

Searching for Shetland's lost seagrass: establishing the baseline distribution and abundance of seagrass in the Shetland Islands

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Project Summary





Project Summary

Seagrass habitats are among the most productive and valuable marine ecosystems—supporting biodiversity, protecting coastlines, and capturing carbon. However, these habitats are now vulnerable, following widespread loss across the UK. Understanding where seagrass still exists is vital for protecting what remains, guiding restoration efforts, and measuring environmental benefits such as blue carbon storage.

This study explored the historic and current distribution of seagrass, focusing on the subtidal eelgrass (*Zostera marina*) in the Shetland Islands. Historic records from across Shetland were reviewed to identify priority areas for assessing the presence of subtidal eelgrass beds. To map the current distribution of seagrass beds, small Unmanned Aircraft Systems (UASs or drones) were used to survey these sites. Drones offer a cost- and time-efficient way to collect high-resolution imagery over large and remote areas.

Aerial images from drone surveys were analysed to identify potential seagrass bed locations. These areas were then checked through paddleboard and snorkel surveys—carried out with the help of local community volunteers. These in-water surveys provided essential confirmation of eelgrass presence and condition, using photo and video transects.

Historic records identified 73 sightings of *Z. marina* across 12 sites in Shetland, dating from 1837 to 2020. Today, only two of these sites—Whiteness Voe and Weisdale Voe—still support eelgrass beds, with the most recent loss recorded at Burra. Additionally, 37 historic records of widgeon grasses (*Ruppia* spp.) were identified across Yell, Whalsay, Fetlar, Unst, and Mainland Shetland, mostly in shallow vadills and lagoons.

The total area of subtidal *Z. marina* habitat in Shetland is now estimated at 1.62 hectares, spread across 14 beds in upper Whiteness Voe and one in Weisdale Voe. The *Z. marina* beds in Whiteness Voe are in relatively good condition, with dense growth during the summer months. In contrast, the *Z. marina* bed at Weisdale Voe is sparser, with more algae intermingled within the bed. Flowering was observed in Whiteness Voe, though reproductive shoot density was low, and it is uncertain how many seeds are successfully produced by these beds.

This study documents a continued decline in seagrass around Shetland, with further loss of seagrass habitat since surveys were last conducted in the early 1990s. However, the relatively stable condition of the eelgrass beds in Whiteness Voe over the last 30 years offers hope and a potential foundation for future restoration. Looking ahead, there is potential for ongoing community involvement to help confirm seagrass loss from other historic sites and to identify new restoration opportunities.

This project shows that low-cost drones and community-led fieldwork are powerful tools for mapping and monitoring marine habitats—especially in remote and complex coastal areas like Shetland. It also highlights the importance of preserving local ecological knowledge and historic data, which play a key role in guiding today's conservation actions.



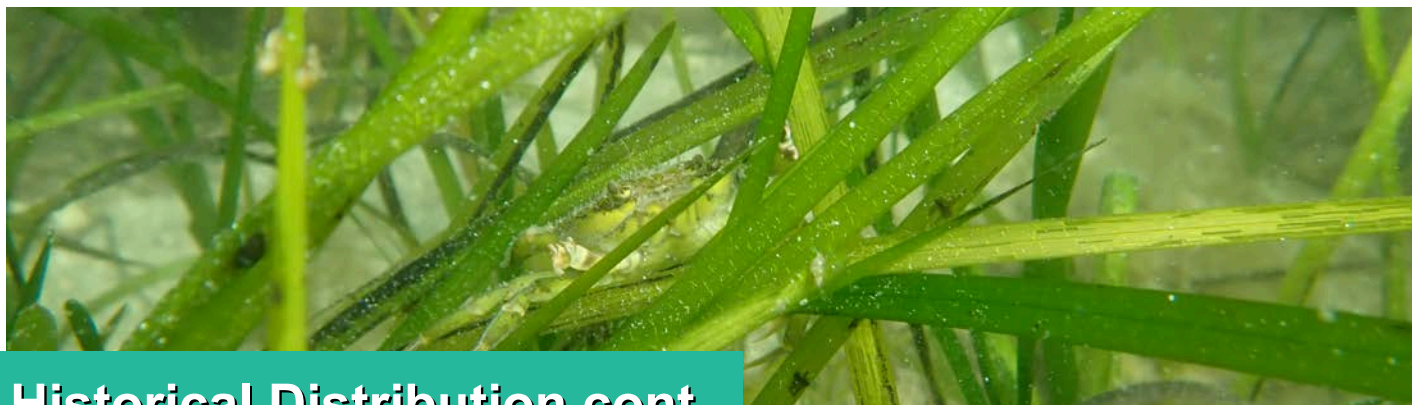
Historical Distribution of seagrass in Shetland

In the UK there are two species of fully marine seagrass, common eelgrass (*Zostera marina* Linnaeus, 1753) and dwarf eelgrass (*Zostera noltii* Hornemann, 1832). *Zostera marina* or eelgrass is the most abundant species of seagrass in the Northern hemisphere, and is typically found in sheltered, shallow areas from the lower shore to 6 m. Subtidal *Z. marina* eelgrass beds are widely recorded across the west coast of Scotland, in the Outer Hebrides, Orkney and in Shetland, as well as within the Firth of Clyde (Cleator, 1993; Kent et al., 2021). Intertidal eelgrass beds of both *Z. noltii* and *Z. marina* are found predominantly in firths and estuaries on the east coast of Scotland.

In Shetland dialect, the name 'marlok'^[1] or 'marlie'^[2] is given to eelgrass (*Z. marina*) beds (Jakobsen, 1932), a name of Norse origin potentially derived from 'marlauk' meaning 'sea onion' (Torbjørn, 2003). Eelgrass beds have been recorded at the head of sheltered shallow voes on the west coast of Shetland, and from Balta sound in Unst, although there have been no records at this location since the 1800s (Scott and Palmer, 1987).

Widgeon grasses (*Ruppia* spp.) are occasionally grouped within seagrass habitats, although they are not considered true seagrasses. Widgeon grasses are a genus of aquatic freshwater plants which have a high salinity tolerance and form beds or meadows and occupy similar habitats to eelgrass (Gamble et al., 2021). Widgeon grasses are found in very shallow sheltered soft, muddy-sand and mud in estuarine and brackish environments, and on occasion can be found interspersed with *Z. marina*. Widgeon grass is more commonly distributed than eelgrass in Shetland, with records for both *Ruppia maritima* and *Ruppia cirrhosa* (syn. *Ruppia spiralis*) in coastal lagoons and pools cut off from the sea by shingle beaches, but also occasionally in shallow sheltered areas of tidal lochs (Druce, 1922; Scott and Palmer, 1987).

The last review of the distribution of seagrass in Shetland was undertaken by W. Scott and R. Palmer as part of their flora 'The Flowering Plants and Ferns of the Shetland Islands' published in 1987. Scott and Palmer (1987) note that the earliest reference to both *Z. marina* and *Ruppia* spp. is in Unst by the Shetland botanist Thomas Edmondston in 1837. In Edmondston's Flora of Shetland (1845), *Z. marina* is described as inhabiting "Sandy sea shores, generally covered unless at very low tides, common". There are further references to *Z. marina* as 'common' in the published flora and survey notes of visiting botanists including Alexander Craig-Christie, William Hadden Beeby, and George Claridge Druce in the late 1800s and early 1900s (Craig-Christie, 1870; Druce, 1922; Druce, 1925; Scott and Palmer, 1987). The same sources also document the occurrence of *Ruppia* spp., with the earliest record for *R. maritima* found in Edmondston's Flora (Edmondston, 1845), although later versions give the same location references for *R. spiralis* and a novel location record for *R. maritima* (Edmondston, 1903).



Historical Distribution cont.

The historic high abundance of *Z. marina* during this early period is documented by Scott and Palmer (1987), to whom Weisdale Voe and Marlee Loch in the Vadills, Brindister Voe were identified as particularly abundant:

“The late W. H. Robertson told us that the ‘marlie’ used to be so abundant towards the head of Weisdale Voe that a channel was sometimes needed to be cut to allow the passage of small boats. At very low tides the plant would become exposed, allowing whelks to be gathered from its bottle-green leaves. The autumn gales would drive masses of eelgrass on to the beaches from where it was harvested for bedding cattle and for stuffing mattresses; for the latter purpose it had to be very carefully dried. In the Weisdale area these practices continued into the early 1920s.”

Indeed, the name ‘Marlee Loch’ is a direct reference to the prevalence of *Z. marina* at this site from the Shetland ‘marlie’ (Jakobsen, 1932). The practice of collecting seagrass after autumn storms for use in mattresses is documented from Shetland more generally and was reportedly believed to protect against fleas (Fenton, 1997). These practices were also seen in Denmark and elsewhere in the UK (Gamble et al., 2021; Torbjørn, 2003).

Z. marina appears to have drastically declined in Shetland around the same time as general loss across the North Atlantic. Scott & Palmer (1987) reference the drastic decline of colonies at Weisdale Voe and Marlee Loch in the 1930s, attributing the loss to seagrass wasting disease (*Labyrinthula* spp.). Whether seagrass decline is attributable purely to disease, or a combination of other factors including environmental conditions and eutrophication is hard to determine.

Starting in 1986, several in-depth field surveys were conducted around the coast of Shetland as part of the Marine Nature Conservation Review (MNCR) of Great Britain (Hiscock 1989). The results of the MNCR and other surveys during the early 1990s in Shetland are summarised in Howson (1999). These surveys included detailed dive surveys of the upper part of Whiteness Voe, between 1987 to 1989 to identify the sublittoral habitats and associated communities (Hiscock, 1989). The survey identified the *Zostera marina* seagrass beds as the most extensive in Shetland, at the time (Hiscock, 1989).

Since the high marine survey effort in the late 1980s and 1990s there has been no dedicated survey to understand the current distribution of seagrass in Shetland. In the 2017 Shetland Islands Marine Region State of the Environment Assessment, seagrass beds in Shetland were assessed to be deteriorating, with findings constrained by lack of evidence on current status (Shucksmith, 2017). Anecdotal accounts suggests that seagrass has continued to decline across Shetland.

[1] Also spelt ‘marlik’ or ‘marklak’ (Anugs (1914), Jakobsen (1932))

[2] Also spelt ‘marli’ or ‘marlee’ (Jakobsen, 1932)

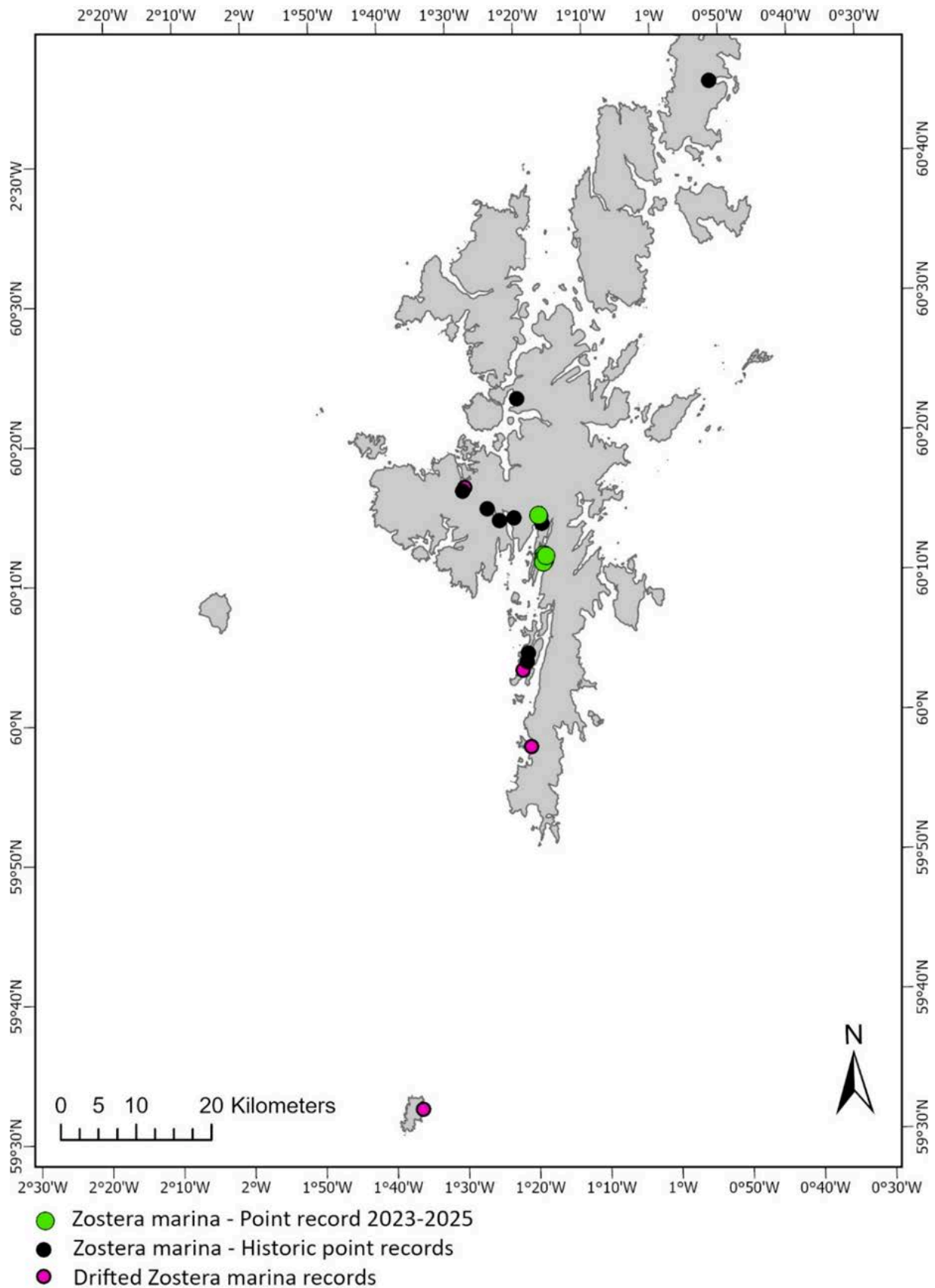
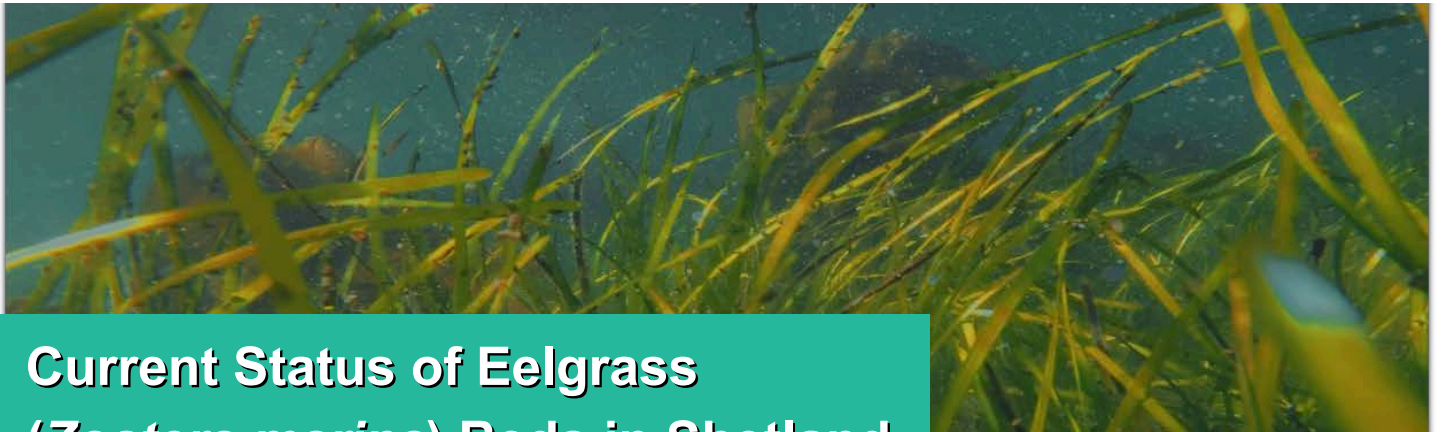


Figure 1. Historic and current point records of *Zostera* sp. from the Shetland Islands from 1888 to 2025. Positions have been corrected for some records where they could be derived from location description.



Current Status of Eelgrass (*Zostera marina*) Beds in Shetland

Surveys conducted in 2023–2025 have confirmed that eelgrass (*Z. marina*) is currently growing in two locations in Shetland: Whiteness Voe and Weisdale Voe. In Whiteness Voe, seagrass is relatively widespread and healthy. Fourteen distinct underwater beds have been identified, mostly in shallow water along the eastern shore. The largest bed lies in the middle of the voe, between two rocky skerries, and covers a large area over 7000 m². Altogether, *Z. marina* in Whiteness Voe covers around 1.62 hectares (16,184 m²). These beds show good plant density during the summer months, suggesting favourable growing conditions. In contrast, only a single small bed of seagrass was found in Weisdale Voe, where the species had not been recorded since 1980. This bed is sparser and less dense than those in Whiteness Voe.

Aerial drone surveys did not detect any large eelgrass beds in other areas, although small or sparse patches may have gone unnoticed—particularly in areas with poor water visibility, like the Loch of Hellister. Additional sites were visited based on local reports (such as North Collafirth and Saltness) and sightings of drifting eelgrass (in the Bay of Scousburgh and at St Ninian's), but no eelgrass beds were visible in aerial images from these areas. These results highlight that eelgrass beds have continued to decline in Shetland over the last 30 years, with remaining eelgrass beds in Whiteness Voe acting as a key stronghold for this important coastal habitat.





High Resolution (25cm) Vertical Aerial Imagery (2021) [JPG geospatial data], Scale 1:500, Tiles: hu3944,hu3945
Updated: 21 October 2020, Getmapping, Using: EDINA Aerial Digimap Service, <<https://digimap.edina.ac.uk>>,
Downloaded: 2024-08-06 11:09:03.629

Figure 2. Aerial image of Whiteness Voe with locations of surveyed *Z. marina* beds (labelled A to L).



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About this project summary

This project summary is part of a series presenting key results of marine science research being carried out at UHI Shetland. More information about the Restoring Shetland's Marlie Meadows project can be found by scanning the QR code or visiting the link below:
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