

## A5.38 Communities of Mediterranean infralittoral muddy detritic bottoms

### Summary

This habitat type develops in areas where a detritus bottom is covered with mud formed by terrigenous deposits from rivers. In some geographical areas, this habitat is characterized by facies with the brittlestar *Ophiothrix quinque maculata* (Ophiuroidea) that extends to the circalittoral zone.

Studies conducted within this zone showed that combined effects of urbanization, fisheries, aquaculture and sedimentation led to a shift in associated assemblages, and this habitat is especially prone to impacts from coastal pollution, coastal zone development, fisheries, contamination of sediments and episodic perturbations. Some fisheries legislation for this whole zone in general exist, but management measures aimed at this particular habitat conservation are not in place. Spatial planning, regulation of discharges to the marine environment and marine protected areas may also benefit this habitat. Direct engagement of stakeholders in the planning of the management process, analysis of social and economic costs and benefits of different management options will be essential to the successful implementation of conservation actions.

### Synthesis

This habitat has a large natural range in the Mediterranean region. The precise extent is unknown however as EOO >50,000km<sup>2</sup>, this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. The AOO is unknown and trends in the extent are also unknown at present. This habitat is directly subject to various anthropogenic impacts resulting from urban, industrial, agricultural, aquaculture and other coastal activities as well as the impact of demersal fishing gears. The analysis conducted within this zone showed that human activities had a substantial reduction on this habitat and that severe degradation is an ongoing process, and so it is reasonable to assume that quality of this habitat has severely declined in the majority of areas of the Mediterranean (intermediate declining affecting at least 50% of the habitat extent). This habitat has therefore been assessed as Vulnerable under criteria C/D1.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Vulnerable	C/D1	Vulnerable	C/D1

### Sub-habitat types that may require further examination

None.

### Habitat Type

#### Code and name

A5.38 Communities of Mediterranean infralittoral muddy detritic bottoms

No characteristic photographs of this habitat currently available.

#### Habitat description

This habitat develops in areas where a detritus bottom is covered with mud formed by terrigenous deposits from rivers. The sediment is a very muddy sand or sandy mud, or even a rather compacted mud,

rich in shell debris or volcanic fragments (scoriae); sedimentation is slow enough to allow the development of sessile epifauna. Gravel, sand and mud are mixed in varying quantities, but mud always predominates. In some geographical areas, this habitat is characterized by facies with the brittlestar *Ophiothrix quinquemaculata* (Ophiuroidea) that extends to the circalittoral. This species in some places forms an extremely dense population which is almost 90% ophiuran.

Indicators of quality:

Both biotic and abiotic indicators have been used to describe marine habitat quality. These include: the presence of characteristic species as well as those which are sensitive to the pressures the habitat may face; water quality parameters; levels of exposure to particular pressure, and more integrated indices which describe habitat structure and function, such as trophic index, or successional stages of development in habitats that have a natural cycle of change over time.

There are no commonly agreed indicators of quality for this habitat, although particular parameters may have been set in certain situations e.g. protected features within Natura 2000 sites, where reference values have been determined and applied on a location-specific basis.

Characteristic species:

Brittle star: *Ophiothrix quinquemaculata*; Polychaete: *Phyloaricia foetida*, *Paradoneis lyra*;  
Gastropods: *Cerithium vulgatum*, *C. rupestre*, Bivalve: *Ruditapes decussatus*; Crustaceans: *Upogebia pusilla*, *Clibanarius misanthropus*; Sipunculid: *Golfingia vulgaris*.

## **Classification**

EUNIS:

Level 4 of the EUNIS classification (v1405). A sub-habitat of Sublittoral mud (A5.3).

Annex 1:

1160 Large shallow inlets and bays

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral mud

EUSEaMap:

Shallow muds

IUCN:

9.5 Subtidal sandy-mud

9.6 Subtidal muddy

**Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?**

Unknown

Justification

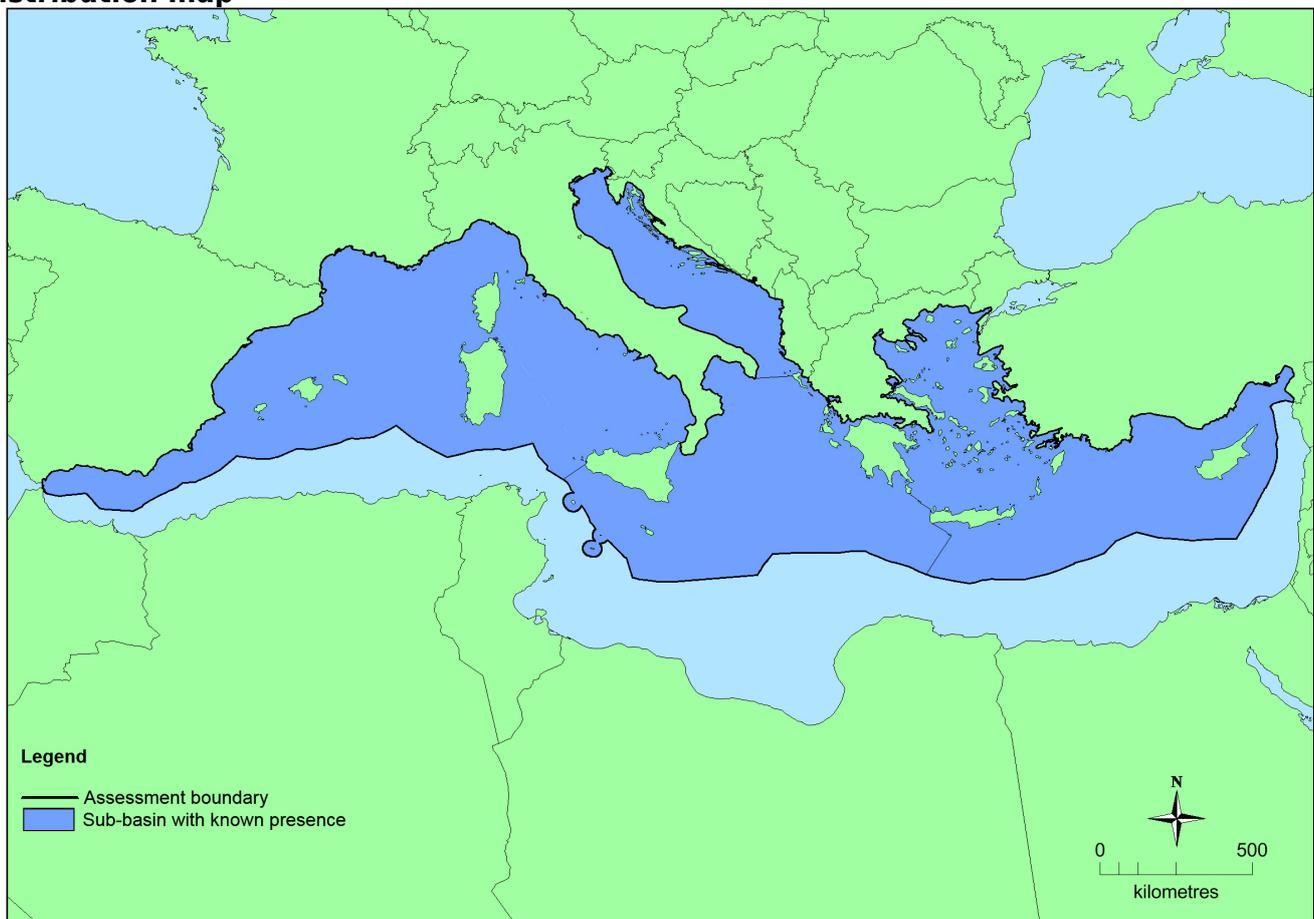
**Geographic occurrence and trends**

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Mediterranean Sea</i>	Adriatic Sea: Present Aegian-Levantine Sea: Present Ionian Sea and the Central Mediterranean Sea: Present Western Mediterranean Sea: Present	Unknown Km <sup>2</sup>	Unknown	Decreasing

**Extent of Occurrence, Area of Occupancy and habitat area**

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
<i>EU 28</i>	>50,000 Km <sup>2</sup>	unknown	Unknown Km <sup>2</sup>	
<i>EU 28+</i>	>50,000 Km <sup>2</sup>	unknown	Unknown Km <sup>2</sup>	

**Distribution map**



This habitat is known to occur in all sub-basins in the Eastern and Western Mediterranean but there is insufficient data to produce a map of its distribution.

## How much of the current distribution of the habitat type lies within the EU 28?

It is unknown how much of this habitat lies within the EU 28 but it does occur in the EU 28+.

### Trends in quantity

The extent of this habitat is still poorly known, and the studies conducted have mostly focused on the description of the benthic assemblages in relation to sediment characteristics. Trends in quantity are therefore unknown.

- Average current trend in quantity (extent)

EU 28: Unknown

EU 28+: Unknown

- Does the habitat type have a small natural range following regression?

No

*Justification*

The habitat has an EOO that exceeds 50,000 km<sup>2</sup>.

- Does the habitat have a small natural range by reason of its intrinsically restricted area?

No

*Justification*

The habitat has an EOO that exceeds 50,000 km<sup>2</sup>.

### Trends in quality

This habitat is directly subject to various anthropogenic impacts resulting from urban, industrial, agricultural, aquaculture and other coastal activities. The continental shelf area in the EU Mediterranean countries is almost all subject to a high intensity of trawled gear fishing increasing on an east to west gradient with the highest intensity and extent in the Adriatic Sea. Fishing in general, and the use of bottom towed fishing gears in particular, pose ephemeral or permanent threats to this biotope, depending on the relative vulnerability of the present species. Aquaculture had negative impacts on muddy habitats, with pathogenic benthic bacteria density increasing in relation to organic enrichment due to fish farms. Some studies have shown that fish farm derived particulate N waste could be traced in benthic invertebrates over distances of several km from the fish farm, while many studies showed that deposition of sediments had negative effects. In addition, many studies have shown that combined impacts of urbanization, fisheries, aquaculture and sedimentation led to a shift in associated assemblages. As all other analysis conducted within this zone showed that human activities had significant negative and that severe degradation is an ongoing process, it is reasonable to assume that quality of this habitat has declined in the majority of areas of the Mediterranean.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

## Pressures and threats

---

Studies conducted within this zone showed that the combined effects of urbanization, fisheries, aquaculture and sedimentation led to a shift in the associated species assemblages. This habitat is especially prone to impacts such as coastal pollution (urban, agricultural, industrial, fish-farming, etc.), coastal zone development (particularly urbanization and uncontrolled coastal infrastructures), demersal fisheries, contamination of sediments and biota by inputs of hazardous compounds and episodic perturbations (i.e. sediment removal and illegal dumping).

### List of pressures and threats

## **Agriculture**

Use of biocides, hormones and chemicals  
Fertilisation

## **Urbanisation, residential and commercial development**

Urbanised areas, human habitation  
Industrial or commercial areas  
Discharges

## **Biological resource use other than agriculture & forestry**

Marine and Freshwater Aquaculture  
Fishing and harvesting aquatic resources

## **Pollution**

Pollution to surface waters (limnic, terrestrial, marine & brackish)  
Marine water pollution  
Soil pollution and solid waste (excluding discharges)

## **Conservation and management**

---

There are a variety of fisheries regulations that are relevant to the conservation of this habitat type. In particular the use of towed gears (trawls, dredges etc.) has recently been prohibited within 3 nautical miles of the coast or within the 50 m isobath where that depth is reached at a shorter distance from the coast. Spatial planning, regulation of discharges to the marine environment and marine protected areas may also benefit this habitat. Direct engagement of stakeholders in the planning of the management process, analysis of social and economic costs and benefits of different management options, will be essential for the successful implementation of conservation actions.

### **List of conservation and management needs**

#### **Measures related to wetland, freshwater and coastal habitats**

Restoring/Improving water quality

#### **Measures related to marine habitats**

Restoring marine habitats

#### **Measures related to spatial planning**

Other spatial measures  
Establish protected areas/sites

#### **Measures related to hunting, taking and fishing and species management**

Regulation/Management of fishery in marine and brackish systems

#### **Measures related to urban areas, industry, energy and transport**

Urban and industrial waste management

### **Conservation status**

Annex 1:

1160: MMED XX

## When severely damaged, does the habitat retain the capacity to recover its typical character and functionality?

Unknown.

### Effort required

## Red List Assessment

### Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %

The extent of this habitat is still poorly known, and the studies conducted have mostly focused on the description of the benthic assemblages in relation to sediment characteristics. Trends in quantity are therefore unknown. This habitat has therefore been assessed as Data Deficient under criteria A.

### Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50,000 Km <sup>2</sup>	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Unknown
EU 28+	>50,000 Km <sup>2</sup>	Yes	Yes	Unknown	Unknown	Yes	Yes	Unknown	Unknown

This habitat has a large natural range in the Mediterranean region. The precise extent is unknown however as EOO >50,000km<sup>2</sup>, this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. AOO is unknown. This habitat is believed to have had a decline in quality but trends in quantity are unknown. The distribution of the habitat is such that the identified threats are unlikely to affect all localities at once. This habitat has therefore been assessed as Least Concern under criteria B1(a,b) and Data Deficient for all other criteria.

### Criterion C and D: Reduction in abiotic and/or biotic quality

Criteria C/D	C/D1		C/D2		C/D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	>50 %	Intermediate %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	>50 %	intermediate %	Unknown %	Unknown %	Unknown %	Unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %	Unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	Unknown %	Unknown%	Unknown %	Unknown%	Unknown %	Unknown%
EU 28+	Unknown %	Unknown%	Unknown %	Unknown%	Unknown %	Unknown%

This habitat is directly subject to various anthropogenic impacts resulting from urban, industrial, agricultural, aquaculture and other coastal activities as well as demersal fisheries. The analysis conducted within this zone showed that human activities had a substantial reduction on this habitat and that severe degradation is an ongoing process, and so it is reasonable to assume that quality of this habitat has severely declined in majority areas of the Mediterranean (intermediate declining affecting at least 50% of the habitat extent). This habitat has therefore been assessed as Vulnerable under criteria C/D1.

### Criterion E: Quantitative analysis to evaluate risk of habitat collapse

Criterion E	Probability of collapse
EU 28	Unknown
EU 28+	Unknown

There is no quantitative analysis available to estimate the probability of collapse of this habitat type. Therefore, it is assessed as Data Deficient under Criterion E.

### Overall assessment "Balance sheet" for EU 28 and EU 28+

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28	DD	DD	DD	DD	LC	DD	DD	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	DD	DD	DD	DD	LC	DD	DD	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Vulnerable	C/D1	Vulnerable	C/D1

### Confidence in the assessment

Low (mainly based on uncertain or indirect information, inferred and suspected data values, and/or limited expert knowledge)

### Assessors

Soldo, A.

### Contributors

S.Gubbay & N.Sanders.

### Reviewers

M. García Criado

### Date of assessment

12/01/2016

### Date of review

04/04/2016

## References

---

- Airoldi, L. and Beck, M.W. 2007. Loss, status and trends for coastal marine habitats of Europe. *Oceanography and Marine Biology: An Annual Review* 45: 345-405.
- Albertelli, G., Covazzi-Harriague, A., Danovaro, R., Fabiano, M., Frascchetti, S. and Pusceddu, A. 1999. Differential responses of bacteria, meiofauna and macrofauna in a shelf area (Ligurian Sea, NW Mediterranean): role of food availability. *Journal of Sea Research* 42: 11-26.
- Bakran Petricioli, T. 2007. *Marine habitats-Manual for mapping and monitoring*. State Institute for Nature Protection. 60 pp.
- Bellan, G., Bourcier, M., Salen-Picard, C., Arnoux, A. and Casserley, S. 1999. Benthic ecosystem changes associated with wastewater treatment at Marseille: Implications for the protection and restoration of the Mediterranean Coastal Shelf Ecosystems. *Water Environment Research* 71(4): 483-493.
- Blum, W.E.H. 2009. Reviewing land use and security linkages in the Mediterranean region. In: *Water scarcity, land degradation and desertification in the Mediterranean region*. Rubio, J., Safriel, U., Dausa, R., Blum, W. and Pedrazzini, F. (Eds.). Springer, Dordrecht, the Netherlands. pp 101-117.
- Bombace, G. 2001. Influence of climatic changes on stocks, fish species and marine ecosystems in the Mediterranean sea. *Archivio di Oceanografia e Limnologia* 22: 67-72.
- Bressan, G., Chemello, R., Gravina M.F., Gambi, M. C., Peirano, A., Cocito, S., Rosso, A. and Tursi, A. 2009. *Other bioconcretions*. In: *Other types bioconstructions*. Relini, G. (Ed.). Friuli Museum of Natural History, Udine, Italy. pp 90-114.
- Cencini, C. 1998. Physical processes and human activities in the evolution of the Po delta, Italy. *Journal of Coastal Research* 14: 774-793.
- Delo, E.A. and Ockenden, M.C. 1992. *Estuarine Muds Manual*. HR Wallingford Report, SR 309. 64 pp.
- Dolenec, T., Lojen, S., Kniewald, G., Dolenec, M. and Rogan, N. 2007. Nitrogen stable isotope composition as a tracer of fish farming in invertebrates *Aplysina aerophoba*, *Balanus perforatus* and *Anemonia sulcata* in central Adriatic. *Aquaculture* 262: 237-249.
- Dounas, C.G. and Koukouras, A.S. 1992. Circalittoral macrobenthic assemblages of Strymonikos Gulf (North Aegean Sea). P.S.Z.N.I. *Marine Ecology* 13(2): 85-99.
- EEA. 2006a. *The Changing Faces of Europe's Coastal Areas*. EEA Report 6/2006. OPOCE, Luxembourg.
- EEA. 2006b. *Priority Issues in the Mediterranean Environment*. EEA Report 4/2006. OPOCE, Luxembourg.
- EEA/UNEP. 1999. *State and pressures of the marine and coastal Mediterranean environment*. European Environment Agency, Copenhagen.
- Falace, A., Alongi, G., Cormaci, M., Furnari, G., Curiel, D., Cecere, E. and Petrocelli, A. 2010. Changes in the benthic algae along the Adriatic Sea in the last three decades. *Chemical Ecology* 26: 77-90.
- Gabrié, C., Lagabrielle, E., Bissery, C., Crochelet, E., Meola, B., Webster, C., Claudet, J., Chassanite, A., Marinesque, S., Robert, P., Goutx, M. and Quod, C. 2012. *The Status of Marine Protected Areas in the Mediterranean Sea*. MedPAN & RAC/SPA (Ed.). MedPAN Collection. 256 pp.
- Gilbert, F., Bonin, P. and Stora, G. 1995. Effect of bioturbation on denitrification in a marine sediment from the West Mediterranean littoral. *Hydrobiologia* 304(1): 49-58.
- Jeftic, L., Bernhard, M., Demetropoulos, A., Fernex, F., Gabrielides, G.P., Gasparovic, F., Halim, Y., Orhon, D. and Saliba, L.J. 1990. *State of the Marine Environment in the Mediterranean Region*. UNEP Regional Seas

Reports and Studies 132/1990 and MAP Technical Reports Series 28/1989. Athens.

MEPA. 2012. *MSFD Initial Assessment: Benthic Habitats*. MEPA. 86 pp.

Micu, D. and Micu, S. 2004. A new type of macrozoobenthic community from the rocky bottoms of the Black Sea. In: *International Workshop on the Black Sea Benthos*, Öztürk, B., Mokievsky, V.O. and Topaloğlu, B. (Eds.). 18-23 April 2004 Istanbul, Turkey. TÜDAV publication no. 20: 244 pp.

Salen-Picard, C., Bellan, G. Bellansantini, D., Arlhac, D. and Marquet, R. 1997. Long-term changes in a benthic community of a Mediterranean gulf (Gulf of Fos). *Oceanologica Acta* 20(1): 299-310.

Salomidi, M., Katsanevakis, S., Damalas, D., Mifsud, R., Todorova, V., Pipitone, C., Fernandez, T.V., Mirto, S., Galparsoro, I., Pascual, M., Borja, A., Rabaut, M. and Braeckman, U. 2010. *Catalogue of European seabed biotopes*. Report of Deliverable 1.2 of MESMA project to the European Commission.

Salomidi, M., Katsanevakis, S., Borja, A., Braeckman, U., Damalas, D., Galparsoro, I., Mifsud, R., Mirto, S., Pascual, M., Pipitone, C., Rabaut, M., Todorova, V., Vassilopoulou, V. and Vega Fernández, T. 2012. Assessment of goods and services, vulnerability, and conservation status of European seabed biotopes: a stepping stone towards ecosystem-based marine spatial management. *Mediterranean Marine Science* 13: 49-88.

Simboura, N. and Zenetos, A. 2002. Benthic indicators to use in ecological quality classification of Mediterranean soft bottoms marine ecosystems, including a new biotic index. *Mediterranean Marine Science* 3/2: 77-111.

UNEP. 2006. *Classification of benthic marine Habitat types for the Mediterranean Region*. UNEP (OCA)/MED WG 149/5 Rev. 1.

UNEP/MAP. 2003. *Concept Paper on Mediterranean Marine Pollution Indicators*. (UNEP(DEC)/MED WG.231/17).

UNEP/MAP/PAP. 2001. White Paper: *Coastal Zone Management in the Mediterranean*. Priority Actions Programme, Split.

UNEP/MAP. 2012a. *Initial integrated assessment of the Mediterranean Sea: Fulfilling step 3 of the ecosystem approach process*. United Nations Environment Programme, Mediterranean Action Plan, Barcelona Convention, Athens.

UNEP/MAP. 2012b. *State of the Mediterranean Marine and Coastal Environment*. United Nations Environment Programme, Mediterranean Action Plan, Barcelona Convention, Athens.

Vespe M, Gibin M, Alessandrini A, Natale F, Mazzarella F, & Osio G. *in press*. Mapping EU fishing activities using ship tracking data – accepted for publication, *Journal of Maps* – available at <http://arxiv.org/pdf/1603.03826>