

Annex 1.1

Mussel Inspections since August 4th 2026

Low Bottom Dutch Wand Mussel Survey 01-09-26

Officers present: GG, LL

Low water: 09:01 1.4m (Liverpool Tides)

Survey method: Dutch Wand

Line transects were completed across the mussel bed using a Dutch Wand. Transects start and finish at the edge of the bed as shown in Figure 2 (transect one was extended due to mussel being present past the original transect end). The number of hits and misses of live mussel were recorded to give percentage cover. The bed area was calculated from the start and end of transects and from observations of officers whilst surveying. It was not possible to walk the perimeter of the bed due to time and tide restraints.

A mussel sample was taken every 25 hits using a 10 cm diameter corer. 6 transects were completed and 24 samples collected. The total weight of live undersize and size mussel was recorded as well as the weight for each size category and size frequency of each sample.

From the transect and sample data the total mussel bed surveyed was **36 hectares**.

Note, not all size mussel is fishable due to the presence of fouling species on slower growing individuals or the mixing of undersize and size in proximity that prevents the removal of sizeable mussel without removing undersize. Some size mussel on this bed were fouled with barnacle.

Biomass

1409 tonnes size mussel and **227 tonnes undersize mussel**.

Length Frequencies

The total length frequency for the surveyed bed is provided in Figure 3. From the length frequency data mussel present on low bottom is a mix of size and undersize mussel ranging from 7mm to 71mm with the majority of mussel between 40mm to 65mm. There is a relatively low number of mussels in the intermediate size range, potentially reflecting variable recruitment or survival from previous years.

Maps

The proportion by weight of each size class of mussels per sample has been mapped in figure 4 with the size of pie representing mussel weight standardised to kg/m². The weight of the size and undersize mussel has been mapped and represented in figure 5.

It can be seen in figure 4 and figure 5 that size mussel >45mm mussel is found across the entire survey area. A small amount of undersize mussel is present across the bed area.

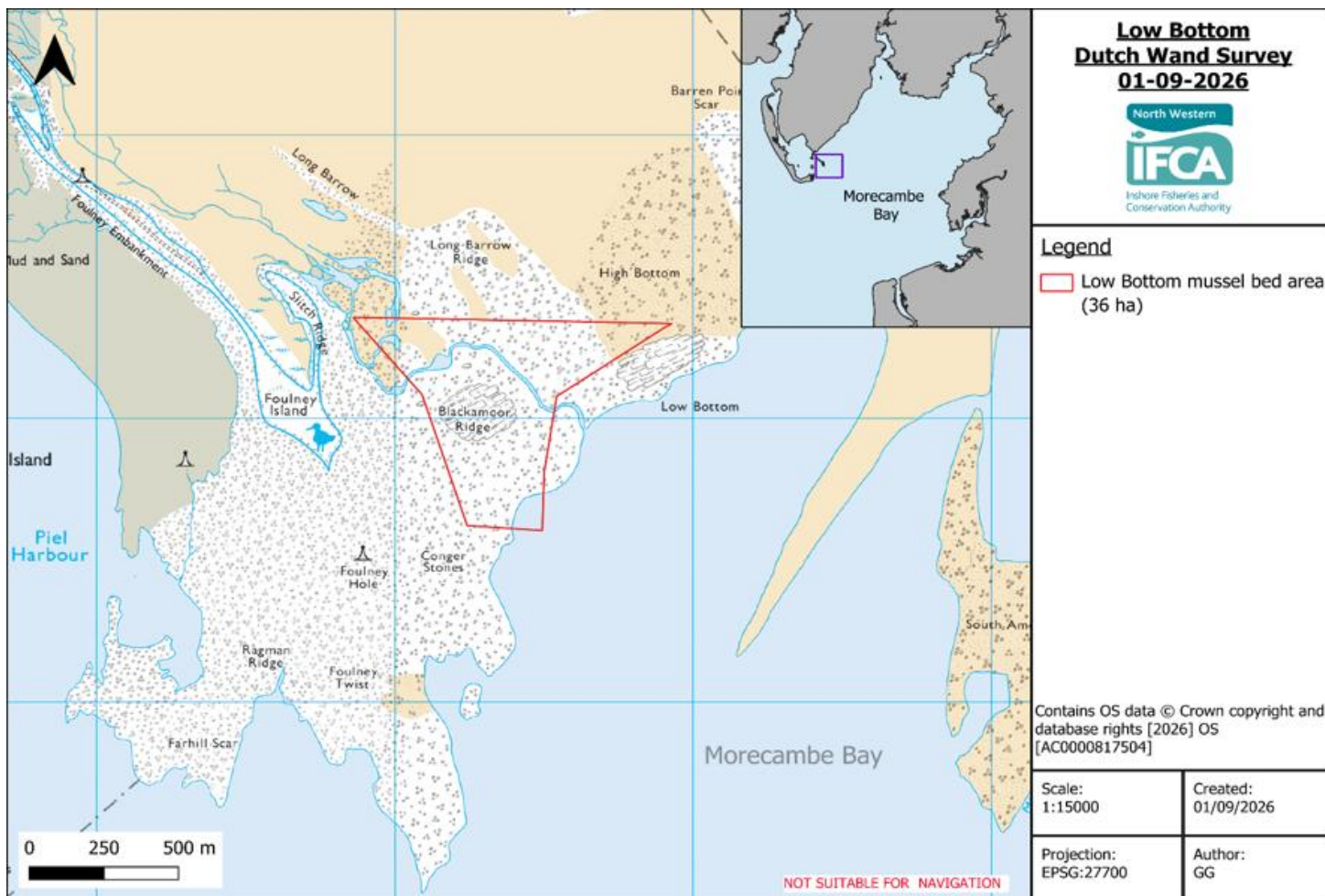


Figure 1: Location of Low Bottom Mussel Bed surveyed.

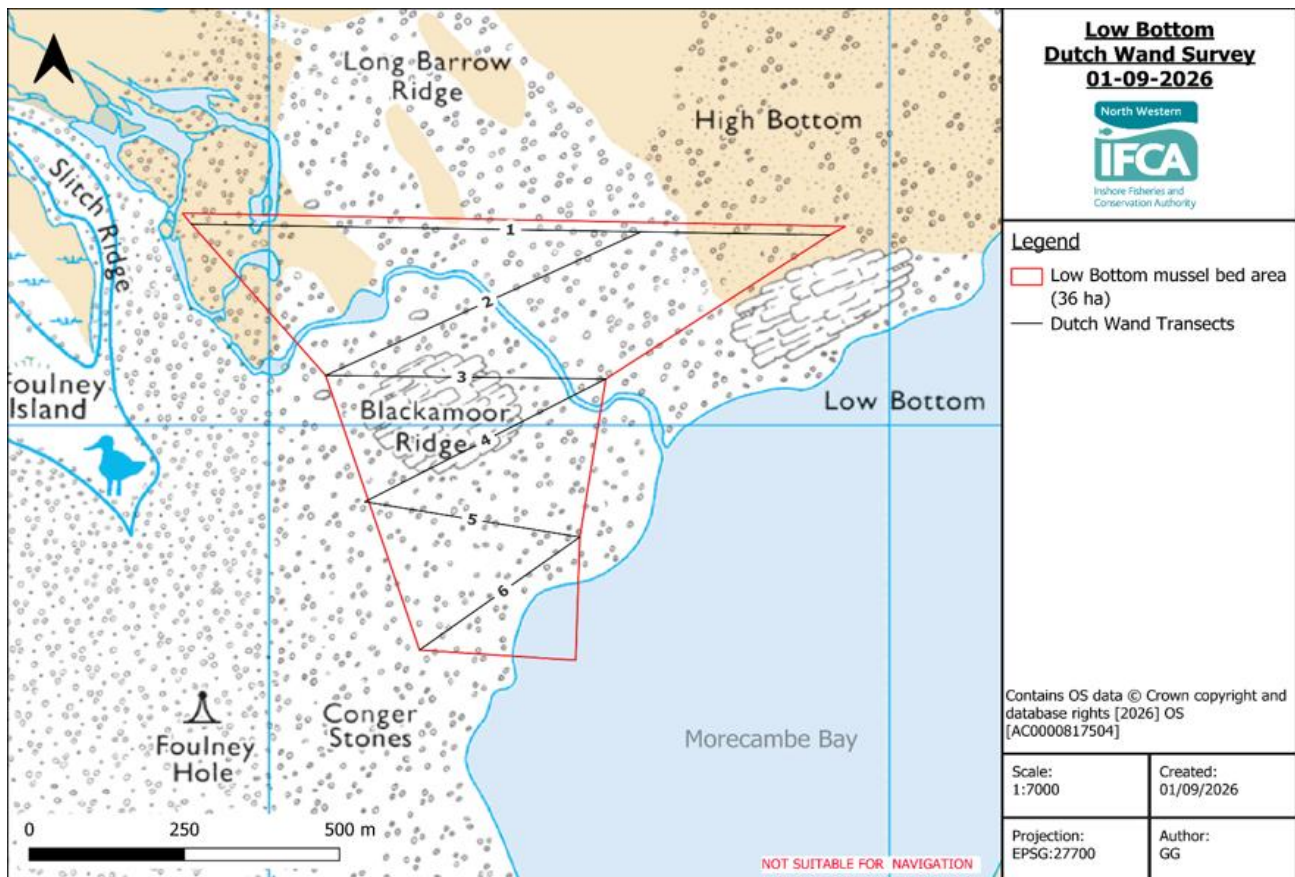


Figure 2: Low Bottom Dutch Wand survey transects and estimated bed area.

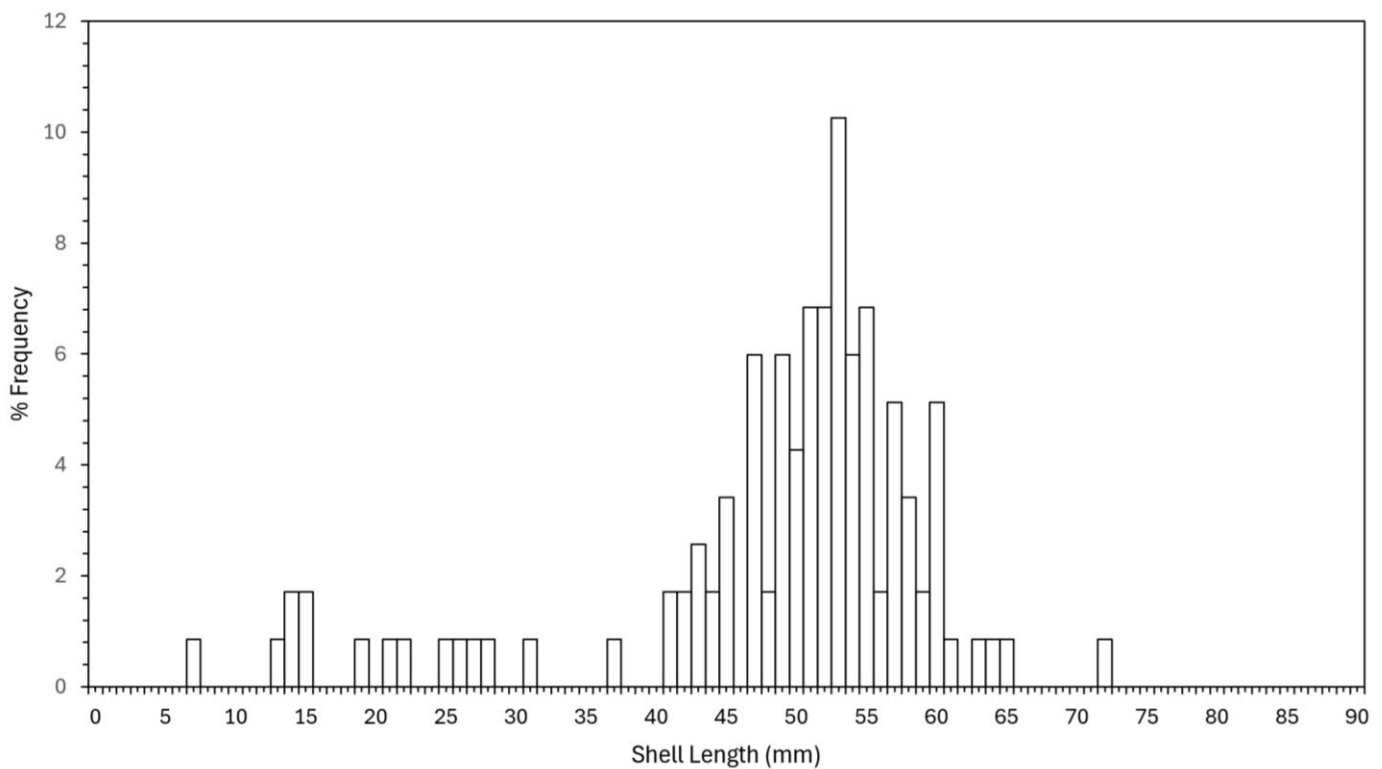


Figure 3: Histogram showing size frequency of mussels from all samples on Low Bottom.

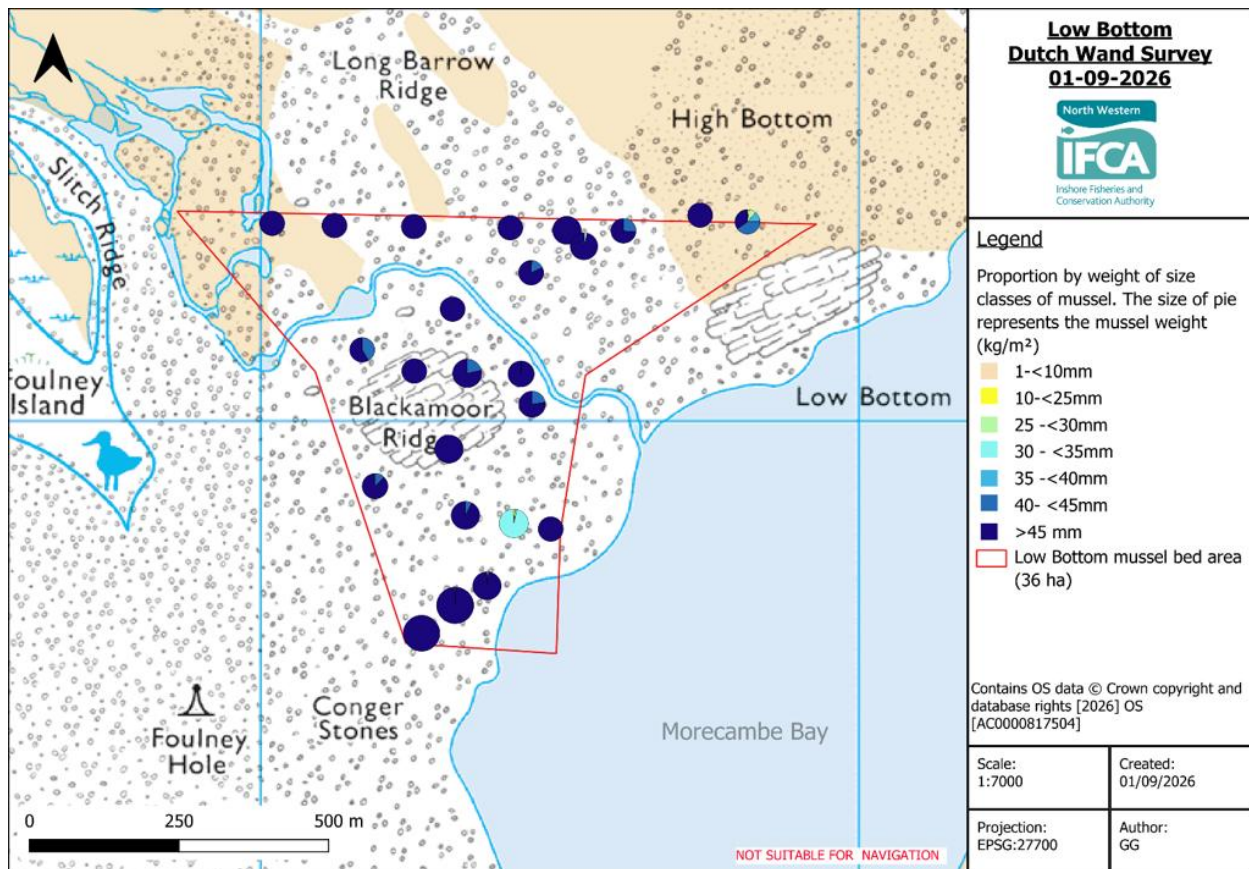


Figure 4: Proportion by weight of size classes of mussel.

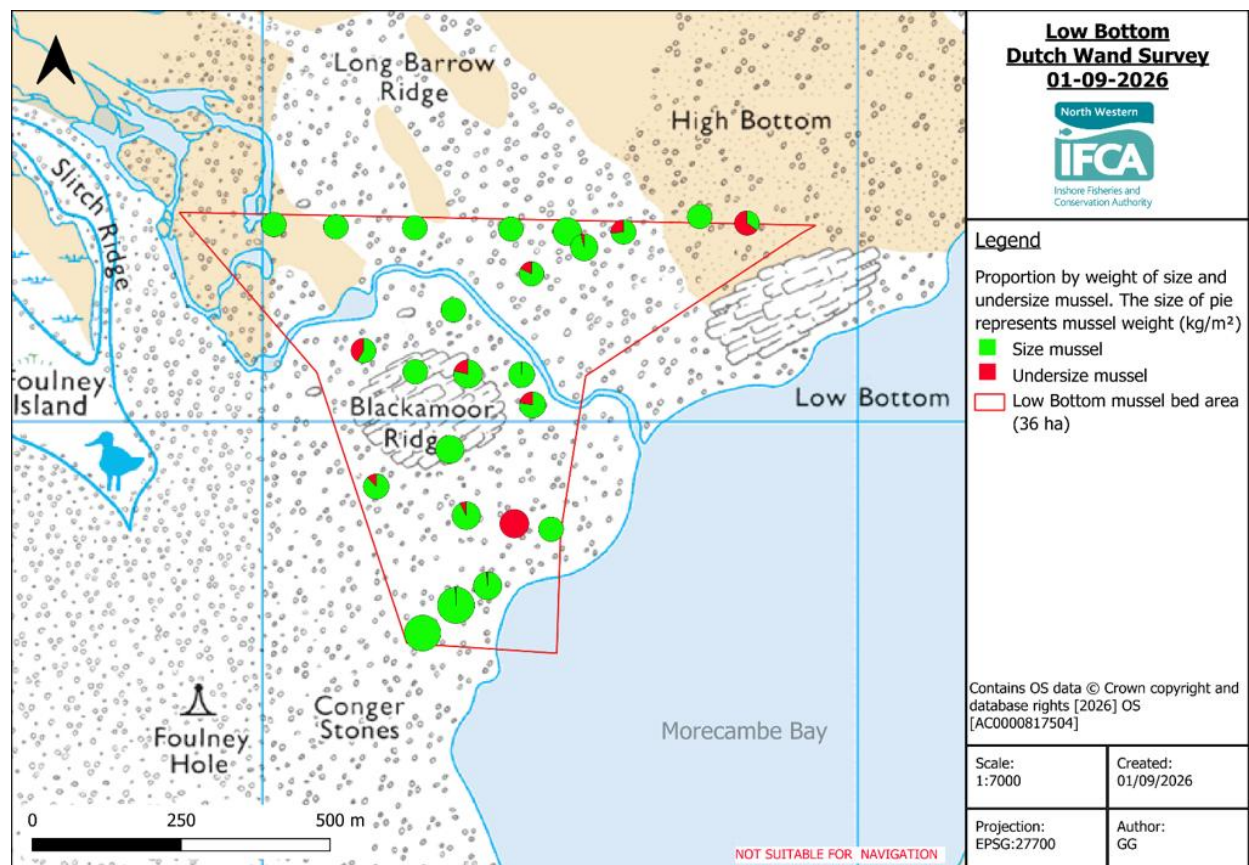


Figure 5: Proportion by weight of size

Heysham Flat Mussel Inspection 02-09-2026

Officers present: GG, RL

Tides: LW 09:33 1.7m (Liverpool tides)

Officers inspected the mussel on Heysham Flat to assess mussel growth over the summer period. Access to the outer skears was not possible across Dallam Dyke due to the depth of water and timings. Officer tracks are mapped in Figure 1.

Live *Sabellaria alveolata* reef was present across part of the skear, beginning at Figure 3 and extending to Figure 5 near Conger rock. In places the reef was dead and colonised by 20-25mm mussel (Figure 4). Mussel coverage across the bed was patchy, with an overall coverage of 30-40%; some areas held less than 10% coverage whilst others exceeded 60%. At the start of the inspection the mussel was of mixed size between 15-30mm (Figure 2). Moving across the bed the mussel became smaller and looser, with 15-20mm mussel sitting loose on soft mussel mud and coverage of approximately 30% (Figure 3). Much of the mussel across the bed was loose and could be picked up in handfuls (Figure 5). Further along, live mussel of 40mm was found mixed in with dead shell (Figure 6), and beyond this the mussel 30-40mm, again sitting loose on mud. Large areas of scour were present (Figure 7) with low mussel coverage recorded in these areas (Figure 8).

Numerous bird species were present feeding in the area including oystercatchers and gulls.

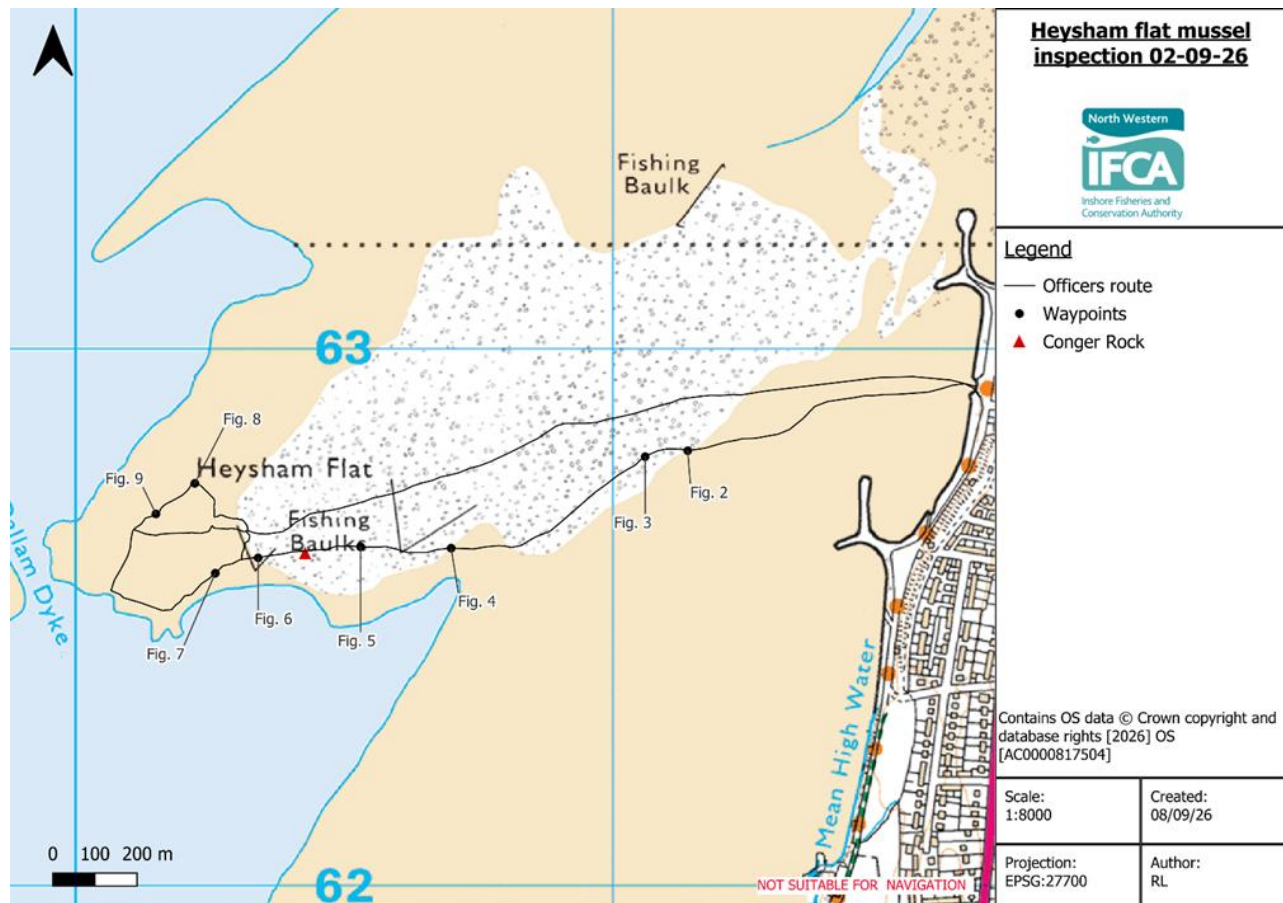


Figure 1: Officer route and the location of waypoints 02-09-26

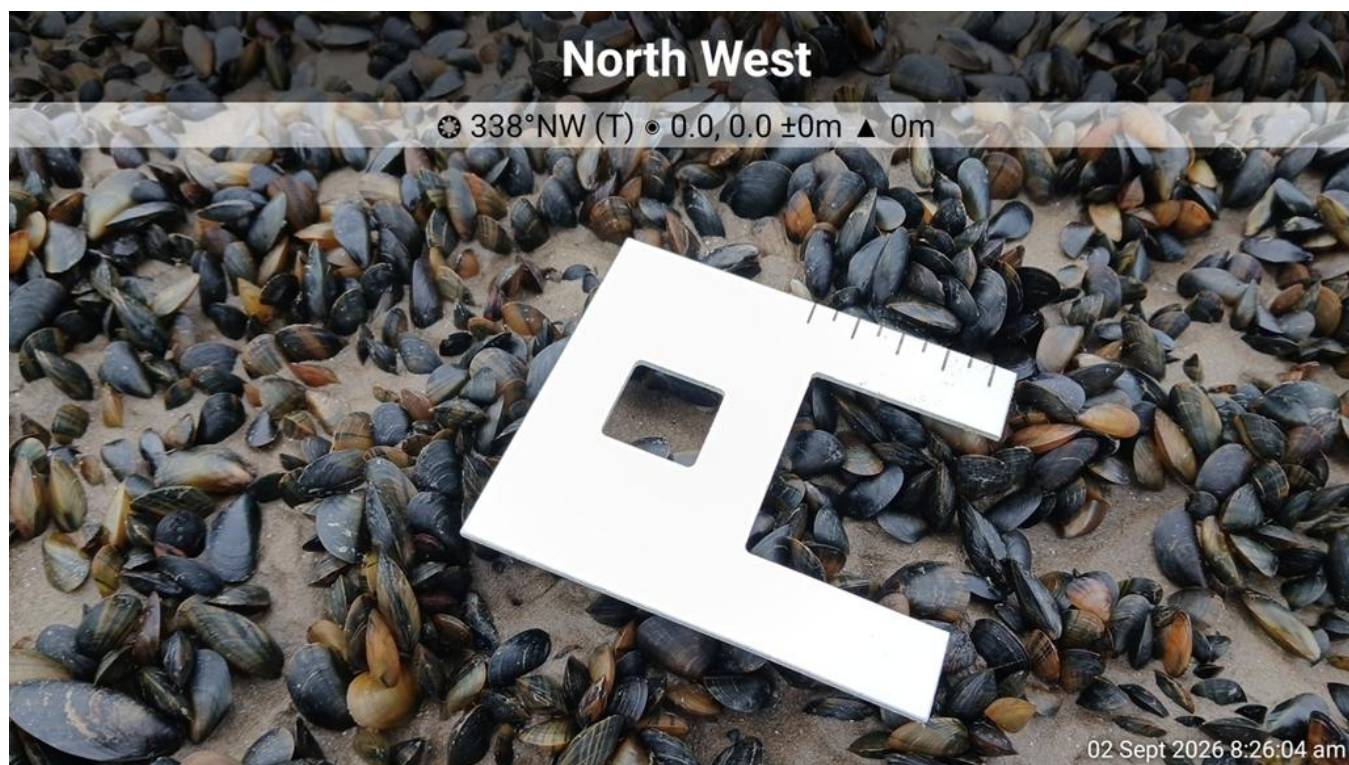


Figure 2: 15mm - 30mm mixed size mussel at the start of the bed area



Figure 3: Loose mussel on soft mussel mud approx 30% coverage

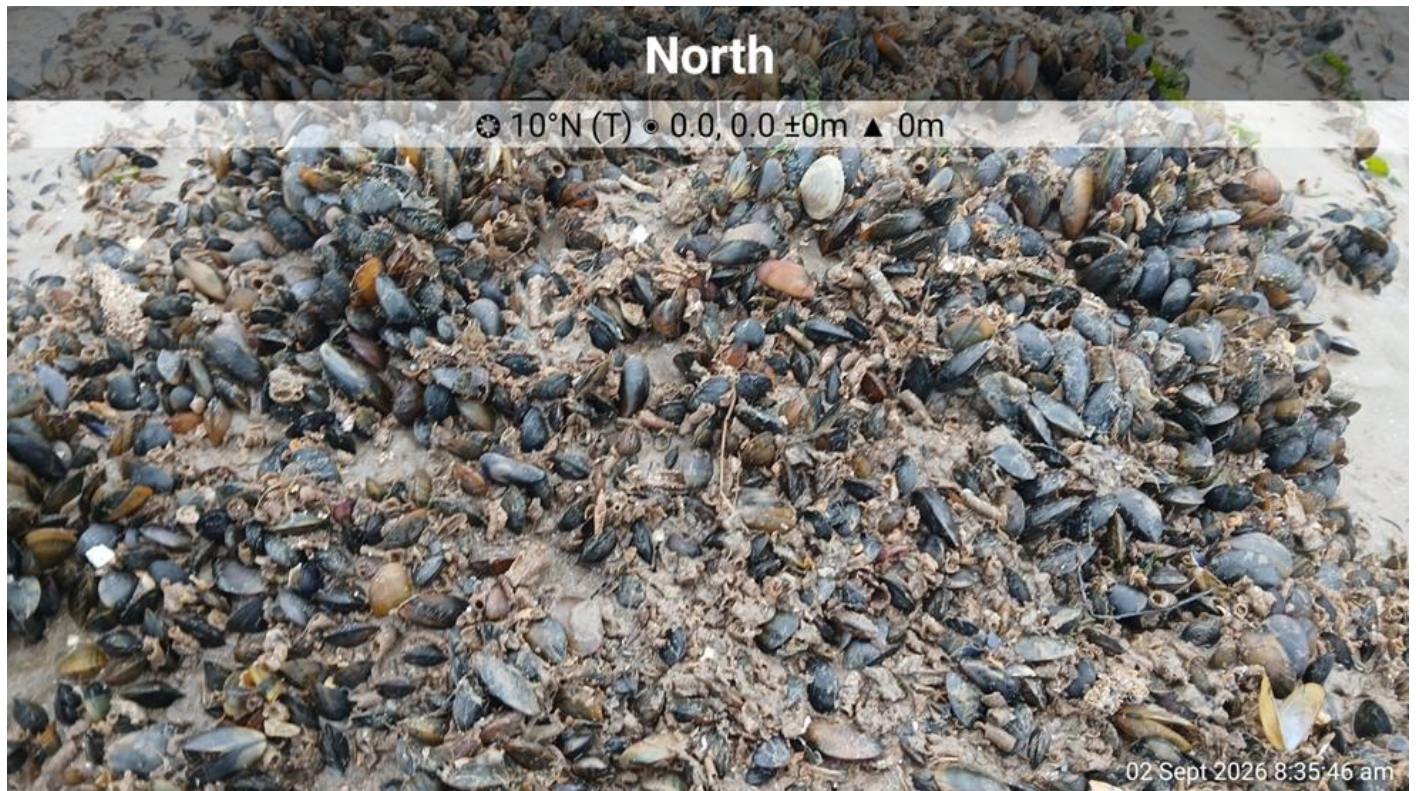


Figure 4: Mixed undersize mussel 20-25mm on dead sabellaria

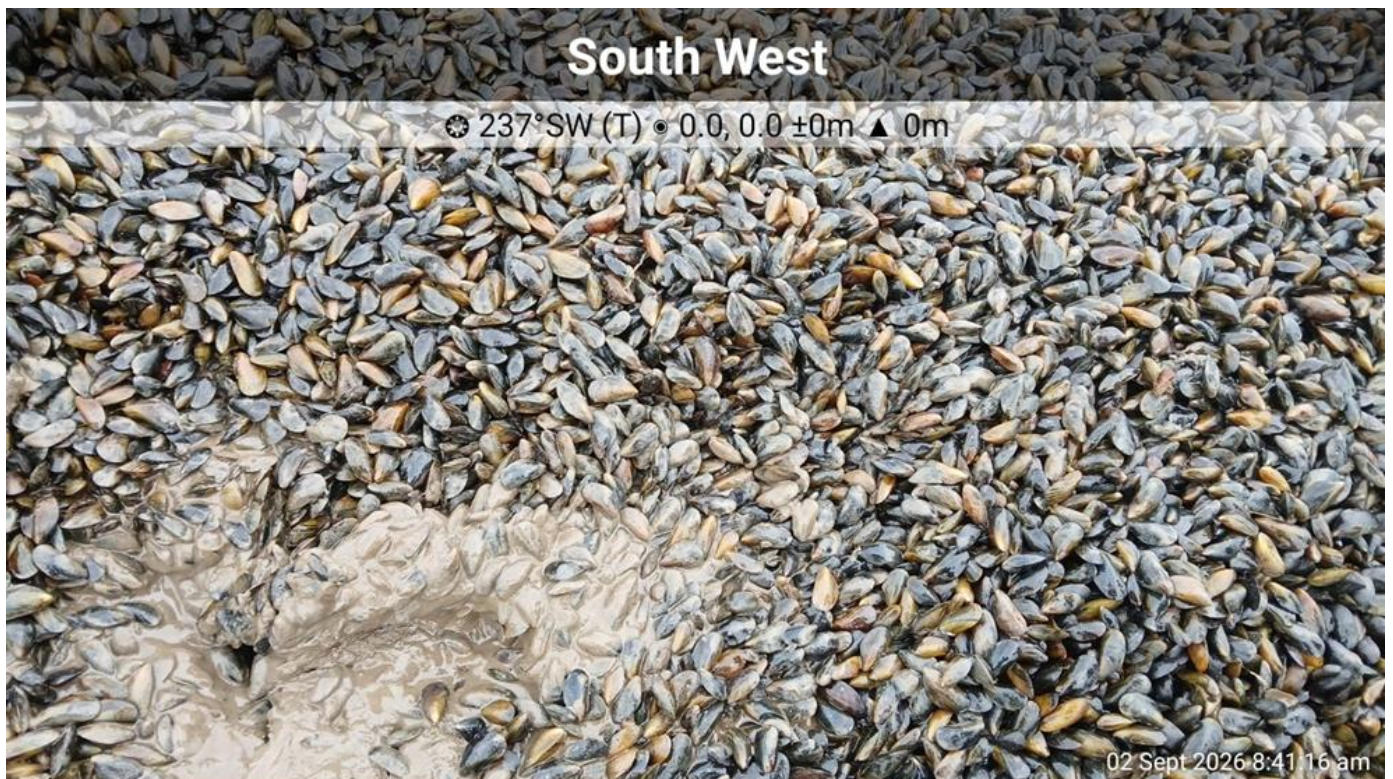


Figure 5: Loose undersize mussel in small dense patches

South

☉ 197°S (T) ● 54.055697°, -2.914036° ±9m ▲ 66m



02 Sept 2026 8:51:10 am

Figure 7: Large areas of scour present at the Northern edge of the bed, low mussel coverage

North East

☉ 65°NE (T) ● 54.055874°, -2.913572° ±8m ▲ 62m



02 Sept 2026 8:49:09 am

Figure 6: 30-40mm mussel, loose on soft mud banks



Figure 8: 40% coverage of undersize mussel and some scouring present



Figure 9: Mixed undersize mussel and dead shell on sand, towards the edge of the bed

Perch Scar and Black Scar Mussel Inspection 02-09-2026

Officers: AP, LL

LW: 09:33 1.7m (Liverpool Tides)

Black Scar

The area of Black Scar was approximately 3.6ha. There were some areas of thin mud with dead shell persisting from previous inspections (figure 2) and large areas of cobble and algae particularly along the channel edge on the east (figures 2 and 3). Mussel measuring 10-20mm was present in small patches on a thin veneer of sand (Figure 4). Coverage was very low around the edges of the bed (~10% coverage); a denser area was mapped which had an area of 1.5ha and coverage of approximately 50% (figure 5).

Perch Scar

The area of Perch Scar was approximately 1.2ha. Significant amounts of mussel mud had persisted since previous inspections (figure 6) and only two small areas of mussel were present. Along the west of the bed mussel measuring 20-25mm with a coverage of approximately 50% was present on sand with very thin layer of mud surrounding it (figure 7). At the northern most part of the bed there was a very small patch of mussel measuring 25-30mm.

Gulls were present and feeding on the beds during the inspection.

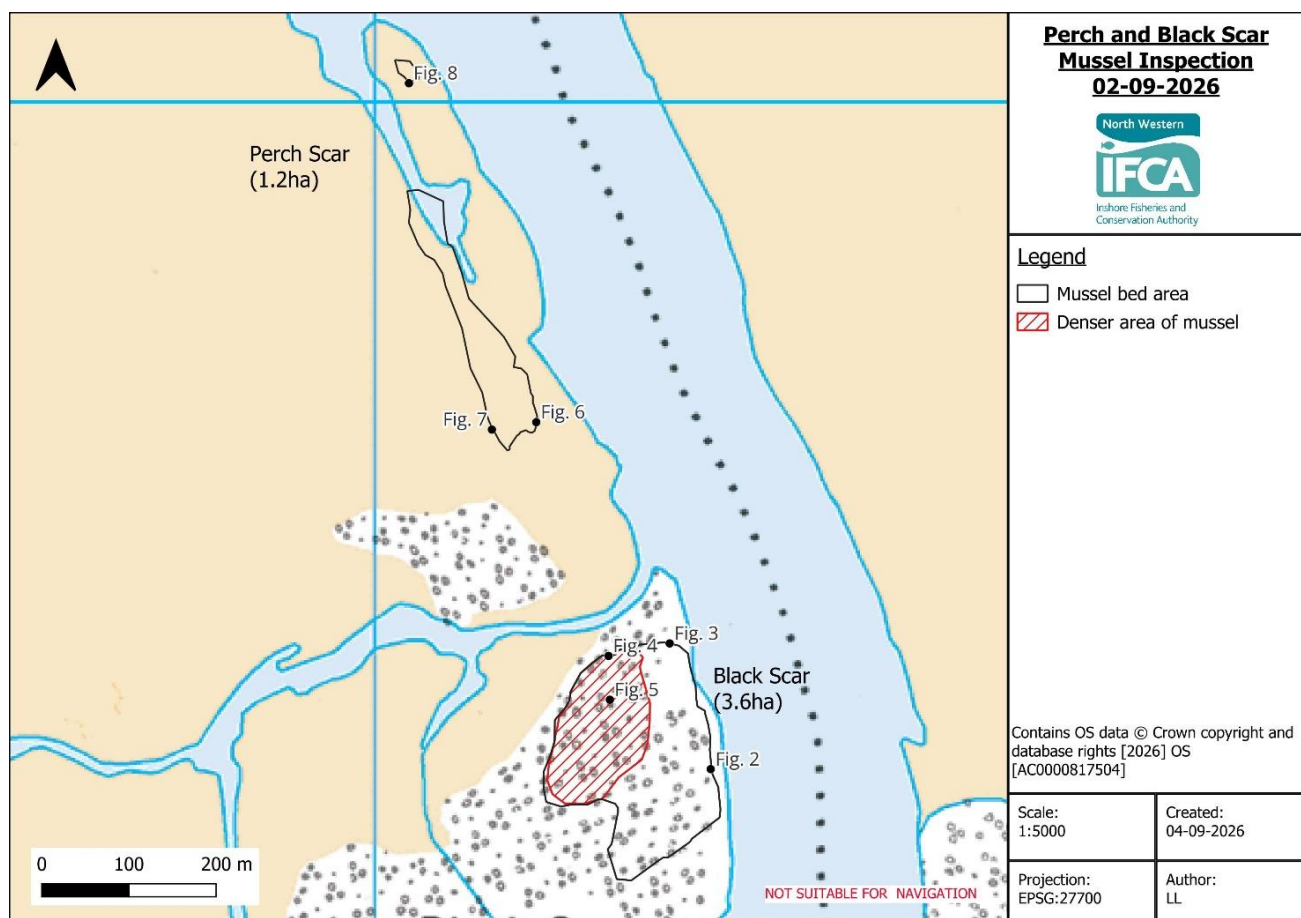


Figure 1. Map of Perch and Black Scar with figure locations September 2026.



Figure 2. Thin mussel mud and cobble along channel edge on Black Scar.



Figure 3. Large areas of algae on Black Scar



Figure 4. Small patches of 10-20mm mussel on a thin veneer of sand on Black Scar.



Figure 5. Denser area of mussel on Black Scar.



Figure 6. Persisting mussel mud and evidence of scour on Perch Scar



Figure 7. Mussel in sand with bare mud and cobble on Perch Scar.

North

☀ 5°N (T) ● 53.941964° N, 3.02156° W ±9m ▲ 64m



Figure 8. Small area 25-30mm mussel at the northern end of Perch Scar

North Bare Ayre Mussel Inspection 11-09-2026

Officers present: GG, RL, AP, JH

Tides: LW 06:45 0.8m (Liverpool tides)

Officers inspected the mussel on North Bare Ayre in Morecambe Bay to get an understanding of the state and extent of the mussel bed. This bed has not previously been inspected.

The mussel bed is present across a short channel which dries at low water. Along the shoreward side of the entry route, there is a large strip of Sabellaria that runs approximately 800m (Image 1). There is a large area of mussel approximately 9.6 hectares in size. Live mussel was present across the site, at around 60% coverage. Mussel was predominantly size but with some mix of undersize.

A large portion of the shoreward side of the bed had a high proportion of Sabellaria mixed in with the mussel (Image 2,3 and 5). In the northern part of the bed, mussel was predominantly size, and of 70 -80% coverage. There was no Sabellaria identified by officers on this portion of the bed (Image 4). Mud was relatively deep, and there was minimal cobble exposure. Mussel had become loose in areas.

The main landward entry point has large Sabellaria present, making it difficult to access the bed from the shore without interacting with Sabellaria (Image 6).

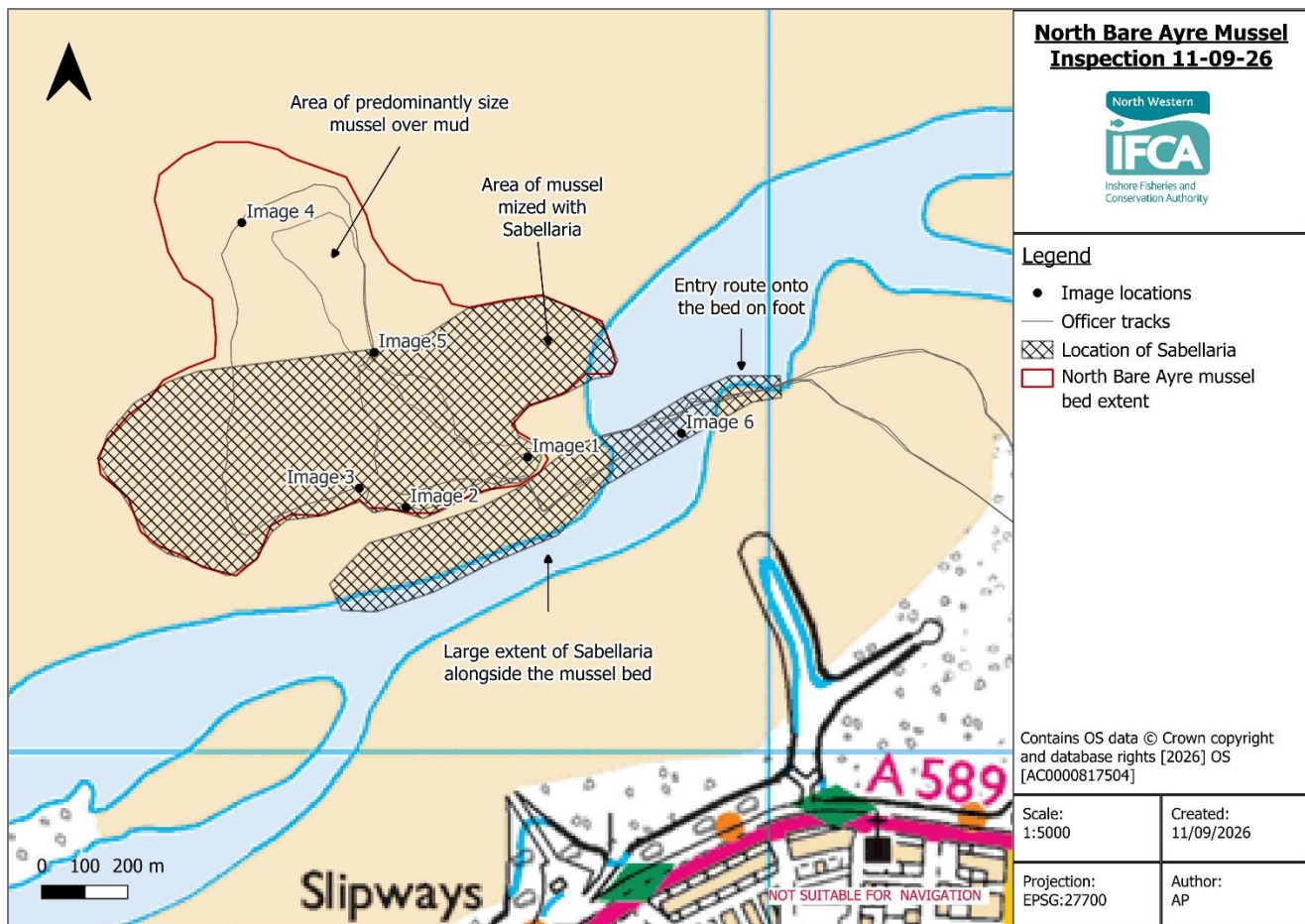


Figure 1. The location and extent of North Bare Ayre mussel bed 11-09-2026



Image 1. Large exposed area of Sabellaria along the edge of the mussel bed.



Image 2. Example of mixed Sabellaria and mussel along the edge of the main mussel bed.



Image 3. Sabellaria mixed with mussel on the southern part of the mussel bed.

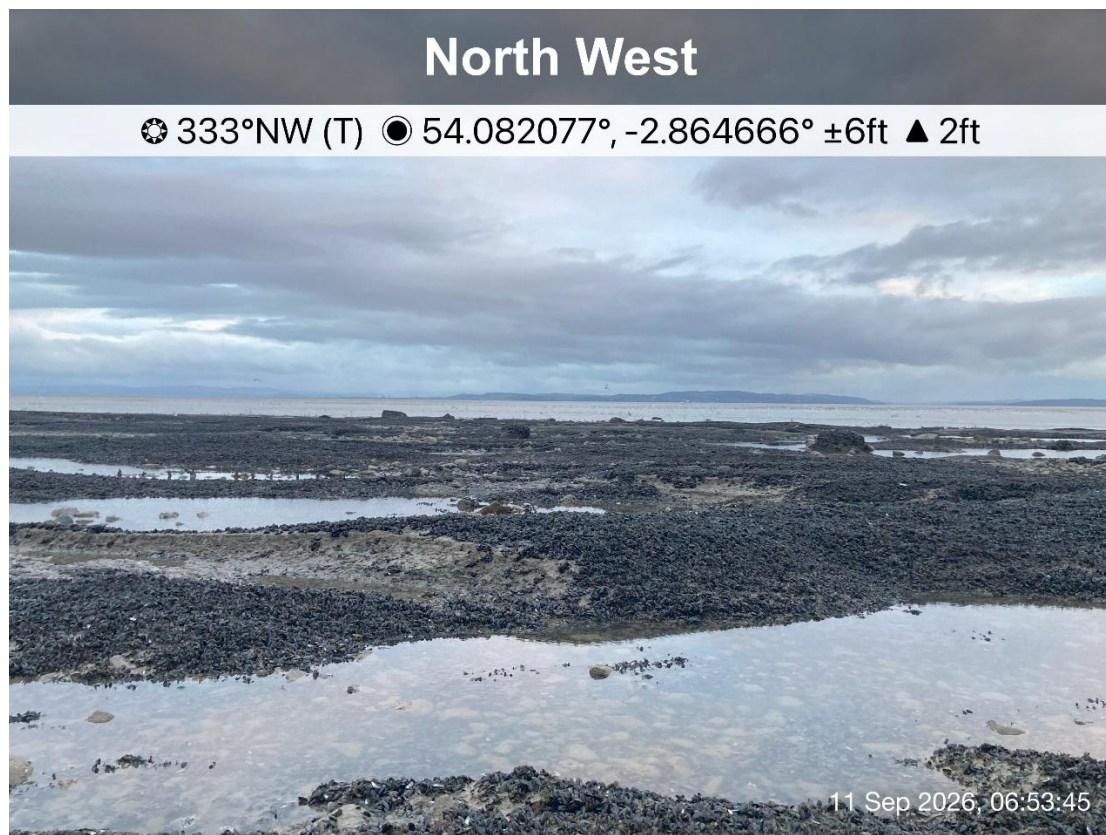


Image 4. High coverage of mussel, over mud, with no Sabellaria present in the northern part of the bed.

East

☀ 99°E (T) ● 54.081046°, -2.862836° ±52ft ▲ 4ft



Image 5. Mix of sabellaria and mussel on the main part of the mussel bed.

East

☀ 72°E (T) ● 54.080427°, -2.858620° ±124ft ▲ 4ft



Image 6. Large area of Sabellaria on the entry route to the mussel bed from the shore.