B1.8a Atlantic and Baltic moist and wet dune slack

Summary

Slacks develop in Atlantic and Baltic dune systems as moist-wet depressions between dune ridges, where blow-outs have lowered the sand level to that of ground-water or, unusually in the Wadden Sea, where barrier islands are occasionally flooded by tidal inundation. Usually, the water table fluctuates seasonally, less so around the Baltic, and the mean wetness of slacks can vary so that the range of vegetation is considerable from dwarf rush and moss pioneer vegetation, through wet grasslands, to various kinds of mire and swamp, with persistent areas of open water with aquatics. Destruction of dune landscapes and changes of hydrological functioning of dunes have caused great losses in extent and quality and continuing threats are succession towards tall herb and shrub vegetation, partly due to abandonment of traditional land-use but also through eutrophication. Successful restoration needs recovery of hydrological function and mowing where the vegetation is becoming too dense.

Synthesis

Large reductions in quantity over the last 50 years (criterion A1) and over a longer time frame (A3) lead to the Red List category Vulnerable (VU). A large part of the remaining area declined in quality, with values just below the threshold for Vulnerable, resulting in a Near Threatened (NT) status for criterion C/D1.

Overall Category & Criteria			
EU 28		EU 28+	
Red List Category	Red List Criteria	Red List Category	Red List Criteria
Vulnerable	A1, A3	Vulnerable	A1, A3

Sub-habitat types that may require further examination

The habitat covers a broad variety in vegetation types, ranging from calcareous and acidic mire communities towards open water with aquatic plants, reedbeds and other helophyte communities. Most characteristic are the mire communities, of which especially the calcareous mires are relatively rich in endangered plant species. Calcareous dune slack mires may deserve further investigated on its Red List status. Another, very rare, subtype to further investigate are dune lakes.

Habitat Type

Code and name

B1.8a Atlantic and Baltic moist and wet dune slack

Dune slack with patches of *Littorella uniflora* in the wettest parts of the dunes of Les Pannes, northern France (Photo: John Janssen).

Decalcified dune slack on the island of Texel (Dutch Wadden Sea) with the characteristic Atlantic dune slack species *Carex trinervis* (Photo: John Janssen).

Habitat description

This is a very broad habitat, comprising all open and closed, low to tall, aquatic, marsh and helophyte vegetation of moist to wet depressions in coastal dunes of the Atlantic and Baltic coasts. It comprises dune lakes and ponds with open water and floating or submerged vegetation, pioneer communities on bare shores, calcareous and acidic fen communities, as well as beds of helophytic reeds and sedges. Within the communities of the hygrosere (the succession series in dune slacks) the late succession stages (scrub, forests) and wet heathlands are considered under other habitats (respectively B1.6a, B1.7a and B1.5a). Also mesic grasslands in coastal dunes are not included in the dune slack habitat, although they may in some cases grow in mosaic with this habitat. On a higher level EUNIS makes a distinction between coastal and inland habitats, but mesic freshwater grasslands in coastal areas are included under inland types, for example grasslands of the *Calthion palustris*, *Nardo-Juncion squarrosi*, *Cynosurion cristati* or *Molinion caeruleae*. In coastal areas such grasslands are often associated with old, traditionally managed meadows or pastures, and are less characteristic for dynamic dune slacks. In many cases they are found on the transition from dunes towards the inland, in other situations they are part of old, traditional mosaic landscapes (like machairs, see B1.9).

Dune slacks may develop in two ways. In the first place wind activity may blow out sand, resulting in depressions up to the depth level of groundwater. These depressions are known as secondary dune slacks. Primary dune slacks are the result of new formed fore-dunes, which isolate a beach from the influence of the sea and thus create a depression with groundwater influence within two ridges. In the Wadden Sea area a rare, third situation occurs on so-called green beaches, found on the head or tail of barrier islands. Such beaches are irregularly flooded both from the North Sea and from the Wadden Sea direction, and have complex gradients of dune slack, salt marsh and dry dune communities.

The water table in dune slacks fluctuates strongly during the year, with relatively wet conditions in winter and spring, and sometimes extreme dry conditions in summer. Because of these fluctuations peat layers rarely develop. In the Baltic coast the water table of dune slacks fluctuates less, and here in some cases acidic mire communities or even bogs develop in dune slacks.

In very wet conditions the dune slack communities of this habitat may form azonal climax communities, but in most slacks the pioneer and mire communities, as well as sedge and reed beds show succession towards scrub (*Salix*) and forest (*Salix*, *Betula*, *Alnus*). Mowing or grazing is practiced to conserve species rich, intermediate and young succession stages, for example communities of the alliances *Caricion davallianae* and *Caricion nigrae*. However, although such management may slow down succession, due to other changes in this dynamic landscape species composition changes in time. For example coastal erosion or sedimentation will change the size and place of freshwater lenses, and in this way affect the vegetation of dune slacks. In calcareous dune slacks, due to high precipitation rates, decalcification takes places, leading to changes in species composition. For this reason, the species rich calcareous fen communities of the *Caricion davallianae* are best preserved in dynamic landscapes, where now and then new primary dune slacks are formed. They may survive in older dune slacks, but only in places with a high rate of seepage of calcareous groundwater.

As many of the vegetation types of dune slacks are also found inland, in similar or other habitats, few plant species are restricted to the Atlantic and Baltic dune slacks. Some coastal species have been described as different ecotypes (*Parnassia palustris*), others have relatively larger populations in coastal areas (*Liparis loeselii*, *Sagina nodosa, Centaurium littorale, Potamogeton coloratus*). Only a few species are mainly restricted to coastal areas, like *Carex trinervis*.

Along the Atlantic coast these dune slacks are found from Norway to northern Spain, with relatively large areas in the broad dunes of Jutland, the Wadden Sea, mainland Netherlands, northern France and southwestern France. In Ireland, England and the Baltic coasts the dune slacks are relatively rare and more widespread. In Spain their occurrences are marginal, while the dune slacks along the Portuguese Atlantic

coast belong to the Mediterranean habitat B1.8b.

Indicators of good quality:

- No anthropogenic changes in water table
- Species richness
- Occurrence of rare and endangered species
- Broad diversity in different types of dune slacks and related plant communities
- Forming intact landscape mosaics with and transitions towards dry dune habitats

Characteristic species:

Vascular plants: *Agrostis canina, Agrostis stolonifera, Anagallis tenella, Apium inundatum, Baldellia ranunculoides ssp. ranunculoides, Blackstonia perfoliata, Bolboschoenus maritimus, Calamagrostis canescens, Calamagrostis epigejos,Calamagrostis stricta, Carex demissa* (= *Carex oederi, C. serotina*), *Carex flacca, Carex hartmanii, Carex nigra, Carex punctata, Carex trinervis, Centaurium erythraea, Centaurium littorale,Centaurium pulchellum, Centunculus minimus, Chara aspera, Chara baltica, Chara canescens, Cicendia filiformis, Cladium mariscus, Dactylorhiza incarnata, Dactylorhiza majalis subsp. purpurella, Eleocharis palustris, Eleocharis quinqueflora, Eleocharis uniglumis, Epilobium palustre, Epipactis palustris, Equisetum variegatum, Erica tetralix, Gentianella amarella, Herminium monorchis, Hippuris vulgaris, Holoschoenus romanus, Hydrocotyle vulgaris, Juncus acutus, Juncus alpinoarticulatus* (= *J. anceps*), *Juncus arcticus* subsp*. arcticus, Juncus arcticus* subsp*. balticus, Juncus articulatus, Juncus bufonius, Juncus maritimus, Juncus subnodulosus, Liparis loeselii, Littorella uniflora, Lythrum salicaria, Mentha aquatica, Myrica gale, Oenanthe lachenalii, Ophioglossum vulgatum, Orchis palustris, Oxycoccus macrocarpon* (=*Vaccinium macrocarpon*), *Parnassia palustris, Phragmites australis, Pilularia globulifera,Platanthera bifolia, Potamogeton coloratus, Potamogeton gramineus, Potamogeton pectinatus, Potentilla erecta, Pyrola rotundifolia, Radiola linoides,Ranunculus baudotii, Ranunculus flammula, Sagina nodosa, Salix repens* subsp*. arenarius, Samolus valerandi, Schoenus nigricans, Teucrium scordium*

Mosses: *Aneura pinguis, Bryum pseudotriquetrum, Calliergonella cuspidata, Campylium stellatum, Drepanocladus aduncus, Moerckia hibernica, Pellia endiviifolia, Preissia quadrata*

Amphibians: *Bufo calamita*

Classification

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

EUNIS:

B1.8 Moist and wet dune slacks

EuroVegChecklist:

Charion canescentis Krausch 1964

Charion fragilis Krausch 1964

Nymphaeion albae Oberd. 1957

Potamogetion Libbert 1931

Hyperico elodis-Sparganion Br.-Bl. Et Tx. ex Oberd. 1957

Scirpion maritimi Dahl et Hadač 1941

Phragmition communis Koch 1926

Caricion fuscae Koch 1926 (= *Caricion nigrae*)

Caricion davallianae Klika 1934 (incl. *Hydrocotylo vulgaris-Schoenion nigricantis*)

Nanocyperion Koch 1926

Annex 1:

H2190 Humid dune slacks

Emerald:

B1.8 Moist and wet dune slacks

MAES-2:

Coastal

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
Atlantic

Justification
Most of the area and the largest diversity of the habitat is found in the Atlantic region.

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)
Belgium	Present	0.5 Km^2	Decreasing	Decreasing
Denmark	Present	76 Km^2	Decreasing	Decreasing
Estonia	Present	1.6 Km^2	Stable	Unknown
Finland	Aland Islands: Uncertain Finland mainland: Present	0.1 Km^2	Decreasing	Decreasing
France	France mainland: Present	75 Km^2	Decreasing	-
Germany	Present	8 Km^2	Decreasing	Decreasing
Ireland	Present	2.8 Km^2	Unknown	Unknown
Latvia	Present	14 Km^2	Decreasing	Decreasing
Lithuania	Uncertain	unknown Km^2	Unknown	Unknown
Netherlands	Present	27 Km^2	Decreasing	Decreasing
Poland	Present	0.9 Km^2	Decreasing	Decreasing
Portugal	Portugal mainland: Present	marginal Km^2	Unknown	Unknown
Spain	Spain mainland: Present	0.1 Km^2	Decreasing	Decreasing
Sweden	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)
UK	Northern Island: Uncertain United Kingdom: Present	18 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)
Iceland	Uncertain	Km^2	Unknown	Unknown
Kaliningrad	Uncertain	Km^2	-	-
Norway	Jan Mayen: Uncertain Norway Mainland: Present Svalbard: Uncertain	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	3042100 Km^2	568	225 Km^2	
EU 28+	3042100 Km^2	568	225 Km^2	

Distribution map

Map rather complete, but habitat maybe also in Norway and Iceland. Data sources: Art17, EVA.

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

95% Maybe some sites exist in Norway,Russia (Kaliningrad, St Petersburg-area) and Iceland.

Trends in quantity

On average there is a strong decrease in area over the last 50 years (-46%), but the values differ largely between the different countries. The average value is strongly impacted by Denmark (37% of reported area data; decline -65%) and France (37%; decline -6%). Also Germany reported large declines, while on the other hand in Latvia a slight increase in area took place. Suitable quantitative data cover 90% of the reported area.

Different countries indicate very different future trends (from decrease or stability to increase), but few quantitative data are given.

The countries that reported quantitative data on historical decline cover about 50% of the present area, indicating on average a decline of -67% over several centuries.

- 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 habitat is widely dispersed over the Atlantic and Baltic sandy coasts.
- Does the habitat have a small natural range by reason of its intrinsically restricted area?
  No
  Justification
  The extent in many sites is relatively small, due to limited areas with suitable underlying factors. The overall range however, is relatively large.

Trends in quality

Calculated from the territorial data, on average 46% of the extent in Europe has been degraded with a relative severity of 58%. Applying a worst-case scenario (using the highest scores for countries that reported ranges of decline) would lead to an affected extent of 47%, with a severity of the impact of 67%.

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

Pressures and threats

The most important pressures and threats are:

(1) natural succession, resulting in development of dune slack shrubland, partly as a result of abandonment of traditional land-use in the dune slacks; succession or encrochment of tall grasses and herbs may be increased by eutrophication, including aerial nitrogen deposition.

(2) changes in the hydrology, like lowering of ground water tables for several reasons (building, drinking water extraction, recreation) or as a result of tree plantations (which have a high evaporation rate).

(3) Overgrazing and overuse by recreational activities.

List of pressures and threats

Agriculture

Intensive grazing

Human intrusions and disturbances

Outdoor sports and leisure activities, recreational activities

Pollution

Nitrogen-input

Natural System modifications

Human induced changes in hydraulic conditions

Natural biotic and abiotic processes (without catastrophes)

Biocenotic evolution, succession

Conservation and management

Management should focus on maintaining or restoring dynamics in hydrology of the dune systems, resulting in yearly fluctuating levels of ground water. Besides, to prevent quick succession towards higher vegetation, mowing or extensive grazing may be applied as a management practice.

List of conservation and management needs

Measures related to agriculture and open habitats

Maintaining grasslands and other open habitats

Measures related to wetland, freshwater and coastal habitats

Restoring/Improving the hydrological regime
Restoring coastal areas

Measures related to spatial planning

Establish protected areas/sites

Conservation status

Annex 1:

2190: ATL U1, BOR U1

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

When severely damaged restoration is possible by restoring hydrological functioning, in combination with creating young pioneer stages of dune slacks.

Effort required

10 years	20 years
Through intervention	Through intervention

Red List Assessment

Criterion A: Reduction in quantity

Criterion A	A1	A2a	A2b	A3
EU 28	-46 %	unknown %	unknown %	-67 %
EU 28+	-46 %	unknown %	unknown %	-67 %

The average decline in the last 50 years has been calculated from territorial data. A general future trend in area is uncertain, as countries reported very different national trends. The countries that reported quantitative data on historical decline cover about 50% of the present area and on this ground an average historical decline of -67% results. However, these data are relatively uncertain.

Criterion B: Restricted geographic distribution

Criterion B	B1				B2				B3
	EOO	a	b	c	AOO	a	b	c	
EU 28	>50000 Km^2	Yes	No		>50	Yes	No		
EU 28+	>50000 Km^2	Yes	No		>50	Yes	No		

EOO and AOO are much higher than the thresholds for applying criterion B. Therefore further subcriteria under B are not relevant.

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	46 %	58 %	unknown %	unknown %	unknown %	unknown %
EU 28+	46 %	58 %	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%

Average values calculated from the territorial data provided by the countries of occurrence in EU results in 46% of the current area being affected by a quantitative decline of 58% severity. Maximum values for C/D1 range up to 47% extent and 67% severity, e.g. those reported by Denmark, Finland and Germany. No data is available for the (few) countries outside the EU28+, like Russia (Kaliningrad), Iceland and Norway.

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	VU	DD	DD	VU	LC	LC	LC	NT	DD	DD	DD	DD	DD	DD	DD	DD	DD

	A1	A2a	A2b	A3	B1	B2	B3	C/D1	C/D2	C/D3	C1	C2	C3	D1	D2	D3	E
EU28+	VU	DD	DD	VU	LC	LC	LC	NT	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	A1, A3	Vulnerable	A1, A3

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

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