The importance of monitoring meadows

What do we know about seagrass in Scotland?

Scotland's coastline provides extensive potential habitat for seagrass due to its many sheltered sea lochs and Firths. Two species of seagrass, also known as eelgrass, can be found in the Forth. These are common eelgrass (Latin name: *Zostera marina*) and dwarf eelgrass (Latin name: *Zostera noltei*). Both types of seagrass used to thrive here, but in the 1930s seagrass wasting disease led to a major decline across many of these meadows. The health of seagrass meadows has continued to decline due to coastal development and declines in water quality. Approximately 58% of Scotland's seagrass has been lost since 1936 (Green et al. 2021).[1]

The extent of seagrass meadows in Scottish waters is still unknown. There is still more work to do to accurately map and monitor seagrass to protect this critical habitat.

Monitoring and mapping seagrass

Continuous mapping and monitoring of seagrass was the most important step in our restoration project to fully understand natural changes in seagrass extent over time. To gather information on the seagrass remaining in the Firth of Forth, we use two methods to monitor existing meadows:

1. **Spatial Extent Mapping** – This maps the shape and size of the meadow and tells us whether it is continuous or smaller patches. Over time, this informs whether a meadow is contracting or expanding.
2. **Fixed Transect Monitoring** – Assessing the quality of the meadow by monitoring changes to density and health of the seagrass along a transect.

These techniques provide a baseline assessment which informs restoration decisions across sites.

Environmental preferences of seagrass

Before selecting sites for restoration we considered historical, physical, biological and chemical factors. A historical investigation was undertaken to identify the locations where seagrass had been recorded, which revealed details of sightings across multiple sites along the Forth as far back as the 19th century. Learning where seagrass had been, and where it still exists, narrowed down our search for suitable

1. Green et al., (2021), 'Historical Analysis Exposes Catastrophic Seagrass Loss for the United Kingdom', *Frontiers in Plant Science*, 12:629962.

restoration sites. We chose sites with existing seagrass as the presence indicates that the environmental factors (sediment type, wave action, light availability) could sustain present-day seagrass populations.

We looked for sheltered environments with low wave energy. Sheltered environments will have less sediment churned up by wave action and therefore clearer water. Seagrass relies on clear water to access sunlight for photosynthesis. We deployed temperature and light loggers to assess light and temperature levels across the seasons and over multiple years.

At our selected sites, we noticed excess epiphytes growing on the seagrass. Epiphytes are algae or animals attached to seagrass blades which can give the blade a furry appearance and can be an indicator of too many nutrients in the water. Too much epiphyte growth can smother seagrass, stopping light from reaching its leaves and preventing it from growing.