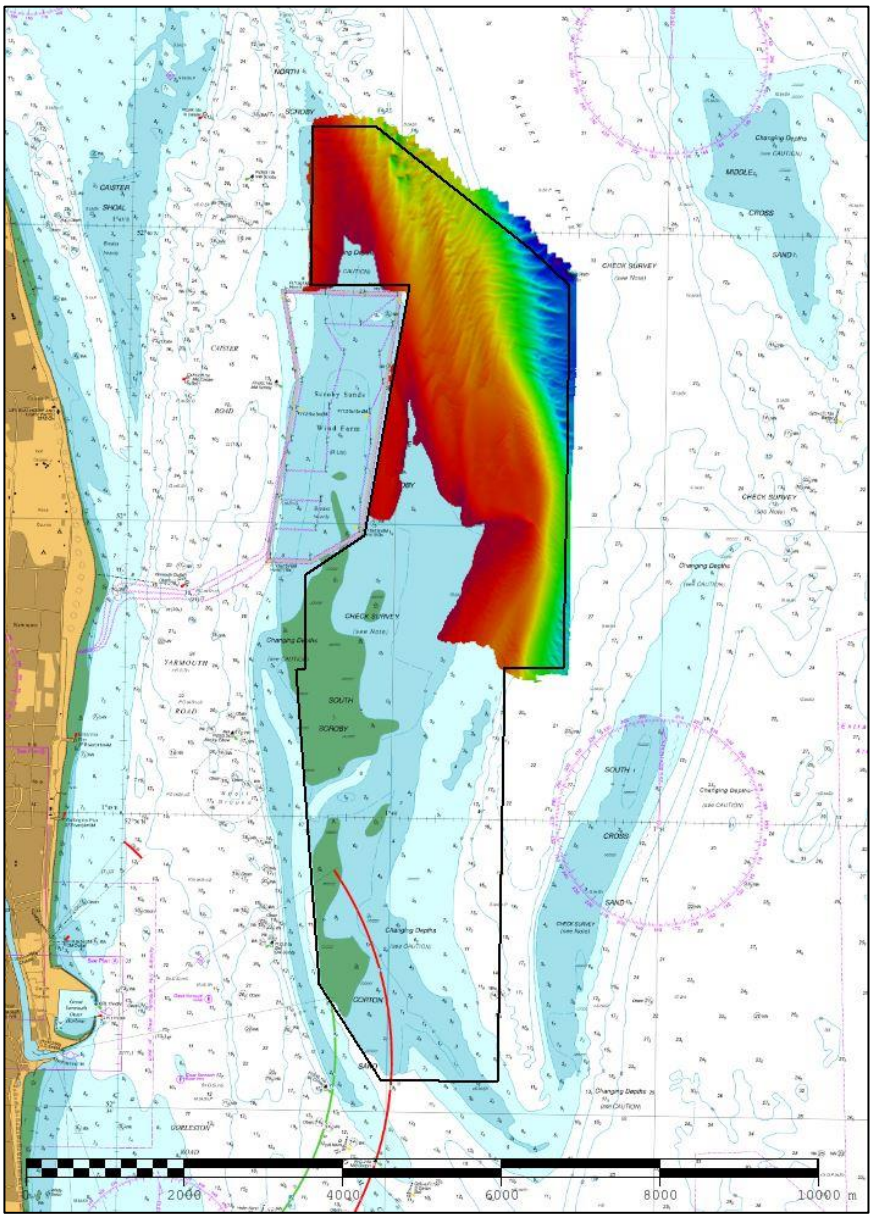
UK Hydrographic Office

EAST ANGLIA
SCROBY SANDS FULL (EA5)
2024 ASSESSMENT

An assessment of the 2024 hydrographic survey of the area EA5: 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).

The Admiralty Chart extracts, other graphics and tables in this Report are included for illustrative purposes only and are NOT TO BE USED FOR NAVIGATION.

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

EA5 SCROBY SANDS FULL, 2024

1. SUMMARY

Changes Detected

1.1 The significant depth for the north of Middle Scroby sand bank is 1.2m, and the most significant depth for Middle Scroby sand bank is 2.2m for the 2024 survey.

1.2 Sand wave migration is evident between the 2024 and 2023 surveys.

1.3 There has been significant southeast shoaling since the last full survey (2011) and the last focused survey (2017). Specific areas currently charted at 37m have shoaled to < 7m.

1.4 The 5m, 10m and 15m contours have all shown a very significant migration to the southeast.

Reasons for Continuing to Resurvey the Area

1.5 Much of the bathymetry in the EA5 survey area has significantly changed, with specific areas shoaling by > 30m. Due to such a large apparent shift of the Middle Scroby sand bank to the southeast, maintaining regular monitoring would be advised.

Recommendations

1.6 Due the observed bathymetric variability and the migration of Middle Scroby sand bank the current 12-year full survey interval, and 6-year focused survey interval should be retained.

1.7 The current full and focused survey area limits should be maintained.

2. LOCATION

2.1 Survey interval at time of resurvey: 12 years for a Full area survey, 6 years for a Focused area survey.

2.2 Area Covered: 28.61 $km^{2.}$

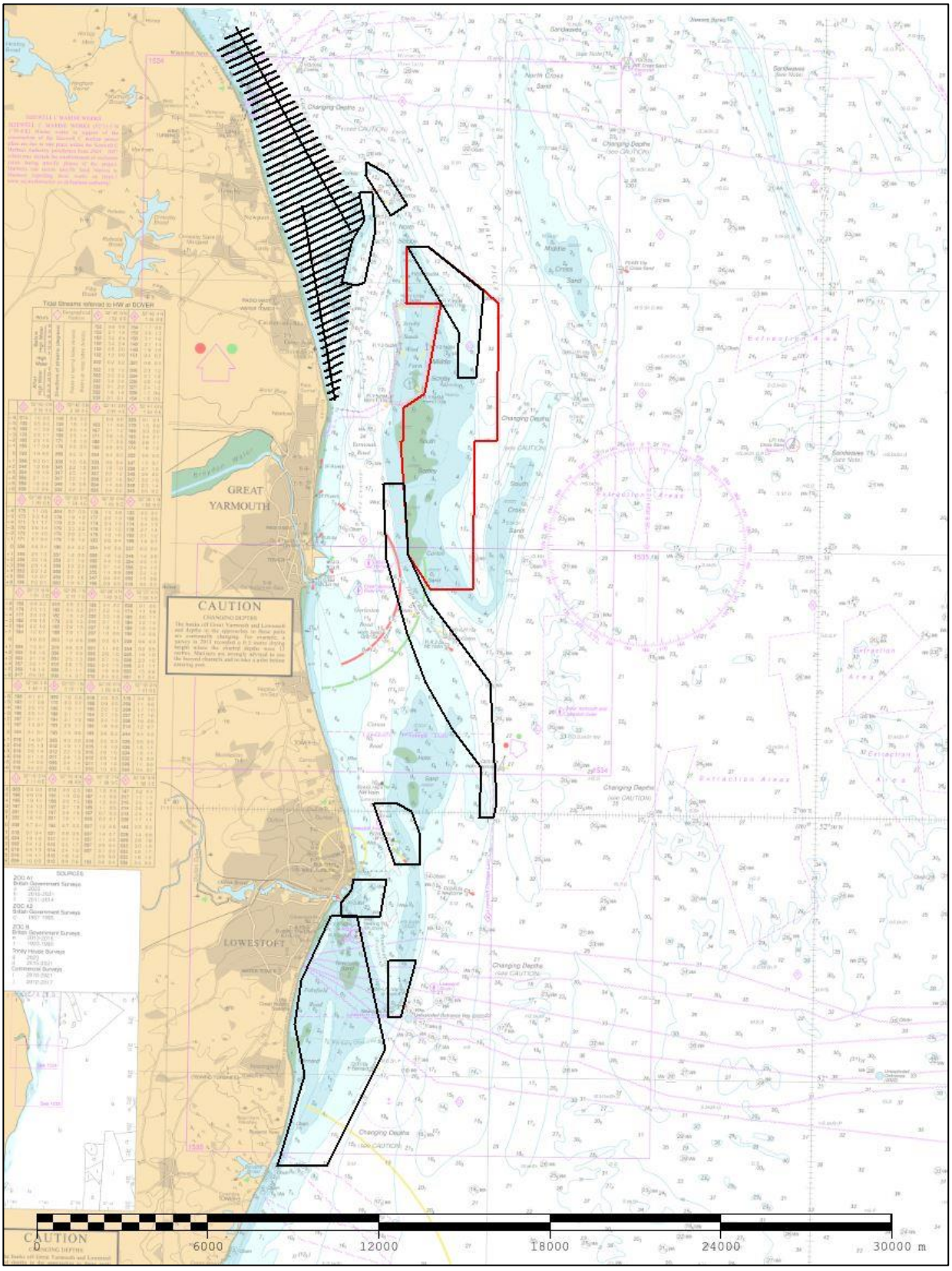

Figure 1: 2024 East Anglia Routine Resurvey areas and EA5A focused area overlaid on BA Chart 1543-0 with EA5 full area in red.

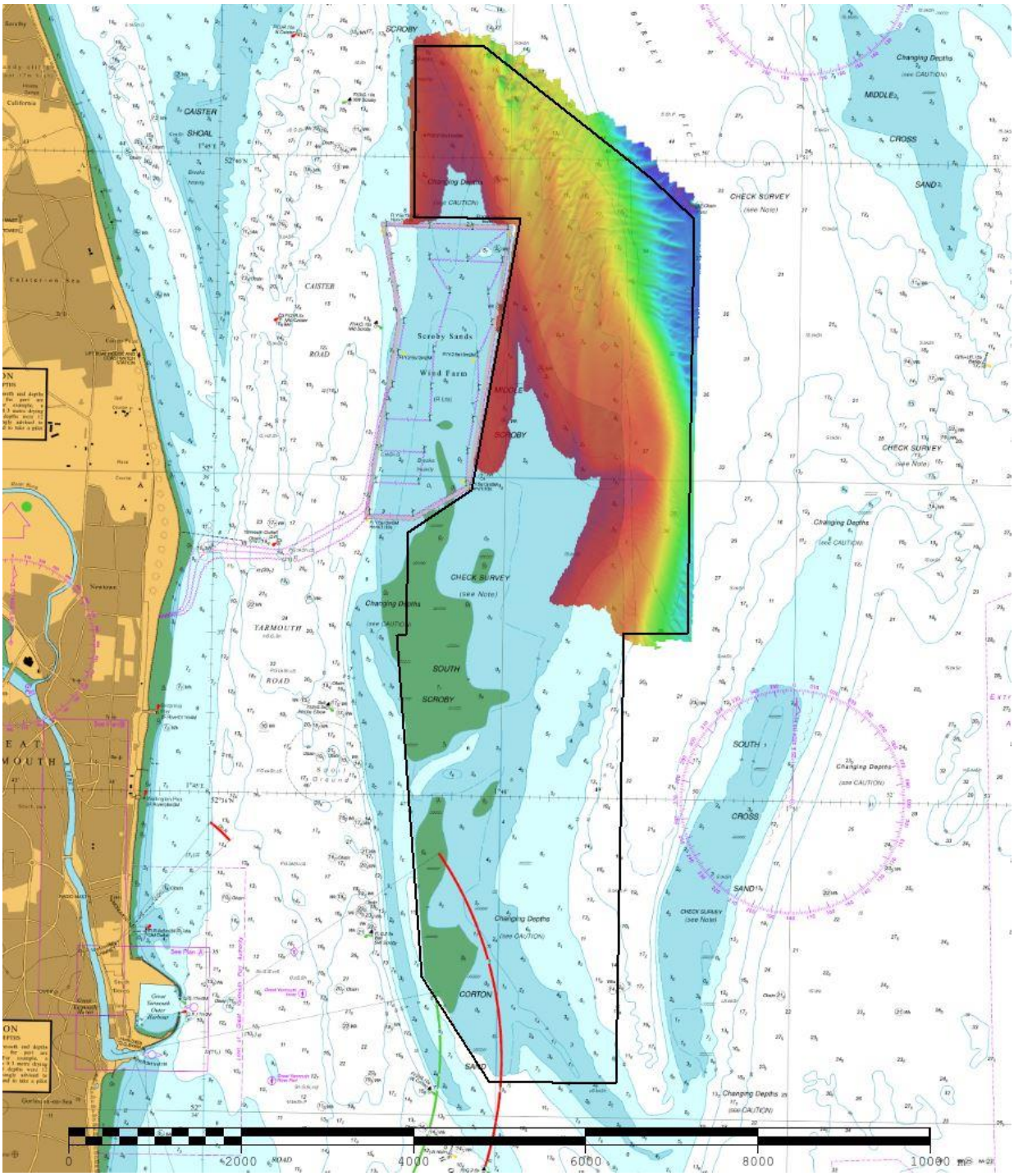

Figure 2: 2024 survey data overlaid on BA Chart 1534

3. REFERENCE SURVEY DETAIL

3.1 The previous full surveys, HI1825 and HI1367, were conducted in 2023 and 2011 respectively, as part of the Routine Resurvey Programme. Both full surveys did not completely cover the HI area, with HI1825 covering the southern region with a series of northern checklines, and HI1367 covered approximately 60% of the area but missed the southern and western regions.

3.2 The previous focused survey, HI1545 was conducted in 2017 as part of the Routine Resurvey Programme. It provides coverage over the full area in the northeast region, see Figure 1 for the coverage area.

3.3 An additional checkline survey, HI1432 was also undertaken in 2013 covering approximately 70% of the full EA5 survey area using SBES at 300m line spacing.

3.4 The Report of Survey for these surveys is available upon request and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

4. NEW SURVEY DETAIL

4.1 The latest full survey, HI1856, was surveyed in September 2024 as part of the 2024 Routine Resurvey Programme.

4.2 The Report of Survey for this survey is available upon request and the validated bathymetric surfaces are available to download from the Admiralty Marine Data Portal.

5. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

5.1 Figure 3 shows significant depths of 2.2m and 5.5m on Middle Scroby Bank where the sand bank has migrated southeast into the deepwater of the navigation channel currently charted at 36m. The other significant depth for the Middle Scroby sand bank is 8.0m, which marks the northern edge of the main sand bank. Only the 8.0m significant sounding overlaps with previous surveys, where it has shallowed from 10.0m in 2017 but remained equal to the depth surveyed in 2011. The other significant/ controlling depths do not have any historical overlap for comparison.

5.2 The northern tongue of Middle Scroby has deepened compared with depths from the checkline survey of 2013, though there is some shoaling into the wind farm highlighted by a 1.2m depth.

5.3 The difference surfaces in Figure 4a and 4b show a westward migration of sand waves between the 2024 (HI1856) and 2023 (HI1825) surveys. Figure 4c shows a cross section profile of the sand waves as indicated in Figure 4b, the sand waves have migrated westward approximately 10-30m, measuring from peak-peak and trough-trough. These observations are based on the limited coverage of the 2024 survey compared with the HI1825 checklines.

5.4 Figures 5a and 5b show the difference between the most recent survey (HI1856) and the 2017 focused survey (HI1545), where there is evident shoaling to the southeast (> 5m in areas) and a north westward sand wave migration. Figure 5c displays the cross-section profile across the centre of the sand waves. This shoaling, while significant, is comparatively less than the change seen between the 2011 survey (HI1367) visible in Figures 6a and 6b. Compared to the most recent survey, over 30% of the survey area has shoaled by greater than 5m.

5.5 Consistent with previous years the 5m, 10m and 15m contours have shifted eastwards from the charted bank into the deeper Barley Picle channel currently charted at 32-37m. The 10m contour has migrated approximately 1020m eastward at the most distant points between 2011 and 2024 as shown in Figure 7. Additionally, between 2011 and 2024, the 5m contour has shifted 1160m (Figure 8) at its most distant point, and the 15m contour has moved 530m (Figure 9).

5.6 The largest driver of bathymetric change across the survey area is the mass shoaling of the southeast sand bank of Middle Scroby present over the past 11-year period. While most noticeable in the shift of the 5m, 10m contours, the change is also reflected in the colour banded sounding plot of Figure 10 where the largest change of 12.7m (shallowing from 16.0m in 2011 to 3.3m in 2024) is located on the South-east of the Middle Scroby.

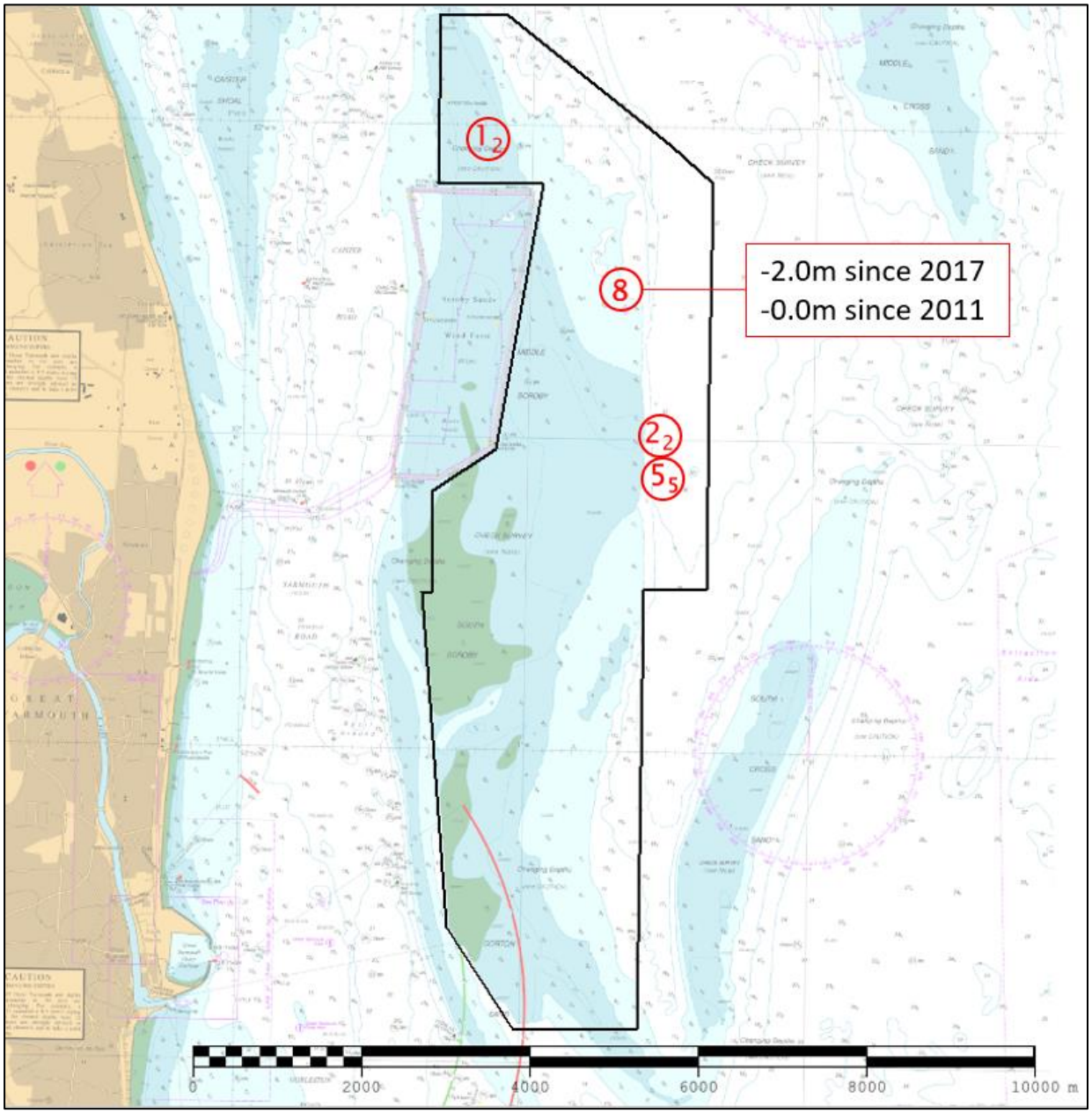

Figure 3: Controlling Depth soundings highlighted, overlaid on BA Chart 1534

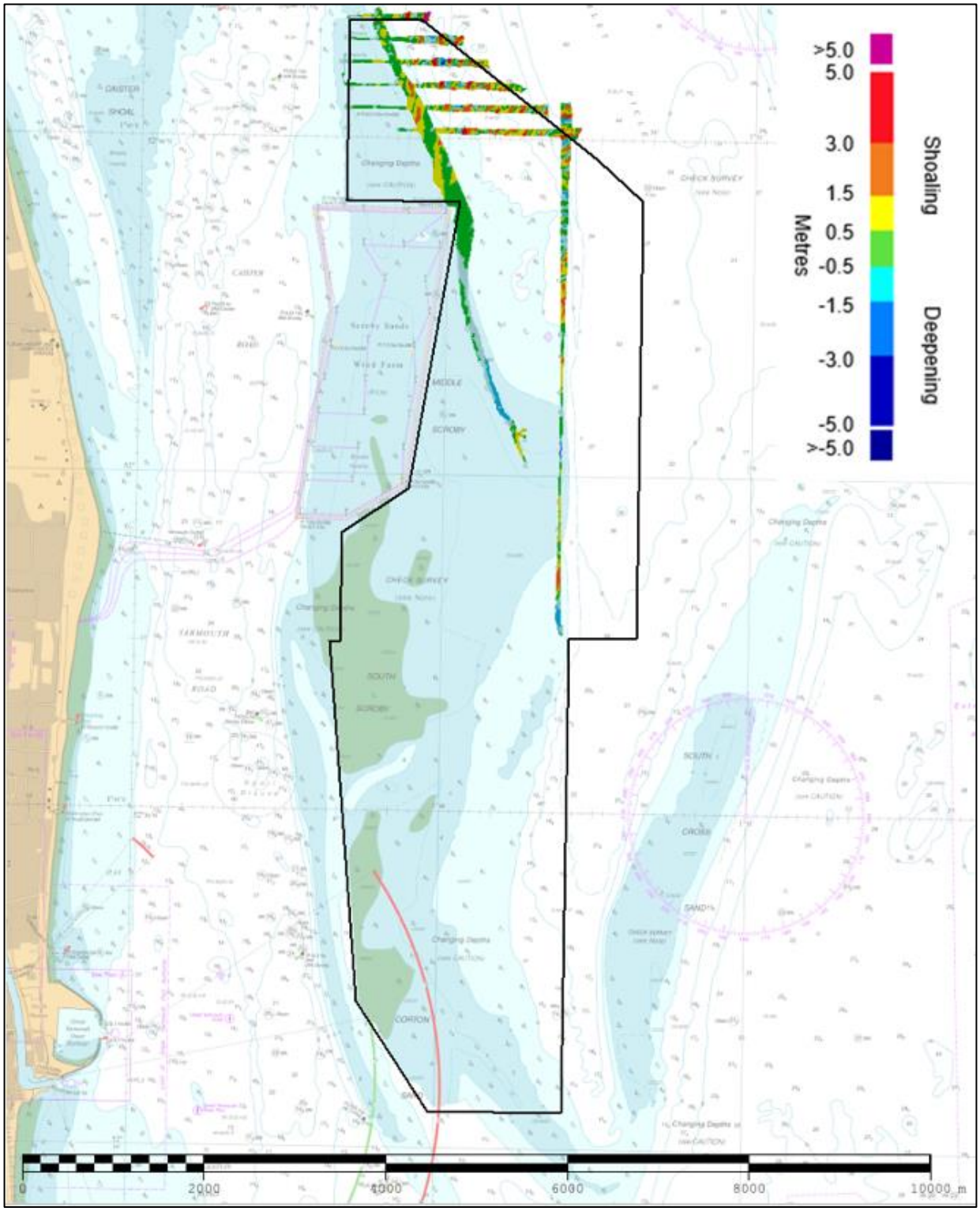

Figure 4a: Difference surface showing bathymetric changes between the 2024 and 2023 surveys overlaid on BA Chart 1534.

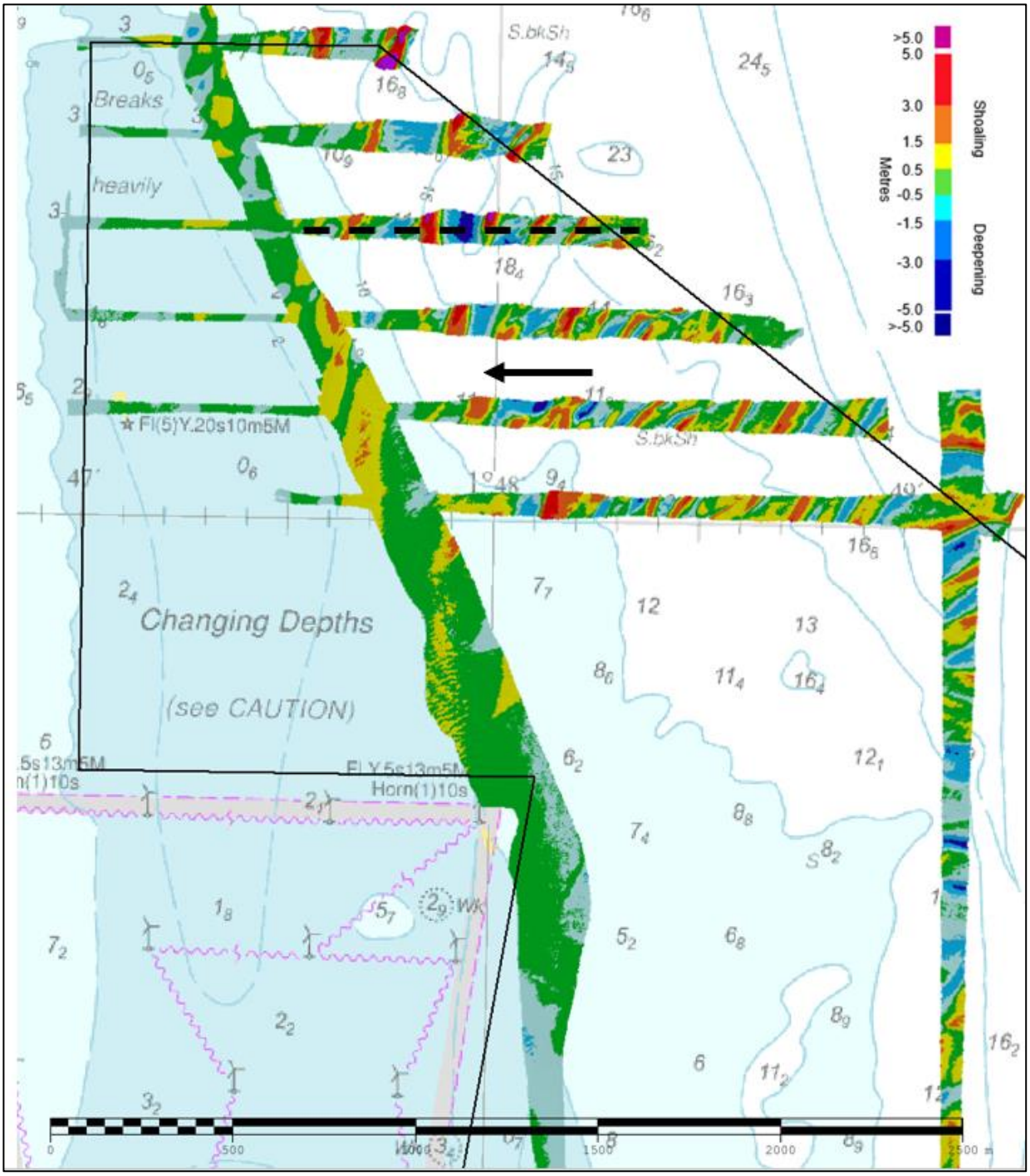

Figure 4b: Difference surface showing bathymetric changes between the 2024 and 2023 surveys overlaid on BA Chart 1534 (Black arrows represent sand wave migration since 2023 survey, black dashed line indicates profile comparisons)

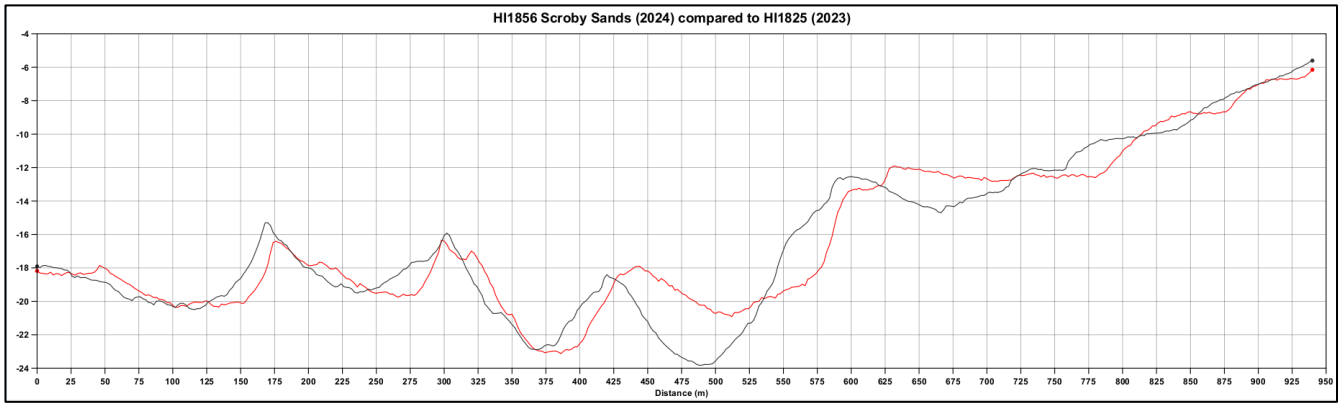

Figure 4c: Profile comparison between the 2024 and 2023 surveys, red is the 2023 survey and black is the 2024 survey. Profile location is denoted by black dashed line in Figure 4b.

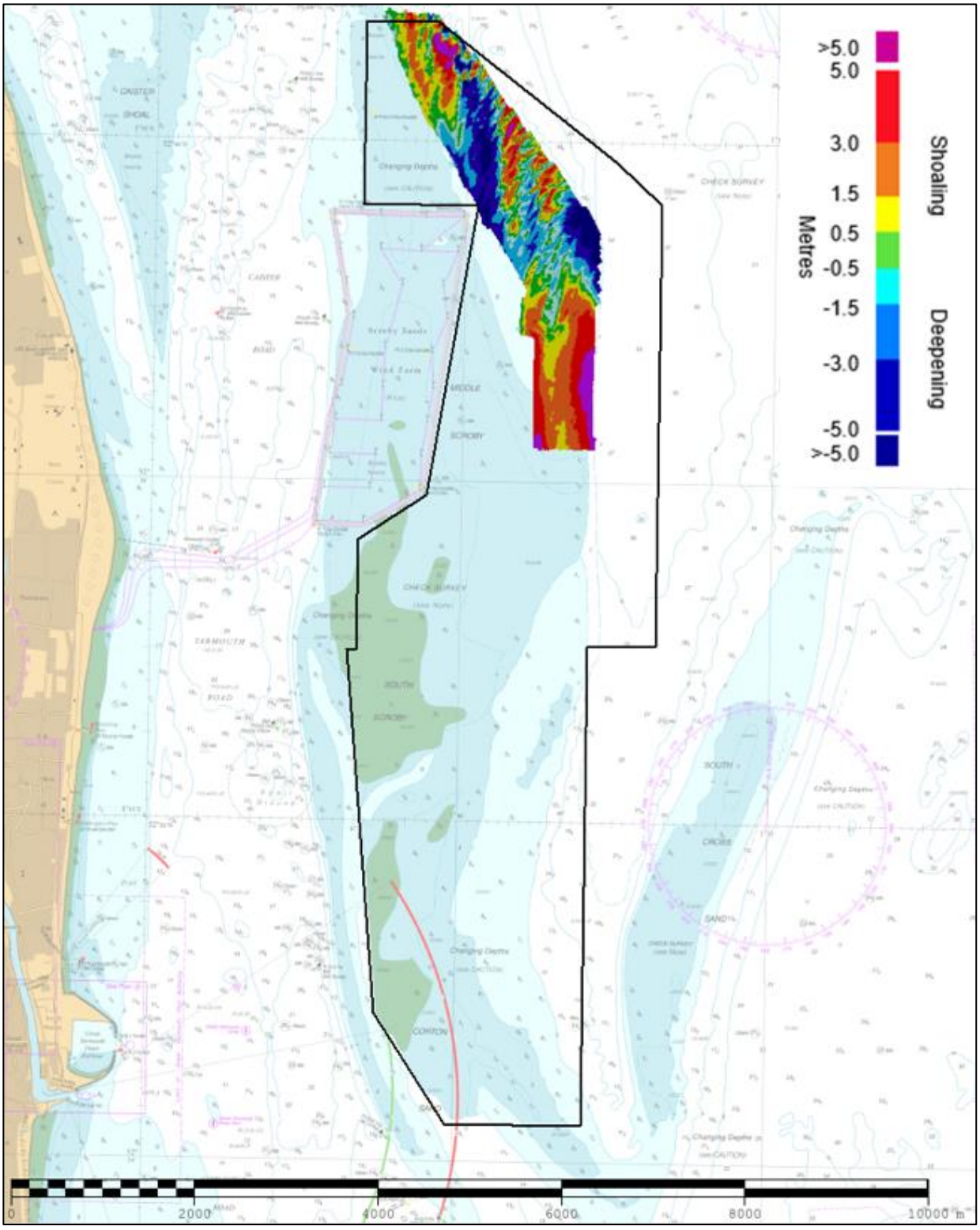

Figure 5a: Difference surface showing bathymetric changes between the 2024 and 2017 surveys overlaid on BA Chart 1534.

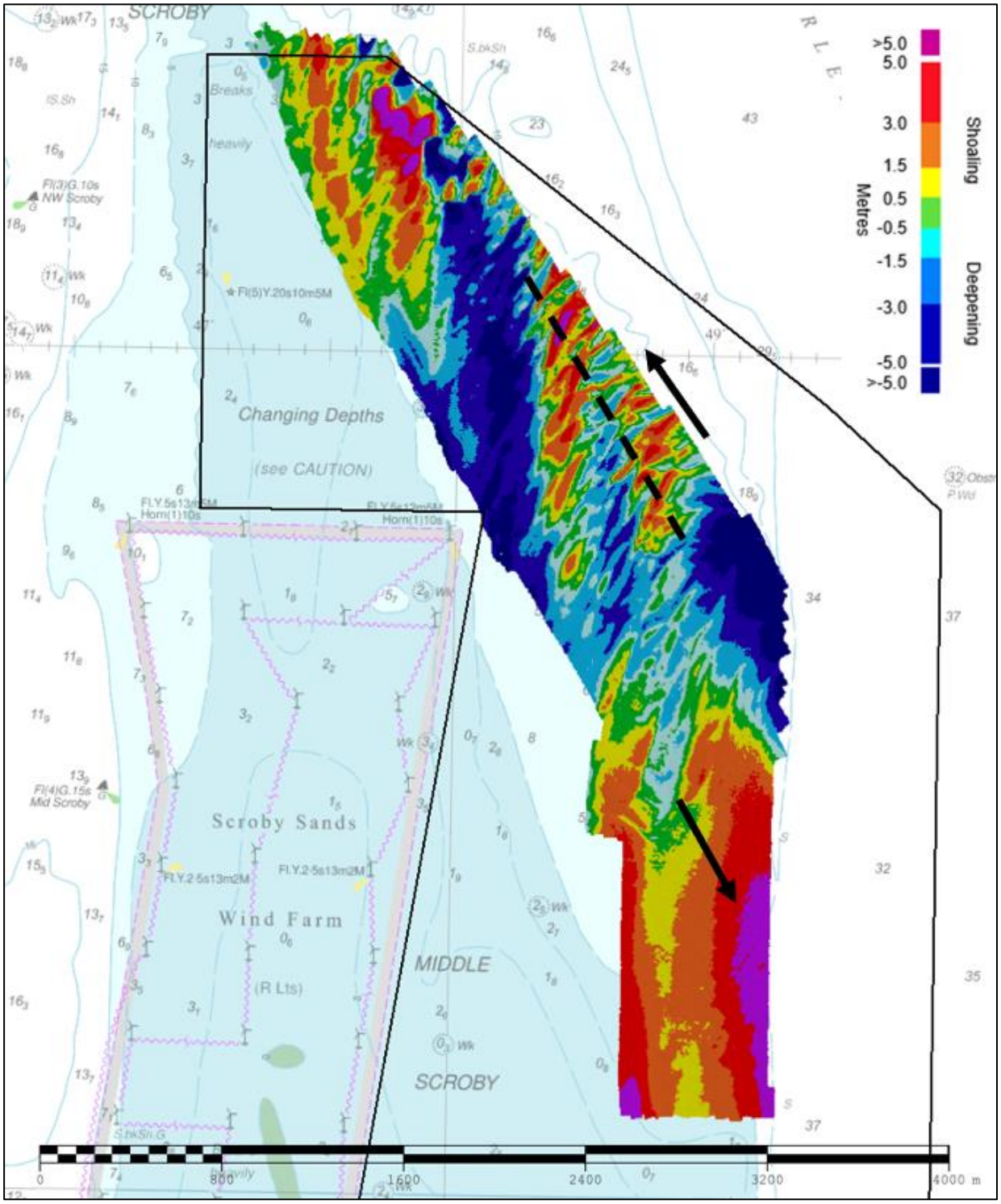

Figure 5b: Difference surface showing bathymetric changes between the 2024 and 2017 surveys overlaid on BA Chart 1534 (Black arrows represent sand wave migration since the 2017 survey, black dashed lines indicate profile comparisons)

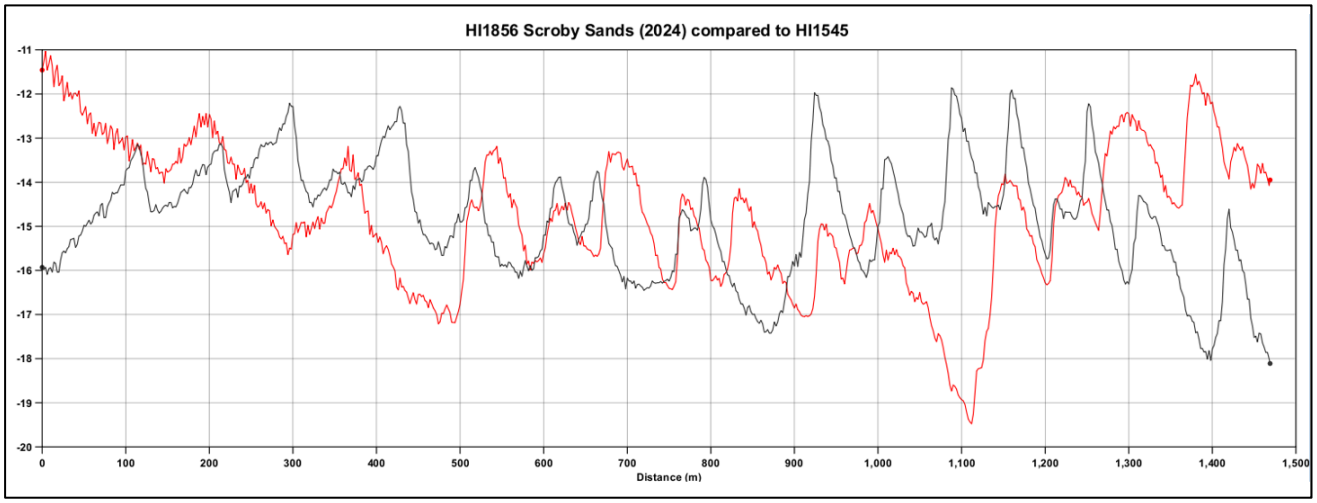

Figure 5c: Profile comparison between the 2024 and 2017 surveys. Red is the 2023 survey and black is the 2024 survey. Profile location is denoted by black dashed line in Figure 5b.

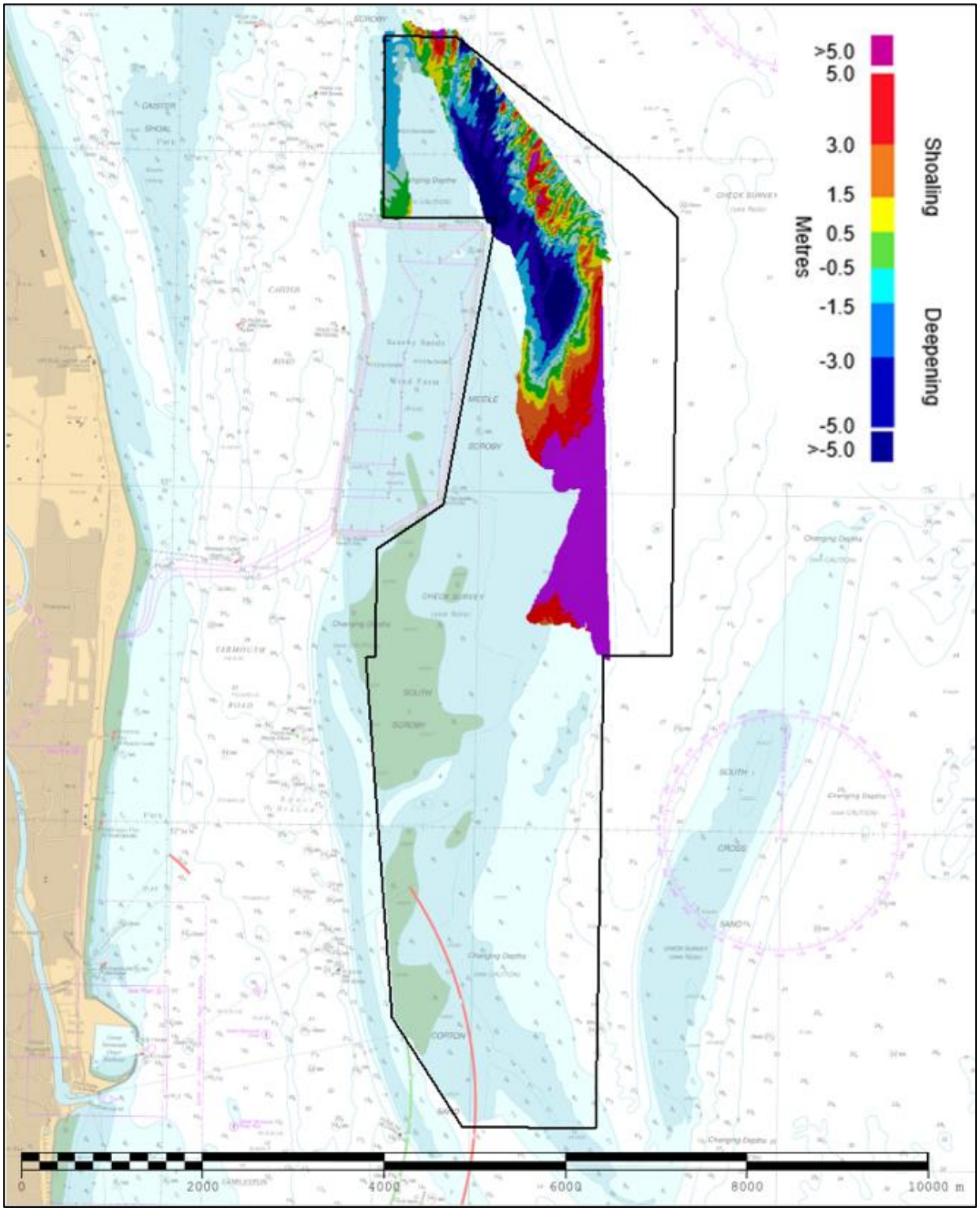

Figure 6a: Difference surface showing bathymetric changes between the 2024 and 2011 surveys overlaid on BA Chart 1534

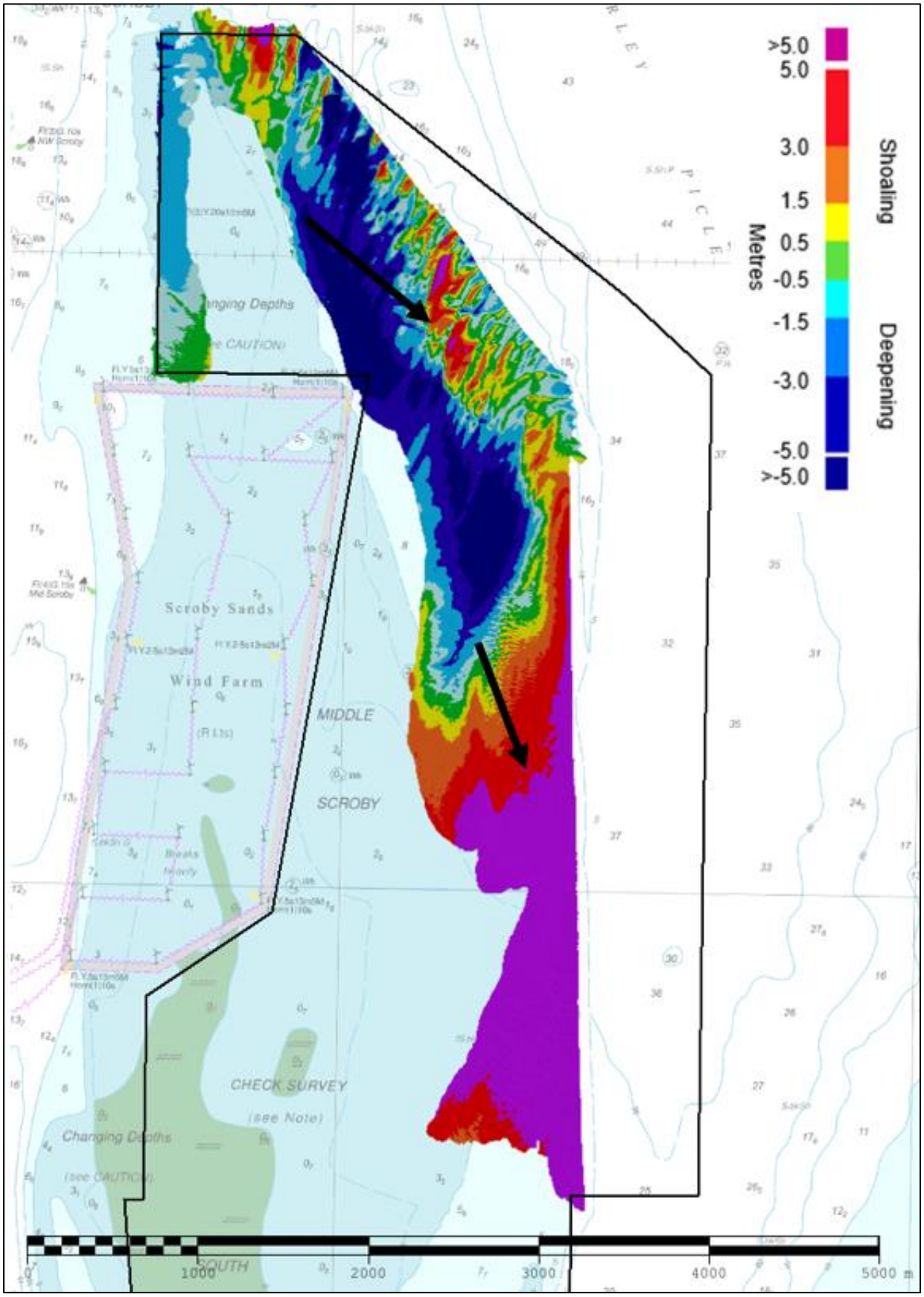

Figure 6b: Difference surface showing bathymetric changes between the 2024 and 2011 surveys overlaid on BA Chart 1534 (Black arrows represent sand wave migration since 2011 survey)

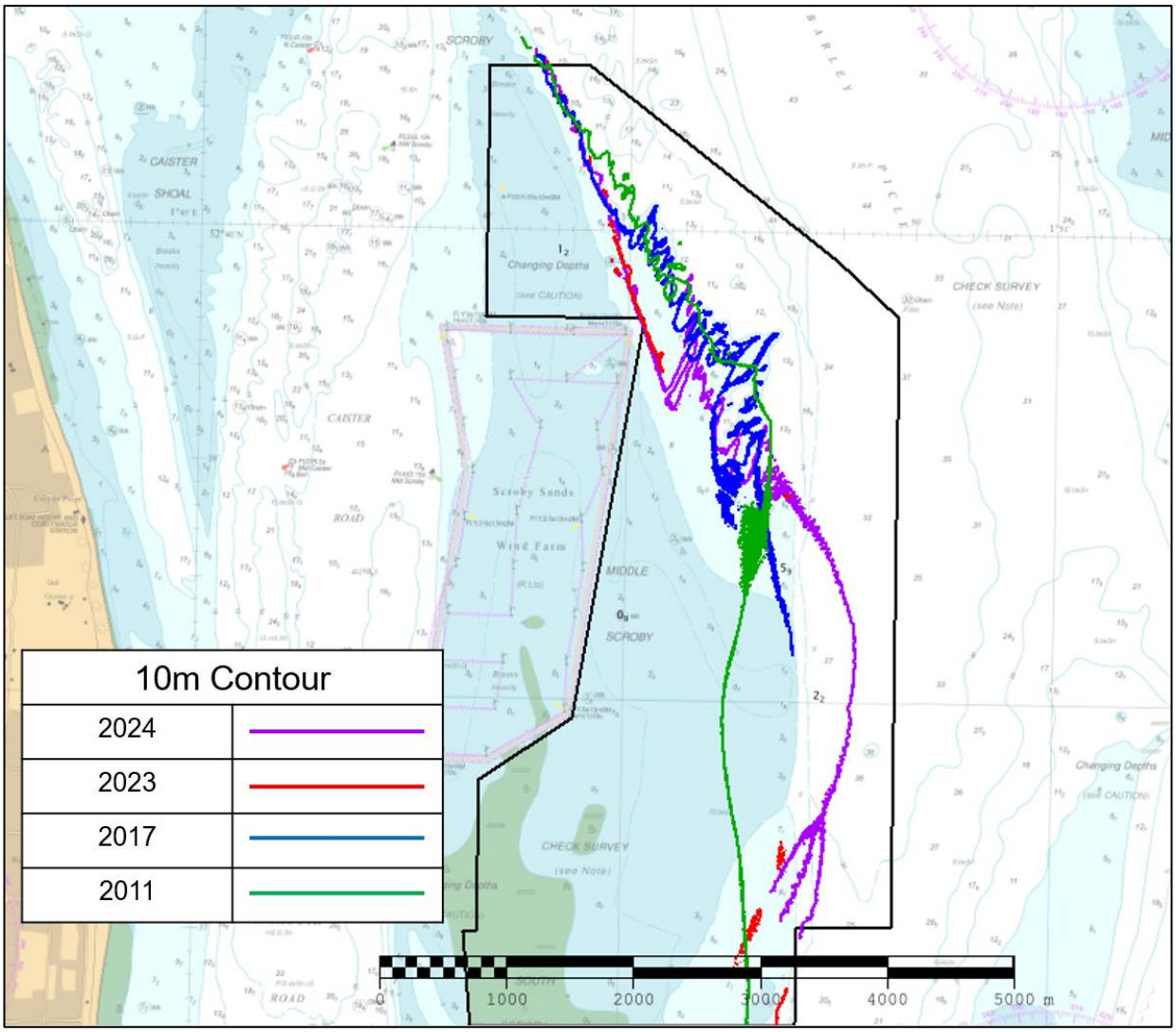

Figure 7: Contour plot showing changes in the 10m contour between 2024 (purple), 2023 (red), 2017 (blue) and 2011 (green).

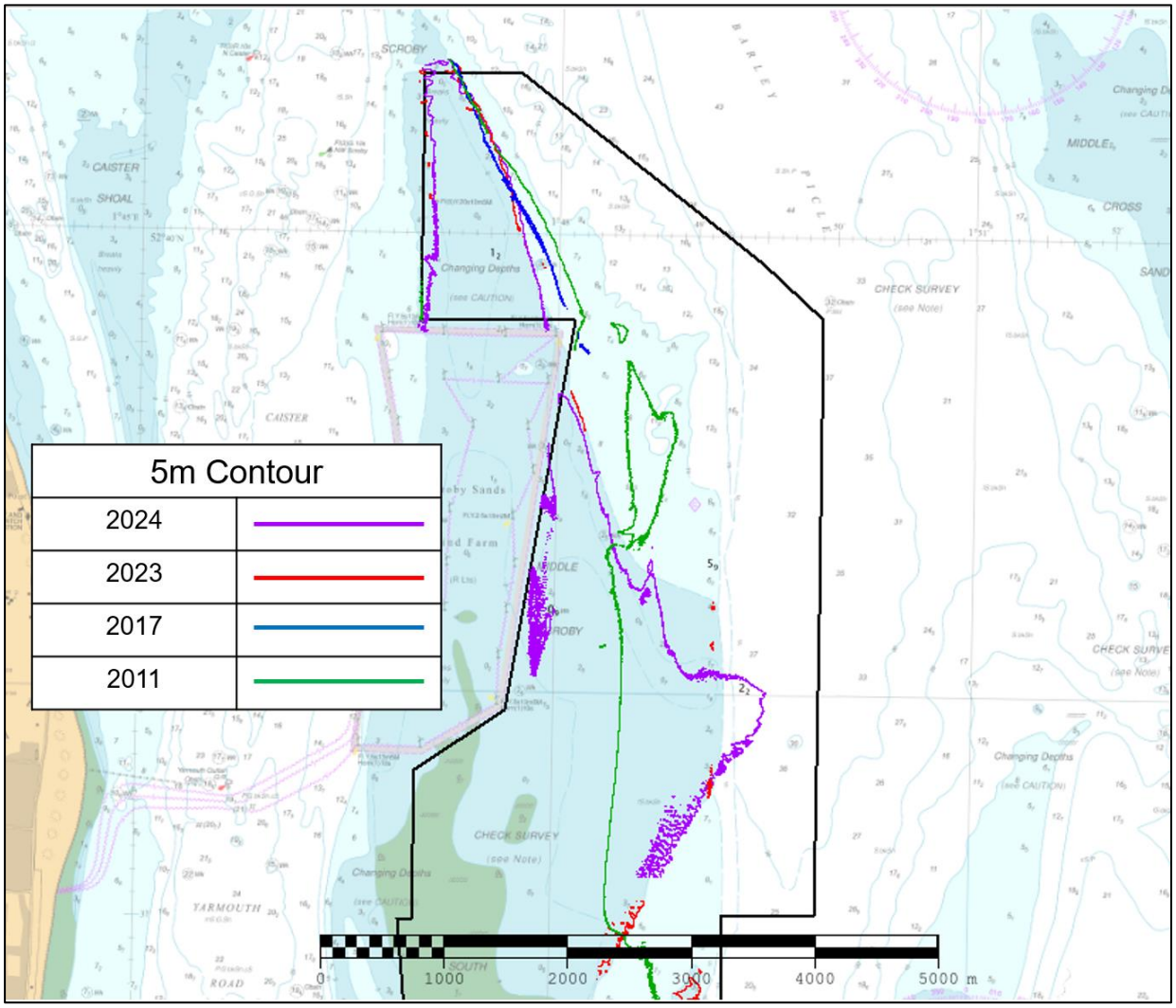

Figure 8: Contour plot showing changes in the 10m contour between 2024 (purple), 2023 (red), 2017 (blue) and 2011 (green).

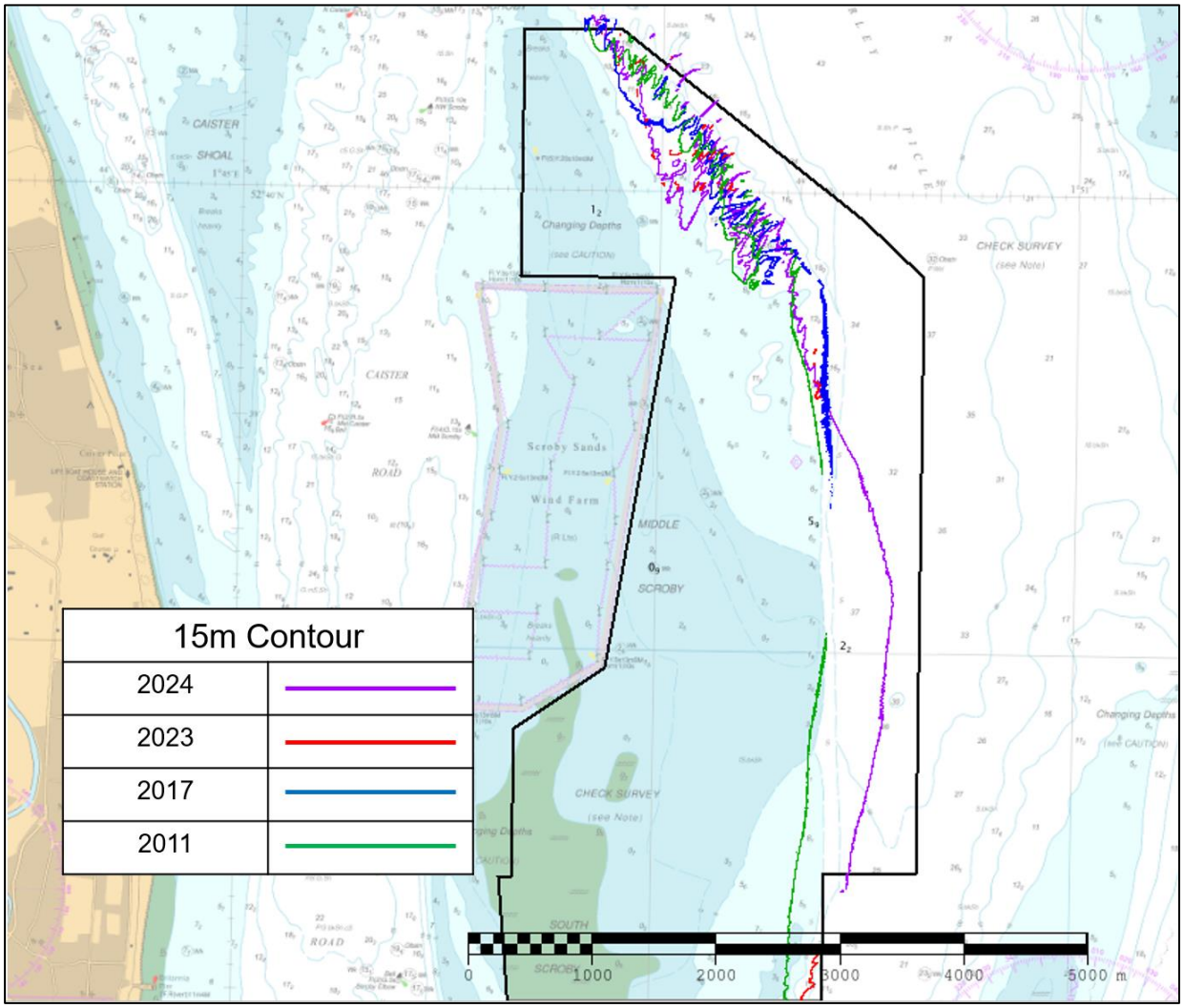

Figure 9: Contour plot showing changes in the 10m contour between 2024 (purple), 2023 (red), 2017 (blue) and 2011 (green).

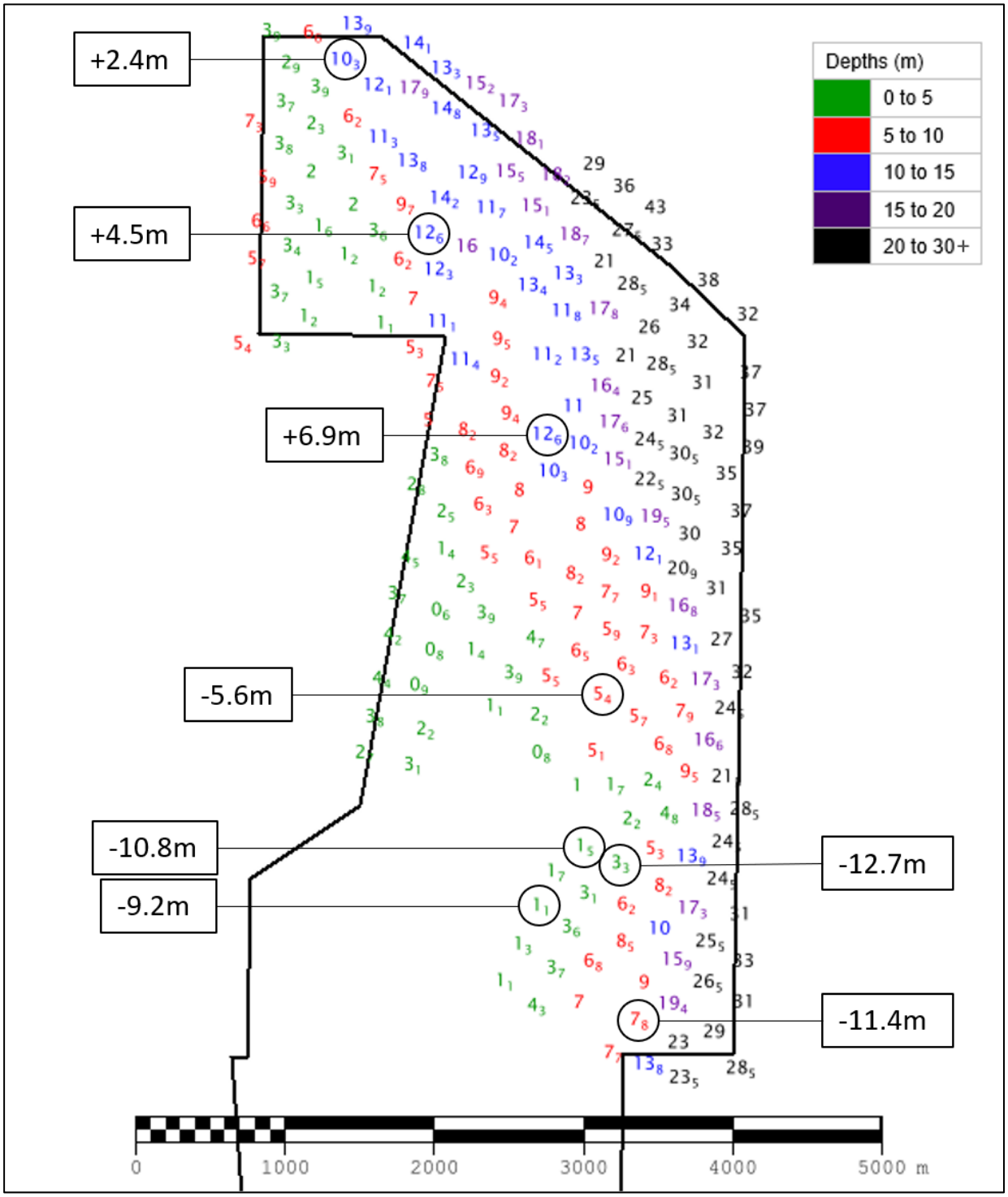

Figure 10: Colour banded depth plot from the 2024 survey with selected depth changes since the 2011 survey. Positive values (+) represent deepening. Negative values (-) represent shoaling.

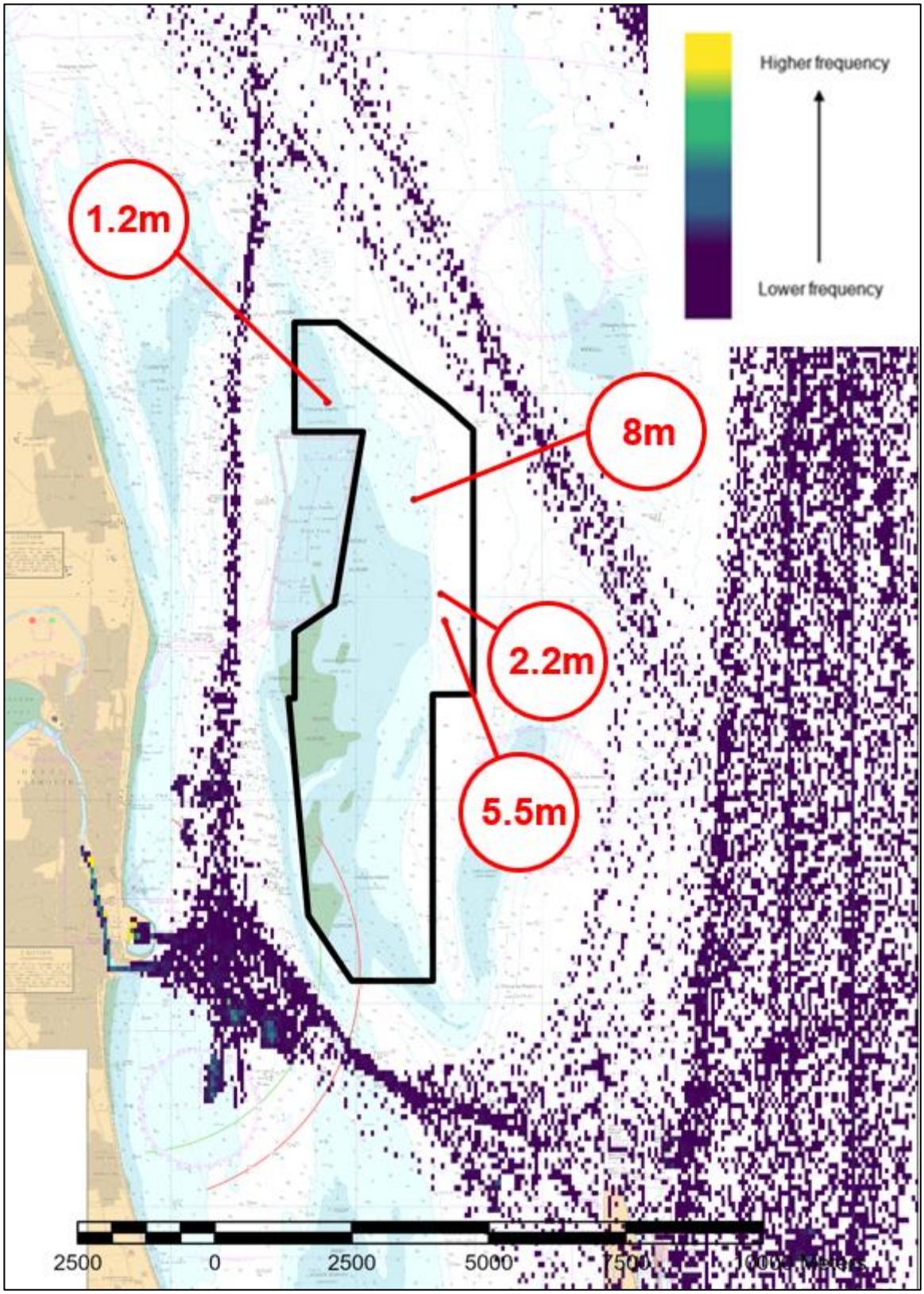

Figure 11: AIS ECDIS regulated tanker, passenger, and cargo vessel data from 2023 with Routine Resurvey EA5 2024 and significant depth soundings (m) overlaid.

6. RECOMMENDATIONS FOR FUTURE SURVEYS

Survey Interval

6.1 Due to the substantial eastwards migration of the Middle Scroby sand bank, regular survey should be continued, the 6-year focused interval and 12-year full survey interval should be at least retained.

Survey Area

6.2 Full coverage of the full survey limits was not achieved in 2023 or 2024, so a focus on covering the whole area would be paramount for the next survey, due in 2029. Consideration could be given to implementing checkline coverage across the whole EA5 area in 2029 instead of the focus area. This could be used to identify areas for further investigation and enable the out-of-date shoal areas to be updated.

6.3 To continue monitoring any progressive migration of the Middle Scroby sand bank into the Barley Picle channel, or to assess for potential signs of any new channels opening, the current area limits should be at least retained for both the full and focused areas.