



CREOCEAN is one of the expert companies of KERAN independent Group

Protecting the sea for a sustainable development of the earth

creocean

Environnement & océanographie

CREOCEAN

Consultancy and services in coastal and marine environment and oceanography

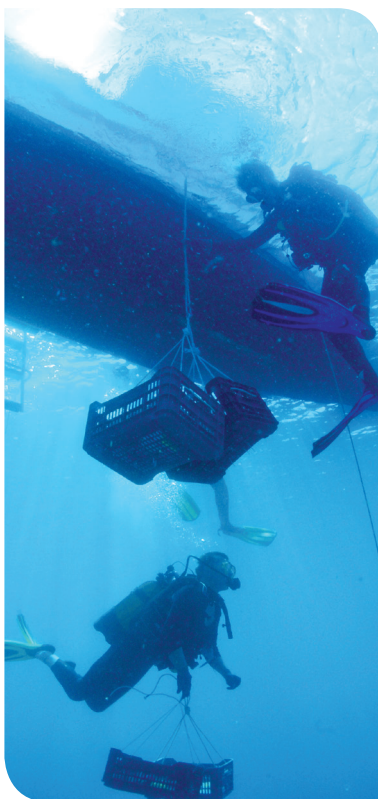


• INTRODUCTION TO SENSITIVITY MAPPING ATLAS PROCESS A TOOL FOR COASTAL MANAGEMENT





CREOCEAN Company provides Marine and Coastal Consultancy Services from Biological to Physical Oceanography.



AREAS OF ACTIVITIES

- 1- Coastal development
- 2- Offshore projects / Geosciences
- 3- Environmental studies in the Atlantic Ocean, English Channel and North Sea
- 4- Environmental studies in the Mediterranean Sea and tropical areas

SERVICES OVERVIEW

- Environment monitoring and auditing
- Impact studies and statutory documents
- Marine aquatic ecology
- Environmental chemistry and toxicology
- Oceanographic and geophysical data gathering
- Hydrodynamic modelling
- Environmental Technologies
- Economy and Coastal Zone Management

OUR MISSION

Understand the whole marine environment to give adapted solutions for Integrated Coastal Management & Development as well as tools for decision makers.



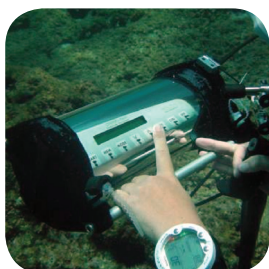
OUR OFFICES



EQUIPMENT

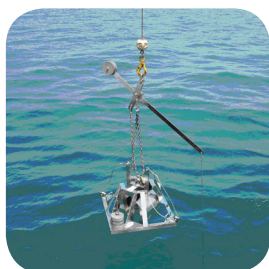
Biological Oceanography

MESURING PHOTOSYNTHETIC PERFORMANCES



Diving-PAM

SEDIMENT SAMPLING



KC DAY GRAB

HYDROBIOLOGY



YSI CTD 6920

Physical Oceanography

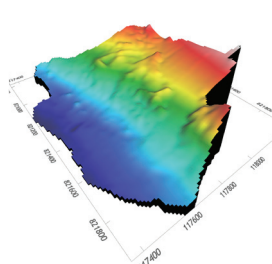
CURRENT AND TEMPERATURE MEASUREMENT



RDI workhorse sentinel

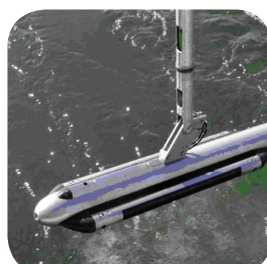
Bathymetry - Seabed mapping

BATHYMETRY



Navisound 215

SEAFLOOR SURVEYING



KLEIN 3000

In situ Observations / Video & Photography

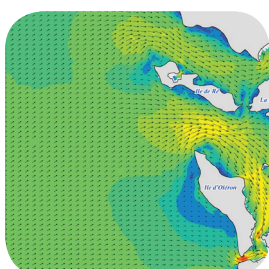


ROV & Commercial Scuba Diving Equipment

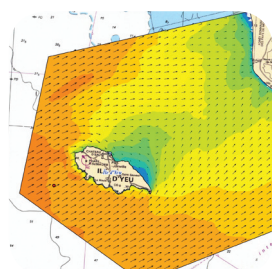
Canon G16 & Nikon D300, D800, Sea&Sea and Isotta housing

Modelling

Waves/Swell/Currents/Plumes



Hydrodynamic (CURRENTOLOGY)



Swell, waves



Plumes, water quality

SENSITIVITY MAPPING ATLAS

The development of coastal areas is increasing and becoming a major concern all over the World. It is widely recognized that the development of urban, industrial, agricultural or touristic activities close to or in the sea needs to be managed in accordance with the preservation of the environment.

Based on our long-term Worldwide experience and multidisciplinary approach (from physical to biological oceanography) we have been developing a functional vision of Sustainable Development in Coastal Areas.

“Sensitivity Mapping Atlas “ is one of the tools that we have been developing for more than 10 years. We believe that this is the first step for Coastal Management.

In fact, based on very precise Scientific data, this tool is understandable by non-scientists. If we consider that most of Coastal development decision makers don't necessarily have scientific backgrounds there is a need of good interaction between scientists and non-scientists. We believe that the Sensitivity Mapping process is one of the solutions to go from sciences to management.

Thanks to this understanding we try to provide adapted solutions for a better Management and Development of the world's Coastal Areas.

Inside an Atlas you will find all the description of your Coastal Zone :

- Marine & Coastal ecosystems Typology
- Threats on those environments both human & natural
- Suggestions for Management improvement
- Sensitivity index and mapping of the Coastal Ecosystems using simple color code
- A very attractive Atlas with pictures and maps, easy to use & show
- And then last but not least Experts to exchange and help you in your willing of Development, Management or Conservation of your Coastal Areas in a sustainable way.



OBJECTIVES OF THIS SPECIFIC TOOL

- Identify areas with high ecological values → give specific attention at any scale
- Be a planning tool easy to use by decision makers and easy to understand for non-scientist but based on scientific data

5 STEP PROCESS

- 1- Preliminary Ecosystems Mapping using satellite images
- 2- Field Truth mission to validate the cartography and the topography & ecosystems quality assessment
- 3- Validation on the habitats maps and production of sensitivity mapping (Ecosystem quality assessment)
- 4- Typology, sensitivity & vulnerability mapping enriched with guidelines for Environmental Coastal Plan
- 5- Edition of an Operational Atlas & presence of experts for further needs



SEVERAL USES

PUBLIC SECTOR :

- Marine Protected Areas Implementation
- Planification of Scientific Research
- Decision aid tool for territory Development

PRIVATE SECTOR :

- Oil Spill Contingency plan
- Impact evaluation of discharged effluents
- Environmental Baseline Studies

- Ecological Value
- Risk & Vulnerability
- Recommendations for Management Plan
- Tool for decision makers
- Easy to Understand for non-scientists
- Lead to more detailed studies

STEP 1 : PRELIMINARY ECOSYSTEMS MAPPING

Tools: existing information, knowledge and satellite images or aerial photo-interpretation.

1 Choose the satellite image

Example :

The choice of the satellite image and type is an important issue. Regarding coastal waters, WorldView-2 is the best one (its blue channel allows good underwater visibility).

However, the price of such images is very high.

Other less expensive satellite images can be used for background images or terrestrial locations.

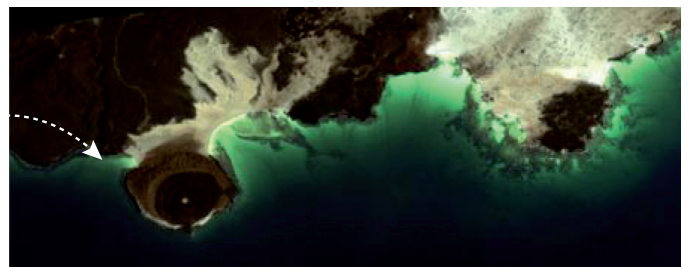
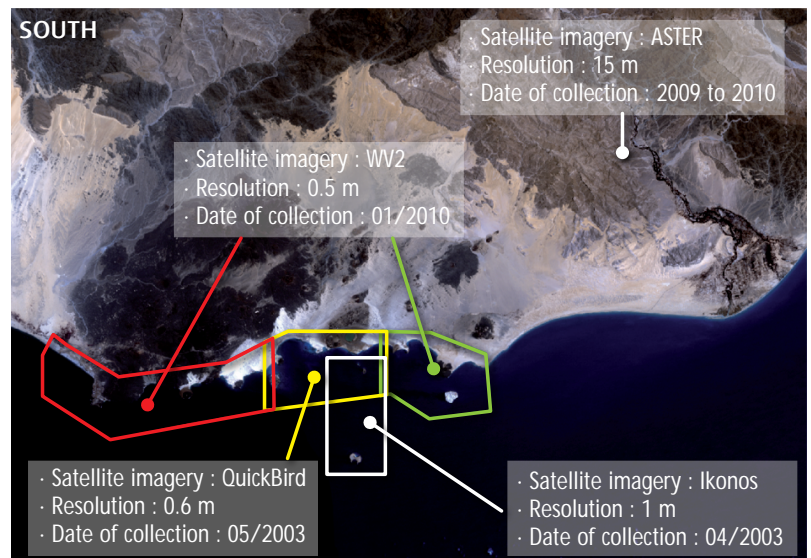
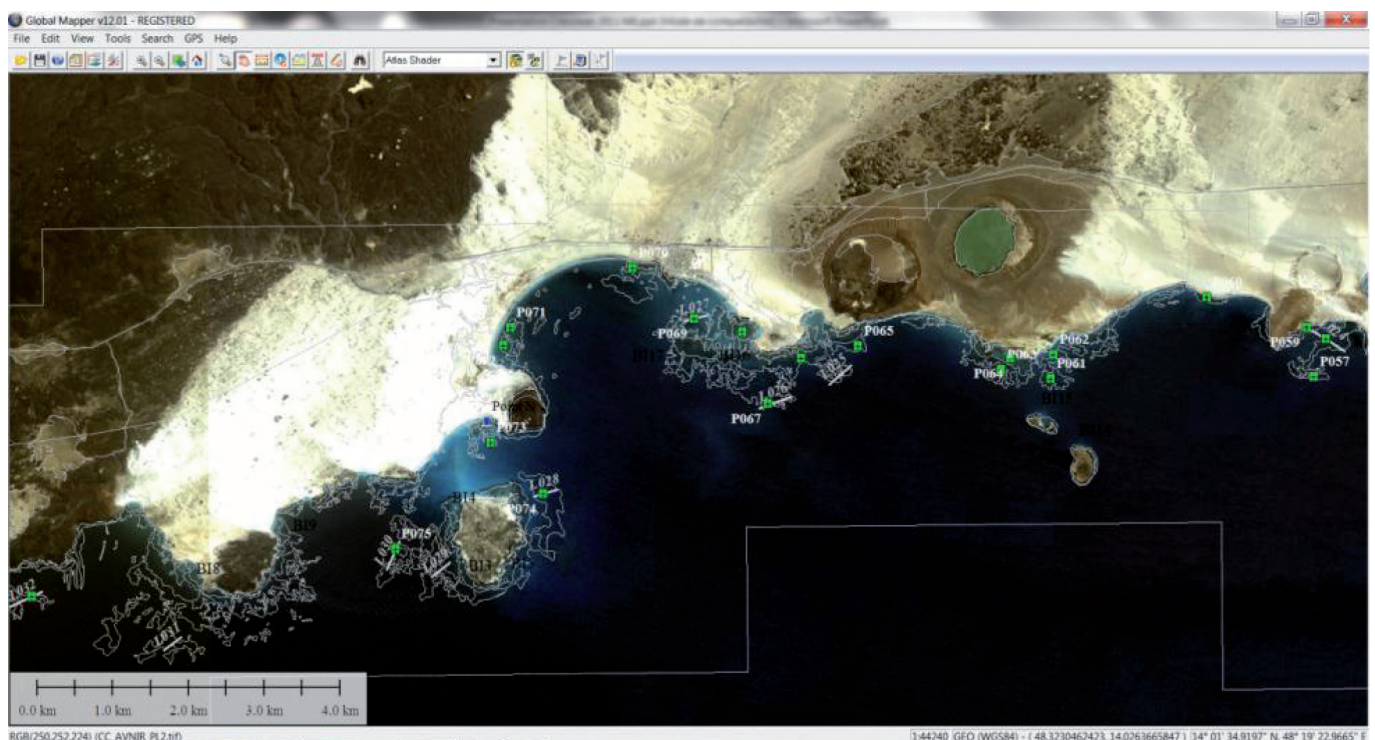


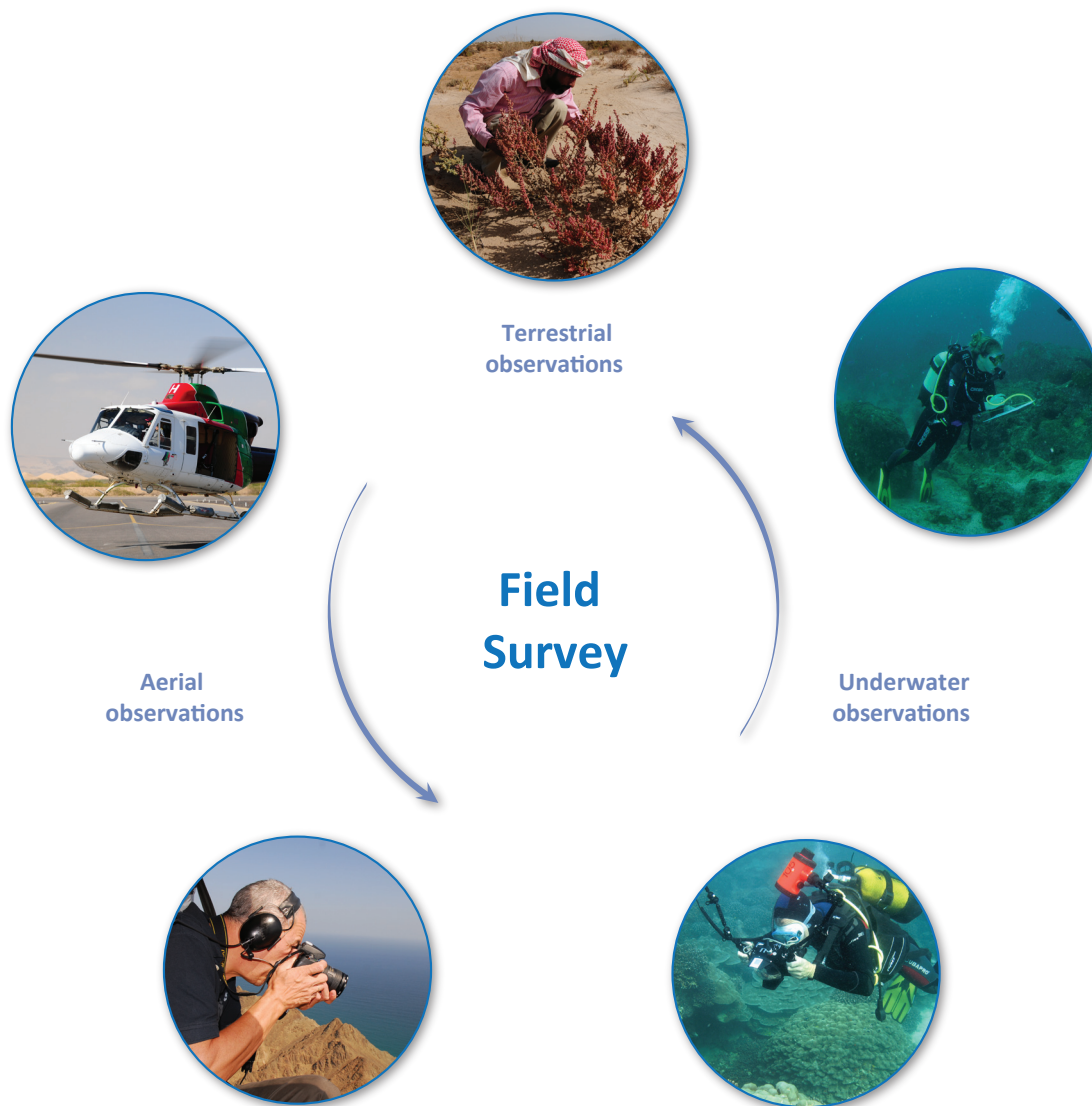
Image enhancement

2 Establish the Field Work sampling



STEP 2 : FIELD TRUTH TO VALIDATE THE CARTOGRAPHY AND THE TYPOLOGY

Tools: The field survey and investigation will be done on specific locations defined during the step 1 by the experts.



The collection of Photography & Marine Scientific data are made by Creoccean's experts or International well known scientists.



STEP 3 : VALIDATION OF THE HABITATS MAPS AND PRODUCTION OF SENSITIVITY MAPS

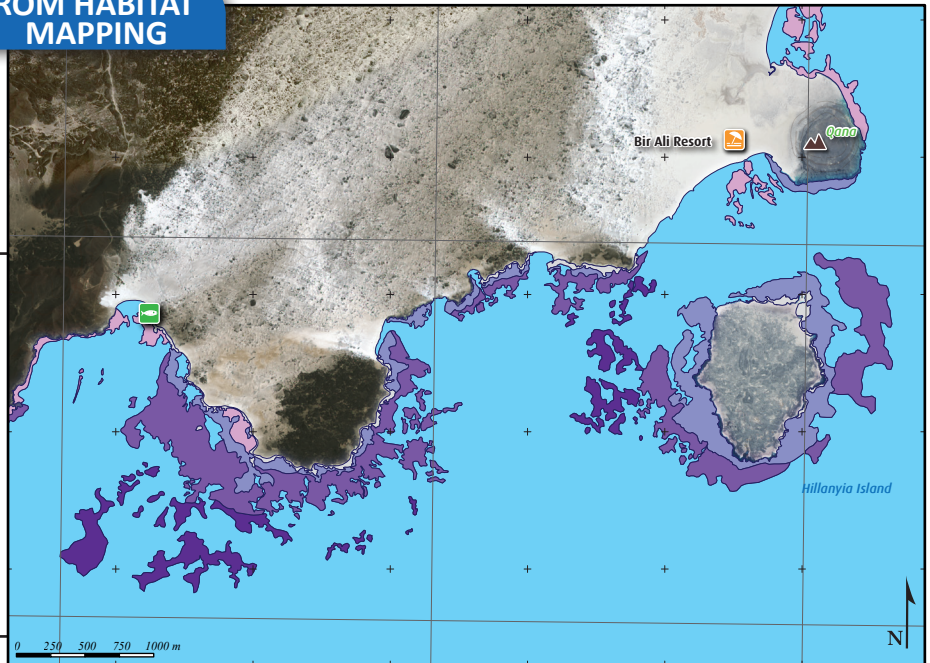
Tools: GIS

FROM HABITAT MAPPING

Map of Habitats

Marine habitats

- Shipwreck
- Underwater rocky protections or intake installation
- Soft substrate or deep sea
- Intertidal hard substrate
- Mixed benthic communities**
- 0-3 m 3-10 m >10 m
- Sparse coral communities**
- 0-3 m 3-10 m >10 m
- Dense coral communities**
- 0-3 m 3-10 m >10 m

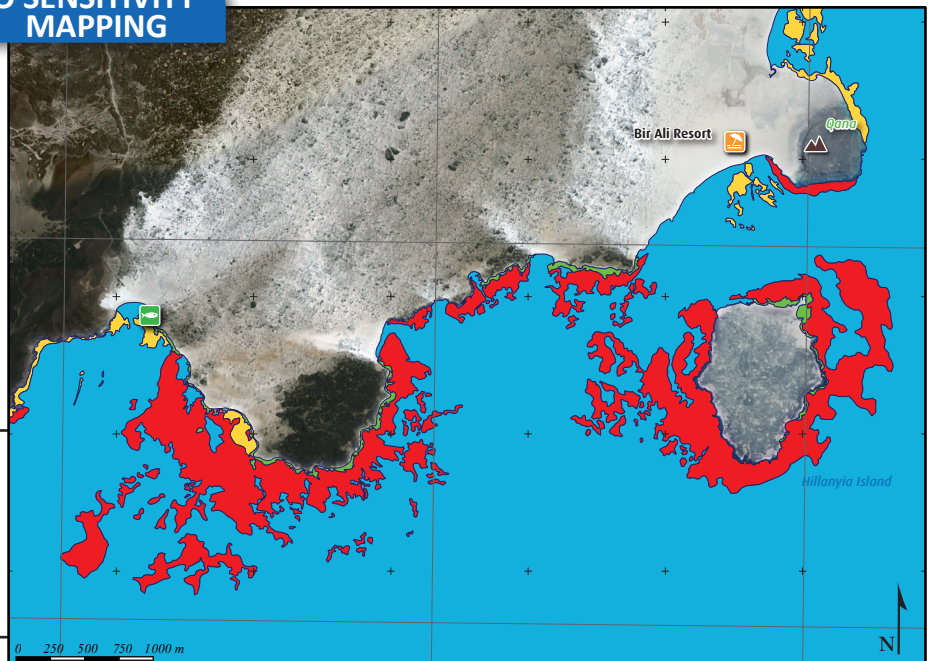


TO SENSITIVITY MAPPING

Marine sensitivity map

Environmental sensitivity

- Very low
- Low
- High
- Very high



STEP 4 : TYPOLOGY, SENSITIVITY & VULNERABILITY MAPPING ENRICHED WITH GUIDELINES FOR ENVIRONMENTAL COASTAL PLAN

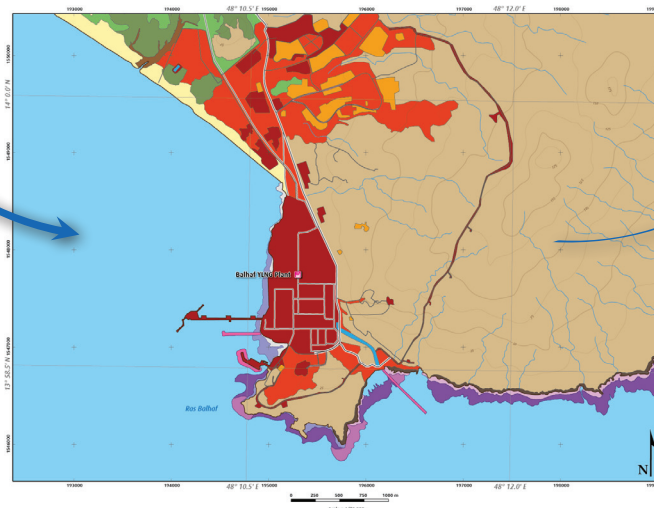
Satellite images



Sensitivity & Vulnerability Mapping



Habitats Mapping



Extract from the Western Coast of Qatar & Halul Island (Sensitivity Mapping Atlas by Creoccean)

Recommendations for the Management Plan

Recommendations for the Management Plan	<p>Local beach cleaning should be set up and executed at regular intervals in order to maintain the beauty of the sites as well as avoid risks of harming the local wildlife.</p> <p>Oil slicks were observed on several locations in this area, it would be of interest to identify to what extent this pollution has spread. As well as defining specific cleaning strategies for soft and hard sediment coastal habitats.</p> <p>The scattered mangroves which are of high sensitivity should be considered with special care. Further development and replantation of mangrove shrubs should be considered and properly managed.</p>
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Some archaeological remains south of Al Arish

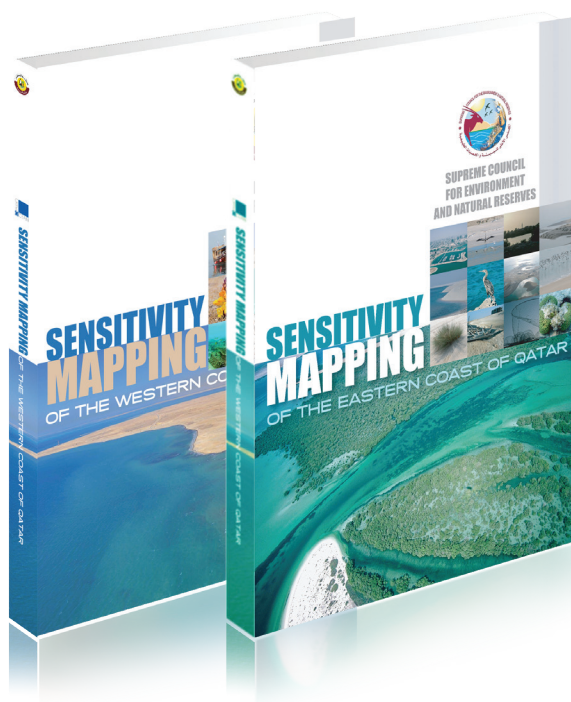


Garbage along the sea-shore

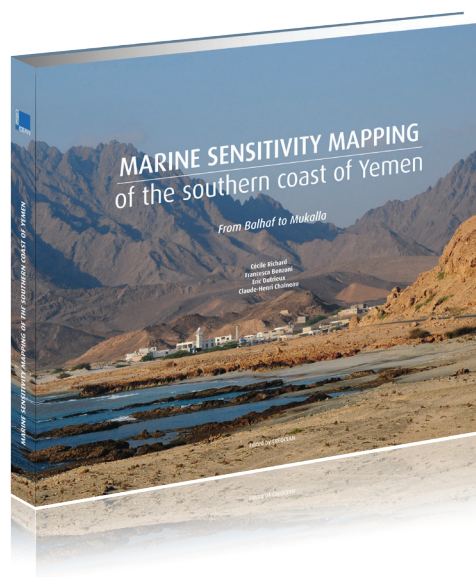
STEP 5: EDITION OF AN OPERATIONAL ATLAS

Tools: Editing process

LATEST CREOCEAN REFERENCES



Atlas of the eastern coast of Qatar : « Sensitivity mapping of the eastern coast of Qatar » (written and edited by Créocéan, 198 p.) / Atlas of the western coast of Qatar and Halul Island : « Sensitivity mapping of the western coast of Qatar and Halul Island » (written and edited by Créocéan 137 p.)



Atlas of the Southern Coast of Yemen : « Sensitivity Mapping of the Southern Coast of Yemen from Balhaf to Mukalla » , (written and edited by Créocéan, 255p.)

PROJECTS AREAS	NAMES OF THE PROJECTS	CLIENTS	YEAR
YEMEN	Sensitivity Mapping of the Southern Coast of Yemen from Balhaf to Mukalla	TOTAL & Yemen LNG	2011
MALDIVES	Climatic Cartography of the Maldives to define coral reefs sensitivity to major climate changes	FIT Group	2010
QATAR	Coastal & Marine habitats mapping (Sumaysimah – Qatar)	Kohn Pedersen Fox Associates (International) PA	2009
QATAR	Western Coast of Qatar and Halul Island	QATAR MINISTRY OF ENVIRONMENT	2008
QATAR	Coastal Zone Environmental Mapping & Management Plan Implementation on Qatar Eastern Coast	QATAR MINISTRY OF ENVIRONMENT	2006
INDIAN OCEAN	Establishment of a methodology guide for Indian Ocean Islands Management	IFREMER	1999





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