

G1.9a Boreal-nemoral mountain *Betula* and *Populus tremula* woodland on mineral soils

Summary

This habitat includes *Betula pubescens* ssp. *czerepanovii/carpatica*-dominated woodland growing in mountains at the extreme cold climatic limit towards the boreal/arctic border and in alpine Fennoscandia, with more scattered occurrences in nemoral mountains. The short growing season, prevalence of frost, snow and high exposure limit both the possible dominants and the structure of the woodland. Silicate soils predominate, strongly acidic, often podzolised, sometimes showing cryogenic microrelief. The field layer is of sub-shrubs and calcifuge herbs with a moss carpet. Infestation by a moth, inappropriate grazing by reindeer and sheep, bioenergy harvesting and invasion of non-native species have decreased the quality of the habitat. Climate change may have a strong impact on this habitat in the future. Establishing protected areas and control of grazing are the important conservation measures.

Synthesis

The habitat is assessed as Least Concern for EU28 and EU28+. In the EU28 its area has decreased -8% within the last 50 years and the area of the habitat is currently stable. A slight decline of quality has occurred on 32% of the area of this habitat in EU28 in the last 50 years. The habitat quality continues to decrease in some, but is stable in most EU28 countries. Trend data on reduction in quantity and quality were available only for a small number of EU countries, while a large part of the area of this type lies within Iceland and Norway. In Iceland the area is increasing, but the trend in quality (criterion C/D1) for the EU28+ is assessed as Data Deficient.

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

Slopes with unstable substrates.

Habitat Type

Code and name

G1.9a Boreal-nemoral mountain *Betula* and *Populus tremula* woodland on mineral soils



Betula pubescens forest with understorey of *Gymnocarpium dryopteris*, Norway



Rare *Betula-Salix* woodland on Iceland (Photo: Wim Ozinga).

Habitat description

This habitat includes deciduous woodlands growing in mountains at the extreme cold climatic limit towards the arctic or, oroarctic zone, where the short growing season, the prevalence of frost, snow conditions and high exposure limit both the possible dominants and the structure of the woodland. Silicate soils predominate, strongly acidic, often podzolised, sometimes showing cryogenic microrelief. But, nutrient-rich and moist brown soils also exist. Birch is the typical dominant tree, in northern Fennoscandia *Betula pubescens* ssp. *czerepanovii* (= *B. tortuosa*), which typically forms a very open, sometimes krummholz, canopy usually only 3-10m tall, with occasional *Picea abies* ssp. *obovata* towards the east. Beneath this, there is a layer of dwarf-shrubs including *Vaccinium myrtillus*, *V. vitis-idaea*, *V. uliginosum*, *Empetrum hermaphroditum*, *Arctostaphylos uva-ursi*, *Betula nana*, *Rubus chamaemorus* and *Ledum palustre*, monocotyledons and herbs such as *Deschampsia flexuosa*, *Carex globularis*, *Cornus suecica* and *Trientalis europaea* and a carpet of mosses and lichens. Similar field layers occur beneath short canopies of *B. pubescens* ssp. *carpatica* in the higher parts of the Scottish Highlands, so such woodland qualify as part of this habitat.

Indicators of good quality:

- Typical flora and fauna composition of the region
- Presence of natural disturbance
- Long historical continuity (ancient woodland) with high species diversity
- Survival of larger stands of forest without anthropogenic fragmentation and isolation (to support fauna which need large undisturbed forests)
- Absence of non-native species in all layers (flora & fauna)
- No signs of eutrophication or pollution
- No man-induced very high population levels of ungulates

Characteristic species:

Tree canopy: *Betula pubescens* ssp. *czerepanovii* (Fennoscandia), or ssp. *carpatica* (UK).

Field layer: Dwarf shrubs: *Arctostaphylos alpina*, *Diphasiastrum* spp., *Empetrum nigrum*, *Linnaea borealis*, *Lycopodium* spp., *Phyllodoce coerulea*, *Vaccinium myrtillus*, *V. vitis-idaea*. Herbs: *Cornus suecica*, *Geranium sylvaticum*, *Melampyrum pratense*, *Pedicularis lapponica*, *Solidago virgaurea*, *Trientalis europaea*, *Viola biflora*. Graminoids: *Calamagrostis lapponica*, *Carex bigelowii*, *Deschampsia flexuosa*, *Festuca ovina*, *Juncus trifidus*.

Bryophytes: *Barbilophozia lycopodioides*, *Dicranum* spp., *Hylocomium splendens*, *Pleurozium schreberi*.

Lichens: *Cladina* spp., *Nephroma arcticum*, *Peltigera aphthosa*.

Classification

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

EUNIS:

G1.9 Non-riverine woodland with [Betula], [Populus tremula] or [Sorbus aucuparia]

EuroVegChecklist alliances:

Betulion tortuosae Doing ex Mucina all. nova hoc loco

Annex I:

9040 Nordic subalpine/subarctic forests with *Betula pubescens* ssp. *czerepanovii*

Emerald:

G1.917 Oroboreal *Betula* woods and thickets

G1.925 Boreal *Populus tremula* woods

MAES-2:

Woodland and forest

IUCN:

1.1 Boreal Forest

EFT:

13.3 Mountain birch forest

VME:

C.1 Eastern boreal open woodlands

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

Yes

Regions

Alpine

Boreal

Justification

This habitat covers relatively large areas at the border of the boreal and alpine regions, therefore usually representing more azonal than zonal vegetation. However, in the northernmost parts of Norway, it also occurs at sea level.

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	5-10 Km ²	Unknown	Unknown
<i>Finland</i>	Finland mainland: Present	4960 Km ²	Decreasing	Decreasing
<i>Germany</i>	Present	10 Km ²	Stable	Decreasing
<i>Ireland</i>	Present	2 Km ²	Stable	Unknown
<i>Sweden</i>	Present	9428 Km ²	Stable	Stable
<i>UK</i>	Northern Island: Present United Kingdom: Present	450 Km ²	Unknown	Decreasing

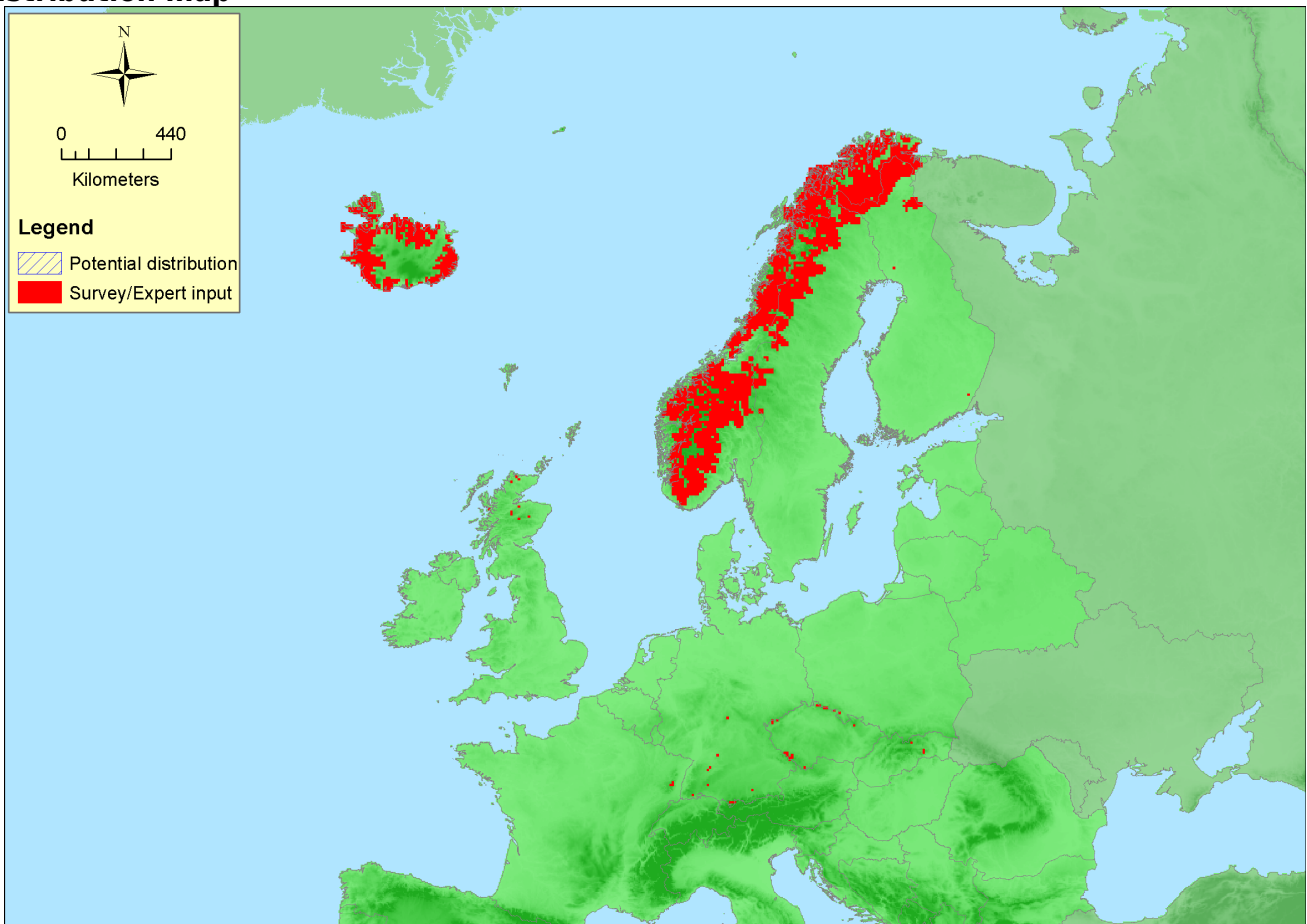
EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Faroe Islands</i>	Uncertain	Unknown Km ²	Unknown	Unknown
<i>Iceland</i>	Present	Unknown Km ²	Unknown	Unknown

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Norway	Norway Mainland: Present	11000 Km ²	Increasing	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	3164100 Km ²	859	14857 Km ²	
EU 28+	4745950 Km ²	3534	> 25857 Km ²	Total area is given without Iceland

Distribution map



The map overestimates the distribution in Iceland and Scandinavia, and underestimates the distribution in Central Europe. Data sources: EVA, BOHN.

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

Less than 30 % of the habitat area lies within the EU28. There are large areas of this habitat in Norway, Iceland and Russia.

Trends in quantity

The decrease of the habitat area was calculated to be -8% for EU28 over the last 50 years, using data from Finland, Germany, Ireland and Sweden, therefore resulting mostly from an inferred decrease of 20% in Finland. This leads to the conclusion Least Concern. Data on the extent of decrease are missing from Austria, UK and Norway, even though Norway reported increase of this habitat type during the past 50 years. Quantitative data from Iceland are missing, but it is known that the area is increasing in that

country. Therefore, also for the EU28+ the conclusion Least Concern is made. There are no historical data for 250-50 years ago. The decrease observed in Finland was mainly caused by massive outbreaks of the moth *Epirrita autumnata* in the 1960's. The current trend in quantity is stable in most countries.

- Average current trend in quantity (extent)

EU 28: Stable

EU 28+: Unknown

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

No

Justification

The habitat has a very large area and a wide distribution in Northern Europe.

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

No

Justification

The habitat can occur in large stands and has a large EOO.

Trends in quality

Extent of degradation in EU28 was calculated to be 32%. Severity of degradation in EU28 was calculated to be 31%. Data from Finland, Germany, Sweden and UK were used in calculations. Austria, Ireland and Norway reported an unknown or uncertain trend. All data from Iceland were missing. As a result, the data are not sufficient for red list assessment in EU28+. The degradation has been biotic in all countries except in Germany, where it was abiotic. The most important reason for the decline of quality has been intensive grazing, which is caused by reindeer in Fennoscandia and by sheep or deer in other areas. Massive outbreaks of moths (e.g. *Epirrita autumnata*) have worsened the situation and in the outbreak areas intensive grazing has prevented regeneration of mountain birch. Other reasons for quality decline are natural succession and loss of aspen trees. There are no quantitative data for degradation 50-250 yrs ago.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Unknown

Pressures and threats

The most important pressures and threats are: overgrazing (by reindeer in Fennoscandia, other animals in other areas), climate change, which is likely to alter and decrease the habitat, herbivory by the moth *Epirrita autumnata*, establishment of recreational cottages (Norway), lack of grazing (Norway) and invasion of *Rhododendron* (UK, Ireland).

List of pressures and threats

Agriculture

Intensive grazing

Sylviculture, forestry

Forestry activities not referred to above

Urbanisation, residential and commercial development

Other patterns of habitation

Natural biotic and abiotic processes (without catastrophes)

Damage by herbivores (including game species)

Climate change

Habitat shifting and alteration

Conservation and management

The most common approaches currently involve establishing protected areas/sites and establishing wilderness areas. Additional actions needed, depending on area, are restrictions of overgrazing and/or allowing grazing in undergrazed areas, further assessments about which subtypes of the habitat are threatened, management of recreational use (Norway), *Rhododendron* control (UK, Ireland) and control of climate change.

List of conservation and management needs

Measures related to forests and wooded habitats

Restoring/Improving forest habitats

Measures related to spatial planning

Establish protected areas/sites

Establishing wilderness areas/allowing succession

Measures related to special resource use

Other resource use measures

Conservation status

Annex I:

9040: ALP FV, BOR U1

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

It is likely that a severely damaged habitat will recover, but it will take a very long time. Intervention would in many cases mean regulation of reindeer grazing.

Effort required

50+ years	200+ years
Through intervention	Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-8 %	unknown %	unknown %	unknown %
EU 28+	unknown %	unknown %	unknown %	unknown %

During the past 50 years the habitat area has decreased -8 % in EU28 based on territorial data, which is why the habitat is assessed as Least Concern under criterion A1. Data on quantitative trends in Austria, UK, Iceland and Norway are missing. The by far largest part of this habitat type lies within Norway and Iceland. In Iceland the area is increasing, and therefore the habitat is assessed as Least Concern under criterion A for the EU 28+ as well.

Criterion B: Restricted geographic distribution

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

This habitat is widely distributed and occupies a very large area in numerous locations. Therefore it is assessed as Least Concern 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	32 %	31 %	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%

In the past 50 years 32% of the habitat area in EU28 was affected by a reduction of quality with 31 % relative severity, resulting in assessment as Least Concern under criteria C/D1. The type of quality degradation was mainly biotic, but also abiotic. A majority of the area with reduced quality was affected with slight severity. Data on qualitative trends in Austria, Ireland, Iceland and Norway are missing. The largest part of this habitat type lies within Norway and Iceland. This habitat is assessed as Data Deficient under Criterion C/D in EU28+.

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	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD

Overall Category & Criteria			
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Least Concern	-	Least Concern	-

Confidence in the assessment

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

Assessors

T. Tonteri

Contributors

Type description: J. Rodwell

Territorial data: E. Bendiksen, J. Dahlgren, P. Finck, K.J. Kirby, T. Kontula, F. O'Neill, U. Rath, U. Riecken, A. Ssymank, W. Willner

Working Group Forests: F. Attore, R-J. Bijlsma, M. Chytrý, P. Dimopoulos, B. Renaux, A. Ssymank, T. Tonteri, M. Valderrabano

Reviewers

J. Janssen

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