# B1.4b Mediterranean and Macaronesian coastal dune grassland (grey dune)

## Summary

These stable (so-called 'grey') dunes of fixed sands along the Mediterranean coast, inland from wind erosion and salt-deposition, have a more or less complete cover of graminoids and herbs, often with a contingent of colourful spring annuals capitalising on early rains. The flora varies according to regional climate and dune topography. The may represent a temporary phase, giving way to evergreen sclrophyll scrub and woodland, or may form more permanent grassland in sites not suitable for shrubland. Through much of the Mediterranean, the habitat has been destroyed, contaminated by invasion of non-native species or is much influenced by tourism, urbanization and infrastructure development, arable cultivation, nitrogen deposition and afforestation.

## Synthesis

The habitat type is assessed as Endangered under Criterion C/D1 both at the EU28 and the EU28+ levels, as the habitat has experienced a substantial reduction in abiotic and/or biotic quality over the last 50 years, affecting about 81% of the extent of the habitat with a 79% relative severity.

| Overall Category & Criteria | | | |
|---|---|---|---|
| EU 28 | | EU 28+ | |
| Red List Category | Red List Criteria | Red List Category | Red List Criteria |
| Endangered | C/D1 | Endangered | C/D1 |

## Sub-habitat types that may require further examination

This habitat includes two different sub-types: a) short grasslands with annual species and b) short grasslands with chamaephytes. It may be relevant to examine both sub-habitats separately.

## Habitat Type

### Code and name

B1.4b Mediterranean and Macaronesian coastal dune grassland (grey dune)


Dune grasslands in the northern part of Lazio region, Italy. (Photo: Alicia Acosta).


Dune grasslands near Sperlonga, Lazio region, Italy. (Photo: Irene Prisco).

### Habitat description

These stable coastal dunes of the Mediterranean are dominated by herbs, graminoids and chamephytes,

with a broad variety of plant communities: a) fixed dunes of the western and central Mediterranean and North Africa, with *Crucianella maritima* (a steno Mediterranean species) and *Pancratium maritimum*; b) coastal stabilised dune grassland communities with medium to fine calciumcontaining sand, growing approximately 200 m from the sea on dunes of about 0.15-10 m; c) associations with many small annuals and often abundant ephemeral spring bloom of deep sands in dry interdunal depressions of the coasts: d) dune formations of pseudo-steppe with grasses and annuals of the *Thero-Brachypodietea* class; e) meso- and thermo-Mediterranean xerophile, mostly open, short-grass perennial grasslands rich in therophytes, as well as therophyte communities of oligotrophic soils on base-rich, often calcareous substrates. All of these components are established generally landwards of the white dunes. The term "grey dunes" originates from the color of the substratum which comes from the increased proportion of humus and silt in the sand. Here, the amount of windblown sand is much reduced, compared to the white dunes, and also salt spray and erosive processes are highly reduced, with higher plant cover. The number of species in general is higher than in shifting dunes. These communities may be followed in succession by evergreen sclerophyllous coastal scrubs and in some cases by *Quercus ilex* woodlands, but may form relatively stable grassland in more extreme sites, less suitable for shrubs.

Human pressures reduce coastal landscape heterogeneity and biodiversity and converge to a striking simplification of the natural zonation on highly urbanized coasts. The impoverishment of soils in highly disturbed areas not only reduces the number of typical native species, but also promotes the colonization of alien and ruderal species. Touristic development and recreational activities (trampling, infrastructures) are the most severe threats for dune habitats, together with land clearance for the expansion of cultivated lands, sand extraction and changes due to in sand enrichment. In fact, large parts of the Mediterranean grey dunes are currently influenced by touristic and recreational activities, or have changed to urbanized areas, arable lands or woody plantations.

Indicators of good quality:

The following characteristics may be considered as indicators of good quality, but these indicators differ in different regions:
- High species richness
- Presence of rare and/or threatened species
- Diversity within the type within an area and over the whole range
- High cover of open soil
- Low cover of encroaching tall grasses, tall herbs and shrubs
- No cover of alien species
- No or few indications of disturbance

Characteristic species:

Flora: *Crucianella maritima, Pancratium maritimum, Euphorbia terracina, Ephedra distachya, Silene nicaeensis, Silene subconica, Malcolmia lacera, Malcolmia ramosissima, Evax astericiflora, Evax lusitanica, Anthyllis hamosa, Linaria pedunculata, Brachypodium* spp., *Ononis variegata, Silene colorata* ssp. *canescens, Cutandia maritima, Cutandia divaricata, Phleum arenarium, Medicago littoralis, Vulpia membranacea, Alkanna tinctoria.*

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

EUNIS:
B1.4 Coastal stable dune grassland (grey dunes)

EuroVegChecklist:

*Psammo-Koelerion* Pignatti 1953

*Diantho catalaunici-Scrophularion humifusae* Baudiere et Simonneau 1974

*Crucianellion maritimae* Rivas Goday et Rivas-Mart. 1958

*Euphorbio paraliae-Lotion glauci* Jardim et al. 2003 (Macaronesia)

*Linarion pedunculatae* Díez Garretas et al. in Díez Garretas 1984

*Alkanno-Maresion nanae* Rivas Goday ex Rivas Goday et Rivas-Mart. 1963 corr. Díez Garretas et al. 2001 (disturbed dunes)

*Laguro-Vulpion fasciculatae* Géhu et Biondi 1994

*Cutandio maritimae-Vulpion membranaceae* de Foucault et Géhu in de Foucault 1999

*Psammo-Vulpion* Pignatti 1953

*Vulpio-Lotion* Horvatic 1963

*Maresion nanae* Géhu et al. 1987

*Medicagini-Triplachnion nitentis* Mayer 1995

*Ononidion tournefortii* Géhu et al. 1996 (Canary islands)

*Anthyllido hamosae-Malcolmion lacerae* Rivas Goday 1958

Annex I:

2210 Crucianellion maritimae fixed beach dunes

2220 Dunes with Euphorbia terracina

2230 Malcolmietalia dune grasslands

2240 Brachypodietalia dune grasslands with annuals

Emerald:

B1.4 Coastal stable dune grassland (grey dunes)

MAES-2:

Terrestrial - Grassland

IUCN:

13.3 Coastal Sand Dunes

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

Yes

Regions
Mediterranean

Justification

The type is more or less restricted to the Mediterranean biogeographical region. Some outstanding examples of typical characteristics of this habitat can be found in Montalto di Castro (Lazio region, Italy), the Tróia Peninsula in Portugal and the sand dunes in Kyparissia (Western Peloponnisos, Greece).

## 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) |
|---|---|---|---|---|
| *Croatia* | Present | Unknown Km$^2$ | Unknown | Unknown |
| *Cyprus* | Present | 0.1 Km$^2$ | Stable | Stable |
| *France* | Corsica: Present<br>France mainland: Present | 550 Km$^2$ | Decreasing | Decreasing |
| *Greece* | Crete: Present<br>East Aegean: Present<br>Greece (mainland and other islands): Present | 10 Km$^2$ | Decreasing | Decreasing |

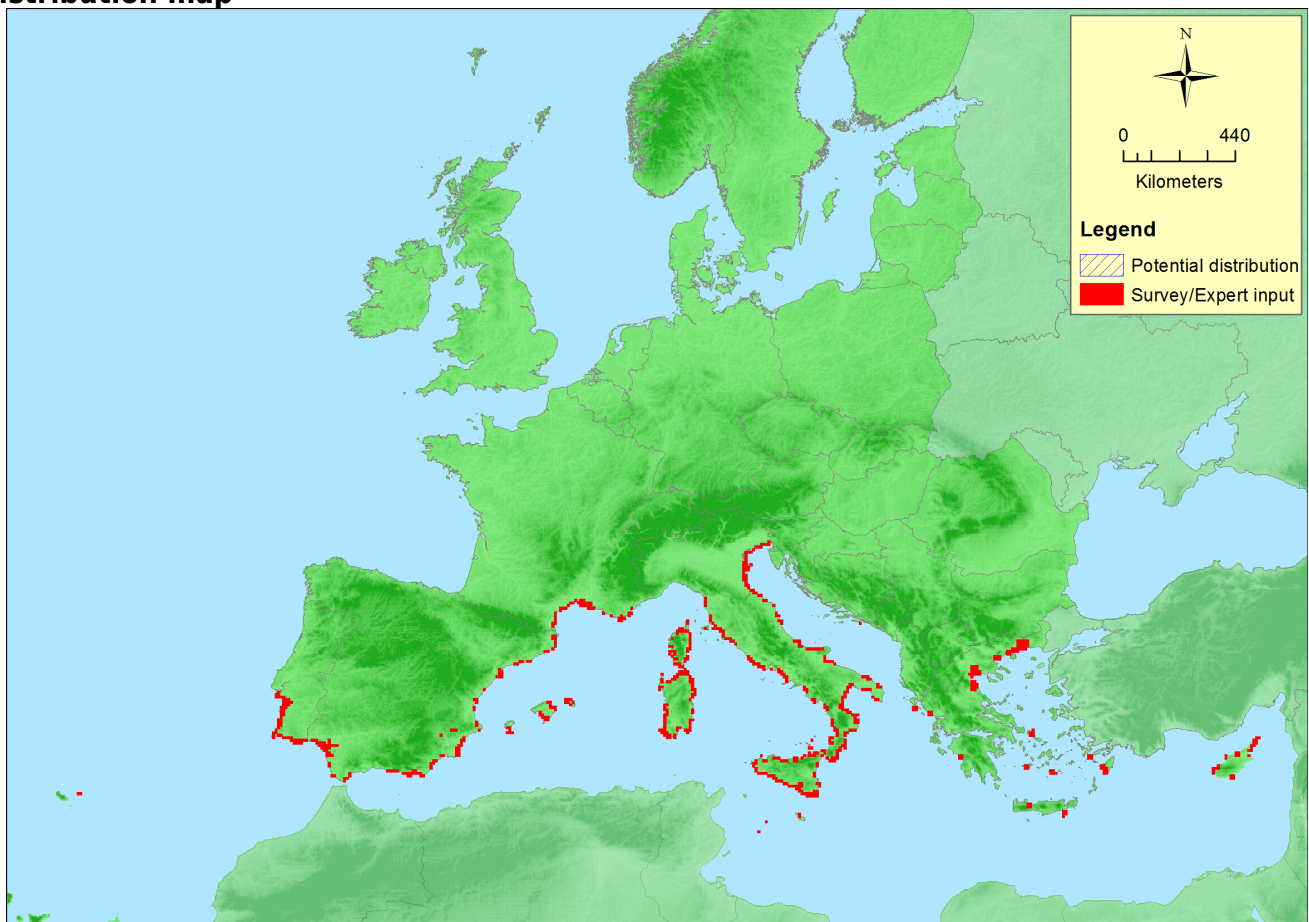| EU 28 | Present or Presence Uncertain | Current area of habitat | Recent trend in quantity (last 50 yrs) | Recent trend in quality (last 50 yrs) |
|---|---|---|---|---|
| Italy | Italy mainland: Present<br>Sardinia: Present<br>Sicily: Present | 195 Km$^2$ | Decreasing | Decreasing |
| Malta | Uncertain | Unknown Km$^2$ | Unknown | Unknown |
| Portugal | Madeira: Present<br>Portugal Azores: Present<br>Portugal mainland: Present<br>Savage Islands: Present | 17 Km$^2$ | Decreasing | Decreasing |
| Spain | Balearic Islands: Present<br>Canary Islands: Present<br>Spain mainland: Present | 6 Km$^2$ | Decreasing | Decreasing |

| 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 | 5 Km$^2$ | Decreasing | Decreasing |
| Montenegro | 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 | 3085000 Km$^2$ | 1217 | 779 Km$^2$ |  |
| EU 28+ | 3085000 Km$^2$ | 1217 | 784 Km$^2$ |  |

## Distribution map



The map is rather complete for EU28, but with data gaps in Croatia, Montenegro, Albania. Data sources:

ART17, EXP, LIT.

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

About 99% of the habitat type is within the EU28. The habitat is less widespread represented out of the EU28.

## Trends in quantity

The average recent past trend in quantity (over the past 50 years) is a decline of 15.87%. The biggest reduction in extent affected countries with a small extent of habitat (Albania, Spain and Portugal), whereas in places where the habitat is most widespread, the reduction is moderate (e.g. France). In the last 50 years this habitat has been replaced by artificial surfaces (infrastructures related to tourism, recreational activities and, in some cases, industries). In other cases, the habitat has been replaced by agriculture or woody plantations. This negative trend is expected to continue in the near future with a predicted average decrease of 5.53%, however, trends have not been indicated for all countries. Since 50-250 years ago about 21% of the potential area has been lost, especially in Italy and Spain.

The recent, future and historical trends have been calculated on the basis of the available territorial data ($km^2$). These data are referred to different years, but we assume that the habitat area is the same in the year of reference as in the year where the data was provided.

- 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 EOO is larger than 50,000 $km^2$
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  *Justification*
  The habitat is widespread in the Mediterranean.

## Trends in quality

The damage in quality affects important areas of occurrence especially in France and Italy and is showing increasing intensity. The severity of degradation is severe for all countries. This is due to the intense anthropogenic activities in the last 100 years and this is also expected to continue if no measures are undertaken. The average extent of degradation is about 81% with a severity of 79%, as has been calculated from territorial data on a 1-5 scale (from stable-slight to severe).

The trends in quality have been calculated on the basis of the available territorial data ($km^2$). These data are referred to different years, but we assume that the habitat area is the same in the year of reference as in the year where the data was provided.

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

## Pressures and threats

The habitat is threatened in both Mediterranean and Black Sea biogeographic regions. Human pressure is probably the main threat: tourism and recreational activities, coastal urbanization and arable cultivation. In the last 60 years, the composition and structure of this typical coastal dune habitat have been drastically

modified by human pressure with a conspicuous reduction in extent and quality of the habitat with the increase of ruderal and alien species such as *Carpobrotus acinaciformis/edulis, Agave americana, Oenothera biennis* and *Ambrosia coronopifolia*. This habitat has been replaced by artificial areas (infra-structures related to tourism, recreational activities and, in some cases, industries). Moreover, the habitat has been replaced by agriculture or woody plantations (eg. *Pinus* and *Eucalyptus* afforestation) but in some cases also invasive exotic species have been used such as *Acacia cianophylla.*

**List of pressures and threats**

**Urbanisation, residential and commercial development**

Urbanised areas, human habitation

**Human intrusions and disturbances**

Trampling, overuse

**Invasive, other problematic species and genes**

Invasive non-native species

## Conservation and management

Most important is the restoration from tourism activities (trampling) and the stop or even removal (restoration) of urbanisation.

**List of conservation and management needs**

**Measures related to wetland, freshwater and coastal habitats**

Restoring coastal areas

**Measures related to spatial planning**

Establish protected areas/sites
Legal protection of habitats and species

**Measures related to urban areas, industry, energy and transport**

Urban and industrial waste management

**Measures related to special resouce use**

Regulating/Management exploitation of natural resources on land

**Conservation status**

Annex I:

2210: MED U2

2220: MED U2

2230: CON U2, MED U2

2240: MED U2

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

If the habitat is dominated by herbaceous annual plants, it could recover without specific actions in a few decades if natural sources of propagules are present in the surroundings. For natural recovery, enclosures are highly recommended. If the habitat is dominated by chamephytes such as *Crucianella maritima*,

special conservation measures are suggested, such as planting *C. maritima* using regionally collected plant material in order to prevent genetic pollution.

## Effort required

| 10 years | 20 years |
|----------|----------|
| Naturally | Through intervention |

## Red List Assessment

### Criterion A: Reduction in quantity

| Criterion A | A1 | A2a | A2b | A3 |
|-------------|------|------|-----------|--------|
| *EU 28* | -15.7 % | -5.6 % | Unknown % | -21.2 % |
| *EU 28+* | -15.9 % | -5.5 % | Unknown % | -21.1 % |

The recent, future and historical trends have been calculated on the basis of the available territorial data (km$^2$). These data are referred to different years, but we assume that the habitat area is the same in the year of reference as in the year where the data was provided.

The percentage of area declining in extent over the past 50 years (Criterion A1) is about 16%. Over longer historic time, this habitat has suffered a much larger reduction in quantity due to human pressure, especially in Albania, Italy, Spain and Portugal. The average historical reduction in quantity was estimated of about 21% (Criterion A3). The estimated future reduction in extent over the next 50 years (Criterion A2a) is about 5.5%. Thus, the habitat is assessed as Least Concern under Criterion A.

No data are available for Criterion A2b.

### Criterion B: Restricted geographic distribution

| Criterion B | B1 | | | | B2 | | | | B3 |
|-------------|-----|---|---|---|-----|---|---|---|-----|
| | EOO | a | b | c | AOO | a | b | c | |
| *EU 28* | 608150 Km$^2$ | Yes | Yes | No | 1246 | Yes | Yes | No | No |
| *EU 28+* | 608150 Km$^2$ | Yes | Yes | No | 1246 | Yes | Yes | No | No |

The extent of occurrence (EOO) and the area of occupancy (AOO) are above the thresholds. However, the Criteria B1a/B2a are met because there is an ongoing continuing decline in biotic (ii) and abiotic (iii) quality. It is likely that a threatening event will cause continuing declines within the next 20 years. The number of locations has not been calculated but it is probably very large. Thus, this habitat is assessed as Least Concern under 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* | 81.7 % | 79.4 % | Unknown % | Unknown % | Unknown % | Unknown % |
| *EU 28+* | 81.3 % | 79.5 % | 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 % |

| 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 % |

| 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 trends in quality have been calculated on the basis of the available territorial data (km$^2$). These data are referred to different years, but we assume that the habitat area is the same in the year of reference as in the year where the data was provided.

Based on the territorial data provided, for Criterion C/D1 only, the reduction in quality over the last 50 years affected about 81% of the current extent, with a relative severity of degradation of 79%. The reduction was in both biotic and abiotic quality. Thus, this habitat is assessed as Endangered 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. Thus, this habitat is 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 | LC | DD | LC | LC | LC | LC | EN | DD | DD | DD | DD | DD | DD | DD | DD | DD |
| EU28+ | LC | LC | DD | LC | LC | LC | LC | EN | 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 |
| Endangered | C/D1 | Endangered | C/D1 |

## Confidence in the assessment
Medium (evenly split between quantitative data/literature and uncertain data sources and assured expert knowledge)

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