C3.5c Periodically exposed saline shore with pioneer or ephemeral vegetation

Summary

The habitat includes periodically flooded, saline and muddy, nutrient-rich shores and dried-up bottoms of saline standing water bodies and occasional saline river banks through the lowlands of Continental Europe and arid Mediterranean regions. There is a low to moderate cover of short salt-adapted plants, mostly grasses and sedges, mainly annuals, developing during the exposure phase, as well as perennials tolerant of temporary inundation with brackish water. During the summer, the bottom of these water bodies dries up, colouring white from the salts and the vegetation often starts to grow only in late summer. Much threatened by habitat destruction and anthropogenic changes in hydrological conditions, the most appropriate conservation measure is to reinforce measures of habitat protection.

Synthesis

The habitat qualifies as Endangered (EN) under the criteria of decline in area over the last 50 to 60 years. Although this calculation is based on data from only five countries, it is likely that this estimation is accurate, as these countries cover large parts of this rare habitat within the EU28 and EU28+.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Endangered	A1	Endangered	A1

Sub-habitat types that may require further examination

A main division can be made between the continental varieties of this habitat versus the Mediterranean examples. Especially the continental (Pannonian) parts of the habitat suffered strong declines, while in the Mediterranean relatively few data on this habitat are available.

Habitat Type

Code and name

C3.5c Periodically exposed saline shore with pioneer or ephemeral vegetation

Crypsis aculeata community in the Karaboaz lowland along the Danube River in middle-north Bulgaria (Photo: Tatiana Lysenko).

Verbena supina and *Heliotropium supinum* dominated stand, Hortobágyi, Hungary (Photo: Flavia Landucci).

Habitat description

The habitat includes periodically flooded, saline and muddy, nutrient-rich shores and dried-up bottoms of saline standing water bodies, with low to moderate cover of short salt-adapted plant species, mostly from the *Poaceae* and *Cyperaceae* families. These include mainly annual plants, developing during the exposure phase, as well as perennial plants tolerant to temporary total flooding and brackish conditions. Typically the habitat is dominated by dwarf-grasses of the genus *Crypsis* (including *Heleochloa*).

The habitat is distributed over lowlands of the continental parts of Europe and arid Mediterranean regions. These ephemeral communities develop mostly on the bottom of small temporary brackish and saline lakes and pools. During the summer the bottom of these water bodies dry-up, colouring white from the salts. The vegetation often starts to grow only in the end of summer or in autumn. Besides, the habitat type occurs on riverbanks of some large rivers, like the Danube and Sava, in regions with a continental climate where there are some processes of salinization. The same plant communities can temporary occur in some artificial localities, such as fishponds, dams, or abandoned and flooded fields.

The dominant species in the continental regions (e.g. the Pannonian basin and adjacent territories) are *Crypsis alopecuroides, Crypsis (Heleochloa) schoenoides, Crypsis (Heleochloa) aculeata*, *Cyperus (Acorellus) pannonicus* and *Polypogon monspeliensis*. These species are accompanied by annual and some perennial species from the class *Bidentetea tripartiate* (habitat C3.5a), while also transitions towards saline inland marshes and steppes (classes *Festuco-Puccinellietea*, *Thero-Salicornietea*; habitats E6.1, E6.2, E6.3) are found. Ephemeral communities with *Salicornia* ssp. in general are found on less eutrophic sites, often with higher salinity. In the Mediterranean region the communities of the alliance *Verbenion supinae* are by most authors considered part of the class *Isoeto-Nanojuncetea* (habitat C3.5b), but in some communities of this alliance the species of *Crypsis* are a characteristic species. Here they grow together with *Chenopodium chenopodioides*, *Fimbristylis bisumbellata*, *Glinus lotoides*, *Polypogon maritimus, Heliotropium supinum*, *Samolus valerandi*, and *Verbena supina*.

Typically the habitat does not develop during years with less suitable conditions. The areas covered by these communities may vary each year in size and location. Similar plant communities occur along the coast, but in that case they are in most cases considered part of coastal salt marshes (habitat A2.5d) or dune slacks (habitat B1.8b).

Indicators of good quality:

- Natural relatively high concentration of salt in the soil
- Natural high electrical conductivity of the water
- No alteration of the natural salinity range
- Exotic species absent or rare (e.g. *Xanthium spinosum*, *Paspalum disticum, P. diatatum, Bidens* spp.)
- Absence of emergent plants, shrubs and trees
- No signs of eutrophication nor dominance of ruderal species
- No indicator of negative anthropogenic influence (e.g. regulation of the water level, chemical pollution

Characteristic species:

Vascular plants: *Centaurium pulchellum, Chenopodium chenopodioides, Chenopodium glaucum, Corrigiola telephiifolia, C. littoralis, Coronopus squamatus, Cressa cretica, Crypsis aculeata, C. alopecuroides, C. schoenoides, Cyperus flavescens, C. pannonicus, Digitaria debilis, Eleocharis carniolica, Euphorbia chamaesyce, Fimbristylis bisumbellata, F. dichotoma, Glinus lotoides, Heliotropium supinum, Juncus articulatus, J. bufonius, J. hybridus, J. gerardii, J. tenageja, Lepidium latifolium, Lythum hyssopifolium, L. tribracteatum, Lotus tenuis, Panicum debile, Peplis portula, Persicaria lapathifolia, Paspalum distichum, Polygonum salsugineum, Polypogon maritimus, P. monspeliensis, Pulicaria paludosa, Pulicaria sicula, Samolus valerandi, Spergularia maritima, S. salina, Trifolium fragiferum, Verbena supina*

Classification

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

EUNIS:

E6.2 Continental inland salt steppes

EuroVeg Checklist:

Cypero-Spergularion salinae Slavnic 1948

Heleochloion schoenioidis Br.-Bl. ex Rivas Goday 1956

Lepidion latifolii Golub et Mirkin 1986

Verbenion supinae Slavnic 1951

Annex 1:

3170 Mediterranean temporary ponds

Emerald:

E6.1 Mediterranean inland salt steppes

E6.2 Continental inland salt steppes

C3.51 Euro-Siberian dwarf annual amphibious swards

MAES:

Rivers and lakes

IUCN ecosystems:

5.6. Seasonal/Intermittent Freshwater Lakes [over 8 ha]

5.8. Seasonal/Intermittent Freshwater Marshes/Pools [under 8 ha]

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

Yes

Regions
Mediterranean
Pannonian

Justification
Distribution of this habitat is limited to inland areas in the Pannonian, Mediterranean and (to a lesser extend) Continental regio,n where salt is present in soil due to geomorphological past processes and where the natural hydrological functioning has been preserved.

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)
Austria	Present	12.5 Km^2	Decreasing	Decreasing
Bulgaria	Present	Unknown Km^2	Decreasing	Decreasing
Croatia	Uncertain	Unknown Km^2	Unknown	Unknown

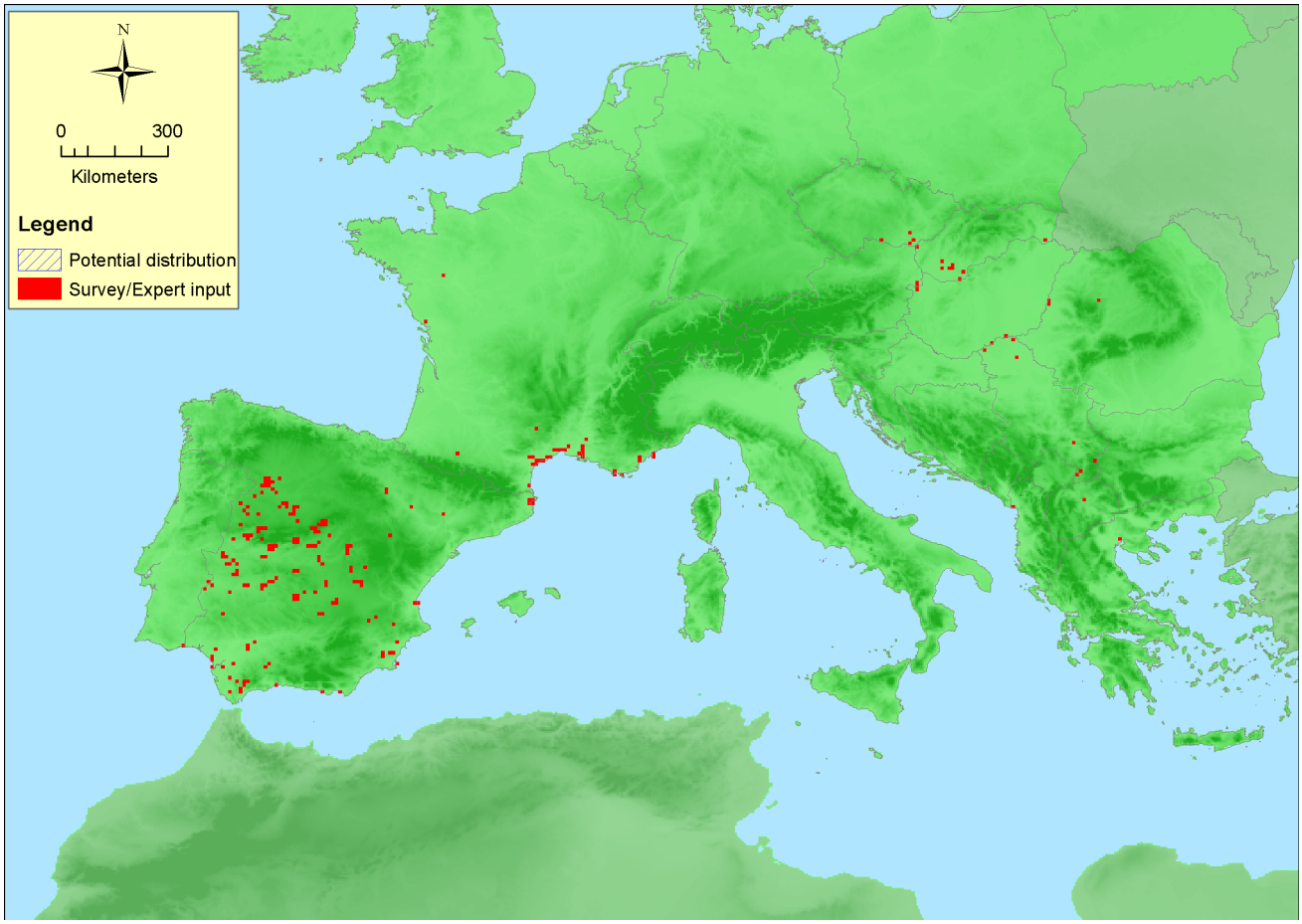
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
France	Corsica: Uncertain France mainland: Present	Unknown Km^2	Unknown	Unknown
Germany	Present	Marginal Km^2	Unknown	Unknown
Greece	Crete: Uncertain East Aegean: Uncertain Greece (mainland and other islands): Uncertain	Unknown Km^2	Stable	Unknown
Hungary	Present	13 Km^2	Decreasing	Decreasing
Italy	Italy mainland: Present Sardinia: Present Sicily: Present	Unknown Km^2	Decreasing	Decreasing
Malta	Uncertain	Unknown Km^2	Unknown	Unknown
Portugal	Portugal mainland: Uncertain	Unknown Km^2	Unknown	Unknown
Romania	Present	Unknown Km^2	Decreasing	Decreasing
Slovakia	Present	0.0001 Km^2	Decreasing	Decreasing
Slovenia	Uncertain	Unknown Km^2	Unknown	Unknown
Spain	Spain mainland: Present	9.5 Km^2	Decreasing	Stable
Sweden	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)
Albania	Uncertain	Unknown Km^2	Unknown	Unknown
Bosnia and Herzegovina	Present	4 Km^2	Decreasing	Decreasing
Former Yugoslavian Republic of Macedonia (FYROM)	Present	Unknown Km^2	Unknown	Unknown
Kosovo	Uncertain	Unknown Km^2	Unknown	Unknown
Montenegro	Uncertain	Unknown Km^2	Unknown	Unknown
Serbia	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	2419450 Km^2	214	35 Km^2	
EU 28+	2419450 Km^2	222	37 Km^2	

Distribution map



Map is incomplete, especially in the Pannonian plane and on the Balkan. Data sources: EVA, LIT, GBIF, NAT.

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

The range of the characteristic *Crypsis*-species goes far eastwards into the steppe zones of Asia, and includes also northern Africa and the eastern part of the Mediterranean region. A rough estimate is that less than 10% of the range is covered by the EU28.

Trends in quantity

Estimated area is about 37 km^2 based on data from five countries (Hungary, Austria, Slovakia, Spain, Bosnia and Herzegovina), with an estimated trend of -55% over the last 50-60 years. The long term trend is likely to be much larger (over 80%), but the calculation is based on relatively few data (three countries) and therefore not very reliable. Expected future trends, based on data provided by five countries, are further decreases by 5-10%.

- 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 is sparsely distributed within a large range of more than 50,000 km^2.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  Yes
  Justification
  This habitat requires specific conditions of salinity and hydroperiod. It occurs on relatively few and small areas within the large distribution range in Continental and Mediterranean Europe.

Trends in quality

Extent of degradation is estimated at 62% with a severity of 55% based on data from four countries. Current trends are considered as decreasing for four countries. The quality is expected to decrease further in future.

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

Pressures and threats

Land reclamation for expansion of agricultural and urban areas is responsible for most of the historical and current decline in periodically flooded saline shores with pioneer and ephemeral vegetation in Europe. Human-induced changes in hydraulic functioning are another major threat currently affecting this habitat. Surface water pollution, habitat succession (scrub encroachment), overgrazing, and proliferation of invasive plants are other threatening factors.

List of pressures and threats

Agriculture

Intensive grazing

Pollution

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

Natural System modifications

Human induced changes in hydraulic conditions
Landfill, land reclamation and drying out, general
Flooding modifications
Modification of hydrographic functioning, general

Conservation and management

The following conservation and management actions are relevant for this threatened habitat:

- Avoid input of freshwater that would modify water (soil) salinity and prevents seasonal dry periods.
- Avoid embankment, modification of cathment area or water derivation that would result in absence of seasonal flooding caused by sustained rainfalls.
- Do not compensate the lack of rainfall by water input, since this ecosystem is adapted to variability and unpredictibility in abiotic conditions.
- Promote extensive grazing, but avoid overgrazing which can also be a cause of degradation of the characteristic flora.
- Install a high-level Biotope protection wherever this habitat occurs seasonally (destruction remains the major threat to this ecosystem).

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 spatial planning

Establish protected areas/sites

Conservation status

Annex I:

3170: CON U2, MED U1

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

Recovery if the characteristic flora has disappeared requires active restoration.

Effort required

10 years
Through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-55 %	unknown %	unknown %	unknown %
EU 28+	-54 %	unknown %	unknown %	unknown %

This habitat has suffered a 55% decline in area based on estimates provided by four countries in the EU28 (Spain, Hungary, Austria, Slovakia) and of 54% in the EU28+ (additional data from Bosnia-Herzegovina) over the last 50-60 years. Historical declines are likely to be larger, but there is limited data available. Expected furture trends for all four EU28 countries are decreasing. The values leads to the category Endangered for A1.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	> 50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No
EU 28+	> 50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No

A continuing decline in both the spatial extent and abiotic/biotic quality of the habitat has been reported, as well as a threatening process (proliferation of invasive plants) which is expected to cause continuing declines in quality over the next 20 years. The EOO is relatively large, but the AOO value is limited for both EU28 and EU28+, but still higher than the thresholds for criterion B2. Therefore the criteria B leads to the conclusion Least Concern.

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	62 %	55 %	unknown %	unknown %	unknown %	unknown %
EU 28+	60 %	54 %	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%

Over the last 50 years a decline in quality has been seen, affecting about 60% of the area with an average severity of more than 50%. This leads to the category Vulnerable for criterion C/D1. No historic trends in quality are provided by the experts. Quality is further expected to decrease due to dewatering, nutrient inputs and expansion of *Paspalum*, an invasive species. Decline in quality is considered as being caused by both abiotic and biotic factors.

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 that estimates 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	EN	DD	DD	DD	LC	VU	LC	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	EN	DD	DD	DD	LC	VU	LC	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	A1	Endangered	A1

Confidence in the assessment

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

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