

E1.5e Madeiran oromediterranean siliceous dry grassland

Summary

This highly distinctive habitat of tussocky grassland, rich in endemics, is restricted to high mountains in Madeira, occurring in crevices and on ledges in silicate volcanics where the soils are kept permanently moist by the very humid climate. Typically occurring in mosaics with heaths and woodlands, the decline of domestic goat grazing has favoured its extension into what were more accessible situations, but invasion by shrubs and trees can then be a threat, particularly problematic when alien species appear. Though more or less stable, the highly restricted distribution make the habitat vulnerable.

Synthesis

This habitat is only found in the highest peaks of Madeira Island, and has an extremely restricted geographic range (extent of occurrence (EEO) is 200 Km², area of occupancy (AOO) is only 2 grid cells). It is assessed as Critically Endangered since wildfires and an invasive shrub species (*Cytisus scoparius*) are likely to lead to a continuing decline in the quantity and quality of this habitat in the next 20 years.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Critically Endangered	B1, B2	Critically Endangered	B1, B2

Sub-habitat types that may require further examination

No sub-habitats have been distinguished for further analysis.

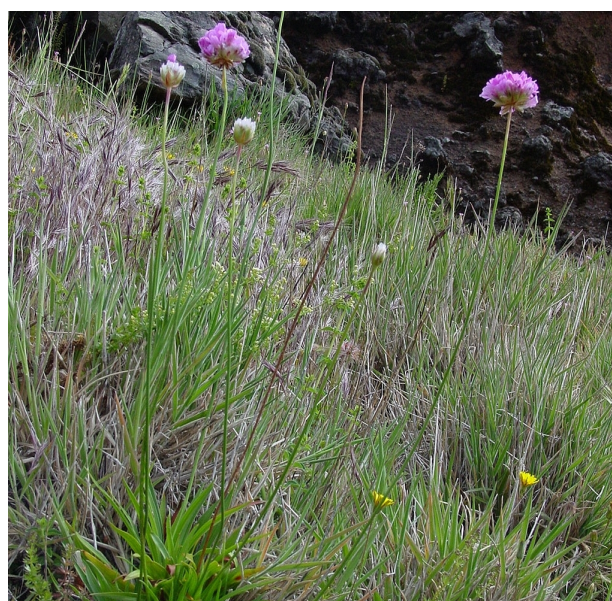
Habitat Type

Code and name

E1.5e Madeiran oromediterranean siliceous dry grassland



Chasmophytic, extreme example of habitat E1.5e, dominated by grasses *Parafestuca albida*, *Deschampsia maderensis* and *Festuca jubata* (Photo: Sandra Mesquita).



Establishment phase of E1.5e habitat in platform after abandonment of grazing, with *Armeria maderensis*, *Galium productum* and the dominant grass *Holcus pintodasilvae* (Photo: Sandra Mesquita).

Habitat description

This habitat consists of perennial cespitose grasslands of oromediterranean, humid to ultrahyperhumid bioclimates, in the summit of mountains of Madeira Island, to which this vegetation is strictly endemic. Such communities occur at altitudes over 1,500 m Asl, either in earthy rock crevices (chasmophytic) or over horizontal platforms along hillsides with shallow andosols, on silicate volcanic substrata (either hardrock or pyroclast). The physiognomy of these communities varies from dense mat-like, more or less continuous in platforms, to discontinuous on rock outcrops following crevices; it's height is normally between 0.2 and 0.4 m. Dominant species are mostly madeiran endemic grasses: *Parafestuca albida* (= *Koeleria albida*), *Deschampsia maderensis*, *Festuca jubata*, *Anthoxanthum maderense*, *Agrostis obtusissima* and *Holcus pintodasilvae*; notheworthy madeiran endemics having their optima in this habitat are: *Armeria maderensis*, *Anthyllis lemmaniana*, *Crepis andryaloides*, *Orchis scopulorum*, *Micromeria varia* subsp. *thymoides* var. *cacuminicola*, *Rumex bucephalophorus* subsp. *fruticescens*.

This vegetation occupies azonal permanent habitats in a mosaic with tree-heath forests of Madeira (*Polysticho falcinelli-Ericion canariensis*- G2.7 = *Polysticho-Ericion arboreae*) and mat-forming mountain low heath communities of *Erica maderensis* (*Argyranthemo montani-Ericetum maderensis*, *Bystropogono punctati-Telinion maderensis* -G2.7). Side contacts with succulent semi-deciduous rosette *Crassulaceae* comophyte (i.e. on the surface of rock) communities (*Sinapidendro angustifolii-Aeonion glandulosi* - F8.2) enrich the madeiran grasslands with many other endemics (see F8.2- Madeiran xerophytic scrub). Other common contacts are with *Thymus micans* communities (E1.Ad).

As the summit of Madeira's mountains was, until recently, grazed mostly by domestic goats, the coenotic extreme of the community in platforms is thought to be quite rare, being the rocky coenotical extreme the dominant case. Platforms if permanently grazed normally had nitrogen-prone grasslands dominated by *Agrostis castellana* / *Holcus* sp. pl. With withdrawal of goat grazing the platforms with shallow andosols were gradually colonized, in recent years, by this habitat's community where the habitat optimum seems to be. Thus, due to grazing withdrawal the actual area of the community is bigger than it was ten years ago. Although in shallower platforms and rock outcrops the community seems to be of a permanent type (a *permasigmetum* in the sense of S. Rivas-Martínez) and kept by regular gravitational disturbance, in deeper more stable soils ecological succession may lead to substitution of grasslands by woody types.

Indicators of quality:

The habitat contains a set of endemics with high constancy and fidelity that are observed in most well-preserved situations. Nevertheless, poorer basal communities dominated by few of the grasses can be found. These have lower floristical quality, but, in turn can develop into fully coenotically saturated versions. In general, the greater the diversity of the above cited flora is found and less of generalist Mediterranean and Madeiran-Canarian grasses or semi-nitrogen-prone grasses (e.g. *Bromus* sp. pl.) are found, the better the habitat quality is (e.g. *Dactylis smithii* subsp. *hylodes*, *Agrostis castellana*).

Characteristic species:

Flora, Vascular plants:

Endemics trictly characteristic of habitat: *Parafestuca albida* (dom.)*, *Deschampsia maderensis* (dom.), *Festuca jubata*, (dom.) *Anthoxanthum maderense*, *Agrostis obtusissima*, *Holcus pintodasilvae*, *Armeria maderensis*, *Anthyllis lemmaniana*, *Crepis andryaloides*, *Orchis scopulorum*, *Micromeria varia* subsp. *thymoides* var. *cacuminicola*, *Rumex bucephalophorus* subsp. *fruticescens*. (Taxonomical remarks: *Parafestuca* is a monotypic genus endemic of Madeira according to the criteria of E.B. Alexeev (1985). Recent revision places it in *Koeleria*. We follow the former criteria; *Festuca jubata* was formerly thought to be shared with Azores, but is now taken to be a strict madeiran endemic; in Azores *F. jubata* auct. is *F. francoi*)

Common transgressive endemics from other habitats: *Odontites holliana*, *Andryala grandulosa* subsp. *varia*, *Saxifraga maderensis* var. *pickeringii*, *Argyranthemum pinnatifidum* subsp. *montanum*, *Teucrium francoi*, *Plantago arborescens* subsp. *maderensis*, *Viola paradoxa*, *Vicia capreolata*, *Sinapidendron frutescens*.

Fauna

Birds: *Pterodroma madeira* (Zino's Petrel, is one of the most threatened bird species in the world (ca. 30 couples) and nests on this habitat alone).

Classification

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

EUNIS:

E1.5 Mediterranean-montane grassland

EuroVegChecklist:

Deschampsio maderensis-Parafestucion albidae Capelo et al. 2000

Annex 1:

-

Emerald:

-

MAES:

Terrestrial - 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

Macaronesian

Justification

Madeiran mountain grasslands are strictly endemic to Madeira Island, within a very small area and have several endemics, with one at genus level: *Parafestuca* and species.

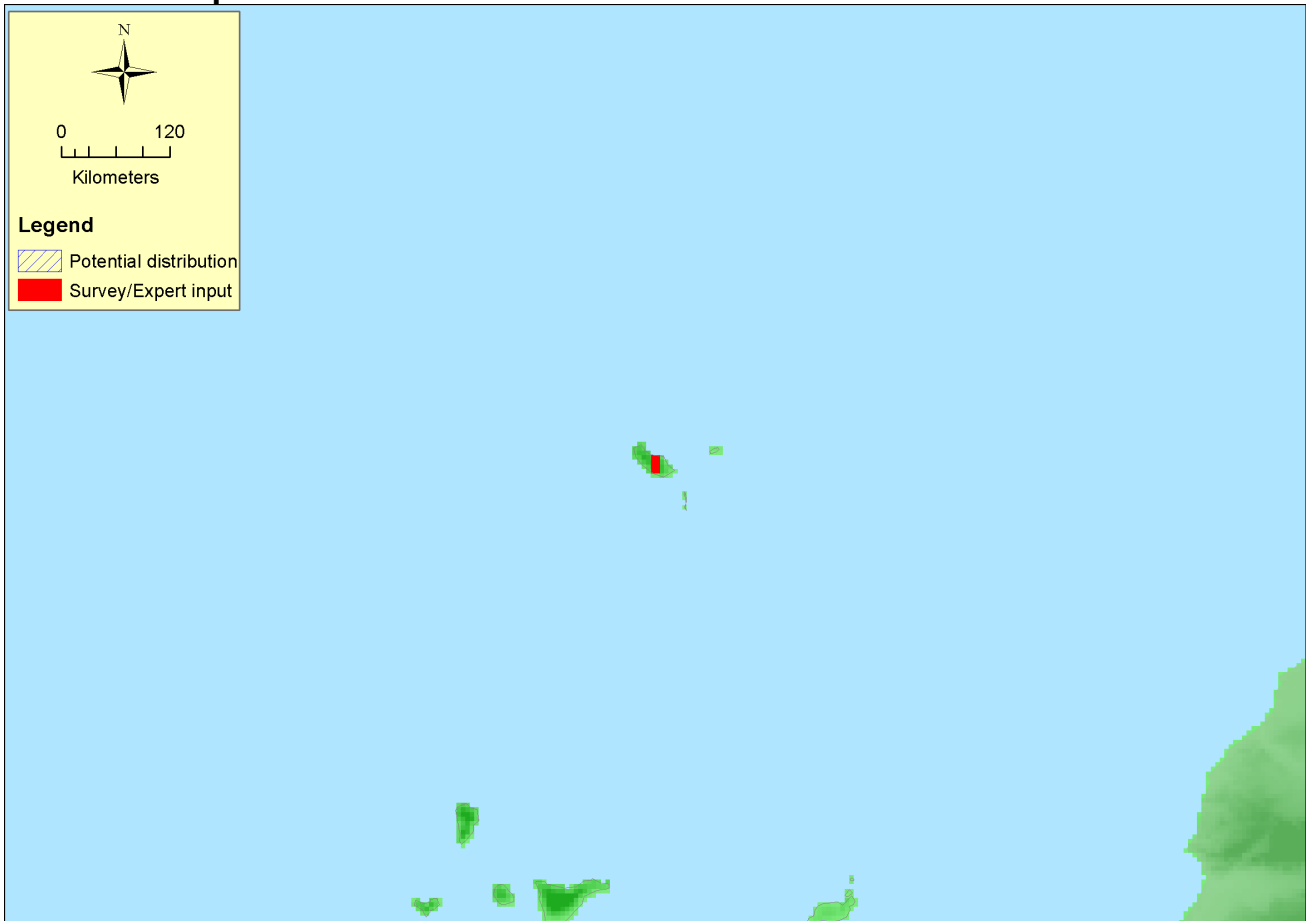
Geographic occurrence and trends

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>Portugal</i>	Madeira: Present	6.5 Km ²	Increasing	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	200 Km ²	2	6.5 Km ²	
EU 28+	200 Km ²	2	6.5 Km ²	

Distribution map



The map is complete as the habitat is restricted to the highest parts of Madeira. Data sources: LIT.

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

Of the current distribution of this habitat type, 100% is within the EU 28 since this species is endemic to Portugal.

Trends in quantity

Madeiran mountain grasslands are restricted to rocky habitats and earthy rock platforms of the island of Madeira above 1,500 m Asl. Historically, they might have been more abundant in a large plateau at 1,500 m Asl (Paul da Serra), however between the XVI or XVII centuries, and the 90's of the XX century the area was intensively grazed and this habitat type was altered almost to the point of collapse (Andrada, 1990; Sousa, 2003). Therefore, the historical reduction might have been greater than 50%, probably greater (80%). During most of the last 50 years, the habitat was restricted to the rocky highest peaks (Pico Areeiro and Pico Ruivo). As the Madeira Natural Park decided to ban goat grazing from mountains (in the 90s), the area has expanded into earthy platforms around the peaks. The increase in extent is estimated to be 225% of total area (during the past 50 years).

- 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

During most of the last 50 years, the habitat maintained its small area at first due to the persistence of grazing within the largest potential area of the habitat. However, in the last 15 to 20 years, the area has

increased much due to banning of goat grazing.

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

Yes

Justification

The habitat is naturally restricted to the highest peaks in Madeira Island, which amount to a very small EOO (approximately 200 Km²).

Trends in quality

In the last 50 years, the trend in quality is estimated to have been stable, although no reliable quantitative estimates are available. No plant extinctions were reported. Nevertheless, a part of the habitat potential area was under a grazing regime (by goats), thus some reduction in quality may have occurred. In terms of composition, the grazed grasslands might have included some of the characteristic species, but mostly common species might have been promoted (e.g. *Holcus lanatus*, *Agrostis castellana*). Since the 90s of the XX century, a great proportion of former pasture land, as it was abandoned, recovered gradually, but as secondary versions of the pristine grassland (previously only on rock). Nevertheless new recovered areas from secondary versions are gaining more and more characteristic species. It is expected that, in the future, recovered areas will be equivalent in quality to pristine ones. Thus, it is assumed that the overall trend in quality is stable.

- Average current trend in quality

EU 28: Stable

EU 28+: Stable

Pressures and threats

Madeiran mountain meadows are, in general, of permanent character and do not depend on grazing to persist. Therefore, successional processes leading to shrub formations are not expected in most of the habitat area. Nevertheless, the invasive alien shrub called the common broom (*Cytisus scoparius*) (from mainland) has some capacity to establish in the habitat and it is expanding in the mountain areas. The dispersion of the common broom into this habitat is positively promoted by wildfires because of the intense dormancy-breaking effect in the soil seed bank after the fires. Wildfires are not a frequent occurrence in the highest peaks but they might occur from time to time during exceptionally dry summers (the last one was in 2011). As strict protective measures have been taken by Park authorities and the habitat is, for the most part inaccessible to humans, only those habitat stretches near mountain trails could be at some risk. Nevertheless, the trails' limits, are, in general, not trespassed by tourists and the effect of trampling is unimportant. Expansion of military and touristic facilities, which happened recently, is to be kept in control. Plantation of native trees way outside their natural altitude range due to volunteer NGO activities was also reported and might compromise some areas. Pillage by botanists (non-authorized) could be also problematic. Climate change might, in the future, lead to mountain meadows being found outside their bioclimatic optimum.

List of pressures and threats

Sylviculture, forestry

Forest replanting (native trees)

Invasive, other problematic species and genes

Invasive non-native species

Introduction or spread of non-indigenous species

Natural System modifications

Burning down

Natural biotic and abiotic processes (without catastrophes)

- Erosion
- Species composition change (succession)

Climate change

- Temperature changes (e.g. rise of temperature & extremes)
- Droughts and less precipitations
- Migration of species (natural newcomers)

Conservation and management

The main conservation measures needed are the establishment of strictly protected areas, the strict control of touristic visits (minimizing trampling), the prevention of grazing and the control of the expansion of invasive *Cytisus scoparius* and planting of other species, even if they are Madeiran native trees and shrubs.

List of conservation and management needs

Measures related to spatial planning

- Establish protected areas/sites
- Legal protection of habitats and species

Measures related to hunting, taking and fishing and species management

- Specific single species or species group management measures

Conservation status

No related Annex I types

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

Provided that there are well-conserved habitats nearby that may act as sources of propagula (seeds), after burning, a landslide or banning grazing, it is expected that habitat recovers with relative ease. Human-induced disturbances are expected to be also kept at minimum possible level (wildfire, trampling).

Effort required

10 years	20 years
Through intervention	Naturally

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	+225 %	Unknown %	Unknown %	> 50% %
EU 28+	+225 %	Unknown %	Unknown %	> 50% %

An historic reduction of more than 50% is estimated to have taken place due to extensive and persistent goat and sheep grazing until the mid 90's of the XX century (which has been banned since). This habitat type is therefore assessed as Vulnerable under Criterion A3. In the last 50 years, there has been an increase in the area of this habitat and there is no information on future trends.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	200 Km ²	No	Yes	<5	2	No	Yes	<5	<5
EU 28+	200 Km ²	No	Yes	<5	2	No	Yes	<5	<5

This habitat has a very restricted geographic range, with an EOO of 200 Km² and an AOO of 2. Wildfires and encroachment by an invasive shrub (*Cytisus scoparius*) are likely to cause a continuing decline in the quantity and quality of this habitat in the next 20 years. Taking into account the likely extent of the effects of these threats and the distribution of this habitat, it is assumed that the habitat occurs at less than five locations. This habitat is therefore assessed as Vulnerable under Criterion B3 and as Critically Endangered under Criterion B1 and B2.

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	Unknown %	Unknown %	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%

There are no quantitative estimates for the reduction in abiotic and/or biotic quality. This habitat types is therefore assessed as Data Deficient under Criterion C/D.

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, which is therefore assessed as Data Deficient under Criterion E.

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	VU	CR	CR	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	DD	DD	VU	CR	CR	VU	DD	DD	DD	DD	DD	DD	LC	DD	DD	DD

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Critically Endangered	B1, B2	Critically Endangered	B1, B2

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

Andrada, E.C. 1990. Repovoamento florestal do Arquipélago da Madeira(1952-1975). Direção-Geral das Florestas. Secretaria de Estado da Agricultura. Ministério da Agricultura, Pescas e Alimentação. Lisboa, 205 pp.

Sousa, M.A.M.M. 2003. A pastorícia nas serras da Região Autónoma da Madeira. In 50 anos a servir a floresta. Governo Regional da Mdeira. Secretaria Regional do Ambiente e Recursos Naturais. Direção Regional de Florestas. Funchal.

Capelo, J., Costa, J.C., Lousã, M., Fontinha, S., Jardim, R., Sequeira, M. and Rivas-Martínez, S. 2000. Vegetação da Madeira (Portugal): aproximação à tipologia fitossociológica. *Silva Lusitana*, 7(2): 257 - 279.

Capelo, J., Sequeira, M. Jardim, R., Mesquita, S. and Costa, J.C. 2005. The vegetation of Madeira Island (Portugal). A brief overview and excursion guide. *Quercetia*, 7: 105 -122.

Costa, J.C., Neto, C., Aguiar, C., Capelo, J., Espírito-Santo, M.D., Honrado, J., Pinto-Gomes, C., Monteiro-Henriques, T., Sequeira, M. and Lousã, M. 2012. Vascular Plant Communities in Portugal (continental, Azores & Madeira) *Global Geobotany* 2: 1-180.

Costa, J.C., Capelo, J., S., Jardim, R., Sequeira, Espírito-Santo, M.D., Lousã, M. Fontinha, S., Aguiar, C. and Rivas-Martínez, S. in Capelo, J. (ed.) 2004. Catálogo sintaxonomico e florístico das comunidades vegetais da Madeira e Porto Santo. *Quercetia* 6: 61-186.

Taxonomical reference: 90(5): 107 (1985) [Byull. Moskovsk. Obshch. Isp. Prir., Otd. Biol. 90\(5\): 107](#)