

C1.2a Oligotrophic to mesotrophic waterbody with Characeae

Summary

This habitat includes permanent, oligotrophic to mesotrophic, calcium-rich waters with charophytes, mainly found in the north-western Atlantic and subatlantic regions and in central Europe. The vegetation comprises pioneer and early successional stands of the charophytes, often monospecific, developing on bare sandy substrates subject to turbulent wave action and periodic emergence. Eutrophication from agriculture and forestry and hydrological changes are the main pressures, with climate change in the future. Restoration measures include the elimination of external nutrient inputs, hydrological measures and management of fish populations.

Synthesis

This habitat reaches the qualification of Vulnerable, because of its reduction in quantity over the last 50 years and before, and for the high percentage of the habitat moderately affected by biotic and abiotic reduction. For this assessment data from Poland were not available. As Polish lakes form an important part of this habitat in Europe, the assessment is not complete. The assessment for EU 28+ was only slightly different from the assessment for EU 28 as only data from a few countries could be added.

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

For this habitat, no subtypes need to be considered in the assessment.

Habitat Type

Code and name

C1.2a Oligotrophic to mesotrophic waterbody with Characeae



Submerged vegetation dominated by *Characeae*, Plićvice Lakes, Croatia (Photo: Flavia Landucci).



Lake with *Characeae* in Finland (Photo: Hekki Toivonen).

Habitat description

Water bodies belonging to this habitat are characterized by the occurrence of stonewort beds (*Characeae*

family, so-called *Chara*-lakes). The waters are most often permanent, clear sometimes humic (brown) freshwater lakes and can be either mesotrophic or oligotrophic, either deep or shallow. The sediments are generally mineral (sand or clay) or lightly organic. The alliances *Charion vulgaris* and *Nitellion syncarpo-tenuissimae* are representative of more basic and nutrient rich (sometimes even eutrophic) waters. The waters are mostly rich in calcium (Ca > 20 mg/L) and are circumneutral to alkaline, moderately to highly buffered. The alliance *Nitellion flexilis* may occur in acid waters. In some cases this habitat type may be in contact with the habitat C1.2b (Mesotrophic to eutrophic waters with floating and/or submerged angiosperms). In Eastern Europe, *Lychnothamnus barbatus* may occur in this habitat; it is a rare species having its northern distribution in Poland and Lithuania.

Charophytes communities are usually poor in species diversity and are often represented by monospecific or very species-poor stands where one species is dominating. The stands may form an open or continuous and closed vegetation bed. The habitat includes pioneer vegetation types or vegetation types in an early successional stage. The habitat conditions that favour the development of Stonewart vegetation include: bare sandy or clayish substrate (e.g. after periodically dredging), relatively high influence of wind that contribute to maintain the lake surface without vegetation, dynamic water levels and periodical emergence of parts of the water body, high light conditions in early spring.

Temporary waters are included as far as related to *Charion vulgaris* vegetation type. It also includes calcium-rich marl and calcium supersaturated lakes, instead *Chara*-dominated communities of brackish waters belong to the *Charion canescentis* alliance and those are included in C1.5 (Permanent inland saline and brackish waters).

Aquatic vascular plants can accompany the *Chara* species, however stonewarts are largely dominating this habitat type.

Indicators of good quality:

- Large stands of *Chara* species
- Absence or very low abundance of plant species characteristic of eutrophic waters
- Low abundance of plant species with other growth forms than the *Chara* growth form, e.g. rooting or floating plants such as *Potamogeton* spp. or *Lemna* spp.
- Low concentrations of nutrients and chlorophyll (approximately P < 30 µg/L and chlorophyll < 7 µg/L)
- Low turbidity and clear water due by low concentrations of chlorophyll and suspended detritus and sediments in the water column
- pH weakly acid to circumneutral to alkaline (usually pH 6-8)
- A thin layer of detritus (no accumulation of organic mud).

Note: Chemical and physical parameters are only indicative, they may change in different geographical area and climatic conditions.

Characteristic species: Flora: Macro-algae: *Chara globularis*, *C. aspera*, *C. aculeolata*, *C. contraria*, *C. delicatula*, *C. hispida*, *C. rudis*, *C. vulgaris*, *C. intermedia*, *C. polyacantha*, *C. tomentosa*, *N. hyalina*, *N. tenuissima*, *N. syncarpa*, *Nitellopsis obtusa*, *Lychnothamnus barbatus*.

Classification

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

EUNIS:

C1.1 Permanent oligotrophic lakes, ponds and pools

C1.2 Permanent mesotrophic lakes, ponds and pools

Euroveg Checklist:

Charion intermediae Sauer 1937 (Syn. *Charion fragilis* Krausch 1964)

Nitellion syncarpo-tenuissimae W. Krause 1969

Charion vulgaris (W. Krause et Lang 1977) W. Krause 1981

Annex 1:

3140 Hard oligo-mesotrophic waters with benthic vegetation of *Chara* spp.

Emerald:

C1.1 Permanent oligotrophic lakes, ponds and pools

C1.25 Charophyte submerged carpets in mesotrophic waterbodies

C1.4 Permanent dystrophic lakes, ponds and pools

MAES-2:

Rivers and lakes

IUCN:

5.5 Permanent freshwater lakes (over 8 ha)

5.7 Permanent freshwater marshes and pools (under 8 ha)

Water Framework Directive:

IC201, LCB1, LCB2

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

No

Justification

The habitat has a wide distribution across Europe.

Geographic occurrence and trends

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Austria</i>	Present	50 Km ²	Decreasing	Decreasing
<i>Belgium</i>	Present	3.3 Km ²	Stable	Unknown
<i>Bulgaria</i>	Present	0.74 Km ²	Decreasing	Decreasing
<i>Croatia</i>	Present	1.5 Km ²	Stable	Unknown
<i>Cyprus</i>	Present	0.5 Km ²	Unknown	Unknown
<i>Czech Republic</i>	Present	0.43 Km ²	Decreasing	Decreasing
<i>Denmark</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Estonia</i>	Present	26.9 Km ²	Decreasing	Unknown
<i>Finland</i>	Aland Islands: Uncertain Finland mainland: Present	48 Km ²	Stable	Decreasing

EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>France</i>	Corsica: Uncertain France mainland: Present	100 Km ²	Decreasing	Decreasing
<i>Germany</i>	Present	1150 Km ²	Decreasing	Decreasing
<i>Greece</i>	Crete: Uncertain East Aegean: Uncertain Greece (mainland and other islands): Present	0.13 Km ²	Unknown	Unknown
<i>Hungary</i>	Present	1 Km ²	Decreasing	Decreasing
<i>Ireland</i>	Present	556 Km ²	Stable	Decreasing
<i>Italy</i>	Italy mainland: Present Sardinia: Present Sicily: Present	70 Km ²	Decreasing	Decreasing
<i>Latvia</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Lithuania</i>	Present	180 Km ²	Decreasing	Decreasing
<i>Luxembourg</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Malta</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Netherlands</i>	Present	92 Km ²	Stable	Stable
<i>Poland</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Portugal</i>	Madeira: Uncertain Portugal Azores: Uncertain Portugal mainland: Present Savage Islands: Uncertain	9.8 Km ²	Decreasing	Unknown
<i>Romania</i>	Present	4 Km ²	Decreasing	Decreasing
<i>Slovakia</i>	Present	0.2 Km ²	Decreasing	Decreasing
<i>Slovenia</i>	Present	4200 Km ²	Stable	Decreasing
<i>Spain</i>	Balearic Islands: Uncertain Canary Islands: Uncertain Spain mainland: Uncertain	Unknown Km ²	Unknown	Unknown
<i>Sweden</i>	Present	311 Km ²	Stable	Stable
<i>UK</i>	Gibraltar: Uncertain Northern Island: Uncertain United Kingdom: Present	97 Km ²	Stable	Decreasing

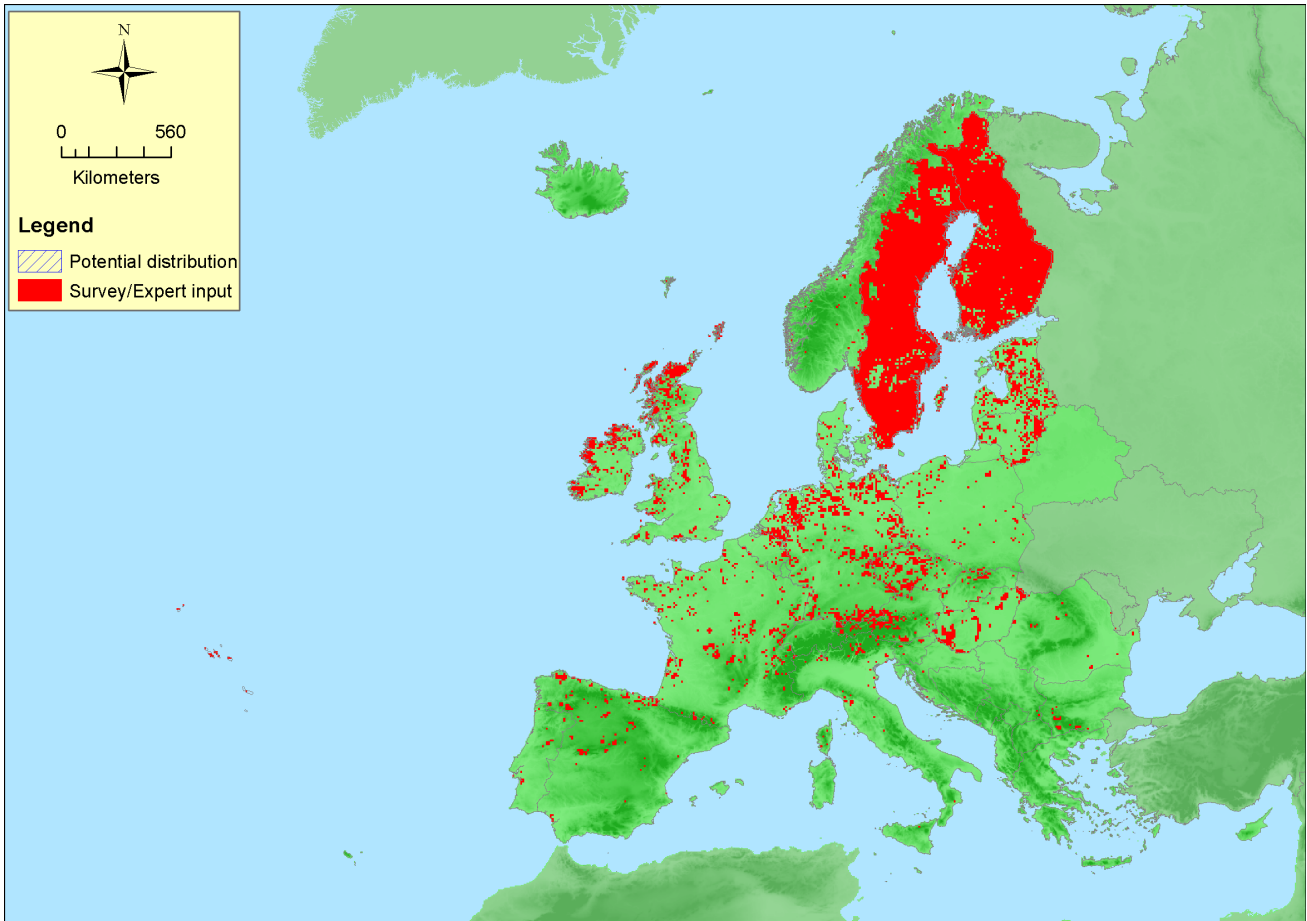
EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Albania</i>	Present	unknown Km ²	Unknown	Unknown
<i>Andorra</i>	Uncertain	Unknown Km ²	Unknown	Unknown

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Bosnia and Herzegovina</i>	Present	5 Km ²	Decreasing	Decreasing
<i>Faroe Islands</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Former Yugoslavian Republic of Macedonia (FYROM)</i>	Present	10.49 Km ²	Decreasing	Decreasing
<i>Guernsey</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Iceland</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Isle of Man</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Jersey</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Kaliningrad</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Kosovo</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Monaco</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Montenegro</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Norway</i>	Jan Mayen: Uncertain Norway Mainland: Present Svalbard: Uncertain	120 Km ²	Decreasing	Decreasing
<i>San Marino</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Serbia</i>	Present	unknown Km ²	Unknown	Unknown
<i>Switzerland</i>	Present	3 Km ²	Increasing	Decreasing
<i>Vatican City</i>	Uncertain	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
<i>EU 28</i>	9375800 Km ²	4742	5039.3 Km ²	Poland is lacking and forms a large contribution to both AOO and EOO
<i>EU 28+</i>	9375800 Km ²	4767	5184 Km ²	Poland is lacking and forms a large contribution to both EOO and AOO

Distribution map



The map is rather complete for EU28, but data for Poland seems to be an underestimation. Data gaps exist outside the EU28 (a.o. in Norway). Data sources: Art17, EVA.

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

The EU 28 probably hosts one third of the total worldwide distribution of the habitat type. The distribution area of this habitat include whole of the northern hemisphere.

Trends in quantity

For the EU 28 the trend in quantity during the last 50 years indicates a reduction of 46% and for the EU 28+ of 45%. However this trend is less severe than the historical one, which is 86% of reduction for EU 28 and 85% for EU 28+. Quantitative future trend data are largely absent, but territorial experts have hypothesized a trend from stable to low decrease in the future. Human direct destruction is an important cause of reduction of this habitat in the past.

- 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

The habitat has not a small natural range, however the decline is ongoing. Future decline is mainly expected due to climate change, however the extent of this decline is currently unknown.

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

No

Justification

The habitat has not a small natural range.

Trends in quality

The extent of degradation in Europe (EU 28 and EU 28+) is 72-77% and the severity of degradation is 42%. As a main causes of degradation, eutrophication and pollution are mentioned as the most frequent. In Norway around 50% of the area is at risk for not having good status, disturbed mainly by eutrophication and loss of habitats.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

The main threats to habitat permanent oligotrophic to mesotrophic waters with Characeae is eutrophication induced by agricultural and forestry activities. In Northern Europe hydraulic changes form the main threat besides agricultural and forestry activities that have caused gradual eutrophication locally and have weakened the state of typical species of this habitat.

List of pressures and threats

Pollution

Pollution to surface waters (limnic, terrestrial, marine & brackish)

Diffuse pollution to surface waters due to agricultural and forestry activities

Pollution to groundwater (point sources and diffuse sources)

Diffuse groundwater pollution due to agricultural and forestry activities

Invasive, other problematic species and genes

Invasive non-native species

Natural System modifications

Human induced changes in hydraulic conditions

Canalisation & water deviation

Canalisation

Modification of hydrographic functioning, general

Modification of standing water bodies

Natural biotic and abiotic processes (without catastrophes)

Species composition change (succession)

Accumulation of organic material

Eutrophication (natural)

Climate change

Water flow changes (limnic, tidal and oceanic)

Conservation and management

The current approaches to conservation and management of permanent oligotrophic to mesotrophic waters with Characeae include minimizing the input of nutrients from agriculture and forestry. It requires the elimination of all external nutrient inputs into the lake. Characeae vegetation is especially vulnerable to eutrophication with phosphorous. Lowering the nutrient input might also require the inlet of water via a longer route or via an extra vegetation filter. Maintaining buffer zones around lakes might contribute to prevent direct nutrient inputs, as they prevent agricultural fields bordering the lakes. Lowering the nutrient status of this habitat might require lowering the hydraulic retention time of the water in the lake, if this is

possible to realize in the water management scheme of the specific lake.

List of conservation and management needs

Measures related to agriculture and open habitats

Adapting crop production

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality
Restoring/Improving the hydrological regime

Measures related to spatial planning

Establish protected areas/sites

Measures related to hunting, taking and fishing and species management

Regulation/Management of fishery in limnic systems
Specific single species or species group management measures

Conservation status

Annex 1 types:

3140: ALP U1, ATL U2, BLS U1, BOR U1, CON U2, MED U1, PAN U1, STE XX

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

Experience from North-Western Atlantic Europe has shown that the vegetation can be restored from a hypertrophic status by a reduction of the hydraulic residence time, by intervention in the fish populations and by elimination of the external nutrient inputs. Intervention in the fish populations means the removal of big sediment-disturbing bream.

Effort required

10 years
Through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-46 %	unknown %	unknown %	-86 %
EU 28+	-45 %	unknown %	unknown %	-85 %

Historical data have only been reported by approximately 20% of the countries in which this habitat occurs. Therefore, even if the calculation of the historical trend resulted in a reduction of the habitat surface of 85-86% (corresponding to the category Endangered), the habitat is still considered as Vulnerable. In near future decreases in quantity are expected to be mainly due to eutrophication and climate change, but data are not available for most countries.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	> 50000 Km ²	Yes	Unknown	unknown	> 50	Yes	Unknown	unknown	unknown
EU 28+	> 50000 Km ²	Yes	Unknown	unknown	> 50	Yes	Unknown	unknown	unknown

The habitat is largely extended in Europe therefore both EOO and AOO are far from the thresholds required by criterion B to consider the habitat threatened. However spatial extent, biotic and abiotic quality of the habitat are in continuing decline.

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	72 %	42 %	unknown %	unknown %	unknown %	unknown %
EU 28+	77 %	42 %	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 %	unkown%	unknown %	unknown%	unknown %	unknown%

Data for EU 28+ could only be assessed for Bosnia and Herzegovina, Republic of Macedonia, Cyprus, Norway and Switzerland in addition to the 28 EU data.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

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

Risks for habitat collapse could not be 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	VU	NT	DD	DD	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	VU	DD	DD	VU	NT	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
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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