

C3.5d Unvegetated or sparsely vegetated shore with mobile sediments in montane and alpine regions

Summary

This habitat type of sparsely vegetated or bare streambeds and banks has a relatively wide distribution in Europe occurring in all mountain and Boreal areas. Its biological diversity mainly depends on the particular altitudinal belt in which it develops and on the energy of the waterflow that characterize the stream but in general it is a very dynamic habitat characterized by pioneer and ephemeral plant communities, their development repeatedly interrupted by torrential flow. The main pressures on this habitat are exploitation of water energy with dam construction and barriers, and extraction of gravel and sand and the development of industrial, agriculture and urban areas. The probability of recovery when the habitat is very damaged by the construction of human infrastructure is very low without complete restoration of the original hydrological regime.

Synthesis

This habitat type is relatively wide distributed in Europe but, during the last centuries, it has undergone a relatively high reduction in quantity (34-36% in the last 50 years) due to the rapidly increasing urbanization and development of agriculture and industrial activities after the Second World War. The habitat is therefore assessed as Vulnerable according to criterion A1.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Vulnerable	A1	Vulnerable	A1

Sub-habitat types that may require further examination

Further investigations about this habitat are necessary in the Balkan countries within EU28+.

Habitat Type

Code and name

C3.5d Unvegetated or sparsely vegetated shore with mobile sediments in montane and alpine regions



Sparsely vegetated alpine streambed, Ova da Morteratsch, Switzerland (Photo: V. Kalníková).



Sparsely vegetated streambed, River Tara, Montenegro (Photo: V. Kalníková).

Habitat description

The habitat includes the bed and banks of rivers and streams from alpine to mountain (and partially sub-

montane) belts and of the northern boreal area. The habitat is highly dynamic because it is characterized by periodical floods and frequent and considerable variation of speed and intensity of the water current, which however remains always rather high. The sediment of the habitat includes mainly gravel deposits and banks of alluvial material, characteristically poor in organic materials and nutrients. The vegetation types occupying these gravel deposits include pioneer vegetation and subsequent early stages in the colonization sequence, with plants specialised to survive in this habitat, having narrow leaves and elastic stems adapted to or tolerant of submersion and rapid changes of the water current: for example *Myricaria germanica*, and species of *Epilobium*, *Salix*, *Agrostis*, *Elimus*, *Poa*. An important feature is that the vegetation stays in its pioneer stage and is ephemeral but eventual succession leads to willow scrub.

Indicators of good quality:

- Natural hydrological cycle of spaces
- Suitable geological substrate which is easily erodible
- High water velocity
- Pioneer vegetation with absence or sporadic abundance of nitrophilous species
- No high abundance of exotic invasive species
- No negative anthropogenic influence (gravel extraction, regulation of the water regime, construction of artificial banks)

Characteristic species:

Vascular plants: *Agrostis gigantea*, *Arabis alpina*, *Astragalus alpinus*, *Calamagrostis pseudophragmites*, *C. stricta*, *Cerastium alpinum*, *Chaerophyllum hirsutum*, *Chondrilla chondrilloides*, *Deschampsia alpina*, *D. cespitosa*, *Epilobium roseum*, *E. fleischeri*, *E. dodoneii*, *E. latifolium*, *Equisetum variegatum*, *Erigeron acer* ssp. *angulosus*, *Festuca vivipara*, *Gnaphalium uliginosum*, *Hieracium staticifolium*, *Hippophae rhamnoides*, *Luzula spicata*, *Lotus corniculatus*, *Myricaria germanica*, *Myosoton aquaticum*, *Myosotis scorpiodes*, *Oenanthe crocata*, *Ptychotis saxifraga*, *Petasites hybridus*, *P. kablikianus*, *Poa trivialis*, *Poa palustris*, *Ranunculus repens*, *Rumex scutatus*, *Stellaria nemorum*, *Saxifraga aizoides*, *Scrophularia canina*, *Trifolium saxatile*, Usually only juveniles or small shrubs of *Salix daphnoides*, *S. elaeagnos*, *S. lapponum*, *S. hastata*, *S. glauca*, *S. myrsinifolia*, *S. phylicifolia*, *S. purpurea*, *Elymus fibrosus*, *Elymus transbaicalensis*, *Elymus kronokensis* subsp. *subalpinus*, *Cotoneaster cinnabarinus*, *Papaver lapponicum*, *P. dahlianum*.

Bryophytes: *Brachytecium rivulare*, *Bryum intermedium*, *B. klinggraeffii*, *Ceratodon purpureus*, *Dichodontium pellucidum*, *Hygrohypnum luridum*, *H. ochraceum*, *Hypnum lindbergii*, *Pohlia drummondii*, *P. fillum*, *Polytrichum juniperinum*, *Pseudoleskea incurvata*, *Racomitrum canescens* s.l., *Tortella inclinata*, *T. tortuosa*.

Lichens: *Rhizocarpon* spp. (yellow lichens on rocks)

Macroinvertebrates: Larval stages of *Odonata*, *Ephemeroptera*, *Plecoptera* and *Trichoptera* characterize the benthic communities of riverbeds while nymph and adult stages of the same species can be found on the river banks. Other characteristic species are *Ancylus fluviatilis*, *Pisidium casertanum*, *Unio crassus*, *Crenobia alpina*, *Hyles hippophaes*, *Proserpinus proserpina*.

Vertebrates: *Castor fiber*, *Arvicola sapidus*, *Myotis blythii*, *Locustella fluviatilis*, *Sterna hirundo*, *Riparia riparia*, *Burhinus oedicephalus*, *Coracias garrulous*, *Anthus campestris*, *Milvus migrans*. Ardeids, breeding passerine and migrating waders can also occur.

Classification

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

EUNIS:

C3.5 Periodically inundated shores with pioneer and ephemeral vegetation

EuroVegChecklist (alliances):

Epilobion fleischeri G. Br.-Bl. ex Br.-Bl. 1950

Calamagrostion pseudophragmitis Rivas-Mart. et al. 1984

Calamagrostion neglectae Nordhagen ex de Molenaar 1976

Annex 1:

3220 Alpine rivers and the herbaceous vegetation along their banks

3230 Alpine rivers and their ligneous vegetation with *Myricaria germanica*

3240 Alpine rivers and their ligneous vegetation with *Salix elaeagnos*

Emerald:

C3.55 Sparsely vegetated river gravel banks

C3.62 Unvegetated river gravel banks

MAES-2:

The habitat is a freshwater habitat, in the category of rivers and lakes and within this category is categorized in inland surface water (water courses and bodies).

IUCN:

5.2. Seasonal/Intermittent/Irregular Rivers/Streams/Creeks

WFD:

R-A1, R-A2, R-E1

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

Yes

Regions

Alpine

Atlantic

Boreal

Continental

Mediterranean

Justification

This habitat is typical of Alpine and Boreal areas of Europe. It also occurs in the high mountains of Atlantic, Continental and sporadically Mediterranean areas.

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	103 Km ²	Decreasing	Decreasing
<i>Bulgaria</i>	Present	Unknown Km ²	Decreasing	Decreasing
<i>Finland</i>	Aland Islands: Present Finland mainland: Present	2-10 Km ²	Stable	Stable

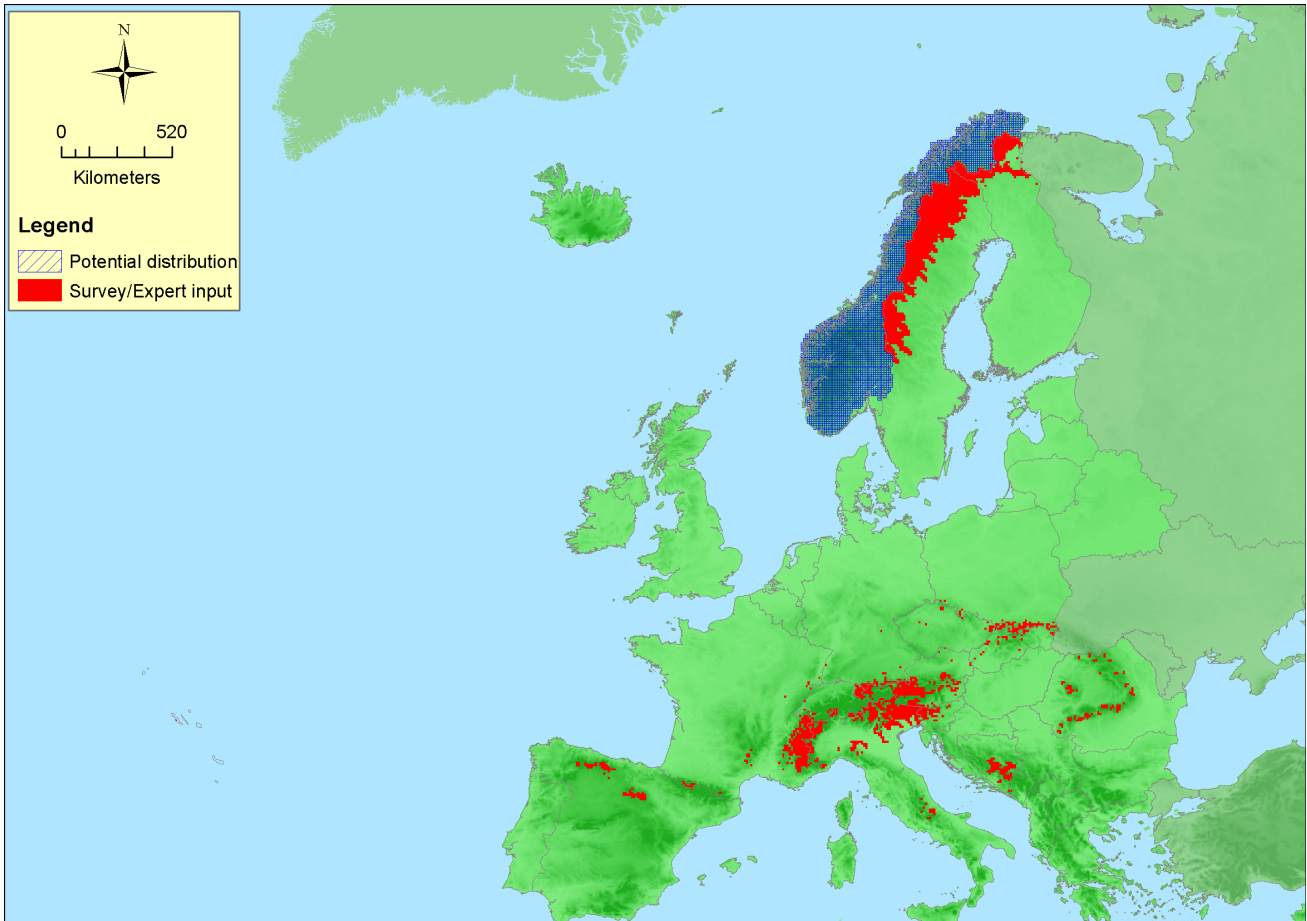
EU 28	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>France</i>	Corsica: Present France mainland: Present	90 Km ²	Decreasing	Decreasing
<i>Germany</i>	Present	1 Km ²	Decreasing	Decreasing
<i>Italy</i>	Italy mainland: Present	263 Km ²	Decreasing	Decreasing
<i>Poland</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Romania</i>	Present	3 Km ²	Decreasing	Decreasing
<i>Slovakia</i>	Present	0.75 Km ²	Decreasing	Decreasing
<i>Slovenia</i>	Present	86 Km ²	Decreasing	Decreasing
<i>Spain</i>	Spain mainland: Present	0.73 Km ²	Decreasing	Decreasing
<i>Sweden</i>	Present	Unknown Km ²	Unknown	Unknown
<i>UK</i>	Northern Island: Uncertain United Kingdom: Uncertain	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>Albania</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Bosnia and Herzegovina</i>	Present	3 Km ²	Decreasing	Decreasing
<i>Former Yugoslavian Republic of Macedonia (FYROM)</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Iceland</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Kosovo</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Montenegro</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Norway</i>	Jan Mayen: Present Norway Mainland: Present Svalbard: Present	Unknown Km ²	Unknown	Unknown
<i>Serbia</i>	Present	Unknown Km ²	Unknown	Unknown
<i>Switzerland</i>	Present	135 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
<i>EU 28</i>	7647600 Km ²	2796	549-557 Km ²	AOO/EOO incl. potential
<i>EU 28+</i>	8050250 Km ²	6125	687-695 Km ²	AOO/EOO incl. potential

Distribution map



Map is rather complete for EU28, but incomplete for EU28+, especially in the Balkan, and with potential distribution in Norway. Data sources: Art17, EVA, NAT.

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

Around 70% of the habitat type lies within EU 28. The remaining part is within EU 28+ countries (Balkan countries) and in the Caucasus. The vegetation of the alliance Muerbeckiello-Epilobion Belonovskaya et al. 2013 is typical of Caucasian river gravel bars.

Trends in quantity

During the last centuries the habitat has undergone a relatively high reduction in quantity (34-36% in the last 50 years and 43-45% since 1750) due to rapidly increasing urbanization and development of agriculture and industrial activities. However several countries (France, Finland, Italy and Switzerland) reported that the habitat is currently stable. There are not sufficient data to make conclusions about the general future trend in Europe, because in some countries the urbanization is still increasing (e.g. Balkan countries).

- Average current trend in quantity (extent)

EU 28: Decreasing

EU 28+: Decreasing

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

No

Justification

The natural range of the habitat (Eoo) is quite extensive and probably far beyond 50,000 Km².

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

No

Justification

The geographical range of the habitat is quite extensive and the habitat does not have intrinsically restricted area.

Trends in quality

Paradoxically the trend in quality, compared to the trend in quantity, during the last 50 years has not been so important. This because human actions on this habitat have always deeply modified the structure and functionality of the habitat up to complete transformation into a different habitat type. In Europe around 31% of the habitat extent has been degraded with a relative severity of 33%. There are not sufficient data available to distinguish between the reduction in abiotic and biotic quality of the habitat, and neither are there sufficient data to assess historic and future trends in quality.

- Average current trend in quality

EU 28: Decreasing

EU 28+: Decreasing

Pressures and threats

The main pressures are constituted by those human actions that lead to modifications of the hydrologic regime and functioning of the watercourse. Construction of dams and barriers for energy production, water supply and/or protection of populated areas in the valleys are very frequent. Sand and gravel extraction have represented a common problem for this habitat until now. However during the last years some countries like Italy introduced restrictions of sediment extraction along rivers to limit coastal erosion. Solid and chemical pollution represent another very frequent threat for watercourses. This habitat, when disturbed by human activities, is subject to easy invasion by pioneer exotic plants that sometimes can even become dominant. Climate change represent a potential threat for the habitat because it can cause the permanent alteration of the water regime.

List of pressures and threats

Mining, extraction of materials and energy production

Mining and quarrying

Sand and gravel extraction

Pollution

Pollution to surface waters (limnic, terrestrial, marine & brackish)

Pollution to groundwater (point sources and diffuse sources)

Invasive, other problematic species and genes

Invasive non-native species

Natural System modifications

Human induced changes in hydraulic conditions

Climate change

Changes in abiotic conditions

Droughts and less precipitations

Flooding and rising precipitations

Changes in biotic conditions

Habitat shifting and alteration

Conservation and management

Regulations enacted to limit sediment extraction and water pollution are now common in most European countries. However the expansion of urban areas and anthropogenic activities makes it difficult to reach the right compromise between habitat conservation and the satisfaction of human needs (exploitation of water resources and protection of populated areas). Nevertheless specific measures aimed to limit the habitat erosion and invasion of exotic plants should be adopted in all European countries, especially those where urban and industrial areas are now rapidly developing after difficult political and economic historical periods (e.g. Balkan countries).

List of conservation and management needs

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving water quality
Restoring/Improving the hydrological regime
Managing water abstraction

Measures related to spatial planning

Establish protected areas/sites
Manage landscape features

Measures related to urban areas, industry, energy and transport

Other measures
Urban and industrial waste management

Conservation status

Annex 1 types:

3220: ALP U1, ATL XX, BOR FV, CON U1, MED U1

3230: ALP U2, CON U2, MED U1

3240: ALP U1, ATL U1, CON U1, MED U1

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

The capacity of this habitat to recover differs according to the type of damage that the habitat has undergone. If, as is most frequent, the damage influences the hydrology and morphology of the stream or its basin, the recovery time can be very long or even unattainable and restoration always requires intervention. If the damage is from water pollution, the habitat can be restored in a relatively short time (10 years, or even less) but anyway through intervention and the complete removal of the causes of pollution.

Effort required

10 years	20 years	50+ years	200+ years
Through intervention	Through intervention	Through intervention	Through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-36 %	unknown %	unknown %	- 43 %
EU 28+	-34 %	unknown %	unknown %	- 45 %

The calculated trend in quantity of the habitat resulted in a reduction of 34-36% during the last 50 years that corresponds to the category Vulnerable according to criterion A1. A slightly higher historic negative trend since 1750 of 43-45% leads to assessment as Near Threatened according to criterion A3. The calculation of the recent trend was performed using the quantitative data available, which represent around 70% of the countries in which the habitat occur. Therefore this calculation can be considered quite reliable. Only 4 countries (around 30%) provided data concerning the historical trend, therefore for the calculation it was assumed the habitat is at least stable in all the other countries.

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	> 50	Yes	-	unknown	unknown
EU 28+	> 50000 Km ²	Yes	-	unknown	> 50	Yes	-	unknown	unknown

The habitat is very extensive in Europe, therefore both EOO and AOO are far from the thresholds required by criterion B to consider the habitat threatened. However the spatial extent and the biotic and abiotic quality of the habitat are in continuing decline.

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	31 %	33 %	unknown %	unknown %	unknown %	unknown %
EU 28+	31 %	33 %	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 reduction in biotic and abiotic quality over the last 50 years affected 31% of the extent of the habitat countries with a severity of 33% both in EU28 and EU28+. This calculation is based on data by around 60% of the countries in which the habitat is expected to occur. According to criterion C/D the habitat is Least Concern.

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	VU	DD	DD	NT	LC	LC	DD	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	VU	DD	DD	NT	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
Vulnerable	A1	Vulnerable	A1

Confidence in the assessment

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

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