

## F2.1 Subarctic and alpine dwarf Salix scrub

### Summary

Subarctic and alpine dwarf willow scrub is a habitat occurring outside the permafrost zone, mainly in the boreal and arctic-alpine mountains with more local occurrences further south and very sparsely in the high mountains of the nemoral zone. Long and deep snow cover protects against winter cold but melts to give way to a short growing period. Dwarf willows dominate and mosses and lichens are abundant but the associated flora depends on the acidity of the typically rudimentary soils. Tourist infrastructure and activities threaten in some localities and there is already evidence of decrease with climate warming to the north and smaller areas further south might be expected to be more vulnerable.

### Synthesis

The habitat seems to be stable in area and quality over the last 50 years, but with large natural fluctuations due to yearly snow cover and other (micro)climatic factors. It has a rather fast turn over, and can disappear or get established in a few decades. The quality of the habitat is decreasing a bit, but not so much to meet any red list criterion. Most of the decline in Europe is inside the EU28, outside Scandinavia and the arctic region. However, as climate change is considered a serious threat, it is expected that for the future a decline in area and quality may occur, resulting at least in a Near Threatened situation in the EU28. For the EU28+ the overall status is assessed as Least Concern (LC).

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	A2a, C/D2	Least Concern	-

### Sub-habitat types that may require further examination

This habitat has a huge distribution from the Balkans to Svalbard, and few species are in common through the whole range. A main subdivision in a Northern Scandinavian/Svalbard subtype and a Central/South European subtype seems needed, as the southern type is experiencing larger declines in area and quality, while more than 75% of the area of the present type is found in the north. A (further) subdivision between snowbed dwarfshrub on calcareous and acidic bedrocks is a second option.

### Habitat Type

#### Code and name

F2.1 Subarctic and alpine dwarf Salix scrub



*Salix retusa* and *Carex parviflora* in a snowbed vegetation on a calcareous plateau



Snow bed community with *Salix* species at Rana Saltfjellet Gubbeltædno, Norway

## Habitat description

Subarctic and alpine snowbed and snow-patch communities dominated by dwarf willows. The habitat type occurs north of or above the climatic tree limit, but outside the permafrost zone. *Salix* species characteristic to this habitat type are usually under 10 cm in height, and rarely exceed 1,5 m. Dwarf scrub is well developed in boreal and arctic mountains and subarctic lowlands.

The habitat type occurs in boreal and arcto-alpine mountains of Fennoscandia, in the Alps, Pyrenees, Carpathians and Caucasus. Occurrences of the habitat type exist locally also in southern mountains in Europe. In mountains of the nemoral and warm-temperate zones, stands of dwarf willow scrub are of much smaller extent and are characteristic of late-lying snow patches.

The habitat type is found on both siliceous and calcareous bedrock, being more species-rich in the latter. There is no single characteristic species describing all the occurrences, but the vegetation varies in different geographic areas and according to the substrate. Communities vary from acidophile-acidocline vegetation with typical species like *Salix herbacea*, *Carex firma*, *Salix retusa*, *Aster alpinus* and *Carex sempervirens* (alliances *Salicion herbaceae*, *Cassiopo-Salicion herbaceae*, *Salici herbaceae-Caricion lachenalii*) to calciphile-calcicline vegetation (alliances *Arabidion caeruleae*). Typical species of the latter are e.g. *Salix polaris*, *Salix reticulata*, *Salix retusa*, (incl. *Salix kitaibeliana*), *Poa alpina*, *Selaginella selaginoides* and *Bistorta vivipara*.

The communities are adapted to short growing season and late-lying snow, which lasts up to 8-10 months. The humus layer is thin and the soil is gravel or sand. After melting, the habitat can be rather dry in summer. Dwarf willows dominate the vegetation, but mosses and lichens are also abundant.

Snowbed communities dominated by grasses, forbs or mosses do not belong to this habitat type, but are included in type E4.1.

Indicators of good quality:

The following characteristics are indicators of good quality:

- Dominance of dwarf willows
- Late-lying snow cover

Characteristic species:

Flora, Dwarf shrubs: *Salix herbacea*, *Salix polaris*, *Salix reticulata*, *Salix retusa*, *Salix kitaibeliana*

Herbs and grasses: *Alchemilla pentaphyllea*, *Antennaria alpina*, *Arabis caerulea*, *Aster alpinus*, *Bistorta vivipara*, *Carex bigelowii*, *C. firma*, *C. foetida*, *C. lachenalii*, *C. sempervirens*, *Cassiope hypnoides*, *Diphysiatrum alpinum*, *Dryas octopetala*, *Epilobium anagallidifolium*, *Erigeron uniflorus*, *Festuca ovina*, *Gnaphalium hoppeanum*, *G. supinum*, *Luzula alpinopilosa*, *Oxyria digyna*, *Pinguicula alpina*, *Poa alpina*, *Ranunculus glacialis*, *R. nivalis*, *R. pygmaeus*, *Saxifraga cernua*, *Selaginella selaginoides*, *Sibbaldia procumbens*, *Silene acaulis*, *Thalictrum alpinum*, *Tofieldia pusilla*, *Veronica alpina*, *Viola biflora*  
In Iceland additionally: *Phleum alpinum*, *Pyrola minor*, *Taraxacum* spp.

Mosses and liverworts: *Anthelia juratzkana*, *Athalamia hyaline*, *Conostomum* spp., *Blepharostoma trichophyllum*, *Dicranum* spp., *Distichium capillaceum*, *Hylocomium splendens*, *Kiaeria starkei*, *Kiaeria* spp., *Marsupella* spp., *Pleurocladula albescens*, *Pohlia drummondii*, *Polytrichastrum alpinum*, *Polytrichum* spp., *Sanionia uncinata*,

Lichens: *Cetrariella delisei*, *Cetraria islandica*, *Cladonia coccifera*, *Lecidea caesioatra*, *Ochrolechia* spp., *Pertusaria* spp., *Psora decipiens*, *Solorina crocea*, *Stereocaulon alpinum*, *Stereocaulon* spp.

Fauna

*Mammals: Lemmus lemmus*

### Classification

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

Annex 1:

6150 Siliceous alpine and boreal grasslands (*small part*)

6170 Alpine and subalpine calcareous grasslands (*small part*)

EuroVegChecklist (alliances):

*Salicion herbaceae* Br.-Bl. in Br.-Bl. et Jenny 1926

*Salici herbaceae-Caricion lachenalii* Béguin et Theurillat 1982

*Arbidion caeruleae* Br.-Bl. in Br.-Bl. et Jenny 1926

*Cassiopo-Salicion herbaceae* Nordhagen 1943

Emerald:

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MAES-2:

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

Alpine

Arctic

Justification

The habitat is very characteristic for alpine areas, where it occurs in the largest area in northern Europe. Outside the EU28 it is also typical for the Arctic 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)
<i>Austria</i>	Present	Unknown Km <sup>2</sup>	Unknown	Unknown
<i>Bulgaria</i>	Present	unknown Km <sup>2</sup>	Decreasing	Decreasing
<i>Finland</i>	Finland mainland: Present	12 Km <sup>2</sup>	Stable	Stable
<i>France</i>	France mainland: Present	172 Km <sup>2</sup>	Decreasing	Decreasing
<i>Germany</i>	Present	1 Km <sup>2</sup>	Decreasing	Decreasing
<i>Italy</i>	Italy mainland: Present	150 Km <sup>2</sup>	Decreasing	Decreasing
<i>Poland</i>	Present	3.5 Km <sup>2</sup>	Stable	Stable
<i>Romania</i>	Present	0.2 Km <sup>2</sup>	Stable	Decreasing

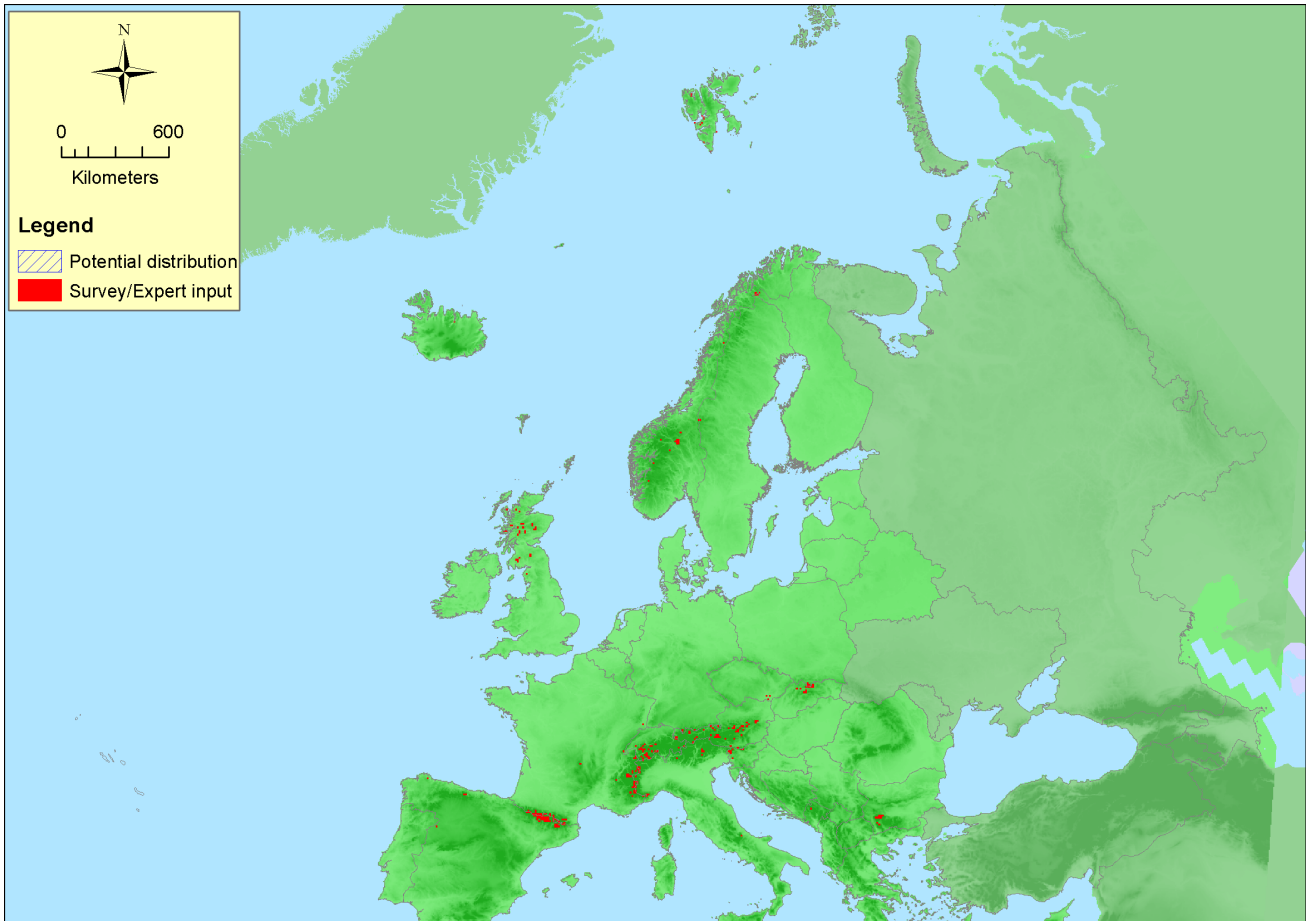
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Slovakia</i>	Present	0.2 Km <sup>2</sup>	Stable	Stable
<i>Slovenia</i>	Present	1.0 Km <sup>2</sup>	Stable	Decreasing
<i>Spain</i>	Spain mainland: Present	23 Km <sup>2</sup>	Stable	Unknown
<i>Sweden</i>	Present	565 Km <sup>2</sup>	Decreasing	Stable

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	2 Km <sup>2</sup>	Stable	Stable
<i>Former Yugoslavian Republic of Macedonia (FYROM)</i>	Present	unknown Km <sup>2</sup>	Decreasing	Decreasing
<i>Iceland</i>	Present	380 Km <sup>2</sup>	Unknown	Unknown
<i>Norway</i>	Jan Mayen: Present Norway Mainland: Present Svalbard: Present	3417 Km <sup>2</sup>	Stable	Stable
<i>Switzerland</i>	Present	600 Km <sup>2</sup>	Stable	Stable

### 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>	4964700 Km <sup>2</sup>	231	928 Km <sup>2</sup>	Lacking data mainly from Austria
<i>EU 28+</i>	7339600 Km <sup>2</sup>	280	5327 Km <sup>2</sup>	Main area of this habitat is in Norway (incl. Svalbard).

### Distribution map



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

Probably less than 25% as Switzerland, Iceland and Norway contain a huge portion of the habitat. The only EU28 member state with a big area is Sweden.

### Trends in quantity

Data on this habitat is very poor, with large gaps in data. Depending on the interpretation of existing data the trend could be decreasing, but less than 1%, or stable. Conclusion is therefore stable.

- Average current trend in quantity (extent)  
 EU 28: Stable  
 EU 28+: Stable
- Does the habitat type have a small natural range following regression?  
 No  
*Justification*  
 The range extent (EEO) is much larger than 50,000 km<sup>2</sup>.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?  
 Yes  
*Justification*  
 The habitat has a large natural range, but within the range the habitat is in most cases restricted to small sites where the snow lasts relatively long.

## Trends in quality

The data is weak as there are big gaps in the data, but existing figures give a severity less than 25% within an affected extent of less than 25%.

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

## Pressures and threats

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The dominating threat for the habitat is climate change that will change the distribution, quantity and quality of the habitat. At local level several other threats can be acting, like building for skiing complex and other tourist accommodations. Overgrazing could be a local problem, mainly because of too heavy trampling by cattle.

### List of pressures and threats

#### Agriculture

Intensive grazing

#### Human intrusions and disturbances

Outdoor sports and leisure activities, recreational activities  
Skiing complex  
Trampling, overuse

#### Climate change

Temperature changes (e.g. rise of temperature & extremes)  
Droughts and less precipitations  
Habitat shifting and alteration

## Conservation and management

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No possible management is known to address negative effects of climate change, the dominating threat, except international reduction of CO<sub>2</sub> output. To prevent different local threats from human activities, a representative number of protected areas is needed, large enough to take into account distribution changes due to climate change.

### List of conservation and management needs

#### No measures

No measure known / impossible to carry out specific measures

#### Measures related to spatial planning

Establish protected areas/sites  
Legal protection of habitats and species

### Conservation status

Annex I:

6150: ALP FV, ATL U2, BOR FV

6170: ALP U1, ATL U2

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

The habitat can probably recover relatively fast if it is affected. It is depending on the (micro)climate, including snowcover time and depth. As this habitat is extremely climate dependent no possible management to make the habitat recover faster is known.

### Effort required

50+ years
Naturally

## Red List Assessment

### Criterion A: Reduction in quantity

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

The calculation of average European trends gives figures very close to zero. But the trend varies a lot between the countries, from stable (Romania, Switzerland) to 50-70% decrease in Germany. Several countries report possible future reductions due to climate change, but no quantitative data is available for criterion A2a. However, for the EU28 a Near Threatened status for A2a is concluded, as the central European mountains are likely to be much more affected than the Scandinavian ones (compare the assessment of grassland snow beds E4.1). The likely lower and slower affects in the boreal and arctic regions, lead to the conclusion Least Concern for EU28+.

### Criterion B: Restricted geographic distribution

Criterion B	B1			B2			B3		
	EEO	a	b	c	AOO	a		b	c
EU 28	>50000 Km <sup>2</sup>	No	Yes	No	>50	No	Yes	No	No
EU 28+	>50000 Km <sup>2</sup>	No	Yes	No	>50	No	Yes	No	No

EEO, AAO and number of locations are much larger than the thresholds for criteria under B. Even if there is a serious threat (climate change) the assessment is 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	15 %	24 %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	3 %	24 %	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%

Some degradation over the last 50 years took place in part of the area, mostly inside the EU28, but the values are relatively low, leading to the conclusion Least Concern. For the future however large areas will be affected negatively due to climate change, especially in the EU28. No quantitative data is available, but a Near Threatened status is concluded for the EU28 for criterion C/D2 and C/D1.

### 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	LC	NT	DD	DD	LC	LC	DD	LC	NT	DD	DD	NT	DD	DD	DD	DD	DD
EU28+	LC	LC	DD	DD	LC	LC	DD	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
Near Threatened	A2a, C/D2	Least Concern	-

### Confidence in the assessment

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

### Assessors

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### Reviewers

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27/01/2016



## Date of review

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## References

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