# G2.7 Macaronesian heathy woodland

## Summary

Forest dominated by tall individuals of arborescent Ericaceae are a relict habitat restricted to the Azores, Madeira and Canary archipelagos. They contain a great wealth of endemic species with variation across the archipelagoes. Threats come from urbanisation, agriculture, exotic forestry, tourism, and also natural hazards like fire and climate change. Limitation of these is necessary for conservation.

## Synthesis

In the past 50 years, an increase in area has occurred and this trend is likely to continue in the future. Nevertheless, the habitat type qualifies as Vulnerable (VU) under criterion A3 due to evidence for a large-scale historical loss in area in the more distant past (since the XVI to XVIII centuries on), which surely has been larger than 50%.

| Overall Category & Criteria | | | |
|---|---|---|---|
| EU 28 | | EU 28+ | |
| Red List Category | Red List Criteria | Red List Category | Red List Criteria |
| Vulnerable | A3 | Vulnerable | A3 |

## Sub-habitat types that may require further examination

There are three sub-types, one for each archipelago, i) Azorean, ii) Madeirean, and iii) Canarian that have a different species composition and structure (each with other endemics) and may require further examination for Red List assessment.

## Habitat Type

### Code and name

G2.7 Macaronesian heathy woodland

Tree-heath forest of *Erica arborea* subsp. *canariensis* at Bica da Cana, Madeira (Photo: Jorge Capelo).

Tree-heath forest of *Erica platycodon* subsp. *platycodon* at Garajonay, La Gomera (Photo: Jorge Capelo).

### Habitat description

The habitat type comprises successionally mature, zonal microforests of Madeira and the Canary Islands with a luxuriant canopy 3 to 12m tall, dominated by one or more of *Erica canariensis* Rivas Mart., M. Osório & Wildpret (=*E. arborea* sensu auct. mad & can. and not *E. arborea* L.), *E. platycodon* subsp. *platycodon* (Canarian) or *E. platycodon* subsp. *maderincola* (Madeiran) usually with some broadleafs, including

Lauraceae. Heath scrub, even if arborescent, that is pioneer, seral or secondary to mature forest, is not included here but placed in F4.3 Macaronesian heath, vegetation typical of cambisols with mor humus. Four distinct subtypes of these primary woodlands can be recognized with notable stretches of types 2 and 4 on Tenerife (Anaga) , Gomera and La Palma.

1. Madeiran, upper mesotemperate to supratemperate, hyper-humid tree-heath forests above the

upper limit of laurel forest from *ca.* 1500 up to 1862m, on andosols or cambisols, with absolute dominance of heaths reaching up to 12m tall, either *E. canariensis* or *E. platycodon* subsp. *maderincola* (Polysticho falcinelli-Ericion canariensis). Intense cold probably excludes laurels but there can be some other broadleafs (*Vaccinium padifolium*, *Sorbus maderensis*) and endemics in the understorey and clearings (e.g. *Teucrium francoi, Odontites holliana, Polystichum falcinellum*). In pristine stands, *Juniperus cedrus* subsp. *maderensis* used to be much more abundant in the forest, having been subsequently cut for timber and charcoal and now surviving as sparse individuals.

2. Tree-heath/Canarian holly forests of the sub-humid to humid mesomediterranean zone on rocky outcrops, but under almost permanent heavy fogs such that the thin soils with low water-holding capacity are kept permanently wet. These forests are co-dominated by *Erica platycodon* subsp. *platycodon* and elements of the Canarian laurel forest (Ixantho-Laurion), e.g. *Laurus novocanariensis* Rivas Mart. et al. (=*Laurus azorica* sensu auct. can. non (Seub.) Franco), *Viburnum tinus* subsp. *rugosum* and *Ilex canariensis* var. *canariensis.*.

3. Madeiran equivalents of type 2 have *Erica platycodon* subsp. *maderincola,* madeiran blueberries *(Vaccinium padifolium*) and elements of the madeiran laurel forest *(*Sibthorpio-Clethrion) on deep cambisols.

4. On west Canaries with a dry to subhumid thermomediterranean climate, there are tree heath/ Canarian strawberry tree microforests dominated by *Arbutus canariensis*, *Erica canariensis*, *Ilex canariensis* var. *canariensi*s with *Visnea mocanera* and *Syderoxylon marmulano*. Madeiran strawberry tree forests have no large tree-heath individuals.

Indicators of quality:

- Closed canopy layer and richness of both dominant and understory characteristic taxa.
- Large gaps in crown layer occurring naturally by death of individual trees or sometimes mass movements of soil in steep slopes.
- No tendency to dominance by shrub thickets of *E. platycodon* subsp. pl., *Teline* sp. pl., *Cistus symphytifolius, C. monspeliensis*, *Globularia salicina, Carlina* sp. pl. or tall perennial grasses (*Hyparrhenia sinaica, H. podotricha).*
- Absence of invasive aliens such as *Cytisus scoparius*, *Ulex europaeus* and *Leptospermum scoparius* or even Australian wattles (*Acacia* sp. pl.), taking advantage of gaps or wildfires.
- Absence of trampling by humans.

Characteristic species:

Flora:

Vascular plants: *Erica canariensis* (= *E. arborea* sensu auct. mad & can.) (dom.), *Erica platycodon subsp. platycodon* (dom.), *E. platycodon subsp. maderincola* (dom.), *Ilex canariensis* (dom.), *Laurus novocanariensis (= L. azorica sensu auct. mad & can.)* (dom.), *Morella faya (= Myrica faya)* (dom.), *Rhamnus glandulosa, Semele androgyna, Smilax canariensis, S. pendulina, Apollonias barbujana, Arbutus canariensis* (dom.), *Carex perraudieriana, Diplazium caudatum, Dryopteris oligodonta, Euphorbia mellifera, Heberdenia excelsa, Ilex perado, Pleiomeris canariensis, Prunus lusitanica* subsp. *hixa* (dom.), *Pteris incompleta, Syderoxylon marmulano, Visnea mocanera, Viburnum tinus* subsp. *rugosum*(dom.) , *Hypericum inodorum, Phyllis nobla, Teline canariensis, Apollonias barbujana, Persea indica, Picconia*

*excelsa, Cedronella canariensis, Hypericum glandulosum, Hypericum grandifolium, Arachnoides webbianum, Berberis maderensis, Carex lowei, Cirsium latifolium, Clethra arborea, Dryopteris aintoniana, Dryopteris x furadensis, Dryopteris maderensis, Festuca donax, Goodyera macrophylla, Hedera maderensis* subsp. *maderensis, Luzula seubertii, Pittosporum coriaceum* (extremely rare), *Polystichum drepanum, Rosa mandonii, Rubus grandifolius, Ruscus streptophyllus, Sibthorpia peregrina, Teucrium betonicum, Teucrium abutiloides, Vaccinium padifolium* (dom.), *Arum italicum* subsp. *canariensis, Dryopteris aemula, Bystropogon punctatus, Juniperus cedrus* subsp. *cedrus, J. cedrus* subsp. *maderensis, Polystichum falcinellum, Ranunculus cortusifolius* var. *minor, Sorbus maderensis.* The genera *Picconia, Semele, Gesnouinia, Lactucosonchus* and *Ixanthus* are entirely endemic to these forests and others such as *Isoplexus, Visnea* and *Phyllis* reach their maximum development here.

Fauna:

Birds: *Columba bollet, C. junionae, C. trocaz, Fringilla coelebs* subsp. *ombriosa, F. teydea.*

## Classification

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

EUNIS:

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EuroVegChecklist:

*Polysthico falcinelli-Ericion arboreae*

*Sibthorpio peregrinae-Clethrion arboreae* (part).

*Ixantho viscosae-Laurion azoricae* (part)

*Visneo mocanerae-Apollonion barbujanae* (part)

Annex 1:

9360 Macaronesian laurel forests (Laurus, Ocotea)

Emerald:

G2 Broadleaved evergreen woodland

MAES-2:

Woodland and forest

IUCN:

1.4 Temperate Forest

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

Yes

Regions
Macaronesian

Justification
The habitat stands for relict forest or arborescent vegetation with strong affinities with Tertiary subtropical vegetation ('geoflora'). Contrary to continental European forest vegetation, it was not influenced by glaciations during the Pleistocene and thus lacks both deciduous elements (artho-tertiary flora) and mediterranean sclerophyllous trees (paleomediterranean elements). It is found in the Azores, Madeira and

Canary Islands, with an impoverished very small spot in Morocco's atlantic coast. It has an absolute compositional and structural originality and very high degree of endemism. The Azorean variant is quite distinct from that of Madeira and Canary Islands.

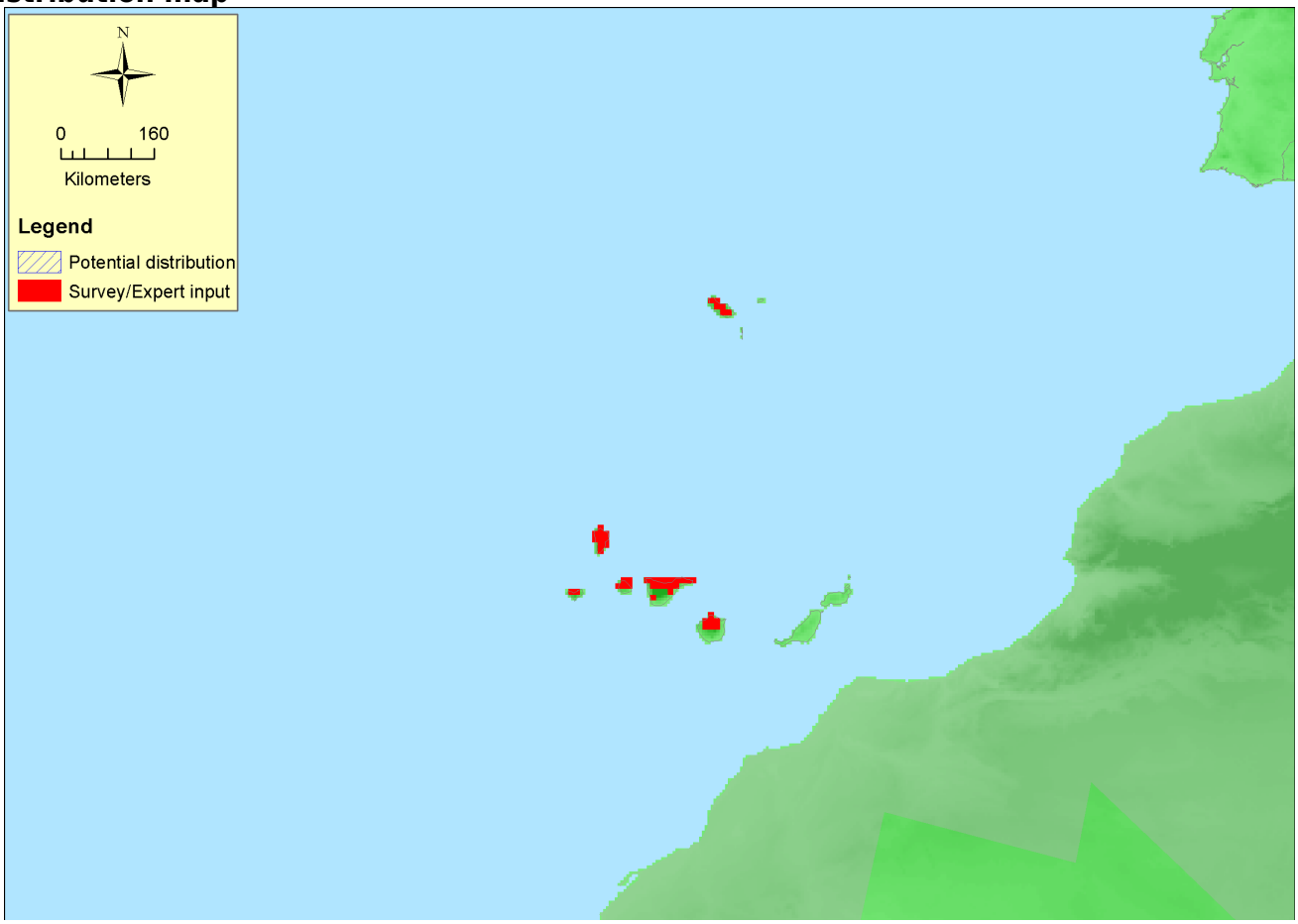
## Geographic occurrence and trends

| EU 28 | Present or Presence Uncertain | Current area of habitat | Recent trend in quantity (last 50 yrs) | Recent trend in quality (last 50 yrs) |
|---|---|---|---|---|
| *Portugal* | Madeira: Present<br>Portugal Azores: Present | 63 $Km^2$ | Increasing | Unknown |
| *Spain* | Canary Islands: Present | 6.3 $Km^2$ | 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* | 89100 $Km^2$ | 46 | 69 $Km^2$ | |
| *EU 28+* | 89100 $Km^2$ | 46 | 69 $Km^2$ | |

### Distribution map




The map is likely to be complete. Data sources: NAT, EXP.

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

The whole (100%) of the habitat area lies within the EU28.

### Trends in quantity

Similarly to macaronesian laurel forest, heathy woodland was historically much reduced, for the production

of firewood, charcoal production and conversion to agriculture. Although territorial estimates of heathy forest for the Canary Islands are unknown, it is plausible that the amount of historical reduction was analogous to laurel forest (G2.3), i.e. up to ca. 80% of area reduction since 1500 CE. The recent tendency , i.e. estimates within the scope of the last 50 years, show a clear tendency of recovery in the case of Madeira (increase of 40%). This is due to abandonment of agricultural land and recovery of secondary forest. Territorial estimates for the Canary Islands amount to 50.000 ha of abandoned agricultural land, as a consequence of changes in political and macroeconomic settings, and some will correspond to heathy woodland but the proportion is unknown. Nevertheless, territorial evaluation is set as 'stable', meaning that no variation should be accounted. As a result, the present and future tendency is to admit some increase of heathy forests, as a result of the PAC and effective nature conservation policies. If these general conditions are kept, some increase in area is expected. It should be noted, that this is a habitat mostly found either at higher altitudes, in steep rocky slopes or as a secondary forest of laurel forest. The increase is probably due to agricultural abandonment in the latter areas. As for the Azores, there are no objective data to account for estimates but the situation is putatively similar to that of Madeira. The general increase value was taken as the average increase value: 35.1%.

- 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 is estimated to have increased ca. 35% in the last 50 years time span.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  *Justification*
  Although restricted to Macaronesia, it is not considered to have a small area (EOO > 50000 km²).

### Trends in quality

Territorial information from the Canary Islands is absent for current and historical times, although it may be taken as stable for future trends in the perspective of charcoal, timber and competitive land-uses (agricultural and exotic forestry) and mostly by the setting of conservation policies. The same may be assumed for the case of Madeira and Azores.

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

## Pressures and threats

As in the case of laurel forest, the expansion of exotic forest (eucalyptus, non-native conifers, and chestnut) is not to be expected anymore, but their persistence in areas of potential heathy forest is a threat because it prevents natural regeneration of native heathy forest. The conversion of such exotic forests to a regeneration of tree-heath is not many times straightforward. Analogous issues can be assumed for agriculture (banana, vineyards, greenhouse crops). Pressures issuing from urban or touristic expansion have still to be taken on account as social and institutional conflicts do not favour nature conservation every time. Climate change may cause bioclimatic optima to change and such vegetation-belt altitude changes might cause ecological disruption of heathy forest vegetation along with the loss of species or promotion of aliens and putatively diminish the potential area of this habitat in altitude areas, as the lower altitudinal limit would rise (termicity rises) and the higher is kept (excess of cold). Although a rare event, wildfires during drought or heat spells may be a serious threat to laurel forests.

### List of pressures and threats

**Agriculture**

- Cultivation
- Grazing
  - Non intensive sheep grazing
  - Non intensive goat grazing

**Sylviculture, forestry**

- Forest replanting
- Forest replanting (non native trees)

**Urbanisation, residential and commercial development**

- Urbanised areas, human habitation
  - Dispersed habitation
  - Agricultural structures, buildings in the landscape

**Invasive, other problematic species and genes**

- Invasive non-native species

**Geological events, natural catastrophes**

- Fire (natural)

**Climate change**

- Temperature changes (e.g. rise of temperature & extremes)
- Droughts and less precipitations
- Habitat shifting and alteration
- Desynchronisation of processes
- Decline or extinction of species
- Migration of species (natural newcomers)

## Conservation and management

The maintenance of local, regional, national and EU-wide conservation statuses, as well as the maintenance of actually protected areas and management practices, will guarantee the persistence of the habitat. In addition, the elimination of alien plants that are frequent in secondary laurel forest should be sought. The reconversion of former exotic afforestations to heath-forest would lead, by succession, to secondary heath forest that gradually would incorporate characteristic species resulting in a raising of the habitat quality. The protection against wildfires and urbanization pressures should be as strict as possible.

### List of conservation and management needs

**No measures**

- No measures needed for the conservation of the habitat/species

**Measures related to forests and wooded habitats**

- Restoring/Improving forest habitats

**Measures related to spatial planning**

- Establishing wilderness areas/allowing succession
- Legal protection of habitats and species

### Conservation status

Annex 1:

9360: MAC U1

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

As a mature forest occurring in steep rocky slopes under frequent fogs, depending on the extent of damage, it will count on ecological succession to establish a comparable state in terms of structure, composition and function (mature closed forest). If the soil was not severely eroded and disturbance regimes causing disruption will cease, it is expected that forest species (tree-heaths) will be able to establish and be ecologically dominant again in a time span of several decades to a century. Silvicultural practices of elimination of dominant individual trees might accelerate tree succession towards mature laurel forests. Otherwise, succession through self-thinning will take longer although the risk of a transformation into a somewhat artificial habitat (the former option) is much reduced.

### Effort required

| 20 years | 50+ years |
|---|---|
| Through intervention | Naturally |

## Red List Assessment

### Criterion A: Reduction in quantity

| Criterion A | A1 | A2a | A2b | A3 |
|---|---|---|---|---|
| *EU 28* | +35 % | increasing % | increasing % | > -50% % |
| *EU 28+* | +35 % | increasing % | increasing % | > -50% % |

For Madeira and Azores, the maps of national forest inventory from 1974 allowed to estimate an increase in area of 40%. For the Canary Islands, according to an experts estimate, the area has remained more or less stable since 1960, so the variation is 0%. For the whole of the habitat range, the weighted average (area proportions) value is an increase of 35%. A simple extrapolation for the next 40 years period would yield an increase around 40% or more. Nevertheless, such a simple reasoning is arbitrary and uncertain and not considered numerically. The historical reduction (A3 sub-criterion) is estimated to be larger than 50% of the original area (1750 C.E.) based on historical evidence, literature or institutional descriptions and comparison of actual area to maps of the potential natural vegetation.

### Criterion B: Restricted geographic distribution

| Criterion B | B1 | | | | B2 | | | | B3 |
|---|---|---|---|---|---|---|---|---|---|
| | EOO | a | b | c | AOO | a | b | c | |
| *EU 28* | 89100 $Km^2$ | No | No | Unknown | 46 | No | No | Unknown | Unknown |
| *EU 28+* | 89100 $Km^2$ | No | No | Unknown | 46 | No | No | Unknown | Unknown |

Both the area and the number of locations are relatively small. The EOO is not far above the 50000 km² threshold foo criterion B1 and the AOO is even lower than the 50 grid cells threshold for AOO. However, as there is no continuing decline in area or quality and no foreseen future threats, the evaluation of criteria B leads to the conclusion Least Concern. Number of locations are not known.

### 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 territorial data on quality for the whole range of the habitat. Mentioned threats that may have reduced the quality are related to agriculture, afforestation, and urban expansion. In the more distant past, we could presume that cutting for charcoal has also been an important pressure.

### 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 | LC | LC | VU | LC | LC | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | NE |
| *EU28+* | LC | LC | LC | VU | LC | LC | DD | DD | DD | DD | DD | DD | DD | DD | DD | DD | NE |

| Overall Category & Criteria | | | |
|---|---|---|---|
| EU 28 | | EU 28+ | |
| Red List Category | Red List Criteria | Red List Category | Red List Criteria |
| Vulnerable | A3 | Vulnerable | A3 |

### Confidence in the assessment

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

### Assessors

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