A4.24 Invertebrate-dominated Pontic circalittoral rock

Summary

The habitat is present throughout the Black Sea on areas where circalittoral rock occurs. It is present in the Sea of Marmara. Data on current extent is available for all Black Sea countries. For Turkey this data is incomplete and based on some assumptions. There is no historic (pre 1965) data available. Quantitative data on the habitat is available for localities in Crimea. This is for the last 50 years only. Quantitative data is not available for the habitat in any other countries. Expert opinion states that this data can be extrapolated and applied to all localities in the Black Sea. Historically the most significant pressure has been eutrophication. This has caused the greatest reductions in quantity and quality. This was most acutely experienced in the north-west Black Sea where there are high riverine inputs. Since the collapse of the Soviet Union improved transboundary pollution measures have been implemented. This has led to a reduction in the pressure. Currently trawling and siltation are the two main pressures for the habitat.

Synthesis

In the EU 28 the habitat type is assessed as Vulnerable under Criterion C/D1. There has been an intermediate decline affecting >50%. There is no data to support this. It is based on expert opinion.

In the EU 28+ the habitat type is assessed as Vulnerable under Criterion C/D1. There has been an intermediate decline affecting >50%. This is based on quantitative data for localities in Crimea. The results have been extrapolated for the rest of the Black Sea.

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

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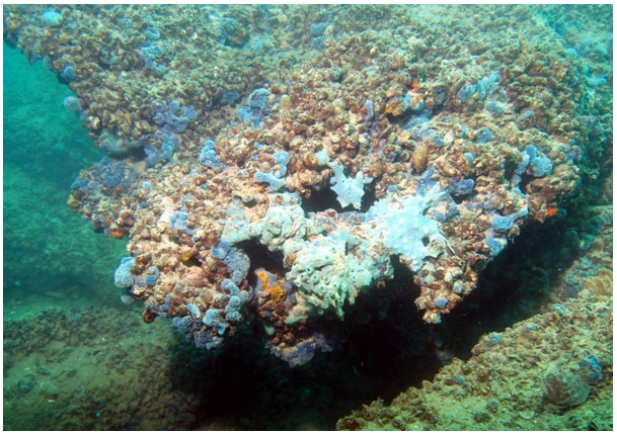
Turf of Corallina officinalis on moderately exposed lower mediolittoral rock in Tyulenovo Sarmatian limestone cliffs, Bulgaria (© D.Micu).



Pontic circalittoral rock with multi-species colonies of erect sponges Cherni Nos reef, Bulgaria (© D.Micu).

Habitat description

Circalittoral rock starts at the lower limit of distribution of photophilic plants and ends where the circalittoral rocky substrate gives way to sediments. On the Northwestern Black Sea shelf the habitat occurs on rocky coasts in depths between 10-15 m (depending on local conditions of light penetration, the upper limit of the habitat is defined as the lower limit of photophilic plants) down to 30-70m (depending on how deep rocky reefs occur at the location). The fauna is highly diverse, including many invertebrate and fish species which occur only in this habitat, some of them rare or protected. The habitat is very important due to the crucial ecological role of mussels in the self-cleansing capacity of the ecosystem and in benthic-pelagic coupling. One square meter of mussel-covered circalittoral rock has a clearance rate of 1.3 to 7.1 m3 m-2 h-1 and is able to filter 31-170 m3 of seawater per day. Biological production of this habitat is usually around 6 kg m-2 but can exceed 10 kg m-2 in favourable conditions, with complex foodweb linking it to other habitats. Also, it is an important feeding ground, nursery and refuge for many commercially valuable fish species and it provides the biofiltering capacity essential for maintaining the quality of nearshore waters.

Indicators of quality:

The following parameters and thresholds have been established for Romania:

1. Cover of *Mytilus galloprovincialis* (in the habitat subtype where it is dominant) ≥ 50%

2. Cover of invertebrate crusts, turfs and canopies (in the habitat subtype where they dominate) ≥ 80%

3. Median shell length of *Mytilus galloprovincialis* ≥ 50 mm SL

4. Live biomass of *Mytilus galloprovincialis* where dominant ≥ 6kg m-2

Characteristic species:

The dominant species is often the blue mussel *Mytilus galloprovincialis*, but in certain subtypes other benthic species may dominate:

- crusts and turfs formed by bryozoans, crust sponges (*Dysidea* sp.) or colonial tunicates *Botryllus schlosseri;*

- vertical walls and ridges can be covered either by dense colonies of erect, branched sponges

Halichondria sp. and *Haliclona sp.* or by solitary ascidians *Molgula manhattensis, Ascidiella aspersa, Ciona intestinalis;*

- Hydrozoans can form dense turfs and even tall canopies in the case of larger species *(Obelia longissima)*

Classification

This habitat may be equivalent to, or broader than, or narrower than the habitats or ecosystems in the following typologies.

EUNIS (2004):

Level 4. A sub-habitat of ‘Circalittoral rock’ (A4).

Annex 1:

1170 Reefs

MAES:

Marine - Coastal

MSFD:

Shelf sublittoral rock & biogenic reef

EUSeaMap:

Shelf rock or biogenic reefs

IUCN:

9.2 subtidal rock and rocky reefs

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?
No

Justification
Invertebrate-dominated communities on circalittoral rock are common globally. These are not unique to the Black Sea.

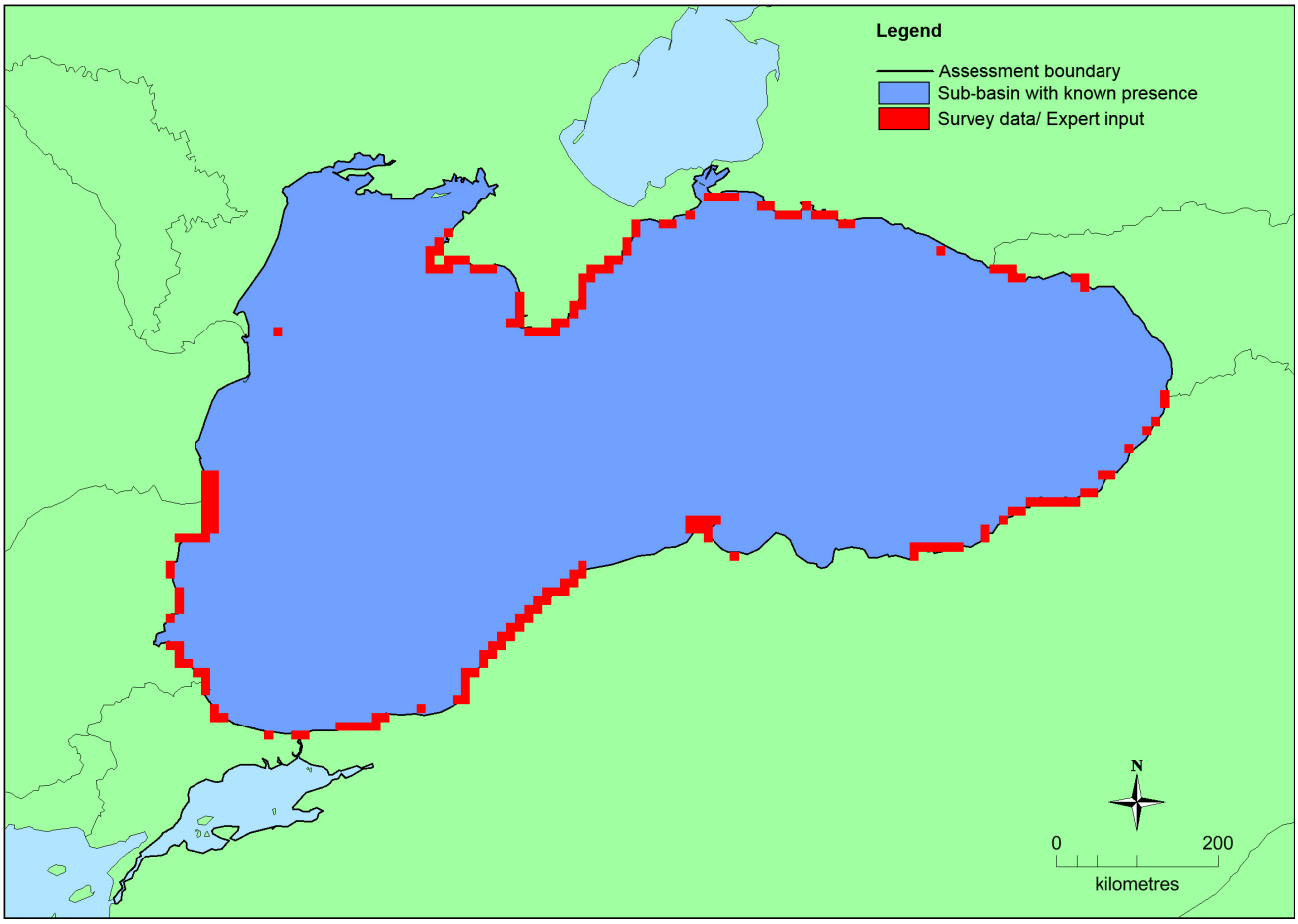
Geographic occurrence and trends

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Black Sea	Black Sea: Present	Unknown Km^2	Decreasing	Decreasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	11041 Km^2	32	Unknown Km^2	EOO and AOO have been calculated on the available data.
EU 28+	460285 Km^2	181	Unknown Km^2	EOO and AOO have been calculated on the available data.

Distribution map



This map has been generated based on expert opinion. The map has been used to calculate AOO and EOO. The map should be treated with caution as it does not necessarily reflect the full distribution of the habitat.

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

Around 18% of this habitat is estimated to be hosted by EU28 in the black sea

Trends in quantity

There is no quantity data available for the historic (pre 1965) period. Expert opinion states that it would have been more widespread than the current distribution. This is based on knowledge of the pressures facing the habitat and their prevalence during this period.

In the recent past (1965 to present day) the habitat has declined in extent. This is as a result of sedimentation and eutrophication. During the period up to the 1990s wide spread and severe eutrophication occurred in Black Sea. This was most notable in the western Black Sea. This caused a significant reduction in extent. Since the late 1990s/2000 signs of stability have been observed.

However, the extent is still reported as declining at some sites in Romania and Bulgaria. Here barrens have started to occur and are spreading, the causes of which are unknown.

In the future the habitat is expected to remain stable. This is based on reduced pressures from eutrophication and sedimentation.

- Average current trend in quantity (extent)
  EU 28: Stable
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  Yes

Justification
The habitat has a small range following regression in the EU countries only. In the EU 28+ the EOO exceeds 50,000 km².The habitat has undergone an important decline in the last 50 years. This is especially true to the western Black Sea (see Trends in Quantity). However, this decline has now halted in the EU and the extent of the habitat is now stable.

- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  -
  Justification
  Circalittoral rock is not widely distributed. In the Black Sea it is limited to depths of approximately 25 m due to sediment deposits.

Trends in quality

In the historic period (pre-1965) the habitat quality is believed to have been high and stable. This is based on expert opinion of the habitat and the likely presence of pressures during this period.

In the current period (1965 to present) the habitat quality has declined. The quality has declined in terms of species numbers, community structure, biomass and density. Bivalves also lost their dominance. The size of molluscs has also reduced and *Mytilus galloprovincialis* is no longer present on circalittoral rock in many locations. This is based on monitoring data from Tarkanhut, Sevstapol, Karadag, Kerch, Utrish and Novorossiik Bay. There is no quality data available for Romania and Bulgaria. However, expert opinion reflects that this process has also occurred in EU states. This is supported by the presence of barren areas on circalittoral rock in Romania. Previously these would have been occupied by invertebrates.

At present in Russia and Ukraine there is a decrease in production and a loss of normal population structure in Mytilus galloprovincialis– very young individuals of only 20-40 mm shell length have become dominant. These could be indicative of a low condition index, shortened life cycle and high mortalities.

In the future the habitat quality is expected to remain stable and to show signs of recovery. This due to improved water quality and reduced pressures. Additionally, recent studies have shown that *Mytilus galloprovincialis* population dynamics show long term cycles of expansion and decline. The population is currently believed to be at a low point and is expected to show expansion in the next 15–20 years.

- Average current trend in quality
  EU 28: Stable
  EU 28+: Decreasing

Pressures and threats

Eutrophication as a result of nutrient enrichment (N, P and organic matter) is the most significant historic pressure on the habitat. Reduced light penetration due to eutrophication caused declines in extent and quality of the habitat. Since the 1990s this pressure has reduced due to tighter controls on pollution in the catchment of the Danube and other rivers which enter the north-west Black Sea. Whilst this pressure is now reduced it is still a continuing threat in the current and future periods. This is especially true for non EU countries surrounding the Black Sea which are not bound by the agreements such as the Water Framework Directive (WFD).

Trawling is a current and future threat to the habitat. This causes habitat destruction by scraping away the benthic communities. Beam-trawling for *Rapana venosa* and shellfish is ongoing in EU states. In Turkey it is prohibited within 300m of the shore. However, illegal trawling takes places.

Siltation is a current and future threat to the habitat. The resettling of suspended sediment can cause smothering. This inhibits the growth of habitat forming species. Siltation is typically caused by dredging, trawling and other activities which disturb bottom sediments.

The alien species *Rapana venosa* is a lesser but constant threat to the bivalve species in the habitat. *R. venosa* preys on the bivalves living on circalittoral rock, resulting in a localised decrease in their population.

List of pressures and threats

Biological resource use other than agriculture & forestry

Professional active fishing

Pollution

Nutrient enrichment (N, P, organic matter)

Invasive, other problematic species and genes

Invasive non-native species

Natural System modifications

Siltation rate changes, dumping, depositing of dredged deposits

Conservation and management

The habitat is currently protected by some MPAs in some Black Sea states. In EU states eutrophication is now being managed by the Water Framework Directive (WFD). Trawling is not prohibited in EU states, protection measures are needed in this respect. Future management should include the designation of additional MPAs, improvement of water quality management outside EU member states, enhanced legal protection for occurrences of the habitat and key species (e.g. additions to the EU Habitats Directive), prohibiting of bottom trawling.

List of conservation and management needs

Measures related to marine habitats

Other marine-related measures

Measures related to spatial planning

Establish protected areas/sites
Legal protection of habitats and species

Measures related to hunting, taking and fishing and species management

Regulation/Management of fishery in marine and brackish systems

Conservation status

Annex 1:

1170: MBLS U1

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

Recovery through intervention cannot be achieved for this habitat. The habitat can recover naturally providing there is a sufficient sources of propagules and the abiotic conditions are appropriate.

Effort required

10 years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	25-30 %	unknown %	unknown %	unknown %
EU 28+	>25 %	unknown %	unknown %	unknown %

In the EU there has been a decline of between 25 and 30% in the last 50 years. This is based on expert opinion. In the EU 28+ the extent has not decreased by >25%. This is based on expert opinion.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	11041 Km^2	No	No	No	32	No	No	No	No
EU 28+	460285 Km^2	No	No	No	181	No	No	No	No

The AOO and EOO are intrinsically small for the EU states. Declines in in spatial extent, abiotic and biotic quality have halted. There are no threatening processes likely to cause declines in the next 20 years. However, there have been significant declines in the recent past which have left the habitat in a fragile state. The habitat exists at various locations, and there are no plausible human activities or stochastic events that may drive the habitat to be CR or Collapsed within a very short time period.

The threshold values for threatened categories are not met for the EU28+.

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	%	Intemediate %	unknown %	unknown %	unknown %	unknown %
EU 28+	%	Intemediate %	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%

In the EU states there has been an intermediate decline affecting >50% extent. This has occurred within the last 50 years. This has affected both biotic and abiotic factors. It is not possible to decouple these. This is based on expert opinion. There is no Quantitative data for EU states.

In the EU 28+ the decline has been intermediate affecting >50%. This has affected both biotic and abiotic factors. It is not possible to decouple these. This is based on quantitative data for localities in Crimea. The

results have been extrapolated for the rest of the Black Sea.

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.

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	NT	DD	DD	DD	LC	LC	DD	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	LC	LC	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)

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