



MPA Adapt Project

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Development of monitoring protocols and enhancing their efficiency

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Mass mortality assessments monitoring protocol

Author(s): Joaquim Garrabou (CSIC) Nathaniel Bensoussan (CSIC) & Ernesto Azurro (ISPRA)

PROJECT PARTNERS



CONTENTS

PROTOCOL MASS MORTALITY ASSESSMENT _____	2
RATIONALE _____	2
OBJECTIVES _____	2
TARGET SPECIES _____	2
FIELD WORK INSTRUCTIONS _____	2
DATABASE AND REPORTING _____	5
CREDITS _____	5

PROTOCOL MASS MORTALITY ASSESSMENT

RATIONALE

The proposed protocol is issued from scientific and field experience gathered during the assessment of mass mortality impact in different areas of the NW Mediterranean. The protocol has been developed focusing in main gorgonian species dwelling in shallow waters (0-50 m) in the NW Mediterranean. However, the protocol can be adapted to assess the impact on other macrobenthic species.

OBJECTIVES

The main goal of the protocol is to set the conservation of surveyed populations while gathering baseline information to assess the impacts of mass mortality events when they occur. Annual surveys in selected sites will provide the baselines from which evaluate the impacts.

TARGET SPECIES

1) **Gorgonian species:** *Paramuricea clavata*, *Eunicella singularis*, *E. cavolini*, *Corallium rubrum*, *Leptogorgia sarmentosa*.

2) **Other potential target species:**

Corals: *Cladocora caespitosa*, *Oculina patagónica*, *Astroides calycularis*

Sponges: *Ircinia fasciculata*, *Sarcotragus spinolusus*, *Spongia spp.*, *Ircinia variabilis*

Bryozoans: *Myriapora truncata*, *Pentapora fascialis*

Calcareous algae: *Mesophyllum alternans*, *Lithophyllum stictaeforme*

Criteria to select other potential species i) they have to be abundant in the study area and ii) easy to identify underwater.

FIELD WORK INSTRUCTIONS

Materials

- ✓ A plastic board to collect data underwater
- ✓ Diving computer to keep the depth of the survey
- ✓ A reference (e.g. a quadrat 50 x 50 cm or 25 x 25 cm, a bar 50 cm)

Determination of field workers specialization

Certified scuba divers working by pairs, recreational divers after a training

Period of monitoring

Every 12 month after summer period (from mid-September to mid-October) or in case of observation of mass mortality. If this period is not possible you can also perform the mortality assessment in any other season of your convenience.

Sampling locations

Within your study area select 3 permanent location (when possible) separated by a minimal distance of about 0.5 Km.

At each location select two depths upper distribution limit of the species and a depth below the seasonal thermocline. The minimum design would include the shallower depth. and for each depth

Data recording

Set the depth of census and stick to the selected depth ~ 1m. Ideally in the depth where the data loggers are setup (i.e. every 5 m from 5 to 40 m depth).

The goal of the assessment is to observe a minimum of 100 colonies / specimens. To help in data gathering use a reference and stick to selection criteria (e.g. quadrat, bar, line). For instance, using a bar, one could only the colonies in contact to the bar or all inside an imaginary rectangle formed as a basis the length of the bar and the height of 10-15 cm.

Do not take into account in small colonies (< 15 cm in height for gorgonians) in the surveys. This will help to standardize the sampling since looking for small colonies it is not straightforward during the surveys.

For each colony/specimen indicate whether or not is affected by mortality. This means in gorgonians that the colony display $\geq 10\%$ of necrosis (Figure 1). For other species in general if they display necrosis they should considered as affected.



Figure 1. Estimation of the colony's extent of injury (adopted from Perez et al. 2000). According to the proposed protocol, colonies with >10% injured surface are considered as affected.

For affected colonies / specimens it should also be noted whether the necrosis is recent (presence of denuded axis or axis colonized by pioneering species such as hydrozoan species in gorgonian species or denuded skeletons of horny sponges), old (axis covered by long-lived species such as bryozoans, calcareous algae) or both types of necrosis are present (Figure 2).

NON AFFECTED		AFFECTED (> 10% necrosis)	
No injuries	DENUDED	AXIS W. EPIBIOSIS	DENUDED + AXIS W. EPIBIOSIS






Figure 2. Underwater board with the illustration of non-affected and differently affected gorgonian colonies using categories as defined.

DATABASE AND REPORTING

A web based database to upload the data collected is available at the T-MEDNet web platform.

The web database is available at <http://t-mednet.org/mass-mortality/monitoring-mortality>

Video-tutorials and presentations will be soon available at the T-MEDNet web platform describing the different actions to conduct Mass mortality assessments monitoring protocols.

CREDITS

This protocol has been originally developed for the project Seawatchers www.observadoresdelmar.es and adapted for the purposes of the project MPA-Adapt