

E6.2 Continental inland salt steppe

Summary

The habitat is an outstanding example of the Pannonian biogeographic region, characteristic of solonetz soils, saturated, even shallow flooded, by soluble carbonates in spring, then drying in summer with surface cracking. According to variations in salinity, slope and erosion by spring floods, the steppe vegetation is a complex mosaic of grasslands and more halophytic herb communities, rich in endemic species and plant communities. Traditionally sustaining older breeds of cattle, the habitat is rather resilient to their disturbance but widespread losses have occurred with attempts to convert to more intensive agriculture, through ploughing and changes in hydrology with drainage. The large stands in Hungary are now mostly protected in National Parks, local protected areas and Natura 2000-sites and the most important conservation measures are to restore hydrological conditions, maintain a proper management by grazing (or by mowing in some cases), and to prevent conversion to other land-uses.

Synthesis

The habitat is assessed to be Vulnerable (VU) because of a decline of more than 30% of the area over the last 50 years (criterion A1), both in the EU28 and EU28+. The long-term historical estimated decline is even larger, more than 50%, which leads to the same category for criterion A3. Over the last 50 years also a decline in quality took place, but not large enough to meet any of the Red List category thresholds.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Vulnerable	A1, A3	Vulnerable	A1, A3

Sub-habitat types that may require further examination

There are no specific subhabitats to be assessed in more detail.

Habitat Type

Code and name

E6.2 Continental inland salt steppe



Continental inland salt steppes are usually used for grazing. Traditional old breeds are important for conservation management. These communities are species poor habitats, but full of specialist species (Photo: Ábel Molnár).



Small patches with high salt concentration supporting species-poor vegetation dominated by the specialist species *Camphorosma annua* in the salt steppe near Szálka-halom in the Hortobágy area, Hungary (Photo Milan Chytrý).

Habitat description

Salt steppes (also called alkali steppes) occur on plains in the Eurasian steppe and forest-steppe zones from the Great Hungarian Plain and adjacent areas through the Danube Lowland in Romania and Bulgaria to Ukraine, Russia, Kazakhstan and Mongolia. The matrix of the salt steppe is formed of steppe grassland dominated by *Festuca pseudovina* and *Artemisia santonicum* and grassland of *Puccinellia distans* agg. at muddy sites that are wet or shallowly flooded in spring but dry out for long periods in summer. Often these grasslands are open and species-poor. On less saline soils, generalist halo-tolerant species are common, including *Bromus hordeaceus*, *Elymus repens*, *Inula britannica*, *Plantago lanceolata* and *Poa bulbosa*. With increasing salt concentration, these species become rarer while obligate or facultative halophytes increase in frequency, for example *Cerastium dubium*, *Plantago maritima*, *Scorzonera cana* and *Tripolium pannonicum*.

Within this saline grassland matrix, patches of one to few square metres with different saline vegetation occur, reflecting small differences in microtopographic position and salt concentration: (1) species-poor to single-species stands of the annual chenopod *Camphorosma annua* are found in small depressions with very high salt concentration and nearly bare soil in Hungary and adjacent countries; (2) stands of perennial *Camphorosma monspeliaca* are found in similar habitats in Macedonia and Bulgaria, however, this vegetation can also be found on steep slopes and slope bases; (3) patches of open vegetation with *Pholiurus pannonicus* and *Plantago tenuiflora* are found in erosion troughs that are flooded in spring, but dry out for a long period in summer. Finally, species-poor stands of annual grasses *Crypsis aculeata* and *Heleochoa schoenoides* occur on bottoms of shallow saline lakes that are subject to slow draining in late spring and summer, but such communities are considered under habitat C3.5c.

This habitat occurs on Solonetz soils, which are characterized by high concentration of easily soluble salts, especially sodium and potassium carbonates. These soils are wet in spring and can be locally shallowly flooded, however they are dry in summer when polygonal cracks often appear on the surface. The columnar structure of the Solonetz soils and erosion by floods causes the development of complex microtopography of the salt steppe.

Salt steppes have traditionally been used as livestock pastures and this management continues in many areas until the present. They are less sensitive to overgrazing or abandonment than other types of lowland grasslands, because on the one hand they are well-adapted to disturbance and have a high resilience, and on the other hand competitive species have reduced ability to spread in saline habitats.

Large areas of salt steppe were destroyed or strongly altered by attempts of their agricultural improvement such as ploughing, fertilizing or drainage. On drained habitats salt concentration decreases and competitive non-halophytic grasses and dicots can spread. If this is combined with cessation of grazing, the salt steppe can change into closed grasslands composed of generalist non-halophytic species. On the other hand, some floodplain meadows changed into salt steppe after artificial drainage. These secondary salt steppes lack the microtopography typical of primary salt steppes and contain some species of floodplain meadows.

Indicators of good quality:

- Presence of obligate halophytic species
- Presence of typical microtopography of the salt steppe
- Existence in the grassland matrix of small patches with extreme ecology (spring flooding or very high salt concentration) and occurrence of specialist species
- Moisture regime with wet soils in spring that dry out in summer
- No spread of ruderal or competitive generalist herb species
- Absence of the species of floodplain meadows
- Absence of strong overgrazing

- Large continuous area of this habitat

Characteristic species:

Flora, Vascular plants: *Artemisia santonicum*, *Bupleurum tenuissimum*, *Camphorosma annua*, *C. monspeliaca*, *Carex stenophylla*, *Cerastium dubium*, *Festuca pseudovina*, *Galatella sedifolia*, *Peucedanum officinale*, *Pholiurus pannonicus*, *Plantago coronopus*, *P. maritima*, *P. tenuiflora*, *Puccinellia distans* agg., *P. festuciformis* subsp. *convoluta*, *Ranunculus pedatus*, *Scorzonera cana*, *Trifolium retusum*, *Tripolium (=Aster) pannonicum*

Classification

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

EUNIS:

D6.1 Inland saltmarshes

E6.2 Continental inland salt steppes

EuroVegChecklist (alliances):

Cypero-Spergularion salinae Slavnić 1948

Festucion pseudovinae Soó 1933

Peucedano officinalis-Asterion sedifolii Borhidi 1996

Puccinellion limosae Soó 1933

Artemision maritimae Micevski 1970

Thero-Camphorosmion annuae Vicherek 1973

Annex 1:

1530 Pannonic salt steppes and salt marshes

Emerald:

E6.2 Continental inland salt steppes

MAES-2:

Grassland

IUCN ecosystems:

5.16. Permanent Saline, Brackish or Alkaline Marshes/Pools

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

Yes

Regions

Pannonian

Steppic

Justification

Salt steppes are one of the most typical representatives of the Eurasian steppes in Central Europe. In some regions extensive areas survived agricultural intensification with typical wildlife (steppe birds and steppe mammals) and often with (semi-)traditional, extensive grazing regimes. The habitat is an outstanding

example for the Pannonian Biogeographic region. The vegetation is rich in local and regional endemic species and endemic plant communities. This habitat may have been existing in this region for ten thousands of years.

Geographic occurrence and trends

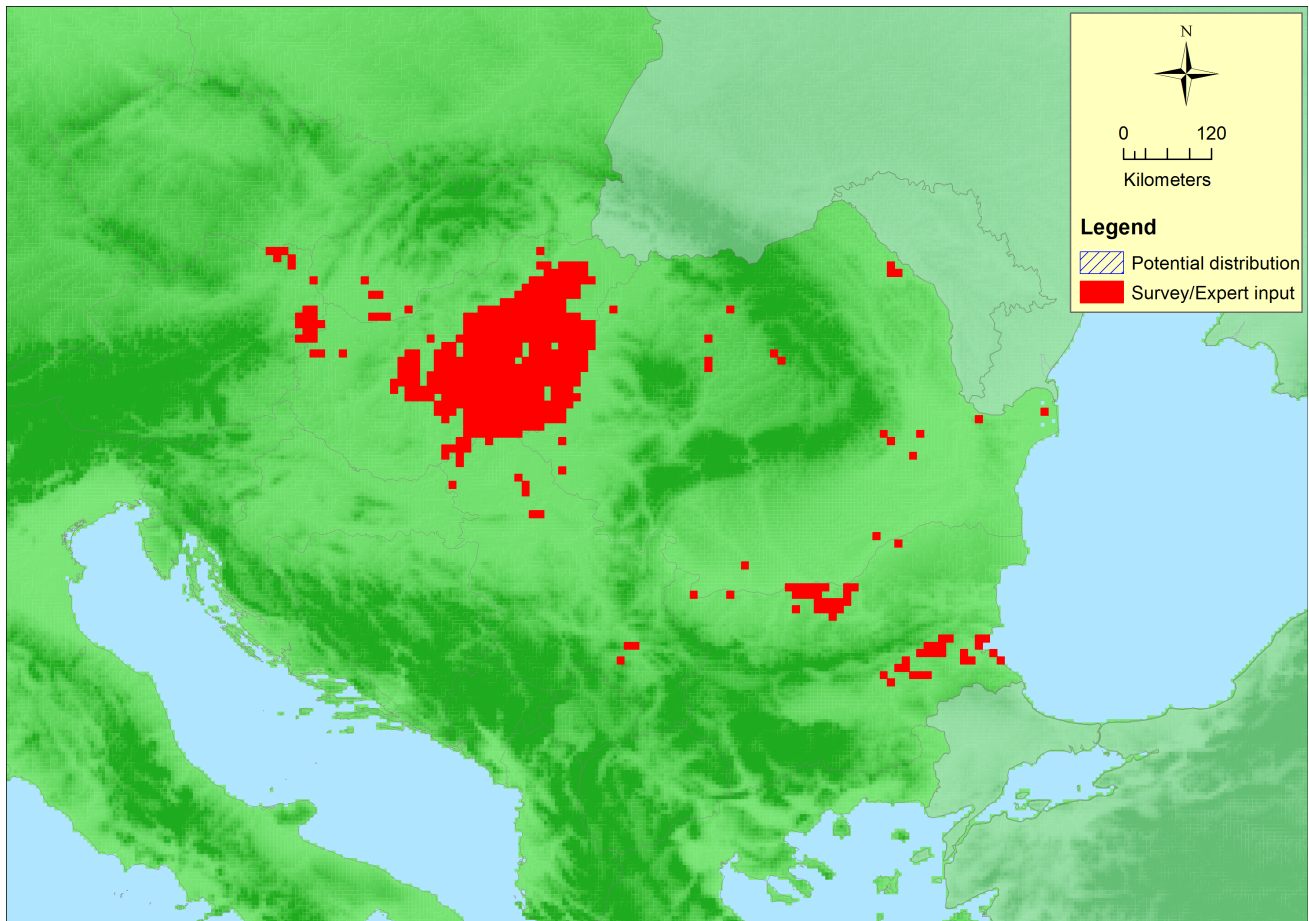
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Austria</i>	Present	38 Km ²	Decreasing	Decreasing
<i>Bulgaria</i>	Present	132 Km ²	Decreasing	Decreasing
<i>Croatia</i>	Uncertain	Km ²	-	-
<i>Czech Republic</i>	Present	0.1 Km ²	Decreasing	Decreasing
<i>Germany</i>	Present	Km ²	-	-
<i>Greece</i>	Greece (mainland and other islands): Uncertain	Km ²	-	-
<i>Hungary</i>	Present	2250 Km ²	Decreasing	Decreasing
<i>Romania</i>	Present	1000 Km ²	Decreasing	Decreasing
<i>Slovakia</i>	Present	0.3 Km ²	Decreasing	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>Former Yugoslavian Republic of Macedonia (FYROM)</i>	Present	60 Km ²	Decreasing	Decreasing
<i>Serbia</i>	Present	600 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
<i>EU 28</i>	409650 Km ²	494	3419 Km ²	
<i>EU 28+</i>	461000 Km ²	505	3419 Km ²	

Distribution map



The map is likely to be complete for EU28, but has data gaps in Balkan countries outside the EU28. Data sources: Art17, LIT.

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

10-20%. The habitat is dispersed further eastwards to Ukraine, Russia and Kazachstan.

Trends in quantity

The decrease in the last 50 years is about 31 % for the EU28 and EU28+. In most countries the trend is still a decrease. The large stands in Hungary are mostly protected in National Parks (and in local protected areas and Natura 2000-sites). Decrease is partly caused by ploughing, but leaching of salts from the upper soil layers (as a consequence of soil water lowering and surface water drainage) is more widespread and acting in the long term. In some areas drainage canals are being abolished (financed by LIFE projects) which help prevent leaching and restore more natural hydrologic conditions. The habitat tolerates overgrazing, but undergrazing can result in litter accumulation, improvement of soil, thus causing loss of habitat area.

- 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 widespread in the Pannonian region and more eastwards.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
 No
Justification

The habitat may occur in relatively large patches.

Trends in quality

The remaining part of the habitat has suffered a decline in area. The extent of degradation covers about 33% of the area, and the severity of degradation is 36%. These averages were calculated based on data from 5 countries (out of 7 that reported the occurrence of this habitat).

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

A main threat is ploughing, but leaching of salts from the upper soil layers (as a consequence of soil water lowering and surface water drainage) is more widespread and acting in a long term. In some areas (e.g. Hortobágy National Park, Hungary) drainage canals are being abolished (financed by LIFE projects) which prevents leaching and restores more natural hydrologic conditions. The habitat tolerates overgrazing, but undergrazing can result in litter accumulation, improvement of soil, thus loss of habitat area and quality. Agricultural intensification was an important threat in the past, but it is decreasing inside protected areas. In leached areas succession leads to other (less/non-halophytic) habitats. Invasive species are usually rare. Urbanisation affects areas near settlements. Abandonment of military use may also result in undermanagement. Climate change can result in further water loss and leaching.

List of pressures and threats

Agriculture

Grassland removal for arable land

Abandonment of pastoral systems, lack of grazing

Natural System modifications

Canalisation & water deviation

Modification of hydrographic functioning, general

Water abstractions from groundwater

Conservation and management

The most important is to improve hydrological conditions (abolish drainage canals), maintain a proper management by grazing (or mowing in some cases), and to prevent conversion to other land-uses. In Romania and Serbia more effective site conservation may be needed.

List of conservation and management needs

Measures related to agriculture and open habitats

Maintaining grasslands and other open habitats

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving the hydrological regime

Measures related to spatial planning

Establish protected areas/sites

Conservation status

Annex I:

1530: BLS U1, CON U1, PAN U1, STE FV

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

The habitat has some capacity to recover naturally, but it is dependent on soil quality (the soil should be salty enough). It could be restored in some areas where local propagule sources are present and soils are suitable.

Effort required

50+ years	200+ years
Naturally	Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-31 %	unknown %	unknown %	>50 %
EU 28+	-31 %	unknown %	unknown %	>50 %

The habitat has decreased on average 31%, based on quantitative data from six EU28 countries and two EU28+ countries. The trend value is about the same for EU28 and EU28+ countries. The historical decline is larger, and estimated to be more than 50%. Both values lead to the category Vulnerable. Further decrease is expected.

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

Although there are continuing declines and threats, the habitat is assessed least concern, as AOO, EOO and number of locations are much higher than the thresholds for 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	33 %	36 %	unknown %	unknown %	unknown %	unknown %
EU 28+	33 %	36 %	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%

An average decline in quality was calculated of 33% affected area with about 36% severity. The values for the EU28+ are the same, as the calculation is dominated by data from Hungary, where the largest amount of the habitat is found. This decline refers both to abiotic and biotic degradation. These values are not close to the Vulnerable thresholds, and lead to the category Least Concern.

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	VU	DD	DD	VU	LC	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	VU	DD	DD	VU	LC	LC	LC	LC	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, A3	Vulnerable	A1, A3

Confidence in the assessment

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

Assessors

Zs. Molnár

Contributors

Habitat definition: M. Chytrý

Territorial data: C. Bitá-Nicolae, M. Janišová, V. Matevski, Zs. Molnár, D. Paternoster, K. Šumberová, R. Tzonev, and Klára Szabados provided some Serbian data

Working Group Grasslands: I. Biurrun, J. Capelo, J. Dengler, D. Gigante, Z. Molnár, D. Paternoster, J. Rodwell, J. Schaminée, R. Tzonev

Reviewers

J. Janssen

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