

LIFE BaHAR for N2K – Interpretation of data & results

Julian Evans

Department of Biology, Faculty of Science
University of Malta



MINISTRY FOR THE ENVIRONMENT,
SUSTAINABLE DEVELOPMENT AND CLIMATE CHANGE



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UNIVERSITY OF MALTA
Faculty of Science
Department of Biology



PARLIAMENTARY SECRETARIAT
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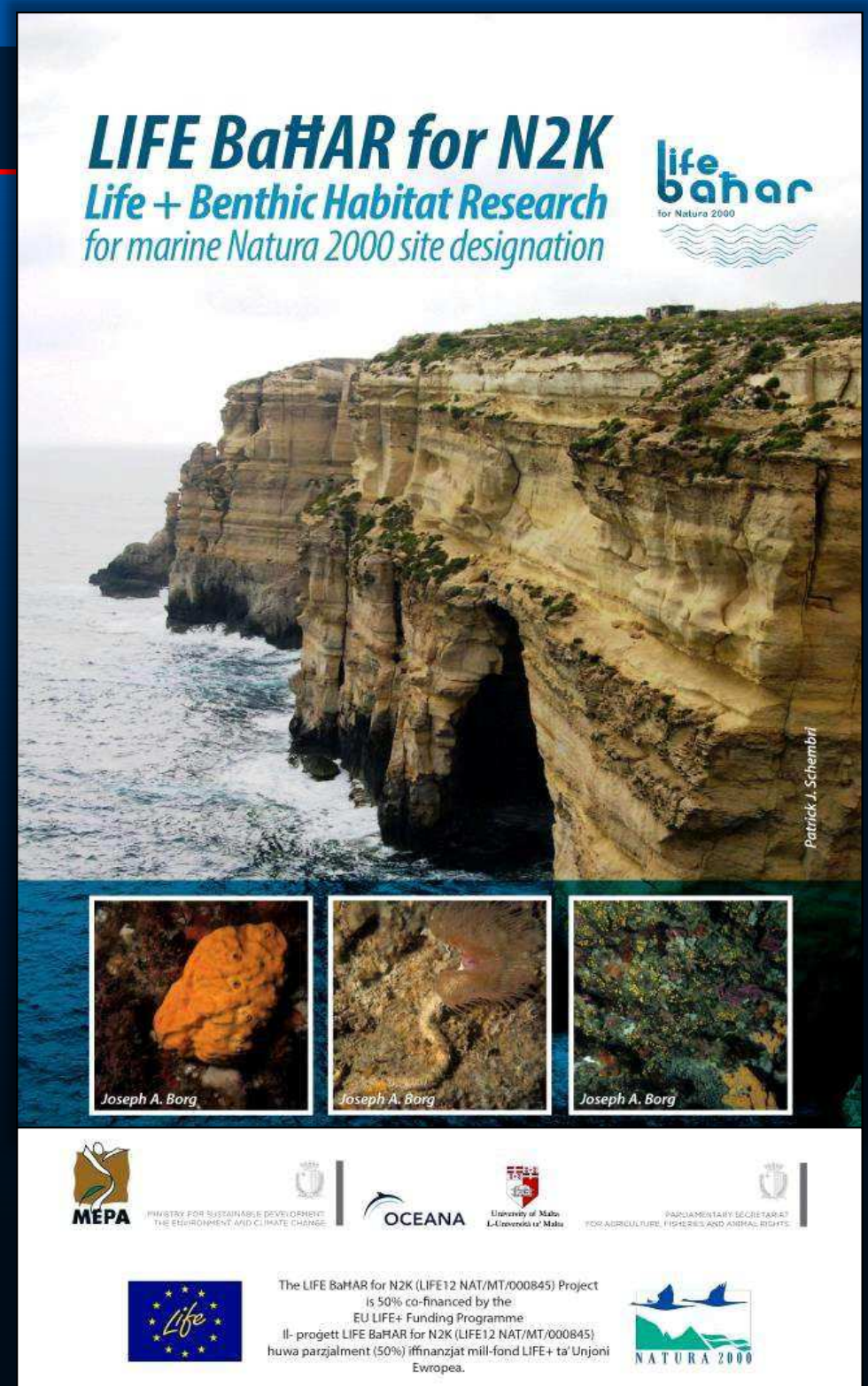
The LIFE BaHAR for N2K Project (LIFE 12 NAT/MT/000845) Project
is 50% co-financed by the
EU LIFE+ Funding Programme



LIFE BaHAR for N2K

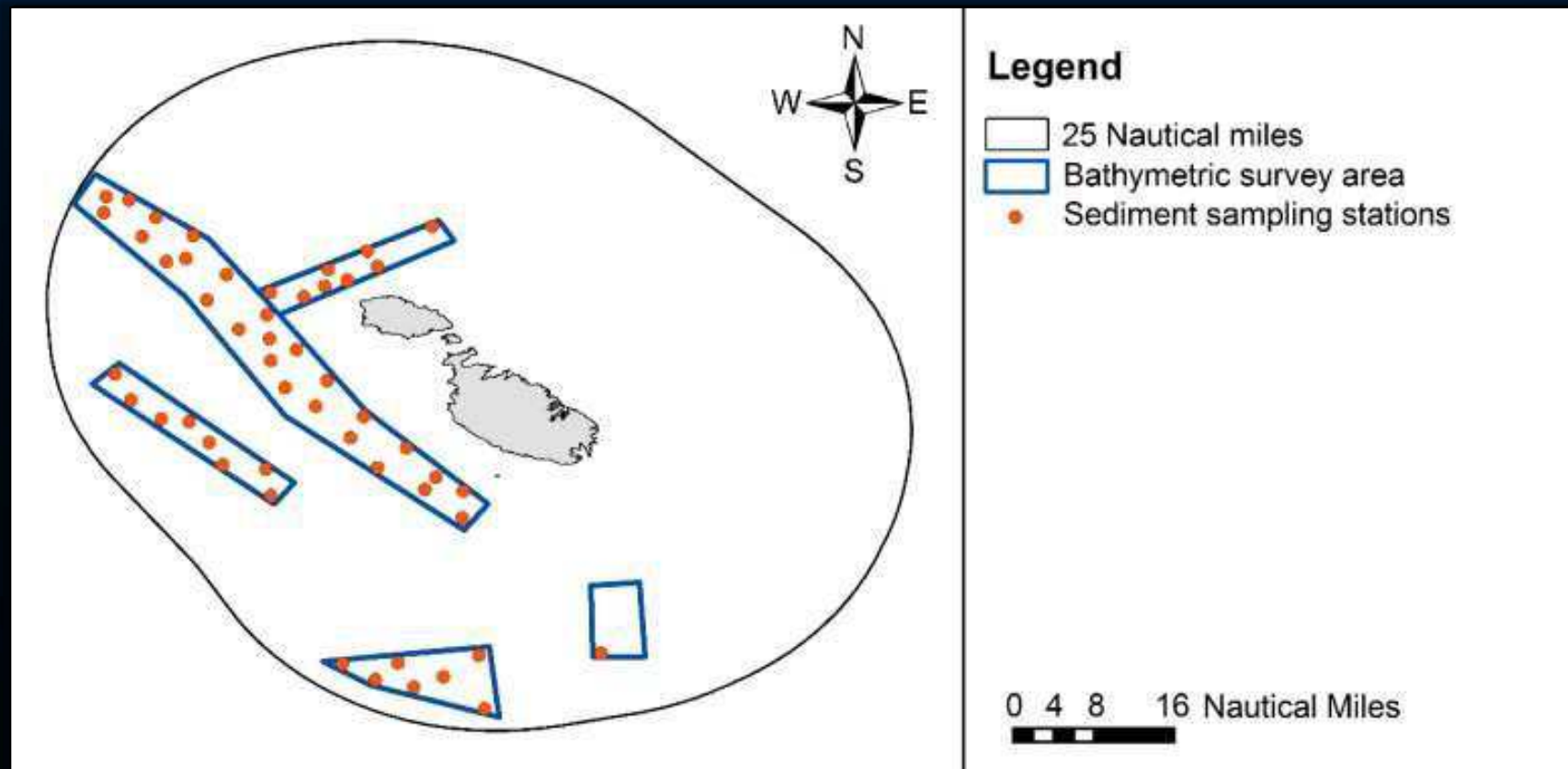
- Aims to support designation of marine NATURA 2000 sites
- Research focus:
 - Sandbanks
 - Marine caves
 - Reefs
- Three phases:
 - Initial data collection
 - 2015 marine surveys
 - 2016 marine surveys

LIFE BaHAR for N2K poster



LIFE BaHAR Surveys: 2015 & 2016

- 206 ROV dives (197 offshore; 9 coastal)
- 42 SCUBA dives
- Multibeam Echosounder and Sediments Survey



Sandbanks

- *“elevated, elongated, rounded or irregular topographic features, permanently submerged and predominantly surrounded by deeper water... above a sandbank the water depth is seldom more than 20 m” [EU Habitat Interpretation Manual]*



Sandbanks

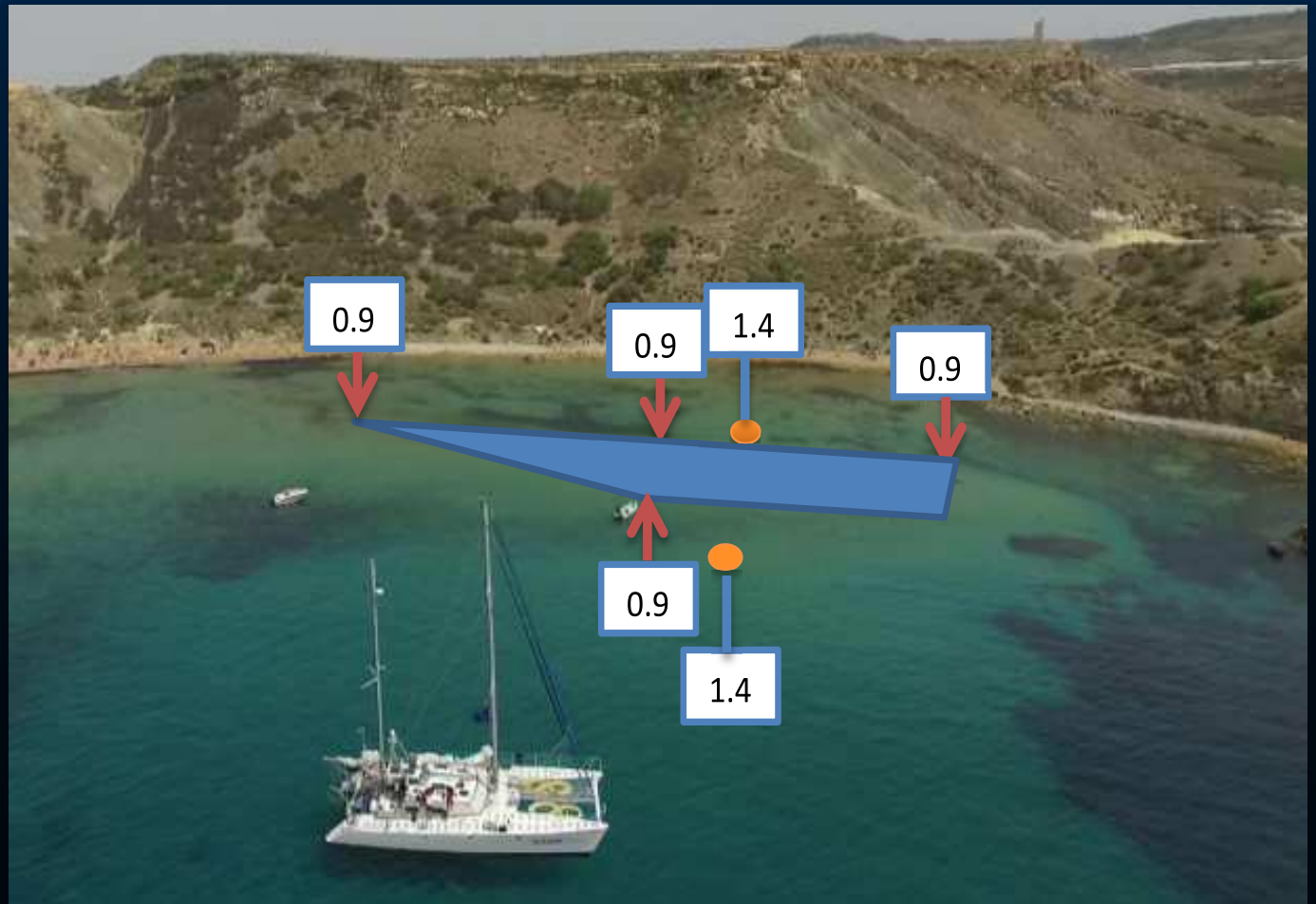
- Elevated sandy features are rare in Maltese Islands
- Three sandy elevations were documented and measured
- All present in very shallow waters and only had small elevations compared to the surrounding seabed:
 - Mellieħa Bay: 0.2 – 0.7 m depth
 - Blue Lagoon: 0.9 – 1.0 m depth
 - Għajn Tuffieħa: 0.9 – 1.4 m depth
- Elevations took the form of a ridge of sand raised above the adjacent sandy bottom, parallel to the beach shoreline

Sandbanks

- Example: Għajn Tuffieħa Bay

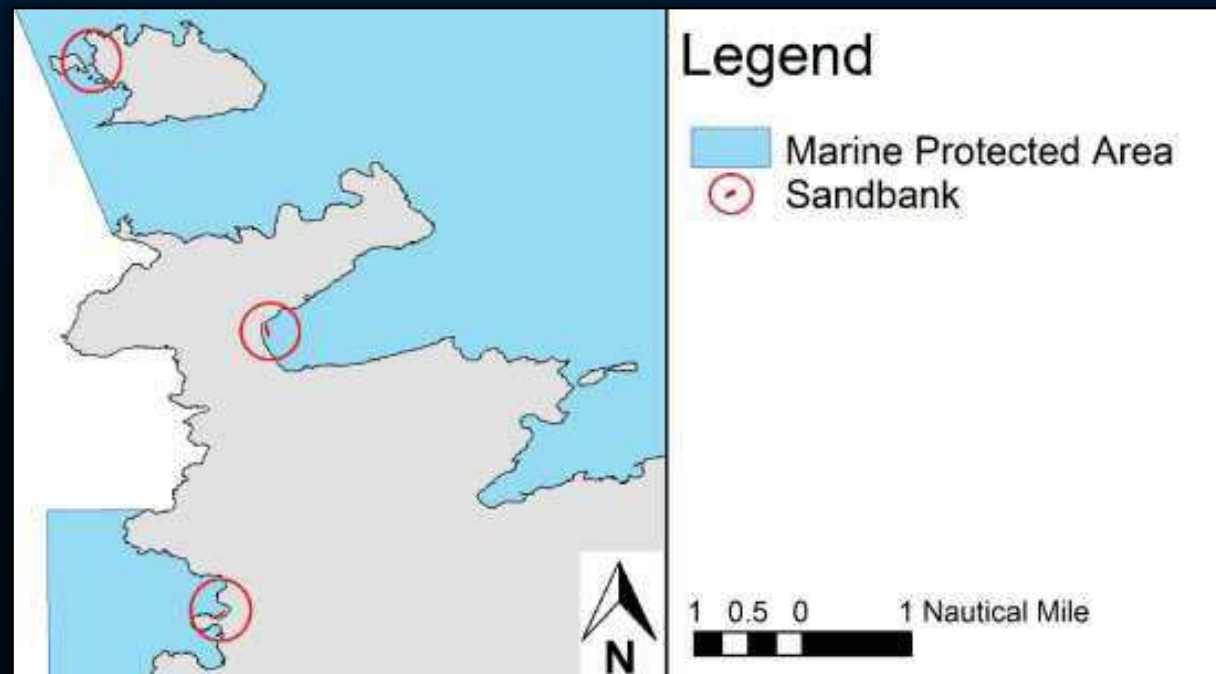
Measurements

- Depth: 0.9 - 1.4 m
- Length: 90 m
- Width: 7.5 m



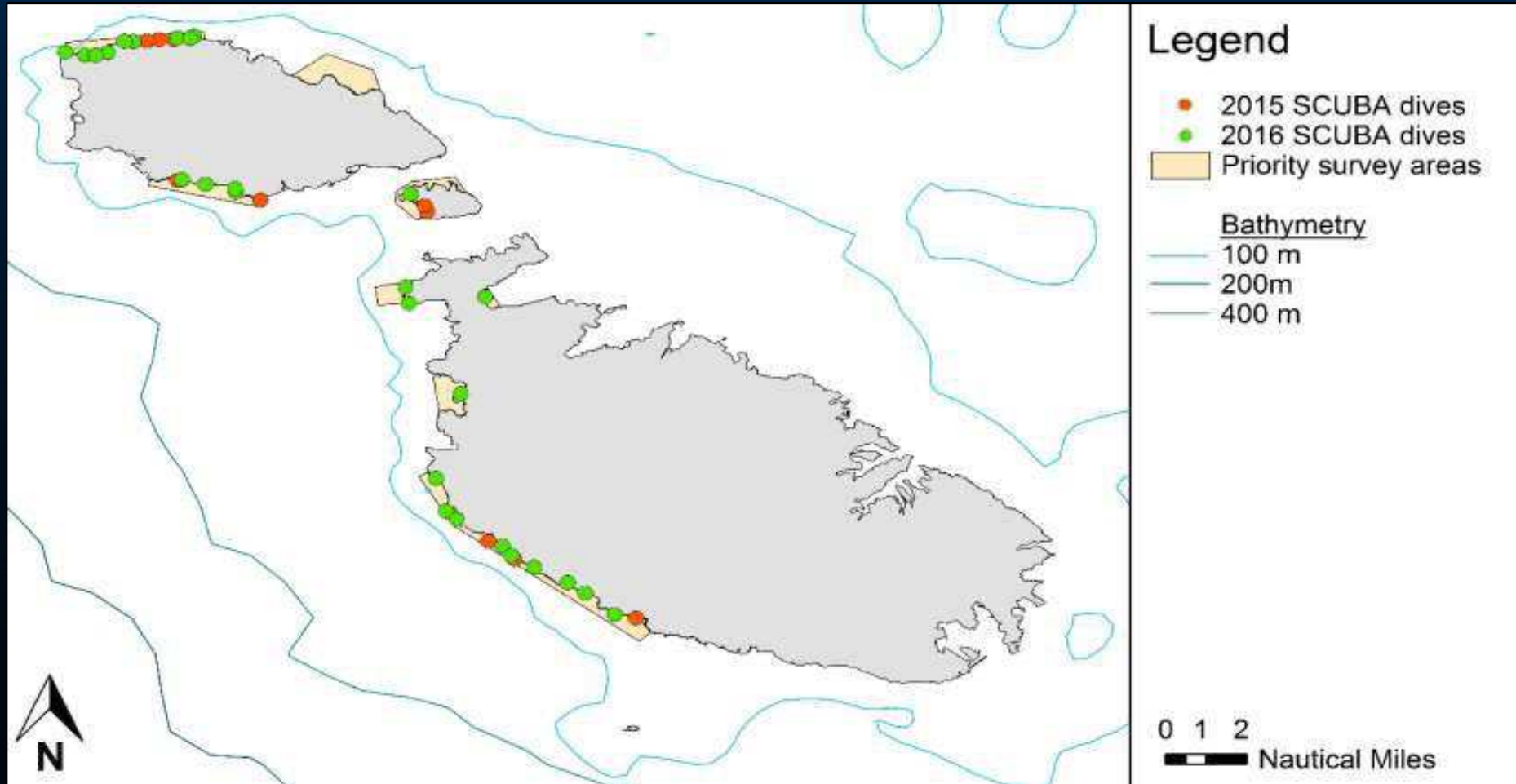
Sandbanks

- No submerged vegetation present, confirming that “*on many sandbanks macrophytes do not occur*” [EU Habitat Interpretation Manual]
- No data on the processes forming and maintaining the sandy elevations available, so it is not possible to conclude if these are ‘sandbanks’ in the geomorphological sense
- Areas where sandy elevations were present were all located in existing MPAs



Coastal Marine Caves

- 37 SCUBA dives in 2015 & 2016, plus stakeholder involvement

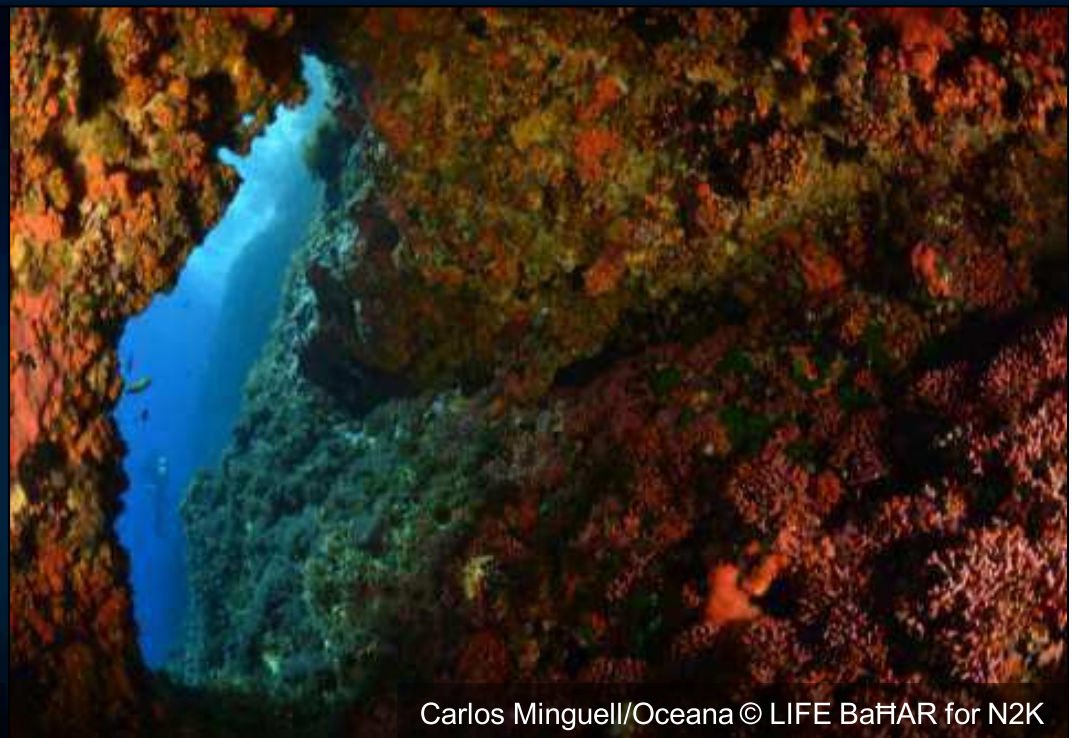


Coastal Marine Caves

- A total of 89 caves were surveyed (36 in 2015 / 53 in 2016)
- Of the surveyed caves 37 were 'emergent' caves
- Depths where caves were located varied from 0 to 40 m
- Caves of various morphologies and dimensions were recorded



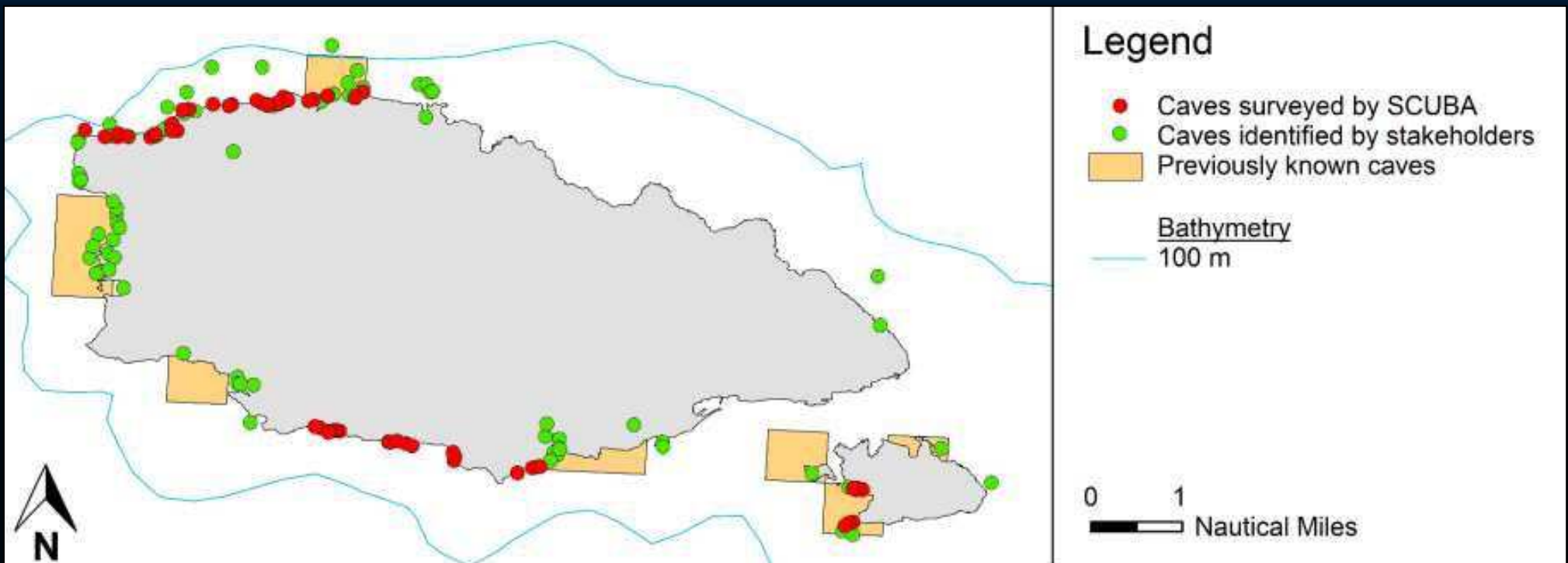
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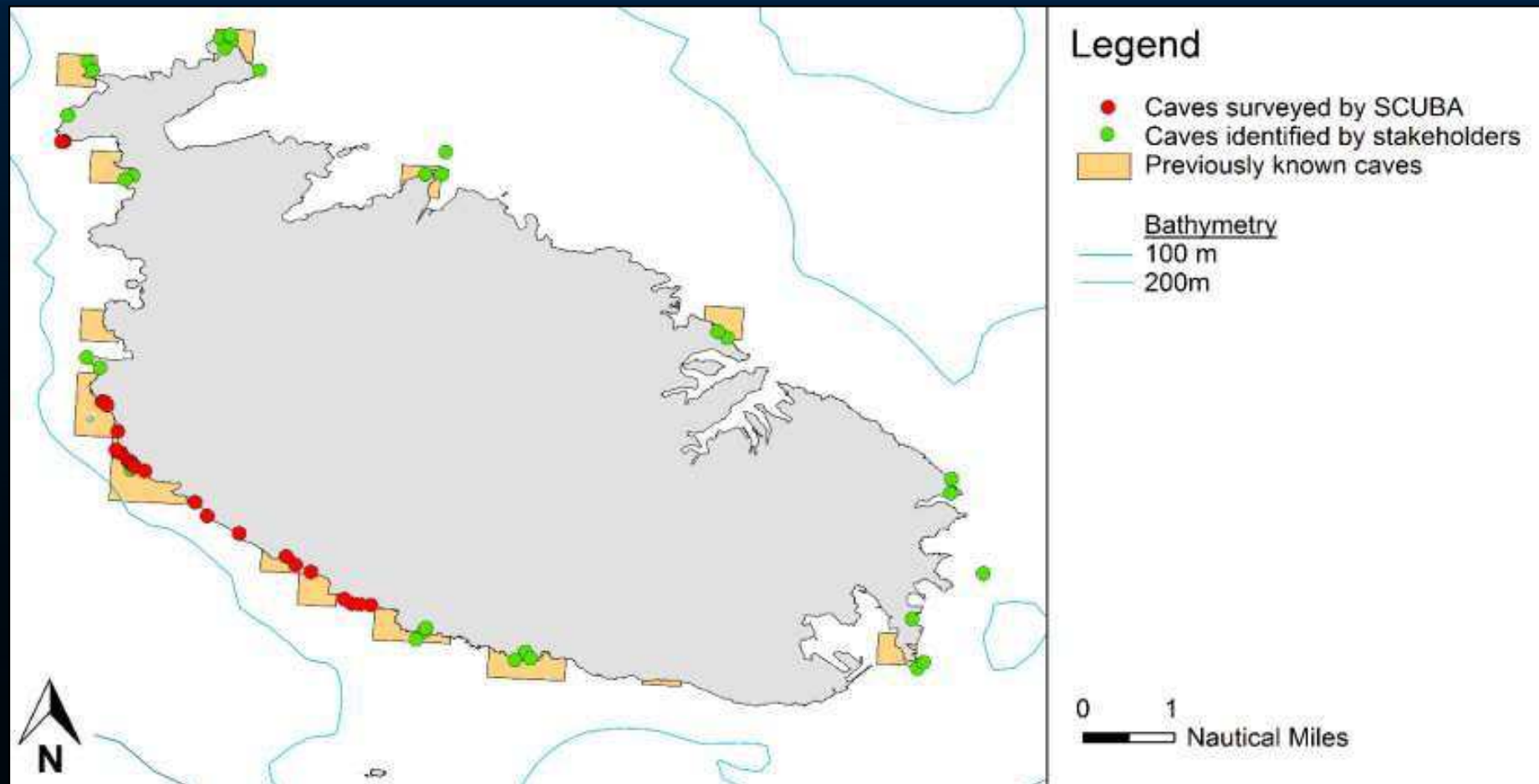
Coastal Marine Caves – Gozo & Comino

- Highest densities of caves were recorded off north-west and southern coast of Gozo
- Small, inaccessible fissures as well as very large caves
- Stakeholder surveys revealed high density of caves at Dwejra



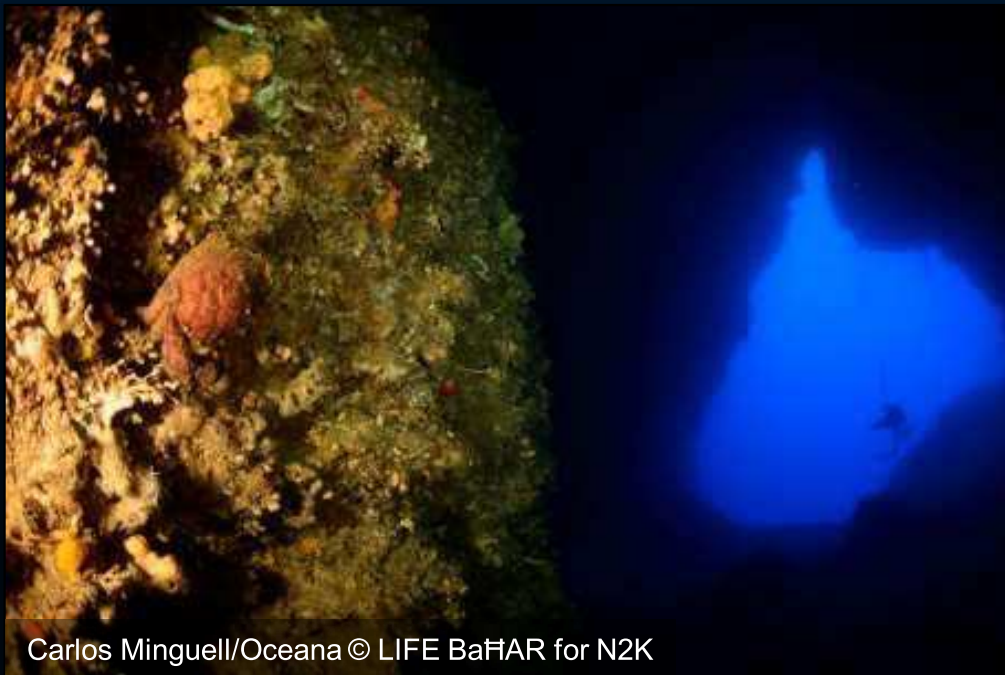
Coastal Marine Caves – Malta

- Steep escarpment to app. 40 m depth along south-western coast
- Small, inaccessible as well as large caves located in escarpment



Coastal Marine Caves – Biota

- Biotic communities varied depending on:
 - Size and structure of caves
 - Exposure to waves, currents, sediment scour



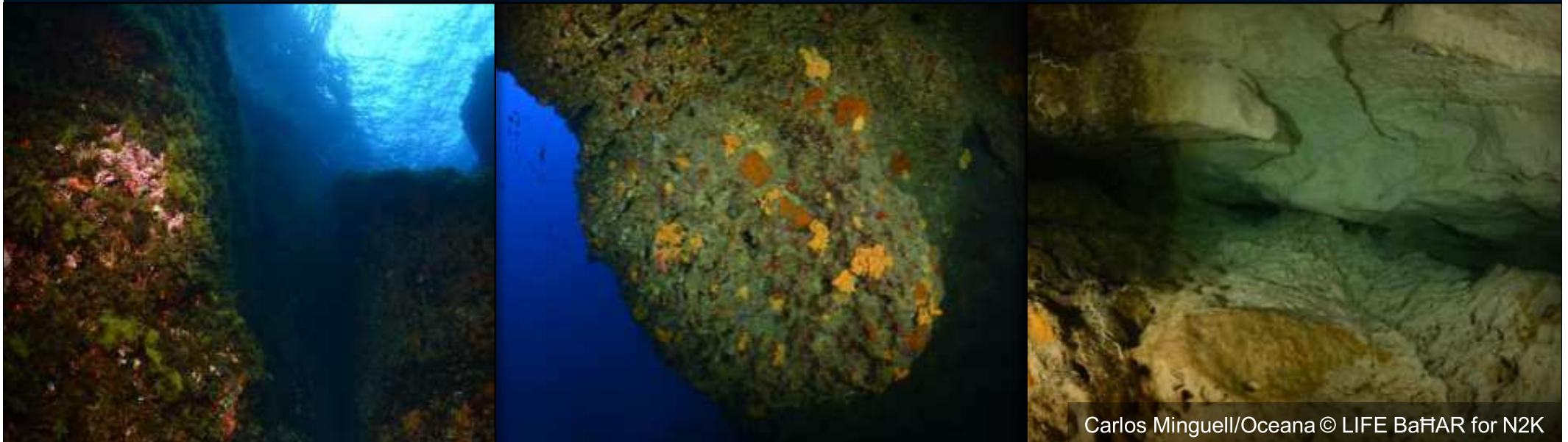
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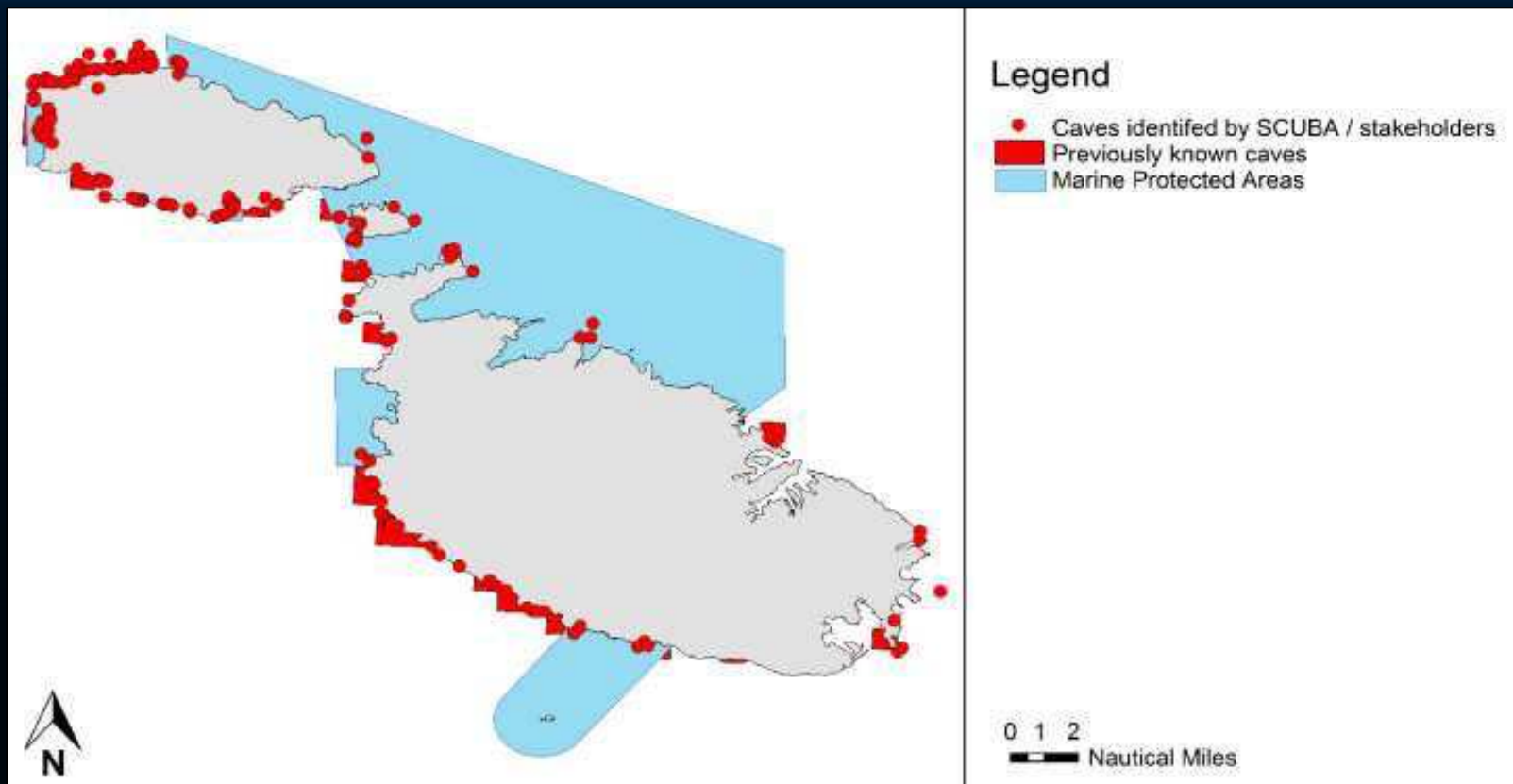
Coastal Marine Caves – Biota

- Three main zones found in larger caves:
 1. Outer section where light penetrates - growth of photophilic algae at the mouth / progressively more sciaphilic inwards
 2. Middle section - sessile invertebrates
 3. Dark inner section largely devoid of sessile organisms.



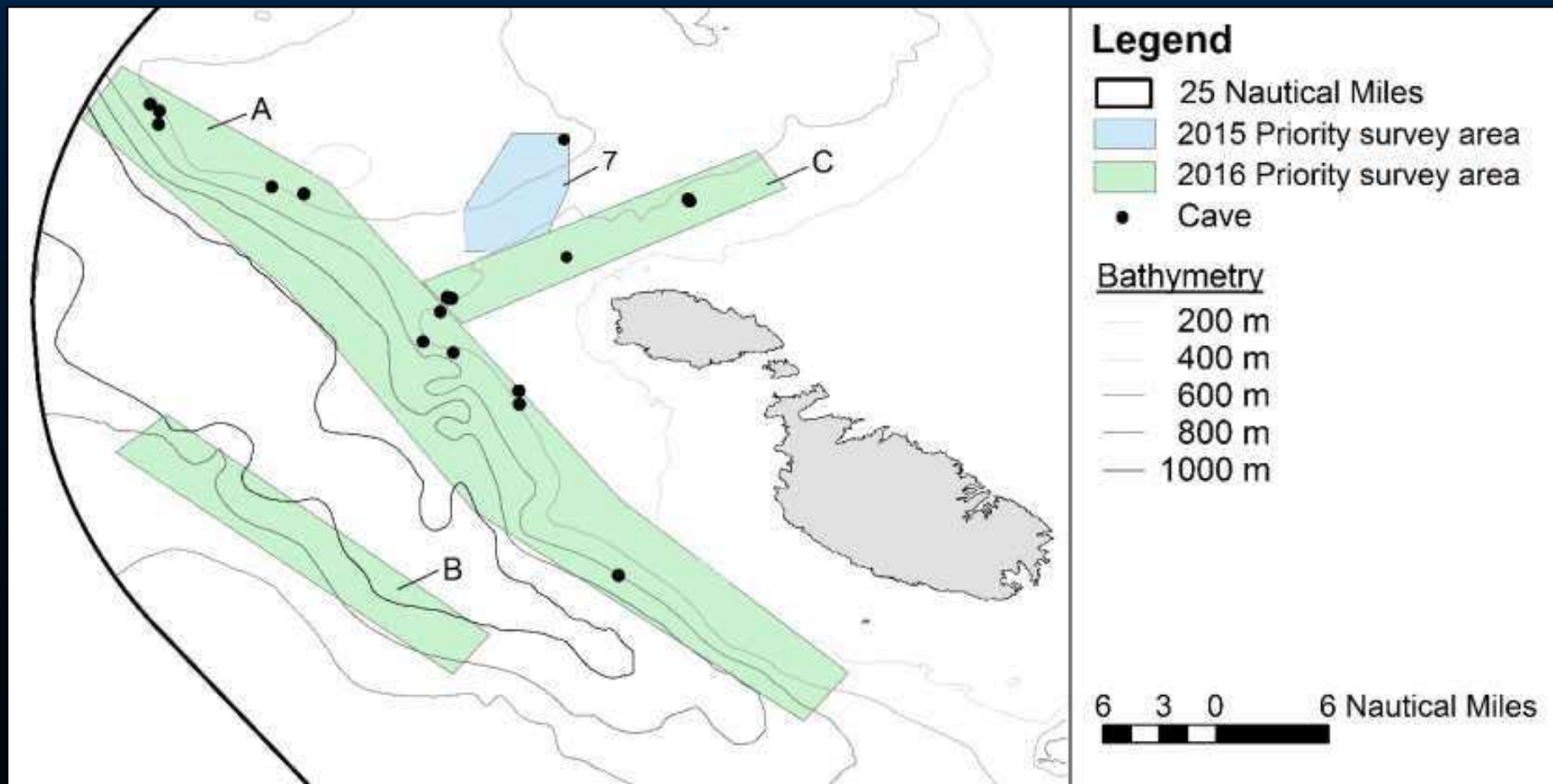
Marine Caves – Location of MPAs

- Several caves were new discoveries and previously unknown
- In particular no records exist of the smaller caves which are less accessible to SCUBA divers
- Many marine caves lie outside existing MPAs



Deep-Water Caves

- During ROV dives deep-water caves were located to the W & NW of the Maltese Islands



Deep-Water Caves

- Most caves located at depths of 250-450 m
- Caves varied in shape and size, overhangs often found nearby
- Largest deep-water cave was found at 438 m
- Deepest record was 795 m
- Caves possibly date back to the Messinian period



Deep-Water Caves – Biota

- Caves were found to harbour diverse communities of sessile & mobile invertebrates, as well as several species of fish



Reefs in Coastal Areas

- Underwater cliff faces & escarpments surveyed via SCUBA diving
- Locations of reefs in coastal areas are well known, so surveying inshore reefs was not a priority



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Reefs in Coastal Areas – Biota

- Well-lit upper areas: Photophilic ('light-loving') brown algae
- Deeper areas & under overhangs: Sciaphilic ('shade-loving') green & red algae and corals, bryozoans, serpulids & sponges



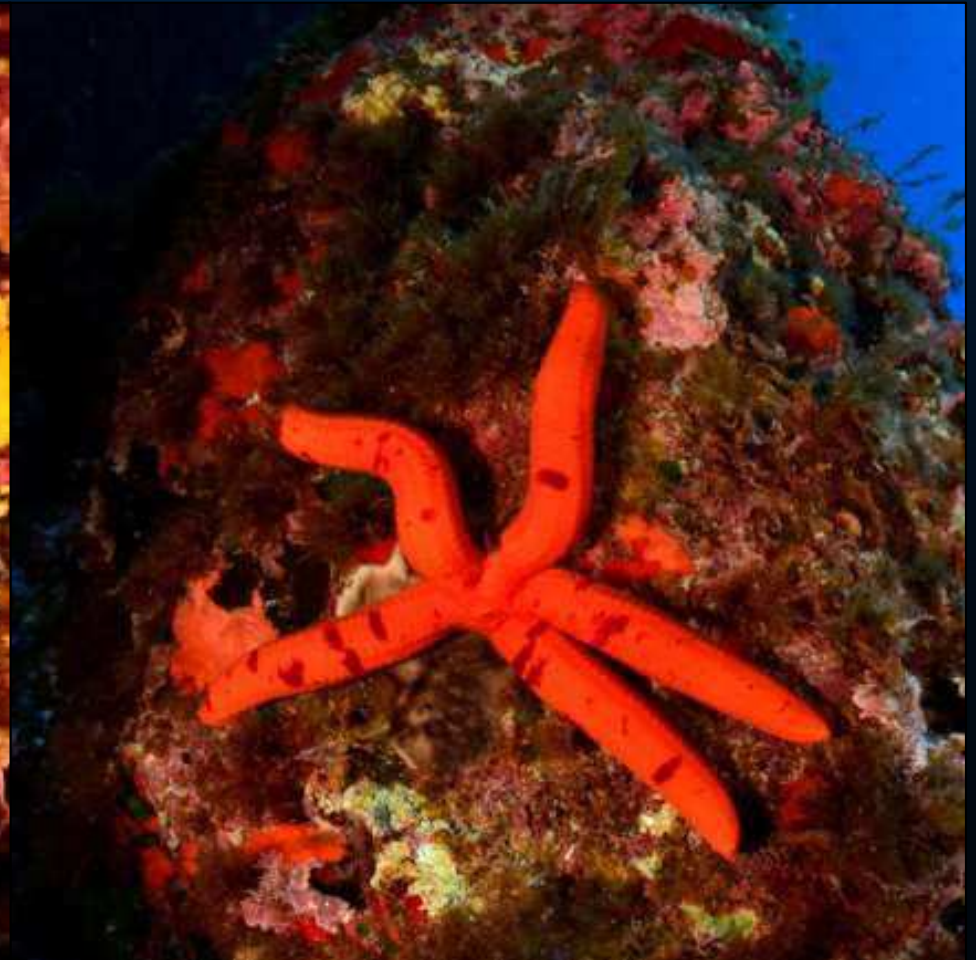
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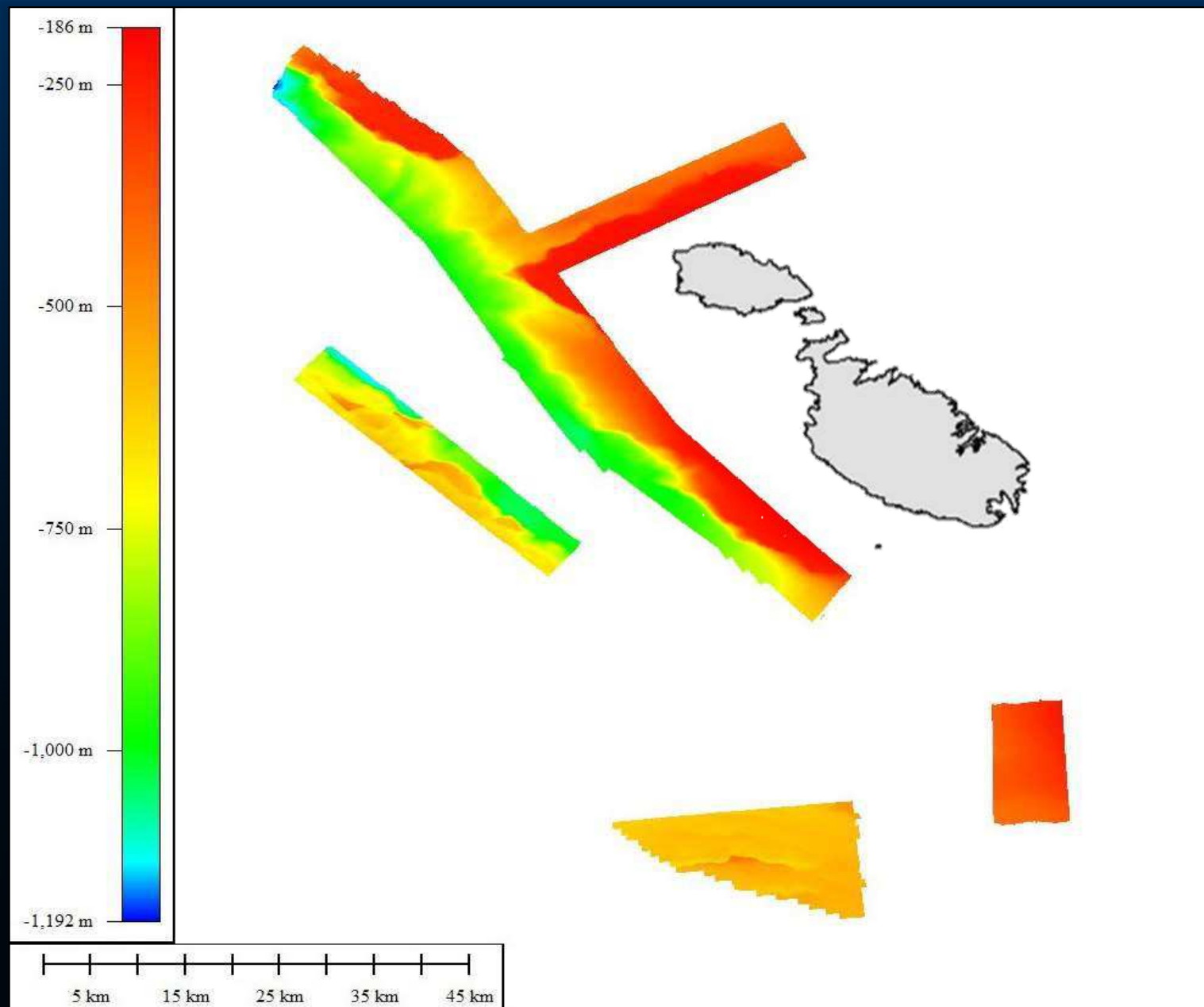
Reefs in Coastal Areas – Biota

- Typical shallow-water rocky bottom assemblages
- Include species of conservation interest

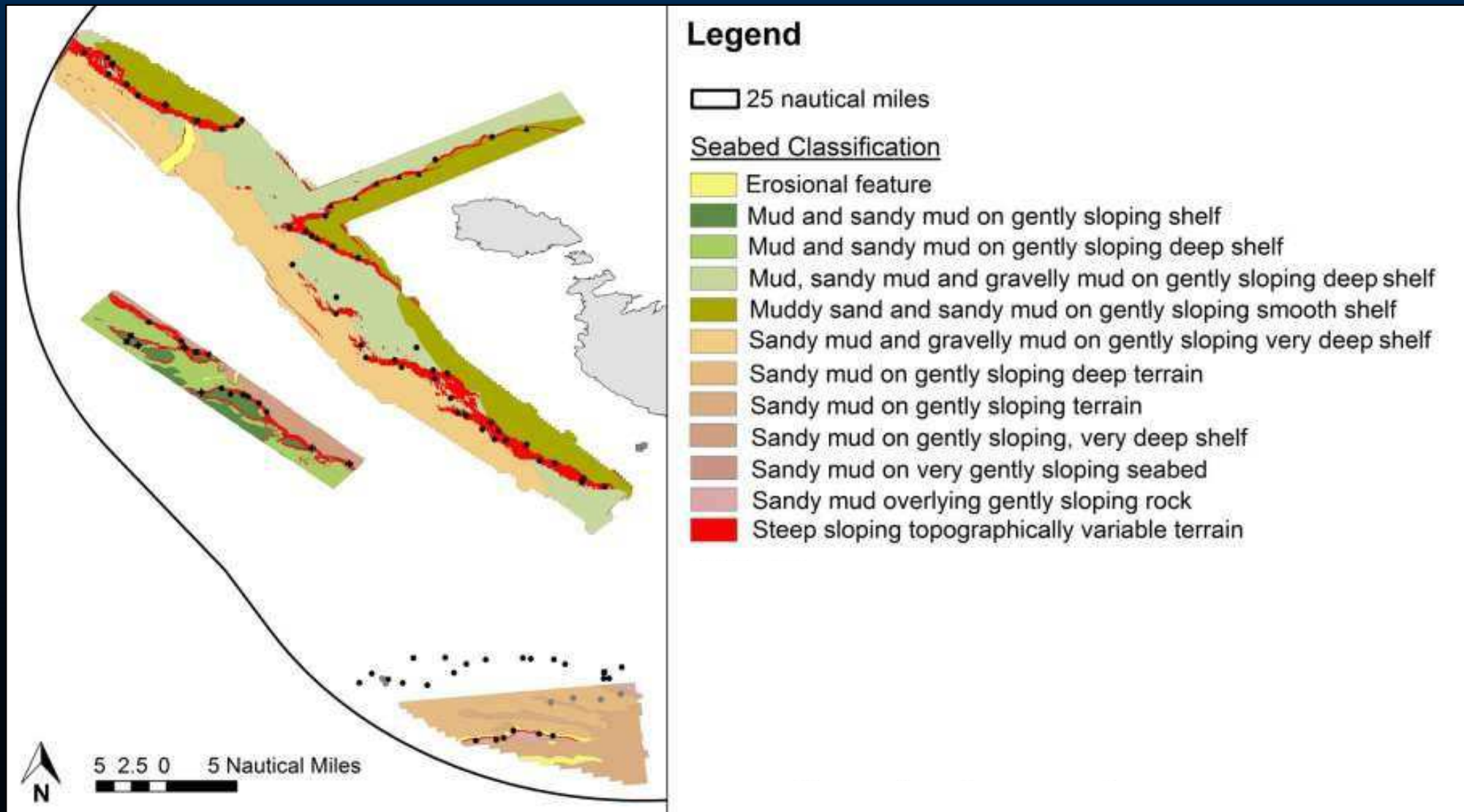


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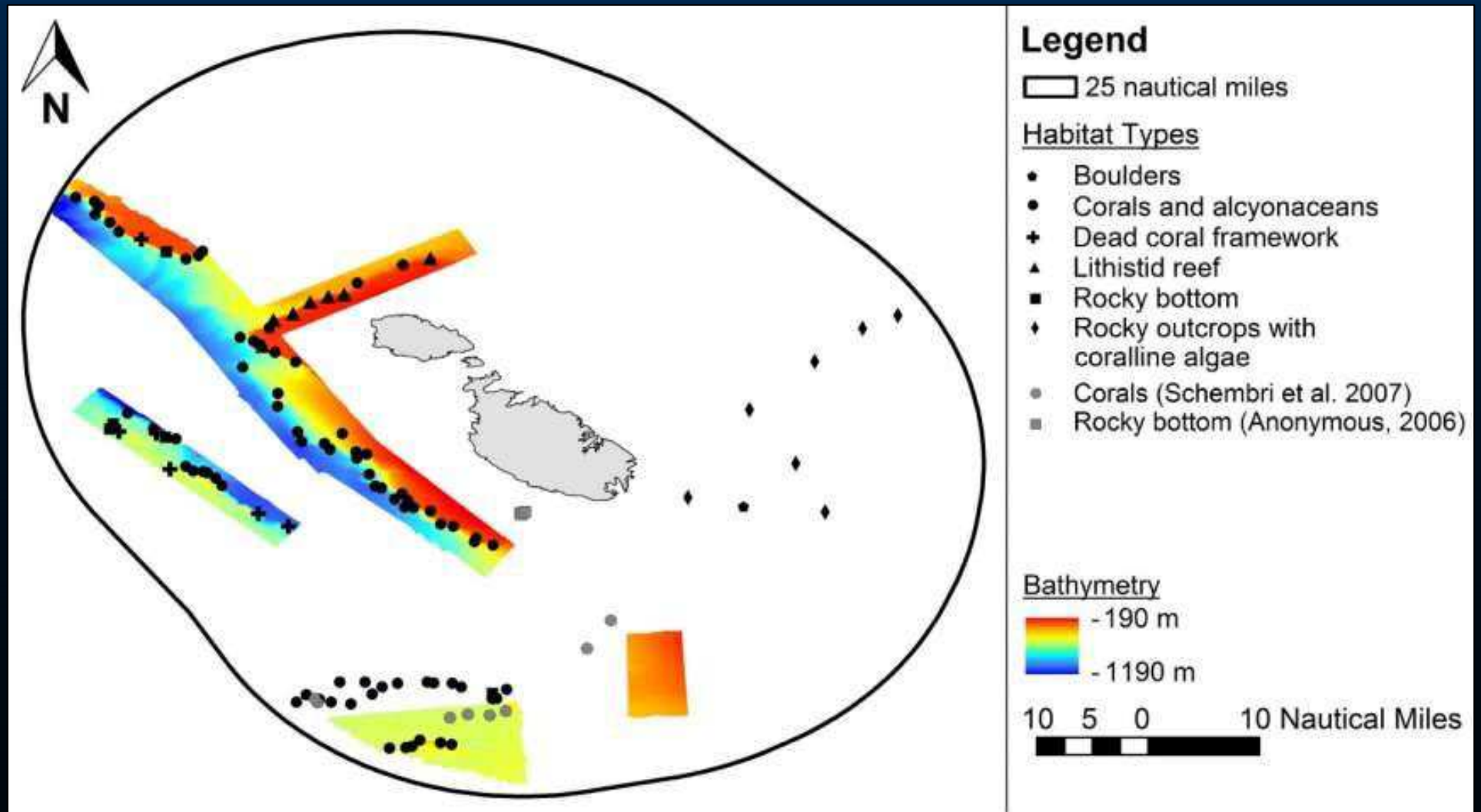
Offshore Reefs – Multibeam Survey



Offshore Reefs – Multibeam Survey

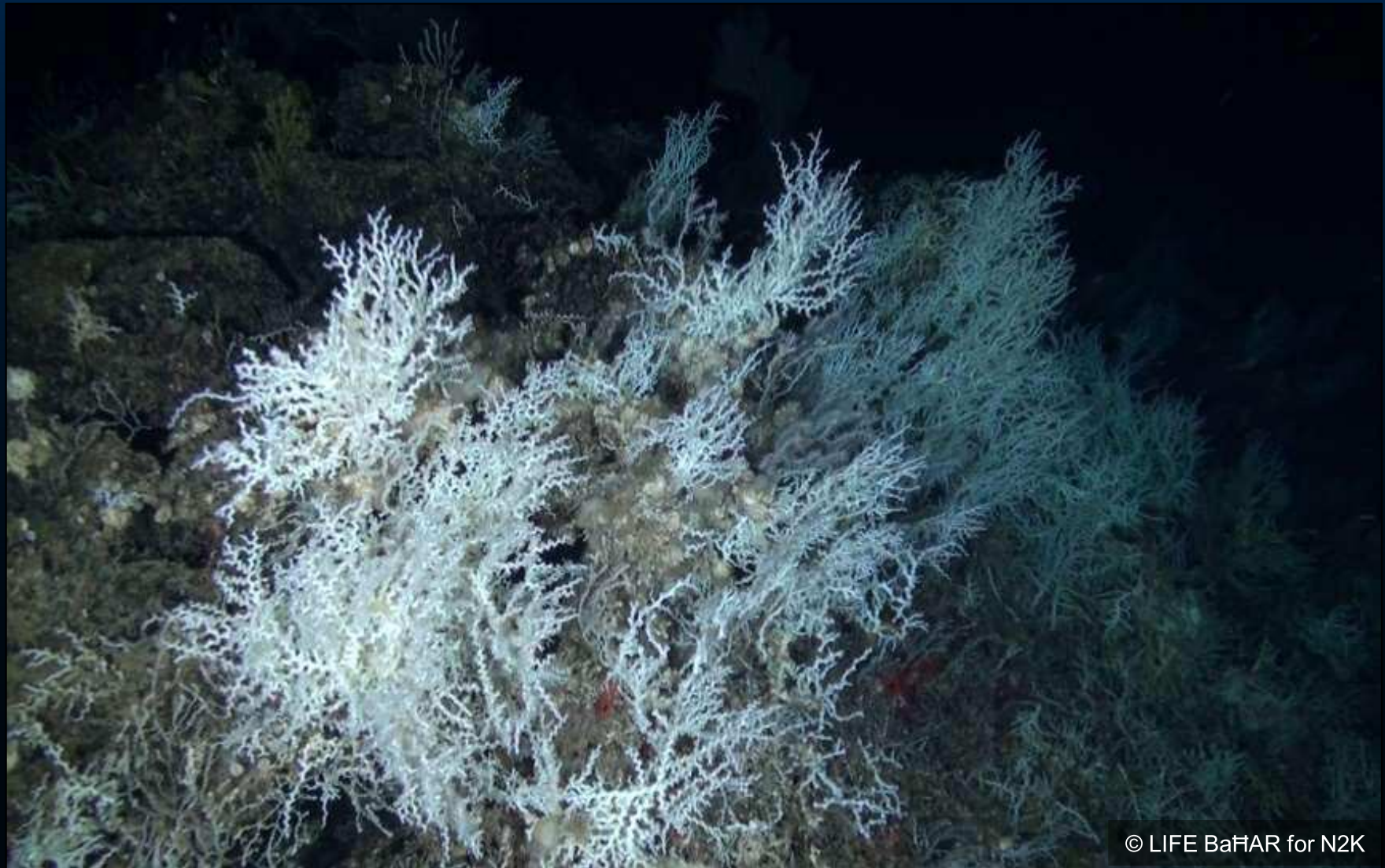


Offshore Reefs – Types of Reefs Located



Cnidarian Reefs – Habitat Forming Species

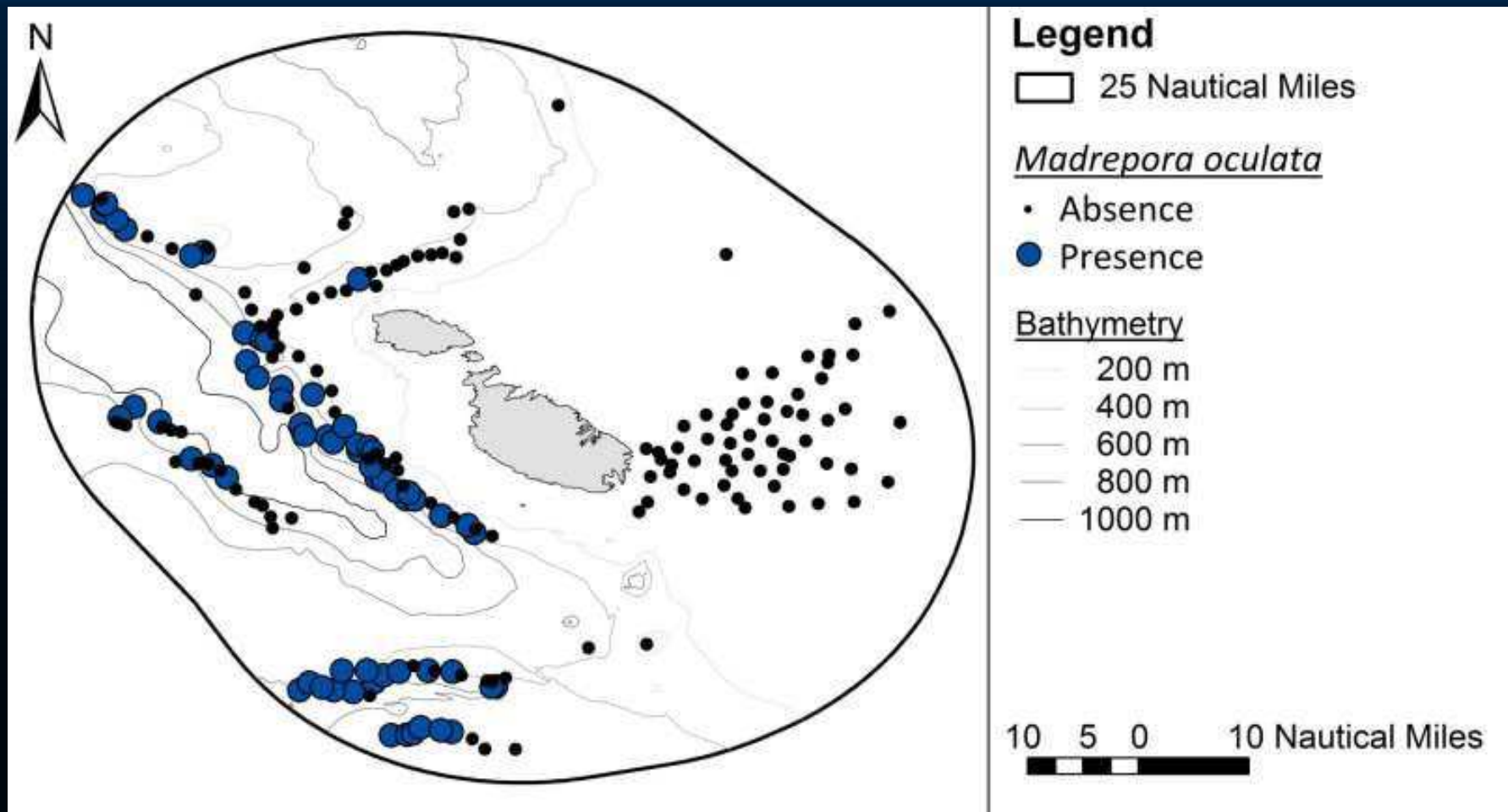
- *Madrepora oculata*



Cnidarian Reefs – Habitat Forming Species

- *Madrepora oculata*

- Location of sightings



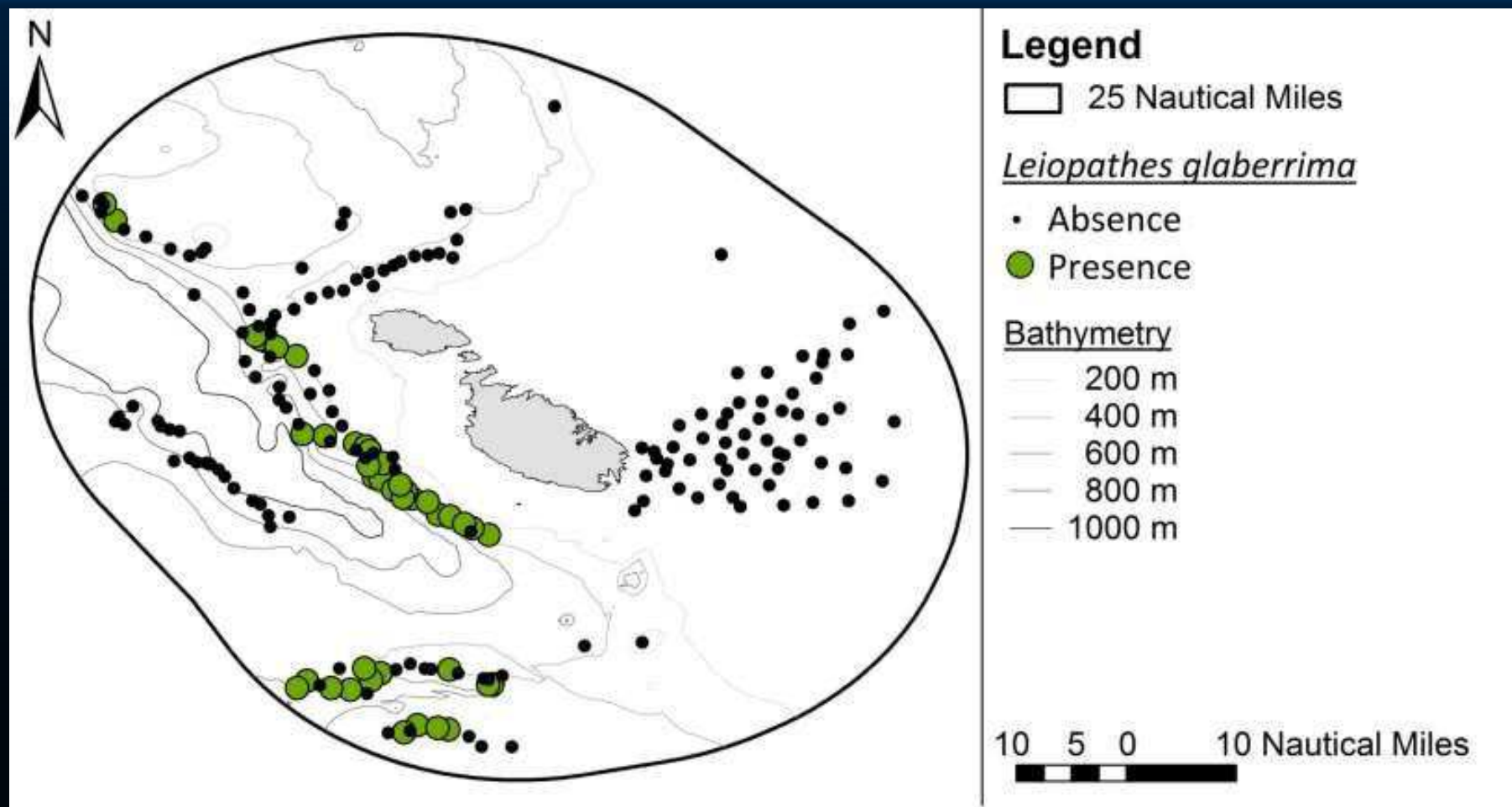
Cnidarian Reefs – Habitat Forming Species

- *Leiopathes glaberrima*



Cnidarian Reefs – Habitat Forming Species

- *Leiopathes glaberrima*
 - Location of sightings



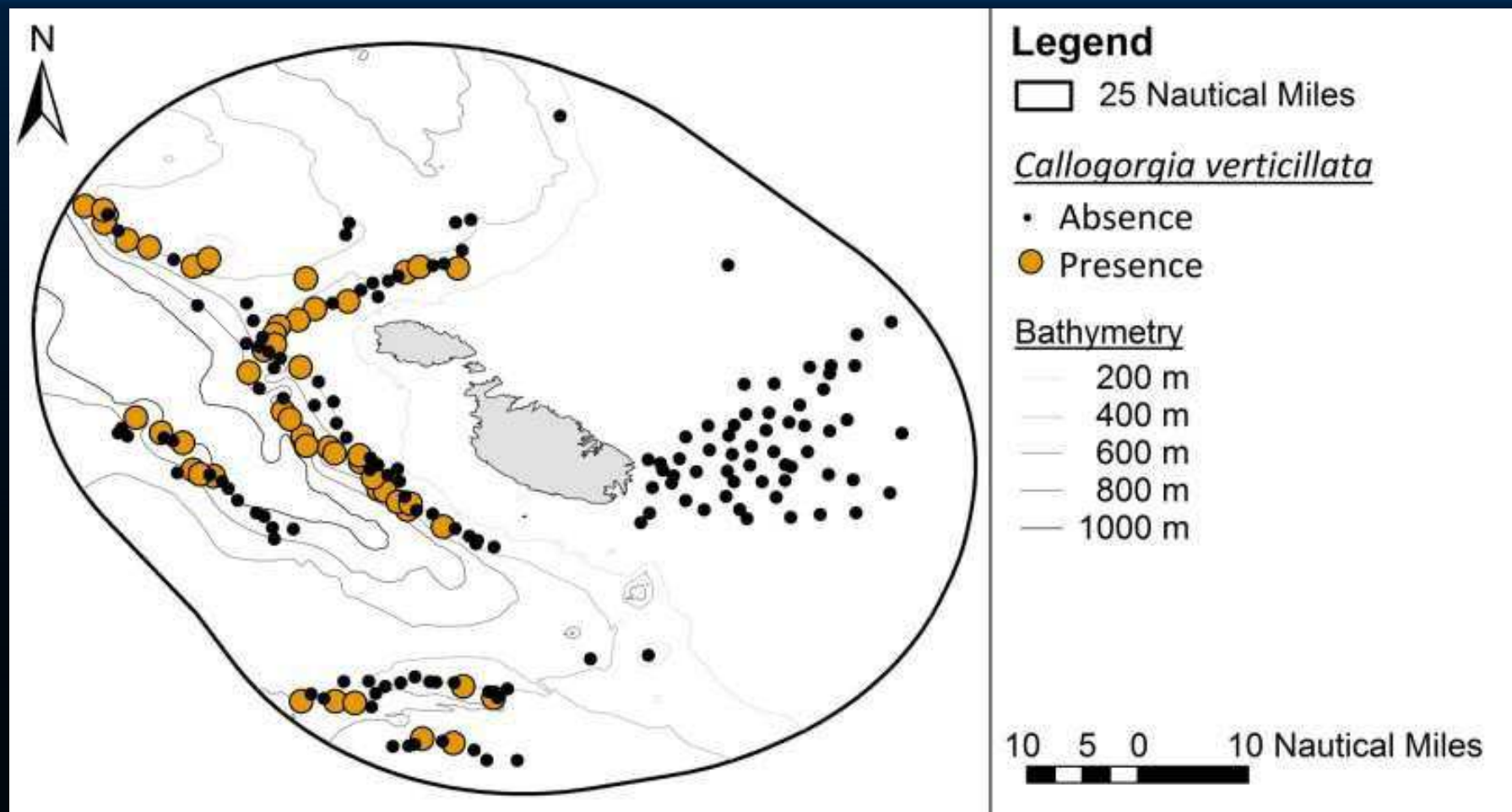
Cnidarian Reefs – Habitat Forming Species

- *Callogorgia verticillata*



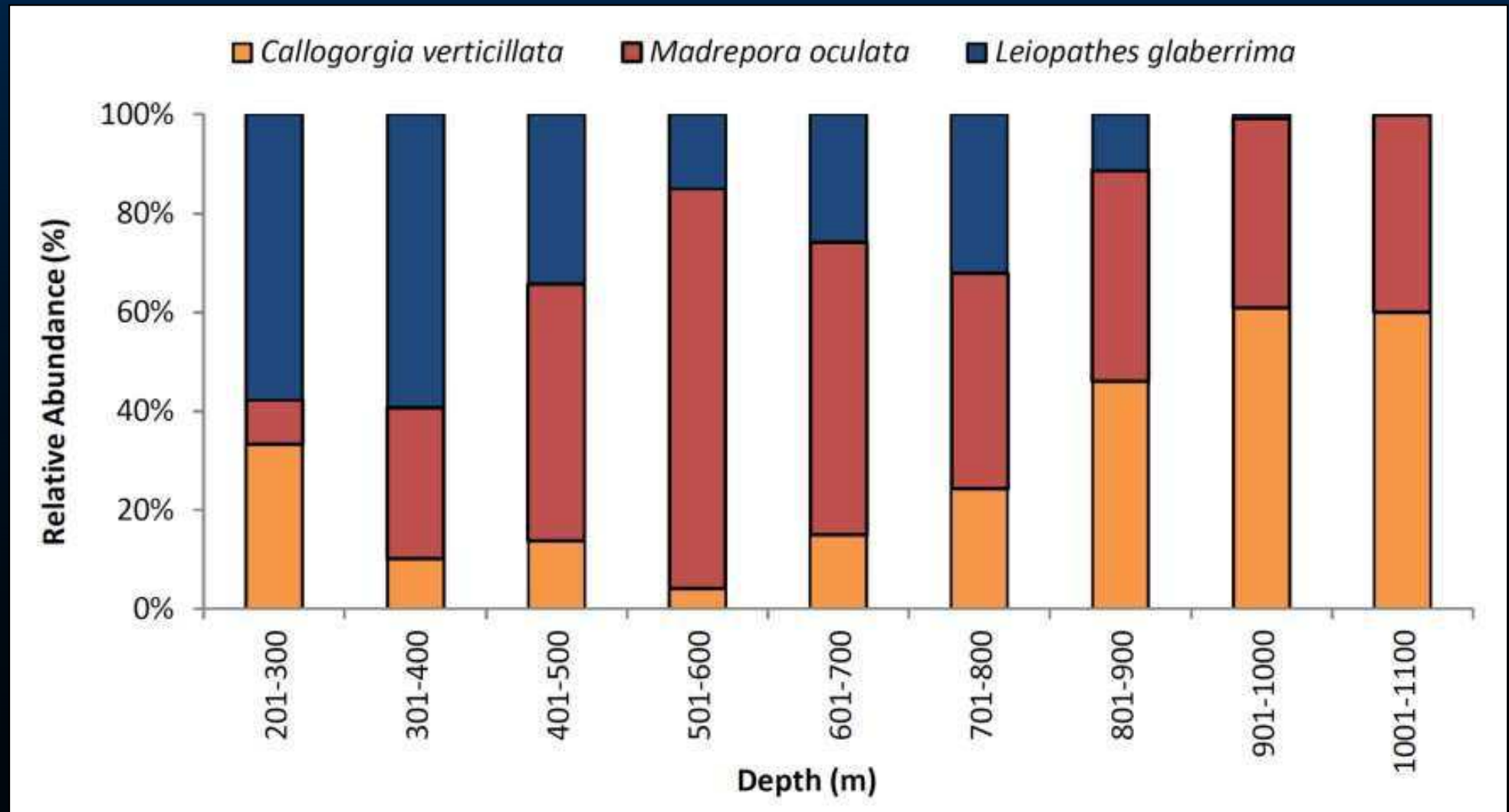
Cnidarian Reefs – Habitat Forming Species

- *Callogorgia verticillata*
 - Location of sightings



Cnidarian Reefs – Habitat Forming Species

- Vertical stratification identified for main habitat-forming species



Cnidarian Reefs – Other Habitat Formers



Cnidarian Reefs – Associated Biota

- High diversity of associated fauna: over 200 species observed



Dead Coral Frameworks

- Areas with extensive dead coral frameworks also discovered west of Gozo and on west side of the Malta Graben



Lithistid Sponge Reef

- Dead (fossilised) stony sponge reef found north of Gozo



Lithistid Sponge Reef – Biota

- Fossil reef provides habitat for several species



Offshore Reefs in Shallow water (< 150m)

- Shallow areas southeast of Malta included a few areas with rocky outcrops forming small reefs



Other Habitats – Soft Muddy Bottoms

- Some areas lacked reefs, were characterized by muddy bottoms
- Included bamboo coral, sea pens, sea urchins and lobsters



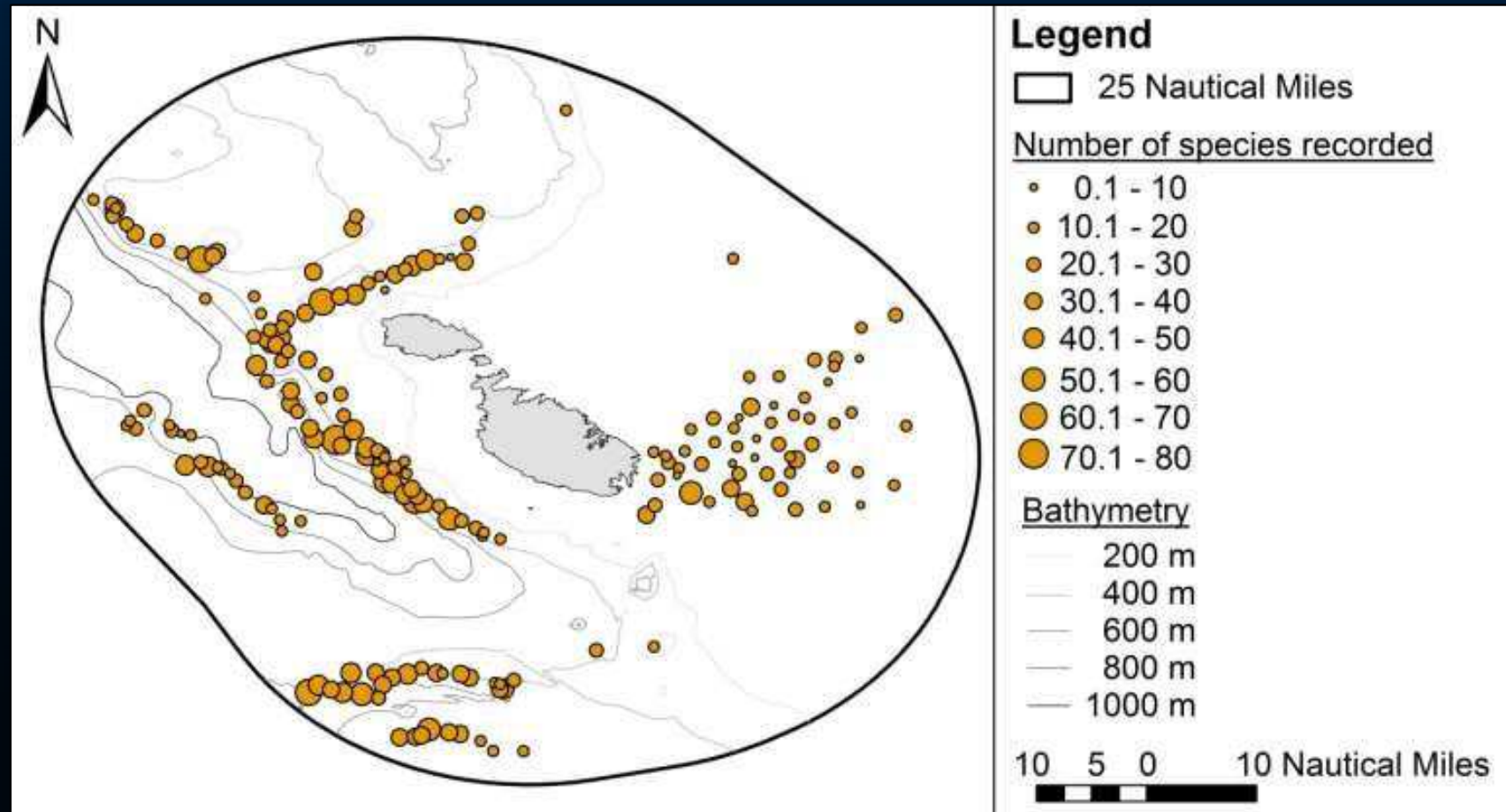
Other habitats – Rhodolith beds

- Shallow areas southeast of Malta also included rhodolith beds



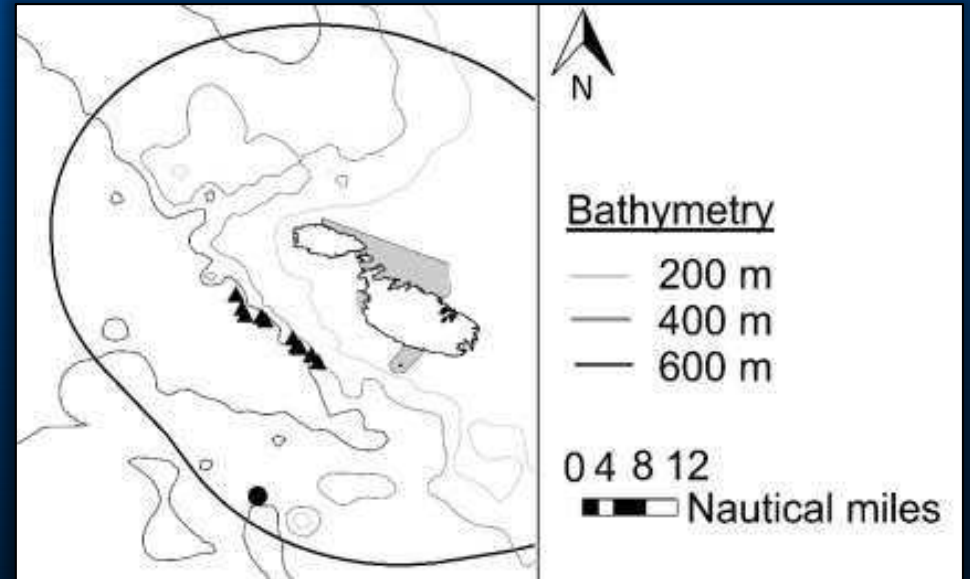
Offshore Habitats – Number of Species

- Cnidarian-dominated communities on escarpments and lithistid reef had most diverse faunal assemblages
- Lower diversity on dead coral frameworks and soft bottoms



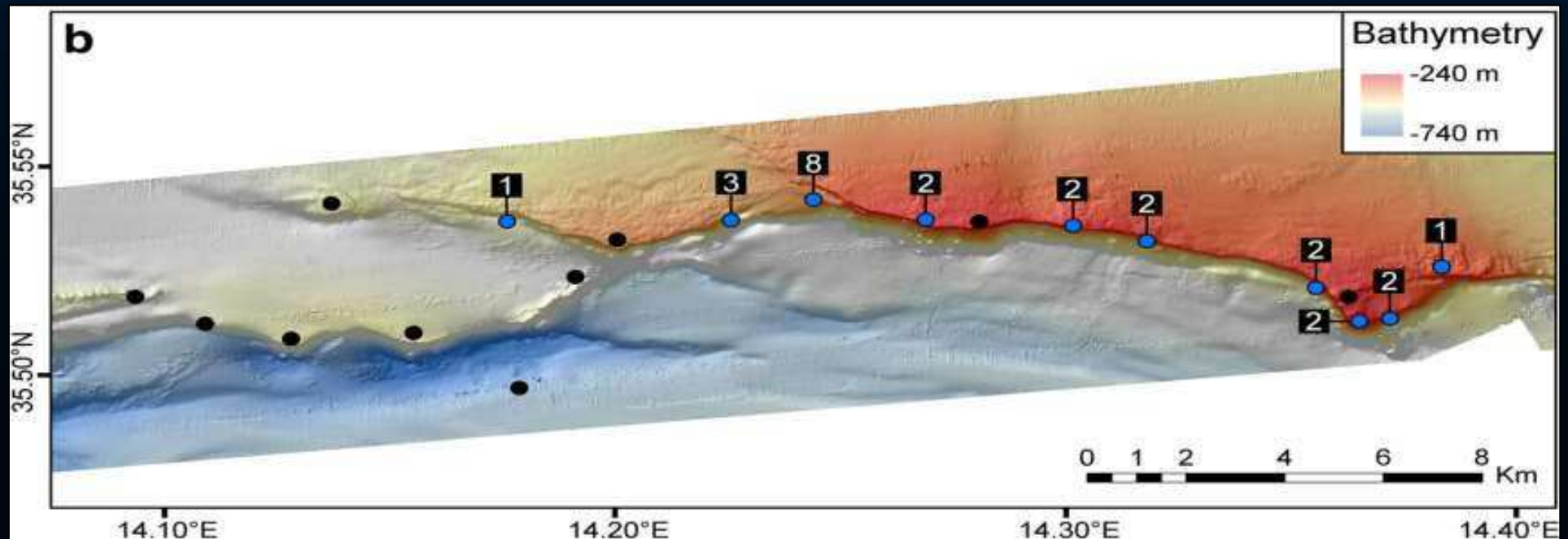
Red Coral Depth Record

- Numerous colonies growing deeper than 800 m recorded
- Maximum observed depth was 1016 m
- Colonies were part of diverse community



Coronaster briareus in the Mediterranean

- First record in Mediterranean Sea
- Total of 26 individuals sighted, 25 at edge of same escarpment
- Identity confirmed by collecting specimen in June 2016



Dissemination of Findings

ERA **OCEANA**

New depth record of the precious red coral *Corallium rubrum* for the Mediterranean

L. Knittweis¹, M. Aguilu², H. Alvarez², J. A. Borg¹, J. Evans¹, S. Garcia¹ and P. J. Schenker¹

¹Department of Biology, University of Malta, Msida MS202000, Malta; ²Fundación Oceana, Gran Via 19, 28013 Madrid, Spain

Abstract
Low estimates of the precious red coral *Corallium rubrum* have previously been recorded in depths of 400-500 m in the Mediterranean, but deep-water populations of this species remain poorly known. During a recent research expedition within the 22 islands near Palermo (Sicily), Italy, the authors examined numerous corals growing deeper than 500 m, up to depths of 1000 m, in more temperate waters. These corals were part of a diverse community of colonial species of corals, sponges, gorgonians, and other invertebrates.

Introduction
The precious red coral *Corallium rubrum* is a species of stony coral that is found in the Mediterranean Sea and the Atlantic Ocean. It is a highly valued species for its ornamental and medicinal properties. It is also a highly valued species for its ecological role in the Mediterranean Sea. It is a highly valued species for its ecological role in the Mediterranean Sea.

Results – A New Depth Record
During summer of 2014, the authors examined numerous corals growing deeper than 500 m, up to depths of 1000 m, in more temperate waters. These corals were part of a diverse community of colonial species of corals, sponges, gorgonians, and other invertebrates.

RECENT EVIDENCE THAT THE DEEP SEA AROUND MALTA IS A BIODIVERSITY HOTSPOT

J. Evans¹, M. Aguilu², H. Alvarez², J. A. Borg¹, J. Evans¹, S. Garcia¹ and P. J. Schenker¹

¹Department of Biology, University of Malta, Msida MS202000, Malta; ²Fundación Oceana, Gran Via 19, 28013 Madrid, Spain

Abstract
Recent 2012 surveys of deep-sea corals around the Maltese Islands revealed the presence of highly diverse habitats, including extensive hard bottom areas dominated by gorgonians and large cold-water corals (CWCs), with a rich variety of associated fauna. Black coral (*Desmophyllum*) corals were dominant at 200-400 m.

Introduction
The Maltese Islands are situated in the central Mediterranean Sea, between Sicily and North Africa. The islands are surrounded by deep-sea corals, which are highly valued for their ornamental and medicinal properties. It is also a highly valued species for its ecological role in the Mediterranean Sea.

Methods
In June-July 2012, remotely operated vehicle (ROV) surveys were conducted around the Maltese Islands, revealing the presence of highly diverse habitats, including extensive hard bottom areas dominated by gorgonians and large cold-water corals (CWCs), with a rich variety of associated fauna.

Recent Discoveries of Extensive Cold Water Coral Assemblages in Maltese waters

Leyla Knittweis¹, Julian Evans¹, Ricardo Aguilu², Helena Alvarez², Joseph A. Borg¹, Silvia Garcia¹ and Patrick J. Schenker¹

¹Department of Biology, University of Malta, Msida MS202000, Malta; ²Fundación Oceana, Gran Via 19, 28013 Madrid, Spain

Summary
Recent deep-sea Remotely Operated Vehicle (ROV) surveys around the Maltese Islands revealed the discovery of highly diverse habitats, including extensive hard bottom areas dominated by gorgonians and large cold-water corals (CWCs), with a rich variety of associated fauna. Black coral (*Desmophyllum*) corals were dominant at 200-400 m.

NEW DEPTH RECORD OF THE PRECIOUS RED CORAL *Corallium rubrum* FOR THE MEDITERRANEAN

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SENCKENBERG

On the occurrence of *Coronaster briareus* (Echinodermata, Forcipulatida, Asteroidea) in the Mediterranean Sea

Julian Evans¹, Leyla Knittweis¹, Ricardo Aguilu², Helena Alvarez², Joseph A. Borg¹, Silvia Garcia¹, Patrick J. Schenker¹

Abstract
The sea urchin *Coronaster briareus* (Echinodermata, Forcipulatida, Asteroidea) is a highly valued species for its ornamental and medicinal properties. It is also a highly valued species for its ecological role in the Mediterranean Sea.

Project

LIFE BaHAR for Natura 2000

Patrick Joseph Schenker, Joseph A. Borg, Julian Evans, Knittweis Leyla

Institution: University of Malta

Goal: The main aim of the LIFE BaHAR for N2K project is to extend existing marine Sites of Community importance (SCIs) in Maltese waters and to designate new marine areas as SCIs to form part of the Natura 2000 network.

The project has five institutional partners: The Malta Environment & Resources Authority (ERA) is the coordinating beneficiary, responsible for overall management and coordination of the project and implementation of certain actions. The other partners are the Ministry of Sustainable Development, the Environment and Climate Change (MSDEC) of the Government of Malta, the Department of Fisheries and Aquaculture (DFA) within MSDEC, the University of Malta (UoM) and the international NGO Fundación Oceana.

More information at <http://lifebahar.org/ml/life-bahar-for-n2k/>

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Recent evidence that the Deep Sea around Malta is a Biodiversity Hotspot

J. Evans¹, M. Aguilu², H. Alvarez², J. A. Borg¹, J. Evans¹, S. Garcia¹ and P. J. Schenker¹

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Introduction
Malta's deep-sea biodiversity is poorly known and, until now, the Maltese deep-sea coral communities, including the presence of highly diverse habitats, including extensive hard bottom areas dominated by gorgonians and large cold-water corals (CWCs), with a rich variety of associated fauna.

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Thank you for your attention!



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