H3.2a Boreal and arctic base-rich inland cliff

Summary

These vegetated cliffs on base-rich (not ultramafic or salt-sprayed) bedrocks, comprise a highly natural habitat type scattered across the boreal region, including Scotland and maybe Iceland. They are often rich in ferns, crustose lichens and, in sunless, damp situations, particularly in more oceanic areas, bryophytes. They have been much destroyed by mining, afforestation on open ground and dispersed urbanization and quality altered by the overgrowth of open habitats through lack of fires, atmospheric nitrogen-inputs and also succession to scrub and woodland.

Synthesis

Despite the very good quality of Finnish data it is not possible to extrapolate them to other countries without data from at least one other country from the boreal region to get a more complete picture. Therefore this habitat type is labelled as Data Deficient (DD).

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Data Deficient	-	Data Deficient	-

Sub-habitat types that may require further examination

No sub-habitats have been distinguished for further analysis.

Habitat Type

Code and name

H3.2a Boreal and arctic base-rich inland cliff

An inland calcareous rock outcrop, Lyngen, Norway (Photo: K. Bjørklund, Skog og landskap).

A low calcareous rock face with ferns and bryophytes, southern Finland (Photo: Tytti Kontula).

Habitat description

These are vegetated cliffs of calcareous and other base-rich rocks found in the boreal and arctic biogeographical regions, in Iceland, Svalbard, the North Sea Island groups of the Hebrides, Shetlands and Faroes, Fennoscandia, and further in northern Russia. As extensive limestone mountains are almost absent in Northern Europe, base-rich cliff habitats are confined to areas of igneous bedrock and, locally, dolomitic rocks or calcareous siltstone and beyond, though the habitat type has a circumpolar distribution in the northern Palaearctic, it is fragmented for geological reasons. It does not include cliffs in the immediate sea spray zone (in B3.1a) or ultramafic cliffs (in H3.2e).

Boreal and arctic base-rich cliffs are important habitats for low-competitive bryophytes, lichens and specialist vascular plants and from a phytogeographic and evolutionary point of view the boreal mountains and the arctic share interesting relict Arctic-alpine plants with the Alps and the Carpathians. Nordic cliffs are poor in vascular plants but species of the genera *Asplenium*, *Draba* and *Saxifraga* may be gregarious in sheltered humid places, the latter especially in the alpine belt. Regional and altitudinal variation in species composition is high but among vascular plants, *Asplenium viride, Woodsia glabella* and *Saxifraga nivalis* may be regarded as characteristic for the base-rich boreal cliffs of northern and eastern Fennoscandia, although *A. viride* also occurs in ultrabasic cliffs.

The bryophyte component of the vegetation may be species-rich particularly in sun-averted crevices and on damp rock and is best developed in oceanic areas such as in southwestern Norway and Iceland. Numerous acrocarpous moss genera and hepatics are represented, among others *Anoectangium*, *Didymodon*, *Encalypta*, *Grimmia*, *Gymnostomum*, *Gyroweisia*, *Leiocolea*, *Orthotrichum*, *Schistidium*, *Tortella*, and *Tortula* and among the most abundant and widespread bryophytes are *Distichium capillaceum, Ditrichum flexicaule, Encalypta streptocarpa* and *Tortella tortuosa.* Exposed rock faces may be covered by crustose lichens (e.g. *Acarospora*, *Caloplaca*, Collema, *Farnoldia*, *Thelidium*, *Polyblastia*, *Protoblastenia* and *Verrucaria*) and other epilithic organisms.

Indicators of good quality

- Occurrence of rare species of bryophytes, lichens and phytogeographically significant vascular plants,
- Presence of sizeable open exposed rock with species-rich bryophyte carpets and lichen crusts
- Variety of aspects of rock walls, exposure to insolation, moisture and rock structures such as overhangs, cavities, rock shelters, ledges
- Contact with natural habitats such as screes, boulder fields and pioneer grasslands
- Absence of quarrying and control structures
- Absence of garbage dumping and anthropogenic nutrient input from above the cliff
- Absence of rock climbing facilities
- Absence of alien species

Characteristic species

Vascular plants: *Arabidopsis petraea, Arabis alpina, Arenaria norvegica subsp. norvegica, Asplenium ruta-muraria, A. scolopendrium, A. trichomanes subsp. quadrivalens, A. viride), Campanula rotundifolia, Cystopteris fragilis (subsp. fragilis, subsp. alpina, subsp. dickieana), Draba fladnizensis, D. incana, Poa glauca, Polypodium vulgare, Potentilla crantzii, Rhodiola rosea, Saxifraga adscendens subsp. adscendens, S. nivalis, S. paniculata, S. rivularis, Sedum spp., Viscaria alpina, Woodsia alpina*.
Bryophytes: *Anoectangium aestivum, Anomodon spp., Barbula convoluta, Brachythecium glareosum, Bryoeryhtrophyllum recurvirostrum, Campyliadelphus chrysophyllus, Cnestrum alpestre, Conocephalum conicum, Ctenidium molluscum (esp. in the west), Didymodon icmadophilus, Distichium capillaceum, Ditrichum flexicaule, Encalypta affinis, Encalypta streptocarpa, Grimmia anodon, Gymnostomum*

aeruginosum, Gyroweisia tenuis, Homalothecium sericeum, Hypnum recurvatum, Isopterygiopsis pulchella, Leiocolea bantriensis, Leiocolea collaris, Leiocolea heterocolpos, Lophozia gillmanii, Lophozia heterocolpos, Mnium stellare, Myurella julacea, Neckera crispa, Orthothecium strictum, Orthotrichum anomalum, Plagiopus oederiana, Pohlia cruda, Preissia quadrata, Rhytidium rugosum, Saelania glaucescens, Sauteria alpina, Schistidium spp., Timmia austriaca, Timmia comata, Tortella tortuosa

Lichens: *Aspicilia calcarea, Aspicilia contorta, Acarospora heppii, Acarospora glaucocarpa, Acarospora macrospora, Caloplaca citrina, Caloplaca ruderum, Caloplaca saxicola, Collema cristatum, Farnoldia jurana, Farnoldia micropis, Farnoldia similigena, Gyalecta jenensis, Lecanora albescens, Lecanora dispersa, Lecanora crenulata, Lecidella stigmatea, Lepraria crassissima, Phaeophyscia nigricans, Physcia caesia, Protoblastenia calva, Protoblastenia incrustans, Rhizocarpon umbilicatum, Rinodina bischoffii, Sarcogyne pruinosa, Squamarina lentigera, Thelidium decipiens, Thelidium incurvatum, Thelidium papulare, Thelidium pyrenophorum, Toninia alutacea, Toninia candida, Verrucaria calciseda, Verrucaria nigrescens, Verrucaria foveolata.*

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

EUNIS:

H3.2 Basic and ultra-basic inland cliffs

EuroVegChecklist:

Cymbalario-Asplenion Segal 1969
Violo biflorae-Cystopteridion alpinae Fernandez Casas 1970

Annex 1:

8210 Calcareous rocky slopes with chasmophytic vegetation is geographically much wider circumscribed than H3.2a but includes a subtype corresponding to H3.2a (Subtype 62.1C - Boreal communities with Asplenium viride, Woodsia glabella).

Emerald:

H3.2 Basic and ultra-basic inland cliffs

MAES-2:

Sparsely vegetated land

IUCN:

6. Rocky area

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

Regions
Boreal
Arctic

Justification
Base-rich cliffs and rocks outcrops are widely represented in Europe but this type is characteristic of the arctic and boreal regions.

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)
Estonia	Uncertain	Km^2	-	-
Finland	Finland mainland: Present	5 Km^2	Decreasing	Decreasing
Latvia	Uncertain	Km^2	-	-
Lithuania	Uncertain	Km^2	-	-
Sweden	Present	unknown Km^2	Unknown	Unknown
UK	United Kingdom: Present	unknown Km^2	Stable	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)
Iceland	Present	unknown Km^2	Unknown	Unknown
Norway	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
EU 28	2014150 Km^2	985	unknown Km^2	Data are available for Finland only.
EU 28+	2014150 Km^2	985	unknown Km^2	Data are available for Finland only.

Distribution map
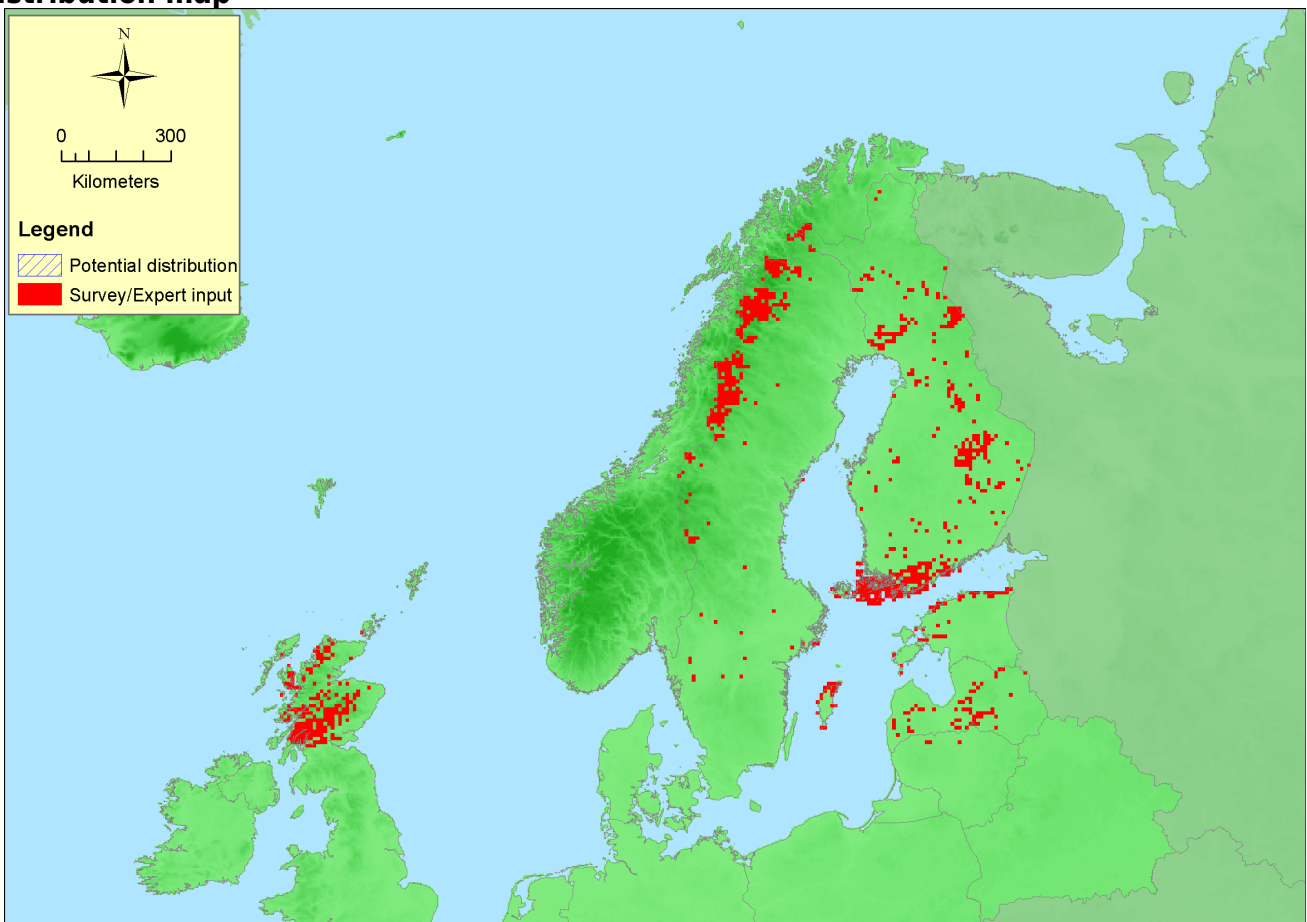
The map is incomplete for Norway (incl. Svalbard) and (possibly) Iceland. Data sources: Art17.

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

About 50%. Following the description, this habitat type is found across the entire boreal zone in the northern hemisphere. We assume a reasonable proportion to be located in the EU28 because there are many mountainous areas.

Trends in quantity

Finland has reported a moderate decline between -5 and -20 % in relation to vegetation overgrowth, mining and construction projects. No other country in the arctic ad boreal regions has reported data for this habitat type and it is not possible to extrapolate to these countries without at least data from Sweden or Norway, which have this habitat in a very different context, further north and higher in altitude, than southern Finland.

- Average current trend in quantity (extent)
  EU 28: Unknown
  EU 28+: Unknown
- Does the habitat type have a small natural range following regression?
  No
  Justification
  This habitat occurs in small stands but is widely distributed with an EOO >50.000 km².
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  Yes
  Justification
  Despite a relatively widespread distribution in southern Finland and northern Sweden, this habitat type occurs naturally only a small spots, when habitat conditions are appropriate. Consequently, it does have an intrinsically restricted area of occurences.

Trends in quality

Finland, the only source of data, has reported a moderate decrease in quality (50 % severity) over quite a large extent (40-60% extent) because of overgrowth of open habitats, related to the lack of fires, atmospheric nitrogen-input, species composition change with succession and also forest planting on open ground. It is not possible to extrapolate to these countries without at least data from Sweden or Norway, which have this habitat in a very different context, further north and higher in altitude, than southern Finland.

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

Pressures and threats

Based on Finnish data only: the main threat is overgrowth of vegetation in relation to the lack of fires, the higher atmospheric nitrogen-inputs, the species composition changes (succession). Forest plantations on open ground, construction of dispersed habitations are of lesser concern.

List of pressures and threats

Sylviculture, forestry

Forest planting on open ground
Forest and Plantation management & use

Urbanisation, residential and commercial development

Dispersed habitation

Pollution

Nitrogen-input

Natural System modifications

Lack of fires

Natural biotic and abiotic processes (without catastrophes)

Species composition change (succession)

Conservation and management

As a highly natural habitat this habitat type has no specific management requirement to remain but leaving it undisturbed and undestroyed. Conservation is then effective when free evolution is possible, like within protected areas. 'Manage landscape features' refers to the need to better protect this kind of habitats with a high degree of naturalness in land-use planning, especially when no specific regulation can be applied (no protected species or habitat, outside a protected area, outside a N2000 site).

List of conservation and management needs

Measures related to forests and wooded habitats

Adapt forest management

Measures related to spatial planning

Manage landscape features

Conservation status

8210: BOR, BLS, CON U1; ALP, PAN FV.

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

At least for generalist rock plants, the natural recovery of this habitat is possible and fast when it is not isolated from habitats of the same type. The return of specialized nesting birds after strong disturbances is less easy for example. The same applies to specialist plants of rock micro-habitats.

Effort required

200+ years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	5-20% %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %

The data refer only to Finland. As no data from other countries is available, the average European trend cannot be calculated in a reliable way.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50000 Km^2	Unknown	Unknown	unknown	>50	Unknown	Unknown	unknown	unknown
EU 28+	>50000 Km^2	Unknown	Unknown	unknown	>50	Unknown	Unknown	unknown	unknown

EOO, AOO and number of locations are much larger 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	40-60% %	50% %	unknown %	unknown %	unknown %	unknown %
EU 28+	unknown %	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%
EU 28+	unknown %	unknown%	unknown %	unknown%	unknown %	unknown%

The data refer only to Finland. As no data from other countries is available, the average European trend cannot be calculated in a reliable way.

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	DD	DD	DD	DD	LC	LC	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	DD	DD	DD	DD	LC	LC	LC	DD	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
Data Deficient	-	Data Deficient	-

Confidence in the assessment

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

Assessors

A. Mikolajczak

Contributors

Habitat description: Tytti Kontula & Erwin Bergmeier

Territorial data: Tytti Kontula

Working Group Sparsely Vegetated Habitats: F. Essl, G. Giusso Del Galdo, A. Mikolajczak, D. Paternoster, M. Valachovič, M. Valderrabano

Reviewers

J. Rodwell

Date of assessment

05/10/2015

Date of review

28/03/2016

References

Dierssen, K. 1996. Vegetation Nordeuropas. Verlag Eugen Ulmer, Stuttgart. 832 p.

Lindgaard, A. &Henriksen, S. 2011 (eds). The 2011 Norwegian Red list for ecosystems and habiat types. Norwegian Biodiversity Information Centre, Trondheim. 124 p.