

### A3.3z1 Lower infralittoral rock with extensive stands of *Phyllophora crispa* with *Apoglossum ruscifolium* and *Gelidium spinosum*

#### Summary

The habitat is present throughout the Black Sea on lower infralittoral rocky substrate. This is a common substrate in the Black Sea. It is present in all countries except Romania. It is not present in the Sea of Marmara. The depth at which the habitat occurs is restricted by light penetration. Historically it occurred at greater depths in periods of lower eutrophication. Quantitative data is available for habitat quantity in the historic period (pre-1965) and recent past (1965 to present day). This is available for all countries where the habitat is known to occur. However, data sets for Turkey are incomplete. 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. Trawling and siltation are the current pressures experienced by the habitat.

#### Synthesis

In the EU 28 the habitat type is assessed as Critical under Criteria A1 and C/D1. For Criterion A1, there has been a reduction in extent >80% in the last 50 years. This is based on current knowledge of habitat extent and historic records. For Criterion C/D1 there has been a severe decline affecting >80% extent of the habitat. This is supported by quantitative data.

In the EU 28+ the habitat type is assessed as Critical under Criterion C/D1. There has been a severe decline affecting >80% extent of the habitat. This is supported by quantitative data.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Critically Endangered	A1,C/D1	Critically Endangered	C/D1

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

None

#### Habitat Type

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##### Code and name

A3.3z1 Lower infralittoral rock with extensive stands of *Phyllophora crispa* with *Apoglossum ruscifolium* and *Gelidium spinosum*



*Gelidium spinosum* on Maslen Nos reef, Bulgaria (© Dragos Micu)



*Apoglossum ruscifolium* turf on Maslen Nos reef, Bulgaria (© Dragos Micu)

## Habitat description

Lower infralittoral bedrock and boulders at depths of 10-18 m, even 28 m in good transparency conditions, covered by extensive stands of sciaphilic algae, the dominant species being *Phyllophora crispa*. *Phyllophora* does not form a continuous canopy, it forms patches and tufts which are distributed more or less densely among the other algae.

Regeneration occurs following erosion or animal grazing. Continual regeneration leads to great variation in the appearance of individual plants as each new growth could come from the end, margin or surface of the blade. Fronds are frequently encrusted with the spiral tube worm *Spirorbis spirorbis* or bryozoans. *Phyllophora crispa* is a cartilaginous seaweed and can, therefore, hold its shape out of water.

The habitat occurs as a discontinuous belt along the Crimean, Caucasian and southern Bulgarian (Strandja) coasts.

Indicators of quality:

- Abiotic – water clarity (low levels of eutrophication)
- Full vertical structure of macro algae (typically three layers of *Phyllophora crispa*, *Apoglossum ruscifolium* and *Gelidium spinosum*)
- Biomass up to 1.5-4 kg/m<sup>2</sup> (pre-eutrophication)
- Coverage (50–80% of *Phyllophora crispa*)
- Maximum depth 30 m

Characteristic species:

The main species of algae are *Phyllophora crispa*, *Apoglossum ruscifolium* and *Gelidium spinosum*, sometimes accompanied by *Zanardinia typus*, *Spermothamnion strictum*, *Sphacelaria cirrhosa*.

The habitat is home to a diverse and rich fauna typical of the hard substrate. The abundance of prey items attracts and maintains large populations of predators: the crab *Eriphia verrucosa*, scorpionfishes *Scorpaena porcus* and *S. notata*, the red gurnard *Chelidonichthys lucerna*, *Gaidropsarus mediterraneus* and *Chromis chromis*.

## Classification

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

EUNIS:

Level 4. Pontic infralittoral rock (A3)

Annex 1:

1170 Reefs

MAES:

Marine - Coastal

MSFD:

Shallow sublittoral rock and biogenic reef

EUSEaMap:

Shallow photic rock or biogenic reef

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?**

Yes

Regions

Black

Justification

While *Phyllophora crispa* as a species occurs in other European seas as well, the formation of extensive stands is unique to the Black Sea.

### **Geographic occurrence and trends**

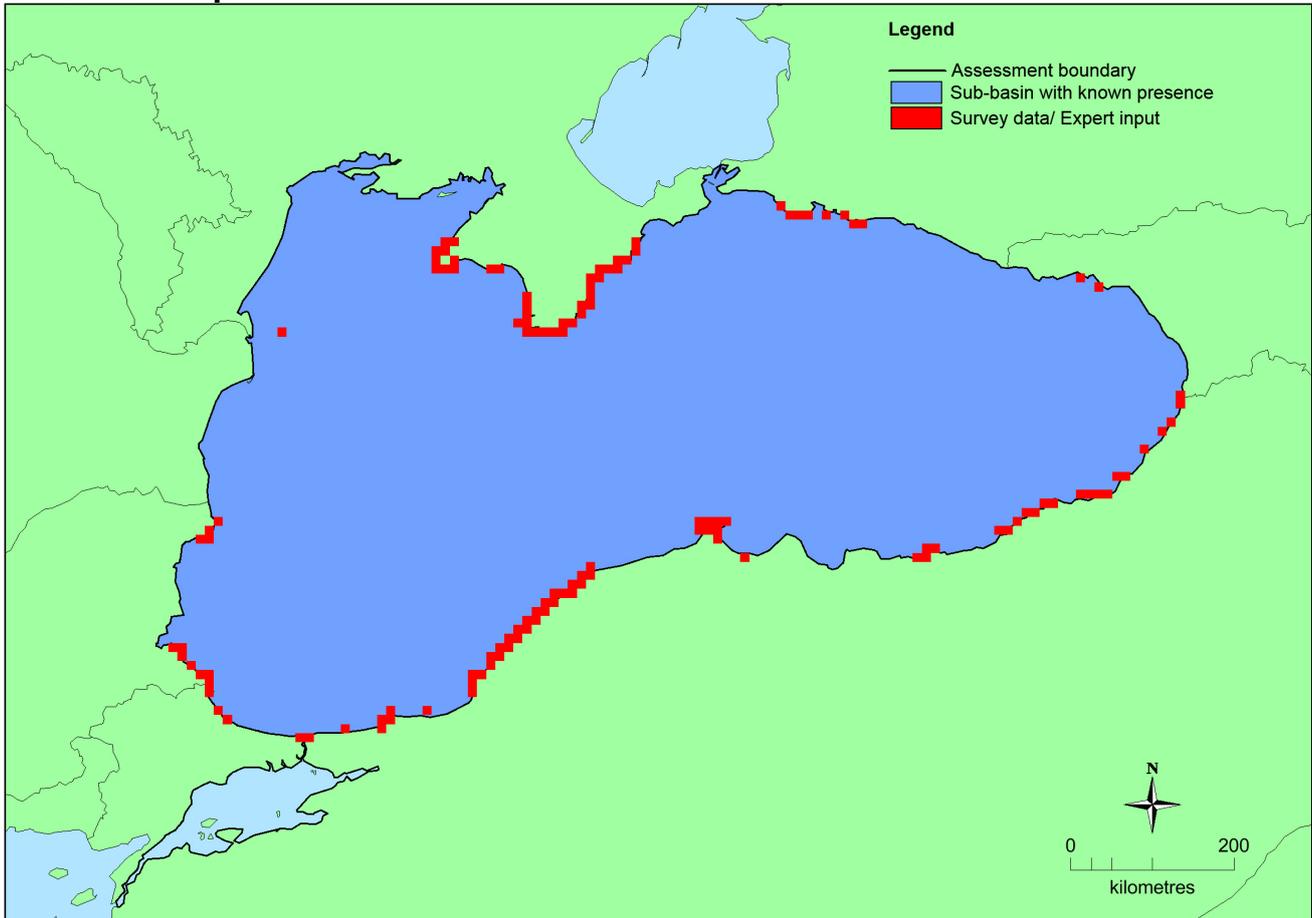
Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Black Sea</i>	Black Sea: Present	Unknown Km <sup>2</sup>	Decreasing	Decreasing

### **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>	7097 Km <sup>2</sup>	11	Unknown Km <sup>2</sup>	Area estimates are available at some localities (e.g. sites in Crimea and Russia) However, these are only a small proportion of the total area and cannot be used to estimate the total area.

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28+	445245 Km <sup>2</sup>	128	Unknown Km <sup>2</sup>	Area estimates are available at some localities (e.g. sites in Crimea and Russia) However, these are only a small proportion of the total area and cannot be used to estimate the total area.

### 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 9% of this habitat is estimated to be hosted by EU28 in the Black Sea.

### Trends in quantity

In the historic period (pre-1965) the habitat was widespread across the infralittoral zone in the Black Sea (except for Georgia). This is based on quantitative data. This includes lists of sites and site descriptions. This can be used to provide a reliable picture of the historic extent of the habitat.

In the recent past (1965 to present day) the quantity has declined due to eutrophication throughout the Black Sea. During the period up to the 1990s widespread and severe eutrophication occurred in Black Sea. This decline has been most severe in the west with a complete collapse in Romania. In Crimea between Cape Priboyny and Chernomorskaya Bay a decline of approximately 72% extent occurred. Between Okunivka settlement and Cape Tarhankut the decline was 76%. The best remaining localities are situated in Crimea, Strandja (BG) and the Caucasus's. This decline is well documented by the UNEP Biodiversity

series. Abiotic conditions have improved in more recent decades. This has halted the decline. The habitat is now believed to be stable in many localities. However due to the slow growth of *Phyllophora crispa* a recovery in extent has not been observed.

If current conditions remain it is likely that some recovery will be seen. Given time it is likely to recolonise areas where it was previously present. However, this will be a slow process due to the growth rate of *P. crispa*.

- Average current trend in quantity (extent)

EU 28: Stable

EU 28+: Stable

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

Yes

*Justification*

The habitat has a small range following regression in the EU 28 countries only. In the EU 28+ the EOO exceeds 50,000 km<sup>2</sup>. The habitat has undergone an important decline in the last 50 years. This is especially true in the western Black Sea (see Trends in Quantity). However, this decline has now halted and the extent of the habitat is stable.

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

No

*Justification*

The lower infralittoral rocks which the habitat prefers are present throughout the Black Sea.

## **Trends in quality**

In the historic period (pre-1965) the habitat quality is believed to have been stable. There is no quantitative or qualitative data from this period. This is based on one expert opinion.

In the recent past (1965 to present day) the habitat quality has declined. In 1971 the average biomass for the Black Sea was reported as 1.5-4 kg/m<sup>2</sup>. Post-1970 a decline was observed. The maximum depth reduced from 30 to 20 m in response to reduced light penetration as a result of eutrophication. The algal structure also changed. Sciaphilic algae declined and filamentous red and green algae developed. *Cladophora* sp. were recorded in Crimea and the Caucasus's. These were not present before 1970. Most notably the average biomass also decreased to 0.3-0.5 kg/m<sup>2</sup>. The morphology of *P. crispa* also altered during this period. The size of individual plants has reduced resulting in reduced cover for fish and faunal species. This has led to an overall reduction in biomass.

The quality of the habitat has now stabilised around Crimea and Bulgaria. This is especially true within MPAs.

In the future the habitat quality is expected to remain stable providing current environmental conditions remain stable. Recovery is also expected if the conditions remain stable for a sufficient period of time.

- Average current trend in quality

EU 28: Stable

EU 28+: Stable

## **Pressures and threats**

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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. The activity was prohibited in EU states but it has recently been legalized in

Romania and it is widespread, although illegal, in Bulgaria. In Turkey it is prohibited within 300 m of the shore. However, illegal trawling takes places. This is often conducted by Turkish fleets operating outside of their state waters.

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 disturbed bottom sediments.

## **List of pressures and threats**

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

Professional active fishing

### **Pollution**

Nutrient enrichment (N, P, organic matter)

### **Natural System modifications**

Siltation rate changes, dumping, depositing of dredged deposits

## **Conservation and management**

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The habitat is currently protected by MPAs in Bulgaria Crimea and Caucasus. In EU states eutrophication is now being managed by the Water Framework Directive (WFD). Key habitat forming species are now legally protected by the Ukraine and Black Sea Red Data Books.

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)

## **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

## **Conservation status**

Annex 1:

1170: MBL5 U1

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

Recovery of the habitat through direct intervention is not possible. The habitat can recover naturally over a long time period. This is due to the slow growth rate of *P. crispa*. This can only occur if the abiotic conditions are suitable and the disturbance pressures (e.g. trawling) are reduced. If trawling is prohibited

the habitat will recolonise deeper waters at a faster rate. This is due to reduced competition compared to shallow waters.

### Effort required

10 years
Unknown

## Red List Assessment

### Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	>80 %	unknown %	unknown %	unknown %
EU 28+	50-80 %	unknown %	unknown %	unknown %

In the EU 28 there has been a decline of >80% since 1965. This is based on the current knowledge of habitat extent and records from pre-1970. The records from pre-1970 are believed to accurately reflect the extent pre-1965.

In the EU 28+ there has been a decline in extent between 50 and 80% since 1965. This is based on the current knowledge of habitat extent and records from pre-1970. The records from pre-1970 are believed to accurately reflect the extent pre-1965.

### Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	E00	a	b	c	A00	a	b	c	
EU 28	7092 Km <sup>2</sup>	No	Unknown	No	11	No	Unknown	No	No
EU 28+	445245 Km <sup>2</sup>	No	Unknown	No	128	Unknown	No	No	No

The A00 and E00 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. In the EU the habitat exists at <5 locations. The threshold values for threatened categories are not met for the EU 28+.

### 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	%	Severe %	unknown %	unknown %	unknown %	unknown %
EU 28+	%	Severe %	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 and EU 28+ there has been a severe decline affecting >80% of the extent within the last 50 years. This severe decline is reflected in reduction in biomass, community structure, species composition, age structure and reduced flora and fauna (Milchakova 2003, 2011, 2005; Milchakova & Miranova 2011, 2012, 2014).

### 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	CR	DD	DD	DD	EN	EN	DD	CR	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	EN	DD	DD	DD	LC	LC	DD	CR	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
Critically Endangered	A1,C/D1	Critically Endangered	C/D1

### Confidence in the assessment

Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

### Assessors

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### Reviewers

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18/01/2016

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