

E6.1 Mediterranean inland salt steppe

Summary

This habitat is typical of inland situations in the Mediterranean region where the soils of flats or gentle hollows are permeated by waters laden with soluble salts from underlying substrates, and are then subject to extreme summer drought, with surface efflorescence of crystalline deposits. The vegetation is dominated by halophytes, and can be rich in endemics, but the particular species composition depends on the regional climate and local soil conditions and there is often a distinctive seasonal pattern of growth and zonation around the hollows. In some regions, the vegetation has provided valuable grazing for sheep and goats in summer drought but abandonment of traditional agriculture, urbanisation and tourism have caused substantial losses in extent and quality.

Synthesis

The habitat is assessed as Vulnerable (VU) under Criterion A1 as it has experienced a reduction in quantity of 30% over the last 50-60 years.

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

Sub-habitat types that may require further examination

No sub-habitats have been distinguished for further analysis.

Habitat Type

Code and name

E6.1 Mediterranean inland salt steppe



Inland salt marsh in Osera, Aragón, Spain. (Photo: Javier Loidi).



Inland salt marsh of Laguna de la Playa, Bujaraloz, Aragón, Spain. (Photo: Javier Loidi).

Habitat description

The vegetation of this habitat is dominated by succulent plants of the *Chenopodiaceae* family and perennial, rosette-forming *Limonium* species as well as other salt-tolerant Mediterranean plants and sometimes also albardín (esparto like) grass (*Lygeum spartum*) in the less saline stretches of the gradient. This habitat occurs in the Mediterranean area, in continental or coastal areas but far from the influence of the sea, under severe climatic drought conditions where endorrheic (non or poorly-drained) clay basins accumulate soluble salts diluted from the surroundings. Several circumstances need to occur for this to happen: a long and deep summer drought, geological material with abundance of soluble salts (often

sulfates) and a flat or gentle topography in which such basins can take place, such as the large depressions of some fluvial systems. Under such conditions, soils are temporarily permeated (though not inundated) by saline water and subject to extreme summer drying, with formation of salt efflorescence which is conspicuous during the dry periods, particularly the summer, and forms a white crust of salt micro-crystals. The most characteristic vegetation is represented by the following species: *Sarcocornietea fruticosi* (*Limonietalia* and *Sarcocornietalia*), *Juncetea maritimi* (*Juncetalia maritimi*), *Thero-Suaedetea* (*Thero-Salicornietalia*) and *Saginetea maritimae* (*Frankenietalia pulverulenta*). Different communities belonging to these units appear in the interior salty steppes in a diversity of combinations depending on the geography, salt concentration and climatic conditions. Often they are surrounded by a ring of *Lygeum spartum* (albardín) or *Stipa tenacissima* (esparto) grassland in the foothill of the depression together with the succulents, a high number of narrow endemic species of *Limonium* occur in those communities and with a number of broader distributed reeds (*Juncus*) and annuals. This vegetation complex presents a phenology in which annuals develop in early spring and perennials in late summer, in a successive flowering pattern which is particularly useful for the local herding management which has to survive the very severe summer drought.

In many areas of the Iberian Peninsula, these salt steppes have been traditionally grazed by sheep or goats, and such use has been compatible with its conservation in good conditions, with all the halophile species and some others linked with grazing activity. Nevertheless, in recent times, as a result of an ancient belief in the local population that these areas could be transformed into arable land, some disastrous initiatives have taken place such as draining, tilling, fertilizing and others, which have caused severe damage to this habitat. This has been done in spite of being declared as a priority habitat by the European Union (EU), in part due to the pressure of the local rural population wills, with the goal of converting these poor and sterile areas into productive ones.

Indicators of good quality:

- Dominance of halophile species
- A medium to high vegetation cover
- Absence of nitrophilic species linked to human activities
- No visible anthropic disturbances due to draining, tilling, building activities, rubbish accumulation or intensive trampling

Flora: Vascular plants. This habitat is characterized by the following halophytic perennials of inland salt steppes: *Arthrocnemum macrostachyum*, *Carex punctata* subsp. *lainzii*, *Elytrigia curvifolia*, *Frankenia corymbosa*, *Halocnemum strobilaceum*, *Gypsophila tomentosa*, *Helianthemum polygonoides*, *Limonium angustibracteatum*, *Limonium aragonense*, *Limonium caesium*, *Limonium carpetanicum*, *Limonium catalaunicum*, *Limonium cofrentanum*, *Limonium cordovillense*, *Limonium costae*, *Limonium delicatulum*, *Limonium dichotomum*, *Limonium erectum*, *Limonium furfuraceum*, *Limonium hybericum*, *Limonium insigne*, *Limonium lobetanicum*, *Limonium majus*, *Limonium minus*, *Limonium pinillense*, *Limonium quesadense*, *Limonium ruizii*, *Limonium santapolense*, *Limonium soboliferum*, *Limonium squarrosum*, *Limonium stenophyllum*, *Limonium sucronicum*, *Limonium toletanum*, *Limonium tournefortii*, *Limonium viciosoi*, *Microcnemum coralloides*, *Puccinellia fasciculata*, *Puccinellia hispanica*, *Puccinellia pungens*, *Senecio auricula* subsp. *auricula*, *Senecio auricula* subsp. *castellanus*, *Sonchus crassifolius*, *Suaeda vera* subsp. *braun-blanquetii*.

Halophytic perennials: *Juncus acutus*, *Juncus maritimus*, *Juncus subulatus*, *Plantago maritima*.

Halophytic annuals: *Aeluropus littoralis*, *Frankenia pulverulenta*, *Halopeplis amplexicaulis*, *Hordeum marinum*, *Hymenolobus procumbens*, *Mesembryanthemum crystallinum*, *Mesembryanthemum nodiflorum*, *Parapholis incurva*, *Sagina maritima*, *Salicornia patula*, *Sphenopus divaricatus*, *Spergularia marina*, *Spergularia media*, *Suaeda maritima*, *Suaeda splendens*.

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

EuroVegChecklist:

Arthrocnemion macrostachyi Rivas-Martínez & Costa 1984

Gaudinio-Podospermion cani S. Brullo et Siracusa 2000 (Sicily, Southern Italy)

Halo-Artemision coerulescentis Pignatti 1953

Juncion maritimi Br.-Bl. In Br.-Bl et al. 1952 (*Soncho crassifolii-Juncenion maritimi* Rivas-Martínez 1984)

Limonion catalaunico-viciosoi Rivas-Mart. et Costa 1984

Lygeo sparti-Limonion furfuracei Rigual 1972

Lygeo-Lepidion cardaminis Rivas Goday et Rivas-Mart. ex Rivas-Mart. et Costa 1984

Microcnemion corallodis Rivas-Martínez 1984

Pholiuro-Spergularion Pignatti 1952

Puccinellion lagascae Rivas-Mart. in Rivas-Mart. et Costa 1976 corr. Alonso et De la Torre 2004

Suaedion braun-blanquetii Br.-Bl. & O. Bolòs 1958 (=Suaedion brevifoliae)

Annex I:

1510 *Mediterranean salt-steppes (*Limonietales*)

Emerald:

D6.1 Inland saltmarshes

D6.23 Interior Iberian salt pan meadows

MAES-2:

Grassland

IUCN

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

Mediterranean

Justification

The habitat is restricted to the Mediterranean region. It is widespread but it does not cover large areas. The vegetation is rich in endemic species (especially *Limonium* spp.).

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>France</i>	France mainland: Present	40 Km ²	Decreasing	Stable
<i>Greece</i>	Greece (mainland and other islands): Present	6 Km ²	Stable	Decreasing
<i>Italy</i>	Italy mainland: Present Sardinia: Present Sicily: Present	28.42 Km ²	Decreasing	Decreasing
<i>Portugal</i>	Portugal mainland: Present	12.4 Km ²	Decreasing	Decreasing
<i>Spain</i>	Spain mainland: Present	106.58 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>	1989600 Km ²	624	193 Km ²	
<i>EU 28+</i>	1989600 Km ²	624	193 Km ²	

Distribution map

Map is likely to be complete. Data sources: Art17.

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

Probably less than 50% (uncertain estimation). The habitat also occurs on the African and Turkish areas of the Mediterranean.

Trends in quantity

Considering the territorial information provided, a decrease of about 14% for the EU 28 is calculated. However, considering that there is lack of data for parts of the distribution of this habitat, the assessor estimates a decrease of ca. 30%. The main cause of change is mostly land conservation to arable and urban development. A slight ongoing decrease in spatial extent is also to be expected because the threats are ongoing. On the other hand, the habitat can recolonize abandoned salt pans.

- 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
None.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
Yes
Justification
The habitat is restricted to special soil, hydrological and climatic conditions.

Trends in quality

The extent (ca. 10%) and severity of the degradation (ca. 35%), were both calculated with data from two

countries only (Portugal and Italy) as information from other countries was not available. The overall quality of the habitat is decreasing, although in some areas it is rather stable. Complete past datasets are not available, but a decline in quality has been observed by most territorial experts.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

This habitat is impacted by the numerous development programs occurring in the coastal areas. While quantitative past data are often not available, a decrease in the distribution area has been observed by most territorial experts mainly as a result of urbanization sensu lato (including tourism) and land conversion. The coastal areas where this habitat occurs are constantly under development programs. Human disturbance (trampling, driving off road) are also important threats. Pollution, alien species and ruderalisation because of overgrazing were also reported for some countries.

List of pressures and threats

Agriculture

Grassland removal for arable land

Urbanisation, residential and commercial development

Urbanised areas, human habitation

Human intrusions and disturbances

Walking, horseriding and non-motorised vehicles

Motorised vehicles

Pollution

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

Invasive, other problematic species and genes

Invasive non-native species

Natural System modifications

Modification of hydrographic functioning, general

Conservation and management

The habitat is subject to severe aggression due to the pressure to convert those sites into urban areas and arable land. This process needs to be stopped through stricter protection and proper incentives. A relatively high grazing pressure by sheep or goats has been a traditional practice and is perfectly sustainable for the management of this habitat type. Construction of touristic infrastructure (such as paths across some sites) could prevent trampling, offroad driving, etc. Finally, the establishment of new protected areas is needed.

List of conservation and management needs

Measures related to agriculture and open habitats

Maintaining grasslands and other open habitats

Measures related to spatial planning

Establish protected areas/sites

Conservation status

Annex I:

1510: MED U2

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

The habitat has some capacity to recover naturally if salt accumulation is ongoing and seed sources are near.

Effort required

50+ years	200+ years
Naturally	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 %

The habitat is assessed as Vulnerable under Criterion A1 since it is estimated that the habitat has undergone a decline of around 30% over the past 50-60 years. There is no information available on the future and historic reduction in quantity of this habitat type.

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	Unknown	>50	Yes	Yes	Unknown	Unknown
EU 28+	>50000 Km ²	Yes	Yes	Unknown	>50	Yes	Yes	Unknown	Unknown

EOO and AOO values are far above the thresholds for criterion B and the number of locations where this habitat is present is high. Even though there is, a continuing slow decline expected to occur in most countries, with a threatening process likely to cause continuing declines within the next 20 years, the habitat is assessed as Least Concern (LC) 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	35 %	10% %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	35 %	10% %	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%

The habitat is assessed as Least Concern under Criterion C/D1 for the EU28 and EU28+, with a severity of 10% affecting 35% of the extent of the habitat quality. However, it has to be noted that this calculation is based only on data provided by Italy and that there is no other information available from other countries to calculate this decline in quality. The habitat is assessed as Data Deficient at the EU 28+ under Criterion C/D, C and D.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

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

There is no information available to calculate the probability of collapse of this habitat type under Criterion E, and thus it is assessed as Data Deficient.

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	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	VU	DD	DD	DD	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	Vulnerable	A1

Confidence in the assessment

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

Assessors

Z. Molnár

Contributors

Type description: J. Loidi

Territorial experts: E. Agrillo, O. Argagnon, F. Attorre, S. Bagella, J. Capelo, L. Casella, P. Dimopoulos, D. Espírito-Santo, D. Gigante, G. Giusso Del Galdo, J. Loidi, C. Marcenò, S. Sciandrello, D. Viciani

Working Group Grasslands: I. Biurrun, J. Dengler, D. Gigante, Z. Molnar, D. Paternoster, J. Rodwell, J.

Schaminée, R. Tzonev

Reviewers

M. García Criado

Date of assessment

15/10/2015

Date of review

06/01/2016

References

Rivas-Martínez, S., Asensi, A., Díez-Garretas, B., Molero, J., Valle, F., Cano, E., Costa, M., Villar, L., Díaz, E., Fernández Prieto, J.A., Llorens, L., del Arco, M., Fernández-González, F., Sánchez-Mata, D., Penas, A., Del Río, S., Masalles, R., Ladero, M., Amor, A., Izco, J., Amigo, J., Loidi, J., Navarro, G., Cantó, P., Alcaraz, F., Báscones, J.C., Soriano, P. 2011. Mapa de series, geoserias y geopermaseries de vegetación de España [Memoria del mapa de vegetación potencial de España]. Parte II. *Itinera Geobotanica* 18 (1 and 2): 5-800.