Horseshoe Point Eelgrass Assessment Survey Report 2017

Quinn, E. S.

1.0 Introduction

1.1 Eelgrass in the Humber Estuary

Eelgrass is the common name for three species of plants within the genus *Zostera*: *Zostera noltii, Zostera angustifolia* and *Zostera marina*. These species, which grow in estuaries and shallow bays, are the only marine flowering plants in the UK and are considered scarce on both a national and international scale.

Eelgrass meadows are highly productive ecosystems that play a valuable role in marine biogeochemical cycling. They form nursery grounds and feeding habitats for juvenile fish species, contribute to nutrient cycling, stabilise sediments, reduce water current velocity and turbulence, serve as a food source for overwintering wildfowl and provide surfaces for attachment (Thayer *et al*., 1984).

Zostera spp. are capable of both sexual and asexual reproduction and are known to extend their beds through both clonal growth and flowering events and seed dispersal (Alexandre *et al*., 2006), although asexual propagules of *Z. noltii* are known to have a considerably higher dispersal potential than detached seeds. Broken fragments of *Z. noltii* are viable over extended periods (>50 days), can grow and produce shoots, and can carry and release seeds for long distances. On the other hand, detached seeds of *Z. noltii* have fast sinking rates and only support small-scale spatial dispersal (in the order of centimetres), which is generally insufficient to connect fragmented populations or colonize new areas (Berković *et al*., 2014). The balance between sexual and asexual reproduction varies significantly between eelgrass meadows, from populations that are entirely monoclonal to those that rely entirely on flowering and seed dispersal to reproduce (Alexandre *et al*., 2006).

Historically, the Humber Estuary supported large expanses of eelgrass meadows. Significant diebacks due to disease were, however, witnessed during the 1930's and 1940's. Only discrete and sparse patches of eelgrass can now be found in the region.

1.2 Eastern IFCA protection of eelgrass

The *Zostera* genus are known to be sensitive to physical disturbance caused by commercial fishing activity, including by bottom-towed fishing gear, hand work and digging for bait and other intertidal species. In September 2013, Eastern IFCA introduced the Protected Areas Byelaw in an effort to further the conservation objectives of Marine Protected Areas in its district. Within this byelaw are four regulatory notices. Regulatory Notice 4 prohibits fishing with bottom towed gear, any handwork fishing and fishing by crab tiling within a restricted area at Horseshoe Point on the south bank of the Humber (Figure 1), to protect the integrity of eelgrass beds in mudflats and sandflats not covered by seawater at low tide as a subfeature of the Humber Estuary Special Area of Conservation.

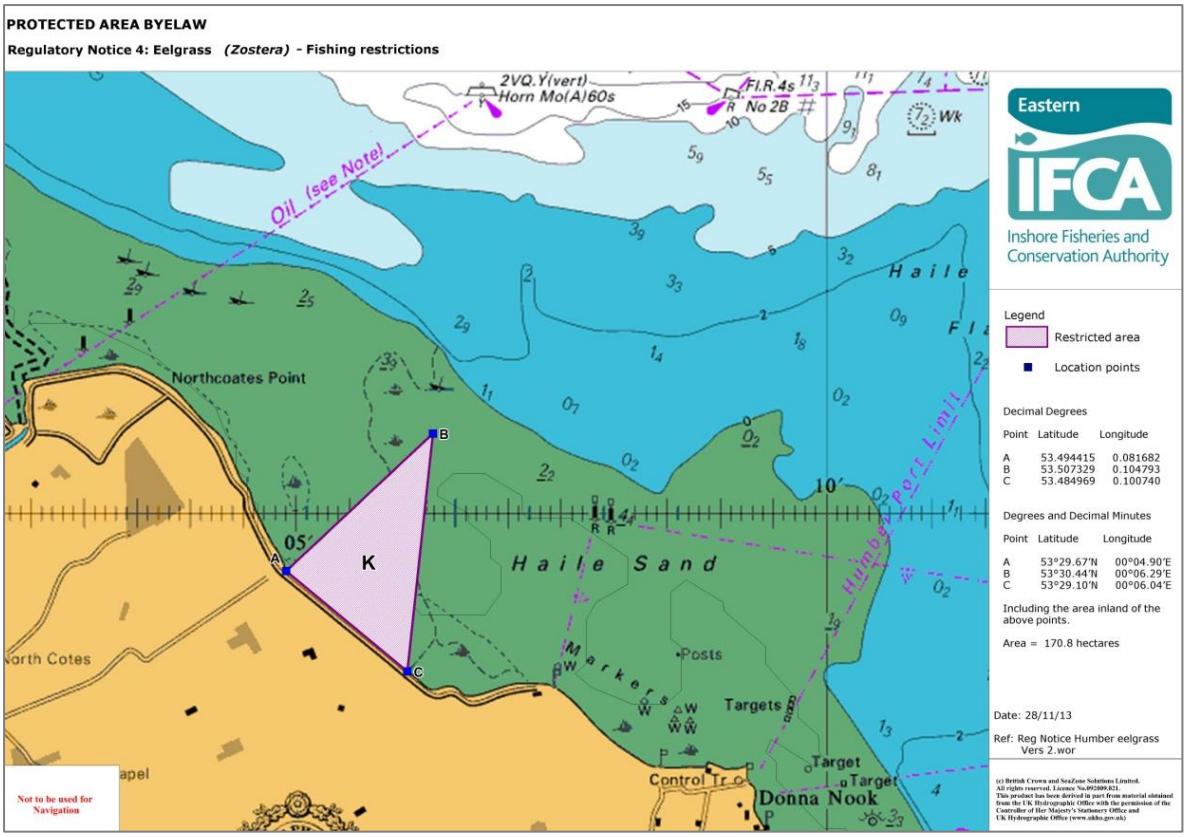

Figure 1. Location of the restricted area (K) at Horseshoe Point, currently closed to all fishing activity in order to protect *Zostera* spp. (eelgrass) beds in the Humber Estuary SAC.

1.3 Annual surveys at Horseshoe Point

Since the introduction of the Protected Areas Byelaw, Eastern IFCA officers have conducted annual foot surveys to assess the extent of *Z. noltii* meadows within the restricted area at Horseshoe Point. The intention of these annual surveys is to form a solid evidence basis for the review of Regulatory Notice 4 of the Protected Areas Byelaw.

While a small patch of *Z. noltii* was found at Horseshoe Point in the summers of 2013, 2014 and 2015, the most recent survey in July 2016 found no evidence of *Z. noltii* within the 78-ha surveyed within the restricted area. The aims of the 2017 survey were 1) to continue to gather evidence for the review of Regulatory Notice 4, and 2) to investigate whether the eelgrass that was lost in 2016 had re-established and if it had, to describe the extent of the feature.

2.0 Methods

The survey was conducted on foot over the low water period of July 25, 2017 (LW 14:47). This date is consistent with previous annual surveys conducted by Eastern IFCA, that have taken place once a year between the end of July and the beginning of August.

The method used for this survey was also consistent with previous surveys. Locations of eelgrass noted in previous surveys were used to establish the survey area (Figure 2). Within the survey area, short walking transects were conducted adjacent to the shore with five Eastern IFCA officers walking at a set distance apart, searching for eelgrass as they walked. The area within the outermost transect points covered 10.78 ha of the restricted area, however areas to either side of these were also surveyed as this was a line of sight survey and officers were looking both into and out of the survey area mapped as they walked (Figure 2). The estimated area covered by the survey is therefore rounded up to 11 ha.

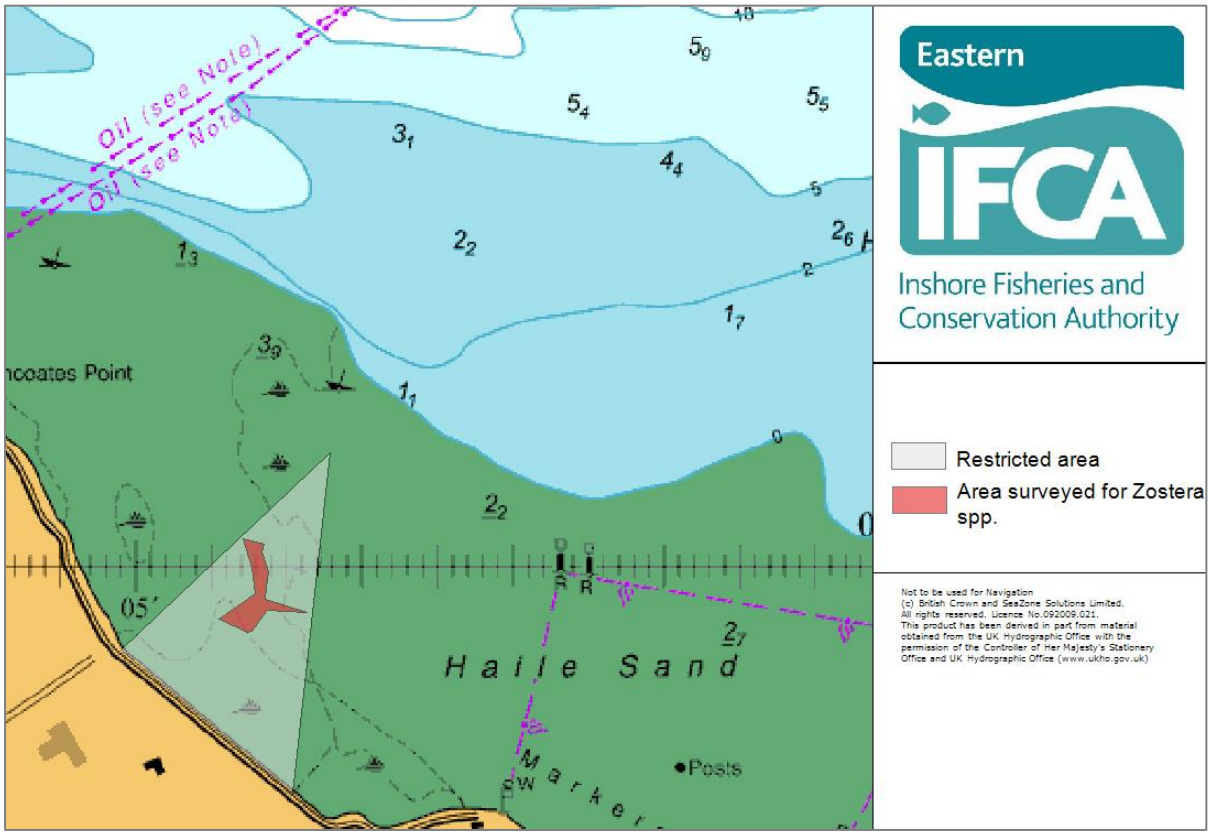

Figure 2. Area surveyed by foot (red) within the area restricted to fishing under Regulatory Notice 4 of the Protected Areas Byelaw (grey).

3.0 Results

Out of the ~11 ha of the intertidal surveyed, just one small patch of eelgrass was found in the same location, approximately 1 km north-east of Horseshoe Point car park as it was originally identified in 2013 (53.496833, 0.095300) (Figure 3; Figure 4). The feature was found submerged in a shallow, wide run that contained slow moving water. No other eelgrass was found during the survey. The patch was approximately 1m long and 40cm wide (0.00004 ha). However, within this the plant was found in small clumps. Assuming this patch of eelgrass is the only one within the 170.8-ha restricted area, the extent of the feature is calculated at <0.0001% of the current area restricted to fishing activity.

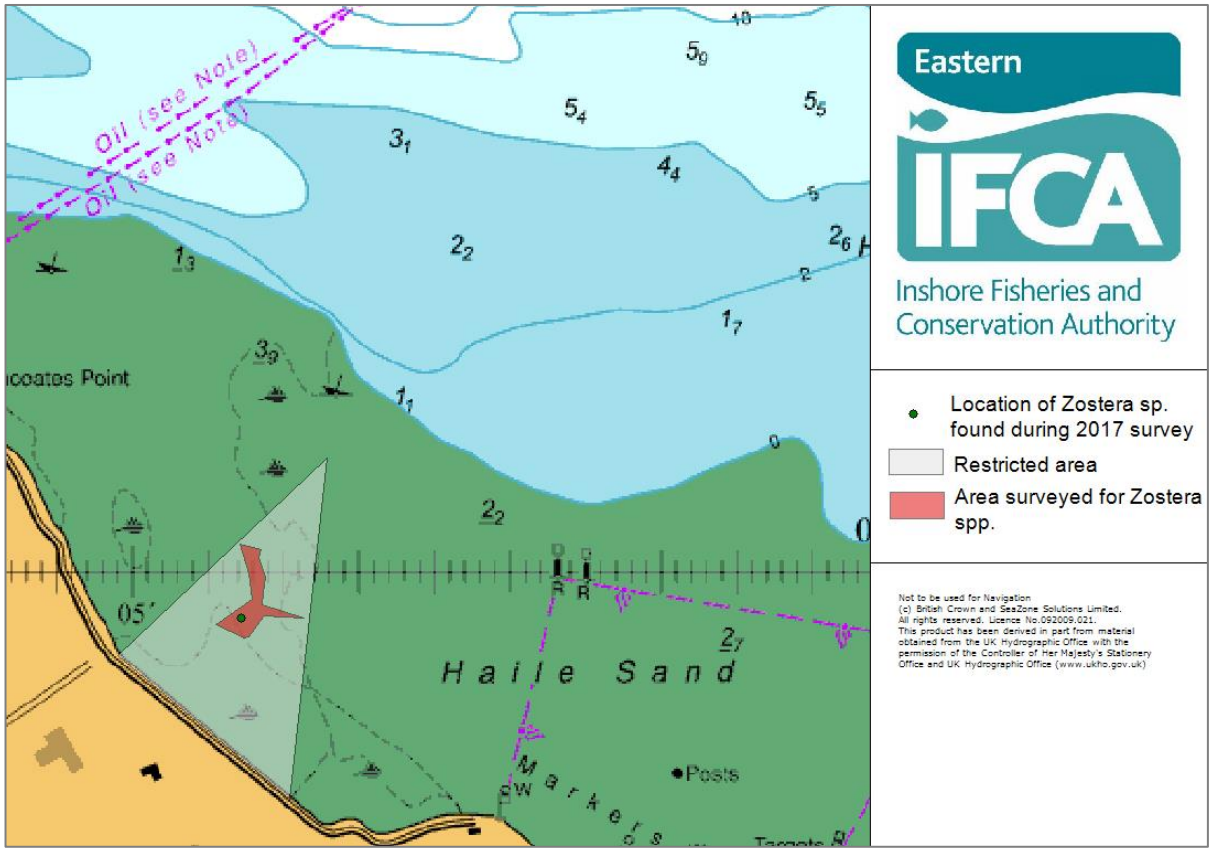

Figure 3. Location of patch of *Zostera* sp. (dark green) within the area surveyed by foot on July 25, 2017 (red), and within the area restricted to fishing activity under Regulatory Notice 4 of the Protected Areas Byelaw (grey).

Figure 4. Photograph of the extent of the patch of *Zostera* sp. found at Horseshoe Point (53.496833, 0.095300) during an annual foot survey on July 25, 2017.

4.0 Discussion and considerations for management

Under the Protected Areas Byelaw, no increase in the area covered by the feature has been seen. The ability of the feature to grow in the same location year-on-year has been maintained under the Byelaw, suggesting that it has protected the subfeature in the portion of the restricted area that the feature has been found, but that it has not necessarily stimulated the spread of eelgrass.

There remain concerns that the closed area extends much further up the intertidal than *Z. noltii* is likely to grow, extending well into the saltmarsh covered area (Eastern IFCA, 2016). Plants growing in this area are unlikely to be submerged on every tide, suggesting that *Z. noltii* is highly unlikely to be found there. Furthermore, the return of the species each year to specific locations suggest that these are the most suitable habitat in the area for the species, if not the only suitable habitats. It may be worth considering these concerns in any future changes to management by decreasing the landward extent of the restricted area.

The review should also consider the proportion of the bed known to support eelgrass, which has remained at <1% from 2013 to 2017, and the likelihood of the population expanding its range within the restricted area in the future. Horseshoe Point supports three productive cockle beds (Horseshoe Point Bed, Grainsthorpe Haven West Bed and Grainsthorpe Haven East Bed) that have in some recent years had the potential to support fisheries (Eastern IFCA, 2017). If the restricted area were to be reduced or removed, the likelihood that these beds could support a fishery in the near future would significantly increase – although access to the beds could remain an obstacle to commercial fishing (Eastern IFCA, 2017). The review of Regulatory Notice 4 should consider both the appropriateness and effectiveness off current restrictions and the need for continued restrictions in the area in the future under the Marine Protected Areas Byelaw 2016[1].

[1]Please note as of October 2017, the Marine Protected Areas Byelaw 2016 is not yet in force. It is currently being considered by Defra. This byelaw was introduced to replace the Protected Areas Byelaw. For more information please visit: http://www.eastern-ifca.gov.uk/marine-protected-areas-byelaw-2016-2/

5.0 References

Alexandre, A., Cabaço, S., Santos, R. and Serrao, E.A., 2006. Timing and success of reproductive stages in the seagrass Zostera noltii. *Aquatic Botany*, *85*(3), 219-223.

Berković, B., Cabaco, S., Barrio, J.M., Santos, R., Serrão, E.A. and Alberto, F., 2014. Extending the life history of a clonal aquatic plant: dispersal potential of sexual and asexual propagules of Zostera noltii. *Aquatic Botany*, *113*, 123-129.

Eastern IFCA, 2016. Horseshoe Point Eelgrass Assessment – Survey Report 2016. Available online at www.eastern-ifca.gov.uk

Eastern IFCA, 2017. Horseshoe Point Cockle Stock Assessment – Research Report 2017. Available online at www.eastern-ifca.gov.uk

Thayer, G.W., Kenworthy, W.J. and Fonseca, M.S., 1984. *Ecology of Eelgrass Meadows of the Atlantic Coast: a community profile* (No. FWS/OBS-84/02). National Marine Fisheries Service, Beaufort, NC (USA). Beaufort Laboratory; Virginia University, Charlottesville (USA). Department of Environmental Sciences.