Indicator: Wetland area

Naturvation challenges: Coastal resilience and marine protection
SDGs: 14
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Date: 19.02.2019

Indicator description
Coastal wetlands (e.g. saltmarshes) provide multiple ecosystem services such as coastal protection and erosion control, where coastal protection primarily is a function of wave attenuation (1). Wave attenuation is the reduction in wave energy or wave height that occurs when a wave passes through wetland vegetation (2). The energy of waves, tides, and currents is attenuated via frictional drag introduced by vegetation and by bottom friction in shallow water areas maintained by wetlands (2). Increased wave attenuation is also linked to sedimentation rate (3) – which is directly linked to increased wetland height i.e. protection against sea level rise (4) as well as extreme weather events (5).

As the relationship between coastal protection and wetland area is not directly measured, most research has rather focused on wave attenuation. In general, there is a nonlinear relationship between wave attenuation and wetland size, which highlights the fact that even small wetlands can provide substantial protection from waves (4, 5). The easiest way to estimate coastal protection by wetlands is therefore to measure wetland area. For this indicator, it is also recommended to measure vegetation density or biomass due to the positive effect of vegetation on wave attenuation as well as shoreline stabilization (4, 5).

Indicator scoring
To calculate and score wetland areas as an indicator for coastal resilience we used data from Shepard et al. 2011 (5), where percentage wave height reduction per unit of distance was measured. Shepard et al. 2011 (5) analysed data from 7 studies, 4 from Europe and 3 from North America. All data was collected in the field and from this data we calculated the quadratic area for the transect lengths 0, 3, 10, 100 and 200m, read the corresponding % wave attenuation and scored wetland areas between 1 – 5. Note that this indicator can only be used for blue areas. We only provide a single score 5 for blue area, the other nature-based solutions we set to "no score".

Score, Wetland area		
% Wave attenuation	**Wetland area (m^2)**	**Score**
1 – 39	0 – 8	1
40 – 51	9 – 99	2
52 – 74	100 – 9999	3
75 – 89	10 000 – 39999	4
90	40 000	5

This project has been funded by the European Union's Horizon 2020 research and innovation programme under grant agreement No. 730243

References

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