

F1.1 Shrub tundra

Summary

Shrub tundra is treeless vegetation of the southern arctic belt with sporadic permafrost, represented in the EU28+ only on Iceland and in mainland Norway and Svalbard. It is characterized by abundant sub-shrubs and often an extensive moss and lichen carpet, though grazing by reindeer and rodents often reduces lichen cover and results in tundra/grassland mosaics. Where grazing is declining or part of a dynamic process of cyclic change, it is not a threat but climate change might be expected to shift the altitudinal and latitudinal range of the habitat. Being essentially a natural habitat, the only conservation requirement is landscape protection.

Synthesis

The habitat is assessed as Least Concern (LC) as no decline or negative change in area or quality is known since the last 50 years. In fact on Iceland a positive trend in area and quality is observed due to a reduction of grazing intensity.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
-	-	Least Concern	-

Sub-habitat types that may require further examination

The species composition of the habitat varies between Iceland, Svalbard and northern mainland Norway, but there is no need to distinguish different subtypes for the Red List assessment.

Habitat Type

Code and name

F1.1 Shrub tundra



Empetrum hermaphroditum dominated shrub tundra with European Golden Plover, Iceland (Photo: Wim Ozinga).



Arctic dwarf shrub tundra with *Cassiope tetragona* at Bolterdalen, Spitsbergen (Photo: Jutta Kapfer).

Habitat description

Tundra is a treeless habitat, dominated by mosses, lichens, herbs and low shrubs, characteristic for arctic and subarctic regions, where the subsoil is permanently frozen (permafrost). The term is also used for physiognomic similar habitats in alpine areas above the timberline, but here it only refers to arctic and

subarctic habitats.

Shrub tundra is a tundra type of the southern arctic belt characterized by abundance of medium small and small shrubs, especially *Ericaceous* species. This in contrast to the colder tundra of the middle and northern arctic belts, where mosses and lichens dominate (type F1.2). Permafrost is sporadic within the southern arctic, with mean temperatures of about 0 °C, and average July temperatures below 10 °C . Shrub tundra is a circumpolar arctic type of the tundra's of Russia, Canada, Alaska and Greenland. In Europe the arctic zone (above the climatic limit of woodland) is mainly found in Russia, but small areas occur on the northern edges of Iceland and Norway, as well as on the islands Jan Mayen, Bjørnøya and the Svalbard archipelago.

In Finnmark, the northern region of Norway, the arctic belt is restricted to the lower altitudes at sea level. Dominant dwarf shrubs here are *Empetrum hermaphroditum*, accompanied by *Salix herbacea* , *Vaccinium myrtilus*, *Vaccinium uliginosum*, *Juncus trifidus*, *Festuca vivipara* and high abundance of mosses (*Racomitrium lanuginosum*, *Dicranum fuscescens*) and lichens (*Cetraria cucullata*, *C. ericetorum*). The habitat forms a gradual transition towards heathlands of the lower alpine zone, with a similar species composition (habitat F 2.2a 'Alpine and subalpine ericoid shrub'). Differences between tundra and alpine heathland are the shorter growth period and lower soil temperatures in the arctic. Due to grazing (reindeer, rodents) the heathland occurs in mosaic with grasslands. Overgrazing leads to disappearance of lichen cover and specific species, like *Cladina stellaris*.

On Island, the same shrubs are characteristic of the tundra belt and, like in Norway, the transition towards boreal subalpine heathlands (habitat type F2.2a) is gradual. On young lava fields of Island vascular plants occur only scattered, and such pioneer stages of the habitat, dominated by the moss *Racomitrium lanuginosum*, sometimes accompanied by *R. ericoides*, are considered part of the shrub tundra.

Also on Jan Mayen, situated in the middle arctic belt, *Empetrum hermaphroditum* is the dominant species, growing together with the mentioned *Racomitrium* species and lichens. Here the type is found in a low, oceanic part of the island and - in contrast to other areas - there is no grazing.

On Svalbard shrub tundra is restricted to the warmest part of the island Spitsbergen, the "Innerfjord zone". This comprises the coastal regions of the central fjords of Spitsbergen, where no sea fog and relatively few clouds result in a slightly warmer climate. Here about 75% of all vascular plants of Svalbard is found. Locally, shrub dominates the tundra. Here, the habitat type is considered a relict vegetation of post-glacial warmer periods. *Empetrum nigrum* and *Vaccinium uliginosum* are the most important species, and here and there *Betula nana* and *Rubus chamaemorus* are found. In the same part of Svalbard low shrubland dominated by *Cassiope tetragona* forms a transition to Moss and Lichen Tundra (F1.2).

Indicators of quality:

In good conditions the habitat shows the following characteristics:

- Dominance of dwarf shrubs,
- No indication of overgrazing,
- No erosion patterns,
- No presence of non-native species (like *Lupinus nootkatensis*),
- High cover and high diversity of lichens and mosses.

Characteristic species:

Vascular plants: Betula nana, Cassiope tetragona, Empetrum hermaphroditum, Rubus chamaemorus, Salix ssp., Tofieldia pusilla, Vaccinium uliginosum

Mosses: Racomitrium ericoides, Racomitrium lanuginosum

Lichens: Cladina mitis, Cladina rangiferina, Cladina stellaris, Flavocetraria nivalis

Classification

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

Annex 1:

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EuroVegChecklist (alliances):

Loiseleurio-Arctostaphylion Kalliola 1939

Phyllodoco-Vaccinion myrtilli Nordhagen 1943

Emerald:

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MAES:

Heathland and shrub

IUCN:

3.1 Subarctic shrubland

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

Yes

Regions

Arctic

Justification

The habitat is an outstanding example for the Arctic Biogeographic region.

Geographic occurrence and trends

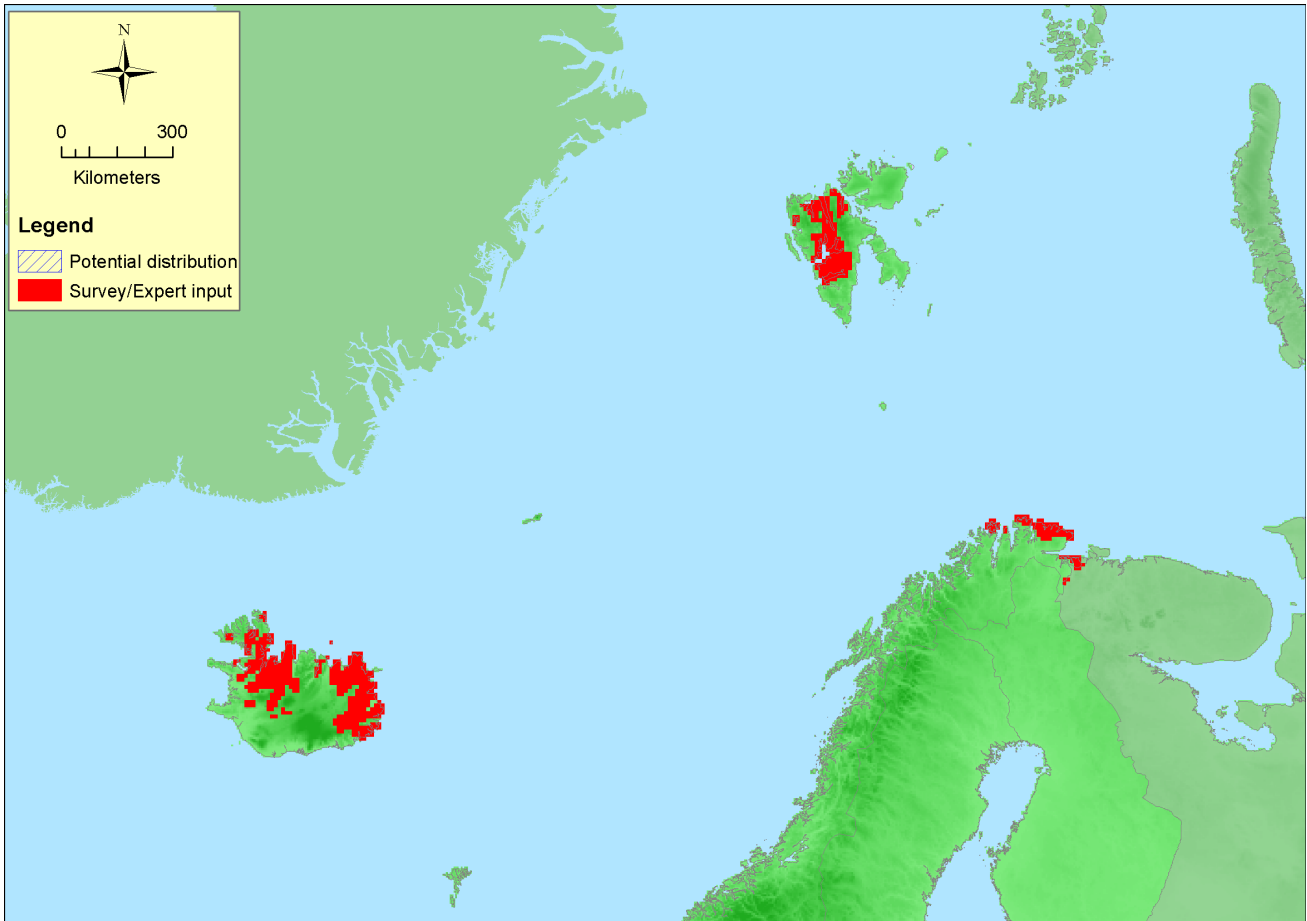
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
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EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Iceland</i>	Present	2000 Km ²	Stable	Stable
<i>Norway</i>	Norway Mainland: Present Svalbard: Present	1800 Km ²	Stable	Stable

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	- Km ²	-	- Km ²	occurs only outside EU28
EU 28+	693 Km ²	1733100	3800 Km ²	Rough estimate of area

Distribution map



The map is complete, but likely gives an overestimate of the distribution on Svalbard and Iceland, as it is based on the potential vegetation which is more or less similar to the actual vegetation for this habitat. Data source: BOHN.

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

0%. All area of the habitat is outside the EU28.

Trends in quantity

The area and quality of the habitat is probably stable over time as climate change mainly will make a shift in the distribution range. On Iceland it could be increasing in the future due to a reduction of grazing, but no good data exist.

- Average current trend in quantity (extent)

EU 28: -

EU 28+: Stable

- Does the habitat type have a small natural range following regression?

No

Justification

The range is larger than 50,000 km².

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

No

Justification

The habitat occurs in large patches and is not declining.

Trends in quality

There is no quantitative information, but the quality of the habitat is assessed to be stable over time in

Svalbard and northern Norway. On Iceland the decreased grazing may increase the quality.

- Average current trend in quality

EU 28: -

EU 28+: Stable

Pressures and threats

The habitat is under little threat today as grazing in Island is declining. Climate change will mostly affect a change in altitude and latitude of the habitat. A possible pressure in Svalbard is the reindeer grazing, but that pressure have to be considered as a natural, dynamic process.

List of pressures and threats

Agriculture

Intensive sheep grazing

Climate change

Temperature changes (e.g. rise of temperature & extremes)

Habitat shifting and alteration

Conservation and management

The only management needed is to have a representative part of the habitat legally protected. This is already done.

List of conservation and management needs

Measures related to spatial planning

Establish protected areas/sites

Establishing wilderness areas/allowing succession

Conservation status

No relation to Annex I types.

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

The processes in the Arctic are extremely slow, so the recovery of the habitat will take a long time.

Effort required

50+ years	200+ years
Naturally	Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	- %	- %	- %	- %
EU 28+	0 %	unknown %	unknown %	unknown %

No decline in area has been observed, and the resulting category therefore is Least Concern.

Criterion B: Restricted geographic distribution

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

No decline or threat is known, and AOO,EOO and number of locations are larger than the thresholds, leading to the category 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	- %	- %	- %	- %	- %	- %
EU 28+	0 %	0 %	unknown %	unknown %	unknown %	unknown %

Criterion C	C1		C2		C3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	- %	- %	- %	- %	- %	- %
EU 28+	0 %	0 %	unknown %	unknown %	unknown %	unknown %

Criterion D	D1		D2		D3	
	Extent affected	Relative severity	Extent affected	Relative severity	Extent affected	Relative severity
EU 28	- %	- %	- %	- %	- %	- %
EU 28+	0 %	0 %	unknown %	unknown %	unknown %	unknown %

No negative change in quality is known. The conclusion is Least Concern.

Criterion E: Quantitative analysis to evaluate risk of habitat collapse

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

No quantitative analysis that estimates the probability of collapse of this habitat type has been carried out for this habitat.

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	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EU28+	LC	DD	DD	DD	LC	LC	LC	LC	DD	DD	LC	DD	DD	LC	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
-	-	Least Concern	-

Confidence in the assessment

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

Assessors

M. Aronsson

Contributors

Working Group Heathland & Scrub: M. Aronsson, C. Bita-Nicolae, F. Bioret, A. Čarni, J. Capelo, P. Dimopoulos, J. Janssen & J. Loidi.

Reviewers

J. Janssen

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