# Evaluating the reduction of erosion by European coastal biotopes

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## **Objective**

#### Legend





We evaluate the contribution of ecosystems to reducing coastal erosion with the aim to identify locations where nature-based solutions can help strengthening the coast and increasing biodiversity.

## Methodology

- 1. We map European biotopes using the EUNIS typology.
- 2. We assign scores  $R_k$  1 to 5 for the erosion reduction capacity of each biotope, adjusted for the width perpendicular to the coastline.
- 3. We sum the scores per biotope for each 500 m coastline using Root Sum Squares (RSS):

$$ES_{erostot} = MIN\left(\sqrt{\sum_{k=1}^{N} (R_k)^2}, 5\right)$$

4. We assign rank scores 1 to 5 for the EMODnet coastal migration rate obtained by

- -4 to -1 favourable condition
- -1 to 1 vulnerable condition
- 1 4 highly vulnerable condition
- Biodiversity issue
- Wadden Sea EUNIS biotopes
  - Atlantic circalittoral sand
  - Full salinity Atlantic infralittoral sand
- Reduced or variable salinity Atlantic infralittoral sand
- Full salinity Atlantic littoral coarse sediment
- Reduced or variable salinity Atlantic littoral coarse sediment
- Atlantic littoral sand
- Full salinity Atlantic littoral mud
- Reduced or variable salinity Atlantic littoral mud
- Atlantic saltmarshes (undefined/Denmark)
- Atlantic upper saltmarshes
- Atlantic upper-mid saltmarshes
- Atlantic mid-low saltmarshes
- Atlantic pioneer saltmarshes
- Atlantic and Baltic moist and wet dune slack
- Low and medium altitude hay meadow
- dike





- satellite data for each 500 m coastline.
- 5. We subtract both scores to obtain a score for Figure 1. Scores for the contribution of coastal ecosystems in reducing coastal erosion for the Ems estuary (NL/DE). the ecosystems' contribution to erosion **Table 1.** Score tables for coastal erosion rank score and reduction.



total summed score for contribution to reduction of coastal erosion.

## **Coastal erosion rank score**

- 5 (severe erosion < -2 m/yr)
- 4 (moderate erosion -1 to -2 m/yr)
- 3 (mild erosion, -0.5 to -1 m/yr)
- 2 (stable -0.5 to 0.5 m/yr)
- 1 (accretion > 0.5 m/yr)

**Total summed score for** contribution to reduction of coastal erosion

- 1-2 (very low reduction)
- 2-3 (low reduction)
- 3-4 (medium reduction)
- 4-5 (high reduction)
- (very high reduction)

**Figure 2.** Scores for the contribution of coastal ecosystems in reducing coastal erosion for the Ebro delta (Spain).

### Outlook

Applying our method for European-wide harmonized EUNIS maps will show which parts of European coasts have vulnerable locations where coastal restoration is desired to strengthen their ecosystem services and to increase biodiversity, thus contributing to the European Green Deal.



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