

Red List of Ecosystem assessment series

Produced by JNCC and NatureScot, supported by Natural Resources Wales, Natural England, and Northern Ireland Environment Agency.

This resource is one in a series/number of Ecosystem Red List assessments developed to accompany the UK Biodiversity Indicator '[Red List of Ecosystems](#)'. The assessments are available at: <https://jncc.gov.uk/resources/7b922dfc-708b-4c8c-9e6a-e2040447fb39>.

Resilient ecosystems are crucial for preventing biodiversity loss and species extinction. Maintaining healthy ecosystems safeguards the essential services they provide, which are fundamental to human well-being and a thriving economy. However, pressures and threats such as deforestation, overfishing, or climate change, can disturb the balance of ecosystems and threaten their health and functioning. Assessing the level of threat facing ecosystems is important in helping us understand the current status of the environment, and on a practical level, assessments can be used to help prioritise conservation funding decisions and where to take conservation management action on the ground.

The 'Red List of Ecosystems' (RLE) is a global assessment approach set out by the International Union on Conservation of Nature (IUCN). The approach includes consideration of a series of criteria, including change in geographic distribution through time; whether the ecosystem distribution is geographically restricted; evidence for any environmental degradation; and disruption to biotic processes or interactions. We have not carried out the quantitative analyses of the probability of ecosystem collapse necessary to assess criterion E as we do not have the data needed to carry out such analyses consistently. The IUCN methodology is widely used as a robust approach to assessing the status of ecosystems. Further details of the criteria used in these assessments are available on the [IUCN portal](#).

This assessment series sets out the RLE assessment conclusions for ecosystems found in the UK, alongside the details of how the assessment was made, including for each IUCN component criterion. The assessments have been peer-reviewed, and source data is referenced. Once complete, the series will cover the full range of natural and seminatural habitats that occur in the UK, throughout marine, terrestrial and freshwater environments.

Assessments are conducted according to the [Global Ecosystem Typology Level 3](#) (Ecosystem Functional Groups). This enables the assessments to feed into the Kunming-Montreal [Global Biodiversity Framework](#) (GBF) headline indicator A.1 Red List of Ecosystems. This indicator, which has been incorporated into the UK Biodiversity Indicator suite, is designed to measure progress against [Goal A](#) ('Protect and restore') and [Target 1](#) ('Plan and manage all areas to reduce biodiversity loss') of the GBF.

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M1.1 Seagrass Meadows

1. Key facts

Ecosystem description:

This ecosystem encompasses intertidal and subtidal seagrass beds comprised of *Zostera marina*, *Z. noltii* or *Ruppia maritima*, in fully marine and brackish (reduced salinity) conditions around the UK.



Image credits: (Left to right) *Zostera marina*, Sound of Barra ©Laura Steel; *Ruppia maritima* © JNCC

Overall assessment conclusion: Critically Endangered (CR) based on criteria A3, B1a, C2b, and D2b.

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Corresponding habitat classifications:

The following habitats were considered in the production of this assessment:

EUNIS codes: [MA522](#), [MB522](#)

UK Marine Habitat Classification: [LS.LMp.LSgr](#) & [SS.SMp.SSgr](#)

2 Assessment against IUCN criteria

Criterion A: Reduction in geographic distribution

Criterion A considers reduction in geographic distribution over ANY of the defined time periods for criteria A1, A2a, A2b or A3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2_EN.pdf](#)

Seagrass beds occur all around the British coasts in a patchy distribution. *Zostera marina* beds have been recorded primarily on the west and east coasts of Scotland and around Orkney and Shetland, but also occur in southern England and Wales (Tyler-Walters, 2008; Carstairs & Carstairs, 2025). Extensive intertidal beds of *Z. noltii* are found in Scotland, but also occur in the Wash, the Essex and Thames estuaries (England), and Strangford Lough (Northern Ireland) (Tyler-Walters, 2005). Most of the UK's *R. maritima* beds have been recorded in Scotland or along the Welsh coast (Tyler-Walters, 2001).

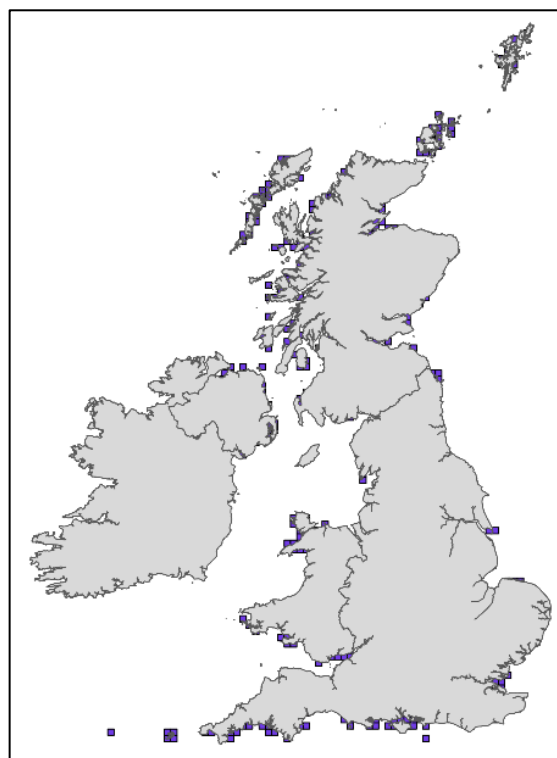
A3 Critically Endangered (CR) – Green et al (2021) identified that at least 44% of seagrass beds have been lost since 1936 and that modelling based on seagrass habitat suitability suggests as much as 92% may have been lost since historic time spans.

Criterion B: Restricted geographic distribution

Criterion B considers restricted geographic distribution indicated by ANY of the time periods for criteria B1, B2 or B3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#).

Seagrass beds vary considerably in size, patchiness and plant density. Beds can be connected via seed dispersal and rafts of flowering shoots (Jahnke *et al.*, 2018; Martínez-García *et al.*, 2021), with bed expansion occurring through vegetative growth from existing rhizomes (Davison & Hughes, 1998). UK seagrass beds are generally considered to be in a degraded condition, with a poor state of health, primarily due to declining water quality (Jones & Unsworth, 2016; Green *et al.*, 2021).

B1aii: Critically Endangered (CR) - restricted extent, estimated to be 188 km² (Mountford *et al.*, 2025) with declining water quality a key concern.



Criterion C: Environmental degradation

Criterion C considers environmental degradation over ANY of the time periods for criteria C1, C2a, C2b or C3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#).

Seagrasses are highly sensitive to degraded water quality, particularly eutrophication resulting from agricultural runoff and overflow discharges but also siltation and changes in turbidity (Burkholder *et al.*, 2007; Jones & Unsworth, 2016; Jones *et al.*, 2018; Moreno-Marín *et al.*, 2018; Krause-Jensen *et al.*, 2021; OSPAR, 2022; Unsworth *et al.*, 2024).

Physical disturbance via trampling (Travaille *et al.*, 2015) and bait digging (Gardiner, 2021), recreational fishing/harvesting (Román *et al.*, 2020; Garmendia *et al.*, 2021), mooring and anchoring (Unsworth *et al.*, 2017; Ouisse *et al.*, 2020), and the use of mobile bottom fishing gear (Nordlund *et al.*, 2018) all impact seagrass beds.

Global climate change is expected to impact UK seagrass beds through increases in the frequency and intensity of storms, and associated surge and swells (Orth *et al.*, 2006; Krause-Jensen *et al.*, 2021), as well as elevated seawater temperatures (Breiter *et al.*, 2024).

C2b: Critically Endangered (CR) – In addition to loss of UK seagrass bed extent, that remaining is thought to be experiencing significant environmental degradation (Jones & Unsworth, 2016; Jones *et al.*, 2018). Climate change will also impact seagrass beds.

Criterion D. Disruption of biotic processes or interactions

Criterion D considers Disruption of biotic processes or interactions over ANY of the time periods for criteria D1, D2a, D2b or D3. For details of time periods and criteria see [IUCN Red List of Ecosystems Criteria Summary Sheet 2.2 EN.pdf](#)

Seagrass is a foundation species, i.e. they are recognised as a key structural species of the habitat. Consequently, any loss of individuals has a significant impact on the extent and condition of the seagrass bed as well as the other species that depend upon it.

Seagrasses are highly sensitive to eutrophication resulting from agricultural runoff and overflow discharges (Burkholder *et al.*, 2007; Jones *et al.*, 2018; Moreno-Marín *et al.*, 2018; Krause-Jensen *et al.*, 2021; OSPAR, 2022; Unsworth *et al.*, 2024). Excess nutrients stimulate algal growth, which results in light reduction and algal overgrowth and smothering (Burkholder *et al.*, 2007). Seagrass will also experience direct physiological responses such as ammonium toxicity. Seagrass decline under nutrient enrichment is usually manifested as sudden shifts in seagrass abundance rather than continuous or gradual changes (Burkholder *et al.*, 2007).

Significant die-offs occurred in the 1930s due to a wasting disease (Tutin, 1942; Tyler-Walters, 2008). Pollution by herbicides and nitrate is thought to increase the susceptibility of seagrass beds to disease (Johnson & Burd, 1995; Hughes *et al.*, 2018).

Non-native species can have multiple effects including contributing to seagrass decline, causing biodiversity changes that affect seagrass ecosystem functions and compromising seagrass restoration (den Hartog, 1997; Williams, 2007; Gardiner, 2021). Grazing by herbivores has also been identified as an issue for some beds (Short & Wyllie-Echeverria, 1996).

D2b Critically Endangered (CR). As a foundation species, continued decline and loss will have a significant impact on the integrity of seagrass beds.

Conservation measures in place

Management measures for seagrass are mainly focused on marine protected areas. Measures include: closure of seagrass beds to bait digging/hand gathering for cockles; prevention of anchoring, mooring and demersal fishing activities through both voluntary and regulatory measures; run off management to control risk of eutrophication (e.g. diffuse water pollution plans and catchment sensitive farming); and refusal of consent for activities or development within MPAs, that would create localised changes in abiotic factors such as water temperatures, salinity, or exposure. Seagrass restoration projects are also underway throughout the UK.

As a Priority Marine Feature (PMF) in Scotland's seas, seagrass beds are also protected outwith the site network via the National Marine Plan General Policy GEN 9b. This ensures that development and use of the marine environment does not have a significant effect on the national status of seagrass beds. It is expected that additional inshore fisheries measures linked to MPA and PMF management areas for fishing gear to which seagrass beds are sensitive to will be consulted upon in 2025/26.

The Scottish Biodiversity Strategy to 2045, the Scottish Biodiversity Duty and UK Marine Strategy Good Environmental Status provide further drivers to ensure biological diversity is restored, and ecosystems are safeguarded.

Overall assessment conclusion

Seagrass meadows in the UK are assessed as being Critically Endangered (CR) based on criteria A3, B1a, C2b and D2b.

3 Literature references

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