South America Mussel Inspection (Quad) 01-09-23

LW: 07:32 0.5m (Liverpool tides)

An inspection of South America was completed to assess the condition of the mussel on the bed since the last inspection completed on the 4th August.

Although tide and conditions were good, access remains limited to a short period over low water due to the depth and size of the channel needing to be crossed. However, officers did manage to access a significant portion of the bed and obtain evidence of the condition and extent of the mussel present included an area to the North which due to tide restraints has not previously been mapped.

Figure 1 shows officer tracks (grey), the estimated area of mussel (blue) and the geolocations of the photographic evidence provided below.

The mussel bed can be split into three areas, the main bed which has been present for the last few years and requires crossing a large channel (Figures 2 to 22). The area of newly exposed stony substrate which received a 2023 settlement (Figures 23 to 31) and a strip of patchy mussel to the North of the bed which has not been previously mapped and was colonised by *Sabellaria alveolala,* reported on in April (Figure 32 to 34).

Crossing over the channel, mussel in the channel was present in patches and on thick mud. On the main extent of the bed, the spread of mussel was patchy, with areas of exposed cobble and mussel on sand (Figure 2,3,4,5,6,7,8 and 9). In the northern, central part of the upper bed, mussel was still patchy but there was softer mud, some loose mussel, large areas of exposed cobble and a mix of mussel sizes with coverage around 50% (Figure 10,11,12).

On the seaward side of the northern part of the bed, the mussel was around 25mm+ in higher densities and on thicker mud, but still patchy (Figure 13). This area gradually changed into a mix of shell and mussel on a thin layer of mud over cobble.

Further south, the bed had high levels of exposed cobble, with thin mud veneer and mussel (Figure 14 and 15) changing to mussel on exposed cobble with no mud beneath. Beyond the centre of the bed on the seaward side, there is a small area of uniform mussel on thin mud (16 and 17), this thin band of mussel runs along the seaward edge towards the bottom, however, along the landward side, there is a significant area of cobble where previous mussel has been scoured off (Figure 18).

Along the southern part of the channel edge there was areas of thicker mussel on mud that was showing signs of becoming loose and with little exposure of cobble (Figure 19,20 and 21). This area ran into the channel (Figure 22) where there was patches of mussel (25mm) and mud.

There has been a reduction in the density of mussel in the newly exposed and settled 2023 area to the West of the main bed. The area is a mix of bare stony substrate, mussel on a thin veneer of mud and/or sand and mussel on a thicker layer of mud (Figures 23 to 31). The mussel in approximately 20-25mm in length (Figure 24).

The strip of mussel North of the previously mapped area is less dense than the rest of the mussel with a sandy substrate and less exposed hard substrate (Figure 32). The mussel is approximately 25mm in length (Figure 33). Some mussel has settled on Sabellaria alveolata which was previously observed in April of 2023. The mussel becomes less dense as you move further North (Figure 34).

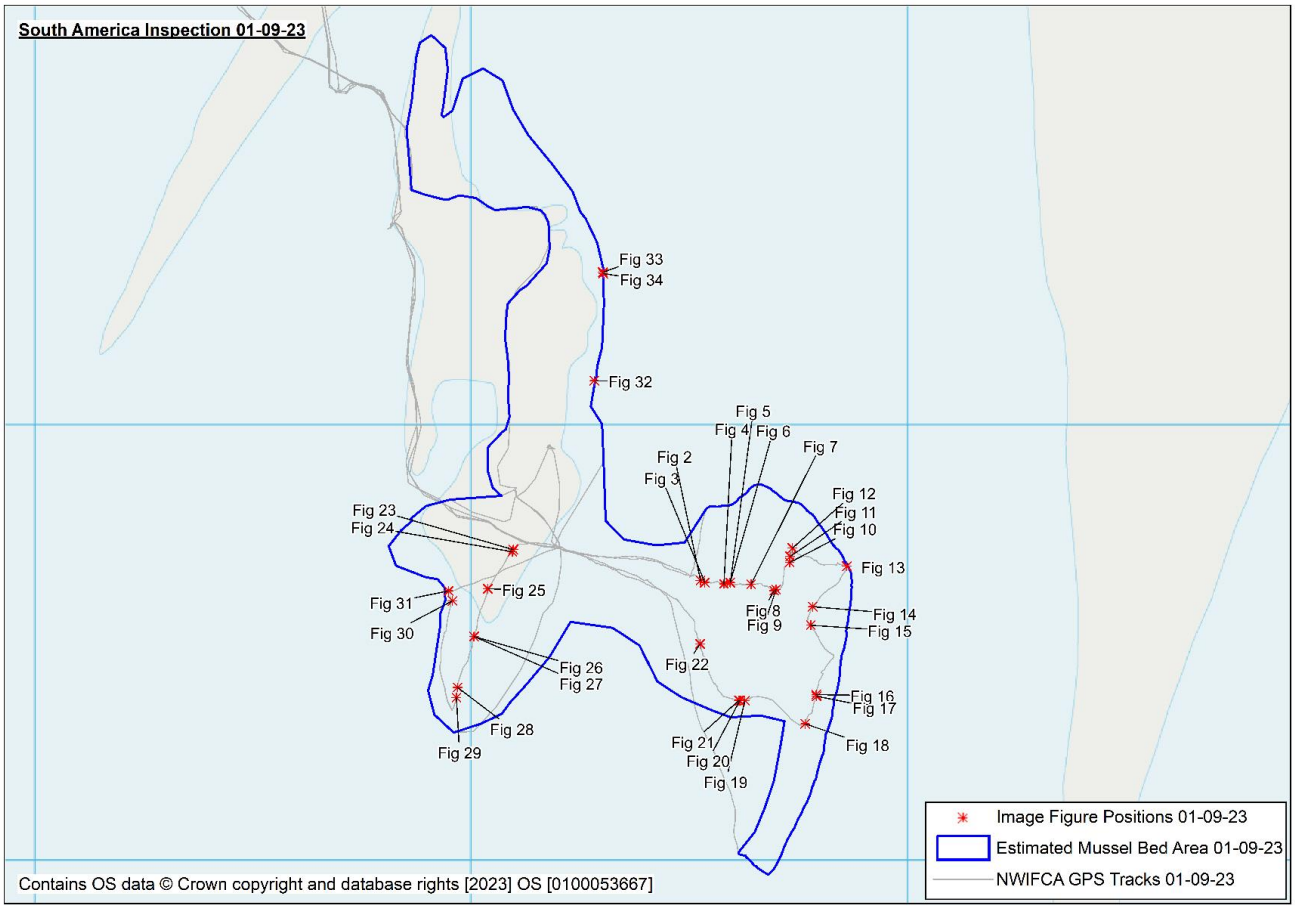

Figure 1. The extent of the South America mussel bed in Morecambe bay, and the geolocations of survey photos.

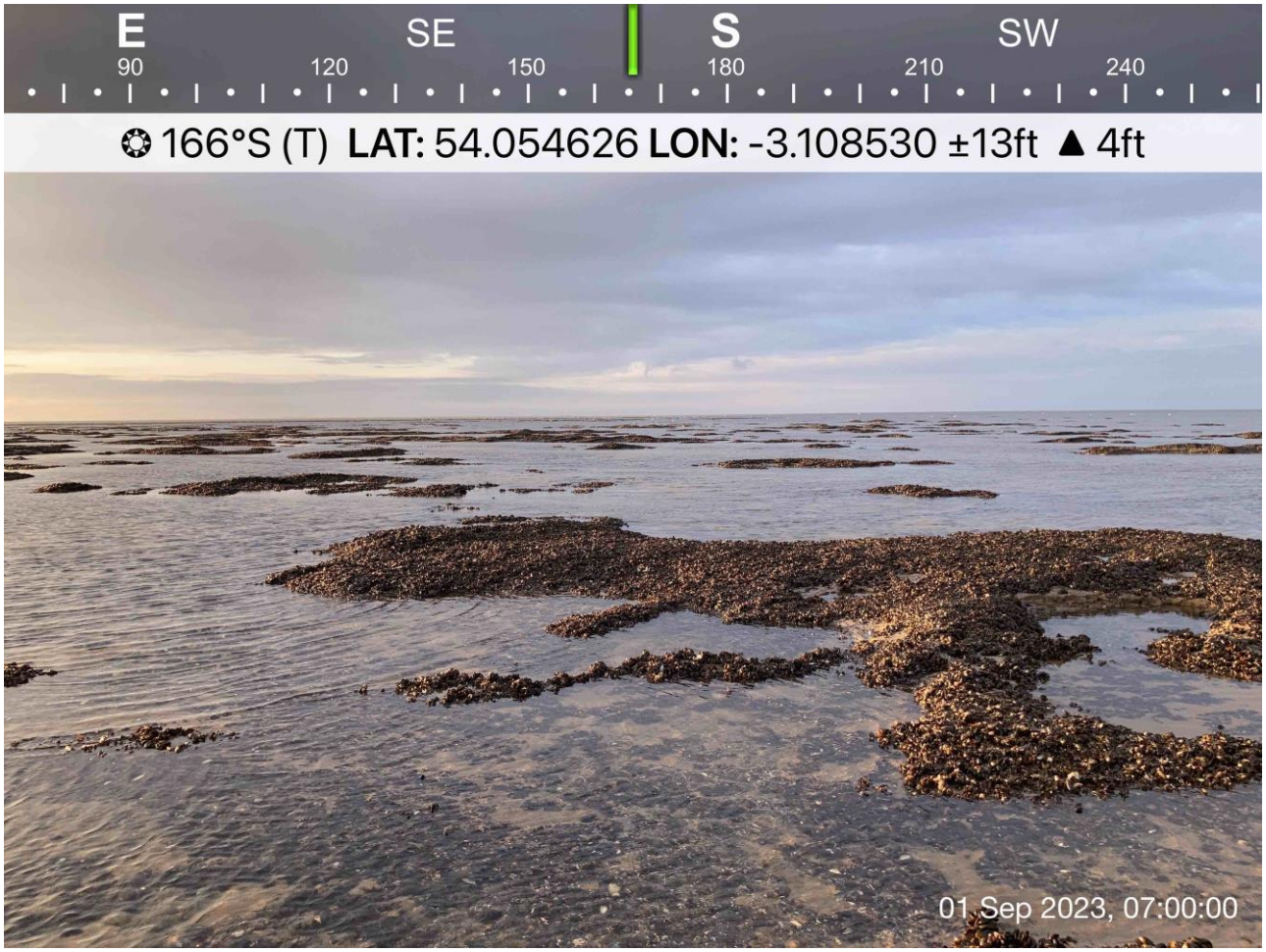

Figure 2. Mussel on thin mud along the edge of the main bed and channel 01-09-2023

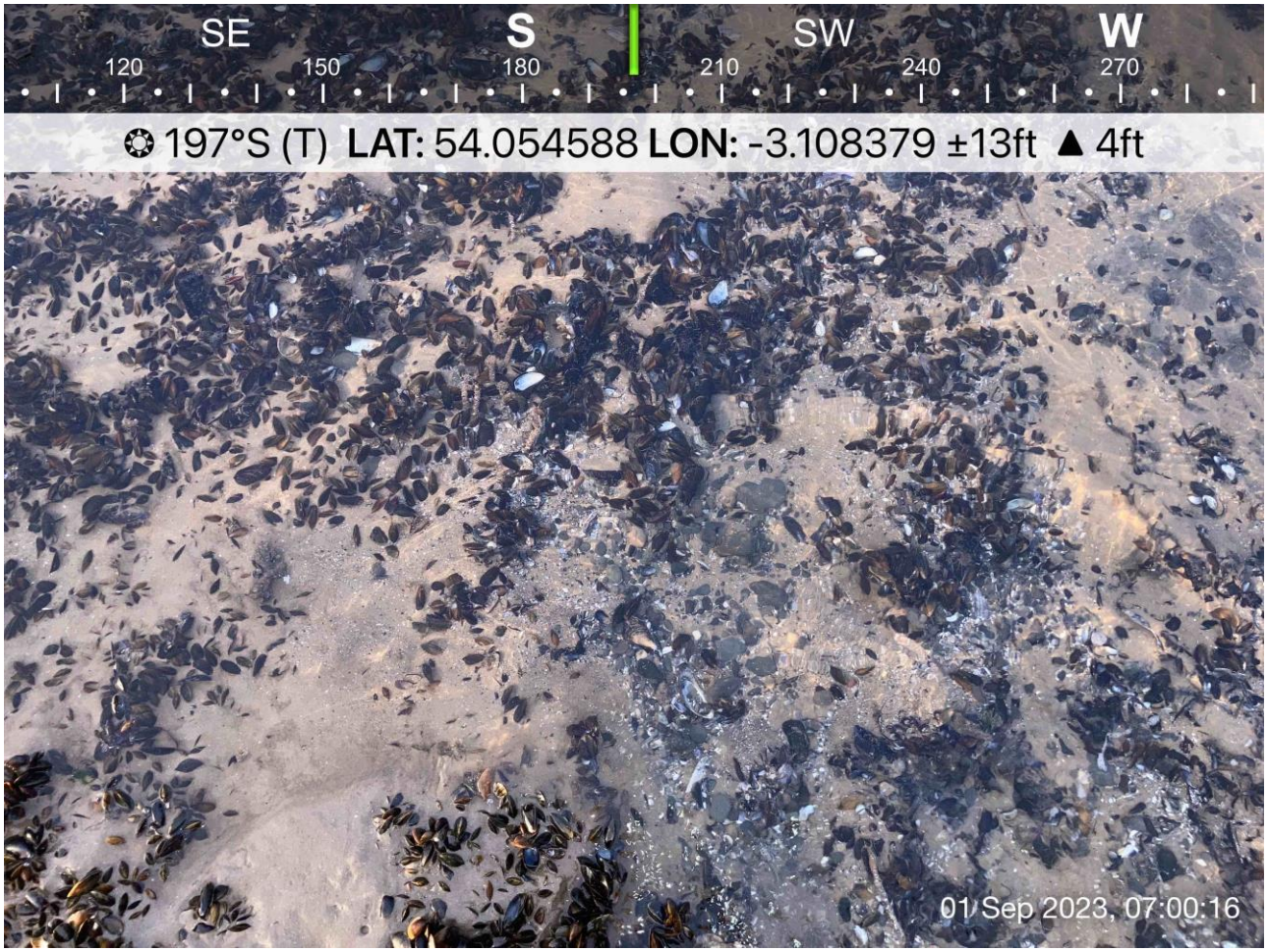

Figure 3. Mussel on thin veneer of sand and mud over cobble 01-09-2023

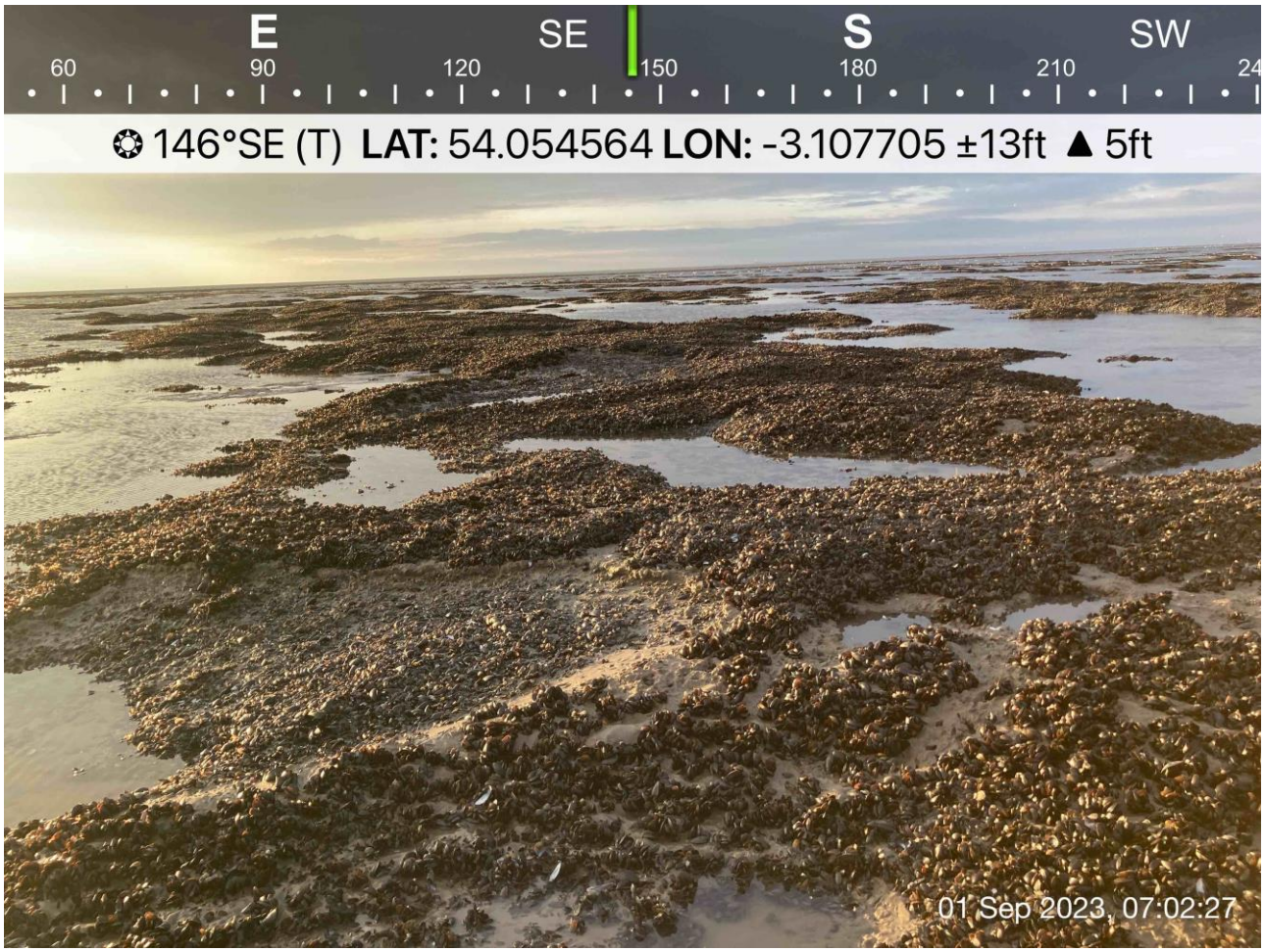

Figure 4. Mussel, scour and cobble exposure in the central north of the bed 01-09-2023

Figure 5. Mix of sizes and mussel with cobble 01-09-2023

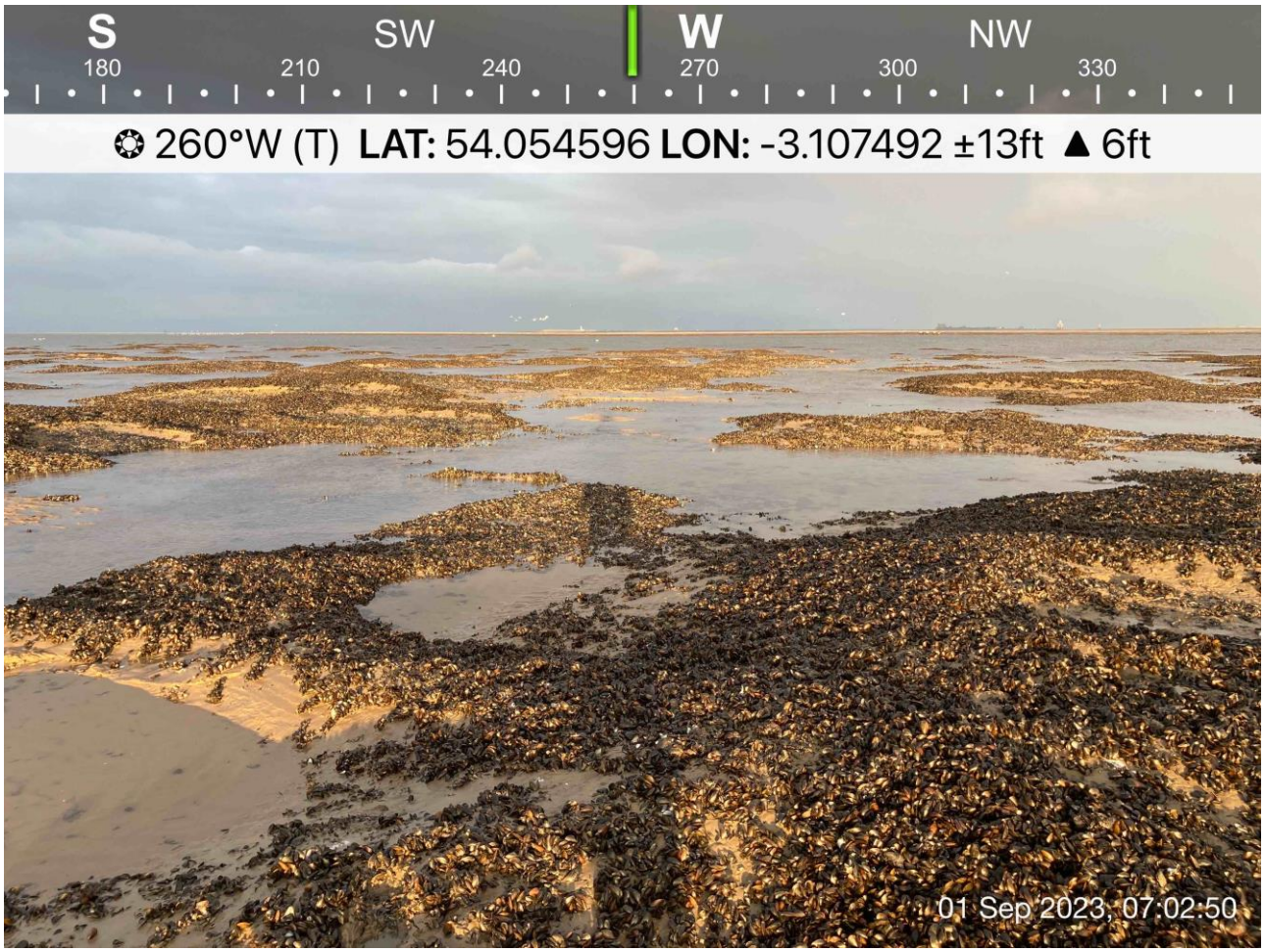

Figure 6. Thin mud and patchy mussel 01-09-2023

Figure 7. Exposed cobble beneath thin mud 01-09-2023

Figure 8. Exposed cobble and thin mussel coverage 01-09-2023

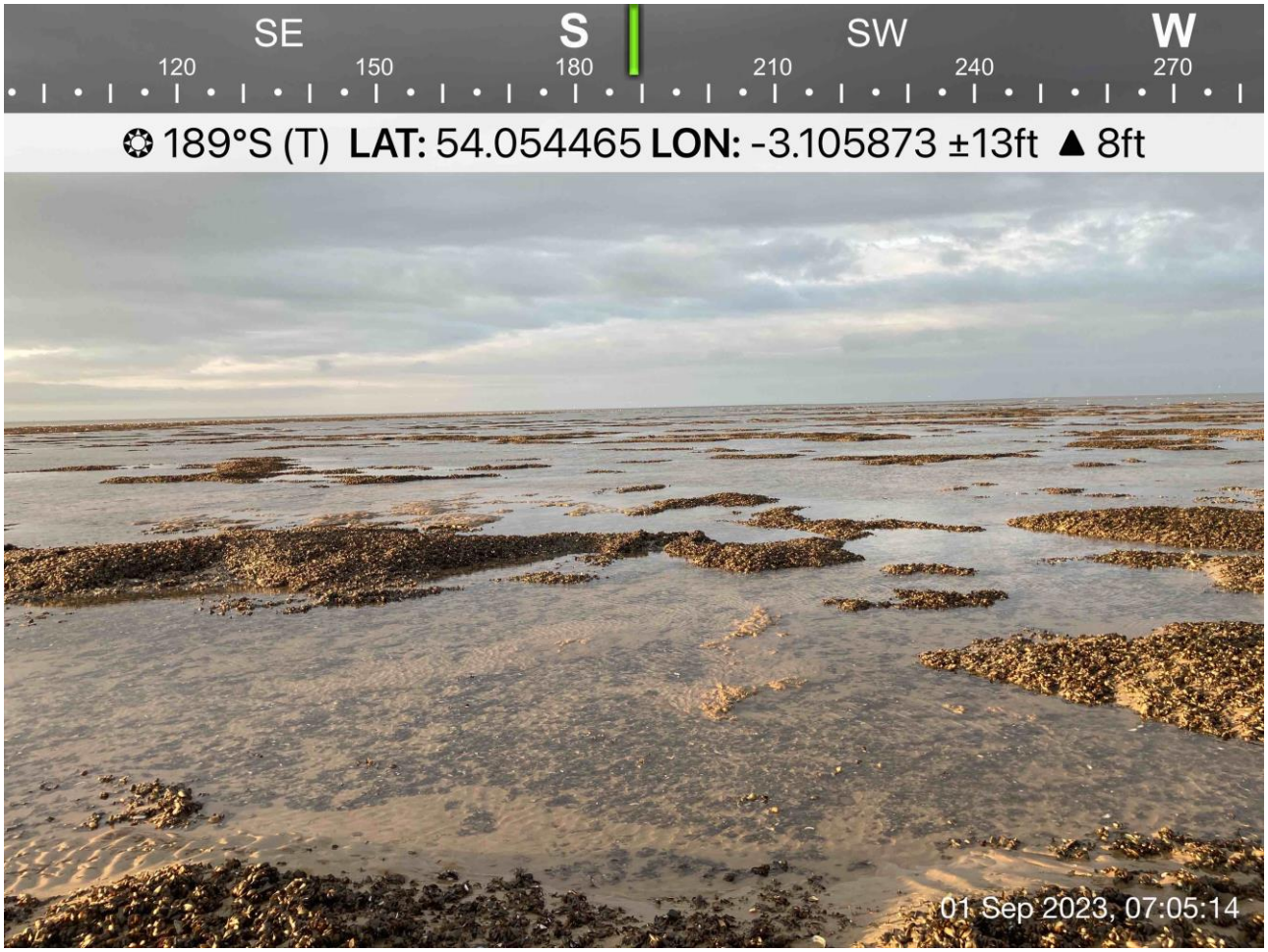

Figure 9. Exposed cobble and patchy mussel 01-09-2023

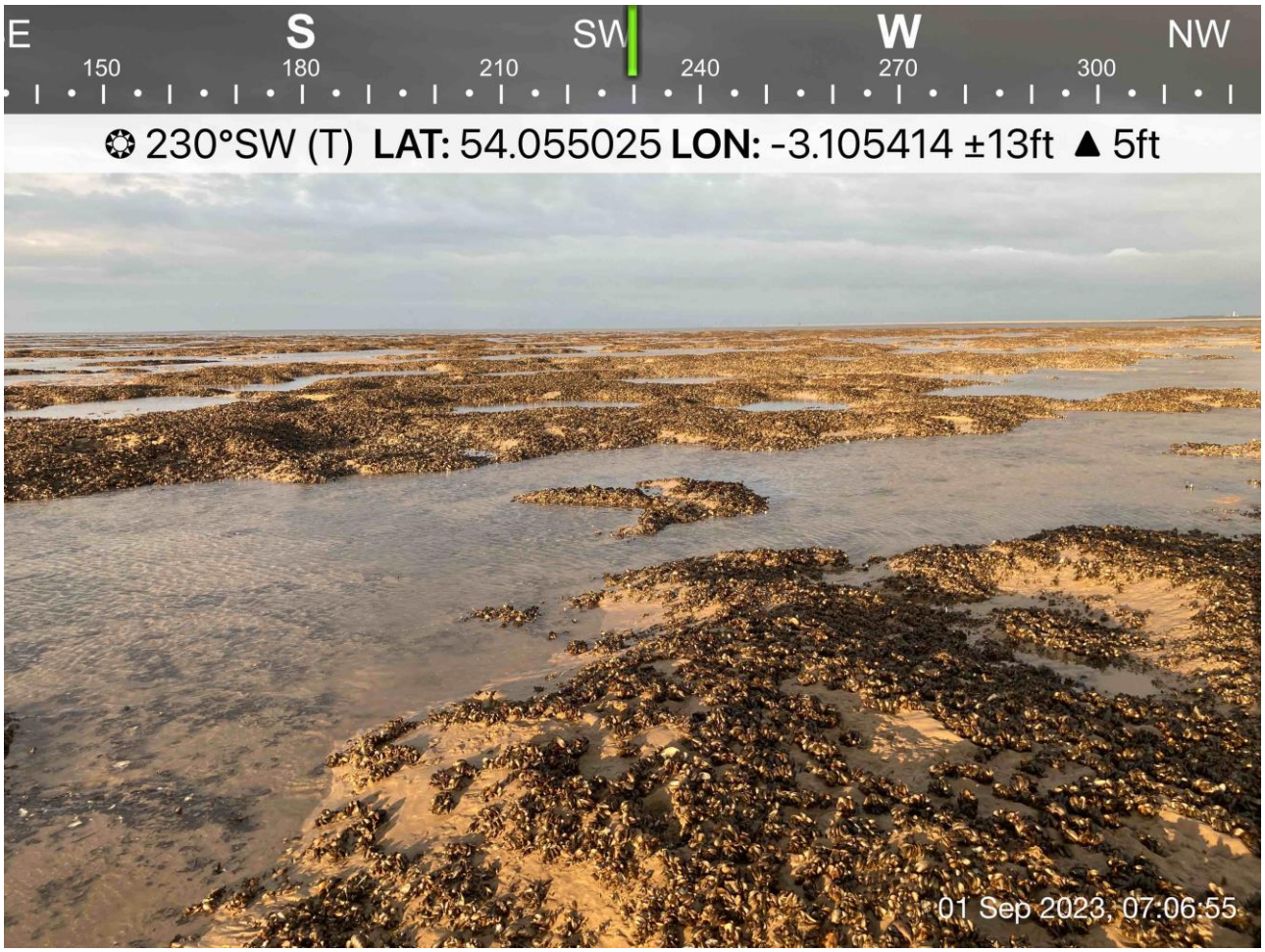

Figure 10. Shallow mud 01-09-2023.

Figure 11. Mix of mussel sizes 01-09-2023.

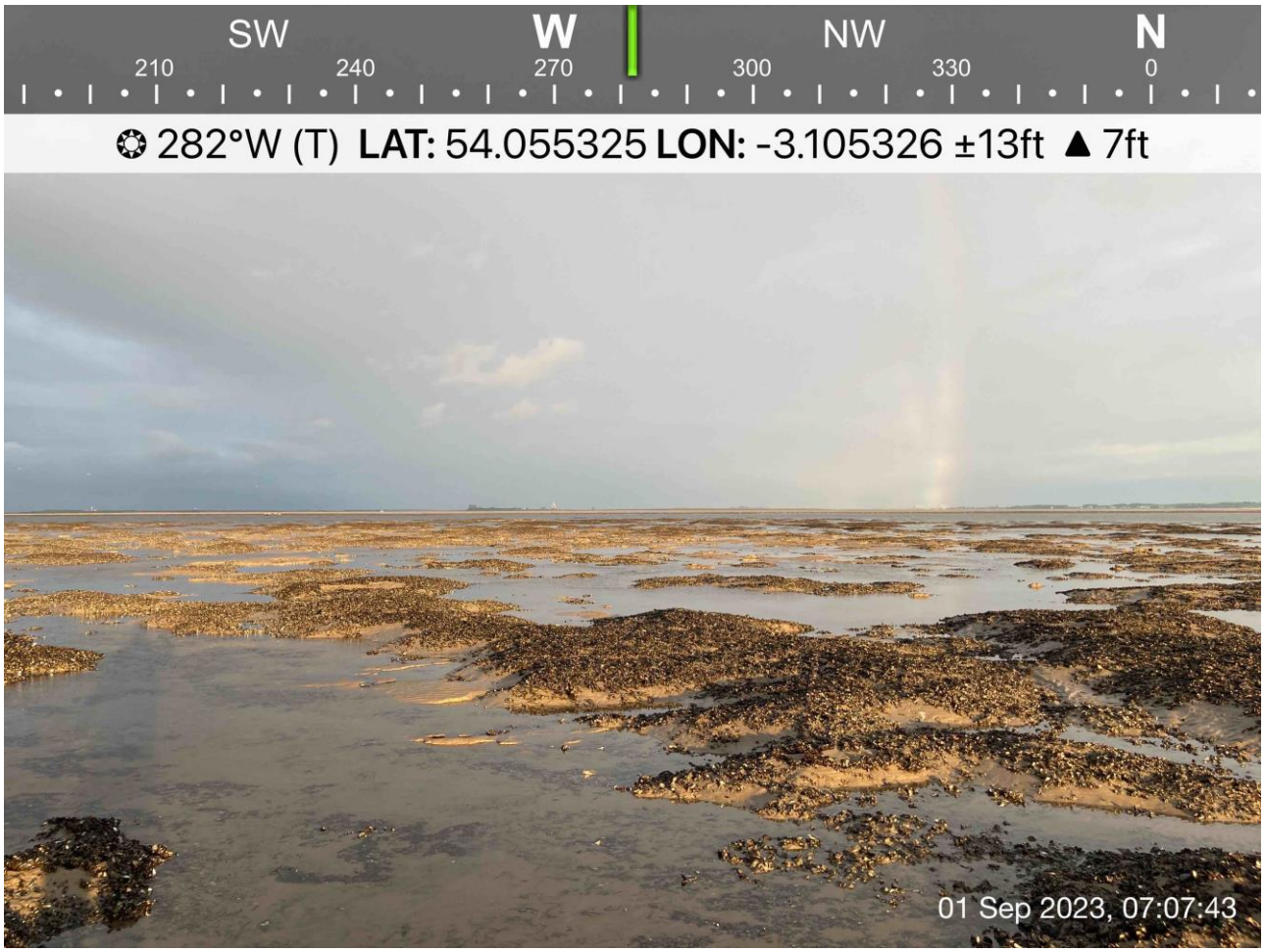

Figure 12. large exposed areas and thin mussel coverage 01-09-2023.

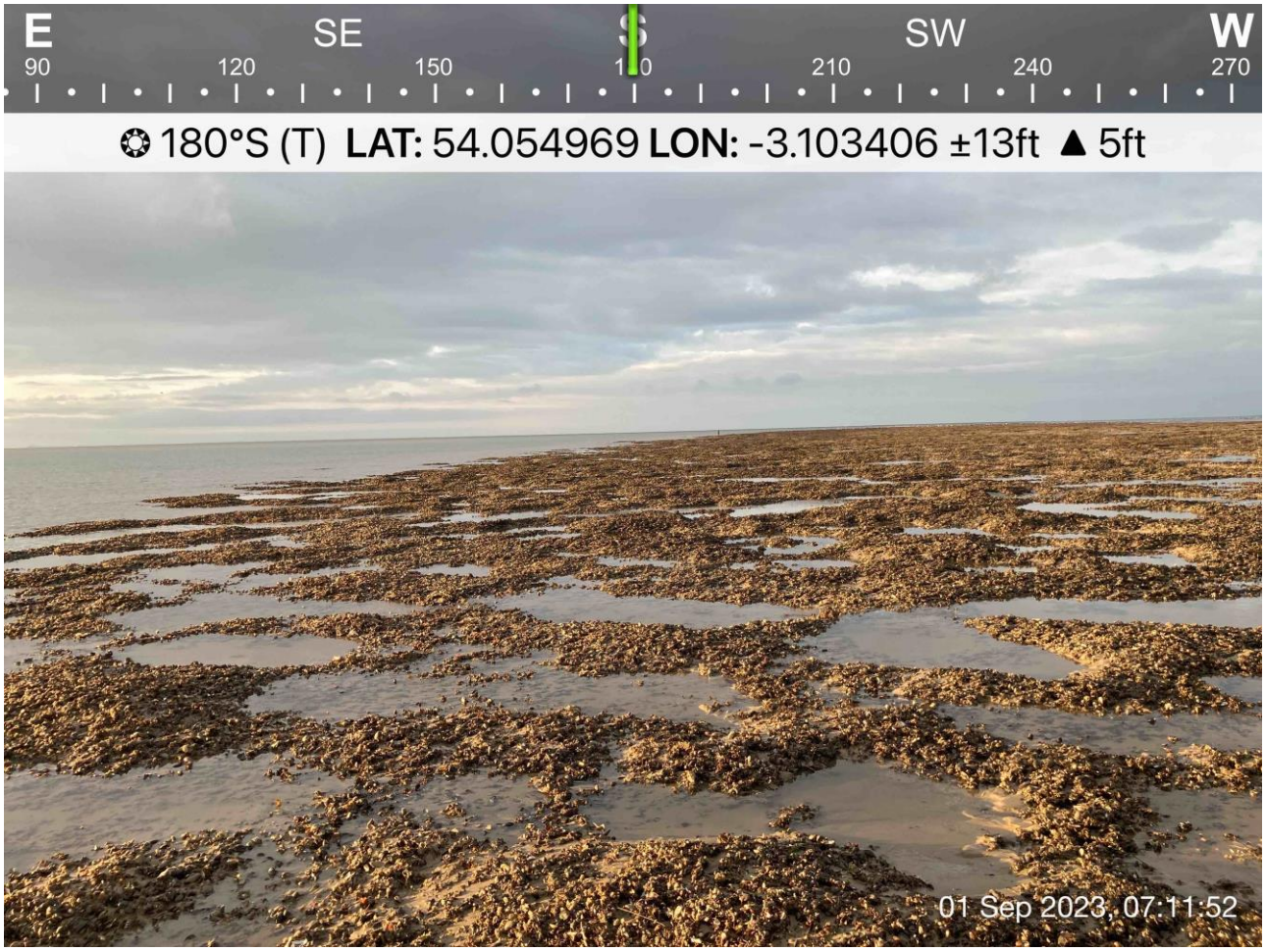

Figure 13. Area of mussel on mud 01-09-2023

Figure 14. Exposed cobble, thing mud and mussel shell 01-09-2023

Figure 15. Exposed cobble 01-09-2023

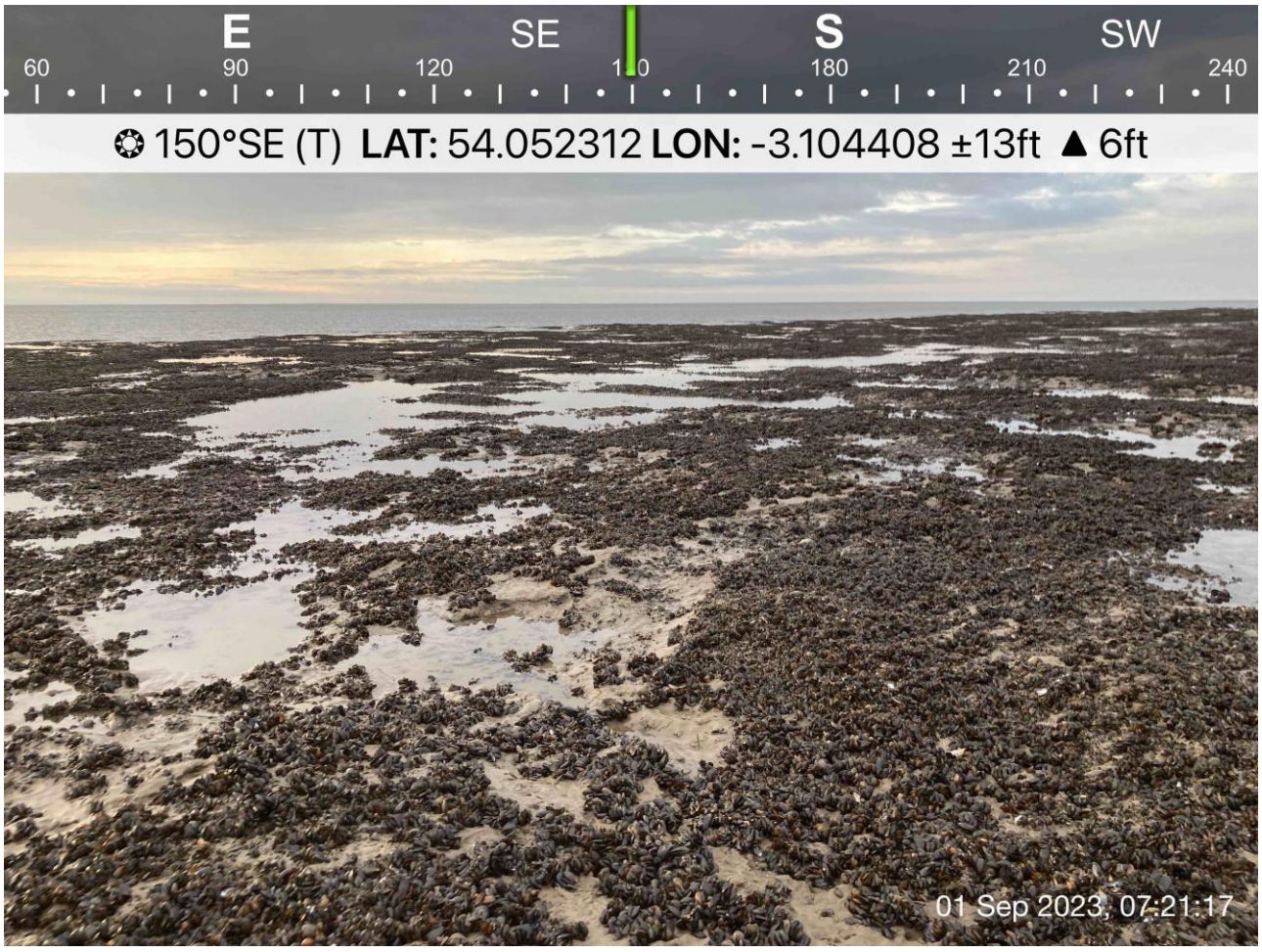

Figure 16. Denser area of mussel with thin mud 01-09-2023

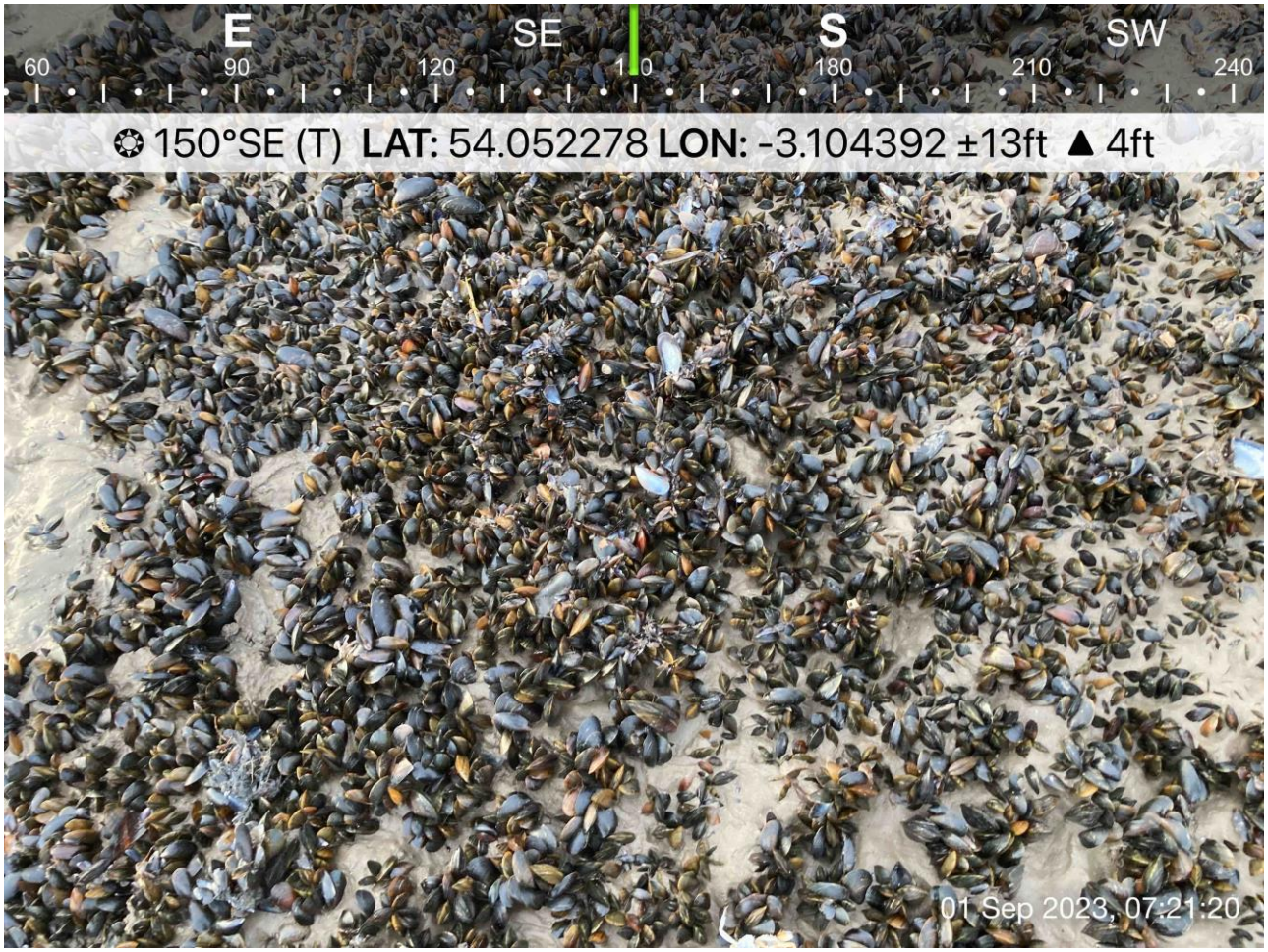

Figure 17. Mussel coverage on sand 01-09-2023

Figure 18. large area of exposed cobble 01-09-2023

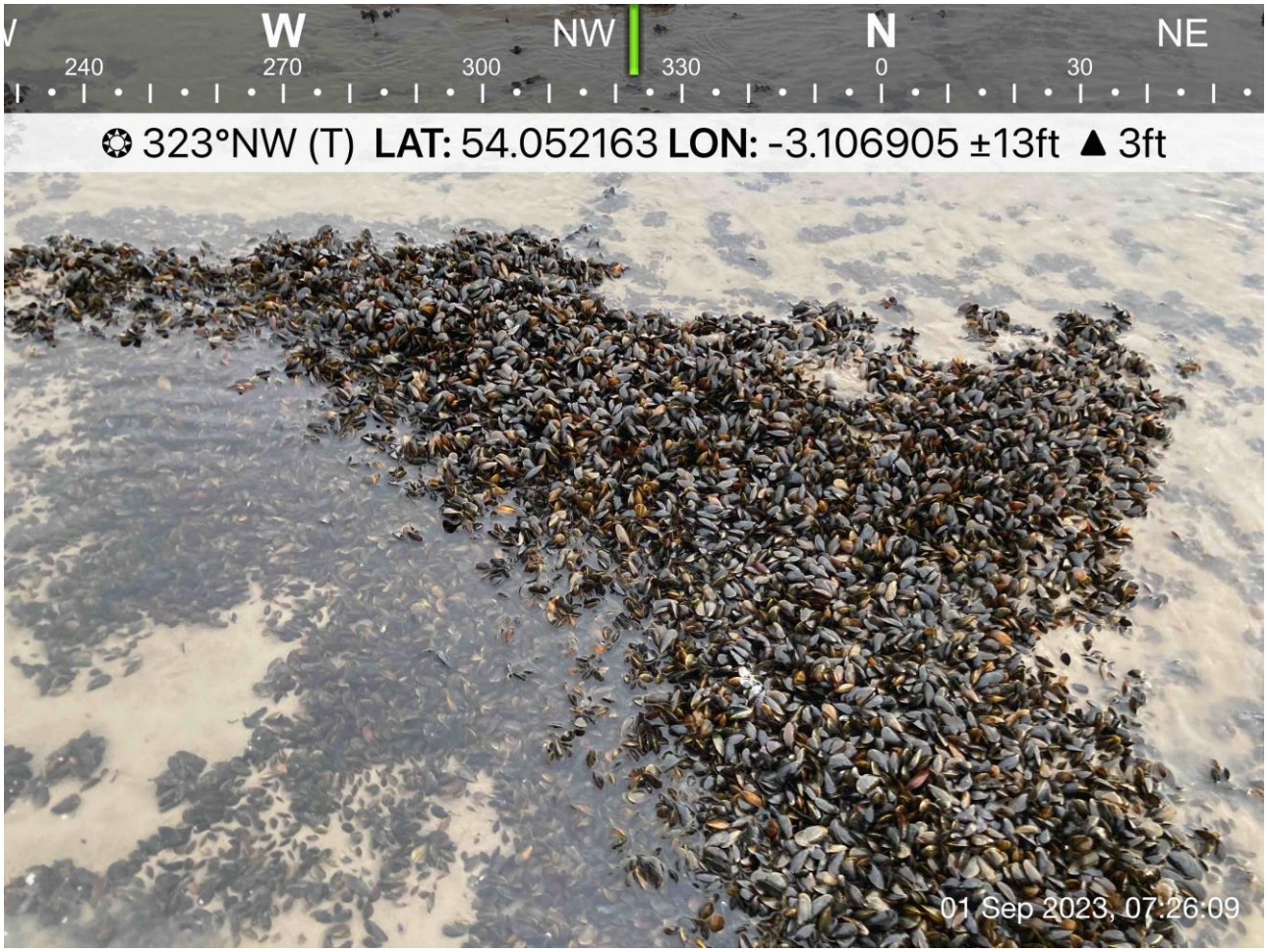

Figure 19. small patches of loose mussel on mud 01-09-2023

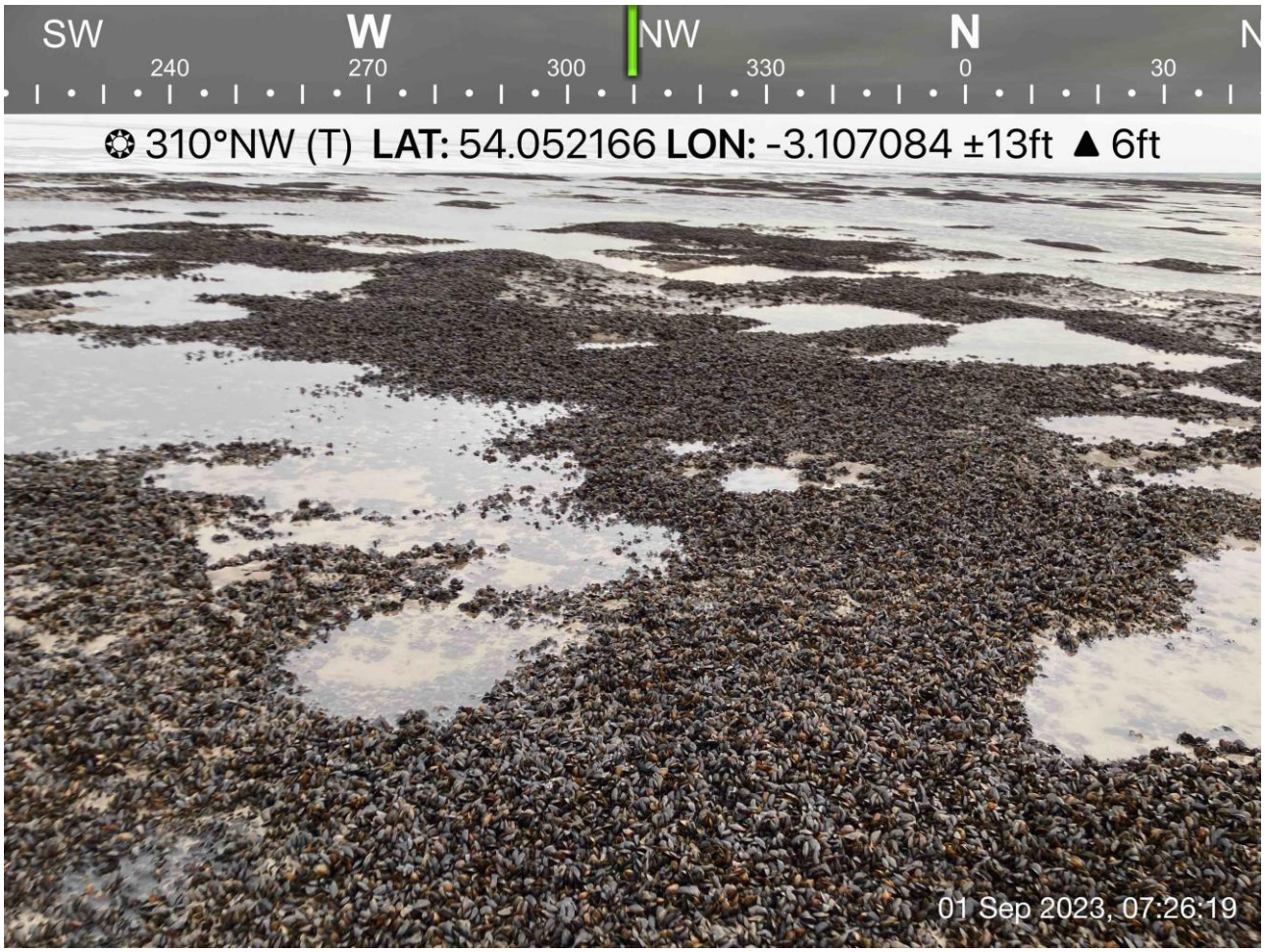

Figure 20. Mussel on mud on channel edge facing inshore 01-09-2023

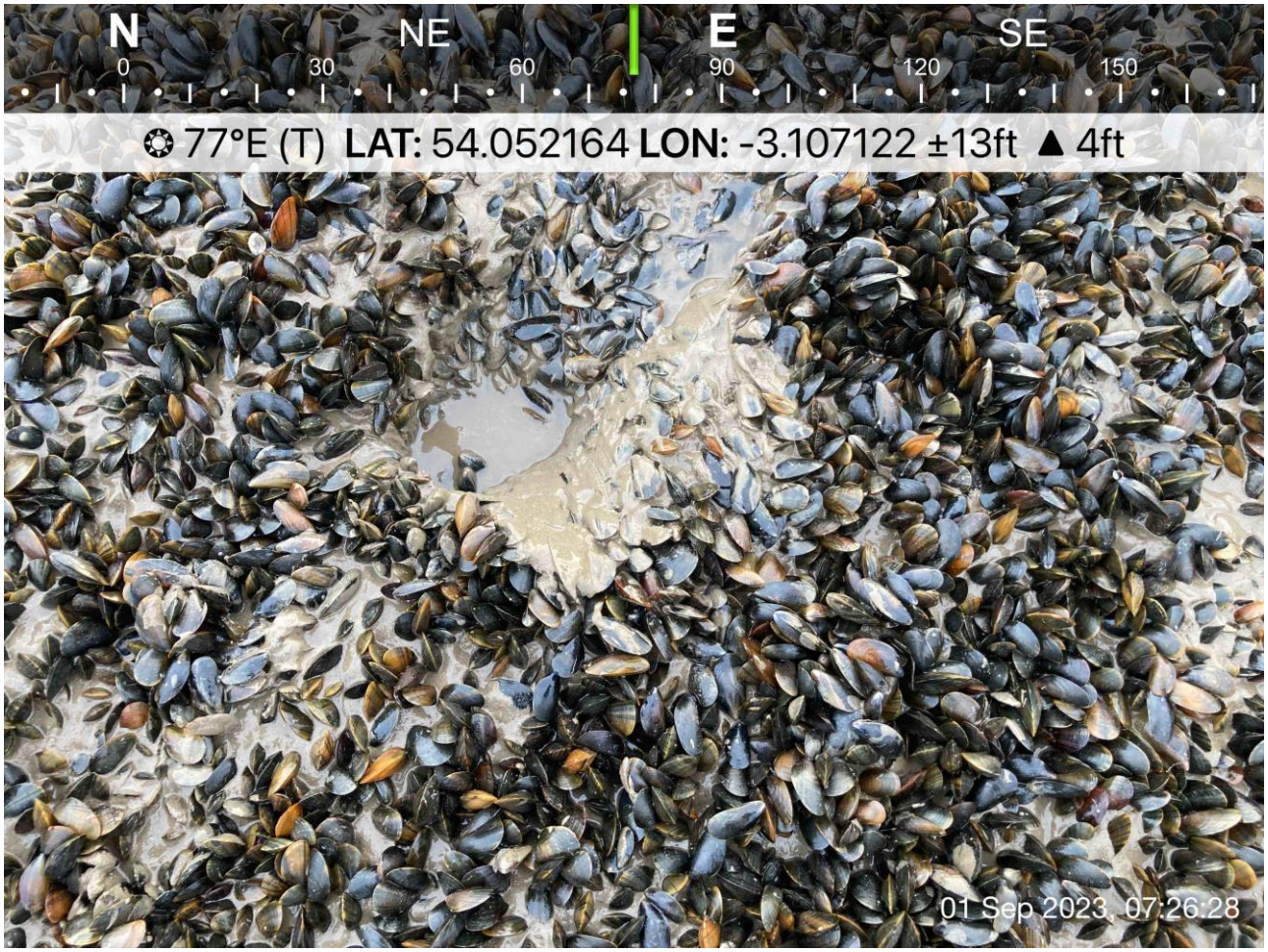

Figure 21. Loose mussel 01-09-2023

Figure 22. Patchy mussel on mud close to channel edge 01-09-2023

Figure 23. Area of mussel on soft mud, mussel on a thin vineer of sand/mud and bare stony substrate 01-09-2023

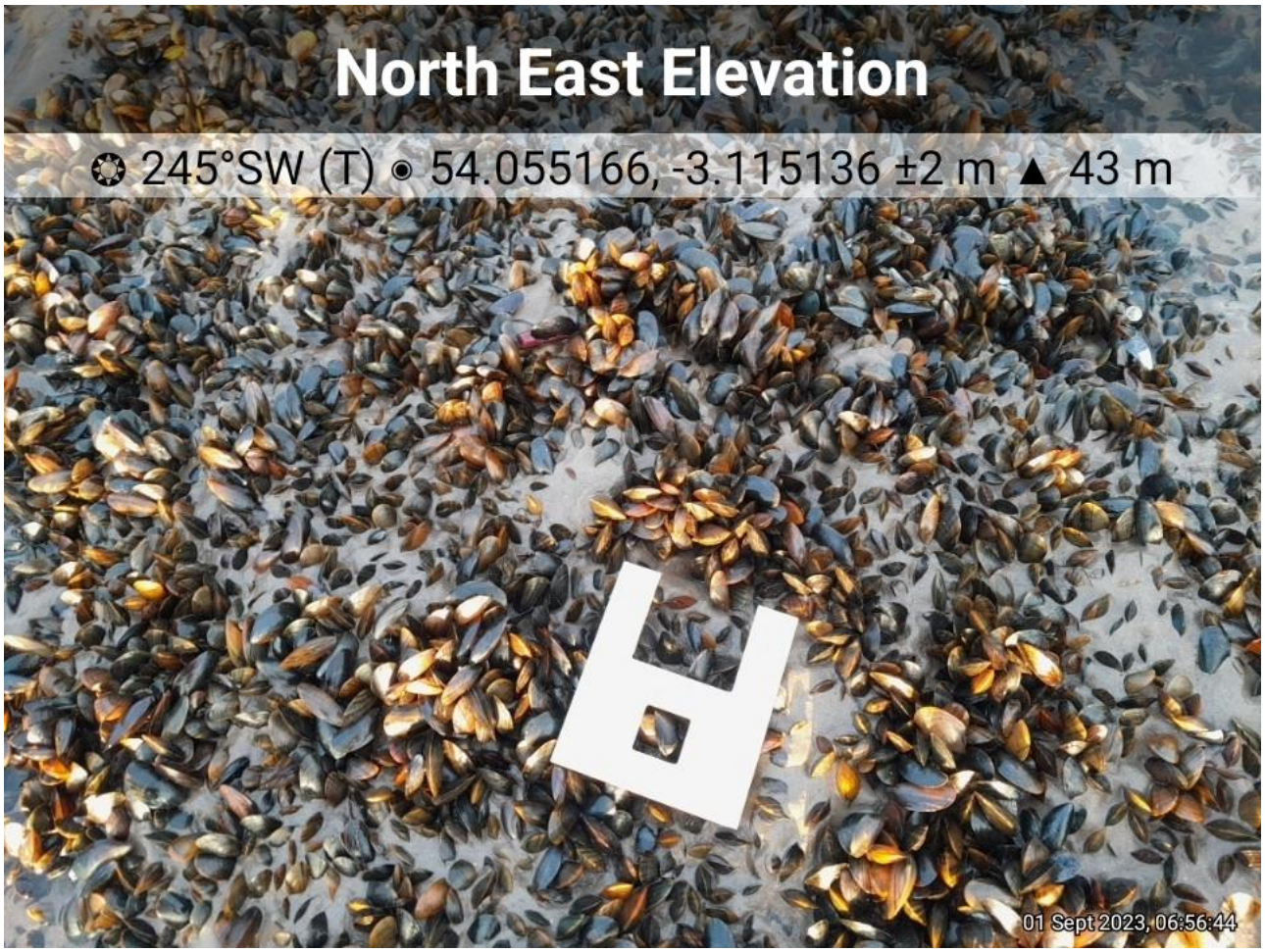

Figure 24. Mussel 20-25mm in length 01-09-2023

Figure 25. Area of loosed dense mussel on mussel mud 01-09-23

Figure 26. Area of mussel on mud and exposed stony substrate 01-09-23

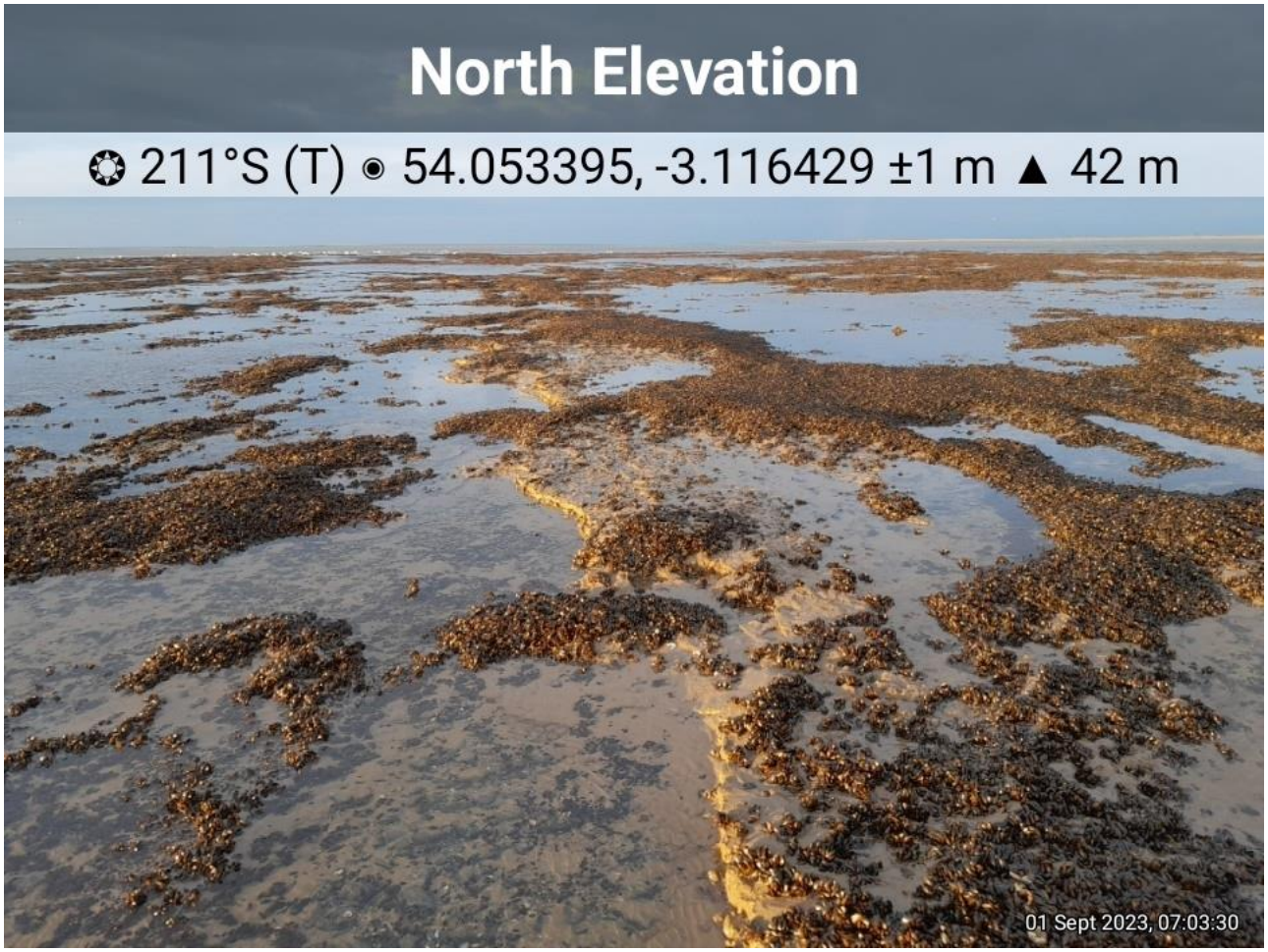

Figure 27. . Area of mussel on soft mud, mussel on a thin veneer of sand/mud and bare stony substrate 01-09-2023

Figure 28. Area of mussel on a thin veneer of sand/mud and bare stony substrate 01-09-2023

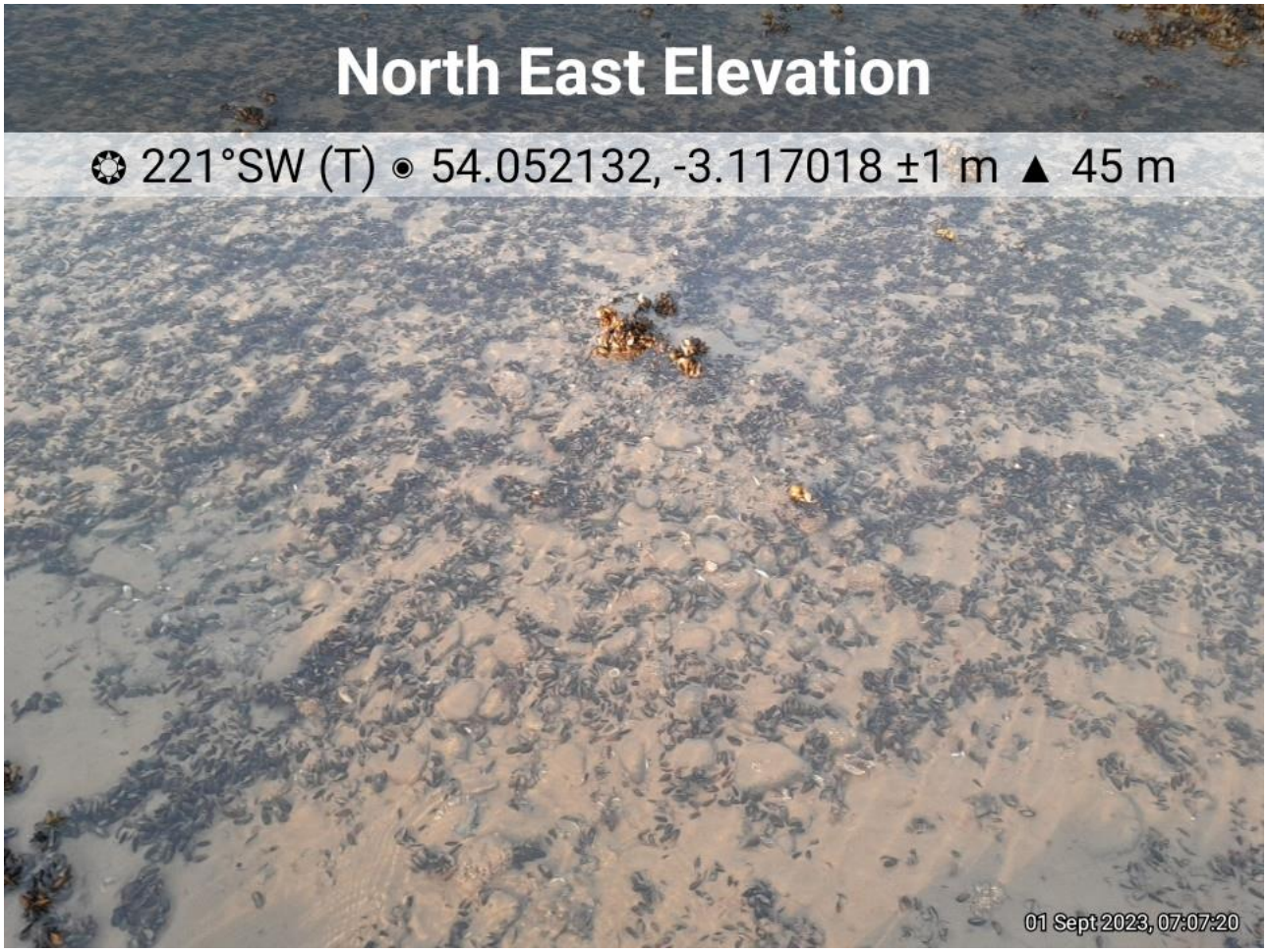

Figure 29. Area of stony substrate with less dense mussel with thin sediment veneer 01-09-23

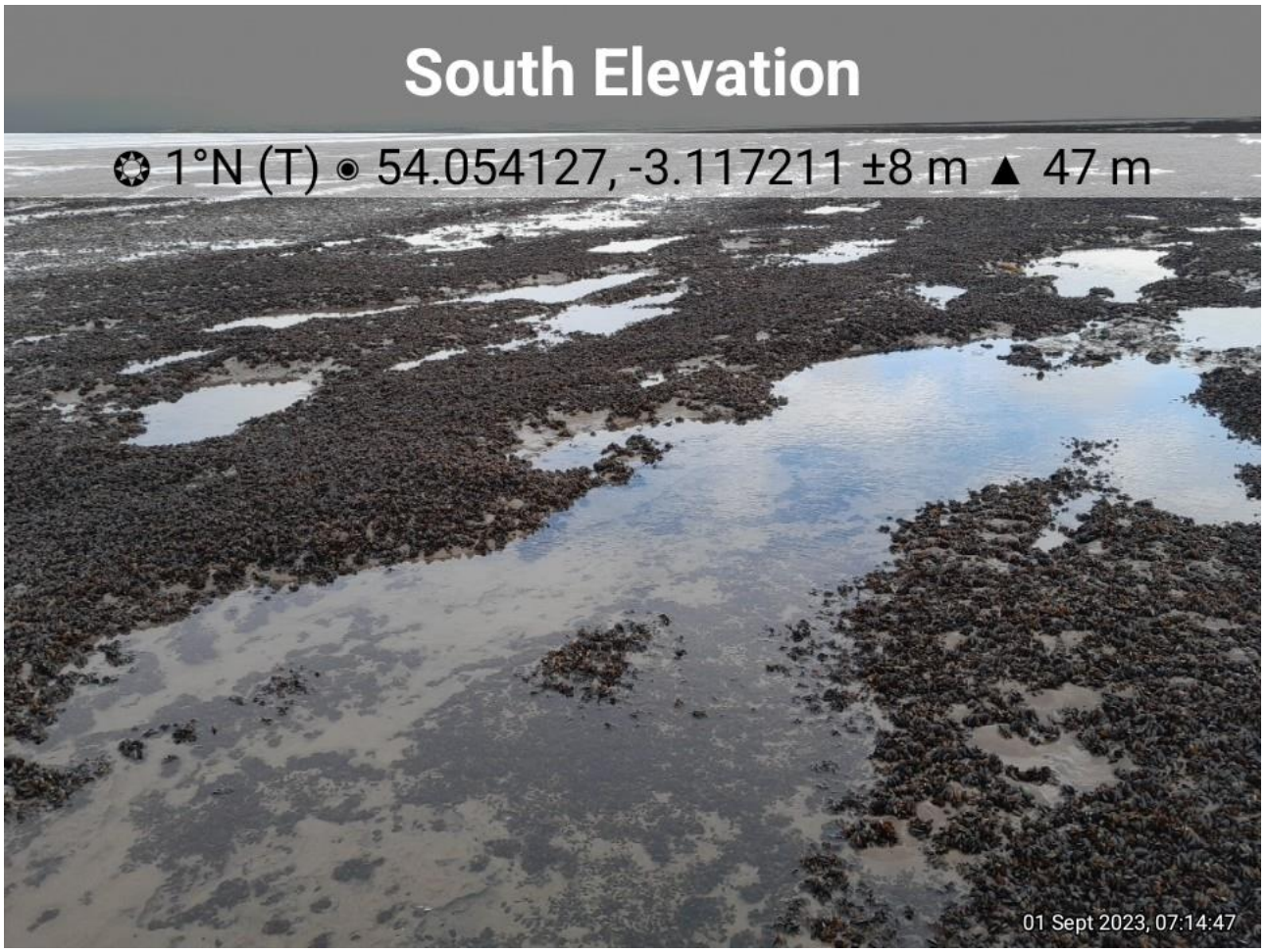

Figure 30. Area of dense loose mussel on a thicker layer of mussel mud 01-09-23

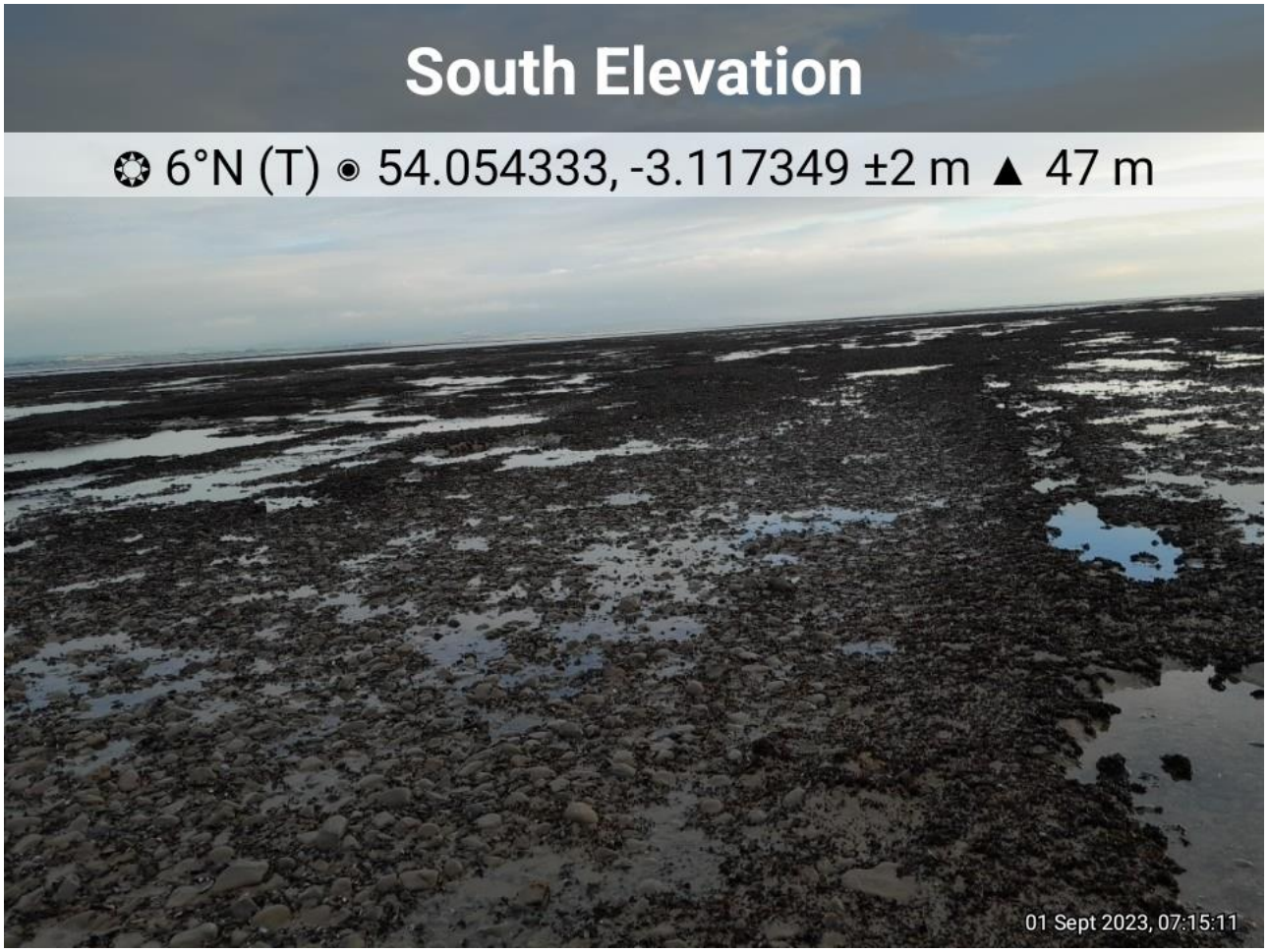

Figure 31. Strip of exposed stony substrate within the bed area 01-09-23

Figure 32. Overview of Northern extent of the bed, where mussel is less dense 01-09-23

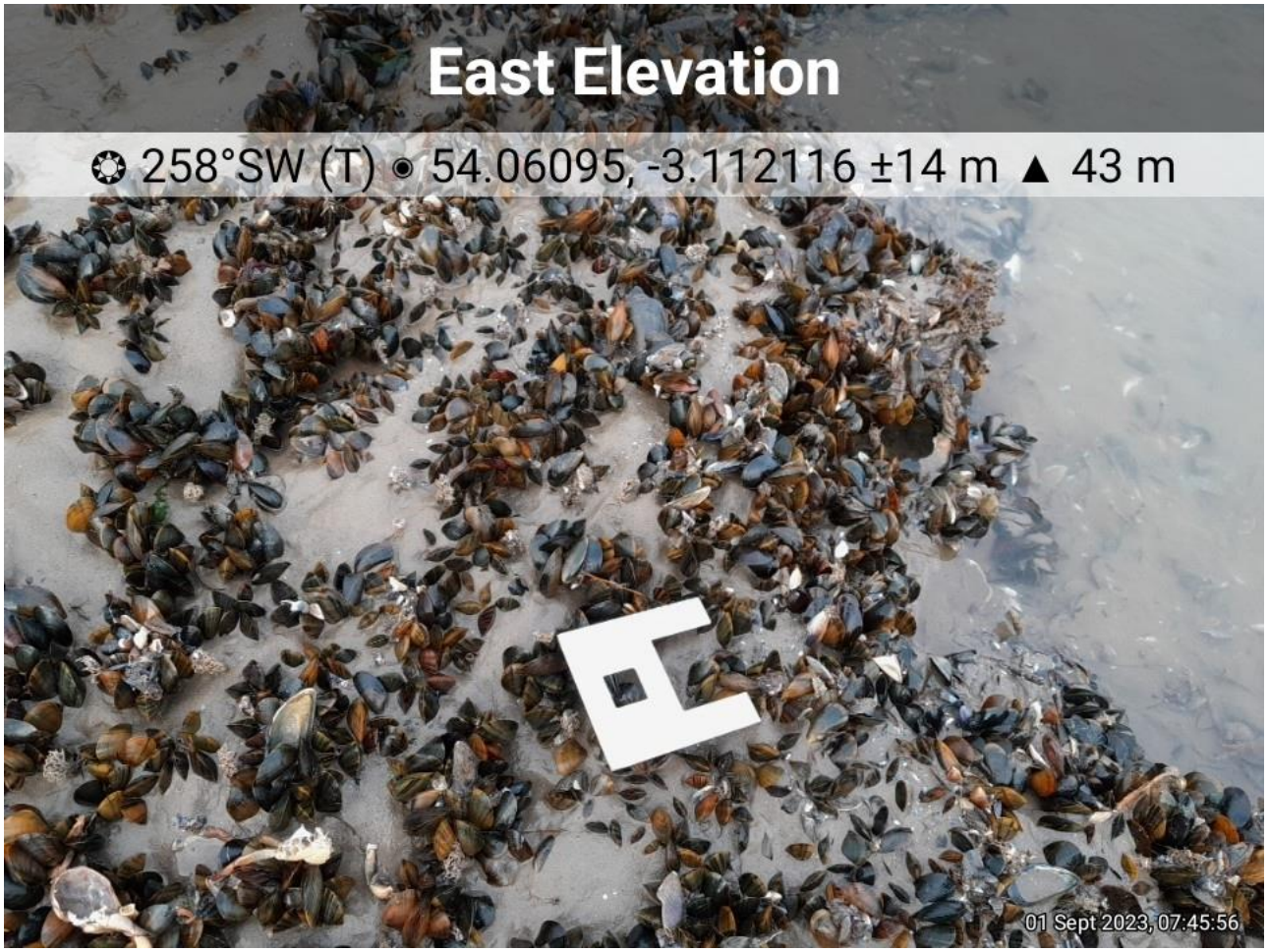

Figure 33. Less dense mussel in the Northern extent of the bed 01-09-23

Figure 34. Overview of Northern extent of the bed, where mussel is less dense 01-09-23