A5.5w Seagrass meadows in Pontic lower infralittoral sands

Summary

The habitat is present throughout the Black Sea on areas of sandy and sandy-muddy bottoms in sheltered habitats with sufficient lighting. Six species of seagrass may be present in this habitat but *Zostera marina* is generally dominant. 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 transboundary pollution measures have been implemented and improved. This has led to a reduction in the pressure. Currently this habitat is present within marine researves around crimea. However prhibiting bait dredging is necessary to protect locations around Turkey. Measures to improve water quality are also needed to protect this habitat.

Synthesis

Due to this habitats restricted distribution and continued decline this habitat has been assessed as Endangered in the EU 28. Due to the overall slight decline in quality, this habtitat has been assessed as Vulnerable in the EU 28+. The threat is plausible based on losses caused in the recent past and plans to continue coastal development and protection works in both the EU 28 and the EU 28+.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	B1b, B2b	Vulnerable	C/D1

Sub-habitat types that may require further examination

None

Habitat Type

Code and name

A5.5w Seagrass meadows in Pontic lower infralittoral sands

Zostera noltei meadow with epiphytes in Mangalia, Romania (© Dragos Micu)

Zostera noltei meadow around Karadag, Russia.(© Nataliya Milchakova)

Habitat description

Seagrass beds are found on sandy and sandy-muddy bottoms in sheltered habitats with sufficient lighting. Maximum development is in the summer. The habitat occurs all around the Black Sea as small and fragmented meadows. Its distribution is well documented in Russia, Ukraine, Romania and Bulgaria, while for Turkey it is mostly unknown. Off the coast of Georgia sparse eelgrass meadows are known to occur at Cape Souk-Sou (after *Cystoseira* communities at a depth of 6-10 m), in the Gulf of Skurge at a depth of 4-6 m. This habitat contains communities in both the upper and lower infralittoral sands with different dominant eelgrass species:

The habitat occurs in the deeper infralittoral zone, most typically where the sediment is silty sand and in the 10 m depth range. The meadows are found in sea water with salinity varying between 11 and 19 psu. Six species of seagrass may be present in this habitat but *Zostera marina* is generally dominant. There are also algae living on the eelgrass blades, mostly red algae. Species diversity develops two peaks, one in spring and the other in autumn. Seasonal dynamics of the biomass and density are less pronounced due to the depth. The communities of *Z. marina* display greatest diversity in the Kerch Strait with its special hydrological and hydrochemical conditions.

Indicators of quality:

Leaf length, biomass, shoot density have all been identified has indicators of quality. However, thresholds have not been set and these can and will vary between countries.

Characteristic species:

Zostera marina is the dominant seagrass species. It may form pure stands or be found in association with *Zostera noltei*, *Cystoseira barbata* and *Gracilaria gracilis*. 115 macroalgal species have been recorded in this habitat type in the Black Sea. Typical genera are: *Ceramium, Cladophora, Kylinia, Laurencia, Melobesia* and *Polysiphonia,* green and red algae prevail.

Classification

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

EUNIS (v1405):

Level 4. A sub-habitat of 'Pontic Sublittoral macrophyte-dominated sediment' (A5.5)

Annex 1:

1110 Sandbanks slightly covered all the time

1160 Large shallow inlets and bays

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal

MSFD:

Shallow sublittoral sand

EUSeaMap:

Shallow sands

IUCN:

9.4 Subtidal sandy

9.9 Seagrass (submerged)

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

Yes

Regions

Justification

Sublittoral *Zostera noltei* beds are not typical for the other regional seas (NEA: only intertidal, Western Baltic Sea: in areas falling dry wind induced, Mediterranean)

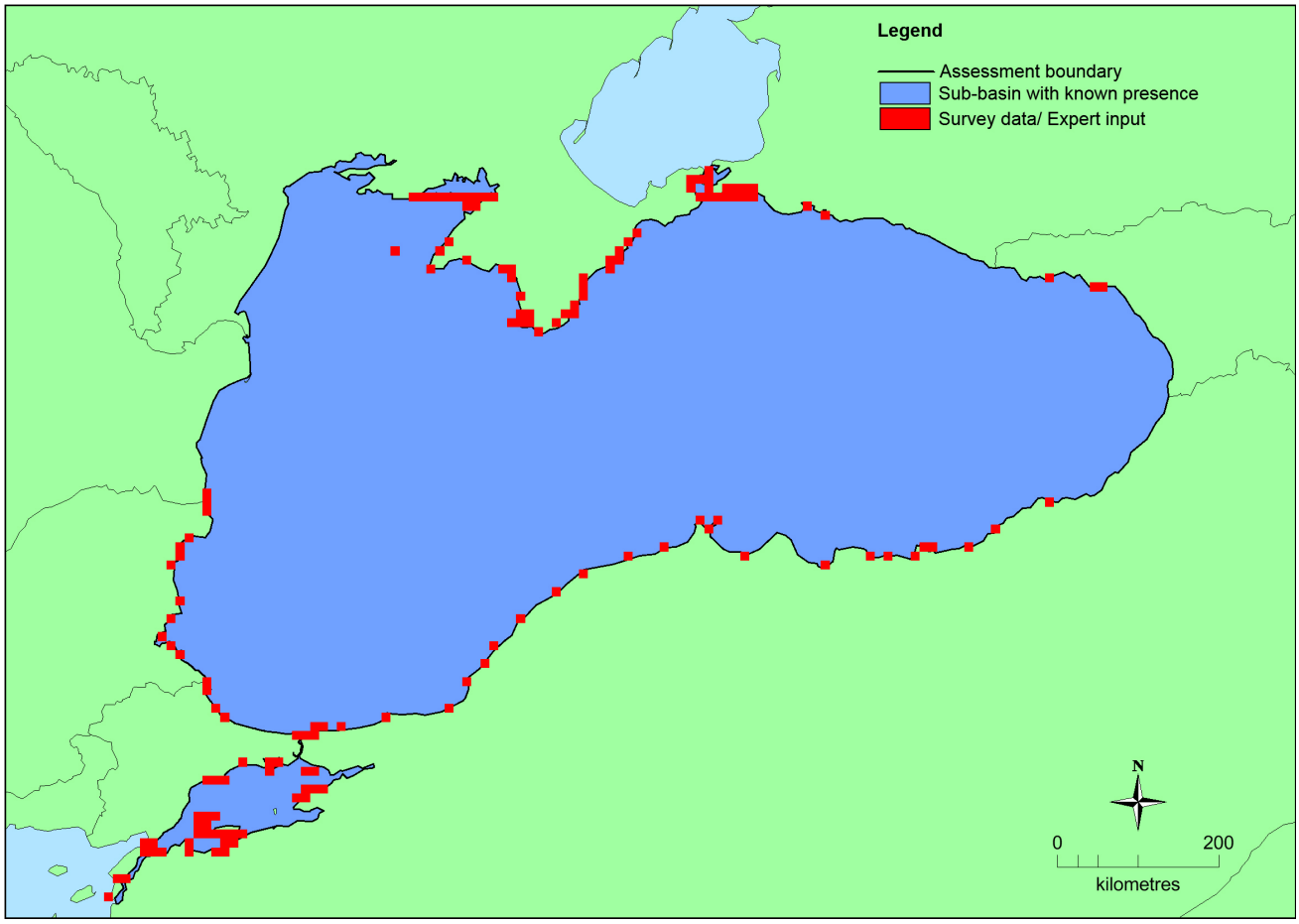
Geographic occurrence and trends

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 Sea of Marmara: Present	Unknown Km^2	Unknown	Unknown

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	9,155 Km^2	13	13,00 Km^2	EOO and AOO have been calculated on the available data.
EU 28+	524,135 Km^2	146	14,600 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 9% of this habitat is estimated to be hosted by EU 28 in the Black Sea.

Trends in quantity

In the historical period (pre-1960s) the habitat has generally decreased in quantity. This is due to wasting disease (caused by *Labyrinthula* sp.) effecting *Zostera marina*. This trend was recorded at a few locations in the Black Sea (e.g. Chernomorskaya Bay and Yarylgachskaya Bay). The trend has been extrapolated for the rest of the Black Sea based on the known impacts of the disease throughout Europe and America. Furthermore, at locations where the habitat has been studied in detail during the historic period it was noted to grow at shallower depths. At sites in the Russian Federation the depth of the habitat shifted from 11 to6 m between 1938 and 1965.

During the period up to the 1990s widespread and severe eutrophication occurred in the Black Sea. This was most notable in the western Black Sea. This caused a significant reduction in extent. In the 1980s around Romania, Bulgaria and the Kerch Strait this habitat was near collapse. In Romania the reduction in extent is estimated at 95%. At Tendrovsky Bay in Ukraine losses of between 70 and 80% have been recorded. A similar trend is also seen along the Sevastopol coast in Crimea where between 40 and 80% of the habitat has been lost. There has been recovery since 2000 but not in deeper areas due to a continued lack of water clarity caused by eutrophication. The quantity of the habitat is now increasing but is yet to reach previous levels. This recovery has not been experienced around Crimea, largely due to the continued development in the area. Coastal development (i.e. hydrotechnical works) have further contributed to these losses in Romania. This has led to a total loss of large areas of meadows in the Razim-Sinoe lagoons. Major losses of shallow meadows have also occurred along the coast due to coastal

protection and harbour building works.

Turkish data on this habitat is sparse. However, there are three bays with the habitat in western Turkey which have been well studied. In these locations the habitat has remained stable in extent since 1992. Little data exists on the extent of this habitat along Turkey's eastern coastline except Sinop area. However, it could be speculated that there has been a decline due to the development of a coastal road in the area. There is no data on the effect of eutrophication in this area.

As a whole there has been an increase in biomass of *Zostera noltei*. The species has now begun to expand into areas previously occupied by *Zostera marina*. This is probably because *Z. marina* has a lower recoverability like in other regional seas

Losses of extent due to eutrophication have been more pronounced in the west close to the source of the pollution. Since this pressure has begun to ease stability and slow recovery has been seen. Whilst losses of extent due to eutrophication have occurred in the eastern Black Sea this was less severe. Coastal development continues to put pressure on this habitat across the entire Black Sea. This has been particularly noted at certain sites in Crimea which have experienced large losses due to dredging activities (e.g. Sevastopol coast and Balaklava Bay).

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  -
  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 and the extent of the habitat is now stable.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  Yes
  Justification
  As the habitat requires sandy, sheltered waters. These conditions have a limited distribution and cannot evolve naturally.

Trends in quality

In the historic period (pre-1960s) the habitat has decreased in quality. This is due to wasting disease (caused by *Labyrinthula* sp.) effecting *Zostera marina*. This trend was recorded at a few locations in the Black Sea (e.g. Chernomorskaya Bay and Yarylgachskaya Bay). The trend has been extrapolated for the rest of the Black Sea based on the known impacts of the disease throughout Europe and America.

In the last 50 years (1965 to present day) the quality has decreased in Romania and Bulgaria. This has been witnessed since 1980s due to the effects of eutrophication. The decline in quality has been experienced in parallel with the decline in quantity. The reduction in quality has been defined by: meadow fragmentation, reduced depth distribution, reduced cover and leaf length, reduced diversity of associated communities, anthropogenic substrate degradation. In Ukraine and Crimea there is a general trend of decline and recovery. For instance, data from Tendrovsky Bay has seen biomass decrease from 3,728 to 456.5 g/m^2 between 1973 and 1990. Where more recent data is available (e.g. Sevastopol coast) biomass has increased between 1984 and 2008. It has now recovered to levels seen in 1972. There is no quality data available from Turkey.

In the last 10 years it has been recorded that *Z. marina* is no longer producing seeds and only expanding due to vegetative growth. This reliance on vegetative, clonal growth can be considered as a decrease in

quality as it is more susceptible to fungal diseases. *Z. noltei* has seen the opposite occur, with less vegetative growth, but more reproductive growth. Due to *Z. noltei*'s smaller leaf size compared to *Z. marina* the overall biomass in the Black Sea is decreasing. Species, which prefer habitats with *Z. marina* compared to *Z. noltei* have been observed as declining. Whilst the overall biomass has decreased as a whole in the Black Sea, biomass has increased in the Kerch Strait and Kartinitski Bay.

- 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).

Coastal development is a threat of current and future importance. This can lead to habitat destruction and siltation. Seagrasses are not tolerant to smothering by mud or other sediments. This is a threat in all parts of the Black Sea. In Romania, Bulgaria, Crimea and the Caucasus intensive hotel development and the creation of artificial beaches are a threat to the underlying substrate. In Turkey proposed road developments also threaten the substrate.

Seagrass rhizomes are sensitive. The leaves can easily be damaged by motor boats and boat moorings. Meadows in shallow waters are also at risk of disturbance due to bait digging and trampling.

List of pressures and threats

Urbanisation, residential and commercial development

Other urbanisation, industrial and similar activities

Human intrusions and disturbances

Other human intrusions and disturbances
Trampling, overuse

Pollution

Nutrient enrichment (N, P, organic matter)

Conservation and management

The habitat is a characteristic feature of several habitat types listed in Annex 1 of the Habitats Directive like 1130 Estuaries or 1160 Large shallow inlets and bays. Areas of this habitat in Romania and Bulgaria all occur in Natura 2000 protected areas. Around the Crimean region all seagrass meadows are included in a local Red List. Many meadows are present in marine reserves. Turkey has limited bait dredging to >30 m. Collection of *Z. noltei* is banned. Additional actions needed: Prohibit bait dredging over the entire Black Sea; Improve enforcement of MPAs; explore habitat restoration (i.e. translocation of sea grasses. This has yet to be tested in the Black Sea), improve water quality.

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 urban areas, industry, energy and transport

Other measures

Conservation status

Annex 1:

1110: MBLS U1

1160: MBLS U1

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

If only quality degradation occurs then it is possible to recover naturally within 50 years if pollution pressures are removed. In case of strong habitat fragmentation or loss of whole meadows recovery may take much longer or even never occur.

Effort required

50+ years
Naturally

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 %

There is insufficient data on changes in quantity of this habitat to undertake an assessment using criterion A.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	9,155 Km^2	No	Yes	No	13	No	Yes	No	No
EU 28+	>50,000 Km^2	No	Unknown	No	146	No	Unknown	No	No

The AOO and EOO are intrinsically small for the EU states. Declines in spatial extent, abiotic and biotic quality have halted. A decline in extent is likely to be caused in the next 20 years due to coastal development. This is based on expert opinion. This habitat is therefore assessed as being Endangered

using criteria B1b and B2b in 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	>80 %	slight %	unknown %	unknown %	unknown %	unknown %
EU 28+	>80 %	slight %	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 a slight decline affecting >80% 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 mostly based on expert opinion. Quantitative data is only available for sites in Romania, Bulgaria, Ukraine, Crimea and Russia. The results have been extrapolated and combined with expert opinion.

In the EU 28+ there has been a slight decline affecting >80%. This has affected both biotic and abiotic factors. It is not possible to decouple these. This is mostly based on expert opinion. Quantitative data is only available for sites in Ukraine, Crimea and Russia. The results have been extrapolated.

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	DD	DD	DD	DD	EN	EN	DD	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	DD	DD	DD	DD	DD	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
Endangered	B1b, B2b	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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