
LIFE BaHAR for N2K (LIFE12 NAT/MT/000845)

ACTION A2: Data Analysis and Interpretation



Summary report on the first Action A2 analysis

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The **Life+ Benthic Habitat Research for Marine Natura 2000 Site Designation** (LIFE BaHAR for N2K) project is an EU Life+ research programme of research on benthic habitats in Maltese waters to support designation of marine Natura 2000 sites. The project aims to collect existing information on marine benthic habitats in the 25 nautical mile Fisheries Management Zone (FMZ) surrounding the Maltese Islands, to carry out scientific surveys in areas where knowledge gaps are identified, and to analyse the data collected during these surveys in order to map the distribution of three habitat types listed in Annex I of the Habitats Directive¹: sandbanks, reefs and marine caves. Action A2 is led by the Department of Biology (DoB) of the University of Malta (UoM), and is concerned with analysing and interpreting data generated during the LIFE BaHAR for N2K project. The present report is concerned with the 1st phase of data analysis, and as such constitutes the first deliverable of Action A2 of the project: “Report containing initial analysis of existing data, and recommended sites for 1st phase of A3 surveys”.

The initial Action A2 analysis considered existing data, which was compiled into two sets of GIS shapefiles under Action A1 of the LIFE BaHAR project. The first set of GIS shapefiles was provided to UoM by the Department for Fisheries and Aquaculture (MSDEC-DFA) in July 2014 and included bathymetric data, data collated through the MSFD Initial Assessment (IA) exercise, and data extracted from published scientific articles and reports. The second set of GIS shapefiles was provided to UoM by MSDEC-DFA in February 2015, and included additional information (e.g. on threats and pressures), as well as some revised versions of previously submitted shapefiles correcting some inaccuracies. Evaluations and interpretations presented in the initial Action A2 analysis for each of the three habitat types of interest were based on the most recent versions of the shapefiles available by the end of February 2015.

Reefs

Two broad categories of reefs are distinguished, depending on the nature of the substratum: geogenic and biogenic reefs. Geogenic reefs are rocky marine habitats where animal and plant communities grow on raised or protruding rock or collections of boulders, whereas biogenic reefs consist of biological concretions where the structure is created by the biota themselves, providing a habitat for epibiotic and other species. Reefs are very variable both in form (drop-offs, vertical rock walls, rock or boulder fields etc.) and in terms of the communities they support (attached algae, invertebrates, fish etc.); the HD Annex I category ‘reefs’ is thus composed of a complex of different biotopes.

No mapping exercise specifically targeting reefs has to date been undertaken in the Maltese Islands, instead most mapping efforts undertaken locally focused on mapping of benthic assemblages. The GIS dataset produced via Action A1 contains a mixture of items, including bathymetric data obtained from different sources, information on benthic assemblages derived from different surveys, as well as a series of shapefiles showing putative reef habitats, labelled as “Shelf sublittoral rock and biogenic reef”, “Shallow sublittoral rock without *Posidonia*”, and “Littoral rock Biogenic reef”, which incorporate data from multiple sources. Based on this information, as well as the practical knowledge and field experience of the UoM team, the following observations were made with regards to the occurrence and distribution of different types of reefs in the Maltese Islands:

- *The submarine parts of emergent vertical rock faces*: This type of reef is found along extensive parts of the shoreline of the Maltese Islands, including the northwestern, western, and southwestern coast of Gozo and the southwestern coast of Malta.

¹ Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora

- *Underwater escarpments*: The data available at present are not of a sufficiently high resolution to identify such underwater escarpments, except in very few places where the vertical drop is of the order of 50 m.
- *Rocky shoals*: Data is only available for rocky shoals which constitute a navigational hazard to mariners; examples include: is-Sikka l-Bajda, is-Sikka ta' San Pawl, Marku shoal, Madalena shoals, St. George's shoals, Merkanti reef, Dragut shoal, Della Larga Forca reef, Żonqor reef, Munxar reef, Bengħajsa reef.
- *Boulder fields*: Although data on the occurrence of boulder fields are limited, some boulder shores are shown on topographic maps of the Maltese Islands and it can be assumed that boulder shores continue underwater as boulder fields. Such boulder shores/fields include those found off Rdum Majjiesa, Rdum il-Qawwi, and l-Aħrax tal-Mellieħa.
- *Littoral crusts, rims and knobs formed by coralline algae*: These are relatively rare, occurring mainly on the sheer vertical cliffs on the southwestern coast of Malta and western coast of Gozo.
- *Vermetid platforms*: These platforms occur mainly at or just below sea level, on the gently sloping shores found along the northeastern coasts of the Maltese Islands.
- *Deep-water coral frameworks*: Live associations of the framework-building corals are known from depths of ca 390–620 m along an escarpment south of the Maltese Islands, extending from Malta to Linosa (now known as the South Malta Coral Province).

The lack of detailed bathymetric data and poor data coverage especially for offshore and deep areas were identified to be the major data gaps for reef habitats. A further gap in the available data for reef habitats is the lack of consistency in the names and categories used for the different habitats. This is due to the fact that the data are derived from separate surveys which, in turn, used different classification schemes. The fact that habitat categories in the A1 dataset were not encoded into a single classification scheme hampered interpretation and spatial analysis given that the same habitat-type may appear under different names, or at a different level of detail.

Sandbanks which are slightly covered by sea water all the time

In line with the definition of sandbanks given in the EU Habitat Interpretation Manual², the LIFE BaħAR for N2K project proposal describes sandbanks as follows: '*permanently submerged banks and surrounded by deeper water, which are composed mainly of sandy sediment, but may also include boulders, cobbles, and mud and other varying grain sizes. Sandbanks form elevated, elongated, rounded or irregular topographic features. Water depth above sandbank is seldom more than 20m below chart datum. Cymodocea nodosa and Zosterum marinae are the vegetation associated with sandbanks.*'

Sandbanks are likely to occur in large shallow bays, smaller embayments, creeks and the harbours of the Maltese Islands, but a comprehensive survey of the distribution of this habitat has yet to be carried out. A preliminary marine ecological survey of two such 'sandy bedforms with a raised topography' located close to the shore within the large, shallow bays of Ġħajn Tuffieħa and Mellieħa Bay was carried out in 2013. Sandbanks running more or less parallel to the shore in shallow waters appeared to be present in both bays, but more detailed seasonal studies of physical characteristics should be carried out in order to confirm with certainty that these habitats are indeed sandbanks. The actual ecological importance of this habitat in Maltese waters has also yet to be demonstrated.

Indeed there is so little information that the exact definition to be used for this habitat is the subject of ongoing discussions. Disagreements over precisely what constitutes 'sandbanks' as a habitat in the Maltese Islands is currently creating confusion when it comes to determining the precise

² European Commission (2013). Natura 2000 Interpretation Manual of European Union Habitats – EUR28. Published by the European Commission Directorate General for the Environment (DG ENV), Nature ENV B.3.

distribution of this unit: the habitats labelled as ‘sandbanks’ in the LIFE BaHAR for N2K Action 1 GIS dataset seem to refer to areas where *Cymodocea nodosa* is found, rather than true sandbanks with the relevant geomorphological features. Information on benthic assemblages alone is not sufficient to map the presence of sandbanks, because the definition of a ‘sandbank’ refers specifically to a raised structure, a feature that can only be ascertained through detailed bathymetric data. The low resolution of bathymetric data available for the Maltese Islands was thus identified as a major data gap.

Submerged or partially submerged sea caves

The Maltese Islands, being almost entirely composed of limestones, have an abundance of partially submerged (or ‘emergent’) and submerged marine caves with different geomorphological characteristics. No comprehensive survey of the distribution of submerged and emergent caves around the Maltese Islands has been carried out to date, and the best-known submerged marine caves are ones which are accessible to divers. These include ones around Gozo, at Dwejra, Wied il-Ghasri, Reqqa Point, Hondoq ir-Rummien and Mgarr ix-Xini; around the Santa Marija (Comino) area and on the western coast of Comino; and around Malta, at Anchor Bay, Qawra and along the south-western coast of Malta. The LIFE BaHAR for N2K GIS dataset compiled through Activity A1 contains preliminary information on localities where the presence of emergent marine caves has been recorded during a single visual survey of the Maltese coastline, which was carried out in 2008.

Data deficiency is a major gap with respect to ‘cave’ habitats; the limited amount of existing data remains surprisingly scattered and largely anecdotal. In particular, very little is known about the potential distribution of marine caves deeper than 40 m or in areas of the coast that are not easily accessible. The only data on cave biota from the Maltese Islands come from a limited number of preliminary surveys, and detailed surveys of these complex habitats have yet to be carried out.

Threats and pressures

Only a limited amount of data on the location of the following threats and pressures were included in the Action A1 GIS dataset: fuel supply points, marine discharges, desalination plants, landfills, spoil grounds / dumping sites. This information is of limited use when assessing the conservation status of the habitats being considered, since no data were made available on several important pressures likely to be affecting reefs, marine caves and sandbank habitats in the Maltese Islands, such as coastal developments, anchoring, high densities of SCUBA divers, and commercial / recreational fishing.

Recommendations for Action A3 surveys

Overall the compilation of data done under Action A1 revealed that data coverage differs between habitats, but important data gaps were identified for all three habitat categories considered. A general pattern identified during the first analysis of Action A2 is the fact that data coverage is higher for inshore areas than for offshore sites. Moreover, even for inshore sites, data coverage on habitats was found to be patchy, with some areas having been subjected to dedicated surveys, and virtually no information being available for other areas. The dataset in its present form is thus only of limited suitability for designating potential Sites of Community Importance.

The dataset was however found to be suitable to narrow down potential areas hosting reef, sandbank and cave habitats, and prioritised lists of both inshore and offshore areas recommended for surveying as part of the first Action A3 survey were drawn up. Survey site selection took into account the likelihood of occurrence of at least one of the three relevant habitat-types, and priority was given to (i) areas for which minimal data exist, and (ii) areas which fell outside the boundaries of existing Marine Protected Areas.