A5.53 Seagrass beds on Atlantic infralittoral sand (Macaronesian)

Summary

This habitat comprises beds of submerged marine angiosperms in the genera *Cymodocea, Halophila, Ruppia, Thalassia* and *Zostera* occuring on the more sheltered, eastern and southern coasts of the southern islands (Madeira and Canary Islands) in Macaronesia. Marine seagrass meadows are very important in providing several ecological services, such as primary production, habitats, nurseries and coastal protection. Primary productivity may vary, depending on many factors such as the density of the meadow, geographic area or hydrologic factors. These ecosystems are one of the most important habitats for several marine organisms, which depend on them in different phases of their life cycle, not only to feed but also to take shelter from predators.

Coastal development including port developments, and waste disposal, particularly sewage discharges are the main pressures on this habitat. In the case of *C.nodosa*. The causes of epiphytic growth of *Lyngbya* sp over *C. nodosa* communities are not still clear. The blooms of this cyanobacteria are ephemeral and probably related to a mix of natural and anthropogenic origins. Regulation of activities (such as coastal development, dredging, waste disposal) and zoning of aquaculture facilities away from this habitat are useful management measures for this habitat. In some cases they may be introduced within protected areas.

Synthesis

This habitat does not have a restricted geographical distribution but it has suffered declines in both quantity and quality over the last 50 years. The dense meadows of *C.nodosa* in the bay of Machico last recorded in 2000, are now absent with *C.nodosa* currently only present in a few areas on the south coast of Madeira covering a total area less than 1km^2. Subtidal *Zostera* beds have always had a very restricted occurrence in the Canarian Archipelago with just three small patches in a single harbour in Lanzarote. They did occur in Grand Canaria in the 1970s but this is no longer the case. There has also been an overall decline in quality of this habitat as indicated by four metrics of the seagrass; shoot density, biomass, leaf length and coverage.

Expert opinion is that over the last 50 years the decline in quantity is estimated to have been over 30% and that the decline in quality has been substantial with a severe decline affecting more than 30% of the extent of this habitat. The Red List assessment is therefore that this is a Vulnerable habitat for both the EU 28 and EU 28+.

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

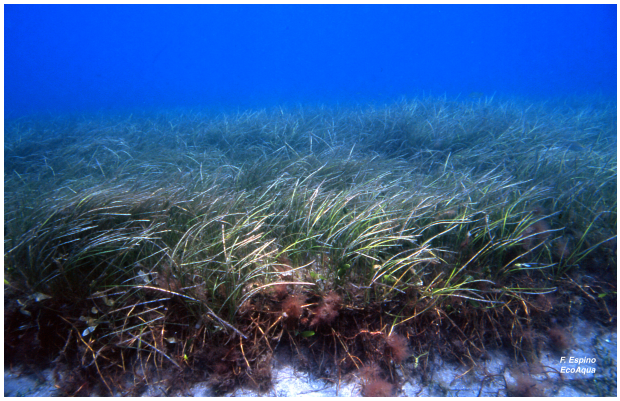
Sub-habitat types that may require further examination

Zostera beds are in more serious condition and therefore would benefit from separate and further examination.

Habitat Type

Code and name

A5.53 Seagrass beds on Atlantic infralittoral sand (Macaronesian)



Zostera marina bed in shallow sublittoral waters. Canary Islands, Spain (© F.Espino, EcoAqua).

Habitat description

This habitat consists of beds of submerged marine angiosperms in the genera *Cymodocea, Halophila, Ruppia, Thalassia* and *Zostera* in the southern islands of Macaronesia (it does not occur in the Azores). Seagrass beds are present mainly off the sheltered eastern coasts of the Canary Islands (Spain), on the wide subtidal platforms with sandy substrata and gently sloping coastlines which are sheltered from the Trade Winds. They may occur in patches or form extensive meadows reaching depths of over 30m where light levels are sufficient to support growth. *C. nodosa* has also been reported in scattered locations along the southern coast of Madeira Island (Portugal). In the Canary Islands, *C.nodosa* can be found forming unispecific meadows, but also mixed with *Halophila decipiens* on muddy bottoms or with the green macroalga *Caulerpa prolifera* on sandy bottoms.

Marine seagrass meadows are very important in providing several ecological services, such as primary production, habitats, nurseries and coastal protection. Primary productivity may vary, depending on many factors such as the density of the meadow, geographic area or hydrologic factors. These ecosystems are one of the most important habitats for several marine organisms, which depend on them in different phases of their life cycle, not only to feed but also to take shelter from predators.

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. Total area covered, density of the intertidal beds and species composition is, for example, used as a Water Framework Directive parameter for assessing ecological status.

The overall quality and continued occurrence of this habitat is dependent on the presence of seagrass species which create the biogenic structural complexity on which the characteristic associated species depend. The density and the maintenance of a viable population of seagrass is therefore a key indicator of habitat quality, together with the visual evidence of presence or absence of physical damage. Shoot density and leaf length have both been examined as potential indicators of quality of this habitat.

Characteristic species:

C.nodosa, and *H. decipiens* are the most common seagrass species. *Zostera marina* is present and *Z. noltei* occurs but is rare and intertidal.

Classification

EUNIS (2004):

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

Annex 1:

1110 Sandbanks which are slightly covered by seawater all the time

1160 Large shallow inlets and bays

MAES:

Marine - Marine inlets and transitional waters

Marine – Coastal

MSFD:

Shallow sublittoral coarse sediment

Shallow sublittoral sand

Shallow sublittoral mixed sediment

EUSeaMap:

Shallow sands

Shallow coarse or mixed sediments

IUCN:

9.9 Seagrass submerged

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

No

Justification

This is a relatively rare habitat in Macaronesia. It is not present in the Azores, and is present as small patches in Madeira. All other records are from the Canary Islands.

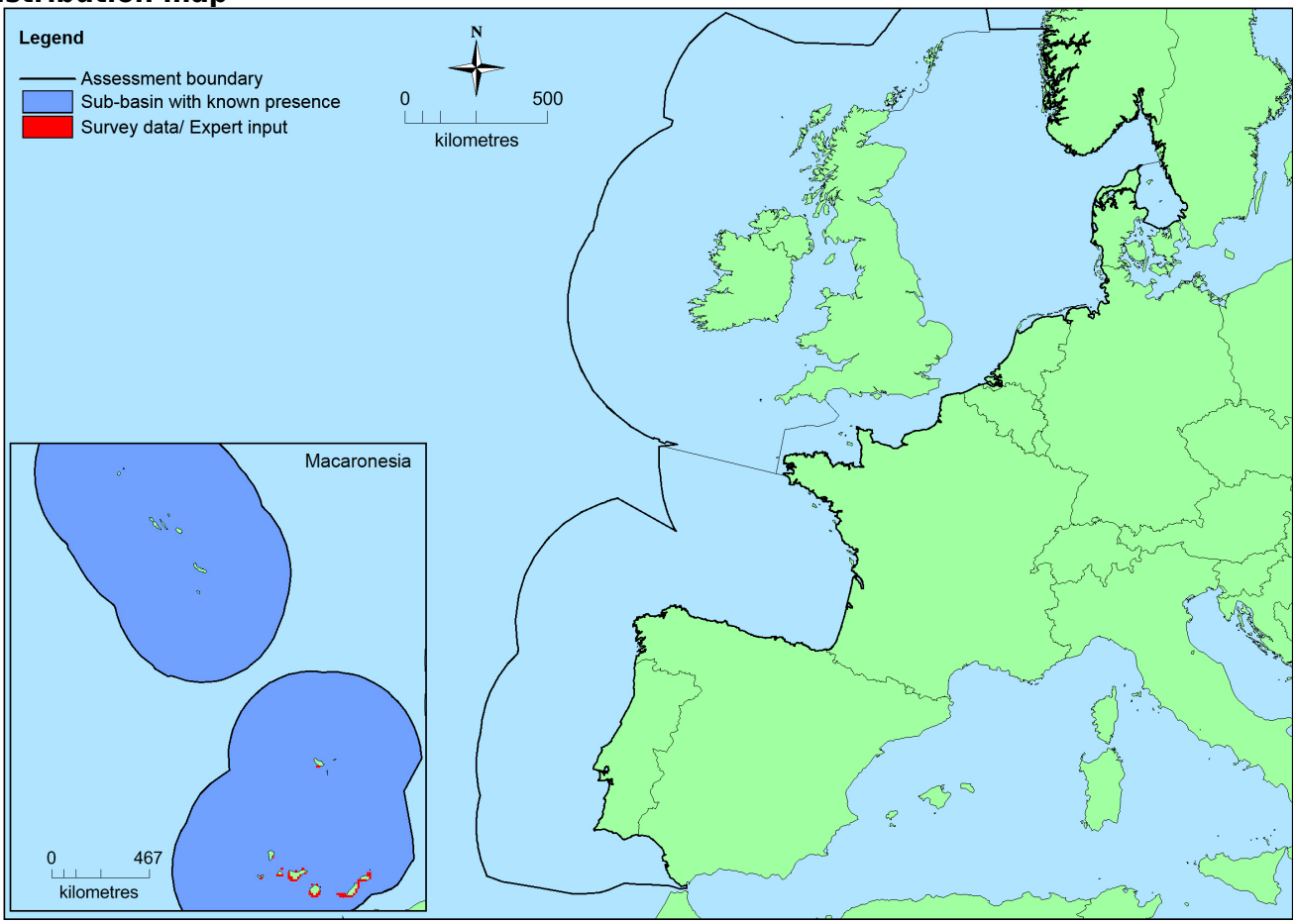
Geographic occurrence and trends

Region	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
North-East Atlantic	Macaronesia: 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	153,446 Km^2	59	unknown Km^2	EOO and AOO have been calculated on the available data. Although this data set is known to be incomplete the figures exceed the thresholds for threatened status.
EU 28+	153,446 Km^2	59	unknown Km^2	EOO and AOO have been calculated on the available data. Although this data set is known to be incomplete the figures exceed the thresholds for threatened status.

Distribution map



There are insufficient data to provide a comprehensive and accurate map of the distribution of this habitat. This map has been generated using EMODnet data from modelled/surveyed records for the North East Atlantic (and supplemented with expert opinion where applicable) (EMODnet 2010). EOO and AOO have been calculated on the available data presented in this map however these should be treated with caution as expert opinion is that this is not the full distribution of the habitat.

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

100% as this is defined as a Macaronesian habitat although similar habitats occur elsewhere e.g. *Cymodosa* meadows in scattered locations in the North Atlantic from southern Portugal and Spain to Senegal, and *Zostera marina* beds in northern Europe.

Trends in quantity

A compliation of all published data including three structural descriptors (seagrass shoot density, cover

and leaf length of *C.nodosa)* at any place in the Canary Islands between 1991 and 2013 covered a total of 87 meadows at 6 islands of the Canarian Archipelago. Coverage was estimated as the percentage of the area in which the presence of *C.nodosa* was detected typically through 25 or 50m long transects. Over this time period there were no significant temporal patterns at El Hierro and Gomera, and decreases in coverage at Lanzarote, Fuerteventura, Gran Canaria and Tenerife.

At the present time *C.nodosa* beds are present in a few areas on the south coast of Madeira (covering a total area less than 1km^2). The dense meadows in the bay of Machico, recorded in 2000 have disappeared but there is still a bed in the bay of Cais do Carvao. Subtidal *Zostera* beds have always had a very restricted occurrence in the Canarian Archipelago with just three small patches in a single harbour in Lanzarote. They were present in Grand Canaria in the 1970's but this is no longer the case.

- Average current trend in quantity (extent)
  EU 28: Decreasing
  EU 28+: Decreasing
- Does the habitat type have a small natural range following regression?
  No
  Justification
  There has been a significant decline in range of this habitat during the last 50 years but the EOO still exceeds 50,000km^2.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  There has been a significant decline in range of this habitat during the last 50 years however the EOO still exceeds 50,000km^2

Trends in quality

There has been an overall decline in quality of this habitat as indicated by four metrics (shoot density, biomass, leaf length and coverage) in a study of changes in the demographic structure of *C.nodosa* seagrass meadows in the Canary Islands over the last 23 years. The dense meadows of *C.nodosa* in Machico Bay, Madeira have disappeared since 2000. The *H.decipiens* beds in Tenerife showed an initial increase in leaf length in the vicinity of fish cages but then a rapid decrease.

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

Pressures and threats

Coastal development including port developments, and waste disposal, particularly sewage discharges are the main pressures on this habitat. In the case of *C.nodosa t*he causes of epiphytic growth of *Lyngbya* sp over *C. nodosa* communities are not still clear. The blooms of this cyanobacteria are ephemeral and probably related to a mix of natural and anthropogenic origins.

List of pressures and threats

Transportation and service corridors

Shipping lanes, ports, marine constructions

Biological resource use other than agriculture & forestry

Marine and Freshwater Aquaculture

Pollution

Pollution to surface waters (limnic, terrestrial, marine & brackish)
Nutrient enrichment (N, P, organic matter)

Natural System modifications

Human induced changes in hydraulic conditions
Removal of sediments (mud...)

Conservation and management

Regulation of activities (such as coastal development, dredging, waste disposal) and zoning to ensure that aquaculture facilities are located away from this habitat are useful management measures.

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality
Restoring/Improving the hydrological regime

Measures related to marine habitats

Restoring marine habitats

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

Measures related to urban areas, industry, energy and transport

Urban and industrial waste management

Conservation status

Annex 1:

1110: MMAC U1

1160: MMAC FV

Cymodocea meadows and *Zostera* beds are an OSPAR threatened/declining habitat type

Cymodocea was previously protected under regional regulation in the Canary Islands but this is no longer the case.

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

Recovery can occur if conditions are suitable but will depend on depth, substratum and the scale of the damage. If damage is minor natural recovery may be possible but if there is more extensive damage or loss, intervention may be needed. A small scale pilot project to transplant healthy *C.nodosa* affected by port expansion in Fuerteventura was considered unsuccessful and recent work suggests that there may be a critical mass of transplants needed for recovery and that proxmity of the area selected for transplantation to donor beds is also beneficial.

Effort required

10 years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

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

A compliation of all published data including three structural descriptors (seagrass shoot density, cover and leaf length of *C.nodosa)* at any place in the Canary Islands between 1991 and 2013 covered a total of 87 meadows at 6 islands of the Canarian Archipelago. Over this time period there were no significant temporal patterns at El Hierro and Gomera, and decreases in coverage at Lanzarote, Fuerteventura, Gran Canaria and Tenerife.

Expert opinion is that there has been an overall decline in quantity of this habitat of more than 30% in the last 50 years although declines in the last 20 years have been more severe (greater than 50%). This habitat has therefore been assessed as Vulnerable under Criterion A1.

Criterion B: Restricted geographic distribution

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

There have been and are likely to be future declines in the quantity and quality of this habitat however as EOO >50,000 km^2 and AOO >50, this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. 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 criterion B.

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	30 %	substantial %	unknown %	unknown %	unknown %	unknown %
EU 28+	30 %	substantial %	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%

There has been an overall decline in quality of this habitat as indicated by four metrics (shoot density, biomass, leaf length and coverage) in a study of changes in the demographic structure of *C.nodosa* seagrass meadows in the Canary Islands over the last 23 years. Expert opinion is that there has been a substantial reduction in quality of this habitat over the last 50 years (severe decline affecting more than 30% of the 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

A risk of collapse does exist however this has not been quantified.

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	VU	DD	DD	DD	LC	LC	LC	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	VU	DD	DD	DD	LC	LC	LC	VU	DD	DD	DD	DD	LC	DD	DD	DD	DD

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

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

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