# A5.6w Mediterranean infralittoral oyster beds

## Summary

Infralittoral oyster beds on rocky and soft bottoms comprised mainly by the European flat oyster *Ostrea edulis* with densities of 5 or more per m$^2$. The oysters cement themself to the substratum and can form a dense cover. They may be found as individuals or clusters attached to rock surfaces, on other shelled animals. This habitat has been affected harvesting as well as by reduced water quality and eutrophication as discharges from the agriculture plains flow in the sea.  Intensive fish farming and the introduction of non-native oysters for cultivation and along with viruses and bacteria that threaten the native oyster are other threats. Cimate change is a future pressure on this habitat.

The remaining natural beds are very few, scattered through the European Mediterranean countries. Whenever these are exploited, this has to be regulated through intervention measures (changes in the extent and amount of the extracted oysters per year or bans on extraction for a long period). Detailed mapping of the extent of the natural mussel beds is lacking and should be a priority for the countries that host this habitat. Also study of the structure and biotic/abiotic characteristics and the identification of the factors that drive the reduction of the natural beds, their extent and biotic/abiotic characteristics will be beneficial.

## Synthesis

This habitat has a widespread distribution in the Mediterranean but is thought to only be present in the EU 28. There is a lack of quantifiable date on trends in the extent and quality of this habitat however it is known to have declined very significantly since the last century. Although there are significant data deficiencies, expert opinion is that this habtiat should be assessed as Endangered for both the EU 28 and EU 28+ on the basis of historical decline.

| Overall Category & Criteria | | | |
|---|---|---|---|
| EU 28 | | EU 28+ | |
| Red List Category | Red List Criteria | Red List Category | Red List Criteria |
| Endangered | A3 | Endangered | A3 |

## Sub-habitat types that may require further examination

None.

## Habitat Type

### Code and name

A5.6w Mediterranean infralittoral oyster beds

Infralittoral oyster beds. South Evoikos, Greece (© D.Pousanidis).


Infralittoral oyster beds. South Evoikos, Greece. (© D.Pousanidis).

## Habitat description

Infralittoral oyster beds on rocky and soft bottoms comprised mainly by the European flat oyster *Ostrea edulis* with densities of 5 or more per m$^2$. The oysters cement themself to the substratum and can form a dense cover. They may be found as individuals or clusters attached to rock surfaces, on other shelled animals like the endemic noble shell (*Pinna nobilis*) or on coarse sandy bottoms. The diet of oysters consists of phytoplankton and detritus filtered from the surrounding water. More frequently they can be found close to river mouth areas or estuaries and sheltered bays. There are three distinct habitat components; the interstices within the oyster matrix; the biodeposits beneath the bed; and the substratum afforded by the oyster shells themselves. A diverse range of epibiota and infauna often exists in these parts of the habitat.

Indicators of quality:

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

There are no known commonly agreed indicators of quality for this habitat, although particular parameters may be set in certain situations, e.g. protected features with Natura 2000 sites, where reference values may have been determined and applied on a location-specific basis. Presence and abundance of the oyster will be a key indicator of this habitat.

Characteristic species:

Dense aggregations of the European oyster and/or the Pacific oyster. The oysters are often encrusted with barnacles and/or bryozoans. Gastropod molluscs such as species of the families Muricidae (e.g the European oyster driller *Ocenebra erinaceus*, the rock-shell *Stramonita haemastoma* ) feed on oysters by drilling them and digesting the oyster flesh. Bryozoans, polychaetes of several genera, and copepods also live in the assemblage. Due to the intensive introduction of non-native oyster species *Crassostrea gigas* for cultivation in the Mediterranean, several invasive species have been introduced.

## Classification

EUNIS (v1405).

Level 4.  A sub-habitat of Infralittoral Biogenic Reefs (A5.6).


Annex 1:

1170 Reefs

MAES:

Marine - Marine inlets and transitional waters

Marine - Coastal


MSFD:

Shallow sublittoral rock and biogenic reef


EUSeaMap:

Shallow photic rock or biogenic reef.


IUCN:

9.4 Subtidal sandy

9.5 Subtidal sandy-mud

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

<u>Justification</u>
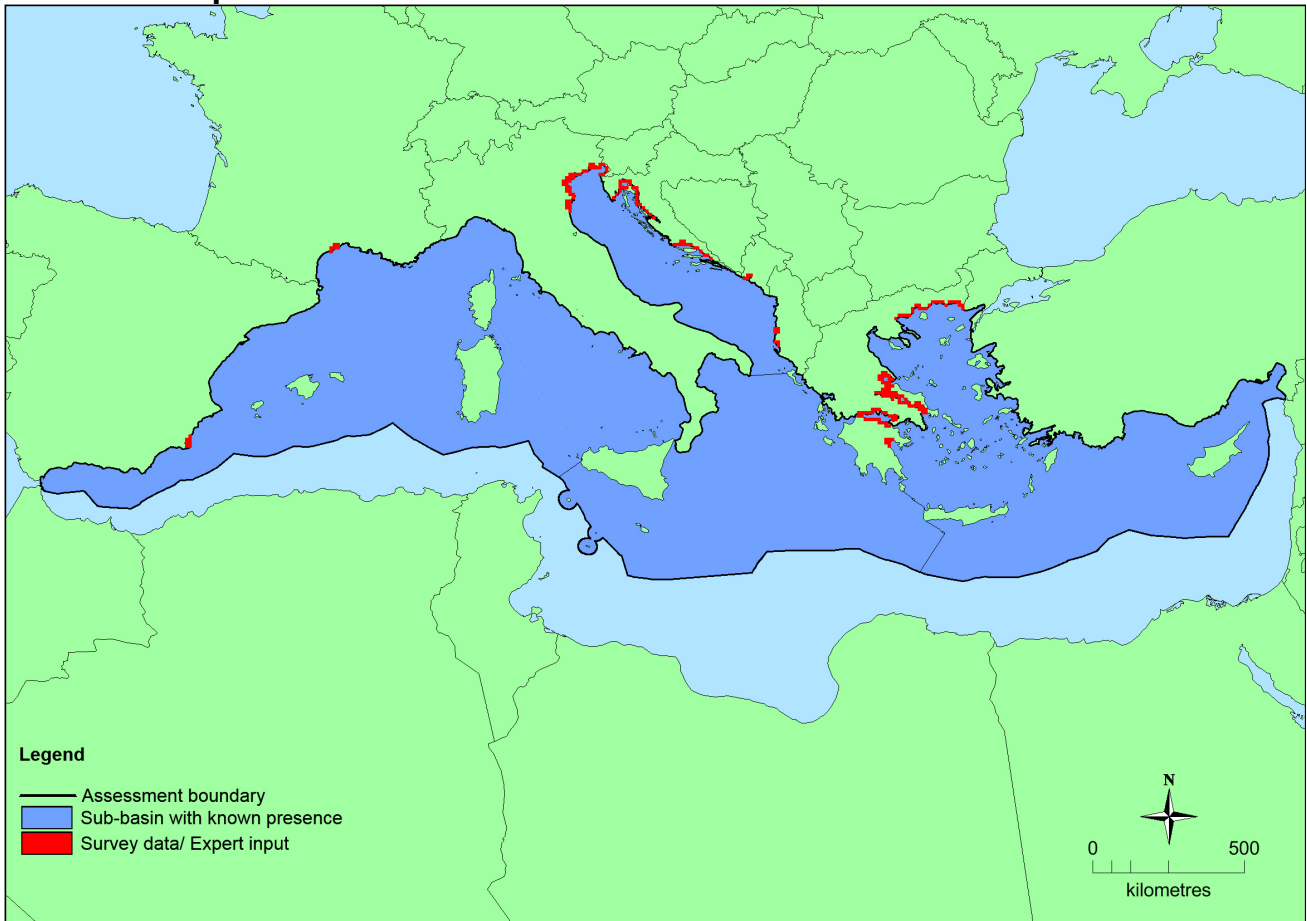This is a rare habitat in the Mediterranean.

## 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) |
|---|---|---|---|---|
| *Mediterranean Sea* | Adriatic Sea: Present Aegian-Levantine Sea: Present Ionian Sea and the Central Mediterranean Sea: Present Western Mediterranean 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* | 1,411,607 Km$^2$ | 212 | 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+* | 1,411,607 Km$^2$ | 212 | 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



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?

Most but not all of the known location of this habtiat are hosted by the EU 28 counties in the Mediterranean.

## Trends in quantity

There is limited quantified information on the historical extent of this habitat. but they are known to have covered a large part of the coastal zone, especially near river mouths, closed bays and other suitable areas in previous centuries. The intensive exploitation of the oyster beds along with the cultivation and the introduction of non-native species for cultivation have resulted in a dramatic decline in the extent of this habitat - in some cases leading to the extinction of natural beds.

There is an ongoing decline due to the intensive exploitation, the introduction of non-native oysters for cultivation and along with these the introduction of non-native species that threaten the native oyster (virus, bacteria, hunters).

- 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*
  This habitat does not have a small natural range as the EOO exceeds 50,000 km$^2$.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?

No
*Justification*
This habitat does not have a small natural range as the EOO exceeds 50,000 km$^2$ .

## Trends in quality

The quality of this habitat has declined over past centuries. More recently  the introduction of non-native oysters for cultivation has had both direct and indirect effects (competion and the introduction of virusus and bacteria on the quality of oyster beds.

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

## Pressures and threats

This habitat has been affected harvesting as well as by intensive agriculture and its practises which have resulted in reduced water quality and eutrophication as discharges from the agriculture plains flow in the sea.  Intensive fish farming can lead to degradation and loss of oyster beds due to the heavy loads of organics from waste food and faecal matter. Low oxygen concentration and bacterial mats are additional pressures in these situations. The introduction of non-native oysters for cultivation and along with these the introduction of non-native species that threaten the native oyster (virus, bacteria, hunters) and in the future climate change is a pressure on this habitat.

### List of pressures and threats

**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

**Invasive, other problematic species and genes**

Invasive non-native species

**Climate change**

Changes in abiotic conditions
Changes in biotic conditions

## Conservation and management

The remaining natural beds are very few, scattered through the European Mediterranean countries. Whenever these are exploited, this has to be regulated through intervention measures (changes in the extent and amount of the extracted oysters per year or bans on extraction for a long period). Detailed mapping of the extent of the natural mussel beds is lacking and should be a priority for the countries that host this habitat.

### 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

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

#### Measures related to special resouce use

Regulating/Managing exploitation of natural resources on sea

## Conservation status

Annex 1:

1170: MMED XX

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

Recovery times from over exploitation and other causes of damage have been estimated to take up to 20 years.

## Effort required

| 20 years |
| --- |
| Naturally and through intervention |

## Red List Assessment

### Criterion A: Reduction in quantity

| Criterion A | A1 | A2a | A2b | A3 |
| --- | --- | --- | --- | --- |
| EU 28 | unknown % | unknown % | unknown % | >70 % |
| EU 28+ | unknown % | unknown % | unknown % | >70 % |

The intensive exploitation of the oyster beds along with the cultivation and the introduction of non-native species for cultivation have resulted in a dramatic historical decline in the extent of this habitat - in some cases leading to the extinction of natural beds. There is an ongoing decline however the extent of this cannot be quantified. This habitat has therefore been assessed as Data Deficient under criteria A1 and A2. Expert opinion is that the historical reductions are likely to have exceeded 70% therefore this habitat has been assessed as Endangered under criteria A3.

### 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 |

This habitat has a large natural range in the Mediterranean. The precise extent is unknown however as

EOO >50,000km$^2$ and AOO > 50 this exceeds the thresholds for a threatened category on the basis of restricted geographic distribution. There have been historical declines in the quanity and quality of this habitat and this is considered likely to continue. 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 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 | unknown % | unknown % | unknown % | unknown % | unknown % | unknown % |
| EU 28+ | unknown % | unknown % | 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 known to have declined in quality over historical time periods. Such trends are likely to continue as the pressures remain however the extent cannot be quantified. This habitat is therefore assessed as Data Deficient under criteria C/D.

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

| Criterion E | Probability of collapse |
|---|---|
| EU 28 | unknown |
| EU 28+ | unknown |

No quantitative analysis has been carried out to assess the risk of ecosystem collapse for this habitat. It is therefore 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 | EN | LC | LC | LC | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD |
| EU28+ | DD | DD | DD | EN | LC | LC | LC | DD | 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 | A3 | Endangered | A3 |

## Confidence in the assessment

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

## Assessors

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## Contributors

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## Reviewers

N.Dankers.

## Date of assessment

08/01/2016

## Date of review

25/01/2016

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