H3.1c Temperate, lowland to montane siliceous inland cliff

Summary

Included here are siliceous rock walls and cliffs in the nemoral biogeographic domain except those in the high mountains and in the sea spray coastal zone. They comprise diverse metamorphic, sedimentary and igneous rocks but also some non-calcareous but more or less base-rich igneous volcanics. The vegetation in the rock fissures and crevices consists of vascular plants such as small ferns, succulents and rosulate herbs, on the rock surface also mosses and hepatics, crustose and foliose lichens, micro-algae and other micro-organisms. Natural succession can lead to scrub and woodland development and threats come from mining and quarrying operations and due to construction of transportation corridors and outdoor sports (especially rock climbing). As these habitats are highly natural, no specific management except avoiding disturbances and destruction of sites is required through careful planning.

Synthesis

In spite of a variable quality among the reported territorial data and a lack of data from non EU28 Balkan States, the calculated trends seem to be reliable. The calculated decreases in quality and quantity are well below the thresholds to qualify for a Near Threatened status. Therefore, the overall Red List status is Least Concern.

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

Serpentine cliffs and cliffs related to Northern Atlantic hepatic mats are in need of further examination.

Habitat Type

Code and name

H3.1c Temperate, lowland to montane siliceous inland cliff

Siliceous inland cliff along the Krumovica River in the Eastern Rodopi mountains of Bulgaria (Photo: Rossen Tzonev).

Sandstone cliffs in the Bohemian Paradise of the Czech Republic (Photo: Milan Chytrý).

Habitat description

Siliceous (rich in quartz and silicate minerals such as mica or feldspar) rock walls and cliffs in the nemoral

biogeographic domain except those in the high mountains and in the sea spray coastal zone. Siliceous cliffs consist chiefly of metamorphic more or less acid rocks such as slate, schist, gneiss and quartzite, sedimentary rock such as sandstone, or of igneous rocks such as granite, porphyry and diorite. Non-calcareous but more or less base-rich igneous volcanic rocks such as andesite, trachyte and basalt are also included. The vegetation in the rock fissures and crevices consists of vascular plants such as small ferns, succulents and rosulate herbs, on the rock surface also mosses and hepatics, crustose (e.g. *Aspicilia*, *Lecanora*, *Lecidea* s.l., *Lepraria*, *Pertusaria*, *Rhizocarpon*, *Rinodina*, *Trapelia*) and foliose lichens (e.g. *Parmelia* s.l. *Umbilicaria*), further epi- and endolithic micro-algae and other micro-organisms. *Asplenium*, *Dianthus*, *Saxifraga*, *Sedum* and *Silene* are important vascular plant genera in extra-alpine temperate siliceous cliffs. Among the mosses the genera *Hedwigia*, *Grimmia*, *Racomitrium* and *Schistidium* are particularly common on siliceous rocks, the latter three are species-rich.

Temperate lowland to montane siliceous cliffs are generally rather poor in plant species (but may be rich in lichens). The species composition depends on the biogeographic (thermic and oceanic) position, on rock type, humidity and water availability. Several species are considered glacial relicts.

The habitat type occurs throughout nemoral Europe from the British Isles and Northwest Spain to the Caucasus and the Ural Mountains and probably much further into Central Asia. It is particularly well-known in Galicia (Spain), the Massif Central, the slate-dominated suboceanic Rhenish Massif and generally in the Central European Uplands, where it is represented by gneiss and granitic rocks of the Rheno-Hercynian zone. The slate-dominated parts of the Carpathian Mountains are another main area of temperate montane siliceous cliffs.

Indicators of good quality:

Temperate lowland to montane siliceous cliffs is a habitat of high phytogeographical significance. Although not species-rich it harbours rare species and disjunct populations including many relict cryptogams of nordic-alpine distribution. There are also a few narrow endemics such as in the northwest Iberian Peninsula and in the Carpathians. Habitat quality must be assessed at regional level and in view of the ecoregional variation. It is crucial to consider bryophytes and lichens. The occurrence of rare and relict species is a main criterion.

The following characteristics may be used as indicators of favourable quality:

- Occurrence of rare species of lichens, bryophytes, ferns and phytogeographically significant vascular plant taxa,
- Presence of sizable open exposed rock and of different aspects of rock walls, different exposure to insolation, moisture and rock structures such as vertical rock faces, overhangs, cavities, rock shelters, and ledges
- Contact with natural habitats such as screes, boulder fields, rock shrubs and pioneer grasslands
- Absence of quarrying and control structures
- Absence of garbage dumping and nutrient input from above the cliff
- Absence of rock climbing facilities

Characteristic species*:*

Vascular plants: *Achillea chamaemelifolia, Asarina procumbens, Asplenium (adiantum-nigrum subsp. adiantum-nigrum, marinum, obovatum subsp. billotii, septentrionale, trichomanes subsp. trichomanes, x alternifolium), Aurinia saxatilis subsp. saxatilis, Coincya monensis subsp. cheiranthos, Centaurea (pectinata, prolongoi), Dianthus (graniticus, henteri, pyrenaicus subsp. attenuatus), Epilobium collinum, Hieracium schmidtii, Jovibarba heuffelii, Leucanthemum monspeliense, Minuartia recurva subsp. recurva, Polypodium vulgare, Primula minima, Saxifraga (hypnoides, paradoxa, rosacea subsp. steinmannii, rosacea subsp. sternbergii), Sedum (hirsutum subsp. hirsutum, stefco), Sempervivum calcareum, Sesamoides purpurascens subsp. suffruticosa, Silene (nutans subsp. dubia, rupestris), Veronica bachofenii, Woodsia*

ilvensis

Bryophytes: *Bartramia halleriana, Bartramia pomiformis, Coscinodon cribrosus, Dicranum scoparium, Grimmia (affinis, arenaria, decipiens, donniana, hartmannii, laevigata, montana, muehlenbeckii, ovalis, trichophylla), Hedwigia (ciliata, integrifolia), Hypnum cupressiforme, Isopterygiopsis muelleriana, Isothecium alopecuroides, Metzgeria conjugata, Polytrichum piliferum, Ptychomitrium incurvum, Ptychomitrium polyphyllum, Racomitrium (affine, fasciculare, heterostichum, sudeticum), Rhabdoweisia (crenulata, crispata, fugax), Schistidium spp.*

Lichens: *Acarospora (paupera, tongletii), Aspicilia (cinerea, gibbosa, morioides, recedens, simoensis), Caloplaca (atroflava, crenularia, saxicola, subpallida), Calycium corynillum, Catillaria (atomarioides, chalybeia), Chrysothrix chlorina, Cornicularia normoerica, Diploschistes scruposus, Ephebe lanata, Fuscidia (austeri, kochiana), Haematomma ochroleucum, Lasallia pustulata, Lecanactis dilleniana, Lecanora (bicincta, cenisia, demissa, intricata, lojkaeana, orosthea, polytropa, rupicola, subcarnea, subplanata, swartzii), Lecidea (atomaria, erratica, fuliginosa, fuscoatra, griseoatra, lapidacea, leucophaea, variegatula), Lepraria (latebrarum, membranacea, neglecta), Leprocaulon microscopicum, Micarea (intrusa, subnigrata), Mosigia intercedens, Opegrapha (gyrocarpa, lithyrga, zonale), Ophioparma ventosa, Parmelia (conspersa, disjuncta, incurva, loxodes, mougeotii, omphalodes, panniformis, pulla, somloensis, sorediosa, stygia, verrucilifera), Pertusaria (corallina, excludens, flavicans, iridioides, lactea, leucosora, maculosa, oculata), Phylliscum demangeonii, Placopsis lambii, Porpidia (albocaerulescens, athroocarpa, glaucophaea, pseudomelinoides), Rhizocarpon (distinctum, eupetraeum, geographicum, hochstetteri, lecanorinum, obscuratum, polycarpum, viridiatrum), Rimularia insularis, Rinodina (aspersa, atrocinerea, interpolata, occulta), Schaereria tenebrosa, Sphaeroporus fragilis, Stereocaulon (dactylophyllum, evolutum, leucophaeopsis, vesuvianum), Thelidium rehmii, Trapelia (coarctata, involuta, mooreana, obtegens, placodioides), Tremolecia atrata, Umbilicaria (grisea, hirsuta)*

Classification

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

EUNIS:

H3.1 Acid siliceous inland cliffs

EuroVegChecklist:

Asarinion procumbentis (Br.-Bl. in Meier et Br.-Bl. 1934) Br.-Bl. in Br.-Bl. et al. 1952

Asplenion marini Segal 1969

Asplenion septentrionalis Gams in Oberd. 1938

Hypno-Polypodion vulgaris Mucina 1993

Sedion stefco V. Ranđelović in Mucina et al. 2014

Sesamoidion suffruticosae Ortiz et Pulgar 2000

Annex 1:

8220 Siliceous rocky slopes with chasmophytic vegetation

Emerald:

H3.1 Acid siliceous inland cliffs

MAES-2:

Sparsely vegetated land

IUCN:

6. Rocky areas

Does the habitat type present an outstanding example of typical characteristics of one or more biogeographic regions?
No

Justification
The habitat type is widely distributed throughout nemoral Europe.

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)
Austria	Present	25 Km^2	Decreasing	Stable
Belgium	Present	0.7 Km^2	Decreasing	Decreasing
Bulgaria	Present	Unknown Km^2	Decreasing	Decreasing
Croatia	Present	Unknown Km^2	Unknown	Unknown
Czech Republic	Present	20 Km^2	Stable	Decreasing
Estonia	Uncertain	Km^2	-	-
France	France mainland: Present	100 Km^2	Decreasing	Decreasing
Germany	Present	30 Km^2	Decreasing	Decreasing
Hungary	Present	1 Km^2	Stable	Stable
Ireland	Present	32 Km^2	Stable	Unknown
Italy	Italy mainland: Present	14 Km^2	Stable	Decreasing
Latvia	Uncertain	Km^2	-	-
Lithuania	Present	0.5 Km^2	Decreasing	Decreasing
Luxembourg	Uncertain	Km^2	-	-
Poland	Present	0.9 Km^2	Unknown	Decreasing
Slovakia	Present	3 Km^2	Decreasing	Unknown
Slovenia	Present	10 Km^2	Stable	Stable
Spain	Spain mainland: Present	6.4 Km^2	Stable	Decreasing
UK	United Kingdom: Present	400 Km^2	Stable	Increasing

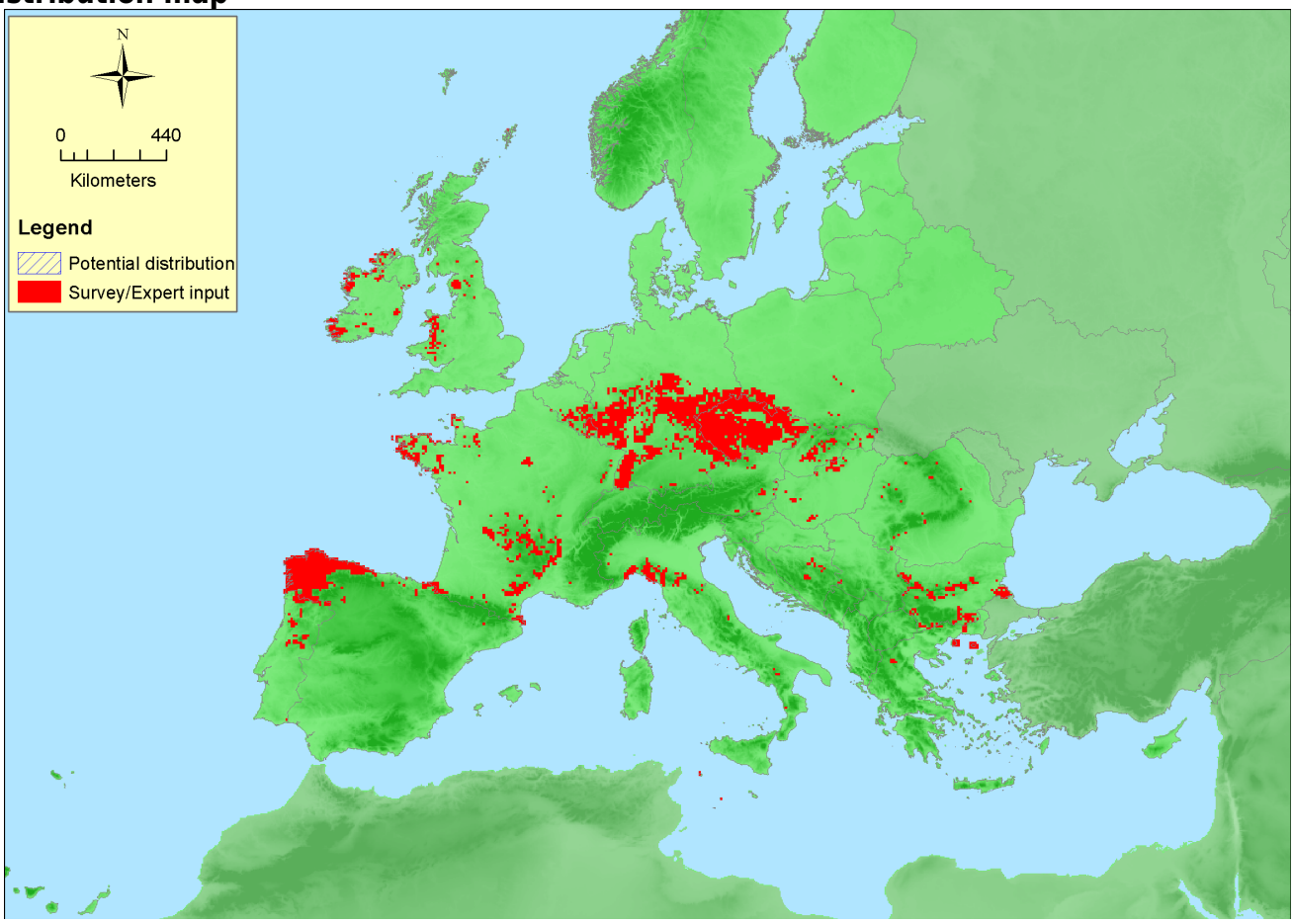
EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Albania	Uncertain	Km^2	-	-
Bosnia and Herzegovina	Present	5 Km^2	Stable	Decreasing
Former Yugoslavian Republic of Macedonia (FYROM)	Present	Unknown Km^2	Unknown	Unknown
Kosovo	Uncertain	Km^2	-	-

EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
Montenegro	Uncertain	Km^2	-	-
Serbia	Uncertain	Km^2	-	-
Switzerland	Present	235 Km^2	Decreasing	Decreasing

Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	5558800 Km^2	3127	654 Km^2	no data from Estonia, Latvia, Luxembourg
EU 28+	5558800 Km^2	3145	894 Km^2	no data from Estonia, Latvia, Albania, Kosovo, Montenegro, Serbia

Distribution map



The map is rather complete, except for the Balkan and Switzerland. Data sources: Art17, NAT.

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

< 50%. The habitat type occurs throughout nemoral Europe from the British Isles and Northwest Spain to the Caucasus and Ural Mountains and probably much further into Central Asia.

Trends in quantity

Most countries - except Bulgaria, France and Lithuania - have reported a stable current trend in quantity. Over the last 50 years, a slight decrease (EU28: -2,5%; EU28+: -3.2%) in quantity was recorded, which

occurred mainly as a consequence of mining and quarrying operations as well as construction of transportation corridors. Though the reported trends differ from country to country (-20% to stable), the overall trend seems to be realistic on a European scale. There are only limited data available concerning historical and future trends but in general stable or slightly decreasing trends were reported.

- 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 type is widely distributed throughout nemoral Europe and the EOO is > 50000 km².
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  The habitat type occurs on siliceous rock walls and cliffs except those in high mountains and is widely distributed throughout nemoral Europe, where it can occupy large areas.

Trends in quality

Most of the countries - except Slovakia - have reported a stable current trend in quality. Over the last approximately 50 years, however, a decrease in quality has occurred, affecting 14% (EU28) or 21% (EU28+) of the total area with a severity of degradation of 9% and 26%, respectively. The big difference between EU28 and EU28+ is due to Swiss data. Switzerland has reported a slight to severe trend in degradation of quality indicators, affecting 40% of extent. The reduction in quality is mainly based on alteration of habitats and disturbance to native biota caused by human activities (securing of cliffs and rock outcrops alongside transportation corridors, impacts of outdoor sports (especially rock climbing), rehabilitation of quarries). Furthermore, secondary habitats are affected by biocenotic evolution. Due to a lack of data, it is not possible to describe both historical and future trends in quality.

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

Pressures and threats

In general, lowland to montane cliffs are more threatened by human activities than high mountain cliffs. The main threat comes from quarrying, especially open cast mining, which causes the destruction of sites. In addition, loss of habitats is also caused by construction of transportation infrastructure. Furthermore, the habitat type is affected by outdoor activities, air pollution, succession processes and changes of abiotic conditions due to climate change, all of which have negative impacts on the habitat quality. Outdoor activities like rock climbing cause disturbances on the local flora and fauna and effectuate modifications on the structure and functioning of this habitat type due to cleaning of climbing routes (e. g. removal of vegetation and loose rocks). The securing of cliffs for safety reasons - e. g. alongside transportation corridors - affects the habitat in more or less the same way.

List of pressures and threats

Mining, extraction of materials and energy production

Mining and quarrying
Open cast mining

Human intrusions and disturbances

Outdoor sports and leisure activities, recreational activities
Mountaineering & rock climbing

Pollution

Air pollution, air-borne pollutants

Natural biotic and abiotic processes (without catastrophes)

Biocenotic evolution, succession

Climate change

Changes in abiotic conditions

Conservation and management

Lowland siliceous cliffs are important natural habitats in low mountain ranges and hilly landscapes. Therefore, no specific management measures are required except avoiding disturbance and destruction of sites. The protection of those habitats and corresponding species is realised best in protected areas, where natural processes are allowed to take place without any restrictions. To avoid further loss and deterioration of sites, these habitats have to be incorporated more strongly in spatial development planning.

List of conservation and management needs

Measures related to spatial planning

Other spatial measures
Establish protected areas/sites
Legal protection of habitats and species

Measures related to special resouce use

Regulating/Management exploitation of natural resources on land

Conservation status

Annex 1 types:

8220: ALP FV, ATL XX, BLS FV, CON U1, MED XX, PAN U1

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

Once completely destroyed, the habitat has almost no capacity to recover, as it's origin is dependent on geomorphological processes. In the case of damage without destruction of sites, at least for plants, the natural recovery of this habitat is rather fast when it is not isolated from similar habitats. The recolonization of sites by poor disperser among specialised plants and breeding birds after strong disturbances may take longer.

Effort required

50+ years	200+ years
Naturally	Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-2.5 %	unknown %	unknown %	unknown %
EU 28+	-3.2 %	unknown %	unknown %	unknown %

The values for A1 were calculated by using the territorial data sheets. The calculated trend in the last 50 years is a reduction of about 2.5% (EU28) and 3.2% (EU28+), respectively (resulting in the category Least Concern). No data (%) available or unsufficient data for A2a, A2b and A3.

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

The EOO and AOO are much larger than the thresholds under criterion B, 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	14.0 %	9.0 %	unknown %	unknown %	unknown %	unknown %
EU 28+	21.1 %	25.9 %	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 values for C/D1 were calculated by using the territorial data sheets. The calculated figures result in a Least Concern category. No quantitative data are available for C/D2, C/D3, C1, C2, C3, D1, D2 and D3.

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

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Date of assessment
20/10/2015

Date of review
20/04/2016

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