

## F2.2b Alpine and subalpine Juniperus scrub

### Summary

Alpine and subalpine Juniper scrub occurs on high mountains in temperate Europe over a variety of bedrock types. The dominant junipers form dense stands of varying height depending on wind exposure and winter snow accumulation which protects from cold, desiccation and high solar radiation. More open stands can have a rich associated flora of graminoids, herbs and cryptogams, often forming a scrub/grassland mosaic. The appearance, persistence and loss of juniper often depends on the intensity of grazing and clearance of trees from pasture, so this has been much affected by changes in mountain pastoralism. Abandonment, particularly at lower altitudes, allows succession to forest. Other threats are tourist infrastructure and activities as well as global warming, that may cause the altitudinal shift of the habitat. For now, the best conservation is traditional pastoralism.

### Synthesis

We consider this habitat least concerned. The habitat is widely spread in the territory of the EU. In the past 50 years, an increase in area of about 10% has been observed and only 5% are slightly degraded. Though the estimated future trend indicates a relatively good prospect, we have to take some threats into consideration, like global warming, afforestation and tourism. Appropriate monitoring of this habitat type is recommended.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Least concern	A1, B1, B2, C/D1	Least concern	A1, B1, B2, C/D1

### Sub-habitat types that may require further examination

The habitat appears in the mountains of the temperate parts of Europe. The dominant species of temperate heaths also appear as elements of heaths in the northern and northwestern parts of Europe but don't dominate the habitats there. The relation with these northern habitats should be further investigated. On the other side, the *Juniperus* dominated scrubs in high mountains of the Macaronesian region are also in need of further investigation and should be properly assessed.

### Habitat Type

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#### Code and name

F2.2b Alpine and subalpine Juniperus scrub



*Juniperus nana* communities on Kužuf at Karaula porta (southern Balkan (Photo: Vlado Matevski).



*Juniperus nana* communities from Calimani Mts, Eastern Carpathians, Romania (Photo: Jozef Šibik).

## Habitat description

*Juniperus* heaths are found on carbonate as well as on non-carbonate bedrock, from the upper montane to the upper subalpine belt. Rarely we can find these communities in the lower alpine belt of all European mountains, especially those where traditional management such as grazing still continues. It occurs as a primary community on rocks and large boulders or as a secondary vegetation on sites where subalpine forests (dominated by beech or spruce) or dwarf pine krummholz communities are the climax. Sometimes it can even be found in moorland. Dominant species in the habitat are *Juniperus communis* subsp. *alpine* (= *J. nana*, *J. sibirica*), *Juniperus communis* subsp. *hemispherica* and *Juniperus sabina*.

These shrubs or dwarf shrubs form communities that tolerate extremely low temperatures in areas where deep and long snow cover during the winter serves as a shelter against freezing, desiccation and high solar radiation. If environmental conditions are suitable, communities may also develop on dry and sunny south exposed sites. *Juniperus* shrubs are able to grow as a procumbent dwarf shrub of only a few centimeters high, which can survive strong winds in the alpine vegetation belt. This plasticity allows these shrubs to form diverse and sometimes also floristically rich stands. The stands in the subalpine vegetation belt are a result of deforestation, subsequent soil erosion and grazing activities. Animals avoid eating the prickly *Juniperus* heaths and the shrubs are considered as undesired elements on pastures. They often are removed by cutting or burning. As a result of former or recent grazing, *Juniperus* heathlands form mosaics with related vegetation types such as dwarf shrub dominated by *Vaccinium* species or/and krummholz communities dominated by *Pinus mugo*.

Depending on the geological bedrock plant communities are either species poor (siliceous bedrock) or richer (calcareous bedrock). The vegetation is mainly classified within the class Loiseleurio-Vaccinietea that comprises arctic-boreal tundra dwarf shrub and relict (sub)alpine acidophilous heathlands. Based on habitat variability, e.g. mass and length of snow cover and thickness and quality of soil, as well as geographical pattern of distribution, the communities may be divided into more types, like acidophilous, mesophilous communities on deeper soils or dry communities on more shallow, drier soils mostly southward orientated.

Indicators of quality:

Due to the collapse of traditional farming systems, many areas in European mountains have been abandoned and processes of shrub and tree encroachment are going on. *Juniperus* shrubs play an important role in these processes as a succession stage of formerly deforested zone towards subalpine forests and krummholz. These processes may last long, however, due to severe mountain conditions. Controversially, developing of these *Juniperus* stands in the past was caused by intensive grazing in montane areas.

The following characteristics may be considered as indicators of good quality:

- Characteristic species richness
- Dominance of diagnostic *Juniperus* species
- Presence of regular moderate grazing regime
- Absence of tree species or dense scrub layer (except for *Juniperus* species)
- Presence of mosaics with other scrub and grassland types
- Absence of nutrient-demanding species.

Characteristic species:

Flora:

Vascular plants: *Achillea distans*, *Arctostaphylos uva-ursi*, *Avenula versicolor*, *Bruckenthalia spiculifolia*, *Calamagrostis villosa*, *Calluna vulgaris*, *Campanula patula* subsp. *abietina*, *C. alpina*, *Carex sempervirens*, *Cotoneaster integerimmus*, *Cystus galanoi*, *Daphne blagayana*, *Daphne oleoides*, *Deschampsia flexuosa*, *Festuca supina*, *Genista versicolor*, *Gentiana acaulis*, *Hieracium intybaceum*, *H. pannosum*, *Hypericum maculatum*, *H. richerii*, *Juniperus communis* subsp. *alpina*, *Juniperus communis* subsp. *hemispherica*, *Juniperus sabina*, *Nardus stricta*, *Oxalis acetosella*, *Phyteuma betonicifolium*, *P. persicifolium*, *Picea abies*, *Pinus mugo*, *Poa chaixii*, *Primula veris*, *Prunus prostrata*, *Pulsatilla vernalis*, *Pulsatilla alpina* s.l., *Rhododendron ferrugineum*, *R. hirsutum*, *R. myrtifolium*, *Rubus idaeus*, *Sempervivum montanum*, *S. wulfenii*, *Senecio abrotanifolius*, *S. nemorensis* agg., *Sesleria coerulescens*, *S. comosa*, *Trifolium alpinum*, *Vaccinium gaultherioides*, *V. myrtillus*, *V. vitis-idea*.

Mosses and lichens: *Alectoria ochroleuca*, *Cetraria islandica*, *Cladonia arbuscula*, *C. pyxidata*, *C. rangiferina*, *Dicranum scoparium*, *Hylocomium splendens*, *Pleurozium schreberi*, *Polytrichum alpinum*, *P. strictum*, *Sphagnum capillifolium*.

### **Classification**

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

EUNIS:

F2.2 Alpine and subalpine shrub

EuroVegChecklist:

*Juniperion nanae* Br.-Bl. in Br.-Bl. et al. 1939

*Aconito nasuti-Juniperion nanae* Onipchenko 2002

*Pino sylvestris-Juniperion sabinae* Rivas Goday in Rivas Goday et Borja 1961

*Genisto versicoloris-Juniperion hemisphaericae* Rivas-Mart. et J.A. Molina in Rivas-Mart., Fernández-González et Loidi 1999

*Pruno prostratae-Juniperion sabinae* Rivas-Mart. et J.A. Molina in Rivas-Mart., Fernández-González et Loidi 1999

*Daphno oleoidis-Juniperion alpinae* Stanisci 1997

*Junipero-Bruckenthalion* (Horvat 1949) Boşcaiu 1971

Annex 1:

4060 Alpine and Boreal heaths

Emerald:

## F2.26 Bruckenthalia heaths

MAES-2:

Heathland and shrub

IUCN:

3.3. Boreal shrub

3.4 Temperate shrub

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

Yes

Regions

Alpine

Justification

*Juniperus nana* dominated vegetation is typical high-altitudinal vegetation the mountain massifs of temperate Europe: on Iberian Peninsula, Massive Central, Alps, Carpathians and Balkan Peninsula.

### 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	50 Km <sup>2</sup>	Stable	Stable
<i>Bulgaria</i>	Present	460 Km <sup>2</sup>	Increasing	Increasing
<i>Croatia</i>	Present	25 Km <sup>2</sup>	Stable	Stable
<i>Czech Republic</i>	Present	marginal Km <sup>2</sup>	Unknown	Unknown
<i>Finland</i>	Finland mainland: Present	marginal Km <sup>2</sup>	Stable	Stable
<i>France</i>	France mainland: Present	415 Km <sup>2</sup>	Stable	Stable
<i>Germany</i>	Present	1 Km <sup>2</sup>	Stable	Stable
<i>Ireland</i>	Present	1 Km <sup>2</sup>	Unknown	Increasing
<i>Italy</i>	Italy mainland: Present Sardinia: Present	893 Km <sup>2</sup>	Increasing	Decreasing
<i>Portugal</i>	Portugal mainland: Present	2.3 Km <sup>2</sup>	Increasing	Unknown
<i>Romania</i>	Present	10 Km <sup>2</sup>	Decreasing	Decreasing
<i>Slovenia</i>	Present	46 Km <sup>2</sup>	Stable	Stable
<i>Spain</i>	Spain mainland: Present	188 Km <sup>2</sup>	Stable	Stable
<i>UK</i>	United Kingdom: Present	8 Km <sup>2</sup>	Stable	Stable

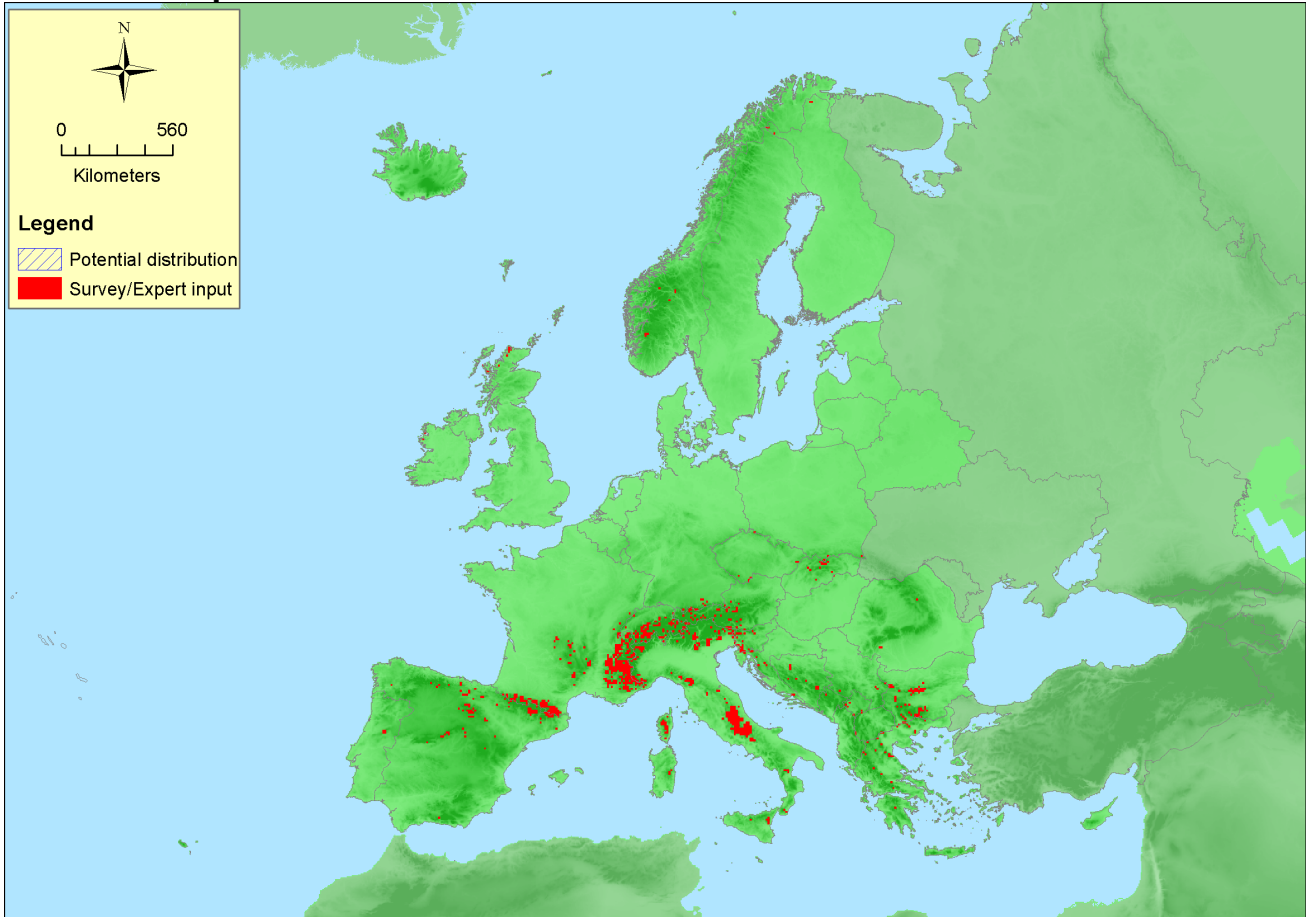
EU 28 +	Present or Presence Uncertain	Current area of habitat	Recent trend in quantity (last 50 yrs)	Recent trend in quality (last 50 yrs)
<i>Bosnia and Herzegovina</i>	Present	40 Km <sup>2</sup>	Increasing	Increasing
<i>Former Yugoslavian Republic of Macedonia (FYROM)</i>	Present	unknown Km <sup>2</sup>	Increasing	Increasing
<i>Kosovo</i>	Present	unknown Km <sup>2</sup>	Increasing	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)
Switzerland	Present	200 Km <sup>2</sup>	Stable	Stable

### Extent of Occurrence, Area of Occupancy and habitat area

	Extent of Occurrence (EOO)	Area of Occupancy (AOO)	Current estimated Total Area	Comment
EU 28	7066250 Km <sup>2</sup>	826	2099 Km <sup>2</sup>	
EU 28+	7066250 Km <sup>2</sup>	928	2339 Km <sup>2</sup>	

### Distribution map



Map is rather complete, with some possible gaps in the Balkan and unclear boundaries to F3.1a. Data: Art17, EVA, NAT.

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

*Juniperus nana* is an amphiboreal-circumboreal arctic-alpine species. It is often an element of heathland communities, but in northern Europe, it does not form communities. In Europe, 89.7% of the surface are within EU28. Similar communities appear on Caucasus, so we can estimate that about 80% of the overall surface are within EU28+.

### Trends in quantity

The surface of these communities is increasing because of the abandonment of traditional grazing in the mountains. We have detected an increase of surfaces in EU28 of 10.8% and 11.8% in EU28+, respectively. Forecasts regarding future trends are various: on one hand the abandonment of grazing is likely to continue and this will give space to *Juniperus* scrub to extend, but on the other hand we can expect a decrease in area of the habitat or its shift in higher elevations due to global warming.

- Average current trend in quantity (extent)

EU 28: Increasing

EU 28+: Increasing

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

No

*Justification*

The habitat has a wide range of distribution from Iberian Peninsula over the European mountain chains to the Balkan Peninsula.

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

No

*Justification*

They appear in all mountains in the temperate parts of Europe.

## **Trends in quality**

The quality of this habitat is adequate. Only 5.7% of the total surface have been degraded slightly to moderately in EU28+ and 5.15% in EU28, respectively. With changes in traditional agricultural practices, *Juniperus* plays an importation role in reforestation. This process can be rather long due to harsh conditions and in initial stages, the floristic composition is not adequate. On the other side, these initial Juniper stands have often been destroyed (cut or burnt) because Juniper is often considered as an undesired element of pastures.

- Average current trend in quality

EU 28: Stable

EU 28+: Stable

## **Pressures and threats**

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The habitat is expanding due to the abandonment of traditional agriculture (grazing). It is threatened due to intensive grazing, cutting or burning of shrub (undesired on pastures), construction of buildings and paths, global warming and afforestation (especially in the montane and subalpine zone).

### **List of pressures and threats**

#### **Agriculture**

Non intensive grazing

#### **Urbanisation, residential and commercial development**

Agricultural structures, buildings in the landscape

#### **Natural biotic and abiotic processes (without catastrophes)**

Species composition change (succession)

#### **Climate change**

Changes in abiotic conditions

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

## **Conservation and management**

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Though these habitats don't require special treatment, conservation problems derive from the abandonment of grazing and afforestation. As *Juniperus* heaths are successional stages in montane and subalpine vegetation belts, those will disappear in the further stages of reforestation. Minor conservation issues are the cutting of the scrub, construction of paths, roads (also for motorcycles), ski

resorts and building in the mountain areas. The most propitious treatment is extensive grazing.

## List of conservation and management needs

### Measures related to agriculture and open habitats

Maintaining grasslands and other open habitats

### Measures related to forests and wooded habitats

Adapt forest management

### Measures related to spatial planning

Legal protection of habitats and species

Manage landscape features

## Conservation status

Annex 1 types:

4060: ALP FV, ATL U2, BOR U1, CON FV, MAC FV, MED XX

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

The process of recovery is rather slow in high mountain regions. We estimate that the stands can recover within 10 years through intervention and within 20-30 years naturally (assuming that appropriate sources of propagules are in the landscape).

## Effort required

10 years	20 years	50+ years
Through intervention	Naturally	Naturally

## Red List Assessment

### Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	+11.8 %	unknown %	unknown %	unknown %
EU 28+	+10.8 %	unknown %	unknown %	unknown %

The figures for A1 have been calculated from the territorial data sheet. The habitat type shows an increase in area over the past 50 years due to abandonment of grazing. Grazing does not allow Juniper to spread, at the same time individual scrubs have been burnt, as they are considered as undesired on pastures. The calculated figures for A1 result in the category Least concern.

### Criterion B: Restricted geographic distribution

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

Both the EOO and AOO are 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	5.15 %	0.35 %	unknown %	unknown %	unknown %	unknown %
EU 28+	5.7 %	0.35 %	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 have been calculated from the territorial data sheets. The calculated figures result in the category Least concern (LC). The stands can be degraded due to human intervention (grazing, burning and urbanization). At the same time, the habitats that appear in the successional stage show rather impoverished floristic composition; they will need a certain amount of time to gain its typical appearance.

## 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	DD	LC	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	DD	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
Least concern	A1, B1, B2, C/D1	Least concern	A1, B1, B2, C/D1

## Confidence in the assessment

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

## Assessors



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### **References**

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