

SCIENTIFIC CONSIDERATIONS REGARDING THE PRESENCE OF CONTINENTAL DUNE HABITATS IN ROMANIA

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Abstract

There are continental dunes habitats of Community interest on the territory of Romania outside the checklist for which two reports were made and submitted to European Commission (2013 and 2019). In the initial checklist for Romania, there were five types of continental dune habitats, present in two biogeographical regions (Black Sea - BLS and Pannonian - PAN) for which seven Natura 2000 sites were designated. In 2025, for the preparation of the third report under Article 17 of the Habitats Directive, it was proposed to extend the list based on information collected from the field and documents referring to dune habitats. During field identification, species characteristic of the plant communities that define the habitats were taken into account. The new list confirmed the presence of all five habitat types, with these being highlighted in nine Natura 2000 sites, including Continental (CON) and Steppic (STE) biogeographical regions. The presence of these habitats in the mentioned biogeographical regions requires the updating and revision of two documents: the standard forms and site management plans, as well as their adoption in appropriate legislative acts.

Key words: checklist, conservation, dunes habitats, Habitats Directive.

INTRODUCTION

At European level, sandy soils are a special category from a geomorphological point of view.

Thus, the soil map has recently been revised (Figure 1) and includes this category (Bertran et al., 2016). Soil data and information is based by a large searchable repository of global and regional datasets and layers available in GIS format and European Atlas of Soil Biodiversity (Jeffery et al., 2010; ISRIC, 2026).

Closely related to soil composition is the establishment of particular types of continental dune vegetation, for the conservation of which habitats have been included in the European Nature directives, respectively defining the Natura 2000 ecological network.

After Romania's accession to the European Union (EU) in 2007, these all these areas were included in the Natura 2000 ecological network as Sites of Community Interest (SCIs).

Special Areas of Conservation (SACs) are sites of community importance for which conservation measures have been established. The Romanian National legal references of SCIs

designation are Ministry Order no. 1.964/2007; Ministry Order no. 2387/2011, and for SAC designation is Government Decision, no. 685/27.05.2022 (G.D., 2022).

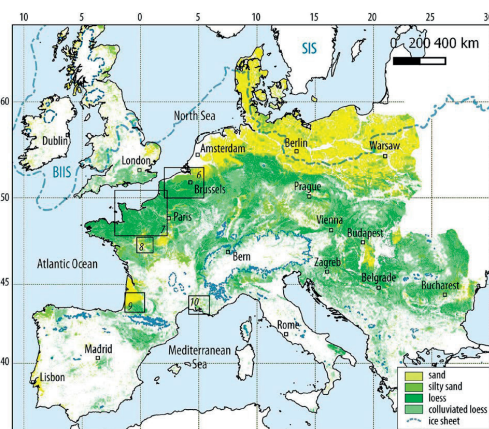


Figure 1. Distribution of European aeolian deposits derived from the LUCAS topsoil database, after Bertran et al., 2016

In Romania the sand-covered lands are present in: Danube Delta Biosphere Reserve, Agigea

Maritime Dune Natural Reserve, Siret and Bârlad valleys, starting from Hanul Conachi and continuing northwest to Tecuci, southern part of Oltenia, in the Ciuperceni – Desa Nature Reserve and Dăbuleni, Western Plain of Romania (Foieni Sand Dunes Natural Reserve and Carei Plain). The sand-covered lands here form the following types of maritime and continental dune habitats:

- 2110 *Embryonic shifting dunes*,
- 2130* *Fixed coastal dunes with herbaceous vegetation ('grey dunes')*,
- 2160 *Dunes with *Hippophae rhamnoides**,
- 2190 *Humid dune slacks*,
- 2340* *Pannonic inland dunes*.

The European Environment Agency (EEA, 2020) checklist included two biogeographical regions: Pannonic (PAN) with only habitat 2340*; and Black Sea (BLS) with 2110, 2130*, 2160 and 2190 habitats.

The presence of sand dune habitats was highlighted in the Danube Delta Biosphere Reserve (ROSCI0065 Delta Dunării), within the perimeter of the sandbanks: Letea Grind, Caraorman Grind, Lupilor Grind and Chituc Grind, which are defined as strictly protected areas. The Lupilor Grind is a lagoonal marine sandy sandbank made up of Holocene age sedimentary formations (Airinei & Pricăjan, 1971; Gâstescu & Şelariu, 1994; Strat, 2002-2003; DDBRA_PM, 2022-2024).

All these areas include coastal dunes (most of the area), marine sandy dunes and interspersed flat surfaces of marine origin with sandy dunes formed by sedimentary rocks (sandy, shell-bearing deposits, of mixed origin: fluvial and marine) with very particularly vegetation types (Sârbu et al., 1995; Popescu et al., 1997; Sârbu et al., 2000; Făgăraş et al., 2008; Făgăraş 2014; Schneider-Binder & Kuhlke, 2015).

The geomorphology of the Black Sea coast has allowed the establishment of specific habitats of sand dunes (Gâstescu et Şelariu, 1994; Gâstescu et Ştiucă, 2006).

The vegetation from the Agiea Maritime Dune Natural Reserve has allowed the inclusion of the habitat of community interest specific to marine coasts. (Boşcaiu, 1975; Popescu & Sanda, 1976-1977; Sârbu et al., 2000; Făgăraş et al., 2008). This area was partially included in the ROSAC0073 Dunele marine de la Agiea (Sea

dunes of Agiea) (M.O. no. 1.964/2007; G.D., 2022).

Since 1937, it was known that sandy soils and sands in Romania are exploited through forestry, agricultural, horticultural and viticultural cultivation (Chiriţă, 1937). Among the sandy formations of Romania, the sands along the Siret and Bârlad valleys, starting from Hanul Conachi and continuing northwest to Tecuci, represented geographical conditions specific to afforestation works. These sands extend in the form of a strip of varying width between 0.5 km and 1 km and 4,250 km long, with an almost north-south orientation, located west and southwest of Hanul Conachi and north of Nămolosa (Chiriţă, 1937).

Afforestation works to stabilize sandy soils have been a constant concern for decades. Currently, the Hanu Conachi Natural Reserve is managed under a forestry regime. This area was partially included in the ROSAC0072 Dunele de nisip de la Hanul Conachi (M.O. no. 1.964/2007; G.D., 2022).

A similar situation was also in the southern part of Oltenia, in the Ciuperceni – Desa Nature Reserve. This area is between Ciuperceni – Desa - Dăbuleni, an area partially included in the ROSAC0039 Ciuperceni Desa site (M.O. no. 1.964/2007; G.D., 2022) where the stabilization of sandy soils has been a permanent concern. In the Oltenia Plain, including Ciuperceni, several alignments of relief rippled dunes have been identified. The main source of sandy material was the alluvium Danube, and the dunes differ from interdunes (Stănilă et al., 2020).

In the last years, fruit and wine varieties have been selected to be adapted to sandy soils (Enache & Croitoru, 2018; Mărcăneanu et al., 2025).

Also in the category of continental sand dunes are areas in the Western Plain of Romania, which border similar areas in Hungary. The continental dunes near the towns of Urziceni and Foeni are located in the Nirului Plain, which is an integral part of the Western Plain (northern sector) of Romania (Raţiu et al., 2000). The Natural Reserve Foieni sand dunes (Dunele de nisip Foieni) was included into the Natura 2000 site ROSCI0020 Câmpia Careiului (Carei Plain) (M.O. no. 1.964/2007; M.O. no. 2.387/2011). The characteristic vegetation was described, including plant communities of Foieni sand

dunes (Karacsonyi, 1995). Recently, the management plan of these protected areas was approved (M.O. 3.221/2023).

Sometimes dramatically associated with the movement of sand dunes in populated areas, desertification actually refers to the land resulting in degradation in arid, semi-arid and dry sub-humid areas from various factors, including climate and human variation activities. For soil biodiversity, desertification is a threat. Habitat fragmentation can be striking as a result of desertification with land degradation continuous vegetation cover to a discontinuous, and finally island, vegetation cover (Jeffery et al., 2010).

In the European Union, all Member States use the *Habitats Directive* (92/43/ECC) on the conservation of natural habitats and of wild fauna and flora as a key instrument for biodiversity conservation (DG Environment, 2017; 2025) and for maintaining and improving the supply of ecosystem services directing their efforts toward designation of protected areas (Maes et al., 2012).

Classification of habitat types was based partly on phytosociology (defined plant communities associations), but this is considered complex and sometimes unclear and has recently been reinterpreted into classification systems based on analysed of accumulated data (Mucina et al., 2016; Rodwell et al., 2018; Chytrý et al., 2020). Thus, assessment of the conservation status of habitat types is based partly on structure (typical/characteristic species), function and future habitat trends (Müller-Kroehling, 2019). In the *Habitats Directive*, monitoring of Annex 1 habitats is required in Article 11, with reporting to the Commission every 6 years of their assessed conservation status, according to the requirements of Article 17, is provided for at national level per each biogeographical or marine region. The EU biogeographical conservation status was assessed by combining the Member State data or by weighting the Member State assessments and colour codes was defined (Table 1).

Table 1. Abbreviations and colour codes for Conservation Status classes (after DG Env., 2017)

Conservation Status	Colour	Abbreviation
Favourable	Green	FV
Unfavourable-inadequate	Amber	U1
Unfavourable-bad	Red	U2
Unknown	Grey	XX

Conservation status is assessed using a standard methodology as being either 'favourable', 'unfavourable-inadequate' or 'unfavourable-bad' (Table 1), based on four parameters as defined in Article 1 of the *Habitats Directive*:

1. range (within the biogeographical region concerned);
2. area covered by habitat type within range;
3. specific structures and functions (including typical species);
4. future prospects (as regards range, area covered and specific structures and functions).

The documents are on the reference portal for reporting under Article 17 of the *Habitats Directive* (EEA, 2020; EEA, 2025a; EEA, 2025b). However, for the designation and management plans of Natura 2000 sites in Romania, the plant communities remain the reference (Mihăilescu et al., 2024).

MATERIALS AND METHODS

The present study justifies the need to expand the checklist for Romania for dune habitats to more biogeographical regions.

The sandy areas were selected based on the documents regarding Romania's accession as well as the scientific references confirming the inclusion of dune habitats in the European classification system. The Annex I of *Habitats Directive* described habitats and sites where whose conservation requires designation of special areas of conservation (SAC, SCIs), so that Romanian habitat types could be integrated into the Natura 2000 network (Doniță et al., 2005; Doniță et al., 2006; Gafta & Mountford, 2008; EUR28, 2013; Chytrý M. et al., 2020).

The *Interpretation Manual of European Union Habitats* (EUR28, 2013) is a scientific reference document, which on 13 April 2007 adopted additional changes for the accession of Bulgaria and Romania.

These types of continental dune habitats are present in the Natura 2000 sites in Romania, as they have been designated since 2007 with Romania's accession to the EU. The Standard Forms have been updated periodically and we present the current situation. In the initial habitat checklist for Romania, there were 5 types of continental dune habitats, present in two bioregions (BLS and PAN) for which 7 occurrences in Natura 2000 sites were

designated. Habitat coverage is taken from the Standard Site Forms according to the official information transmitted by Romania in the European system (BISE, 2025).

The grid is based on the recommendation at the 1st European Workshop on Reference Grids in 2003 and later INSPIRE geographical grid systems 10 x 10 km (ETRS 89 grid cells, LAEA EPSG:3035) (INSPIRE, 2007; DG Environment 2017; 2023). For each country three vector polygon grid shape files, 1, 10 and 100 km, are available. Last updated was in 2016 (EEA, 2016). For the Romanian continental dune habitats, we used 1x1 km for the small area and 10 x 10 km for large area.

At the European level, the last edition of map generated by the EEA was in 2016 and these documents define the biogeographical regions dataset contains the official delineations used in the *Habitats Directive* (92/43/EEC) (Figure 2).



Figure 2. EEA geospatial data catalogue. Biogeographical regions, Europe 2016

Dune habitats were identified in the field based on plant communities as described in *Habitats of Romania – Habitatele din România* (H.R.) (Doniță et al., 2005; Doniță et al., 2006), starting from the description in *Interpretation manual of European Union habitats* (EUR 28, 2013). The edifying plant species and communities present in Romania were taken into account. The description of the habitats according to these follows:

Habitats descriptions

2110 Embryonic shifting dunes

Formations of the coasts of the Atlantic, the North Sea, the Baltic Sea and the Mediterranean, representing the first stages of dune construction, constituted by ripples or raised sand surfaces of the upper beach or by a seaward fringe at the foot of the tall dunes. Along the Black Sea coast (Făgăraș 2014) are present following plant communities according with H.R.: *Elymetum gigantei* Morariu 1957; *Artemisietum Tschernievianae* (arenariae), *Agropyretum juncei* (Br.-Bl. et De L.1936) Tx. 1952; *Secali sylvestri* – *Alysssetum borzeani* (Borza 1931) Morariu 1959, *Aperetum maritimae* Popescu et al. 1980, *Bromo tectori* (Kern 1863) Soó (1925) 1939. Conservation status at Member States of EU level on bioregion: BLS: Poor (U1); CON: Bad (U2) (BISE, 2025).

2130* Fixed coastal dunes with herbaceous vegetation ('grey dunes')

Fixed dunes, stabilised and colonised by more or less closed perennial grasslands and abundant carpets of lichens and mosses, from the Atlantic coasts, the shores of the North Sea and the Baltic. Subtype presents in Romania and Bulgaria is Pal. 16.22B - Pontic fixed dunes - fixed dunes of the coasts of the Black Sea (EUR 28, 2013).

Plant communities according with H.R., 2005-2006: *Ephedro* – *Caricetum colchicae* (Prodan 1939 n.n. Morariu 1959) Sanda & Popescu 1973 (Syn.: Association with *Ephedra distachya* and *Carex ligERICA* (Prodan 1939) Morariu 1959) *Koelerio glaucae* – *Stipetum borysthenicae* Popescu & Sanda 1987; *Scabioso argenteae* – *Caricetum colchicae* (Simon 1960) Krausch 1965, *Scabioso argenteae* – *Artemisietum campestris* Popescu & Sanda 1987; *Holoschoeno* – *Calamagrostetum epigeios* (Syn.: *Calamagrostetum epigeios* Eggler 1933 subas. *arenosum* Popescu & Sanda 1976).

By analysing a large number of plots, errors in classifications were identified, thus recognizing that there are differences in interpretation that can lead to confusion or some cases inconsistent, characterization confused the meaning of the EUNIS habitats. Therefore, the current interpretation of the same habitat type can vary among European countries habitats (Chytrý et al., 2020). The revised EUNIS habitat types and

the number of plots assigned to each of them by the EUNIS-ESy expert system, with the current codes and corresponding codes used in the 2007 version of the EUNIS classification and in the European Red List of Habitats (Chytrý et al., 2020). Based on 967 plots habitat *Black Sea coastal dune grassland (grey dune)* was revised and included as follow: EUNIS code N17; EUNIS2007 code B1.4; Red List code B1.4c. (Chytrý et al., 2020).

The habitat 2130* *Fixed coastal dunes with herbaceous vegetation (grey dunes)*, considered a priority habitat, was included in this category of protection.

Conservation status at Member States of EU level on bioregion: BLS: Unknown (XX), CON: Bad (U2) (BISE, 2025).

2160 Dunes with *Hippophae rhamnoides*

Sea-buckthorn formations of forest colonisation in both dry and humid dune depressions, mostly in Denmark, Germany, the Netherlands, Belgium, Britain and Ireland (EUR 28, 2013). Subtype presents in Romania and Bulgaria: Pal. 16.251 Sea-buckthorn formations of forest colonisation in both dry and humid dune depressions.

Plant communities according with H.R., 2005-2006: *Hippophaë – Salicetum elaeagni* Br.-Bl. et Volk 1940 (Syn.: *Calamagrostio epigei-Hippophaëtum rhamnoides* Popescu et al. 1986 *Hippophaë – Berberidetum* auct. rom. non. Moor, *Viburno – Crataegetum berberidetosum* Mititelu et Barabáš 1970).

Conservation status at Member States of EU level on bioregion: BLS: Good (FV). Presence in bioregion only in Romania (BISE, 2025).

2190 Humid dune slacks

Humid depressions of the dunal systems. Humid dune-slacks are extremely rich and specialised habitats very threatened by the lowering of water tables. Subtype presents in Romania and Bulgaria (EUR 28, 2013):

Pal. 16.34 - Dune-slack grasslands: humid grasslands and rushbeds (see 37.31, 37.4) of dune-slacks, also often with creeping willows (*Salix rosmarinifolia*, *S. arenaria*).

Plant communities according with H.R., 2005-2006: *Saliceto (rosmarinifoliae) – Holochoenetum vulgaris* Mititelu et al., 1973.

Conservation status at Member States of EU level on bioregion: BLS: Poor (U1) (BISE, 2025).

2340* Pannonic inland dunes

Inland dunes of the Pannonic plain and of neighbouring basis. This habitat represents a mosaic of different plant associations with open sand, dune lichen communities, pioneer swards with many therophytes, open and closed swards. For steppes and meadow-steppes on stabilised sand or sandy soils is not associated with dune complexes as habitat 6260* *Pannonic sand steppes* (EUR 28, 2013).

Plants species composition in Romania: *Cladonia convoluta*, *C. furcata*, *Corynephorus canescens*, *Thymus serpyllum*, *Viola tricolor* ssp. *tricolor*, *Cerastium semidecandrum*, *Spergularia morisonii*, *Alyssum montanum* ssp. *gmelinii*, *Bassia laniflora*, *Cynodon dactylon*.

Plant communities according with HR, 2005-2006: *Festuco vaginatae – Corynephoretum* Soó 1935; *Festucetum beckeri* Popescu & Sanda (1976) 1997 (Syn.: *Festucetum vaginatae* subass. *arenicolum* Popescu & Sanda (1976) 1979); *Mollugietum cervianae* Borza 1963.

Conservation status at Member States of EU level PAN, in our region RO, BG, HU: Bad (U2) (BISE, 2025).

In the checklist for Romania, there were five types of continental dune habitats (Tabel 2), present in two biogeographical regions (BLS and PAN) for which seven Natura 2000 sites were designated.

Table 2. Types of continental dune habitats for Romania distributed on regions

Natura 2000 habitat code	Description	Biogeographical regions
2110	Embryonic shifting dunes	BLS
2130*	Fixed coastal dunes with herbaceous vegetation ('grey dunes')	BLS
2160	Dunes with <i>Hippophae rhamnoides</i>	BLS
2190	Humid dune slacks	BLS
2340*	Pannonic inland dunes	PAN

*priority habitat

RESULTS AND DISCUSSIONS

As we mentioned, for soil biodiversity, desertification is a threat. Analysing the Map of Soil Biodiversity Potential Threats on the European level (Jeffery et al., 2010), the sand dunes in Romania were included partly in the Low category and partly in the Moderate category.

In 2025, for the preparation of the third report under Article 17 of the *Habitats Directive*, it was proposed to extend the list based on information collected from the field (between 2019-2024) and documents referring to continental dune habitats. The distribution map of dune habitats was generated to confirmed the presence of all five habitat types, on biogeographical regions in Romania (Figure 3).

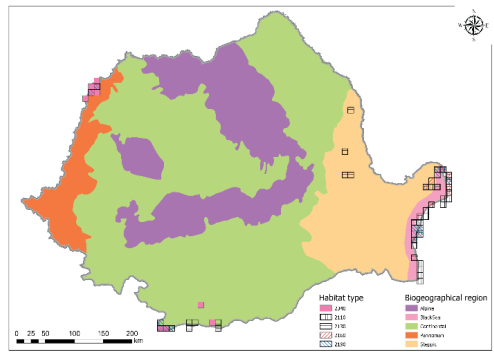


Figure 3. Distribution map of dune habitats in Romania

For this report the field identification took into account the species characteristic of the plant communities that define the habitats. At the European level, the latest edition of the map generated by the EEA in 2016 defines biogeographical regions, but these are not fully correlated with the geomorphology of the terrain.

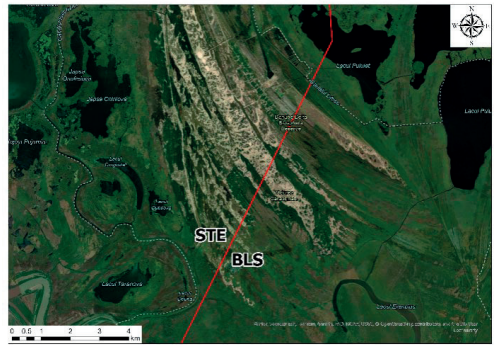


Figure 4. Habitat 2130* identified at Caraorman into the Danube Delta Biosphere Reserve (red line represent the limit between BLS and STE biogeographical regions)

Thus, the dataset used for reporting under Article 17 of the *Habitats Directive* can lead to the separation of plots taken from the field into

two biogeographical regions. This also happens at the level of the Caraorman Grind (Figure 4). Because dunes differ from interdunes in relief and soil, this fact is reflected in the types of vegetation that settle in this area. The habitat 2190 are found in the CON in the site ROSCI0039, also confirmed by the Management Plan of site Ciuperceeni – Desa (M.O. 1.248/ 2016). The habitat 2130* present in CON in ROSCI0039 (Figure 5) as well as in the STE at the ROSAC0072, also confirmed by the identified characteristic species.



Figure 5. Habitat 2130* *Fixed coastal dunes with herbaceous vegetation (grey dunes)* identified at ROSCI0039 Ciuperceeni – Desa. Photo: Simona Mihăilescu

The new list confirmed the presence of all 5 habitat types, these being highlighted in 9 occurrences in the Standard Forms of Natura 2000 sites, including Continental - CON and Steppic STE biogeographical regions (Table 3).

Table 3. Types of continental dune habitats distributed on Natura 2000 sites in Romania

Natura 2000 habitat code	Natura 2000 sites		Cover (ha)	Bio-geographic regions
Initial habitat checklist				
2110	ROSCI0065	Delta Dunării	857.23	BLS
2130*	ROSCI0065	Delta Dunării	1355.58	BLS
2130*	ROSAC0073	Dunele marine de la Agigea	6	BLS
2160	ROSCI0065	Delta Duării	125.70	BLS
2190	ROSCI0065	Delta Dunării	645.49	BLS
2190	ROSCI0020	Câmpia Careiului	847.5	PAN
2340*	ROSCI0020	Câmpia Careiului	100	PAN

Proposed expand the habitat checklist after field data processing (2019-2024) to include in 2025 report			
		Cover (ha) estimated	
2190	ROSCI0065 Delta Dunării	129	STE
2190	ROSCI0065 Delta Dunării	516.49	BLS
2130*	ROSAC0072 Dunele de nisip de la Hanul Conachi	34.5	STE
2130*	ROSAC0039 Ciuperceni - Desa	18.98	CON
2160	ROSAC0039 Ciuperceni - Desa	3.75	CON
2190	ROSAC0039 Ciuperceni - Desa	38	CON
2190	ROSCI0020 Câmpia Careiului	469	PAN

*priority habitat

These habitats are also found in the perimeter of the Letea, Caraorman and Lupilor grinds in the R.B.D.D. (ROSCI0065 Delta Dunării) which were reported for the BLS bioregion in 2013 and 2019.

During the period 2019-2024, for the third report (from 2025) field data and information were collected according to the requirements of the reporting guide (DG Environment, 2023) based on Article 17 of the *Habitats Directive*, taking into account the species characteristic of the plant communities that define the habitats when identifying them. Distribution and spread maps updated with recent information were also developed, and for Romania the first short-term trend reporting was carried out.

Between 2025 and beginning 2026, it was necessary to check supplementary some presents of the characteristic species into the habitats (Figure 6, 7, 8, 9) (GBIF, 2023a; 2023b; 2023c).

For the Caraorman sand dunes, we report the partial presence in the BLS bioregion, but also in the STE, of the habitat 2190 *Humid dune slacks*. The habitat was found in this biogeographical region in the last reporting period. The combination is valid due to improved knowledge of the habitat distribution. The priority habitat 2130 * *Fixed coastal dunes with herbaceous vegetation ('grey dunes')* is present in ROSAC0072 Sand dunes at Hanul Conachi, belonging to the STE bioregion, and 2160 *Dunes with Hippophae rhamnoides*, 2190 *Humid dune slacks*, were identified in the CON in the ROSCI0039 Ciuperceni – Desa site, information also confirmed by the management plan for these protected areas. The presence of

habitat 2130 was not included in the Standard Form and in the Management Plan of the ROSAC0072 site, requiring the updating of the two documents.

We mentioned that the priority habitat 2130* *Fixed coastal dunes with herbaceous vegetation ('grey dunes')* is present on Black Sea coast, in Romania and Bulgaria (Valcheva et al., 2021). Taking into account the species characteristic of the plant communities that define the habitats when identifying them.

Plants: *Aira* spp., *Anacamptis pyramidalis*, *Bromus hordeaceus*, *Carex arenaria*, *Cerastium* spp., *Corynephorus canescens*, *Erodium glutinosum*, *E. lebelii*, *Galium verum*, *Gentiana campestris*, *G. cruciata*, *Koeleria* spp., *Milium scabrum*, *Myosotis ramosissima*, *Ononis repens*, *Phleum arenarium*, *Polygala vulgaris* var. *dunensis*, *Silene conica*, *S. otites*, *Trifolium scabrum*, *Tuberaria guttata*, *Viola curtisii*, *V. rupestris* var. *arenaria*.

Conservation status at BLS: Unknown (XX).

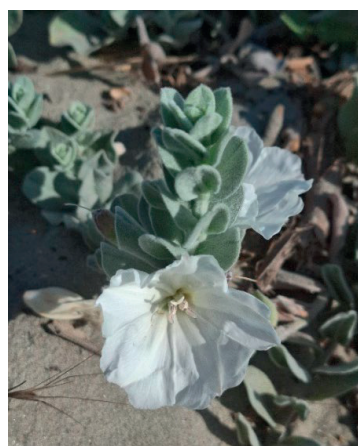


Figure 6. *Convolvulus persicus* L. Identified at Sulina into the Danube Delta Biosphere Reserve. Photo: Simona Mihăilescu

The phytocoenoses with *Convolvulus persicus* L. (Figure 6) were present in some areas of the Danube Delta Biosphere Reserve (Sulina, Sf. Gheorghe, Cardon), in the natural reserve Marine Sand Dunes of Agigea and on Durankulak beach, in Northern Bulgaria into the Natura 2000 site: BG0000154 Ezero Durankulak (Făgăraș & Jianu, 2016; Mitoi et al., 2025). It is typical psammophytes species for the continental dune habitats. The species assessed in the European Red Lists prepared by the IUCN

for the European Commission are also included (EEA, 2020).

On the territory of Romania, there are continental dunes of community interest outside the checklist for which the first two reports were made (2013 and 2019).

In order to update the presence of habitats in the habitat's checklist for Romania, there are scientific arguments to confirm their presence in other biogeographical regions besides BLS and PAN. These are found in CON in the ROSCI0039 Ciuperceni – Desa site (Figure 5), as well as in STE in the ROSAC0072 Sand dunes at Hanul Conachi site.

These habitats have a common geomorphological origin with the Letea Grind and Caraorman Grind in RBDD that were reported for the BLS bioregion (2013 and 2019). During the period 2019-2024, for the 2025 report, field data and information were collected according to the requirements of the reporting guide for art.17 of DH, in identification taking into account the characteristic species of the plant communities that define the habitats. Distribution and range maps updated with recent information were also produced.

Habitat 2130 * *Fixed coastal dunes with herbaceous vegetation (grey dunes)* is present in ROSAC0072 Sand dunes at Hanul Conachi belonging to the STE bioregion, and 2160 *Dunes with Hippophae rhamnoides* and 2190 *Humid intradunal depressions* were identified in CON in the ROSCI0039 Ciuperceni – Desa site, information also confirmed by the management plan for these protected areas (M.O. 1.248/2016).

In the floristic composition of the phytocenoses, in addition to vascular plant species, moss and lichen species were identified in the areas researched during 2019-2024.

These species are particularly for the herbaceous vegetation of coastal dunes: Mosses: *Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr (Syn. *Tortula ruraliformis* (Besch.) Ingh.) (Figure 7), and Lichens: *Cladonia* spp.: *Cladonia furcata* subsp. *subrangiformis* auct. non (Sandst.) Abbayes (Figure 8A and 8B) and *Cladonia foliacea* (Huds.) Schrad. (Figure 9). This led to the reporting in 2025 of the habitats mentioned above also in Natura 2000 sites in the CON and STE biogeographical regions.



Figure 7. *Syntrichia ruralis* (Hedw.) F. Weber & D. Mohr identified at Hanu Conachi Natural Reserve (voucher Herbarium BUCM). Photo: Simona Mihăilescu



A



B

Figure 8. (A and B). *Cladonia furcata* subsp. *subrangiformis* auct. non (Sandst.) Abbayes identified at Hanu Conachi Natural Reserve (vouchers Herbarium BUCM L4470; BUCM L4411). Photo: Simona Mihăilescu

We confirmed that continental dune habitats and coastal dune meadows present species composition as the main difference between the Atlantic-Baltic and Mediterranean-Black Sea regions (Marcenò et al., 2018; Chytrý et al., 2020).



Figure 9. *Cladonia foliacea* (Huds.) Schrad. identified at Hanu Conachi natural reserve (voucher Herbarium BUCM L4412). Photo: Simona Mihăilescu

Conservation Status

The Conservation Status of habitats was evaluated by Natura 2000 sites and on distribution by biogeographical region (Tabel 4).

Table 4 Conservation status of continental dune habitats for Romania, reported in 2025

Natura 2000 habitat code	Biogeographic regions			
	BLS	CON	STE	PAN
2110	U1			
2130*	U1			
2160	FV			
2190	FV	U1	U1	
2340*				FV

*priority habitat

The conclusions were on overall assessment: range (within the biogeographical region concerned); area covered by habitat type within range; specific structures and functions (including typical species), and future prospects. Relating the Conservation Status, the habitats which are in Unfavourable-inadequate (U1), the necessary conservation measures are:

- Manage the use of natural fertilisers and chemicals in agricultural (plant and animal) production (CA09).
- Other measures related to agricultural practices (CA16).

- Habitat restoration of areas impacted by residential, commercial, industrial and recreational infrastructure, operations and activities (CF02).

CONCLUSIONS

The new list confirmed the presence of all five habitat types of continental dune (2110; 2130*; 2160; 2190; 2340*), with these being highlighted in nine Natura 2000 sites, including Continental (CON) and Steppic (STE) regions. At European level, the EEA, based on the information received from the Member States, should define the biogeographical regions more accurately, namely to make a better correlation with the geomorphology of the terrain. Thus, some confusions can be avoided for the next reporting in 2031.

For the report on 2025, the dataset on biogeographical regions containing their official delimitations leads to the separation of the corresponding areas into two regions. Thus, habitat 2130* becomes present in both the BLS and STE regions, especially in the Danube Delta Biosphere Reserve which includes ROSCI0065. Field data collected between 2019-2024 confirms this fact.

The presence of habitat 2130* was not included in the Standard Form and in the Management Plan of the ROSAC0072 site, this fact requiring the updating of the two documents.

The presence of these habitats in the mentioned biogeographical regions requires the updating and revision of two documents: the Standard Forms Natura 2000 sites and management plans of these, as well as their adoption in appropriate legislative acts for the following Natura 2000 sites: ROSCI0065 Delta Dunării (Danube Delta), ROSAC0039 Ciuperceni – Desa, and ROSAC0072 Dunele de nisip de la Hanul Conachi (Sand dunes at Hanul Conachi).

To maintain habitats in a Favourable conservation status, but especially for habitats in an Unfavourable-inadequate (U1), the necessary conservation measures must be financed and applied with consideration.

ACKNOWLEDGEMENTS

Data obtained in the framework of the Sectorial Operational Programme ENVIRONMENT

2007-2013 (POS no. 130537/10.01.2011), the Large Infrastructure Operational Programme 2014-2020 (POIM no. 238/11.03.2019) and PDD 2025-2027 (SMIS no. 2021 – 336936) projects financed by the Ministry of Investments and European Projects. The paper was written in the framework of project RO1567-IBB04 from Institute of Biology Bucharest of Romanian Academy financed by Romanian Academy. We thanks to dr. Sorin Ștefănuț for mosses confirmation.

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