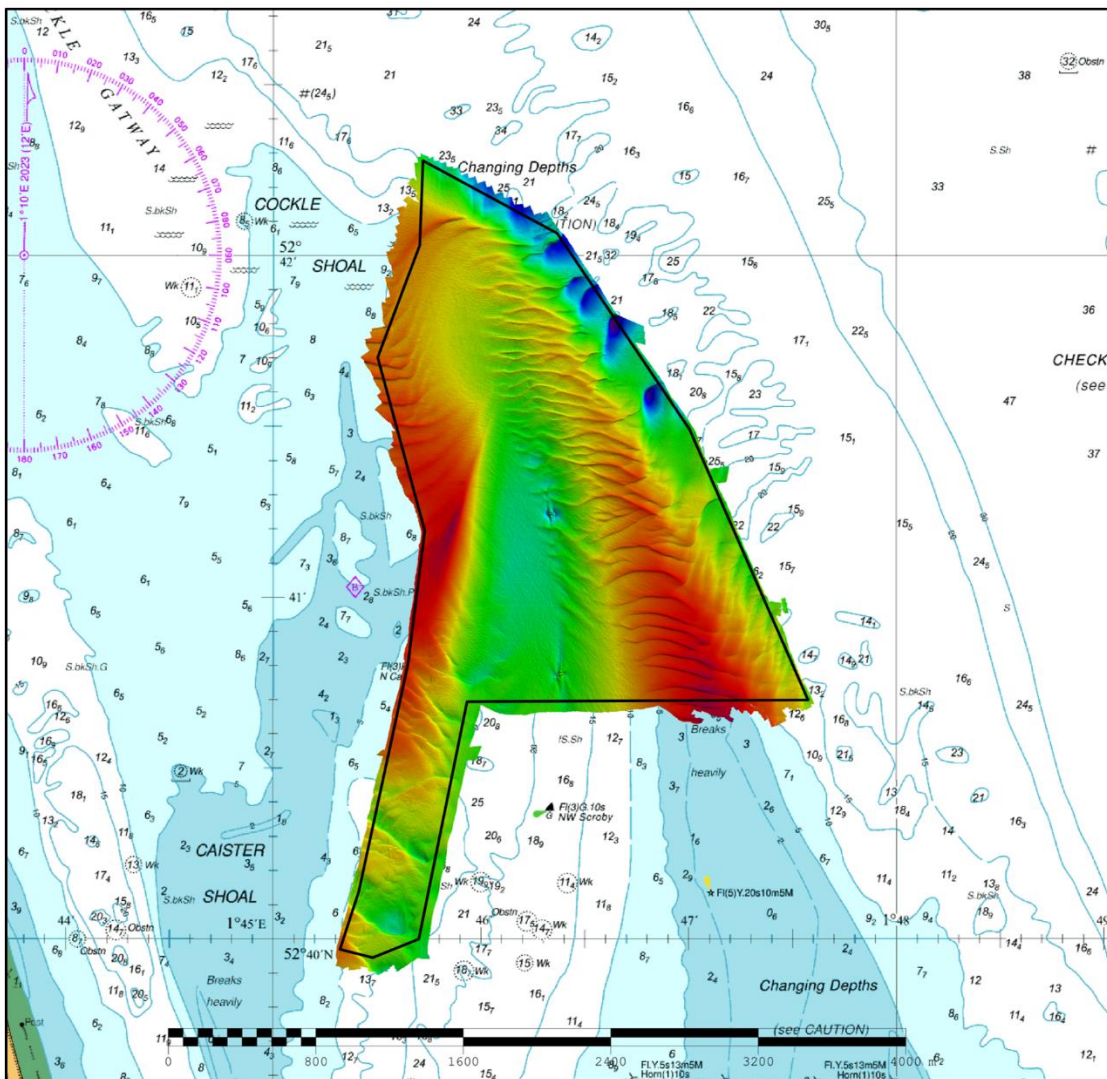




UK Hydrographic
Office

EAST ANGLIA COCKLE SHOAL FULL (EA3) 2023 ASSESSMENT

An assessment of the 2023 hydrographic survey of the area EA3: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.



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Notes

This Assessment is produced by the UK Hydrographic Office (UKHO) for the Maritime and Coastguard Agency (MCA). Analysis of the Routine Resurvey Areas forms part of the Civil Hydrography Programme and the reports are made available through the UKHO website and are presented to the Civil Hydrography Working Group. When approved, the recommendations are incorporated into the Routine Resurvey Programme. The report is governed by a Memorandum of Understanding between the DfT (including the MCA) and the MOD (including the UKHO).

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No analysis of shipping traffic has been included within this report due to no AIS data being supplied by MCA.

All depths are to Chart Datum, defined using the UKHO Vertical Offshore Reference Frame (VORF) Model.

COCKLE SHOAL FULL, 2023

1. SUMMARY

Changes Detected

- 1.1 Caister Shoal continues to migrate northeast into Caister Road, with a least depth of 3.4m.
- 1.2 Cockle Shoal continues to slowly migrate east into the survey area, with a least depth of 8.2m.
- 1.3 Sandwaves along North Scroby bank and to the east of the survey area are highly mobile, but with no overall direction of migration.
- 1.4 In the south of the survey area large sandwaves continue to migrate north, resulting in changeable depths.

Reasons for Continuing to Resurvey the Area

- 1.5 Depths in the area remain changeable and potentially hazardous to vessels navigating the area and therefore require continued monitoring through annual resurveys.

Recommendations

- 1.6 Given the location of the survey in relation to the approaches to Great Yarmouth, and the continued migration of Cockle Shoal, Caister Shoal and North Scroby bank, EA3 should remain on the 3-year interval, with EA3A and EA3B covering the most mobile areas annually.
- 1.7 Recommend that in both EA3 full and EA3 A focused, the area south of the North Caister Buoy is expanded west to more adequately cover the 5m and 10m contours of Caister Shoal.

2. LOCATION

- 2.1 Survey interval at time of resurvey: 3 years full area, 1-year focused areas.
- 2.2 Area covered: 5.24 km².

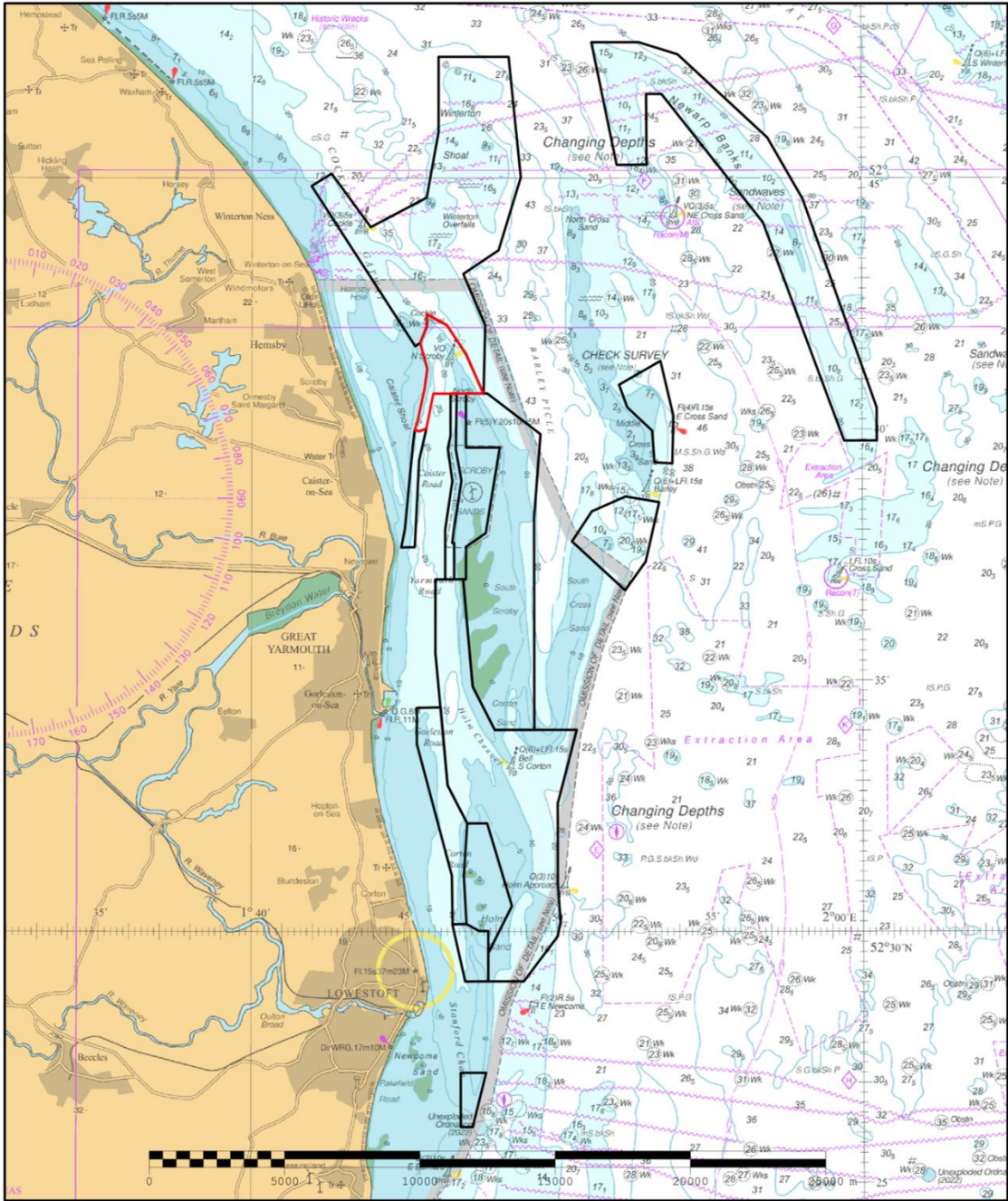


Figure 1: 2023 East Anglia Routine Resurvey areas overlaid on BA Chart 1534-0 with area EA3 in red.

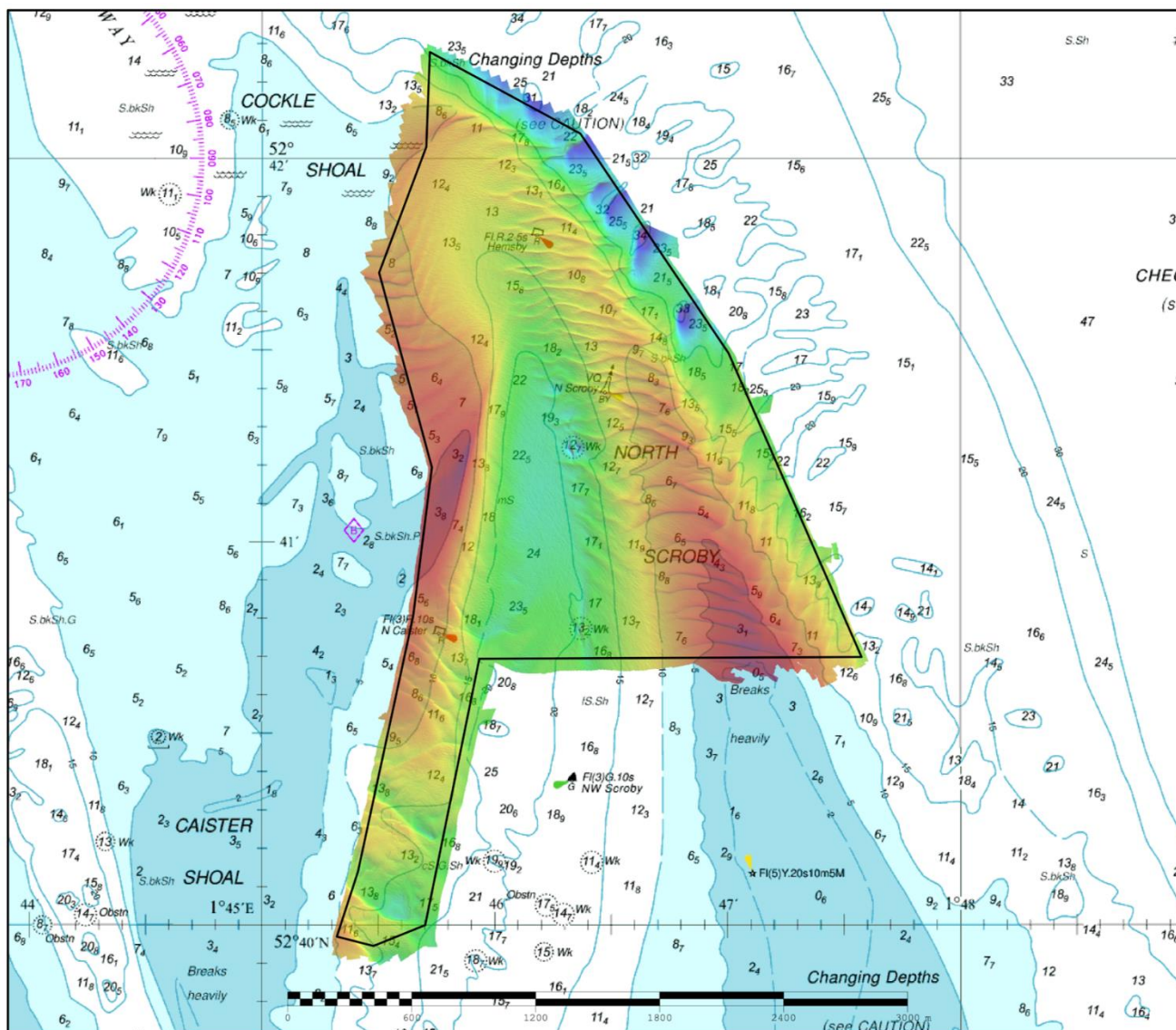


Figure 2: 2023 survey data overlaid on BA Chart 1534-0.

3. REFERENCE SURVEY DETAIL

- 3.1 Focused survey HI1760 was conducted as part of the 2022 Routine Resurvey Programme in September 2022 covering areas EA3A and EA3B. In 2021 another focused survey was completed covering EA3A and EA3B in HI1736 as part of the 2021 RRS Programme. The last full survey, HI1684, was conducted as part of the 2020 RRS programme.
- 3.2 The Report of Survey for this survey is available upon request from the UKHO and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

4. NEW SURVEY DETAIL

- 4.1 The full survey for EA3 was conducted in October 2023 as part of HI1823.
- 4.2 The Report of Survey for this survey is available upon request from the UKHO and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

- 5.1 Caister Shoal continues to migrate northeast, as can be seen in the movement of the 10m contour in Figure 6. Shoaling in this area can also be seen in the difference surfaces in Figures 4 and 5. Figure 8 shows the depth in this area has shoaled by 5.8m since 2022, and by 14.6m since 2020. The least depth on the Caister Shoal bank at the western edge of the survey area is now 3.4m as can be seen in Figure 3.
- 5.2 Cockle Shoal continues to slowly migrate east and move into the survey area, with a least depth of 8.2m (see figure 3). Figure 8 shows it has gotten 3.5m shoaler since 2022, but between 2021 and 2022 it deepened from 10.6m to 11.7m. In 2022 the least depth in this area was 8.6m and was located only 50m northwest of the 2023 shoalest point. This shows it is not a consistent shoaling but a general trend.
- 5.3 The central and north-eastern areas of the survey are highly mobile, with large sandwaves on the eastern boundary, and smaller sandwaves along North Scroby bank. There is evidence of both southerly and northerly movement of these sandwaves, this inconsistency indicates there is general movement of sandwaves but no overall migration. This can also be seen in Figure 7, where the 20m contour shows small changes but no general movement. Figure 8 shows changing depths of two adjacent soundings, one of which is deepening, and one shoaling, which is consistent with sandwave movement.
- 5.4 Movement of sandwaves in the north of North Scroby shoal means the least depth is 3m, and the controlling depth to the north of the shoal is now 9.6m, as seen in Figure 3. Note the North Scroby buoy has since been moved to the north of the 9.6m but the chart is yet to be updated.
- 5.5 The southern limb of the survey area has large sandwaves migrating northwards, as can be seen in the difference surfaces in Figures 4 and 5, and in Figure 7 which shows the northward movement of the 20m contours. This movement is evident in Figure 8, where the depth circled in the southern limb shows a deepening of 4.3m since 2022, but between 2021 and 2022 it shoaled by 2m. This is likely due to sandwave movement causing an inconsistent deepening.
- 5.6 The controlling depth in the centre of the Caister Road channel is now 14.4m, due to wreck 68589 (see Figure 3). This is 1.2m deeper than charted. The other wreck in the survey area, 77813, is 18.8m, which is 6.1m deeper than charted (see figure 8). It is recommended that full wreck investigations are carried out next year to acquire better data of current wreck depths for updated charting.

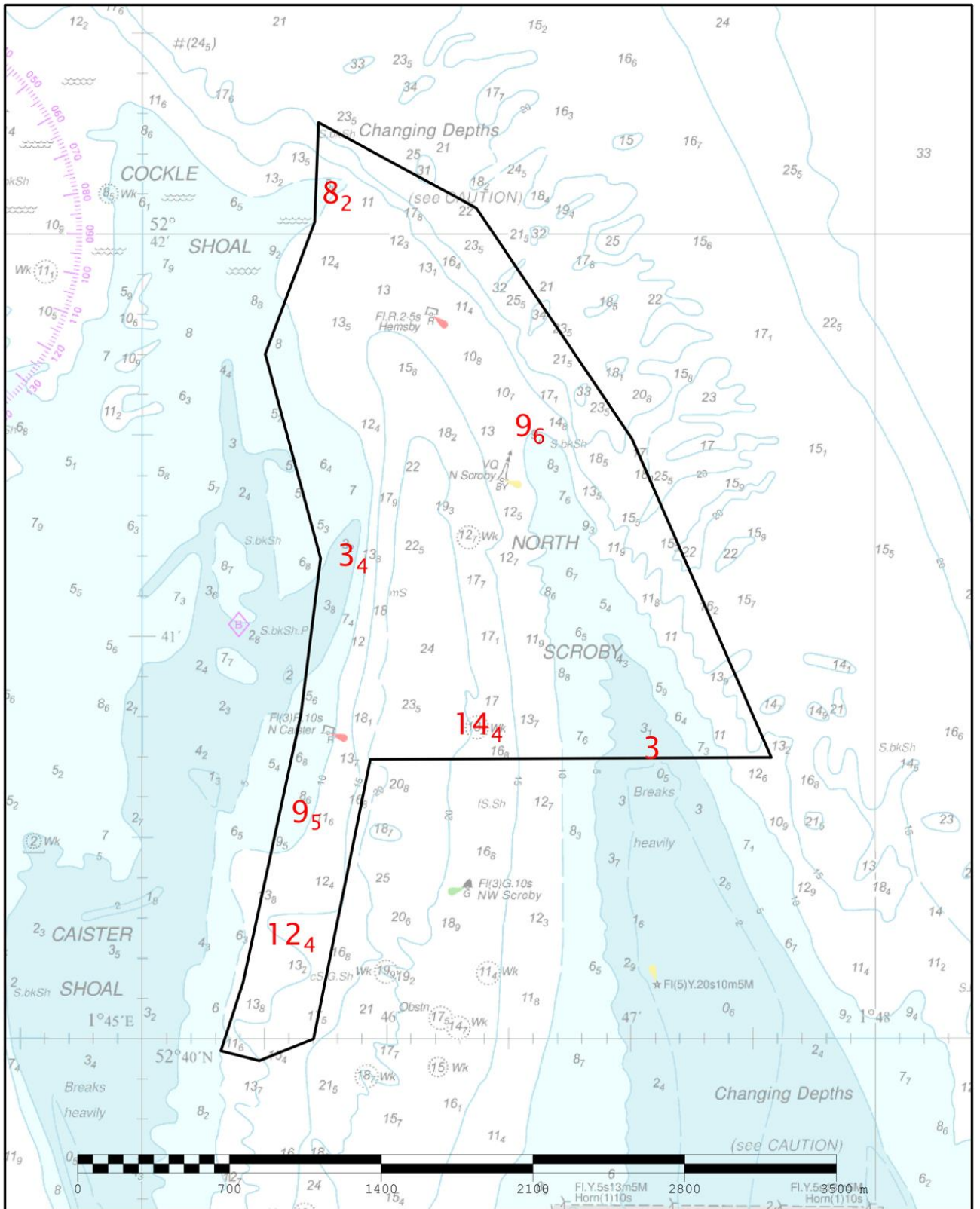


Figure 3: Controlling and Significant Depth soundings highlighted, overlaid on BA Chart 1534-0.

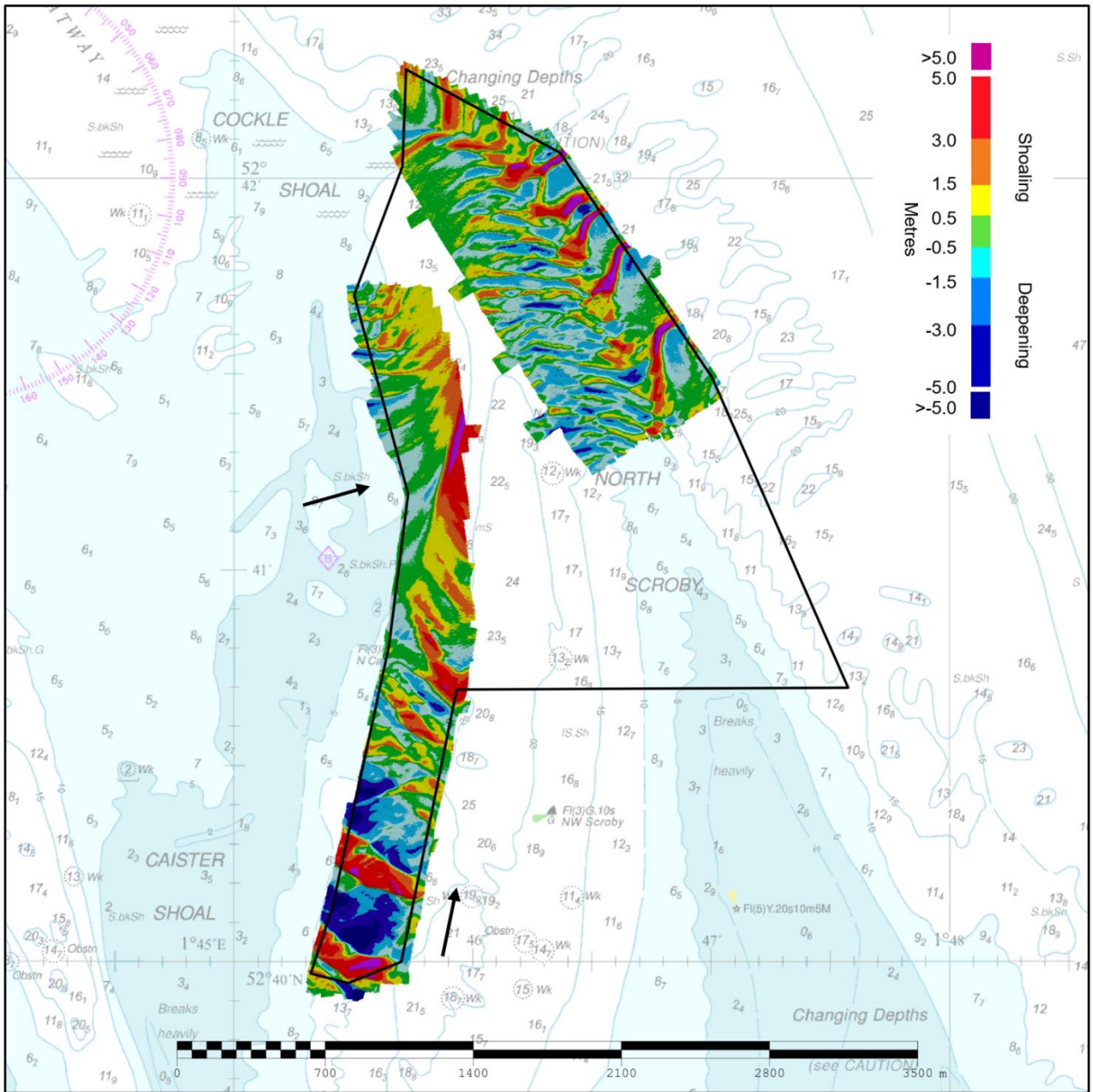


Figure 4: Difference surface showing bathymetric changes between the 2022 and 2023 surveys overlaid on BA Chart 1534-0 (Black arrows represent sandwave migration since 2022 survey).

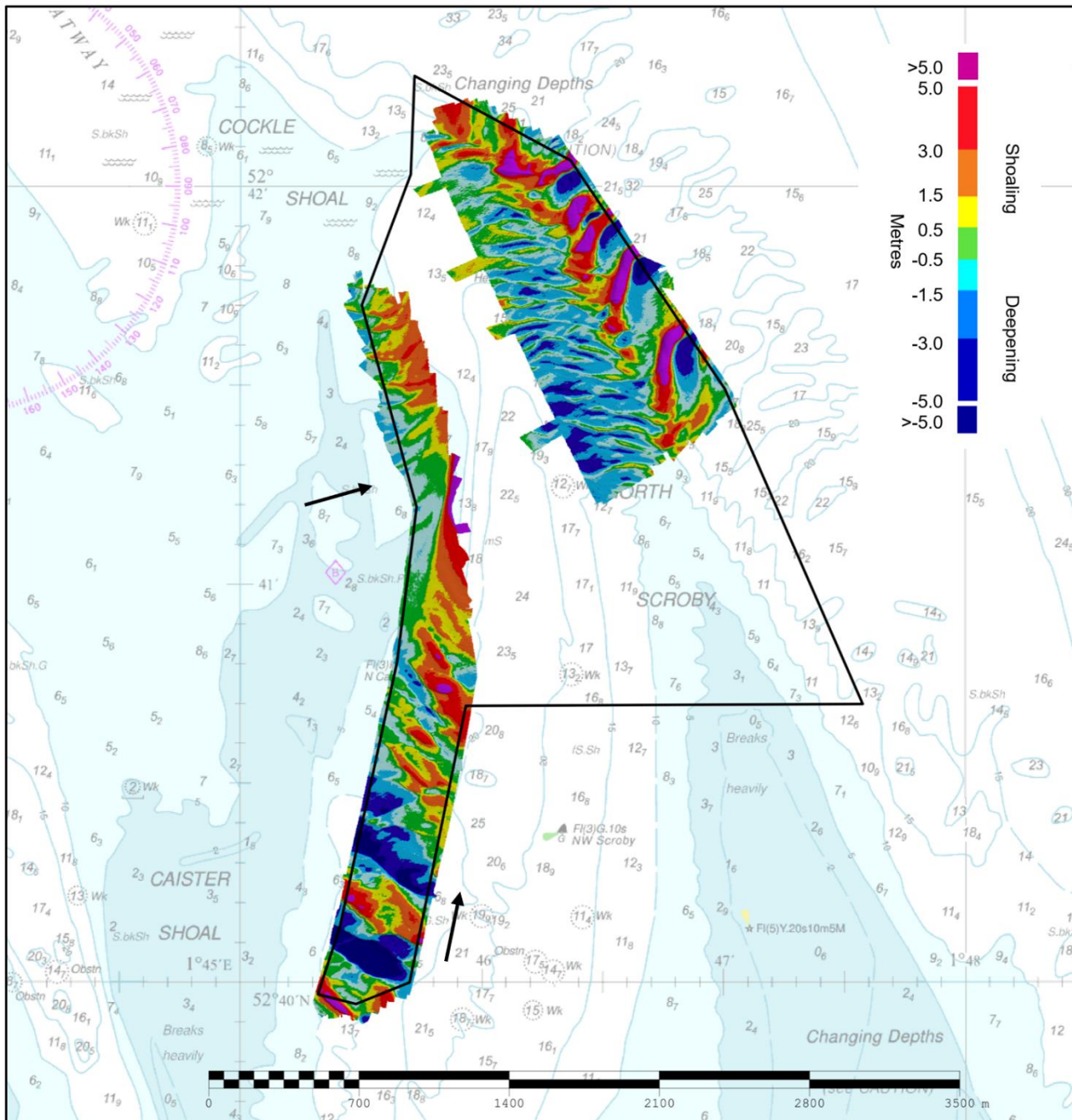


Figure 5: Difference surface showing bathymetric changes between the 2021 and 2023 surveys overlaid on BA Chart 1534-0 (Black arrows represent sandwave migration since 2022 survey)

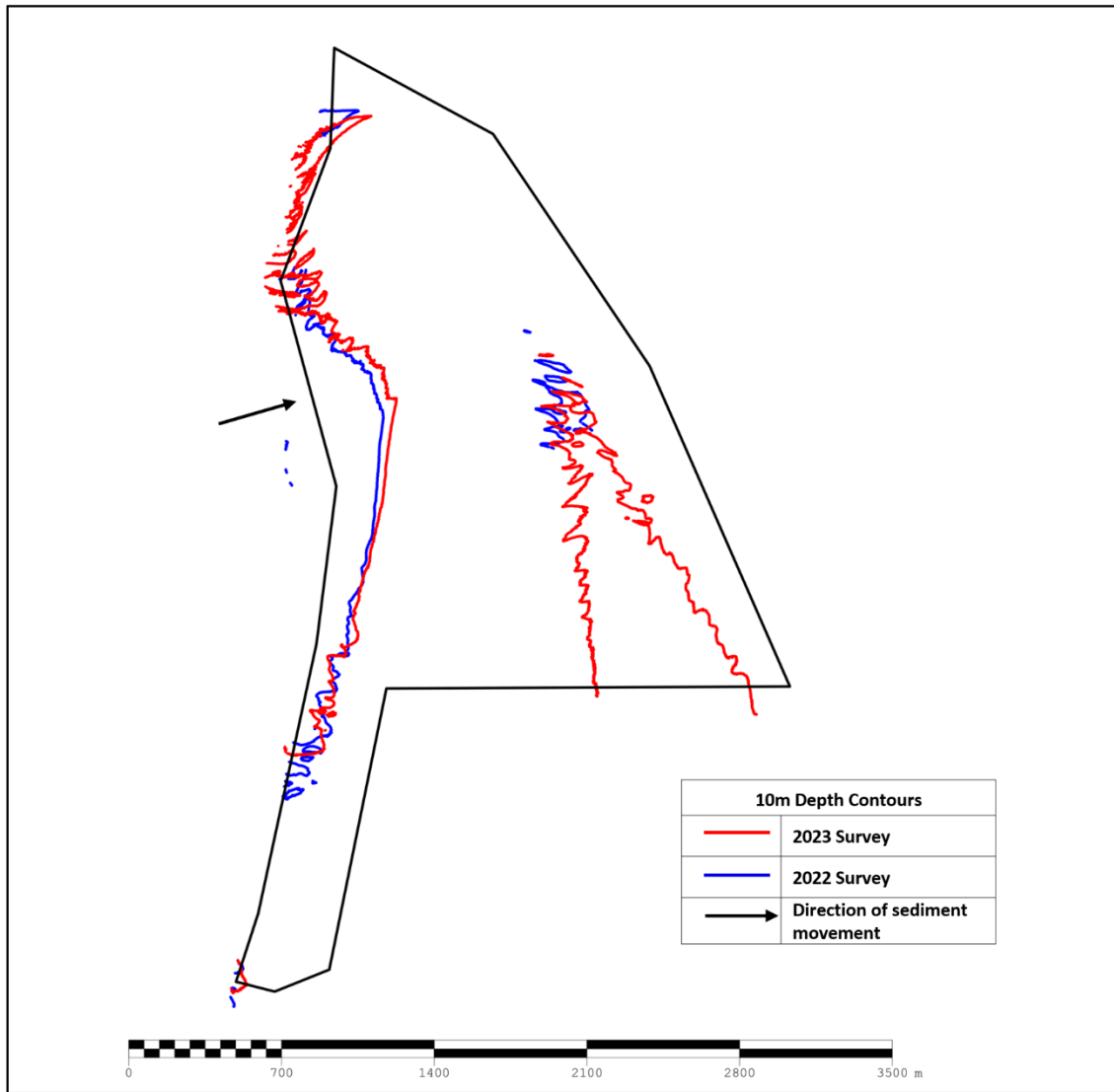


Figure 6: Contour plot showing changes in the 10m contours between 2022 (blue) and 2023 (red). Black arrow represents feature migration.

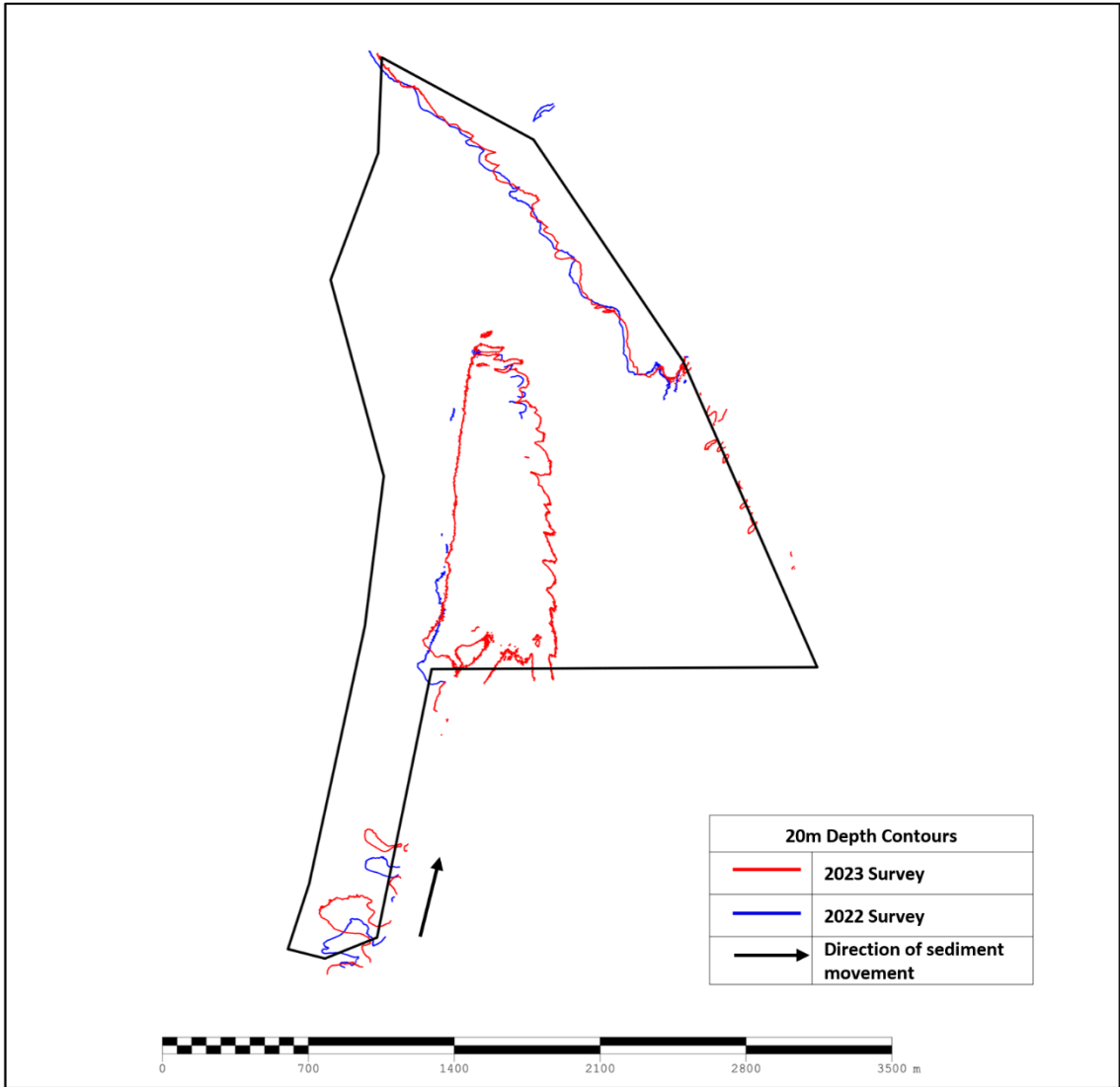


Figure 7: Contour plot showing changes in the 20m contours between 2022 (blue) and 2023 (red). Black arrow represents feature migration.

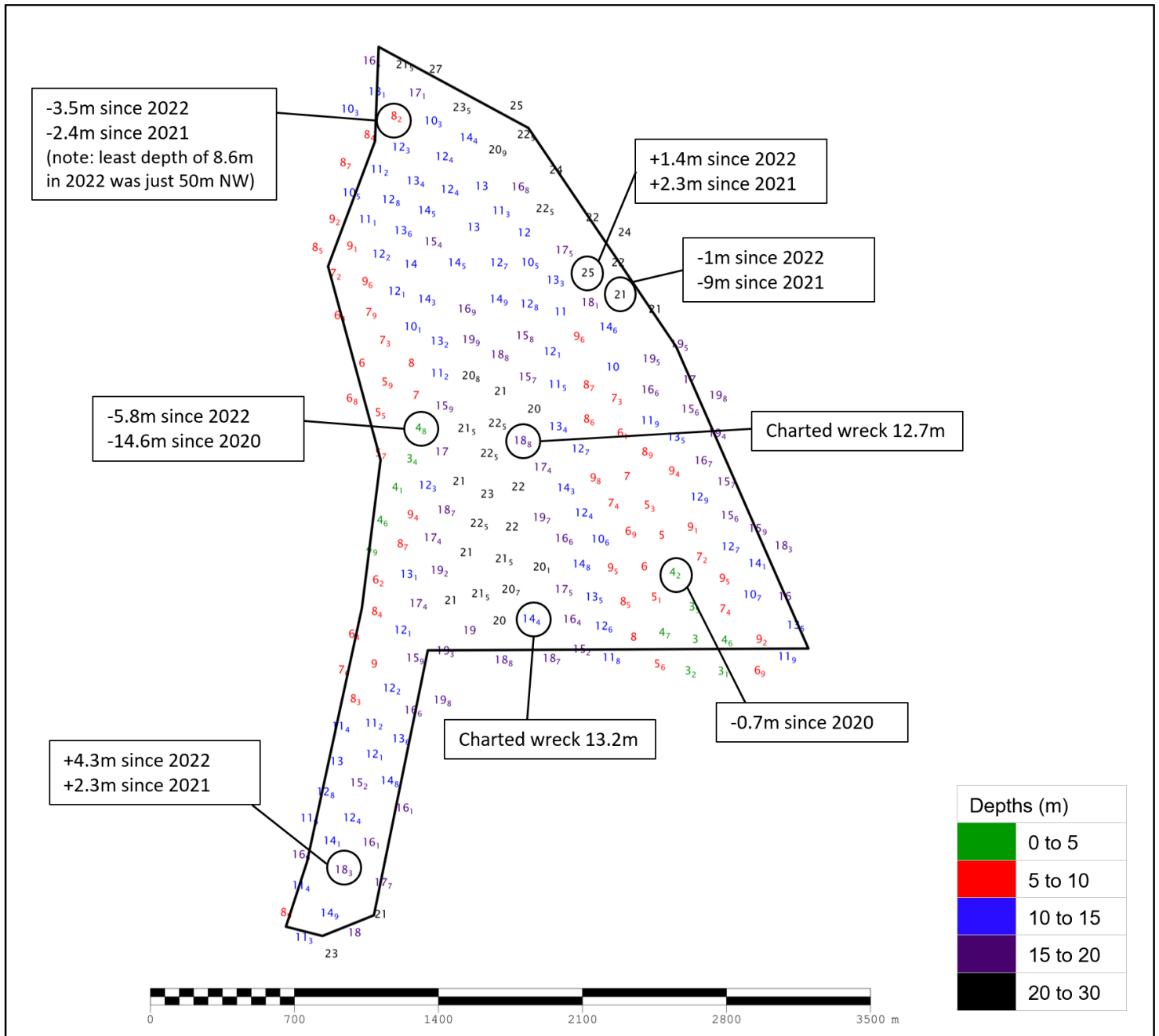


Figure 8: Colour banded depth plot from the 2023 survey with selected depth changes since the 2022, 2021 and 2020 surveys. Positive values (+) represent deepening. Negative values (-) represent shoaling.

6. RECOMMENDATIONS FOR FUTURE SURVEYS

Survey Interval

6.1 Due to the mobility of sandwaves the 3-year frequency should be continued, with 1-year focused areas covering the banks of Caister Shoal and North Scroby.

Survey Area

6.2 The 5m contour of Caister Shoal has gradually been migrating to the E/NE for the last decade, however, the current limits of the southern limb of EA3 (to the south of the North Caister Buoy) adequately cover this movement.

6.3 However, it is also suggested that the western edge of EA3 (both full and focused areas) is expanded to include more of Caister Shoal, in order to more adequately capture the 5 and 10m contours of the bank.

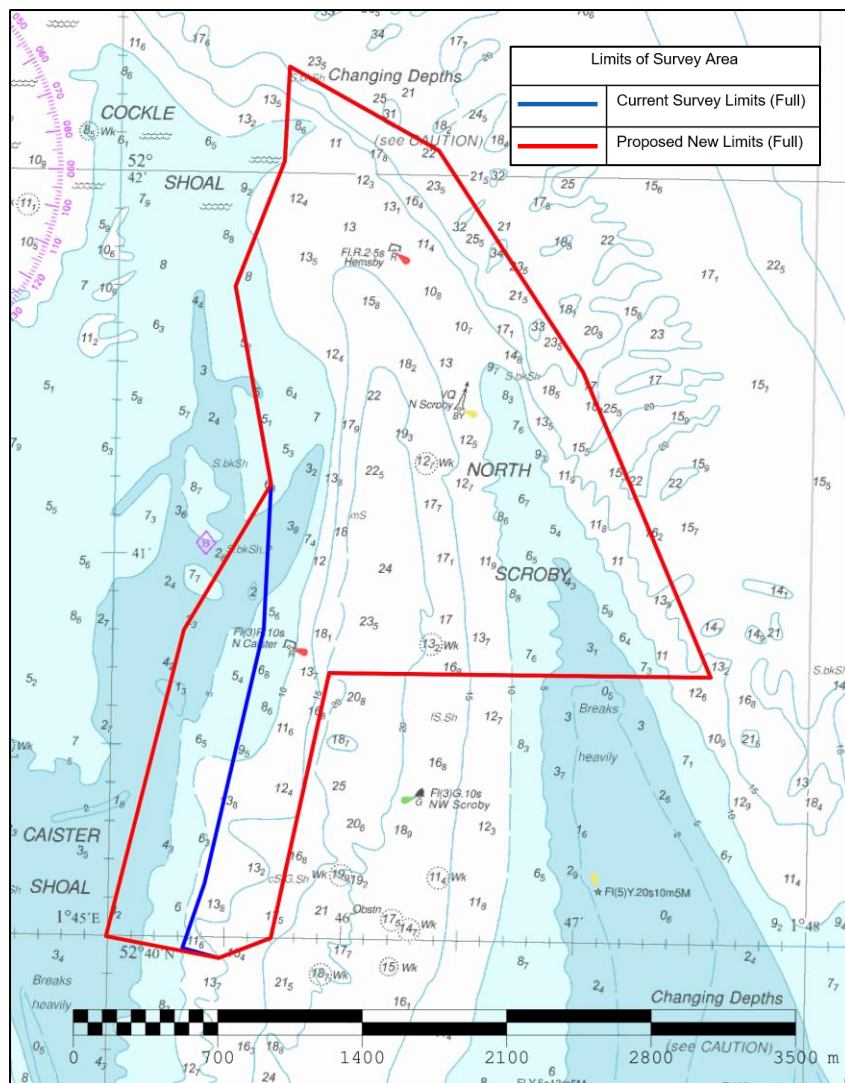


Figure 9: Recommended changes to survey limits of area EA3 Full

The coordinates of the recommended adjusted survey area limits for the 3-year full area EA3 are shown below:

EA3 (full) total area: 5.46 km²

	Latitude	Longitude
1	52.695043N	001.758345E
2	52.700519N	001.761717E
3	52.704643N	001.761975E
4	52.701099N	001.772747E
5	52.691538N	001.783366E
6	52.678332N	001.792873E
7	52.678252N	001.765522E
8	52.666665N	001.761655E
9	52.665759N	001.757957E
10	52.666622N	001.749848E
11	52.680029N	001.755056E
12	52.686442N	001.761131E

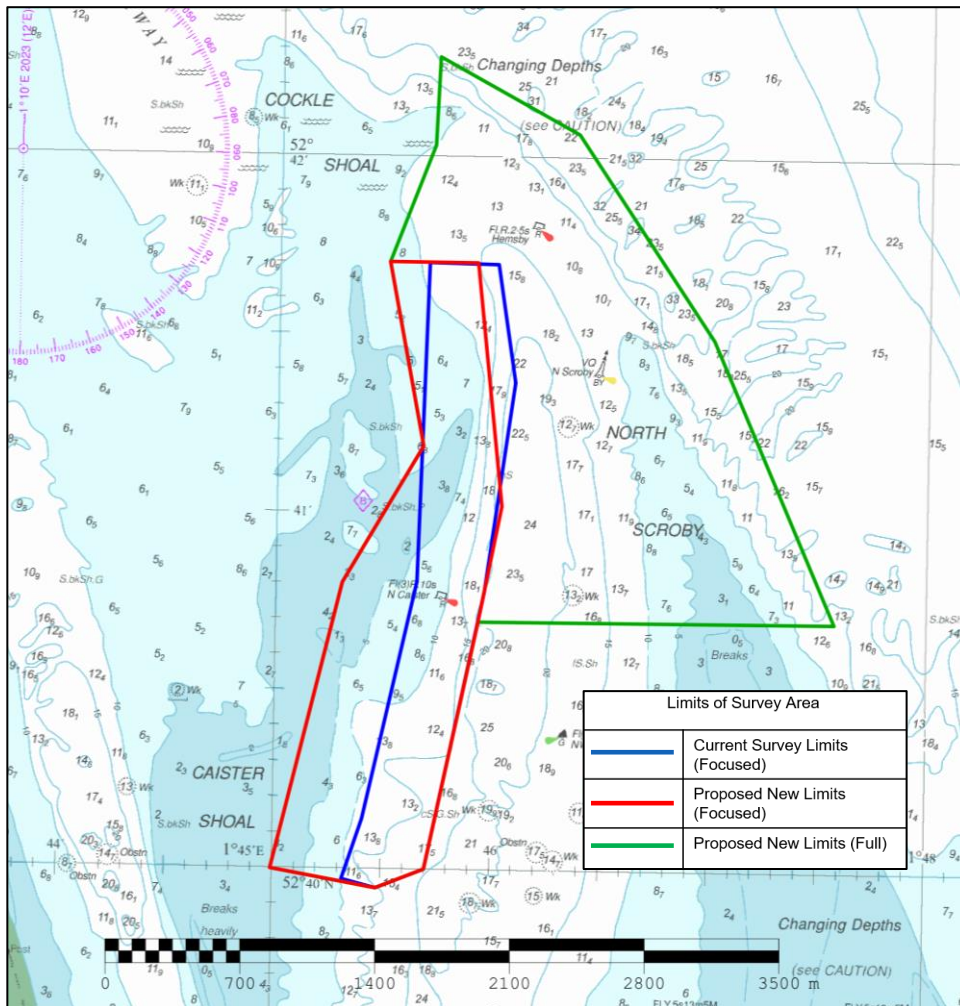


Figure 10: Recommended changes to survey limits of area EA3 A (focused)

The coordinates of the recommended adjusted survey area limits for the 1-year focused area EA3A are shown below:

EA3A (focused) total area: 2.01 km²

	Latitude	Longitude
1	52.695043N	001.758345E
2	52.695043N	001.765112E
3	52.683677N	001.767216E
4	52.678252N	001.765522E
5	52.666665N	001.761655E
6	52.665759N	001.757957E
7	52.666622N	001.749848E
8	52.680029N	001.755056E
9	52.686442N	001.761131E