E1.1h Heavy-metal dry grassland of the Balkans

Summary

This highly specialised habitat confined to nutrient-poor soils rich in heavy metals derived from ultramafic rocks in the mountains of the Balkans and Cyprus comprises open grasslands with rich mixtures of grasses and forbs, including many endemics. Vulnerable to quarrying and mining and, where grazing has helped maintain the open cover, to reduction in grazing, it has declined in extent and quality over parts of its range but the current situation elsewhere is unknown. Control of grazing and proper planning for exploitation of mineral resources are essential for its conservation.

Synthesis

The habitat type is assessed as Near Threatened (NT) at EU28 level, but with some uncertainty. Very few quantitative information was available to assess its trends in quantity and quality. It meets the criteria for Near Threatened (NT) since the habitat has a relatively small extent of occurrence ≤ 100,000 km^2 (B1) and area of occupancy ≤ 100 km^2 (B2) in EU28, in combination with (relatively small) continuing pressures and threats. The main threats responsible for the decline of habitat's quantity and quality are quarrying and mining activities and changes in the grazing regime. In the EU28+ the habitat is much more widespread and does not qualify for any Red List category, and the conclusion is Least Concern (LC).

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Near Threatened	B1, B2	Least Concern	-

Sub-habitat types that may require further examination

The habitat is highly specialized and rich in local endemic plant species and subspecies in most of its localities. Ultramafic outcrops are isolated and function as biogeographical islands. They include several sub-types which have different species combinations that are differentiated in many cases by regional or even local endemic plants.

Habitat Type

Code and name

E1.1h Heavy-metal dry grassland of the Balkans

Ultramafic outcrops in East Rodopi with communities dominated by *Convolvulus boissierii*, Bulgaria (Photo: Rossen Tzonev).

Serpentine grassland with *Halacsya sendtneri* in the Gomsique valley of Albania (Photo: Milan Chytry).

Habitat description

Ultramafic rocks (e.g. serpentine, ophiolite) form dark-colored soils characterized by high content of heavy metals such as iron, nickel, cobalt and chromium, and a relatively low content of nutrients such as calcium, potassium and phosphorous, as well as by a low ratio of Ca/Mg. Ultramafic soils are also characterized by pronounced fluctuation of temperature, heat and drought because of their dark color, small water capacity and usually low organic matter content. The above-mentioned special properties of ultramafic soils are considered responsible for their low fertility and the specialized vegetation they host. Species growing on ultramafic soils possess a range of adaptations to these severe ecologic conditions, such as nanism, pelosity, shiny surfaces and the ability to hyperaccumulate heavy metals in their tissues. In these habitats grow many relict and endemic species. The largest ultramafic surfaces in Europe are found in the Balkan Peninsula: Bosnia, Serbia, Kosovo, FYR of Macedonia, Bulgaria and Greece.

Indicators of quality:

This habitat depends on ultramafic soil properties but also on the type of land use. Grazing of medium intensity helps the conservation of the floristic composition and the physiognomy of this habitat type. The following characteristics may be considered as indicators of good quality: natural species composition, absence of invasive species as well as of tall herb, shrub and tree species, regular grazing and presence of endemic or specialized species adapted to ultramafic soils.

Characteristic species:

Vascular plants:*Achillea pseudopectinata, Allyssum heldreichii, Allyssum montanum* subsp.*serbicum, Allysum markgrafii, Armeriacanescens, Asplenium adiantum-nigrum* subsp. *serpentini, Astargalus onobrychis* subsp. *chlorocarpus, Botriochloa ischaemum, Bromopsis pannonica, Bromopsis erercta, Centaurea grisebachii* subsp.*occidentalis, Centaurea kosanini, Centaurea stoebe* subsp.*australis, Convolvulus boissieri* subsp. *parnassicus, Dianthus giganteus* subsp. *croaticus, Drymocallis rupestris, Echium rubrum, Erysimum linariifolium, Euphorbia glabriflora, Euphorbia montenegrina, Fumana bonapartei, Gypsophila spergulifolia, Halacsya sendtneri, Haplophyllum boissieranum, Medicago prostrata, Minuartia verna subsp. collina, Noccaea kovatsii, Paragymnopteris marantae, Pistorinia hispanica, Plantago holosteum, Plantago subulata, Poa badensis, Polygonum albanicum, Potentilla astrachanica, Potentilla visianii, Rumex acetosella, Scabiosa leucophylla, Scleranthus perennis, Scrophularia canina subsp. tristis, Sedum hispanicum, Sedum ochroleucum, Sedum serpentini, Sesleria latifolia, Silene armeria, Silene bupleuroides* subsp.*staticifolia, Stachys recta* subsp*. baldacii, Stachys scardica, Thymus praecox* subsp. *jankae, Verbascum glabratum* subsp*. bosnense.*

Classification

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

EUNIS:

1.2.Perennial calcareous and basic steppes;

EuroVegChecklist:

Polygonion albanicae Ritter-Studnicka 1970 (incl. *Potentillion visiani* Ritter-Studnička 1970)

Centaureo-Bromion fibrosi Blecic et al. 1969

Alyssion heldreichii Bergmeier et al. 2009

Annex 1:

62B0 Serpentinophilous grassland of Cyprus

Emerald:

-

MAES-2:

Grassland

IUCN:

4.4 Temperate grassland

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

Regions
Alpine
Continental

Justification
The habitat depends on local soil conditions (physical, chemical and biological properties). It is geographically restricted to the Balkans, where it is distributed in the Continental and Alpine region. The reported occurrence on Cyprus (Mediterranean region) may have to be distinguished as a separate habitat type or subtype.

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)
Bulgaria	Present	Unknown Km^2	Decreasing	Decreasing
Croatia	Present	Unknown Km^2	Unknown	Unknown
Cyprus	Present	0.41 Km^2	Stable	Stable
Greece	Greece (mainland and other islands): 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)
Albania	Present	70 Km^2	Decreasing	Decreasing
Bosnia and Herzegovina	Present	200 Km^2	Decreasing	Decreasing
Former Yugoslavian Republic of Macedonia (FYROM)	Present	Unknown Km^2	Decreasing	Decreasing
Kosovo	Present	Unknown Km^2	Unknown	Unknown
Serbia	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	74400 Km^2	86	Unknown Km^2	
EU 28+	211550 Km^2	325	Unknown Km^2	

Distribution map
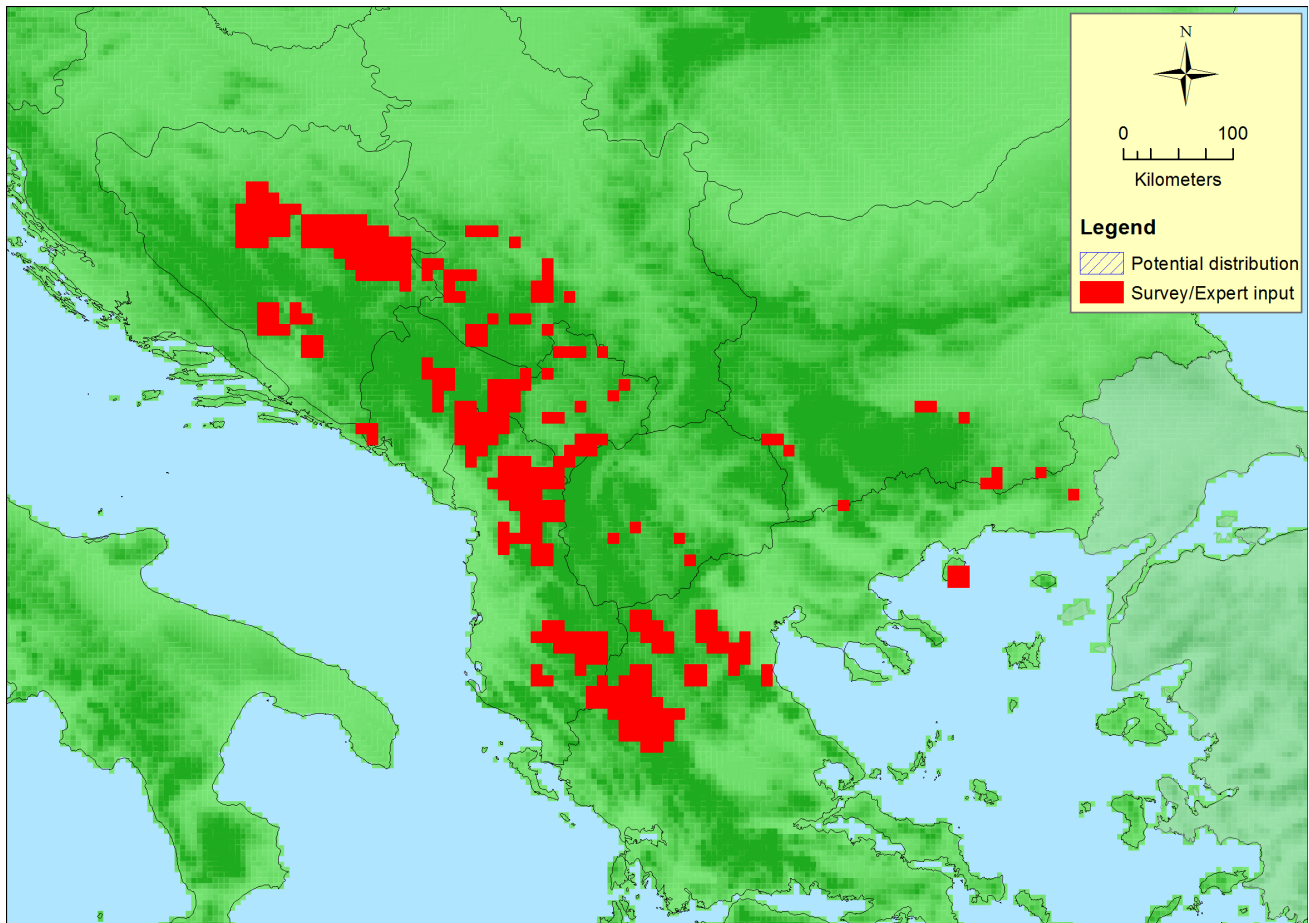
The map gives an underestimation of occurrences throughout the range, with a.o. data gaps for Croatia, but potential distribution is provided for part of the Balkan. Data sources: LIT, EVA, BOHN.

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

Probably not more than 40%. The habitat type is widespread in Albania, Bosnia and Herzegovina (largest coverage), Kosovo, South Serbia and part of FYR Macedonia, while its extent in other Balkan countries is relatively unknown.

Trends in quantity

A small decrease in quantity is reported for Bulgaria (<5%), and the habitat area is stable in Cyprus, but no data is known for the rest of the EU countries. The decrease is mostly caused by excavation activities (new quarries) and lesser due to the overgrazing or the abandonment of grazing. In EU28+ a decrease in quantity is reported for Macedionia (5%), Bosnia and Herzegovina (20%) and Albania (3%).

- 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 areas with serpentine rocks are restricted in some areas on the Balkans, but they have not been reduced significantly during the last 50 years.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  The serpentine rocks are distributed in many parts of Balkan Peninsula. Their range is limited but in some

areas they occupy large territories.

Trends in quality

Habitat's quality in Bulgaria is reported as declining for about 10% with slight severity of degradation, but it is stable in Cyprus, while there are no data for Greece. Habitat's quality is also declining in Bosnia and Herzegovina (15%), Albania (5%) and FYR Macedonia (10%), but the severity of decline is considered as "slight, low or not". No data exist for Kosovo, Serbia and Montenegro.

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

Pressures and threats

The most important threats for the habitat are mining and quarrying activities, human habitation, planting of forest plantations, overgrazing or abandonment of grazing that initiates natural succession and thus the invasion of shrub and forest species into the grasslands.

List of pressures and threats

Agriculture

Grazing
Intensive grazing
Abandonment of pastoral systems, lack of grazing

Sylviculture, forestry

Forest planting on open ground

Mining, extraction of materials and energy production

Mining and quarrying

Urbanisation, residential and commercial development

Urbanised areas, human habitation

Natural biotic and abiotic processes (without catastrophes)

Biocenotic evolution, succession

Conservation and management

The habitat is characterized by very specific features and it is very rich in local and regional endemic plant species or subspecies. Its conservation status has been assessed only in Cyprus. It is not included in the Annex I of the Habitat' Directive (except for Cyprus) and thus is not protected in most of the European countries. Legal protection of habitat is necessary all over its distribution range. Therefore, it should be added in the Annex I of Habitats' Directive and new sites should be designated in conservation networks. Additional measures that can be implemented are the restriction (at least partial) of the creation of new quarries and mines in the habitat's areas and the proper management of grazing activities.

List of conservation and management needs

Measures related to agriculture and open habitats

Maintaining grasslands and other open habitats

Measures related to spatial planning

> 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 I type

CS: Range Area S&F FP Overall MED 62B0 FV

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

The habitat does have limited and slow capacity to recover naturally or through intervention because it depends on natural geological and geomorphological processes

Effort required

200+ years
Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	0/-5% %	unknown %	unknown %	unknown %
EU 28+	-5/-20% %	unknown %	unknown %	unknown %

Few data is available for the EU and especially area information is lacking, but from the reported trends in area (Bulgaria -5%) and Cyprus (stable) it is likely that the average EU trend is below the threshold for Near Threatened. A negative trend (- 20%) has been recorded in Bosnia and Herzegovina, where the habitat seems most widespread among the other Balkan countries. A small decrease has been recorded in Albania (-3%) and Macedonia (-5%). Also for the EU28+ no European average has been calculated, due to lack of area data, but the overall trends is likely to be below the NT-threshold of -25%. No data exists for Greece, Kosovo, Croatia and Serbia. No information exists on longer historical and future trends.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	74400 Km^2	Yes	Yes	no	86	Yes	Yes	no	No
EU 28+	211550 Km^2	Yes	Yes	no	325	Yes	Yes	no	No

Both the values of the area of occupancy and the extent of occurrence in the EU28 are just slightly higher than the thresholds for B1 and B2. However, the exact AOO and EOO values are uncertain. On the one hand, it is likely that data gaps exist in the distribution and the AOO and EOO values are higher in reality, while on the other hand some potential distribution is included in the calculation of AOO and EOO, and in reality the values may be lower. Besides, the reported trend data in quantity and quality is very small (called "insignificantly" for Bulgaria) and therefore it is uncertain whether the habitat meets subcriterion a or b. As some pressures result from decreasing grazing (abandonment), it is concluded that there is a

continuing and future threat, resulting in the overall conclusion for the EU28 of Near Threatened (NT). In the EU28+ the AOO and EOO are much larger and the habitat is assessed as Least Concern under B1, B2 and (because of a high number of locations) also B3.

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 %	slight %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	5-15 %	slight %	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 overall extent and severity of degradation cannot be estimated accurately because no adequate data exist for most countries. Overall reported trends are between 5 and 15% extent, and slight/low severity, so the conclusion for both EU28 and EU28+ is Least Concern. No information exists on long historical or future trends in quality (CD2, CD3, C2, C3, and D2). The changes in quality are both abiotic (quarrying and mining) and biotic (grazing regime), so C/D1 has not been split into C1 and D1.

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	NT	NT	DD	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
Near Threatened	B1, B2	Least Concern	-

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

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