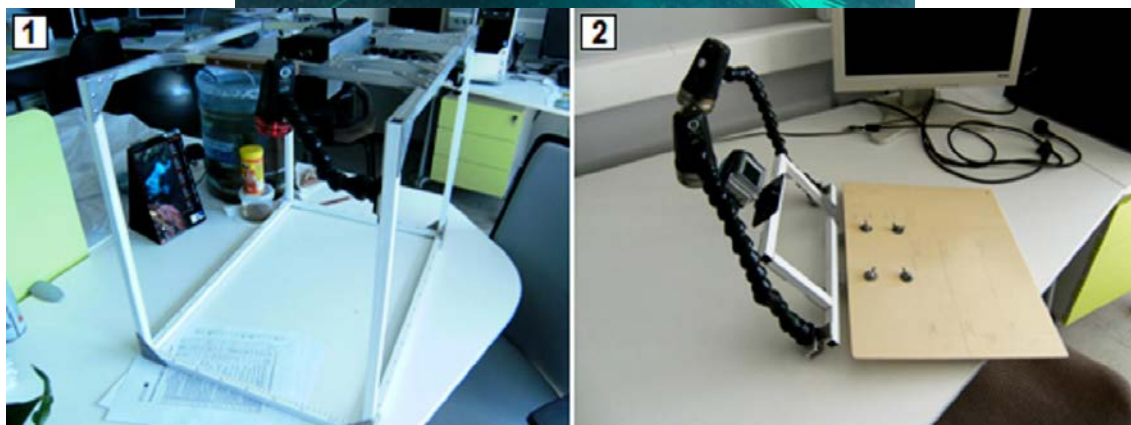


Figure 2. Data acquisition by SCUBA Divers along transect installed on coralligenous bottoms.  
 1: photographic quadrat used for images storage, 2: plastic board equipped with a GoPro® Camera used to note the site characteristics and species observed.

<sup>1</sup> ESEI: ratio between the percentage of Sensible Species and Indifferent Species respect to impact on coralligenous. Metric noted on images using an analysis on PhotoQuad.

<sup>2</sup> RSO: Observable Specific Richness noted on images, video and the "observer-diver".

In complement of INDEX-COR stations, 15 sites were chosen between Marseille and Toulon to apply the INDEX-COR method, especially to test the variability of the index at a low scale. Based on these first results, 15 other sites will be chosen to test it according to the bathymetric level. Concerning the metric M1 (ESEI), we have stabilized a first list of 59 species responding to impacts affecting coralligenous bottoms (high level of Organic Matter, high level of sedimentation, physical impacts and the effects of Global Warming). A global note is affected to each species and uses to calculate the M1 values. To adjust global impact level note for each species, back on this first list after a first statistical analysis of data will be performed based on the statistical analysis of the first data.

Concerning the metric M2 (RSO), we have established a list of sessile (macrobenthos easily identifiable) and motile benthic species (in this case, patrimonial species). This list constitutes the library of species necessary to the analyses by PhotoQuad software. It presently contains 145 observable species in the north-west basin of the Mediterranean Sea.

The 30 photographs performed along the transects put on the bottom, are analyzed with PhotoQuad3<sup>3</sup>. To determine the number of points needing to images analysis, a work was performed on two dataset acquired in two stations: "Pierre du Matelot" (high impacted site) and "Moyade" (low impacted or "pristine" site). For that, we tested the analysis with 64 random points<sup>4</sup>, 100 uniform points and 200 points. For this moment, an analyze with 100 uniform points seems to be the most adapted method to determine the metric M1. The use of PhotoQuad allowed us to note some computer "bugs" needing to be discuss in the future with other members of CIGESMED, in order to update this software.

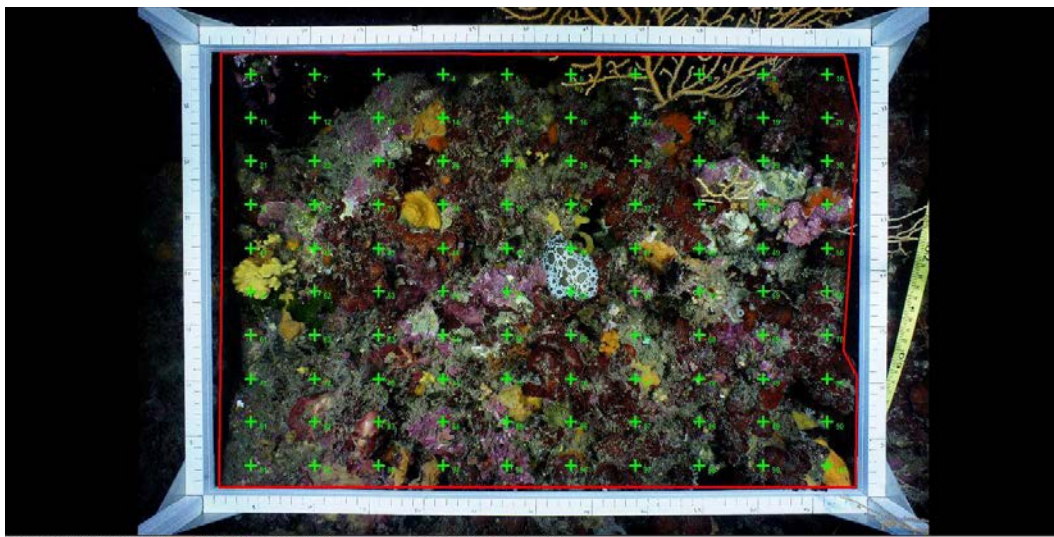


Figure 3. Image analyzed by the PhotoQuad software with 100 uniform points.

<sup>3</sup> Trygonis V., Sini M., 2012. PhotoQuad: A dedicated seabed image processing software, and a comparative error analysis of four photoquadrat methods. *Journal of Experimental Marine Biology and Ecology*, 424-425: 99-108.

<sup>4</sup> Deter, J., Descamps, P., Boissery, P., Ballesta, L., Holon, F., 2012. A rapid photographic method detects depth gradient in coralligenous assemblages. *Journal of Experimental Marine Biology and Ecology*, 418-419: 75-82.



A first treatment of 14 stations (INDEX-COR and CIGESMED) was performed to obtain the metrics M1 and M2. Actually, these results are currently statistically analyzed.

Other tasks are also in progress:

- ↳ the application of the metric 3 (index of Structural complexity) on dataset.
- ↳ the combination of the three metrics to obtain the INDEX-COR index.

Documents are in preparation:

- ↳ a stabilized list species/notation for the metric 1,
- ↳ an illustrated guide of species (NW Mediterranean Sea) identified in the library used for analysis with PhotoQuad,
- ↳ a guide presenting the INDEX-COR method (data acquisition *in situ*, presentation of metric and guide for data analysis).

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### TASK 3.2: APPLICATION OF INDEX-COR IN THE AEGEAN AND LEVANTINE BASINS AND COMPARISONS [FEBRUARY 2014 – APRIL 2015].

Not in progress during this first year.

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### TASK 3.3: COMPARISON OF THE DIFFERENT METHODS AND INDICES [OCTOBER 2014 – FEBRUARY 2016].

The objective of this task is to compare the INDEX-COR with other methods previously defined (ex: RECOR Index, RVA methods, ESCA Index) and using comparable methods (photography and observations) to evaluate the coralligenous state along the Mediterranean coasts. Planned to begin from the month of October 2014, the task 3.3 started with a first work performed in collaboration with Giulia Gatti (PhD - University of Genova) who worked during 10 months in the LER-PAC (IFREMER) (March to December 2013). During this period, Giulia Gatti applied her method (RVA method)<sup>5</sup> defined along Italian coasts, in Languedoc and PACA regions (France). This method is based on a structural approach to determine the state of conservation of coralligenous bottoms, considering the evaluation of three main layers: (i) a basal layer (incrusting species), (ii) an intermediate layer (species between 5 and 15cm high) and (iii) an upper layer (>15cm). Data are obtained by an observer in SCUBA Diving among three quadrats of 1.5m<sup>2</sup>. The RVA method defined in front of the Vado Ligure Harbor (Savona-Italy). First results showed the interest of this method, easy to apply and requiring a short diving time. Nevertheless, additional data were needed: (i) to verify the variability between observers, (ii) the validity of this method in other areas and (iii) to propose a global index formula based on the notes obtained for each layer.

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<sup>5</sup> Gatti G., Montefalcone M., Rovere A., Parravicini V., Morri C., Albertelli G., Bianchi C.N., 2012. Seafloor integrity down the harbor waterfront: the coralligenous shoals off Vado Ligure (NW Mediterranean). *Advances in Oceanography and Limnology*, 3(1): 51–67.



During the first year of the CIGESMED project, we applied the RVA method in 24 stations where INDEX-COR data were acquired, in the same time and on the same transects, in order to be able to compare results obtained by this two methods. Data obtained by RVA method allowed to show its robustness (low variability between observers) and to propose a global formula adapted (RVA index). These results support a part of the thesis of Giulia Gatti and will be published in scientific publication quite soon. The next step will consist on the comparison between the evaluation by RVA index and the values of the INDEX-COR index.

At last, concerning the task 3.3, a second work was started with the CNRS to test a new rapid method for the evaluation of coralligenous state of conservation. A first work on field were started at the beginning of the year 2014, between our scientific teams, to apply this method. In the second year of CIGESMED project, acquisition of data by IFREMER divers, based on this method, will be performed between 45 and 50m depth on the same sites where data will be obtained at 30-35m depth by the CNRS. These sites correspond to some INDEX-COR sites, allowing the comparison between methods.

## PROGRESS OF WP3 DELIVERABLES

Deliverable N°	Title	Delivery month	Deliverable progress (%)										Action taken to date		
			10	20	30	40	50	60	70	80	90	100			
D3.1.1	Testing of metrics along French Coasts	12	■												To be presented at CIGESMED meeting. IZMIR May 2014
D3.2.1	Testing of metrics in East Mediterranean	24													
D3.2.2	Listing of Coralligenous facies in the field sites	26													

## WORK PACKAGE 4:

# INNOVATIVE MONITORING TOOLS

WORK PACKAGE LEADER: ANNE CHENUIL (CNRS-IMBE)  
PARTNERS CONTRIBUTING: EGE; IFREMER; HCMRS; NMPZ

### WORK PACKAGE OBJECTIVES FOR THE PERIOD

During the first year of the project we planned to obtain samples and setup molecular tools on coralline red algae, and to select on which species we would focus for the population genetic analyses.

### WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

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#### TASK 4.1: BASIC AND FUNDAMENTAL KNOWLEDGE: THE TAXONOMIC COMPOSITION OF THE CORALLIGENOUS INGENEER SPECIES, AND ITS VARIATION IN SPACE AND TIME USING GENETIC TOOLS [SEPTEMBER 2013 – FEBRUARY 2016].

We collected red algae samples, mostly *Lithophyllum* sp.

CNRS-IMBE hosted and trained a Greek student for molecular tools (still ongoing, since October 2013) and morphological taxonomy of red algae.

We initiated collaborations with external scientists, not officially involved in the CIGESMED project: Line Le Gall (MNHN), Carlos Jimenez (Cyprus). We are expecting to receive samples from the former one during April 2014 (several dives but difficulty at first to recognize the right species).

We set up the sampling for the metabarcoding approach (with help of other CIGESMED WPs: Romain David, Jean-Pierre Féral, Frédéric Zuberer who frequently dive on coralligenous habitats for CIGESMED) both from the field point of view, and from the laboratory (though this is not complete, changes would probably occur after first trials). Those protocols, thoroughly detailed and illustrated, were written in both French and English yet.

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#### TASK 4.2: A NEW ECOSYSTEM MONITORING TOOL: A MULTISPECIFIC INDEX OF INTRASPECIFIC DIVERSITY [SEPTEMBER 2014 – FEBRUARY 2016].

After several meetings, taking into account what other teams work on, the red alga *Lithophyllum* sp and the bryozoans *Myriapora truncata* were chosen as targets of a more detailed population genetic and phylogeographic study. Samples were obtained for Marseille area, which were highly

contextualized according to ecological factors, preserved, and used for first molecular characterizations.

For *Lithophyllum*, we tested alternative methods for sample preservation than the published ones, in order to be able to obtain samples from difficult and varied field situations. This was successful since ethanol preserved samples appear to provide good results, in addition to silicagel dried specimens. Also for DNA extraction, we could successfully amplify COI and PsbA from Chelex extracted samples, which is both much less expensive and time-consuming than the traditionally used DNA extraction methods for these organisms. The 96 first DNA sequences should be received soon (48 for each marker) and contain samples from Marseille (mostly) and Turkey.

For *Myriapora*, no genetic marker was ever used before our study. We successfully amplified COI region, as well as several intronic regions. Sequence data were obtained very recently for three of those molecular markers, and are not yet fully analyzed. They are of good quality but seem to display poor polymorphism at the small geographic scale of the bay of Marseilles.

Electronic microscopy was done on those species.

It is now urgent to obtain samples from other parts of the Mediterranean, but they should be obtained the next weeks or few months (from HCMR, Cyprus). We sent a simplified and highly illustrated protocol in order that our partners are efficient in sampling them in their countries.

## PROGRESS OF WP4 DELIVERABLES

Deliverable N°	Title	Delivery month	Deliverable progress (%)											Action taken to date	
			10	20	30	40	50	60	70	80	90	100			
<b>D4.1.1</b>	1st Barcoding protocol allowing to identify the taxonomic composition of the coralligenous building algae (using COI, and if necessary intronic markers).	24													Simplified and highly illustrated sampling and conservation protocol sent to partners
<b>D4.1.1</b>	2nd Barcoding protocol allowing to identify the taxonomic composition of the coralligenous building algae (using COI, and if necessary intronic markers).	36													
<b>D4.1.2</b>	Description of the taxonomic composition of the coralligenous building algae in several geographical locations (chosen from the three main partners study sites), and within geographical area, in various environments	36													
<b>D4.2.1</b>	Development of genetic tools for identification and monitoring based on genetic differentiation and structuring of selected species at intraspecific level	36													

## WORK PACKAGE 5:

# CITIZEN SCIENCE NETWORK IMPLEMENTATION

WORK PACKAGE LEADERS: CHRISTOS ARVANITIDIS (HCMR) & JEAN-PIERRE FÉRAL (CNRS)  
CONTRIBUTING PARTNERS: EGE; NMPZ

## WORK PACKAGE OBJECTIVES FOR THE PERIOD

The sole objective for the project period is: *“to develop a framework for a citizen science network”*.

## WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

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### TASK 5.1: DESIGN OF THE STRUCTURE AND FUNCTIONING OF THE CITIZEN SCIENCE NETWORK [SEPTEMBER 2013 – FEBRUARY 2016].

Task 5.1 has a single activity, which has been initiated and carried out over the reporting period: Education. The three other activities will start after the first annual meeting: Research, Market exploitation. It has been prepared mostly since January 2014 and will be launched during the second general assembly in May 2014.

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#### EDUCATION

There are two main activities under “Education”, for which the Consortium has developed a solid plan, presented in detail below:

**a) The interactive e-learning portal**

The discussions on this tool have already been started. The basic components of the portal are: (i) the list of conspicuous species, along with their diagnosis and good quality photos, when available; (ii) the underwater “*virtual promenades*” which will train the future citizen scientists with the geological and biological morphology of the coralligenous bottoms and their surrounding substrates, the light conditions, etc. Short video clips, along with the 3D reconstructions (see Task 5.2, below) will complement this feature of the tool; (iii) a test page, which includes the evaluation of knowledge of the future citizen scientist and provides him/her with a certificate when successful.

## **b) The special “biodiversity diver” seminars**

These seminars will be first developed by the Consortium and appear as \*.ppt or \*.pdf files on the web site of the project. They will practically provide the knowledge and basic skills a future “biodiversity diver” must have in a concise and pictorial type of presentation with little text and as many photos as appropriate in order to train the diver. The text will be first developed in English and then translated to the other three languages of the project. These seminars will be provided physically by all partners to the divers associated with the participating marine parks, associations of SCUBA divers and interested local diving clubs. The main principle will be “*train the trainer*”, which engages those divers who will have the training directly from the Consortium members to the training of the future divers who will join the pilot citizen science project. The seminars will be delivered in all three participating countries and an attempt will be made to involve the local media, during the implementation phase.

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## **TASK 5.2: IMPLEMENTATION OF THE CITIZEN SCIENCE PILOT PROJECT [NOVEMBER 2013 – FEBRUARY 2016].**

Task 5.2 has two main activities to carry out over the reporting period: Creation of an electronic infrastructure; Setting up the community network.

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### **CREATION OF AN ELECTRONIC INFRASTRUCTURE**

The partners who initiated the activities of the Task are HCMR and IMBE. These two partners maintain a day-to-day communication level in order to sort out correctly all the issues to the finest detail of the Task. However, in order to design and properly develop the structure and functioning of the citizen science network, all ideas suggested during the kick-off meeting of the project by all partners, were taken into account. In compliance with the workflow of the project, as described in the project, a sample of a dedicated website was created, intended to act as the central entry point to e-learning and data collection tools to encourage participation and facilitate the network of citizen scientists to be developed. This website will be extended to other CIGESMED partners and countries.

The web page is located at: <http://vm4.her.hcmr.gr/cigesmed/scratchpads-2.0/>. It is based on a Scratchpads (<http://scratchpads.eu/>) application, which has been developed in the course of the COMBER citizen scientist pilot project (<http://vm4.her.hcmr.gr/comber/scratchpads-2.0/>), developed and implemented in the course of the EU funded e-Infrastructure ViBRANT (<http://www.vibrant.eu>).

Scratchpads are an open source and free to use platform (web content management application) that enables researchers to work in a collaborative online environment. Scratchpads provide the tools to enter, structure, curate, link and publish biodiversity data online. Currently, with over 7,000 active users in more than 630 communities and with a strong sustainability outlook,

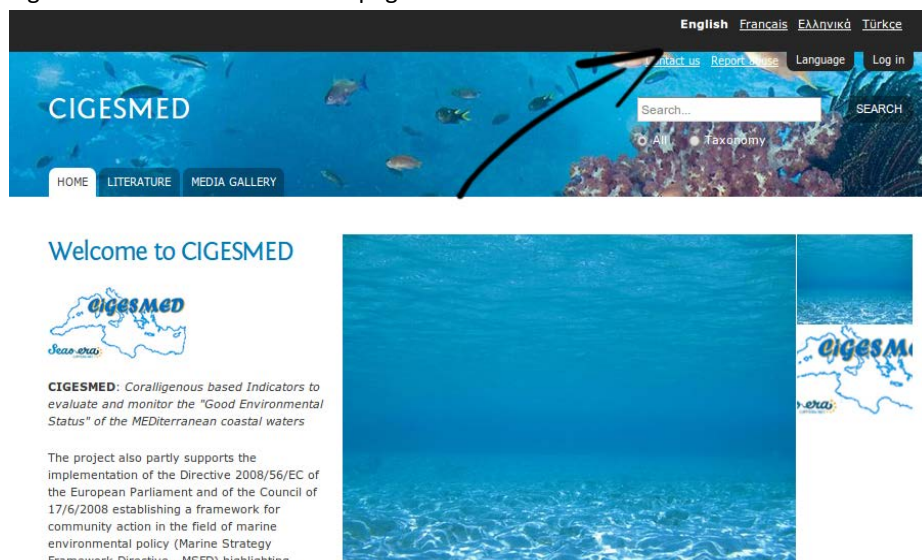
Scratchpads is now considered a reliable and sustainable virtual research environment for biodiversity researchers and citizen scientists around the world. During the course of the ViBRANT e-Infrastructure, a set of tools and services, including Scratchpads, have been developed. These applications include novel publication platforms and workflows to analytical tools and citizen science platforms. Therefore, ViBRANT created a unique ecosystem of interoperating systems for researchers in Europe and worldwide.

The COMBER pilot citizen science project aims to engage anyone interested in nature through a coastal marine biodiversity observation network. COMBER offers a website which provides project information and data recording tools for citizen scientists. Data collected in COMBER are disseminated to large biodiversity data aggregators like GBIF, formally published via PENSOFT and being analyzed for biodiversity monitoring potential. The project has expanded from the Aegean Sea to the Mediterranean basin, where it has been adopted by other projects, and is developing a sustainable model by working with commercial diving centers and sailing companies throughout the region. In the current version, the application for uploading data from mobile phones is integrated. Based on *Anymals and Plants* application for mobile phones (available for both iOS and Android operating systems), it is restricted to marine species of the Mediterranean Sea. This new feature facilitates field use, because access to the internet in the vicinity of the activity is not required to upload the data collected at sea. As they take their break, after a dive or snorkeling, the participating citizen scientists can simply run the application from their cell phone and store their data instantly.

Therefore, the above web applications provide the full range of the technology needed for the citizen science initiative in the CIGESMED project. The current web page provides all the appropriate facility in order for the citizen scientists to upload not only species observations but also photos of the habitat or even video files. At present, there are four main tabs on the main menu: «*home*», «*literature*», «*media gallery*» and «*about us*». The main pages are already translated to the four languages of the project: English, French, Turkish and French.

The web page has been developed by the web developer of HCMR in close collaboration with the COMBER web site developer (EP, SF).

Figure 4. Screenshot of the web page.



The project coordinator (JPF) took the initiative to compile a list of the conspicuous species which are considered as typical members of the coralligenous assemblage, all over the Mediterranean. All partners are currently working on this list in order to arrive to a complete product and an exhaustive species list with updated names. After the compilation of the list, the updated names will be obtained from the TaxonMatch tool of the World Register of Marine Species (WoRMS; <http://www.marinespecies.org/aphia.php?p=match>). The final list will be published on CIGESMED website.

## SETTING UP THE COMMUNITY NETWORK

The concept of the pilot project of CIGESMED has been communicated at strategic spots all over the Aegean Sea. Meetings in collaboration with the local diving clubs and divers associations were held in Lesbos, with the University of the Aegean; in Thessaloniki with Aristotle's University of Thessaloniki; and in Athens with the Association of Recreational Divers "Tethys". COMBER presentations were also attended by the divers' associations of Patras, Veroia and Volos, using Skype. Some initial feedback, especially on the potentially sensitive species and the geographical precision of their citing on the web page, has been taken and it is included in the current development.

Another relevant and innovative product of the current project that is going to populate the citizen scientists' web page is the 3D reconstructions and the medium to large scale mosaics of coralligenous faces. This is based on the novel "Structure from Motion" computer vision-based photogrammetric approach that makes the creation of such products possible from underwater photos taken from different angles and perspectives, independent of resolution, distance from subject and camera system used. The first 3D reconstructions and mosaics of the hard substrate are already in place and provide a reliable representation of the hard bottom habitats of the Aegean and Ionian Sea. This new way of habitat visual presentation and further developments will enable the beginner citizen scientists to form a more complete idea about the structure of coralligenous communities and will thus facilitate their personal training in combination with the eLearning tool of the web site.

## PROGRESS OF WP5 DELIVERABLES

Deliverable N°	Title	Delivery month	Deliverable progress (%)										Action taken to date
			10	20	30	40	50	60	70	80	90	100	
D5.1.1	Prototype of the web infrastructure for the citizen scientists (multi-lingual)	12	100%										To be agreed at CIGESMED GA
D5.2.1	1st Citizen scientist reports	12	100%										
D5.2.1	2nd Citizen scientist reports	24	0%										
D5.2.1	3 <sup>rd</sup> Citizen scientist reports	36	0%										
D5.2.2	Scientific document on the reliability of the data collected by the citizen scientists	30	0%										



## WORK PACKAGE 6:

# DATA MANAGEMENT, MAPPING AND ASSIMILATION TOOLS

WORK PACKAGE LEADER: ANTHONY FREMAUX (LIGAMEN) & ROMAIN DAVID (CNRS-IMBE)  
PARTNERS CONTRIBUTING: HCMR; NMPZ

## WORK PACKAGE OBJECTIVES FOR THE PERIOD

The Work Package 6 is based on the technology prototype developed by the SME LIGAMEN to generate and visualize Knowledge Tree (KT). The goal of this WP is to adapt and to experiment this technology to map and manage data and meta-data about coralligenous habitat. The files corresponding to the « size » CSV will be formatted and imported in the KT software to generate data mapping. Interactive maps will enable the visualization of data collected by the observers, with a global view on the corpus, and a generation of maps coming from data's sub-groups with the help of a sorting function. For this period, there is no data about coralligenous habitat to treat. So the objectives for the period were:

- Introduce partners to Knowledge Tree (KT) mapping approach
- Develop the mapping algorithm to adapt KT approach to the CIGESMED problematic.

## WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

On one hand, this first year was devoted to practice the actual KT technology, in order to introduce partners to this mapping approach through two different axes

- a knowledge mapping provided by the CIGESMED's partners
- and a coralligenous data mapping (reference species)

Also, on the other hand, this first period was devoted to adapt the Ligamen mapping algorithm to the specific CIGESMED problematic.

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### TASK 6.1 TREATMENT AND MAPPING OF COLLECTIONS OF EXISTING META-DATA ABOUT CORALLIGENOUS HABITAT [MARCH 2013 – FEBRUARY 2015].

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#### INTRODUCE PARTNERS TO KNOWLEDGE TREE APPROACH

**We introduced partners to Knowledge Tree approach through the practice of two different mappings, automatically generated** from the expression of each participant:

- Mapping of partners' competencies

- Mapping of reference species, selected by the partners to analyze coralligenous

## MAPPING OF REFERENCE SPECIES SELECTED BY THE PARTNERS TO ANALYZE CORALLIGENOUS

**The second mapping practice introducing the Knowledge Tree approach to the CIGESMED partners consisted in visualizing** selected species names to analyze the coralligenous habitat. In this case, the attribute, *i.e.* **each brick or leaf in the tree, represents a specie, not a competence.**

In general indeed, the input data in KT are:

- Individual,
- Attributes,
- Order

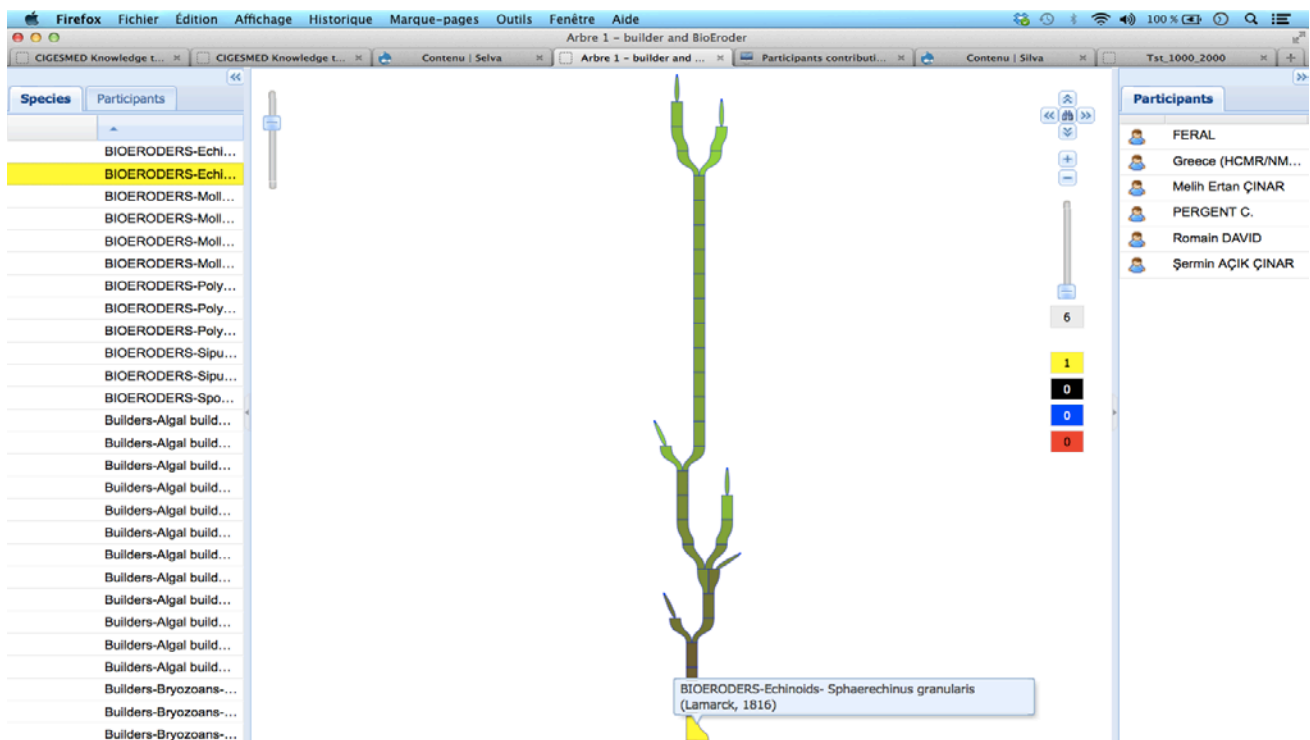
**Individual** input is an entity described by a set of attributes. For example, an individual is an actor (cf.6.1.1), a photo, a video, a specimen, a point of view etc.

An **attribute** is a quality to differentiate individuals. For example, attributes are competences (cf.6.1.1), Species, Index, Meta data, etc.

For each individual the assigned **list of attributes is ordered**. For example, the order is Frequency order (by default), Preference order, Importance order, etc.

During CIGESMED kickoff meeting, each participant produced a list of the species he wishes to use to analyze coralligenous habitat. We've imported this data in KT software to visualize the group's preferences and help decide the final common list of species of reference (Fig. 5).

Figure 5: Mapping of reference species selected by the partners to analyze coralligenous habitat

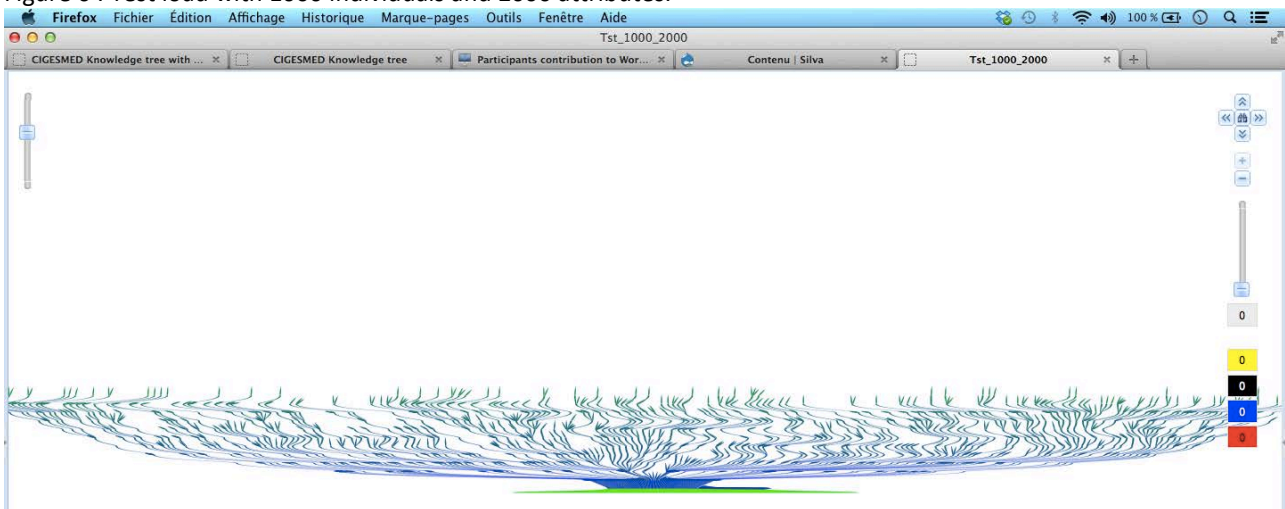


## DEVELOP THE MAPPING ALGORITHM

The increase in the volume of data causes various problems. Some of them can become critical, are often not easy to predict. To solve them some tasks are then necessary, such as:

- **Spatial optimization** is necessary for a better representation of the information. An Agile methodology has been used to reach a suitable solution and to prepare future evolutions.
- **Performance:** Some benchmarks have been made to get a better knowledge of the behaviors of computed objects for big data. Some synthetic data have also been used.
- **Flatness:** Some aspects of the object geometry have been newly computed to overcome defaults occurring for some large layers and being troublesome for interaction.
- **Interaction speed:** New image format have been introduced, with a corresponding java script code, to get higher interaction speed in the interface.

Figure 6 : Test load with 1000 individuals and 2000 attributes.



## PROGRESS OF WP6 DELIVERABLES

Deliverable N°	Title	Delivery month	Deliverable progress (%)								Action taken to date		
			10	20	30	40	50	60	70	80		90	100
D6.1.1	Dynamic mapping of existing meta-data	24											
D6.3.1	Dynamic mapping of data set	36											
D6.3.2	Methodological document for the mapping analysis, for the evaluation of the data robustness and for the efficacy of indicators	36											

# WORK PACKAGE 7:

## OUTREACH, STAKEHOLDER ENGAGEMENT & DISSEMINATION

WORK PACKAGE LEADER: CHRISTOS ARVANITIDIS (HCMR)  
PARTNERS CONTRIBUTING: CNRS; EGE; IFREMER; LIGAMEN; NMPZ

### WORK PACKAGE OBJECTIVES FOR THE PERIOD

The objectives of the WP, over the entire period of the project are:

1. *“To deliver the project's messages to all interested parties”;*
2. *“To connect the ideas and practices of the project to the efforts of targeted user groups and the society at large”.*

The strategy behind this WP includes the following components: (i) well-defined target groups, which aim to include all potential interested parties; (ii) detailed plan of activities; (iii) clear and comprehensible communication language; (iv) incorporation of the project's provocative messages into contemporary societal messages and mottoes; (v) development of mechanisms to capture the feedback of the interested parties to the project's messages; (vi) link project's activities with everyday practices of the audience.

### WORK PROGRESS AND ACHIEVEMENTS DURING THE PERIOD

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#### TASK 7.1: OUTREACH [MARCH 2013 – FEBRUARY 2016].

This Task is targeted to the continuous information flow from the project's activities to the society and the collection of the feedback and the measurement of the engagement of the broad interested audiences. Two types of activities are foreseen:

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#### CAMPAIGNS, CARRIED OUT BY MULTIPLE MEANS

(a) The members of the Consortium participated to a number of Conferences, Symposia and Workshops, which are listed at the attached CIGESMED Dashboard.xls file. During these events, the CIGESMED scientists had the opportunity to present the project and communicate its objectives and main principles on which its implementation is based. This list is surprisingly long for the first year of the project and is anticipated to be longer as the activities over the next period

will inevitably draw more attention by all potential interested parties, including the stakeholders and policy makers.

(b) The coordinating participant along with the WP leader developed an initial flyer, which is the main printed material for communication at present (attached, at the end of the report). It has the basic information on the project's goals and outputs, the overall organization of the project's activities into well-defined workpackages and it presents the participating members of the Consortium.

The remaining means have not yet been employed because the project hasn't started the production of the data and knowledge needed.

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## OPEN DAYS AND SHOWCASES

The members of the WP leading Institute communicated the project to the greater audience in the course of two events, which have been held in the Cretaquarium – the most important aquarium in Greece and a major landmark for thousands of visitors each year:

(a) During the exhibition on the Climate Change. This exhibition has been founded by the American Museum of Natural History (NYC) and was hosted by the Cretaquarium during the summer of 2013. Scientists from HCMR participating in CIGESMED organized a talk open to visitors (July 20<sup>th</sup>) where they provided information regarding the sensitive habitat of the Mediterranean coralligenous along with the initiative and aims of CIGESMED.

(b) During the TEDx Heraklion –the first TEDx event in Crete– which was hosted by the Cretaquarium on the 8<sup>th</sup> February. This event has been established 30 years ago in the US and since then it is locally implemented in different countries around the globe. It stresses particularly on the local vectors of knowledge and innovation and on the voluntarily contribution of the participants in order to achieve better connections between the members of the relevant community. Again, the CIGESMED scientist group from HCMR talked to the audience focusing on the importance of the coralligenous habitat.

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## TASK 7.2: DISSEMINATION [MARCH 2013 – FEBRUARY 2016].

The overall objective of task 7.2 is to broadcast the messages of the CIGESMED Consortium to the public.

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## PROJECT'S WEB SITE

The main vehicle for the dissemination of CIGESMED's scope and activities is the project's web site (hosted by CNRS-IMBE). The web site was already initiated by the time of the kick-off meeting in Crete (17-19/04/2013). During this meeting, the members of the Consortium populated the web page with their expertise, skills and knowledge, relevant to the activities of the project. Thereafter,

the web page developed in a powerful dissemination tool which provides essential information on the project's objectives, its implementation plan and the articulation of the project's activities into WPs. The participating Institutes, the scientists, the students and other employees of the project are presented along with their short CVs. Soon after the kick-off meeting, the web page main text was translated into French, Turkish and Greek.

The main menu includes the following tabs: (a) "home"; (b) the current "General Assembly", which provides information on the future annual project meeting in Izmir; (c) the "Work Packages" with a brief information on the project's articulation and its main goals; (d) "Who's who" includes information on the participating Institutes and the short CVs of the Consortium members involved in the various work packages and their activities; (e) the language selection tab, through which the user can switch to any of the four languages of the project; (f) a useful "forum", where the members of the Consortium may bring any issue for an open discussion; (g) the last tab, "help" properly guides the user to navigate through the page. On the left part of the web page there's a quick and useful menu with tabs in a drop-down form. They provide quick overview of the project and its participants, a list with the coming events, a space for the storage of the media material, to be used by any of the users and last a gallery of the Consortium members. On the left side there's a suite of utilities, such as the calendar, announcements, and the number of visitors of the page, among others. Over the first year of the project's life, the number of visits exceeded the 50,000.

A screenshot of the webpage is provided below.





## OTHER DISSEMINATION MEDIA

A list with the dissemination activities has been developed by the WP leader in order to summarize the number and type of events in which information on the project has been disseminated. This list is attached along with this report in annex 3.

A flyer, edited in English and in the languages of CIGESMED's countries is downloadable at: < <http://www.cigesmed.eu/-Brochures-> >

## PROGRESS OF WP7 DELIVERABLES

The current report provides the following two deliverables (M12):

Deliverable N°	Title	Delivery month	Deliverable progress (%)										Action taken to date
			10	20	30	40	50	60	70	80	90	100	
D7.1.1	Dissemination and outreach plan of activities	6	100										submitted in May 2013
D7.1.2	Project's web site launched; fully operating in four languages	6	100										<a href="http://www.cigesmed.eu/">http://www.cigesmed.eu/</a>
D7.1.3	Annual Outreach Report	12	100										
D7.1.3	Annual Outreach Report	24	100										
D7.1.3	Annual Outreach Report	36	100										
D7.1.2	Annual Dissemination Report	12	100										
D7.1.2	Annual Dissemination Report	24	100										
D7.1.2	Annual Dissemination Report	36	100										

The collage displays various project materials:

- Partners / Partenaires / Ortaklar:** Lists participating institutions such as CNRS, Aix-Marseille, Mio, Ifremer, and others in English, French, and Greek.
- Project Description:** Text in multiple languages describing the project's goals, such as "Coralligenous based Indicators to evaluate and monitor the 'Good Environmental Status' of the Mediterranean coastal" and "Indicateurs basés sur le corail pour évaluer et suivre le « Bon Etat Ecologique » des côtes méditerranéennes".
- Logos:** Includes logos for CIGESMED, Seao era, and various partner organizations.
- Visuals:** Features underwater photographs of coral reefs and maps of the Mediterranean region.
- Language:** Materials are provided in English, French, and Greek to reach a wider audience.



# **Annex 1 : CIGESMED Consortium Agreement**

## **Consortium Agreement**

**Coralligenous based indicators to evaluate and monitor the "good environmental status" of the Mediterranean coastal waters (CIGESMED)**

**ERANET SEAS ERA 2012**

**April 2013**

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## CONSORTIUM AGREEMENT

BETWEEN:

**Partner 1:**

CNRS, Centre National de la Recherche Scientifique, France, represented by Younis HERMES, délégué régional Provence et Corse, acting for and on behalf of IMBE (UMR 7263), MIO (UMR 7294) and SPE (UMR 6134)

**Partner 2:**

EGE, Ege University Faculty of Fisheries, acting for and on behalf Dokuz Eylul University, Institute of Marine Sciences and Technology, Faculty of Science, Celal Bayar University, Faculty of Science and Arts, Ministry of Forestry and Water Affairs, General Directorate of Nature Conservation and National Park, Turkey, represented by Prof. Dr Mesut ONEN, President

**Partner 3:**

LIGAMEN, France, represented by Anthony FREMAUX, Director General

**Partner 4 :**

IFREMER, Institut Français de Recherche pour l'Exploitation de la Mer, France, acting for and on behalf of Centre de Méditerranée, Laboratoire Environnement Ressources PACA, represented by Gérard RIOU

**Partner 5 :**

HCMR, Hellenic Center for Marine Research acting for and on behalf of Institute of Marine Biology, Biotechnology and Aquaculture; Institute of Oceanography and Institute of Marine biological Resources, represented by Prof Costas SYNOLAKIS

hereinafter, jointly or individually, referred to as "Parties" or "Party"

relating to the Project entitled

**Coralligenous based indicators to evaluate and monitor the "good environmental status" of the Mediterranean coastal waters , ERANET SEAS ERA 2012**

in short

**CIGESMED**

hereinafter referred to as "Project"

**WHEREAS:**

The Parties, having considerable experience in the field of Oceanography and Marine Biology , have submitted a proposal for the Project as part of the Seventh Framework Programme of the European Community for Research, Technological Development and Demonstration Activities under the funding scheme of "ERA-NET SEAS ERA 2012.

The involved Agencies/Ministries (France: ANR, Turkey: TUBITAK, Greece: GSRT) have accepted the proposal "**CIGESMED**" for funding.

The Parties wish to specify or supplement binding commitments among themselves

NOW, THEREFORE, IT IS HEREBY AGREED AS FOLLOWS:

## **Section 1: Definitions**

### **1.1 Definitions**

Words beginning with a capital letter shall have the meaning defined herein without the need to replicate said terms herein.

### **1.2 Additional Definitions**

#### **"Defaulting Party"**

Defaulting Party means a Party which the Steering Committee has identified to be in breach of this Consortium Agreement and/or the Grant Agreement as specified in Article 4.2 of this Consortium Agreement.

#### **"Joint Research Unit"**

A Joint Research Unit means an unincorporated entity created by a written contract between a Signatory Party and the Third Party Linked to a Beneficiary it represents

#### **"Third Party Linked to a Beneficiary"**

A Third Party Linked to a Beneficiary means a Legal entities, either public or private, represented in the Grant Agreement by a Signatory Party. This Signatory Party and the Third Party Linked to a Beneficiary it represents shall be partners in "Joint Research Unit".

Third Parties Linked to a Beneficiary in this Consortium Agreement are :

For CNRS

- AMU, Aix Marseille Université
- Université de Corse

#### **"Needed"**

means:

For the implementation of the Project:

Access Rights are Needed if, without the grant of such Access Rights, carrying out the tasks assigned to the recipient Party would be impossible, significantly delayed, or require significant additional financial or human resources.

For Use of own Foreground:

Access Rights are Needed if, without the grant of such Access Rights, the Use of own Foreground would be technically or legally impossible.

#### **"Software"**

Software means sequences of instructions to carry out a process in, or convertible into, a form executable by a computer and fixed in any tangible medium of expression.

## **Section 2: Purpose**

The purpose of this Consortium Agreement is to specify with respect to the Project the relationship among the Parties, in particular concerning the organisation of the work between the Parties, the management of the Project and the rights and obligations of the Parties concerning inter alia liability, Access Rights and dispute resolution.

## **Section 3: Entry into force, duration and termination**

### ***3.1 Entry into force***

An entity becomes a Party to this Consortium Agreement upon signature of this Consortium Agreement by a duly authorised representative.

This Consortium Agreement shall have effect from January, 1<sup>st</sup>, 2013.

A new Party enters the Consortium upon signature of the accession document Attachment 3 by the new Party and the Coordinator. Such accession shall have effect from the date identified in the accession document.

### **3.2 Duration and Termination**

This Consortium Agreement shall continue in full force and effect until complete fulfilment of all obligations undertaken by the Parties under this Consortium Agreement.

In the event that a Party were to breach its obligations hereunder, the other Parties may, subject to the agreement of National Agencies funding the Project, terminate the Agreement vis-à-vis the defaulting Party if, within 30 days of a registered letter with acknowledgment of receipt having been sent to the Party and the corresponding National Funding Agency, the defaulting Party has still failed to comply with its obligations. The termination decision must be adopted by an unanimous vote from the non-defaulting Parties within the Steering Committee and has to be validated by all the National Agencies funding the project.

In the event of a Party failing to meet its obligations to the National Agency supplying the funding for its Work, the National Agency reserves the right to terminate the defaulting Party according to the rules and regulations in place in that Party's country. In either case, the remaining Parties may elect either to assume the Work of the defaulting Party themselves or to entrust a third party with all or part of the Work to be carried-out. In both situations, this can only be undertaken with the explicit consent of the National Agencies funding the project.

The defaulting Party undertakes to provide, free-of-charge, the other Parties or the substitute third party with all the information required to continue with implementation of the Project in its stead.

### **3.3 Survival of rights and obligations**

The provisions relating to Access Rights and Confidentiality, for the time period mentioned therein, as well as for Liability, Applicable Law, and Settlement of Disputes shall survive the expiration of this Consortium Agreement.

Termination shall not affect any rights or obligations of a Party leaving the Consortium incurred prior to the date of termination, unless otherwise agreed between the Steering Committee and the leaving Party. This includes the obligation to provide all input, deliverables and documents for the period of its participation.

For the avoidance of doubt, in case of termination of the defaulting Party's participation the provisions of confidentiality shall survive.

## **Section 4: Responsibilities of Parties**

### ***4.1 General principles***

Each Party undertakes to take part in the efficient implementation of the Project, and to cooperate, perform and fulfil, promptly and on time, all of its obligations under this Consortium Agreement as may be reasonably required from it and in a manner of good faith as prescribed by Belgian law.

Each Party undertakes to notify promptly, in accordance with the governance structure of the Project, any significant information, fact, problem or delay likely to affect the Project.

Each Party shall promptly provide all information reasonably required by a Consortium Body or by the Coordinator to carry out its tasks.

Each Party shall take reasonable measures to ensure the accuracy of any information or materials it supplies to the other Parties.

### ***4.2 Breach***

In the event a responsible Consortium Body identifies a breach by a Party of its obligations under this Consortium Agreement (e.g.: a partner producing poor quality work), the Coordinator will give written notice to such Party requiring that such breach be remedied within 30 calendar days. If such breach is substantial and is not remedied within that period or is not capable of remedy, the Steering Committee may decide to declare the Party to be a Defaulting Party and to decide on the consequences thereof which may include termination of its participation.

### ***4.3 Involvement of third parties***

A Party that enters into a subcontract or otherwise involves third parties (including but not limited to Affiliated Entities) in the Project remains solely responsible for carrying out its relevant part of the Project and for such third party's compliance with the provisions of this Consortium Agreement. It has to ensure that the involvement of third parties does not affect the rights and obligations of the other Parties under this Consortium Agreement.

## **Section 5: Liability towards each other**

### ***5.1 No warranties***

In respect of any information or materials (incl. Foreground and Background) supplied by one Party to another under the Project, no warranty or representation of any kind is made, given or implied as to the sufficiency or fitness for purpose nor as to the absence of any infringement of any proprietary rights of third parties.

Therefore,

- the recipient Party shall in all cases be entirely and solely liable for the use to which it puts such information and materials, and
- no Party granting Access Rights shall be liable in case of infringement of proprietary rights of a third party resulting from any other Party (or its Affiliates) exercising its Access Rights.

### ***5.2 Limitations of contractual liability***

No Party shall be responsible to any other Party for any indirect or consequential loss or similar damage such as, but not limited to, loss of profit, loss of revenue or loss of contracts, provided such damage was not caused by a wilful act.

A Party's aggregate liability towards the other Parties collectively shall be limited to once the Party's share of the total costs of the Project provided such damage was not caused by a wilful act or gross negligence.

The terms of this Consortium Agreement shall not be construed to amend or limit any Party's non-contractual liability.

### ***5.3 Damage caused to third parties***

Each Party shall be solely liable for any loss, damage or injury to third parties resulting from the performance of the said Party's obligations by it or on its behalf under this Consortium Agreement or from its use of Foreground or Background.

### ***5.4 Force Majeure***

No Party shall be considered to be in breach of this Consortium Agreement if such breach is caused by Force Majeure. Each Party will notify the competent Consortium Bodies of any Force Majeure as soon as possible. If the consequences of Force Majeure for the Project are not overcome within 6 weeks after such notification, the transfer of tasks - if any - shall be decided by the competent Consortium Bodies.

## **Section 6: Governance structure**

### ***6.1 General structure***

The Steering Committee is the decision-making body of the Consortium.

The Coordinator is the legal entity acting as the intermediary between the Parties and Seas-era ERA-NET program. The Coordinator shall, in addition to its responsibilities as a Party, perform the tasks assigned to it as described in this Consortium Agreement.

The Management Support Team assists the Steering Committee and the Coordinator.

### ***6.2 Members***

The Steering Committee shall consist of one representative of each Party (hereinafter referred to as "Member").



Each Member shall be deemed to be duly authorised to deliberate, negotiate and decide on all matters listed in Article 6.3.6 of this Consortium Agreement.

The Coordinator shall chair all meetings of the Steering Committee, unless decided otherwise by the Steering Committee.

The Parties agree to abide by all decisions of the Steering Committee.

This does not prevent the Parties from submitting a dispute for resolution in accordance with the provisions of settlement of disputes in Article 11.8 of this Consortium Agreement.

English summary will be required. These reports should be written in the context of the project as part of a collaborative initiative and reference should be made to the progress of the other partners.

### ***6.3 Operational procedures for the Steering Committee***

#### ***6.3.1 Representation in meetings***

Any Member:

- should be present or represented at any meeting;
- may appoint a substitute or a proxy to attend and vote at any meeting;
- and shall participate in a cooperative manner in the meetings.

#### ***6.3.2 Preparation and organisation of meetings***

6.3.2.1 Convening meetings:

The chairperson shall convene Annual Project Meeting of the Steering Committee at least once every twelve months and shall also convene extraordinary meetings at any time upon written request of any Member.

6.3.2.2 Notice of a meeting:

The chairperson shall give notice in writing of a meeting to each Member as soon as possible and no later than 14 calendar days preceding an Annual Project Meeting and 7 calendar days preceding an extraordinary meeting.

6.3.2.3 Sending the agenda:

The chairperson shall send each Member a written original agenda no later than 14 calendar days preceding the meeting, or 7 calendar days before an extraordinary meeting.

6.3.2.4 Adding agenda items:

Any agenda item requiring a decision by the Members must be identified as such on the agenda. Any Member may add an item to the original agenda by written notification to all of the other Members no later than 7 calendar days preceding the meeting.

6.3.2.5 During a meeting of the Steering Committee the Members present or represented can unanimously agree to add a new item to the original agenda.

6.3.2.6 Any decision may also be taken without a meeting if the chairperson circulates to all Members a written document which is then signed by the defined majority of Members (see Article 6.3.3 of this Consortium Agreement).

6.3.2.7 Meetings of the Steering Committee may also be held by teleconference or other telecommunication means.

6.3.2.8 Decisions will only be binding once the relevant part of the minutes has been accepted according to Article 6.3.5 of this Consortium Agreement.

### **6.3.3 Voting rules and quorum**

6.3.3.1 The Steering Committee shall not deliberate and decide validly unless two-thirds (2/3) of its Members are present or represented (quorum).

6.3.3.2 Each Member shall have one vote.

6.3.3.3 Defaulting Parties may not vote.

6.3.3.4 Decisions shall be taken by a majority of two-thirds (2/3) of the votes.

### **6.3.4 Veto rights**

6.3.4.1 A Member which can show that its own work, time for performance, costs, liabilities, intellectual property rights or other legitimate interests would be severely affected by a decision of the Steering Committee may exercise a veto with respect to the corresponding decision or relevant part of the decision.

6.3.4.2 When the decision is foreseen on the original agenda, a Member may veto such a decision during the meeting only.

6.3.4.3 When a decision has been taken on a new item added to the agenda before or during the meeting, a Member may veto such decision during the meeting and within 15 days after the draft minutes of the meeting are sent.

6.3.4.2 In case of exercise of veto, the Members shall make every effort to resolve the matter which occasioned the veto to the general satisfaction of all Members.

6.3.4.3 A Party may not veto decisions relating to its identification as a Defaulting Party. The Defaulting Party may not veto decisions relating to its participation and termination in the Consortium or the consequences of them.

6.3.4.4 A Party requesting to leave the Consortium may not veto decisions relating thereto.

### **6.3.5 Minutes of meetings**

6.3.5.1 At each meeting, one participant will be appointed to produce written minutes of the meeting. Draft version of the minutes, which shall be the formal record of all decisions taken, shall be sent to all Members within 15 calendar days of the meeting.

6.3.5.2 The minutes shall be considered as accepted if, within 15 calendar days from sending, no Member has objected in writing to the chairperson with respect to the accuracy of the draft of the minutes.

6.3.5.3 The chairperson or project manager shall send the accepted minutes to all the Members of the Steering Committee, and to the Coordinator, who shall safeguard them. If requested the Coordinator shall provide authenticated duplicates to Parties.

### **6.3.6 Decisions of the Steering Committee**

The Steering Committee shall be free to act on its own initiative to formulate proposals and take decisions in accordance with the procedures set out herein.

The following decisions shall be taken by the Steering Committee:

Content, finances and intellectual property rights

- (a) Withdrawals from Attachment 1 (Background included)
- (b) Additions to Attachment 2 (Background excluded)

Evolution of the Consortium

- (c) Entry of a new Party to the Consortium and approval of the settlement on the conditions of the accession of such a new Party
- (d) Withdrawal of a Party from the Consortium and the approval of the settlement on the conditions of the withdrawal
- (e) Declaration of a Party to be a Defaulting Party
- (f) Remedies to be performed by a Defaulting Party
- (g) Termination of a Defaulting Party's participation in the Consortium and measures relating thereto

Appointments

Agree on the Members of the Management Support Team, upon a proposal by the Coordinator.

In the case of abolished tasks as a result of a decision of the Steering Committee, Members shall rearrange the tasks of the Parties concerned. Such rearrangement shall take into consideration the legitimate commitments taken prior to the decisions, which cannot be cancelled.

## **6.4 Coordinator**

6.4.1 With the Parties' joint agreement, CNRS Dr. Jean-Pierre FERAL is hereby appointed Coordinator of the Project. The Coordinator shall be the intermediary between the Parties and shall perform all tasks assigned to it as described in this Consortium Agreement.

6.4.2 In particular, the Coordinator shall be responsible for:

- (a) monitoring compliance by the Parties with their obligations
- (b) keeping the address list of Members and other contact persons updated and available
- (c) collecting, reviewing and submitting information on the progress of the Project and reports and other deliverables (including financial statements and related certification)
- (d) preparing the meetings, proposing decisions and preparing the agenda of Steering Committee meetings, chairing the meetings, preparing the minutes of the meetings and monitoring the implementation of decisions taken at meetings
- (e) transmitting promptly documents and information connected with the Project,
- (f) providing, upon request, the Parties with official copies or originals of documents which are in the sole possession of the Coordinator when such copies or originals are necessary for the Parties to present claims.

- (g) The Coordinator will be responsible to submit a final report, in English within three months of the end of the project. This report should cover the work undertaken by all of the project partners.

6.4.4 The Coordinator shall not be entitled to act or to make legally binding declarations on behalf of any other Party.

6.4.5 The Coordinator shall not enlarge its role beyond the tasks specified in this Consortium Agreement.

### ***6.5 Management Support Team***

The Management Support Team shall be proposed by the Coordinator. It shall be appointed by the Steering Committee and shall assist and facilitate the work of the Steering Committee.

The Management Support Team shall provide assistance to the Coordinator for executing the decisions of the Steering Committee. It shall be responsible for the day-to-day management of the Project.

### ***6.6 Board of External Advisors (BEA)***

A Board of External Advisors (BEA) will be appointed and steered by the Steering Committee. The BEA shall assist and facilitate the decisions made by the Steering Committee. The members of the BEA are required to sign a non-disclosure agreement no later than 30 days after their nomination or before any confidential information will be exchanged, whichever date is earlier. The Coordinator or the appointed person shall write the minutes of the BEA meetings and prepare the implementation of the BEA 's suggestions. The BEA members shall be allowed to participate in Steering Committee meetings upon invitation but have not any voting rights.

## ***Section 7: Financial provisions***

Each Party receives funding relating to its share of the work directly from the National Agency responsible for that Party and according to the provisions of that Agency's decision to award aid. By accepting national aid, each Participant is required to abide with the rules and regulations concerning project funding in its own country. The Articles set down in this Agreement do not replace, impinge, impede or otherwise impact the national rules and regulations which apply to each Party. In case of doubt, these national notifications shall prevail over the provisions of this Agreement.

The Parties shall, if necessary, individually provide the additional funding required in order to carry out their share of the work.

## **Section 8: Foreground**

### ***8.1 Joint ownership***

In case of joint ownership of Foreground each of the joint owners shall be entitled to Use the joint Foreground as it sees fit, including to grant non-exclusive licenses to third parties, without any right to sub-license, subject to the following conditions :

- at least 45 days prior notice must be given to the other joint owner(s); and
- fair and reasonable compensation must be provided to the other joint owner(s).

### ***8.2 Transfer of Foreground***

8.2.1 Each Party may transfer ownership of its own Foreground

8.2.3 The transferring Party shall, however, notify the other Parties of such transfer and shall ensure that the rights of the other Parties will not be affected by such transfer.

### ***8.3 Dissemination***

#### ***8.3.1 Publication***

8.3.1.1

In all publications it will be mentioned that the results are obtained within an international ERA-Net – CIGESMED Research Project named "Coralligenous based indicators to evaluate and monitor the "good environmental status" of the Mediterranean coastal waters"

If possible, please add the following sentence:

"These results were obtained within the international Seas-Era ERA-Net Research Project CIGESMED: "Coralligenous based indicators to evaluate and monitor the "good environmental status" of the Mediterranean coastal waters". The program is jointly funded by the French National funding agency ANR (contract number 12-SEAS-0001-01, 12-SEAS-0001-02, 12-SEAS-0001-03), the Greek GSRT (contract number Submission Form Ref. No. 56/04.01.2013 and Tübitak (contract number 112Y393)

Prior notice of any planned publication shall be made to the Steering Committee 45 days before the publication. Any objection to the planned publication shall be made in writing to the Steering Committee and to any Party concerned within 30 days after receipt of the notice. If no objection is made within the time limit stated above, the publication is permitted.

8.3.1.2 An objection is justified if

- (a) the objecting Party's legitimate academic or commercial interests are compromised by the publication; or
- (b) the protection of the objecting Party's Foreground or Background is adversely affected.

The objection has to include a precise request for necessary modifications.

8.3.1.3 If an objection has been raised the involved Parties shall discuss how to overcome the justified grounds for the objection on a timely basis (for example by amendment to the planned publication and/or by protecting information before publication) and the objecting Party shall not unreasonably continue the opposition if appropriate actions are performed following the discussion.

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### **8.3.2 Publication of another Party's Foreground or Background**

For the avoidance of doubt, a Party shall not publish Foreground or Background of another Party, even if such Foreground or Background is amalgamated with the Party's Foreground, without the other Party's prior written approval. For the avoidance of doubt, the mere absence of an objection according to 8.3.1 is not considered as an approval.

### **8.3.3 Cooperation obligations**

The Parties undertake to cooperate to allow the timely submission, examination, publication and defence of any dissertation or thesis for a degree which includes their Foreground or Background. However, confidentiality and publication clauses have to be respected.

### **8.3.4 Use of names, logos or trademarks**

Nothing in this Consortium Agreement shall be construed as conferring rights to use in advertising, publicity or otherwise the name of the Parties or any of their logos or trademarks without their prior written approval.

## **Section 9: Access Rights**

### **9.1 Background covered**

9.1.1 The Parties shall identify in the [Attachment 1](#) the Background to which they are ready to grant Access Rights, subject to the provisions of this Consortium Agreement. Such identification may be done by e.g.

- subject matter and possibly in addition by
- naming a specific department of a Party
- 

9.1.2 The owning Party may add further Background to [Attachment 1](#) during the Project by written notice.

However, only the Steering Committee can permit a Party to withdraw any of its Background from [Attachment 1](#).

9.1.3 The Parties agree that all Background not listed in [Attachment 1](#) shall be explicitly excluded from Access Rights. The Parties agree, however, to negotiate in good faith additions to [Attachment 1](#) if a Party asks them to do so and those are needed.

For the avoidance of doubt, the owner is under no obligation to agree to additions of his Background to [Attachment 1](#).

9.1.4 In addition, if a Party wishes to list specific Background as excluded, it shall identify such Background in the [Attachment 2](#).

The owning Party may withdraw any of its Background from [Attachment 2](#) during the Project by written notice.

However, only the Steering Committee can permit a Party to add Background to [Attachment 2](#).

## **9.2 General Principles**

9.2.1 Each Party shall bear sole responsibility for ensuring that its acts within the Project do not knowingly infringe third party property rights.

9.2.2 Parties shall inform the Consortium as soon as possible of any limitation to the granting of Access Rights to Background or of any other restriction which might substantially affect the granting of Access Rights (e.g. the use of open source code software in the Project).

9.2.3 If the Steering Committee considers that the restrictions have such impact, which is not foreseen in the Consortium Plan, it may decide to update the Consortium Plan accordingly.

9.2.4 Any Access Rights granted expressly exclude any rights to sublicense unless expressly stated otherwise.

Access Rights shall be free of any administrative transfer costs.

Access Rights are granted on a non-exclusive basis, if not otherwise agreed in writing by all the Parties.

9.2.5 Foreground and Background shall be used only for the purposes for which Access Rights to it have been granted.

9.2.6 All requests for Access Rights shall be made in writing.

The granting of Access Rights may be made conditional on the acceptance of specific conditions aimed at ensuring that these rights will be used only for the intended purpose and that appropriate confidentiality obligations are in place.

9.2.7 The requesting Party must show that the Access Rights are Needed.

## **9.3 Access Rights for implementation**

Access Rights to Foreground and Background Needed for the performance of the own work of a Party under the Project shall be granted on a royalty-free basis, unless otherwise agreed for Background in Attachment 1.

## **9.4 Access Rights for Use**

9.4.1 Access Rights to Foreground if Needed for Use of a Party's own Foreground including for third-party research shall be granted on fair and reasonable conditions.

Access rights for internal research activities shall be granted on a royalty-free basis.

9.4.2 A request for Access Rights may be made up to twelve months after the end of the Project or, in the case of Art. 9.6.2.2, after the termination of the requesting Party's participation in the Project.

9.4.3 Access Rights to Background if Needed for Use of a Party's own Foreground shall be granted on fair and reasonable conditions.



### ***9.5 Additional Access Rights***

For the avoidance of doubt any grant of Access Rights not covered by this Consortium Agreement shall be at the absolute discretion of the owning Party and subject to such terms and conditions as may be agreed between the owning and receiving Parties.

### ***9.6 Access Rights for Parties entering or leaving the Consortium***

#### ***9.6.1 New Parties entering the Consortium***

All Foreground developed before the accession of the new Party shall be considered to be Background with regard to said new Party.

#### ***9.6.2 Parties leaving the Consortium***

##### ***9.6.2.1 Access Rights granted to a leaving Party***

###### ***9.6.2.1.1 Defaulting Party***

Access Rights granted to a Defaulting Party and such Party's right to request Access Rights shall cease immediately upon receipt by the Defaulting Party of the formal notice of the decision of the Steering Committee to terminate its participation in the Consortium.

###### ***9.6.2.1.2 Non-defaulting Party***

A non-defaulting Party leaving voluntarily and with the other Parties' consent shall have Access Rights to the Foreground developed until the date of the termination of its participation. It may request Access Rights within the period of time specified in Art. 9.4.2.

##### ***9.6.2.2 Access Rights to be granted by any leaving Party***

Any Party leaving the Project shall continue to grant Access Rights pursuant to this Consortium Agreement as if it had remained a Party for the whole duration of the Project.

### ***9.7 Specific Provisions for Access Rights to Software***

For the avoidance of doubt, the general provisions for Access Rights provided for in this Section 9 are applicable also to Software.

Parties' Access Rights to Software do not include any right to receive source code or object code ported to a certain hardware platform or any right to receive respective Software documentation in any particular form or detail, but only as available from the Party granting the Access Rights.

## **Section 10: Non-disclosure of information**

10.1 All information in whatever form or mode of transmission, which is disclosed by a Party (the "Disclosing Party") to any other Party (the "Recipient") in connection with the Project during its implementation and which has been explicitly marked as "confidential", or when disclosed orally, has been identified as confidential at the time of disclosure and has been confirmed and

designated in writing within 15 days from oral disclosure at the latest as confidential information by the Disclosing Party, is "Confidential Information".

10.2 The Recipients hereby undertake for a period of 5 years after the end of the Project:

- (a) not to use Confidential Information otherwise than for the purpose for which it was disclosed;
- (b) not to disclose Confidential Information to any third party without the prior written consent by the Disclosing Party;
- (c) to ensure that internal distribution of Confidential Information by a Recipient shall take place on a strict need-to-know basis; and
- (d) to return to the Disclosing Party on demand all Confidential Information which has been supplied to or acquired by the Recipients including all copies thereof and to delete all information stored in a machine readable form. If needed for the recording of ongoing obligations, the Recipients may however request to keep a copy for archival purposes only.

10.3 The Recipients shall be responsible for the fulfilment of the above obligations on the part of their employees and shall ensure that their employees remain so obliged, as far as legally possible, during and after the end of the Project and/or after the termination of employment.

10.4 The above shall not apply for disclosure or use of Confidential Information, if and in so far as the Recipient can show that:

- (a) the Confidential Information becomes publicly available by means other than a breach of the Recipient's confidentiality obligations;
- (b) the Disclosing Party subsequently informs the Recipient that the Confidential Information is no longer confidential;
- (c) the Confidential Information is communicated to the Recipient without any obligation of confidence by a third party who is in lawful possession thereof and under no obligation of confidence to the Disclosing Party;
- (d) the disclosure or communication of the Confidential Information is foreseen by provisions of the National funding contract or National Rules and Regulations.
- (e) the Confidential Information, at any time, was developed by the Recipient completely independently of any such disclosure by the Disclosing Party; or
- (f) the Confidential Information was already known to the Recipient prior to disclosure.

10.5 The Recipient shall apply the same degree of care with regard to the Confidential Information disclosed within the scope of the Project as with its own confidential and/or proprietary information, but in no case less than reasonable care.

10.6 Each Party shall promptly advise the other Party in writing of any unauthorised disclosure, misappropriation or misuse of Confidential Information after it becomes aware of such unauthorised disclosure, misappropriation or misuse.

10.7 If any Party becomes aware that it will be required, or is likely to be required, to disclose Confidential Information in order to comply with applicable laws or regulations or with a court or administrative order, it shall, to the extent it is lawfully able to do so, prior to any such disclosure notify the Disclosing Party, and comply with the Disclosing Party's reasonable instructions to protect the confidentiality of the information.

10.8 The confidentiality obligations under this Consortium Agreement shall not prevent the communication of Confidential Information to the National Agencies.

## **Section 11: Miscellaneous**

### ***11.1 Attachments, inconsistencies and severability***

This Consortium Agreement consists of this core text and  
Attachment 1 (Background included)  
Attachment 2 (Background excluded)  
Attachment 3 (Accession document)  
Attachment 4 (initial list of Members and other contact persons)  
Attachment 5 (Description of Work)

In case the terms of this Consortium Agreement are in conflict with the terms of the National Rules and Regulations, which apply to each Party, the terms of the latter shall prevail. In case of conflicts between the attachments and the core text of this Consortium Agreement, the latter shall prevail.

Should any provision of this Consortium Agreement become invalid, illegal or unenforceable, it shall not affect the validity of the remaining provisions of this Consortium Agreement. In such a case, the Parties concerned shall be entitled to request that a valid and practicable provision be negotiated which fulfils the purpose of the original provision.

### ***11.2 No representation, partnership or agency***

The Parties shall not be entitled to act or to make legally binding declarations on behalf of any other Party. Nothing in this Consortium Agreement shall be deemed to constitute a joint venture, agency, partnership, interest grouping or any other kind of formal business grouping or entity between the Parties.

### ***11.3 Notices and other communication***

Any notice to be given under this Consortium Agreement shall be in writing to the addresses and recipients as listed in the most current address list kept by the Coordinator based on the initial list of Members and other contact persons in Attachment 4.

Formal notices:

If it is required in this Consortium Agreement (Article. 9.7.2.1.1 and 11.4) that a formal notice, consent or approval shall be given, such notice shall be signed by an authorised representative of a Party and shall either be served personally or sent by mail with recorded delivery or telefax with receipt acknowledgement.

Other communication:

Other communication between the Parties may also be effected by other means such as e-mail with acknowledgement of receipt, which fulfils the conditions of written form.

Any change of persons or contact details shall be notified immediately by the respective Party to the Coordinator. The address list shall be accessible to all concerned.

### ***11.4 Assignment and amendments***

No rights or obligations of the Parties arising from this Consortium Agreement may be assigned or transferred, in whole or in part, to any third party without the other Parties' prior formal approval.

Amendments and modifications to the text of this Consortium Agreement not explicitly listed in Article 6.3.6 require a separate agreement between all Parties.

### ***11.5 Mandatory national law***

Nothing in this Consortium Agreement shall be deemed to require a Party to breach any mandatory statutory law under which the Party is operating.

### ***11.6 Language***

This Consortium Agreement is drawn up in English, which language shall govern all documents, notices, meetings, arbitral proceedings and processes relative thereto.

### ***11.7 Applicable law***

This Consortium Agreement shall be construed in accordance with and governed by the laws of Belgium.

### ***11.8 Settlement of disputes***

All disputes arising out of or in connection with this Consortium Agreement, which cannot be solved amicably, shall be finally settled under the following arrangement :

Should a dispute arise between the Parties concerning the validity, the interpretation and/or the implementation of this Consortium Agreement, they will try to solve it through mediation, according to the rules of Mediation, Brussels. The Parties undertake not to put an end to the mediation before the introductory statement made by each party in joint session.

Should the mediation fail to bring about a full agreement between the Parties putting an end to the dispute, sole competent courts will be the courts of Brussels.

## Section 12: Signatures

AS WITNESS:

The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature the day and year first above written.

### Partner 1

Centre National de la Recherche Scientifique

Signature(s) 

Name : Younis HERMES

Title Délégué régional Provence et Corse



14 JUIN 2013

AS WITNESS:

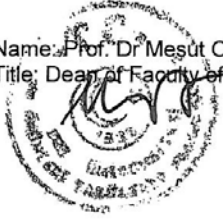
The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature the day and year first above written.

**Partner 2**

EGE, Ege University Faculty of Fisheries

Signature

Name: Prof. Dr. Mesut ONEN  
Title: Dean of Faculty of Fisheries



AS WITNESS:

The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature the day and year first above written.

**Partner 3:**  
**LIGAMEN**

Signature

Name : Anthony FREMAUX  
Title : Director General



**LIGAMEN**  
Société de la Vallée  
59016 MARTELLE L'ESTAQUE  
SIRET 524 799 319 00016



AS WITNESS:

The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature the day and year first above written.

**Partner 4**

IFREMER, Institut Français de Recherche pour l'Exploitation de la Mer

Signature

Name : Gérard RIOU

Title :



AS WITNESS:

The Parties have caused this Consortium Agreement to be duly signed by the undersigned authorised representatives in separate signature the day and year first above written.

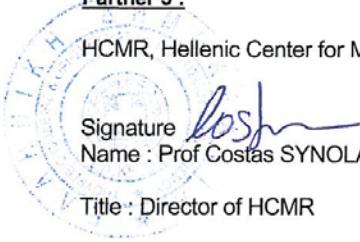
**Partner 5 :**

HCMR, Hellenic Center for Marine Research

Signature

Name : Prof Costas SYNOLAKIS

Title : Director of HCMR



## **Attachment 1: Background included**

Access Rights to Background made available to the Parties:

### **Partner 1**

Background of the CNRS, Centre National de la Recherche Scientifique is all Know-how generated within the department of Jean-Pierre Feral at IMBE/UMR 7263, Marc Verlaque at MIO/UMR7294 and Gérard Pergent SPE/UMR6134 as far as needed to duly perform our work in the Project.

### **Partner 2:**

Background of Ege University, Faculty of Fisheries is all know-how generated within Department of Hydrobiology (Director: Dr. Özdemir EGEMEN), Department of Aquaculture (Director: Dr. Semra CİRİK), and Department of Fishing and Processing Technology (Director: Dr. Adnan TOKAÇ) as far as needed to duly perform our work in the project.

### **Partner 3:**

LIGAMEN

### **Partner 4 :**

IFREMER, Institut Français de Recherche pour l'Exploitation de la Mer

### **Partner 5 :**

Background of the HCMR, Hellenic Center for Marine Research is all Know-how generated within the Institute of Marine Biology, Biotechnology & Aquaculture (Director: Dr Pascal Divanach), the Institute of Oceanography (Director: Dr Vasilis Lykousis), and the Institute of Marine Biological Resources (Director: Dr Alcibiades N. Economou) as far as needed to duly perform our work in the Project.

This represents the status at the time of signature of this Consortium Agreement.

## **Attachment 2: Background excluded**

Background excluded from Access Rights:

### **Partner 1:**

#### **CNRS, Centre National de la Recherche Scientifique**

- Any Background created outside the three research departments IMBE/UMR 7263, MIO/UMR 7294 and SPE/UMR 6134.
- Any Background created outside the research group led by Dr. Jean-Pierre Feral at IMBE/UMR 7263, Marc Verlaque at MIO/UMR 7294 and Gérard Pergent at SPE/UMR 6134.
- Any Background created within the research groups led by Dr Jean-Pierre Feral, Marc Verlaque and Gérard Pergent but not directly relevant to the CIGESMED project.
- Any Background which is already subject to any third party agreement.
- Any Background which is not owned by CNRS.

### **Partner 2:**

#### **EGE, Ege University Faculty of Fisheries**

Any background created outside the three departments, Department of Hydrobiology, Department of Aquaculture and Department of Fishing and Processing Technology.

Any background created within the three departments, Department of Hydrobiology, Department of Aquaculture and Department of Fishing and Processing Technology

Any background created within the benthos group led by Dr. Melih Ertan ÇINAR (Ege University), Dr. Ferah KOÇAK (Dokuz Eylül University) and Dr. Ergün TAŞKIN (Celal Bayar University)

Any Background which is already subject to any third party agreement.

Any Background which is not owned by EGE.

### **Partner 3:**

#### **LIGAMEN**

The mapping algorithm and mathematical underlying principles developed by Ligamen, remains Ligamen's intellectual property.

### **Partner 4 :**

#### **IFREMER, Institut Français de Recherche pour l'Exploitation de la Mer**

The Workpackage 3 (Indicators development and tests) is based on the methodology developed in the program INDEX-COR launching in 2011. This program associates IFREMER and AAMP (Agency for the Protected Marine Areas) for the definition of an Index allowing the evaluation of state of Coralligenous bottoms: the INDEX-COR method. The WP3 of CIGESMED ERA-NET program used this method. The objectives are its improvement in French coasts areas and the adaptation of this method in the east basin of Mediterranean. Thus, during the CIGESMED program, specially for the task 1, the AAMP will be associated within the decision and the technical aspects of the application of INDEX-COR method.

25 / 31

**Partner 5 :**

**HCMR, Hellenic Center for Marine Research**

- Any Background created outside the three research institutes, Institute of Marine Biology, Biotechnology & Aquaculture, Institute of Oceanography and Institute of Marine Biological Resources.
- Any Background created within the three research institutes, Institute of Marine Biology, Biotechnology & Aquaculture, Institute of Oceanography and Institute of Marine Biological Resources but not directly relevant to the CIGESMED project.
- Any Background which is already subject to any third party agreement.
- Any Background which is not owned by HCMR.

This represents the status at the time of signature of this Consortium Agreement.

### **Attachment 3: Accession document**

ACCESSION

of a new Party to

CIGESMED Consortium Agreement, version [..., YYYY-MM-DD]

[OFFICIAL NAME OF THE NEW PARTY AS IDENTIFIED IN THE GA]

hereby consents to become a Party to the Consortium Agreement identified above and accepts all the rights and obligations of a Party starting [date].

CNRS Centre National de la Recherche Scientifique

hereby certifies that the Consortium has accepted in the meeting held on [date] the accession of [the name of the new Party] to the Consortium starting [date].

This Accession document has been done in 2 originals to be duly signed by the undersigned authorised representatives.

[Date and Place]

[INSERT NAME OF THE NEW PARTY]

Signature(s)  
Name(s)  
Title(s)

[Date and Place]

CNRS Centre National de la Recherche Scientifique  
Signature(s)  
Name(s)  
Title(s)



## **Attachment 4: Initial list of Members and other contact persons**

Recipients for Notices in Accordance with Section 11 of this *Consortium Agreement*.

### **Partner 1 CNRS**

#### **IMBE UMR7263**

Member of the Steering Committee

Mr Jean-Pierre FERAL

Position Directeur de Recherche

Tel.+ 33401041614 / +33672931467 (mobile)

Fax +33491041635

E-mail: jean-pierre.feral@imbe.fr

13008 Marseille France

#### Administrative contact point

Mrs Béatrice SAINT-CRICQ

Position : Responsable du Service Partenariat et Valorisation

Tel. +33 4 91 16 40 08

Fax +33 4 91 77 93 04

E-mail : spv@dr12.cnrs.fr

CNRS Délégation Provence et Corse

31 Chemin Joseph Aiguier

130402 Marseille Cedex 20, France

### **Partner 2, EGE UNIVERSITY, FACULTY OF FISHERIES**

EGE ÜNİVERSİTESİ, SU ÜRÜNLERİ FAKÜLTESİ

Member of the Steering Committee:

Mr Prof. Dr. Melih Ertan ÇINAR

Position : Full Professor

Tel. +90 2323111734

Fax +90 2323883685

E-mail: melih.cinar@ege.edu.tr

Ege University, Faculty of Fisheries, 35100 Bornova, Izmir, TURKEY

#### Administrative contact point

Dr. Alper DOĞAN

Position: Associate Professor

Tel. +90 2323115201

Fax +90 2323883685

E-mail: alper.dogan@ege.edu.tr

Adress if different from the above one

00000 City, Country,

### **Partner 3 LIGAMEN**

Member of the Steering Committee:

Mr Anthony FREMAUX

Position : Director General

Tel. +33 6 2529 1141

E-mail: afremaux@ligamen.fr

196, chemin de la Nerthe 13016 Marseille – France

Administrative contact point  
Mr Anthony FREMAUX  
Position : Director General  
Tel. +33 6 2529 1141  
E-mail: afremaux@ligamen.fr

**Partner 4 IFREMER**  
**Institut Français de Recherche pour l'Exploitation de la Mer**  
**Laboratoire Environnement Ressource- PACA**  
Member of the Steering Committee:  
Mr Stéphane SARTORETTO  
Position : Researcher  
Tel. +33 4 94.30.49.73  
Fax +33 4 94.30.44.17  
E-mail: stephane.sartoretto@ifremer.fr

Administrative contact point  
Mr Emmanuel SARGENTON  
Position : Head of Contract Department  
Tel. + 33 4 94 30 48 19  
Fax + 33 4 94 30 44 15  
E-mail: [emmanuel.sargenton@ifremer.fr](mailto:emmanuel.sargenton@ifremer.fr)

Adress :  
IFREMER, Centre de Méditerranée, Z.P. de Brégaillon  
CS 20330 - 83507 La Seyne-sur-mer Cedex, France

**Partner 5 HCMR**  
**Hellenic Centre for Marine Research**  
Member of the Steering Committee:  
Dr Christos ARVANITIDIS  
Position: Senior Researcher  
Tel. +30 2810 337748; 337801  
Fax +30 2810 337880  
E-mail: arvanitidis@hcmr.gr

Address:  
Hellenic Centre for Marine Research  
Institute of Marine Biology, Biotechnology and Aquaculture  
P.O. Box 2214, 71003 Heraklion Crete, Greece

Administrative contact point  
Mr Stelios Kastrinakis  
Position: Lear of HCMR, Head of the Financial and Administrative Department of HCMR Crete  
Tel. +30 2810337711  
Fax +30 2810337822  
E-mail: [kastr@hcmr.gr](mailto:kastr@hcmr.gr)

#### **Attachment 5: Subcontracting**

In the frame of CIGESMED project, CNRS will subcontract a study entitled "Coralligenous survey in the North-East Mediterranean" which is described in the Description of Work.

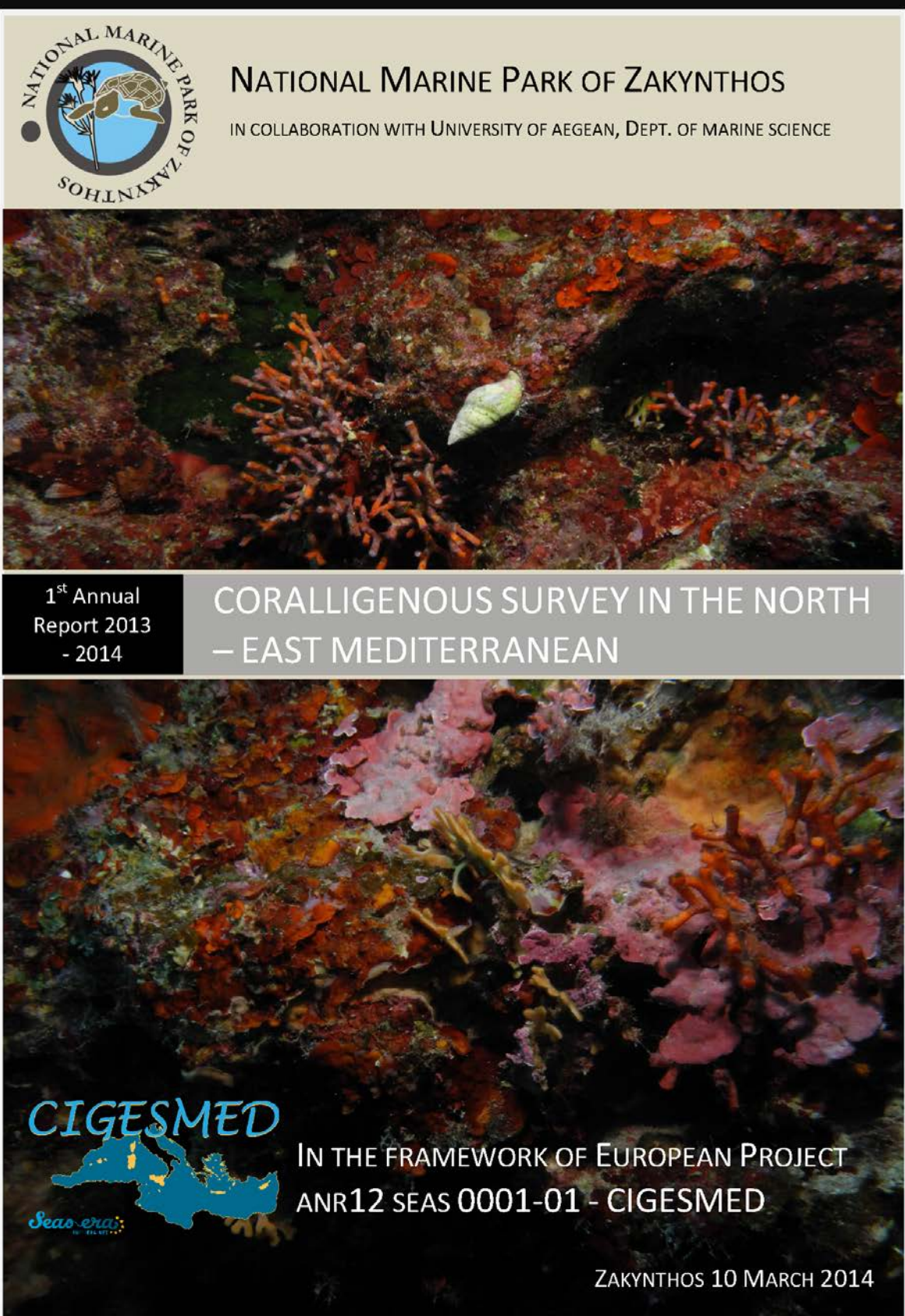
A call for tender was issued for a feasibility study to deal with the above mentioned study.


The National Marine Park of Zakynthos has been retained to conduct the study.

As subcontractor, the National Marine Park of Zakynthos works without the direct supervision of CNRS and is not hierarchically subordinate to CNRS.

CNRS must ensure that the intellectual property that may be generated by a subcontractor reverts to the Parties of CIGESMED consortium.


## Annex 2: First NMPZ annual progress report



 NATIONAL MARINE PARK OF ZAKYNTHOS  
IN COLLABORATION WITH UNIVERSITY OF AEGEAN, DEPT. OF MARINE SCIENCE

1<sup>st</sup> Annual Report 2013 - 2014

CORALLIGENOUS SURVEY IN THE NORTH – EAST MEDITERRANEAN

 CIGESMED  
IN THE FRAMEWORK OF EUROPEAN PROJECT ANR12 SEAS 0001-01 - CIGESMED

ZAKYNTHOS 10 MARCH 2014

# CORALLIGENOUS SURVEY IN THE NORTH – EAST MEDITERRANEAN

## 1<sup>st</sup> Annual Progress Report

### Authors:

Koutsoubas D., Sini M., Gerovasileiou V., Dimitriadis C., Sourbes L., Poursanidis D.

### WORKING GROUP

Name	Affiliation	Specific tasks
Drosos Koutsoubas	NMPZ	<u>Project coordinator</u>
Laurent Sourbes	NMPZ	Report preparation, administrative and communication tasks
Charalampos Dimitriadis	NMPZ	Report preparation, communication tasks, field work
John Batzakas	Univ. of the Aegean	Report preparation, communication tasks, field work
Vasilis Gerovasileiou	Univ. of the Aegean	Report preparation, communication tasks, field work
Maria Sini	Univ. of the Aegean	Report preparation, communication tasks, field work
Dimitris Poursanidis	Univ. of the Aegean	Report preparation, field work
Zinovia Erga	Univ. of the Aegean / CNRS	Laboratory work

### NATIONAL MARINE PARK OF ZAKYNTHOS

[HTTP://www.nmp-zak.org](http://www.nmp-zak.org)

### DEPT. OF MARINE SCIENCES, UNIVERSITY OF AEGEAN

[HTTP://www.mar.aegean.gr](http://www.mar.aegean.gr)

Front page photos: F. Nikoloudakis



## 1. INTRODUCTION

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The current document is the first annual progress report (1<sup>st</sup> reporting period) of activities that were undertaken by the National Marine Park of Zakynthos as a subtask in the framework of the European Project CIGESMED according to deliverable requirements of the contract (Ref CNRS: DR12-JE 093 579) signed by NMPZ and CNRS. The first annual report includes the tasks and activities carried out from June of 2013 until February of 2014. The activities of the subtask 'Coralligenous Survey in the North – East Mediterranean' and their relation to the Work Packages (WP) of CIGESMED project are presented in Table 1.

**Table 1: NMPZ's activities and their relation to CIGESMED project WPs**

NMPZ Activities	Description	Connection to CIGESMED WP's
<b>Activity 1</b>	Coralligenous assessment and monitoring	<b>WP2</b> - <i>Coralligenous assessment and threats in the different basins</i> <b>WP3</b> - <i>Indicators' development and test</i>
<b>Activity 2</b>	Management tools	<b>WP4</b> - <i>Innovative monitoring tools</i> <b>WP6</b> - <i>Data management, mapping and assimilation tools</i>
<b>Activity 3</b>	Participatory process- Promotion -Public awareness activities	<b>WP5</b> - <i>Citizen science network implementation</i> <b>WP7</b> - <i>Outreach, dissemination and stakeholder engagement</i>

## 2. CIGESMED KICK OFF MEETING

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D. Koutsoubas, M.Sini and D. Poursanidis, members of the NMPZ work team, participated in the kick off meeting of CIGESMED project which was held at Heraklion, Crete from 17<sup>th</sup> to 19<sup>th</sup> of April 2013.

During the three day meeting they had the opportunity to meet with other project participants, and get acquainted with the project structure, organization, and deliverables. They attended a series of presentations focusing on the description of the different work packages, the presence of coralligenous habitats in France, Greece, and Turkey, the experience obtained from previous citizen science projects (i.e. COMBER), and the application of knowledge trees in information assimilation and data management. The NMPZ members exchanged ideas and technical knowledge regarding the study of coralligenous, contributed to the compilation of a generalized species list regarding flora and fauna of

coralligenous communities in Greece, and registered in the Tree of Knowledge – consortium competences. Finally, M. Sini gave a short presentation on the main features and functions of photoQuad, a layer-based image processing software developed at the University of the Aegean, as a potential tool for the assessment of coralligenous communities in the context of CIGESMED project (Figure 1).



Figure 1: PHOTOQUAD Software presentation excerpts

### 3. CIGESMED FIELD TRIP IN MARSEILLE

---

V. Gerovasileiou and M. Sini, members of the NMPZ/University of Aegean work team, joined the CIGESMED diving workshop held in Marseille from 2<sup>nd</sup> to 4<sup>th</sup> of July 2013. The aim of the workshop was to give the chance to participants from Greece and Turkey to get acquainted with the well-developed coralligenous assemblages found at the Bay of Marseille for future reference and comparison with coralligenous communities found elsewhere.

Two diving fieldtrips were realized during which coralligenous habitats were photographed using quadrats of different size in order to check their efficiency. The participants also had the opportunity to attend the following presentations / discussions: a) Encrusting Coralligenous Rhodophyta – the main algal bioconstructors, by Marc Verlaque (CNRS – MIO), b) Basic principles towards the development of a coralligenous index (IndexCor), by Stéphane Sartoretto (IFREMER), c) Development of photographic and video tools, by Romain Bricout (CNRS associate), d) Hands-on application of photoQuad, by Maria Sini (NMPZ, University of the Aegean). Finally, a round table discussion took place regarding the main biotic, abiotic, and observer attributes that should be considered during future fieldwork and data analysis.

### 4. COMMUNICATION WITH LOCAL DIVE CLUBS

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During August 2013, NMPZ initiated communications with local dive centers and divers so as to obtain information regarding the presence of coralligenous



communities along Zakynthos Island coastline. The task included an initial presentation of the coralligenous habitats to the diving centers through the use of visual material (e.g. photos, video). After the briefing, the divers recommended several locations around Zakynthos coasts where coralligenous habitats could possibly be found. The obtained information was used to design the preliminary field survey in the NMPZ.

## 5. PRELIMINARY FIELD SURVEY IN NMPZ

For the establishment of suitable coralligenous study sites in Zakynthos Island (SW Ionian Sea, Eastern Mediterranean), a preliminary survey was conducted during September 2013 in three locations found at the SW part of the Island within the boundaries of the Marine Protected Area of the National Marine Park of Zakynthos (Figure 2). The choice of the locations was based on information provided by local diving centers and recreational divers, during dedicated interviews regarding the potential presence of coralligenous habitats along Zakynthos coastline. The locations of the examined candidate sites are presented in Figure 3.



Figure 2: The marine protected area of NMPZ including the zoning scheme of protection and the locations of the candidate sampling sites.



Figure 3: Locations of the three candidate sites in the NMPZ

**CANDIDATE SITE 1: Marathonisi Islet**

Coordinates: 37°40'57.43"N, 20°52'26.49"E



Figure 4: Location of the candidate site at Marathonisi Islet

Divers: Charalampos Dimitriadis (NMPZ), Fanis Nikoloudakis (Divers Paradise Dive club)

### Site description

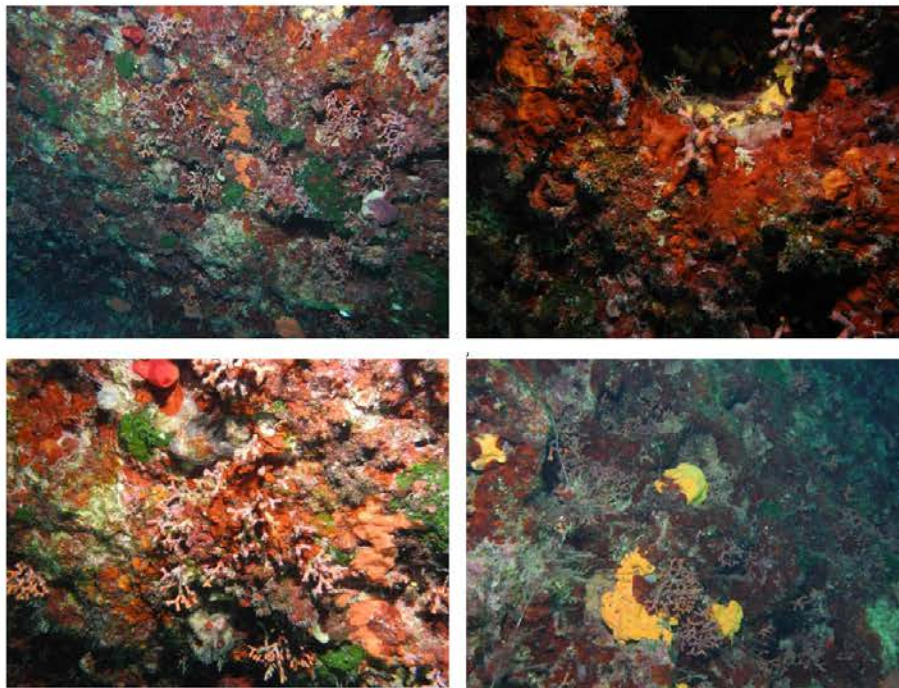
The site is located in zone B of the Marine Protected Area of the National Marine Park of Zakynthos (NMPZ). In particular, the candidate sampling site is situated at the southern part of Marathonisi Islet and starts at around 15 m depth (Figure 4). The underwater topography consists of different habitats (e.g. sandy beds and *Posidonia oceanica* meadows) whereas large boulders with overhangs and crevices are also present. This site is exposed to the prevailing South-Southeast and Southeast winds and is influenced by the water exchange of Laganas Bay with the open Ionian Sea.

### Human Pressures

The preliminary survey and previous studies that have taken place in this area indicate the presence of ghost nets and abandoned long lines, as well signs of potential disturbance due to intense recreational diving activity.

### Characteristic photos

Depth 15 – 20 m





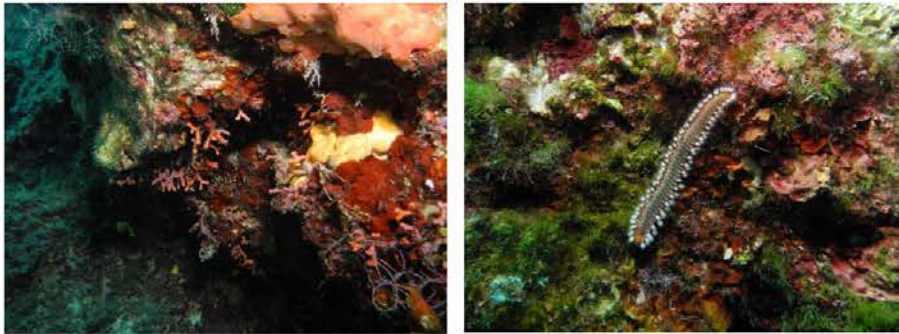


Figure 5: Typical coralligenous communities that can be found at candidate site 1

### CANDIDATE SITES 2 & 3: KERI – MAVROS KAVOS

Coordinates:

Site Keri: 37°38'46.15"N, 20°50'9.80"E

Site Mavros Kavos: 37°38'42.32"N, 20°49'48.90"E



Figure 6: Candidate sites at Keri and Mavros Kavos locations

Divers: Charalampos Dimitriadis (NMPZ), Fanis Nikoloudakis (Divers Paradise Dive club)

#### Sites description

Both sites are situated at the SW part of Zakynthos Island, close to the westernmost boundaries of the NMPZ. The area is characterized by cooler water temperatures in comparison to Laganas Bay, possibly due to the direct exposure

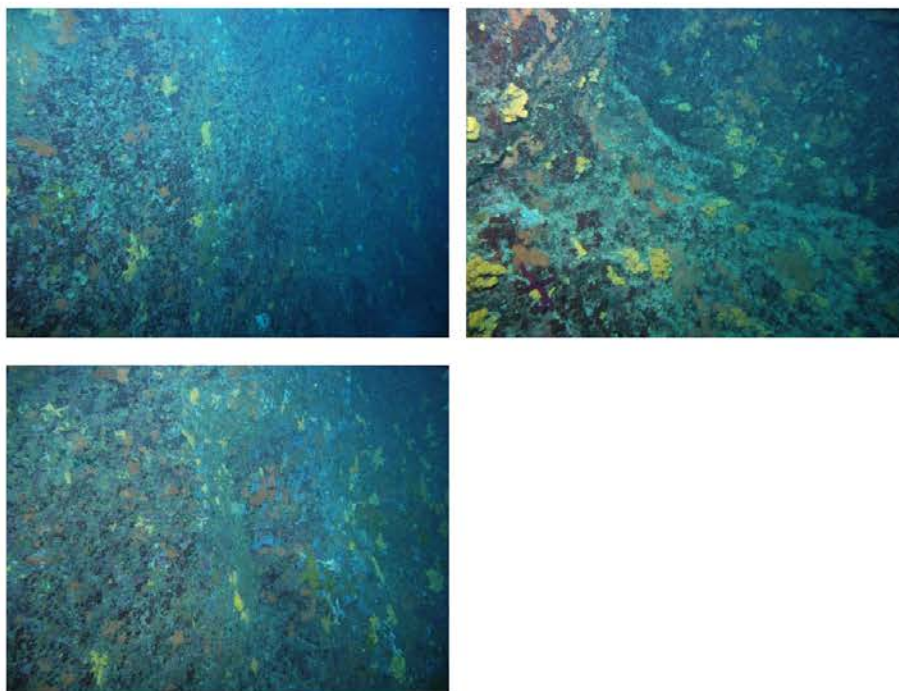
to the open Ionian Sea and the local wind driven upwellings. The topography of both sites is characterized by extensive vertical rocky walls with crevices, overhangs and numerous submerged caves. Rocky cliffs starting from 100 – 150 m above sea level drop vertically to depths of 30 – 40m. These geomorphological features account for the increased shadowy conditions observed locally over the greatest part of the day. At both sites depth of sciaphilic – coralligenous communities were recorded from 10 to 30 m.

### **Human Pressures**

The preliminary survey and previous studies that have taken place in these areas indicate the presence of ghost nets and abandoned long lines, as well signs of potential disturbance due to intense recreational diving activity.

### **Characteristic photos:**

#### **Site KERI – Depth 15 -30m**



**Figure 7: Typical coralligenous communities that can be found at candidate site 2**



Site MAVROS KAVOS – Depth 12-30 m

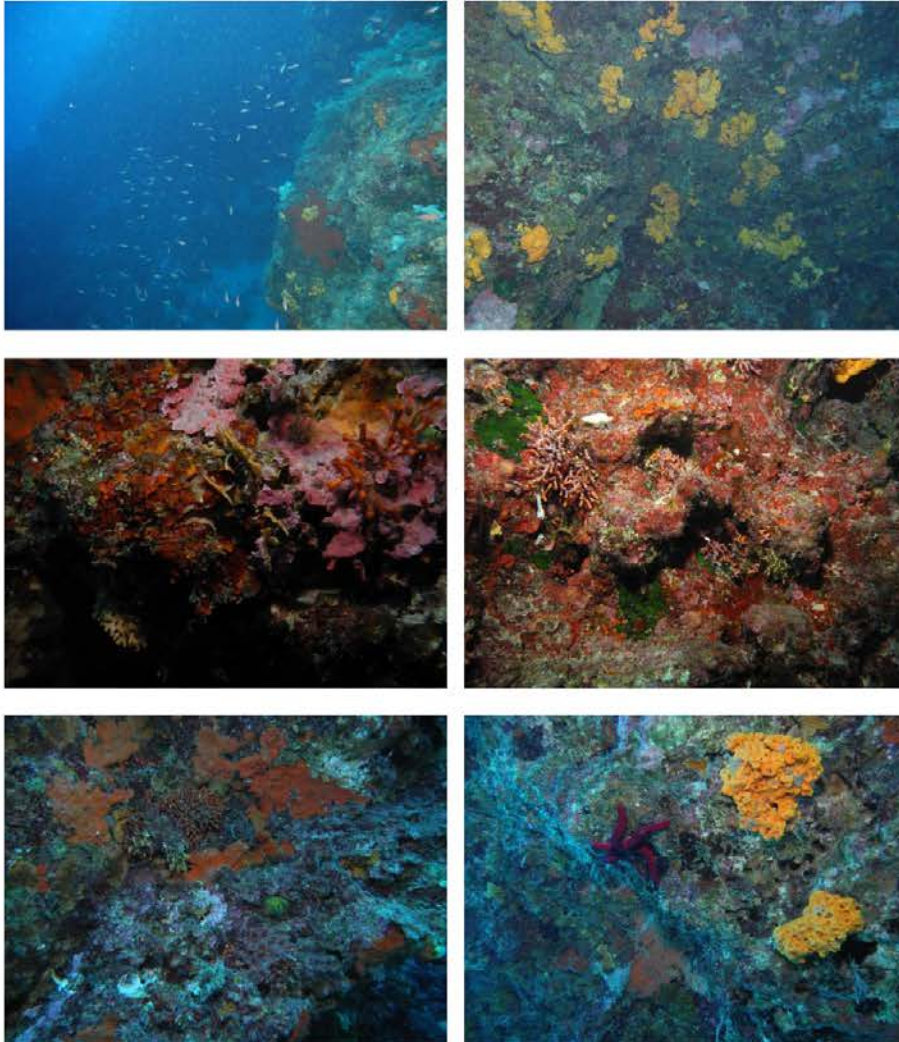


Figure 8: Typical coralligenous communities that can be found at candidate site 3

## Species list from the preliminary survey

A total of 42 species were encountered during the preliminary survey (Table 2).

**Table 2:** Species recorded in the candidate sampling sites of Zakynthos Island.

	Keri	Mavros Kavos	Marathonisi
<b>Rhodophyta</b>			
<i>Amphiroa rigida</i> J.V. Lamouroux, 1816			+
<i>Amphiroa cryptarthrodia</i> Zanardini, 1844			+
<i>Liagora viscida</i> (Forsskål) C.Agardh, 1822			+
<i>Peyssonnelia</i> spp	+	+	+
<i>Peyssonnelia</i> cf. <i>bornetii</i>	+	+	+
<i>Peyssonnelia squamaria</i> (S.G. Gmelin) Decaisne, 1841		+	+
<i>Peyssonnelia rosa-marina</i> Boudouresque & Denizot, 1973			+
<i>Peyssonnelia</i> cf. <i>rubra</i>	+	+	+
<i>Mesophyllum</i> sp.	+		
<i>Mesophyllum alternans</i> (Foslie) Cabioch & M.L.Mendoza, 1998		+	+
<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman & R.A.Townsend, 1993			+
<b>Chlorophyta</b>			
<i>Pseudochlorodesmis furcellata</i> (Zanardini) Børgesen, 1926			+
<i>Palmophyllum crassum</i> (Naccari) Rabenhorst, 1868	+	+	+
<b>Foraminifera</b>			
<i>Miniacina miniacea</i> (Pallas, 1766)		+	
<b>Porifera</b>			
<i>Acanthella acuta</i> Schmidt, 1862	+		
<i>Agelas oroides</i> (Schmidt, 1864)	+	+	+
<i>Aplysilla rosea</i> (Barrois, 1876)			+
<i>Axinella damicornis</i> (Esper, 1794)	+	+	
<i>Cacospongia mollior</i> Schmidt, 1862			+
<i>Chondrosia reniformis</i> Nardo, 1847		+	
<i>Cliona schmidtii</i> (Ridley, 1881)			+
<i>Crambe crambe</i> (Schmidt, 1862)	+	+	+
<i>Fasciospongia cavernosa</i> (Schmidt, 1862)			+
<i>Petrosia</i> ( <i>Petrosia</i> ) <i>ficiformis</i> (Poiret, 1789)	+		+
<i>Phorbas tenacior</i> (Topsent, 1925)	+		
<i>Spirastrella cunctatrix</i> Schmidt, 1868	+	+	+
<i>Terpios gelatinosa</i> (Bowerbank, 1866)			+
<b>Cnidaria</b>			
<i>Caryophyllia</i> sp.		+	
<i>Eudendrium</i> sp.		+	+
<i>Leptopsammia pruvoti</i> Lacaze-Duthiers, 1897	+		+
<i>Madracis pharensis</i> (Heller, 1868)		+	+
<b>Mollusca</b>			
<i>Rocellaria dubia</i> (Pennant, 1777)			+
<b>Annelida</b>			
<i>Hermodice carunculata</i> (Pallas, 1766)			+
<i>Myxicola infundibulum</i> (Montagu, 1808)			+
<i>Protula tubularia</i> (Montagu, 1803)		+	
<b>Bryozoa</b>			
<i>Adeonella</i> sp.	+	+	+
<i>Myriapora truncata</i> (Pallas, 1766)	+	+	+
<i>Rhynchozoon neapolitanum</i> Gautier, 1962		+	
<i>Schizomavella</i> sp.		+	
<b>Echinodermata</b>			
<i>Echinaster sepositus</i> (Retzius, 1783)			+
<i>Ophidiaster ophidianus</i> (Lamarck, 1816)	+	+	
<b>Tunicata</b>			
<i>Halocynthia papillosa</i> (Linnaeus, 1767)			+

## Remarks

Based on the observations of the preliminary surveys, coralligenous assemblages at Marathonisi site were only found as enclaves in overhangs and crevices. On the other hand, the western sites of Keri and Mavros Kavos could potentially be used as sampling sites of Zakynthos, as defined by the geomorphological characteristics (i.e. steep vertical walls) and the associated benthic communities. The scarcity of rich coralligenous communities observed may be due to the prevailing oligotrophic conditions that characterize both the S. Ionian and S. Aegean Seas. Considering this peculiarity, further site investigation is recommended in order to determine the optimum location/s.

## 6. SCIENTIFIC MEETING BETWEEN NMPZ AND HCMR AND FIELD SURVEY IN THE NORTH AEGEAN SEA

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V. Gerovasileiou, member of the NMPZ work team, T. Dailianis and G. Chatzigeorgiou, members of the HCMR work team, met in the framework of a scientific meeting organized by HCMR, the leading collaborator of CIGESMED WP 5, in the framework of COMBER citizen science project, on the 12<sup>th</sup> of October, in Thessaloniki. The two teams had the opportunity to discuss about the development of the CIGESMED citizen science network, in NMPZ and the rest of Greece.

On the 13<sup>th</sup> of October they dived in typical coralligenous communities of the North Aegean Sea, in Chalkidiki Peninsula, and identified typical assemblages and species, marking the differences and similarities with communities of the NW Mediterranean, the South Aegean and Ionian seas.

## 7. PRELIMINARY WORK FOR CITIZEN SCIENCE

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The preliminary work for the citizen science component of the project included actions towards the development of a network that will bring together the local dive centers and recreational divers with the scientific group of NMPZ. Diving activity in the Marine Protected Area of NMPZ A is well developed. Four dive centers are operating in the area for more than a decade and a close collaboration of the MPA with the dive centers has recently been established for the co-management of the diving activity. Rough estimations considering the diving activity in the NMPZ suggest that more than 10.000 dives are taking place in this area per year, including both visitor and local resident divers. Hence, the establishment of a citizen science network for the monitoring of coralligenous in Zakynthos Island is feasible and further work towards the development of a cost-



effective, reliable, user friendly and sustainable in the long term scheme should be considered.

The preliminary design of the citizen science network was discussed with the leading collaborator of CIGESMED WP 5 (HCMR members) during two scheduled meetings (October 2013 and February 2014) in order to establish the basic principles of the citizen science network development. In this respect, future actions for the establishment of the CIGESMED citizen science network have been planned in close collaboration with HCMR.

## 8. PRELIMINARY FIELD SURVEY IN CRETE

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In the framework of setting up a common monitoring network of coralligenous stations in Greece, M. Sini and D. Poursanidis, members of the NMPZ/University of Aegean work team, joined members of the HCMR team in order to investigate potential sites in Crete. The fieldtrip was organized by HCMR from 12<sup>th</sup> to 18<sup>th</sup> of November 2013. The NMPZ members participated in the dive trips, collected photographs and samples of marine fauna and flora, and contributed to species identification. The two teams discussed about their future collaboration in the realization of the various CIGESMED project tasks (e.g. sampling, monitoring, and citizen science network development).

## 9. SUMMARY OF ACTIVITIES PROGRESS

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During the first year of project's activities implementation several difficulties have been met and successfully resolved. Considering the activities of the current project, NMPZ progress is in line with the requirements that are described in the Technical Annex of the relative contract.

Summary of activities progress of the present project in relation to CIGESMED work packages is provided in the following table.

NMPZ Activities	CIGESMED WP's	NMPZ PROGRESS
<b>Activity 1</b> <i>Coralligenous assessment and monitoring</i>	<b>WP2 - Coralligenous assessment and threats in the different basins</b> <b>WP3 - Indicators' development and test</b>	Preliminary field survey and candidate site selection, preliminary biodiversity assessment of coralligenous communities, preliminary identification of the possible threats and sources of disturbance, collaboration with national partners (HCMR) of CIGESMED project
<b>Activity 2</b> <i>Management tools</i>	<b>WP4 - Innovative monitoring tools</b> <b>WP6 - Data management, mapping and assimilation tools</b>	Not relevant to the current reporting period
<b>Activity 3</b> <i>Participatory process-Promotion - Public awareness activities</i>	<b>WP5 - Citizen science network implementation</b> <b>WP7 - Outreach, dissemination and stakeholder engagement</b>	Communication with local dive clubs, preliminary actions for citizen science network development, collaboration with national partners (HCMR) of CIGESMED project



### Annex 3 : List of dissemination activities

Type of Activity	Event / Conference Name	Speaker / Author	Main Lead	Title	Date dd/mm/yy	Place	Type of audience	Size of Audience	Countries Addressed
<b>Internal meeting</b>	kick off	WP leaders	CNRS	Power Point presentation	17-19/04/13	Heraklion	Scientific Community	0 - 50	France, Greece, Turkey
<b>Presentations</b>	Internal seminar	Line Le Gall (MNHM, Paris)	CNRS	Evolution and Biodiversity of red algae (Rhodophyta)	27/06/13	Marseille	Scientific Community	0 - 50	France, Italy
<b>Presentations</b>	Internal seminar	Marc Verlaque	CNRS	Encrusting Coralligenous Rhodophyta	02/07/13	Marseille	Scientific Community	0 - 50	France, Greece, Turkey, Italy
<b>Presentations</b>	Internal seminar	Florian Holon	CNRS	Diversité des assemblages coralligènes sur le littoral Méditerranéen Français (Indice RECOR)	27/05/13	Marseille	Scientific Community	0 - 50	France
<b>Conference</b>	International Polychaete Conference	Christos Arvanitidis	HCMR	Short communication of the project to the participants	12/08/13	Sydney	Scientific Community	51 - 150	Australia
<b>Conference</b>	Biodiversity Informatics 2013	Christos Arvanitidis	HCMR	Short communication of the project to the participants	09/05/13	Rome	Scientific Community	51 - 150	Italy
<b>Workshops</b>	Kick-off meeting of EMODNET	Christos Arvanitidis	HCMR	Short communication of the project to the participants	18/09/2013	Ostende	Scientific Community	0 - 50	Blegium
<b>Workshops</b>	EMBOS meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	16/10/2013	Riga	Scientific Community	0 - 50	Latvia
<b>Conference</b>	3rd International marine protected areas congres	Romain David	CNRS	Ensuring coherent networks of MPAs : WS5A3 instrument and actions in the European water : « Currently discussed MPA improvement and new solutions for the Mediterranean Sea : information management with the example of coralligenous habitat	21-27/10/13	Marseille	Scientific Community/ Stakeholders	> 300	International
<b>Poster</b>	Internal seminar	Romain David	CNRS	CIGESMED*intercalibration of data and observations on coralligenous habitats for the effective evaluation of the "Good Environmental Status"	03/12/13	Marseille	Scientific Community	0 - 50	France

				of the Mediterranean Sea?					
<b>Workshops</b>	VECTORS annual assembly	Christos Arvanitidis	HCMR	Short communication of the project to the participants	05-07/11/13	Athens	Scientific Community/ Stakeholders	51 - 150	EU
<b>Workshops</b>	EMBOS meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	20-22/11/2013	Anavyssos	Scientific Community	0 - 50	EU
<b>Workshops</b>	EU BON WP3, 4	Christos Arvanitidis	HCMR	Short communication of the project to the participants	25-27/11/2013	Solsona	Scientific Community	0 - 50	EU
<b>Workshops</b>	LifeWatch Board	Christos Arvanitidis	HCMR	Short communication of the project to the participants	28-29/11/2013	Lecce	Scientific Community	0 - 50	EU
<b>Workshops</b>	OBIS Steering Group meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	04-06/12/2013	Ostende	Scientific Community	0 - 50	EU
<b>Workshops</b>	MAPMED SC meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	05-07/12/2013	Porto Marina, El Alamein	Scientific Community	0 - 50	EU, Tunisia, Egypt
<b>Conference</b>	EuroLag Conference	Christos Arvanitidis	HCMR	Short communication of the project to the participants	16-19/12/2013	Lecce	Scientific Community	0 - 50	EU
<b>Workshops</b>	ViBRANT meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	29/01/2014	Brussels	Scientific Community	0 - 50	EU
<b>Workshops</b>	LifeWatch Technical Meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	03-04/02/2014	Granada	Scientific Community	0 - 50	EU
<b>Workshops</b>	EMBOS meeting	Christos Arvanitidis	HCMR	Short communication of the project to the participants	18-20/02/2014	Oristano	Scientific Community	0 - 50	EU
<b>Workshops</b>	National Strategy for protected species	ME Çınar	EGE	Importance of coralligenous habitats	Oct-2013	Ankara	Scientific Community/ Stakeholders	0 - 50	Turkey

## Annex 4: List of species reported from sampling sites in Turkey, Greece and France (\*Alien species).

SPECIES	TURKEY	GREECE	FRANCE
<b>PHAEOPHYCEAE</b>			
<i>Cutleria chilosa</i> (Falkenberg) P.C.Silva, 1957	+		
<i>Cystoseira corniculata</i> (Turner) Zanardini, 1841		+	
<i>Cystoseira spinosa</i> Sauvageau, 1912		+	
<i>Cystoseira zosteroides</i> C.Agardh, 1820			+
<i>Dictyota dichotoma</i> (Hudson) J.V.Lamouroux, 1809	+		+
<i>Dictyota fasciola</i> (Roth) J. V. Lamouroux, 1809			+
<i>Dictyota implexa</i> (Desfontaines) J.V.Lamouroux, 1809	+		
<i>Dictyota</i> sp.		+	
<i>Dictyopteris polypodioides</i> (A.P.De Candolle) J.V. Lamouroux, 1809			+
<i>Halopteris filicina</i> (Grateloup) Kützing, 1843	+	+	+
<i>Lobophora variegata</i> (J.V.Lamouroux) Womersley ex E.C.Oliveira, 1977	+		
<i>Padina pavonica</i> (Linnaeus) Thivy, 1960	+	+	
<i>Phyllariopsis brevipes</i> (C.Agardh) E.C.Henry & G.R.South, 1987			+
* <i>Styopodium schimperi</i> (Kützing) M.Verlaque & Boudouresque, 1991	+		
<i>Zanardinia typus</i> (Nardo) P.C.Silva, 2000	+		+
<b>RHODOPHYTA</b>			
<i>Amphiroa beauvoisii</i> J.V.Lamouroux, 1816	+		
<i>Amphiroa cryptarthrodia</i> Zanardini, 1844		+	
<i>Amphiroa rigida</i> J.V.Lamouroux, 1816	+	+	
<i>Amphiroa rubra</i> (Philippi) Woelkerling 1983	+		
<i>Acrodiscus vidovichii</i> (Meneghini) Zanardini, 1868	+	+	
<i>Champia parvula</i> (C.Agardh) Harvey 1853	+		
<i>Chondria capillaris</i> (Hudson) M.J.Wynne 1991	+		
<i>Chrysiomena ventricosa</i> (J.V.Lamouroux) J.Agard, 1842			+
<i>Dasya rigidula</i> (Kützing) Ardissonne, 1878	+		
<i>Gelidium serra</i> (S.G.Gmelin) E.Taskin & M.J.Wynne 2013	+	+	
<i>Gloiocladia repens</i> (C.Agardh) Sanchez & Rodriguez-Prieto, 2007			+
<i>Halymenia elongata</i> C.Agardh, 1822			+
<i>Halymenia floresii</i> (Clemente) C.Agard, 1817			+
<i>Herposiphonia secunda</i> (C.Agardh) Ambronn 1880	+		
<i>Hildenbrandia</i> sp.	+		
<i>Hydrolithon farinosum</i> (J.V.Lamouroux) D.Penrose & Y.M.Chamberlain 1993	+		
<i>Irvinea boergesenii</i> (Feldmann) R.J.Wilkes, L.M.Mclvor & Guiry, 2006	+		
<i>Jania adhaerens</i> J.V.Lamouroux, 1816	+	+	
<i>Jania rubens</i> (Linnaeus) Lamouroux, 1816	+		
<i>Kallymenia microphylla</i> J.Agardh, 1851	+		
<i>Kallymenia</i> sp.		+	
<i>Liagora viscida</i> (Forsskål) C.Agardh, 1822		+	
<i>Lithothamnion philippii</i> Foslie, 1897		+	
<i>Lithophyllum racemus</i> (Lamarck) Foslie, 1901		+	
<i>Lithophyllum stictaeforme</i> (Areschoug) Hauck, 1877	+	+	+
<i>Lithophyllum</i> sp.		+	
<i>Lithophyllum cabiochiai</i> (Boudouresque & Verlaque) Athanasiadis			+
<i>Lithothamnion crispatum</i> Hauck, 1878	+		
<i>Lithothamnion valens</i> Foslie, 1909		+	
<i>Lithothamnion</i> sp.	+		
<i>Lophosiphonia obscura</i> (C.Agardh) Falkenberg in 1897	+		
<i>Lophosiphonia scopulorum</i> (Harvey) Womersley, 1950	+		
<i>Mesophyllum alternans</i> (Foslie) Cabioch & M.L.Mendoza, 1998	+		+
<i>Mesophyllum expansum</i> (Philippi) Cabioch & M.L.Mendoza, 2003	+		+
<i>Mesophyllum lichenoides</i> (J.Ellis) Me.Lemoine, 1928	+		
<i>Mesophyllum</i> sp.	+	+	

SPECIES	TURKEY	GREECE	FRANCE
<i>Neogonolithon mamillosum</i> (Hauck) Setchell & L.R.Mason, 1943	+	+	
<i>Nitophyllum punctatum</i> (Stackhouse) Greville, 1830	+		
<i>Peyssonnelia bornetii</i> Boudouresque & Denizot, 1973		+	
<i>Peyssonnelia dubyi</i> P.L.Crouan & H.M.Crouan, 1844	+		
<i>Peyssonnelia polymorpha</i> (Zanardini) F.Schmitz, 1879	+	+	
<i>Peyssonnelia rosa-marina</i> Boudouresque & Denizot, 1973	+	+	
<i>Peyssonnelia rubra</i> (Greville) J.Agardh, 1851	+	+	
<i>Peyssonnelia squamaria</i> (S.G.Gmelin) Decaisne, 1842	+	+	
<i>Peyssonnelia</i> sp.		+	+
<i>Ptilophora mediterranea</i> (H.Huvé) R.E.Norris, 1987		+	
<i>Rodriguezella strafforelloii</i> F.Schmitz ex J.J.Rodríguez y Femenías, 1895	+		
<i>Sphaerococcus coronopifolius</i> Stackhouse, 1797			+
<i>Titanoderma trochanter</i> (Bory de Saint-Vincent) Benhissoune, Boudouresque, Perret-Boudouresque & Verlaque 2002		+	
<i>Tricleocarpa fragilis</i> (Linnaeus) Huisman & R.A.Townsend, 1993	+	+	
* <i>Womersleyella setacea</i> (Hollenberg) R.E.Norris, 1992		+	
<i>Wrangelia penicillata</i> (C.Agardh) C. Agardh, 1828			+
<i>Wurdemannia miniata</i> (Sprengel) Feldmann & G.Hamel 1934	+		
<b>CHLOROPHYTA</b>			
<i>Anadyomene stellata</i> (Wulfen) C.Agardh, 1823	+	+	
* <i>Caulerpa racemosa</i> var. <i>cylindracea</i> (Sonder) Verlaque, Huisman & Boudouresque, 2003	+		
<i>Cladophora</i> sp.	+		
<i>Codium bursa</i> (Olivi) C.Agardh, 1817	+	+	+
<i>Codium coralloides</i> (Kützing) P.C.Silva, 1960			+
<i>Codium effusum</i> (Rafinesque) Delle Chiaje, 1829			+
<i>Codium vermilara</i> (Olivi) Delle Chiaje, 1829			+
<i>Derbesia tenuissima</i> (Moris & De Notaris) P.L.Crouan & H.M.Crouan, 1867	+		
<i>Flabellia petiolata</i> (Turra) Nizamuddin, 1987	+	+	+
<i>Halimeda tuna</i> (J.Ellis & Solander) J.V.Lamouroux, 1816	+	+	+
<i>Palmophyllum crassum</i> (Naccari) Rabenhorst, 1868	+	+	+
<i>Pedobesia simplex</i> (Meneghini ex Kützing) M.J.Wynne & Leliaert, 2001	+		
<i>Pseudochlorodesmis furcellata</i> (Zanardini) Børgesen, 1926		+	+
<i>Valonia macrophysa</i> Kützing, 1843			+
<i>Valonia utricularis</i> (Roth) Agardh, 1823	+		
<b>FORAMINIFERA</b>			
* <i>Amphistegina lobifera</i> Larsen, 1976	+		
<i>Miniacina miniacea</i> (Pallas, 1766)		+	
<b>PORIFERA</b>			
<i>Acanthella acuta</i> Schmidt, 1862		+	+
<i>Agelas oroides</i> (Schmidt, 1864)	+	+	+
<i>Aplysilla rosea</i> (Barrois, 1876)		+	
<i>Aplysina aerophoba</i> Nardo, 1833	+		
<i>Aplysina cavernicola</i> Vacelet, 1959			+
<i>Axinella cannabina</i> (Esper, 1794)	+	+	
<i>Axinella damicornis</i> (Esper, 1794)	+	+	+
<i>Axinella dissimilis</i> (Bowerbank, 1866)	+		
<i>Axinella polypoides</i> Schmidt, 1862	+		+
<i>Axinella verrucosa</i> Esper, 1794			+
<i>Cacospongia mollior</i> Schmidt, 1862		+	
<i>Cacospongia</i> spp.			+
<i>Chondrosia reniformis</i> Nardo, 1847	+	+	+
<i>Clathrina clathrus</i> Schmidt, 1864			+
<i>Clathrina lacunosa</i> Johnston, 1842			+
<i>Clathrina</i> sp.		+	
<i>Cliona celata</i> Grant, 1826	+		+
<i>Cliona schmidtii</i> (Ridley, 1881)	+		
<i>Cliona viridis</i> Schmidt, 1862	+		+
<i>Cliona</i> sp.		+	
<i>Crambe crambe</i> (Schmidt, 1862)	+	+	+

SPECIES	TURKEY	GREECE	FRANCE
<i>Crella (Crella) elegans</i> Gray, 1867			+
<i>Dictyonella incisa</i> (Schmidt, 1880)		+	
<i>Dysidea avara</i> (Schmidt, 1862)	+	+	+
<i>Dysidea fragilis</i> (Montagu, 1814)		+	
<i>Fasciospongia cavernosa</i> (Schmidt, 1862)		+	
<i>Haliclona (Halichoclona) fulva</i> (Topsent, 1893)	+		+
<i>Haliclona mediterranea</i> Griessinger, 1971			+
<i>Haliclona (Soestella) mucosa</i> (Griessinger, 1971)		+	+
<i>Haliclona (Reinera) sp.</i>	+		
<i>Hemimycale columella</i> Bowerbank, 1874			+
<i>Hexadella racovitzai</i> Topsent, 1896	+		+
<i>Ircinia oros</i> (Schmidt, 1864)		+	+
<i>Ircinia variabilis</i> (Schmidt, 1862)	+	+	+
<i>Ircinia sp.</i>		+	
<i>Myceliospongia araneosa</i> Vacelet & Perez, 1998			+
<i>Oscarella lobularis</i> (Schmidt, 1862)	+	+	+
<i>Oscarella tuberculata</i> (Schmidt, 1868) (balibalo?)		+	+
<i>Petrosia (Petrosia) ficiformis</i> (Poirer, 1789)	+	+	+
<i>Phorbas tenacior</i> (Topsent, 1925)	+	+	+
<i>Phorbas fictitius</i> (Bowerbank, 1866)	+	+	
<i>Plakina trilopha</i> Schulze, 1880			+
<i>Pleraplysilla spinifera</i> (Schulze, 1879)	+	+	+
<i>Sarcotragus foetidus</i> Schmidt, 1862			+
<i>Sarcotragus spinosulus</i> Schmidt, 1862			+
<i>Sarcotragus sp.</i>		+	
<i>Scalarispongia scalaris</i> Schmidt, 1862			+
<i>Sphaciospongia papillosa</i> Ridley & Dendy, 1886			+
<i>Spirastrella cunctatrix</i> Schmidt, 1868	+	+	+
<i>Spongia (Spongia) lamella</i> Schulze, 1879			+
<i>Spongia officinalis</i> Linnaeus, 1759			+
<i>Suberites spp.</i>			+
<i>Terpios gelatinosa</i> (Bowerbank, 1866)	+	+	
<i>Tethya aurantium</i> Pallas, 1766			+
? <i>Timea unistellata</i> (Topsent, 1892)		+	
<b>CNIDARIA</b>			
<i>Aglaophenia spp.</i>			+
<i>Aiptasia mutabilis</i> Gravenhorst, 1831			+
<i>Alicia mirabilis</i> Johnson, 1861			+
<i>Alcyonium acaule</i> Marion, 1878			+
<i>Alcyonium coralloides</i> Pallas, 1766			+
<i>Anemonia viridis</i> Forskål, 1775			+
<i>Balanophyllia (Balanophyllia) europaea</i> Risso, 1826	+	+	+
<i>Cereus pedunculatus</i> Pennant, 1777			+
<i>Cerianthus membranaceus</i> Spallanzani, 1784			+
<i>Cribrinopsis crassa</i> Andrès, 1881			+
<i>Caryophyllia (Caryophyllia) inornata</i> (Duncan, 1878)		+	+
<i>Caryophyllia (Caryophyllia) smithii</i> Stokes & Broderip, 1828	+		+
<i>Caryophyllia sp.</i>		+	
<i>Cladocora caespitosa</i> Linnaeus, 1767			+
<i>Condylactis aurantiaca</i> Delle Chiaje, 1825			+
<i>Corallium rubrum</i> Linnaeus, 1758			+
<i>Corynactis viridis</i> Allman, 1846			+
<i>Epizoanthus arenaceus</i> Delle Chiaje, 1823			+
<i>Eunicella cavolini</i> (Koch, 1887)		+	+
<i>Eunicella singularis</i> Esper, 1791			+
<i>Eunicella verrucosa</i> Pallas, 1776			+
<i>Eudendrium sp.</i>		+	+
<i>Hoplangia durotrix</i> Gosse, 1860	+	+	+
<i>Leptogorgia sarmentosa</i> Esper, 1789			+

SPECIES	TURKEY	GREECE	FRANCE
<i>Leptopsammia pruvoti</i> Lacaze-Duthiers, 1897	+	+	+
<i>Madracis pharensis</i> (Heller, 1868)	+	+	+
<i>Parazoanthus axinellae</i> Schmidt, 1862	+		+
<i>Paramuricea clavata</i> Risso, 1826			+
<i>Phyllangia mouchezii</i> (Lacaze-Duthiers, 1897)	+	+	+
<i>Polycyathus muelleriae</i> (Abel, 1959)		+	
<i>Pteroeides griseum</i> Linnaeus, 1767			+
<i>Tubipora musica</i> Linnaeus, 1758			+
<b>POLYCHAETA</b>			
<i>Bispira volutacornis</i> Montagu, 1804	+		+
<i>Eupolymnia nebulosa</i> Montagu, 1818	+		+
<i>Filograna</i> sp.			+
<i>Hermodice carunculata</i> (Pallas, 1766)	+	+	
<i>Myxicola infundibulum</i> (Montagu, 1808)		+	
<i>Myxicola</i> sp.	+		
<i>Protula tubularia</i> (Montagu, 1803)	+	+	+
<i>Sabella spallanzanii</i> Gmelin, 1791	+		+
<i>Salmacina</i> sp.			+
<i>Serpula vermicularis</i> Linnaeus, 1767	+		+
<i>Serpula</i> sp.		+	
<b>CRUSTACEA</b>			
<i>Galathea squamifera</i> Leach, 1814			+
<i>Galathea strigosa</i> Linnaeus, 1761			+
<i>Homarus gammarus</i> Linnaeus, 1758			+
<i>Maja crispata</i> Risso, 1827			+
<i>Maja squinado</i> Herbst, 1788			+
<i>Munida rugosa</i> Fabricius, 1775			+
<i>Palinurus elephas</i> Fabricius, 1787			+
<i>Scyllarides latus</i> Latreille, 1803			+
<i>Scyllarus arctus</i> Linnaeus, 1758			+
<b>ECHIURA</b>			
<i>Bonellia viridis</i> Rolando, 1821	+		+
<b>MOLLUSCA</b>			
<i>Bittium circa</i> Moreno, 2006			+
<i>Charonia tritonis</i> (Linnaeus, 1758)		+	
<i>Euthria cornea</i> Linaeus, 1758			+
<i>Felimare picta</i> Schultz in Philippi, 1836			+
<i>Flabellina affinis</i> Gmelin, 1791	+		+
<i>Flabellina pedata</i> Montagu, 1815			+
<i>Haliotis tuberculata tuberculata</i> Linnaeus, 1758	+		
<i>Hypselodoris</i> spp.			+
<i>Janolus cristatus</i> Delle Chiaje, 1841			+
<i>Lithophaga lithophaga</i> (Linnaeus, 1758)	+		
Ostreidae (sp.)	+		
<i>Peltdoris atromaculata</i> Bergh, 1880	+		+
<i>Phyllidia flava</i> Aradas, 1847	+		
<i>Pinna nobilis</i> Linnaeus, 1758			+
<i>Pleurobranchus testudinarius</i> Cantraine, 1835			+
<i>Rocellaria dubia</i> (Pennant, 1777)	+	+	
<i>Umbraculum umbraculum</i> Lightfoot, 1786			+
<b>BRYOZOA</b>			
<i>Adeonella calveti</i> (Canu & Bassler, 1930)		+	+
<i>Adeonella pallasii</i> Heller, 1867			+
<i>Adeonella</i> sp.		+	
<i>Beania hirtissima cylindrica</i> Hincks, 1886			+
<i>Caberea boryi</i> Audouin, 1826			+
<i>Cellaria</i> spp.			+
<i>Fron dipora verrucosa</i> Lamouroux, 1821			+
<i>Gregarinidra gregaria</i> Heller, 1867			+



SPECIES	TURKEY	GREECE	FRANCE
<i>Hornera frondiculata</i> Linnaeus, 1758			+
<i>Myriapora truncata</i> (Pallas, 1766)		+	+
<i>Pentapora fascialis</i> (Pallas, 1766)		+	+
<i>Reteporella grimaldii</i> Jullien, 1903			+
<i>Reteporella mediterranea</i> Jullien, 1903			+
<i>Rhynchozoon neapolitanum</i> Gautier, 1962		+	
<i>Rhynchozoon</i> spp.			+
<i>Schizomavella auriculata</i> (Hassall, 1842)		+	
<i>Schizotheca serratimargo</i> Hincks, 1886			+
<i>Schizomavella mamillata</i> Hincks, 1886			+
<i>Schizomavella</i> sp.		+	
<i>Smittina cervicornis</i> (Pallas, 1766)		+	+
<i>Turbicellepora avicularis</i> Hincks, 1860			+
Bryozoa (sp.)	+		
<b>ECHINODERMATA</b>			
<i>Antedon mediterranea</i> (Lamarck, 1816)		+	+
<i>Arbacia lixula</i> Linnaeus, 1758	+		+
<i>Astrospartus mediterraneus</i> Risso, 1826			+
<i>Centrostephanus longispinus</i> Philippi, 1845	+		+
<i>Chaetaster longipes</i> Retzius, 1805			+
<i>Cidaris cidaris</i> Linnaeus, 1758			+
<i>Echinaster (Echinaster) sepositus</i> (Retzius, 1783)	+	+	+
<i>Echinus melo</i> Lamarck, 1816			+
<i>Hacelia attenuata</i> Gray, 1840	+		+
<i>Holothuria (Holothuria) tubulosa</i> Gmelin, 1791	+		+
<i>Holothuria (Panningothuria) forskali</i> Delle Chiaje, 1823			+
<i>Holothuria sanctori</i> Delle Chiaje, 1823			+
<i>Marthasterias glacialis</i> Linnaeus, 1758			+
<i>Ocnus planci</i> Brandt, 1835			+
<i>Ophidiaster ophidianus</i> (Lamarck, 1816)		+	+
<i>Ophioderma longicauda</i> Bruzelius, 1805			+
<i>Ophiothrix fragilis</i> Abildgaard, in O.F. Müller, 1789			+
<i>Paracentrotus lividus</i> Lamarck, 1816			+
<i>Spatangus purpureus</i> O.F. Müller, 1776			+
<i>Sphaerechinus granularis</i> (de Lamarck, 1816)	+		+
* <i>Synaptula reciprocans</i> (Forskål, 1775)	+		
<b>TUNICATA</b>			
<i>Aplidium undulatum</i> Monniot & Gaill, 1978			+
<i>Aplidium</i> spp.			+
<i>Ciona edwardsi</i> Roule, 1884			+
<i>Clavelina dellavallei</i> (Zirpolo, 1825)		+	
<i>Clavelina</i> sp.			+
<i>Cystodytes dellechiajei</i> Della Valle, 1877			+
<i>Diazona violacea</i> Savigny, 1816			+
<i>Didemnum drachi</i> Lafargue, 1975			+
<i>Diplosoma listerianum</i> Milne-Edwards, 1841			+
<i>Halocynthia papillosa</i> (Linnaeus, 1767)	+	+	+
<i>Phallusia fumigata</i> Grube, 1864			+
<i>Phallusia mammillata</i> Cuvier, 1815			+
<i>Polysyncraton</i> spp.			+
<i>Pyura dura</i> Heller, 1877			+