B1.3b Mediterranean and Black Sea shifting coastal dune

Summary

This habitat comprises the primary, shifting (so-called 'white') dunes of dynamic coastal sands around the Black and Mediterranean seas, and into the Atlantic around SW Iberia and Macaronesia. Early pioneers upshore from the strandline catch sand blown from the beach and initiate embryo dune development, stages which may come and go with subserquent storms, or continue to build higher mobile white dunes that move inland. Except in Macaronesia, the dominant plant in the middle to later stages is *Ammophila arenaria* (ssp. *arundinacea* in the Mediterranean), and the associated flora on the permeable, impoverished sands is limited and sparse. Coastal tourism, urbanisation and industrial development have totally destroyed the habitat in much of the Mediterranean but, with maintenance of the dynamic natural environment, it is resilient.

Synthesis

The habitat has experienced a substantial reduction in abiotic and biotic quality over the last 50 years, affecting 47% (average) to 52% (maximum) of the extent of the habitat, with about 67% relative severity. The figures are on the edge of the categories Near Threatend and Vulnerable, but it is assessed by expert knowledge that this habitat should be considered Vulnerable (VU) under Criterion C/D1, both at the EU28 and the EU28+ levels.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Vulnerable	C/D1	Vulnerable	C/D1

Sub-habitat types that may require further examination

The habitat is relatively homogeneous within the Mediterranean region and also within the Black Sea region, but it has different species between these regions. Therefore, sub-habitats for these regions may be considered.

Habitat Type

Code and name

B1.3b Mediterranean and Black Sea shifting coastal dune

Mediterranean shifting coastal dunes in Kalogria, West Peloponnisos, Greece. (Photo: Maria Panitsa).

Mediterranean shifting coastal dunes near the Saccione river, Molise region, Italy. (Photo: Alicia Acosta).

Habitat description

Embryonic shifting dunes and "white" shifting dunes along the shoreline of the Macaronesian islands, Black Sea, Mediterranean and Thermo-Atlantic region (northwards up to central Portugal) represent the first stages of dune construction. The habitat consists of mobile coastal sand ridges which are occupied by open grasslands; they sometimes form tall dune ridges but in many cases rather low (less than 10 m high). A zonation is distinguished form primary, embryonic dunes towards higher, and more stable white dunes, but these different sectors are not always well separated. Embryonic dunes are characterised by *Elymus farctus* (= *Elytrigia juncea* = *Agropyron junceum*) that produces horizontal rhizomes which crawl along the sand or penetrate it. Its stalks constitute obstacles where sand accumulates to a few decimetres forming embryonic dunes. These dunes are at the start of the psammosere; they grow by sand accretion and are sporadically inundated by the sea during storms. More inland, white shifting dunes are found, characterised by the dominance of *Ammophila arenaria* (subsp. *arundinacea* in the Mediterranean) that has a growth form in which the older parts (strong erect culms up to 1.5 m high) protect the plant and enable it to regenerate from its center. *Ammophila arenaria* is a very important rhizomatous dune species as it constitutes a barrier for windblown sand, contributing to the increase of the dune height. These dunes occur on yellow, very permeable and humus poor soils. Among the characteristic species accompanying the dominant grasses on embryonic and white dunes *Sporobolus pungens, Chamaesyce peplis* (= *Euphorbia peplis*), *Otanthus maritimus, Medicago marina, Anthemis maritima, Eryngium maritimum, Pancratium maritimum, Euphorbia paralias, Calystegia soldanella, Echinophora spinosa, Cutandia maritima* and *Polygonum maritimum* could be mentioned. On the Macaronesian islands both *Ammophila arenaria* and *Elymus farctus* are absent, but in some places white dunes exist, characterized by *Chamaesyce peplis* (= *Euphorbia peplis*), *Euphorbia paralias, Cyperus capitatus, Polygonum maritimum* (with some island endemics such as *Plantago madarensis* on Madeira) and succulent shrubs of the alliance *Traganion moquinii* (see habitat B1.6c). Large parts of the Mediterranean dunes are disturbed or completely destroyed by human pressure such as tourism activities, coastal urbanisation and industry.

Indicators for good quality:

- Undisturbed, discrete coastal dune zonation (spatial succession pattern)
- Sparse vegetation cover ≥ 20%
- No presence of alien or ruderal species

Characteristic species:

Flora: *Elymus farctus* (=*Agropyron junceum*), *Ammophila arenaria, Androcymbium psammophilum, Anthemis maritima, Anthemis tomentosa, Calystegia soldanella, Convolvulus caput-medusae, Cutandia maritima, Cyperus capitatus, Echinophora spinosa, Eryngium maritimum, Euphorbia paralias, Chamaesyce peplis (=Euphorbia peplis), Honkenya peploides, Leymus arenarius, Medicago marina, Ononis natrix, Otanthus maritimum, Pancratium maritimum, Polycarpaea nivea, Polygonum maritimum, Sporobolus pungens, Zygophyllum fontanesii.*

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

EUNIS:

B1.3 Shifting coastal dunes

EuroVegChecklist:

Ammophilion Br.-Bl. 1921

Elymion gigantei Morariu 1957

Annex I:

2110 Embryonic shifting dunes

2120 Shifting dunes along the shoreline with Ammophila arenaria ('white dunes')

Emerald:

B1.3 Shifting coastal dunes

MAES-2:

Sparsely vegetated land

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
Black Sea
Mediterranean

Justification
The habitat type is more or less restricted to the Mediterranean and Black Sea biogeographic regions. Some outstanding examples of typical characteristics of the Mediterranean biogeographic region could be highlighted such as the Sites of Community Importance Foce Trigno-Marina di Petacciato and Foce Saccione-Bonifica Ramitelli (Molise region, Italy), the Tróia Peninsula in Portugal, the sand dune systems in Zacharo and Strofylia (Western Peloponnisos, Greece) and dunes in Korfu island (Korission lagoon) in Greece. As far as the Black Sea biogeographic region concerns, Durankulak and Shabla Lake in Bulgaria could be mentioned.

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	1.6 Km^2	Decreasing	Decreasing
Croatia	Present	0.01 Km^2	Increasing	Decreasing
Cyprus	Present	1 Km^2	Unknown	Unknown
France	Corsica: Present France mainland: Present	70 Km^2	Decreasing	Decreasing
Greece	Crete: Present East Aegean: Present Greece (mainland and other islands): Present	66 Km^2	Decreasing	Decreasing
Italy	Italy mainland: Present Sardinia: Present Sicily: Present	139 Km^2	Decreasing	Decreasing
Malta	Uncertain	Unknown Km^2	Unknown	Unknown
Portugal	Madeira: Present Portugal Azores: Present Portugal mainland: Present Savage Islands: Present	24 Km^2	Decreasing	Decreasing
Romania	Present	8 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)
Spain	Balearic Islands: Present Canary Islands: Present 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	1 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	3453050 Km^2	1343	316 Km^2	
EU 28+	3453050 Km^2	1345	317 Km^2	

Distribution map
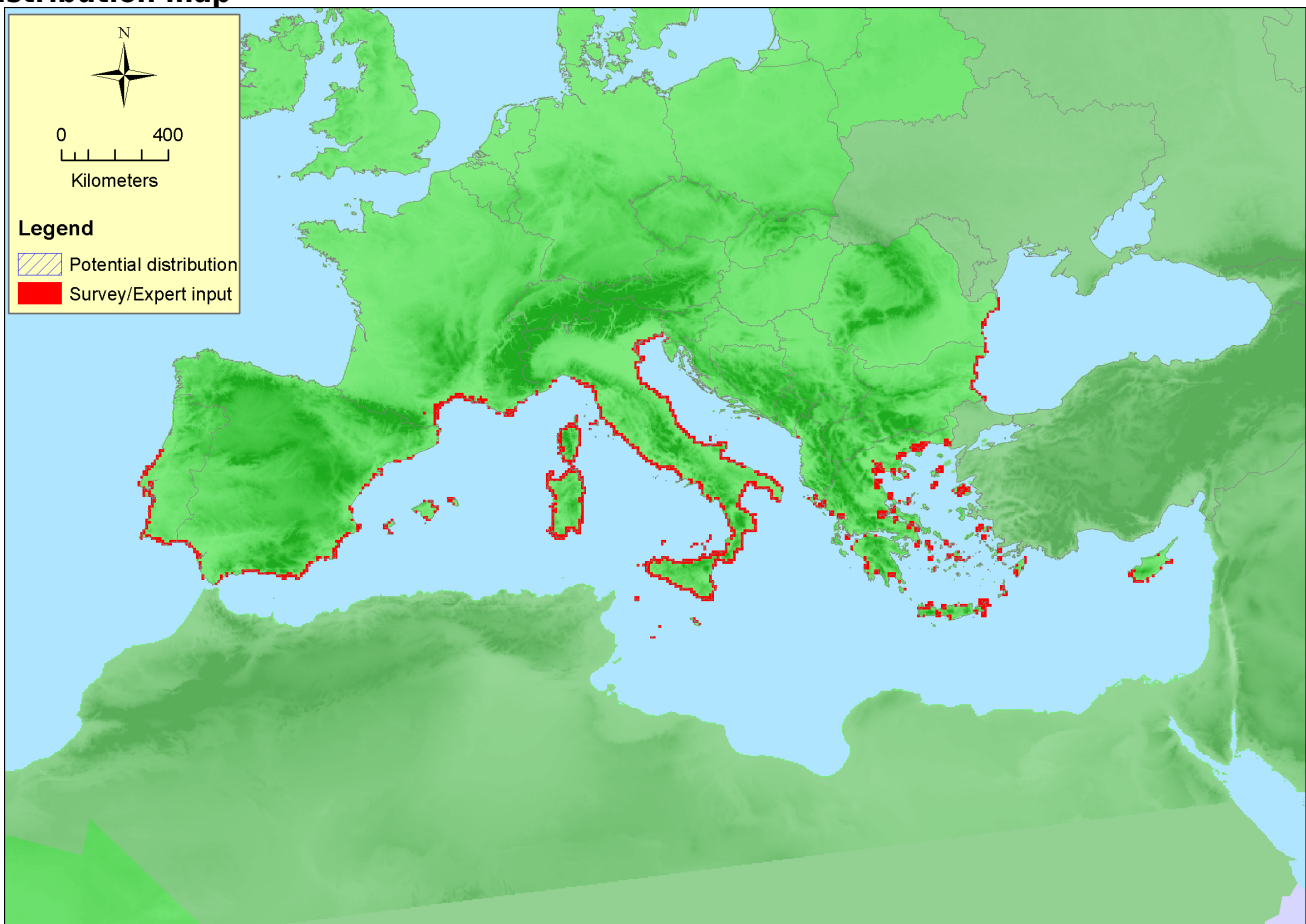
The map is rather complete, with data gaps in Croatia, Montenegro, Albania. Data sources: EVA, ART17.

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

Ca. 99% of the habitat type is within the EU 28. The habitat is least represented outside the EU28.

Trends in quantity

The habitat has declined in quantity 20.8% over the past 50 years. Along the coasts of France, Croatia and Black Sea (Bulgaria and Romania) the habitat experienced a slight decrease (10%), while a higher

negative trend has been recorded for the other countries (up to 40%). In recent years the habitat has been influenced by human trampling and by the mechanical levelling of sand dunes, which cause a reduction in extent and quality of the habitat. Moreover, it was conspicuously replaced by artificial areas. Since 50-250 years ago about 24.72% of the potential area has been lost according to data provided only from Italy, Spain and Black Sea countries. This negative trend is expected to continue in the near future with a predicted average decrease of 8.82%, however, trends have not been indicated for all countries. 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 and in the Black sea, occurring in long, linear araes. Outside Europe this habitat is also present in the Mediterranean north Africa and Asian countries.

Trends in quality

The damage in quality affects important areas especially in France, Italy, Spain and Bulgaria. In other countries the degraded area is lower, but the severity of degradation is even so moderate-severe. The average degraded area in the last 50 years is 47.21% with a severity of 66.81%, as has been calculated from territorial data in a 1-5 scale (from stable-slight to severe). The maximum calculated from reported ranges in trends, exceeds 50% extent. 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 the Mediterranean and Black Sea biogeographic regions. Human pressure is the main threat: coastal urbanization, coastal recreational activities (tourism) and in some cases, coastal erosion. In the last 60 years the composition and structure of this typical coastal dune habitat have been drastically modified. In particular, the habitat has been influenced by human trampling and by the mechanical levelling of sand dunes, which cause a reduction in extent and quality of the habitat. Moreover, it was conspicuously replaced by artificial areas (mainly structures related to tourism, recreational activities and in some cases industries), by agriculture or woody plantation such as *Pinus* afforestations, or simply replaced by the sea in areas with strong coastal erosion. In some countries invasive non-native species such as *Carpobrotus acinaciformis* or *C. eduli*s represent an important threat.

List of pressures and threats

Urbanisation, residential and commercial development

Urbanised areas, human habitation

Human intrusions and disturbances

    Walking, horseriding and non-motorised vehicles
    Trampling, overuse
    Intensive maintenance of public parcs / Cleaning of beaches

Invasive, other problematic species and genes

    Invasive non-native species

Natural biotic and abiotic processes (without catastrophes)

    Erosion

Conservation and management

Legal protection of habitats and species is still needed. In particular, a general legislation to prevent construction of new infrastructures at expense of this habitat should be shared by all the EU countries. Moreover, establishing new protected areas/sites and restoring degraded coastal areas are also important. However, in many cases just the simple delimitation of the shifting dunes could be an efficient deterrent to avoid trampling. Finally, urban and industrial waste management should be regulated. Special attention should be paid to the mechanical cleaning of beaches which could also affect this habitat negatively.

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

Conservation status

Annex I:

2110: BLS U2, CON U2, MAC U2, MED U2

2120: BLS U1, CON U2, MAC FV, MED U2

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

The habitat could recover without specific actions in few decades but it depends on: a) the coastal area should be stable or in accretion (regular supplies of sand are needed for some characteristic species, psammophytes such as *Ammophila arenaria*, b) natural sources of propagules are also needed. If the former conditions are met and the dune morphology is still relatively well preserved, the habitat could recover naturally. However, for natural recover enclosures are highly recommended. When the habitat is severely damaged, human intervention could be suggested, such as planting *Ammophila arenaria* and /or *Elymus farctus* but using regionally collected plant material in order to prevent genetic pollution.

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	-20.7 %	-8.9 %	Unknown %	-24.8 %
EU 28+	-20.8 %	-8.8 %	Unknown %	-24.7 %

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, and it is assumed 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 21%. This habitat has suffered historically a larger reduction in quantity due to human pressure, especially in Italy and Spain. The average historical reduction in quantity (since 0-250 years ago) was estimated at about 25% (Criterion A3). The estimated future reduction in extent over the next 50 years period (Criterion A2a) is about 8.8%. Thus, the habitat is assessed as Least Concern under Criterion A.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50000 Km^2	Yes	Yes	No	>50	Yes	Yes	No	No
EU 28+	>50000 Km^2	Yes	Yes	No	>50	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 the main threats affecting this habitat (e.g. human pressure, recreational activity and coastal erosion) 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	43/52 %	68/69 %	Unknown %	Unknown %	Unknown %	Unknown %
EU 28+	43/52 %	68/69 %	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 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. There is only data available for Criterion C/D1. Based on the territorial data provided, the reduction in quality over the last 50 years on average affected about 47% of the current area, with a relative severity of degradation of about 68%, both for EU28 and EU28+. The reduction was in both biotic and abiotic quality. However, when using the maximum of the provided ranges in territorial data, more than 50% of the habitat is affected negatively, resulting in the category Vulnerable (VU) for criterion C/D1. Based on expert assessment this category is considered most applicable to this white dune type.

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	VU	DD	DD	DD	DD	DD	DD	DD	DD	DD
EU28+	LC	LC	DD	LC	LC	LC	LC	VU	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
Vulnerable	C/D1	Vulnerable	C/D1

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

Assessors
A.T.R. Acosta

Contributors
Habitat definition: M. Panitsa

Territorial data: Z. Barina, F. Bioret, J.A. Campos, J. Capelo, P. Dimopoulos, D. Espírito-Santo, M. Fagaras, I. Prisco, Z. Škvorc, R. Tzonev

Working Group Coastal: A. Acosta, F. Bioret, H. Gardfjell, J. Janssen, J. Loidi, R. Tzonev

Reviewers
A. Nieto

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