

H2.1 Boreal and arctic siliceous scree

Summary

The habitat comprises Boreal and Arctic unvegetated siliceous boulders, stones or gravel screes occurring over base-poor substrates that harbour acidophilous plant communities. They are of diverse origin, uneven distribution through the region and often subject to continuing natural disturbance through rock falls, freeze-thaw or coastal erosion and deposition. The vegetation typically consists of lichens and bryophytes with different growth forms dominating different microhabitats, e.g. crustose and foliose lichens and small-cushion forming bryophytes on the sides of boulders, and fruticose lichens and mat forming bryophytes in the hollows between blocks. Where vascular plants find enough soil between blocks, they contribute a sparse cover. Potential threats are mainly related to climate change, touristic activities and the absence of a proper disturbance regime. Ensuring the latter is the major goal with regards to the conservation of this habitat.

Synthesis

The habitat is assessed as Least Concern (LC) under criterion A1 in both EU28 and EU28+. There is no direct or indirect evidence or suspicions about significant quantitative changes in the habitat within the last 50 years. A small proportion of habitat type occurrences has been destroyed in various construction projects and changed into woodland or scrub habitat types through overgrowth. Human-induced overgrowth may have caused also some changes in the vegetation and species composition (especially in the southern part of the boreal zone) but all in all qualitative changes are regarded slight, leading to the same category (Least Concern) under criterion C/D1. It should be noticed that actual data about the quantity and quality of the habitat was received only from Finland, and the overall status was inferred from that data and from general knowledge about potential threats within the boreal zone.

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

Sub-habitat types that may require further examination

In Finland, the habitat type partly corresponds to 6.5 Scree (with all its subtypes), 8.9.5 Mountain oligotrophic and mesotrophic boulder fields and 8.10.1 Oligotrophic and mesotrophic talus formations. The majority of the mentioned partly corresponding habitat types are categorized as LC in the assessment of threatened habitat types in Finland (the scree habitats have been assessed in Kontula et al. 2008).

Habitat Type

Code and name

H2.1 Boreal and arctic siliceous scree



Siliceous screes in the landscape near Laerdalstunnel, Norway (Photo: Daniel Dítě).



Cerastium regellii, Petumbiabukta Bay, Svalbard (Photo: Petr Šmarda).

Habitat description

This habitat type includes all kinds of boreal and arctic unvegetated accumulations of siliceous boulders, stones or gravel, except for the littoral habitats. They form a base-poor substrate that harbours acidophilous plant communities. The habitat type is heterogeneous in regard to its biota, as it extends from the small blockfields of the southern boreal taiga to the highlands of Iceland. Screes and blockfields are produced by various geological processes. Scree usually refers to a collection of broken rock fragments on slopes or under cliffs produced by slope processes (also called talus formations). Screes often show a sorting of rock fragments. The largest blocks falling off from cliff faces roll down the furthest, whereas the finest material accumulates in the uppermost part of the slope. Other boulder and gravel fields originate from glacial deposition, frost action breaking rock outcrops in situ, or e.g. frost heaving from moraine. Rock glaciers and ice-dominated moraines are distinguished as a separate habitat H4.3, however. Yet another type of boulder fields is related to ancient beach deposits constituted by former coastal constructional processes. Sparsely vegetated screes and block and gravel fields are distributed across the whole boreal and arctic region but with varying abundance. The largest screes are found in Iceland (incl. gravel fields) and along the Scandinavian Mountain range, where they reach mid- or high-alpine levels. Large stable blockfields cover mountaintops in northern Fennoscandia and some quite large ancient beach deposits encircle high hills along the ancient coasts of the Baltic Sea. The vegetation of scree slopes represents a complex that covers many vegetation types from forests at the foot of the slopes to scrubs and sparsely vegetated unstable screes in the upper parts of formations. The forest and scrub types are not included in the habitat described here, but included under G- and F-types, respectively. More or less flat boreal blockfields may be also covered by trees or sometimes by scrubs, but also in this case, the habitat type in question only refers to open areas that do not have a tree or scrub layer. In such screes, the most characteristic assemblages of vascular plants are found in unstable patches, where also weak competitors can persist. In other blockfields, the role of vascular plants is small. The vegetation typically consists of lichens and bryophytes with different growth forms dominating different microhabitats, e.g. crustose and foliose lichens and small cushion-forming bryophytes on the sides of boulders, and fruticose lichens and mat-forming bryophytes in the hollows between blocks. Where vascular plants find enough soil between blocks, they form sparse vegetation. Transitions may occur towards grasslands or heathlands while near mountain summits transitions towards fjell-fields (H5.1) may be found. Probably the most important steering factor in screes and blockfields is a natural or semi-natural disturbance regime, which maintains characteristic species assemblages. In the arctic, gravel and blockfields are kept open just by the harsh climate, but in the boreal zone slow overgrowth has been observed in some regions. In screes, the disturbance regime is characterized by the continuum of periodic rockfall, instability of the substrate, and in some regions also by the long tradition of grazing. In some cases, grazing or, e.g., hiking or mountaineering activities may cause additional erosion in the habitat to such an extent that it disturbs the formation of typical vegetation. In forested areas, especially small blockfields tend to become more and more vegetated, starting gradually from the margins. In these habitats, the characteristic scarce

vegetation may be in the long run dependent on regular forest fires.

Indicators of good quality:

- natural or seminatural disturbance regime, with a continuum of periodic rockfall and instability of the substrate or (in some cases) forest fires
- no or little succession towards scrub and forest
- continuation of traditional grazing (where relevant)
- no disturbance (for example by hiking, grazing, etc.)
- diversity of lichen, moss, and vascular plant species

Characteristic species:

Flora: Majority of the listed species are relevant for the Scandinavian scree habitats, where they represent floral elements from the southern Boreal region to mid- or high alpine levels. Species relevant also or especially for boreal blockfields are indicated with*, those relevant especially for Icelandic screes and gravel fields with (I) and those mainly for Svalbard with (S).

Vascular plants: *Alchemilla alpina* (I), *Arabis alpina* (I), *A. glabra*, *Arctostaphylos uva-ursi**, *Arenaria norvegica* (I, common and not restricted to particularly baserich screes in Iceland), *Armeria maritima* (I), *Calamagrostis epigejos*, *Campanula rotundifolia*, *Cardaminopsis petraea*, *Carex bigelowii* (I), *C. capillaris* (I), *C. rupestris*, *Cerastium alpinum* coll., *C. arcticum* (S), *C. regelii* (S), *Cryptogramma crispera**, *Cystopteris fragilis**, *Deschampsia alpina*, *D. flexuosa*, *Draba daurica*, *D. incana*, *D. norvegica*, *Dryas octopetala* (I, not restricted to particularly baserich screes in Iceland), *Dryopteris carthusiana**, *Empetrum nigrum**, *Epilobium angustifolium*, *E. collinum*, *E. latifolium* (I), *Equisetum variegatum* (I), *Erigeron acer* ssp. *politus*, *Erysimum strictum*, *Festuca ovina*, *F. rubra*, *F. vivipara*, *Galium normanii* (I), *G. verum*, *Gentiana nivalis* (I), *Gymnocarpium dryopteris**, *Hieracium alpinum* (I), *Huperzia selago*, *Juncus trifidus*, *Juniperus communis*, *Lotus corniculatus*, *Luzula arcuata*, *L. spicata*, *Minuartia biflora*, *M. rubella* (I), *M. stricta* (I), *Oxyria digyna*, *Papaver radicum* coll. (I, S), *Poa alpina*, *P. glauca*, *P. nemoralis*, *Polygonatum odoratum*, *Polypodium vulgare**, *Polystichum lonchitis*, *Potentilla crantzii*, *P. robbinsiana* ssp. *hyparctica* (S), *P. nivea*, *Ranunculus glacialis*, *R. sulphureus* (S), *Rhodiola rosea*, *Rosa villosa*, *Rubus idaeus*, *R. saxatilis*, *Salix herbacea*, *S. starkeana*, *Saxifraga aizoides* (I), *S. cernua* (S), *S. groenlandica* (S), *S. nivalis*, *S. oppositifolia*, *Sedum annum*, *S. telephium*, *Silene acaulis*, *S. uniflora* (I), *Solidago virgaurea*, *Thalictrum alpinum*, *Thymus praecox* ssp. *arcticus* (I), *Tofieldia pusilla* (I), *Trisetum spicatum*, *Vaccinium myrtillus**, *V. vitis-idaea**, *V. uliginosum**, *Verbascum nigrum*, *Verbascum thapsus*, *Veronica fruticans*, *Vicia sylvatica*, *Viola canina* ssp. *montana*, *V. tricolor*, *Viscaria alpina*, *V. vulgaris*, *Woodsia ilvensis**

Mosses: *Andraea rupestris*, *Dicranum scoparium*, *Pleurozium schreberi*, *Ptilidium ciliare*, *Polytrichum* spp., *Racomitrium lanuginosum*, *R. microcarpon*, *Tetralophozia setiformis*

Lichens: *Arctoparmelia* spp. (especially *A. centrifuga*), *Brodoa intestiniformis*, *Cetraria* spp., *Cetrariella commixta*, *Chrysothrix chlorina*, *Cladina* spp., *Cladonia* spp. *Diploschistes scriposus*, *Lecanora* spp., *Lecidea sensu lato*, *Melanelia* spp., *Ophioparma ventosa*, *Parmelia saxatilis*, *Porpidia* spp., *Protoparmelia badia*, *Rhizocarpon* spp., *Stereocaulon* spp., *Umbilicaria* spp.

Classification

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

EUNIS:

H2.1 Cold siliceous screes

EuroVeg Checklist:

Allosuro-Athyrium alpestris Nordhagen 1943

Antitrichio-Rhodiolion roseae Hadač 1971

Andreaeion petrophilae Šmarda 1944

Racomitrium lanuginosi von Krusenstjerna 1945

Umbilicarium cylindricae Frey 1933

Rhizocarpion alpicolae Frey ex Klement 1955

Annex 1:

8110 Siliceous scree of the montane to snow levels

Emerald:

H2.1 Cold siliceous screes

MAES-2:

Sparsely or unvegetated land

IUCN:

6 Rocky areas

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

Yes

Regions

Boreal

Arctic

Justification

The habitat type occurs in the Boreal and Arctic zone only.

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>Finland</i>	Aland Islands: Present Finland mainland: Present	700 Km ²	Stable	Stable
<i>Sweden</i>	Present	Unknown Km ²	Unknown	Unknown
<i>UK</i>	United Kingdom: Present	Unknown Km ²	Unknown	Unknown

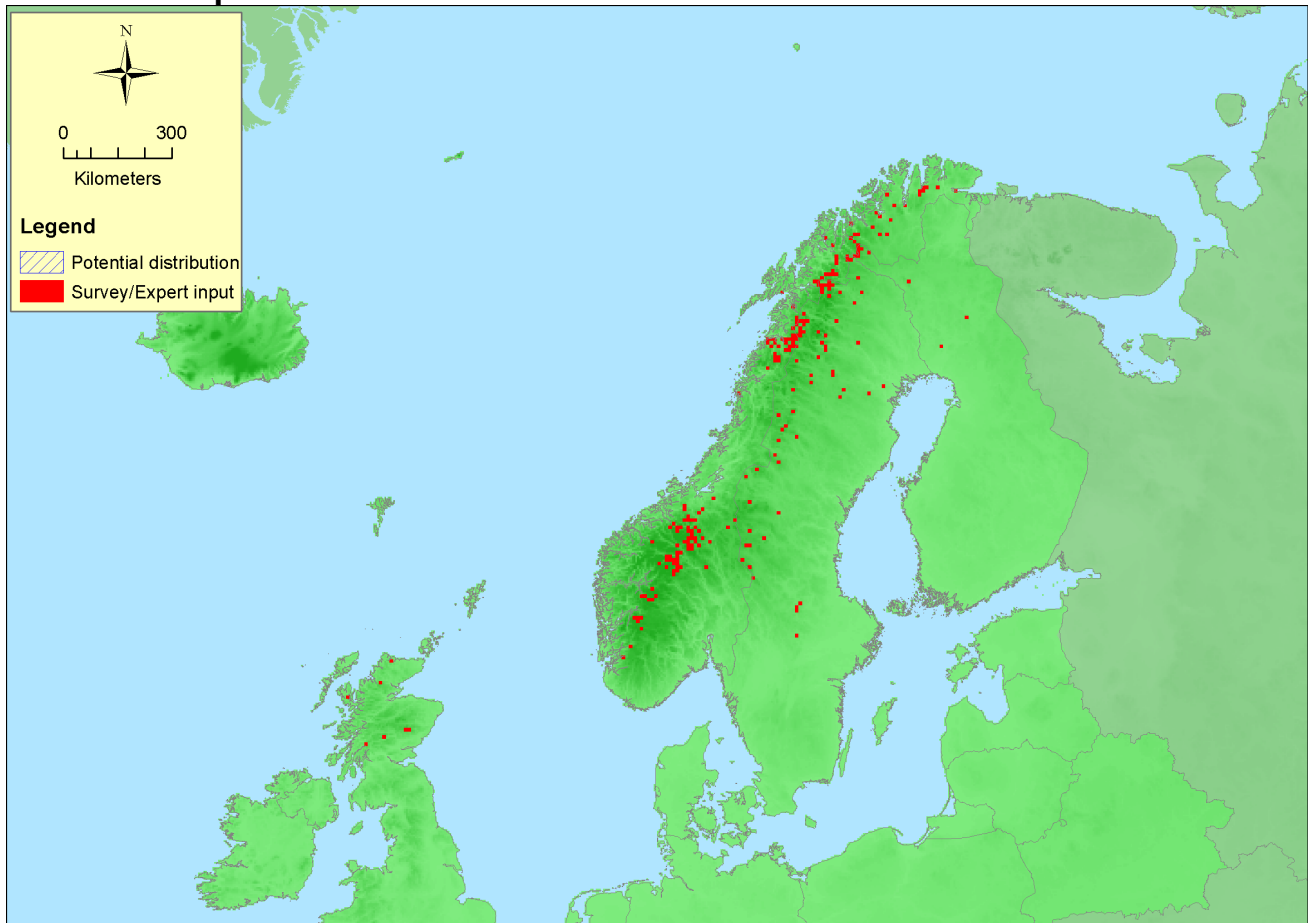
EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Iceland</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Norway</i>	Jan Mayen: Present Norway Mainland: Present Svalbard: Present	Unknown Km ²	Unknown	Unknown

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
<i>EU 28</i>	950000 Km ²	93	>700 Km ²	

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28+	1093050 Km ²	222	Unknown Km ²	

Distribution map



The map is rather incomplete, especially for Svalbard and Iceland. Data sources: Art17, EVA, GBIF.

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

Within the EU28+, the habitat type occurs in Finland, Sweden, Iceland, and Norway. Outside the EU28+, it is found in (boreal and subarctic) Russia and on Greenland.

Trends in quantity

Both the historical trend as well as the trend over the last 50 years is unknown due to a lack of data, but the characteristics of the habitat type are supposed to be in a stable status.

- 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 habitat is widespread in the Arctic. The EOO is much higher than 50.000 km². There is no information available about a recent significant decrease.

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

No

Justification

The habitat occupies large areas across the Arctic and Boreal zone.

Trends in quality

The trend in quality over the last 50 years is probably stable. According to Finnish experts, the pressures affecting boulder fields have been low, but due to a lack of data, the calculation of trends in quality is not possible.

- Average current trend in quality

EU 28: Stable

EU 28+: Stable

Pressures and threats

There are no significant pressures. Potential threats are: (1) the absence of a natural or semi-natural disturbance regime, which maintains characteristic species assemblages, (2) climate changes (in the Arctic, gravel and block fields are kept open just by the harsh climate, but in the Boreal zone, slow overgrowth has been observed in some regions), (3) in some regions extensive grazing, or (4) hiking or mountaineering activities, and (5) in forested areas, especially small blockfields tend to become more and more vegetated, starting gradually from the margins. In the long run, the characteristic scarce vegetation of these habitats may be dependent on regular forest fires.

List of pressures and threats

Agriculture

Non intensive grazing

Sylviculture, forestry

Forest replanting (native trees)

Geological events, natural catastrophes

Earthquake

Collapse of terrain, landslide

Climate change

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

Conservation and management

The most important steering factor in Boreal and Arctic siliceous scree and block fields is a natural or semi-natural disturbance regime, which maintains characteristic species assemblages. Due to the necessity of natural processes, only the establishment of protected areas is an optimal regime for environmental policy and conservation.

List of conservation and management needs

Measures related to spatial planning

Establish protected areas/sites

Manage landscape features

Measures related to special resource use

Regulating/Management exploitation of natural resources on land

Conservation status

Annex I:

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

The recovery of the habitat is possible but requires the existence of natural processes over a long time-period.

Effort required

200+ 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 %

Only data from Finland were available for the estimation of current, past and future trends in quantity.

Criterion B: Restricted geographic distribution

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

EOO, AOO and number of locations are much larger than the thresholds for criteria 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	unknown %	unknown %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	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 %

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%

Only limited data for the estimation of current, past and future trends in quality were available (only from Finland). However, there is no direct or indirect evidence or suspicions about significant quantitative changes in the habitat within the last 50 years. A small proportion of habitat type occurrences has been destroyed in various construction projects and changed into woodland or scrub habitat types through overgrowth. Human-induced overgrowth may have caused also some changes in the vegetation and species composition (especially in the southern part of the boreal zone) but all in all qualitative changes are regarded slight, leading to the same category (Least Concern) under criterion 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	DD	DD	DD	LC	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	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
Least Concern	-	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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Date of review

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