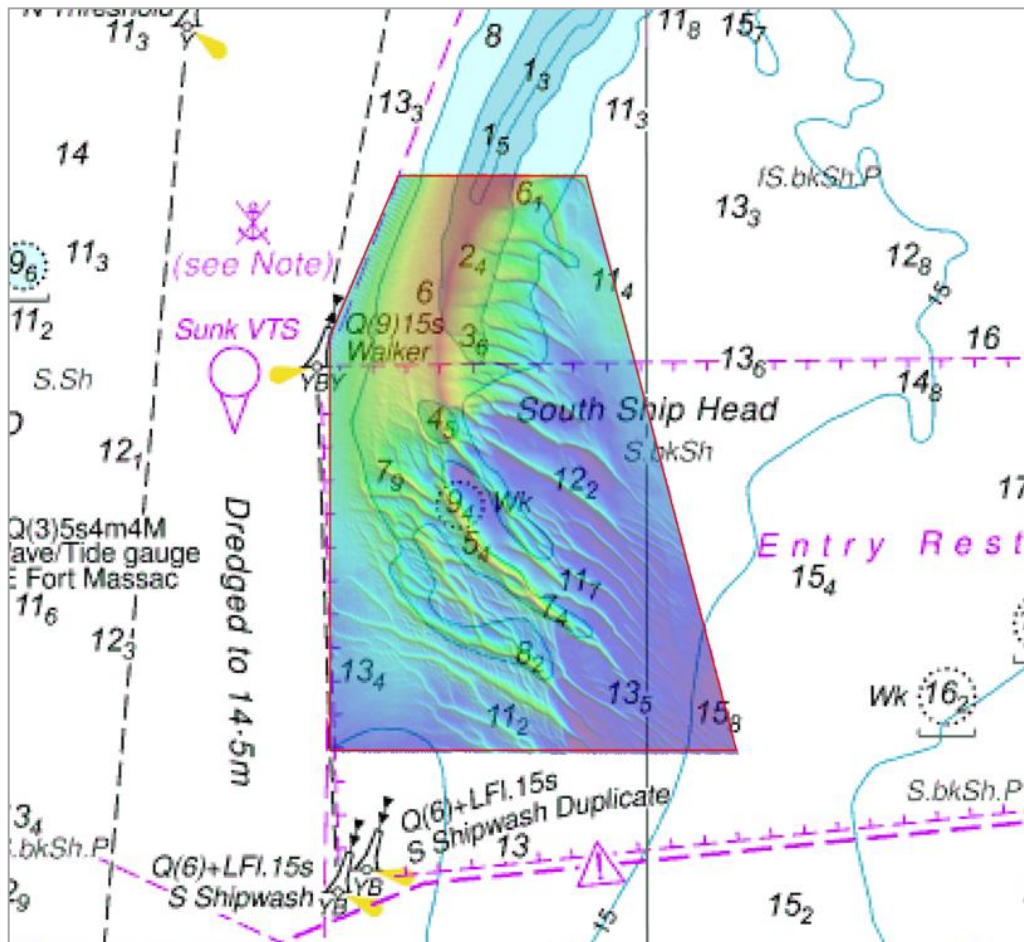




THAMES ESTUARY SOUTH SHIP HEAD

ASSESSMENT ON THE ANALYSIS OF ROUTINE RESURVEY AREA TE3
FROM THE 2014 SURVEY



ENGLAND - THAMES ESTUARY

SOUTH SHIP HEAD

Assessment TE3/2014

An assessment of the 2014 hydrographic survey of the area: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.

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SOUTH SHIP HEAD, 2014

1. EXECUTIVE SUMMARY

The Area and Recent Changes

- 1.1 TE3 covers the southern end of Shipwash, including South Ship Head. Sandwaves up to 5 metres high lie along the seaward side of the bank, with an 8 metre high sandwave at the southern end of the bank. A ridge running along the top of the bank provides the minimum depths in the area.
- 1.2 Harwich Deep Water Channel lies to the west of the area and vessels using this channel pass close south of South Ship Head. Use of the southern part of TE3 is restricted to certain vessels and those meeting certain pilotage requirements.
- 1.3 South Ship Head shows a slight westward migration towards the Harwich Deep Water Channel, with the 10 metre contour migrating 50 metres in the vicinity of Walker buoy.

Reasons for Continuing to Resurvey the Area

- 1.4 Due to its close proximity to the busy approach into the Harwich Deep Water Channel, South Ship Head requires periodic resurveying. However, the bank falls outside the heavily trafficked area, which is covered by area TE3A to the south.

Recommendations

- 1.5 The 6 year survey frequency should be retained with unchanged limits.

2. INTRODUCTION

- 2.1 This Assessment is produced by the United Kingdom Hydrographic Office (UKHO) for the Maritime and Coastguard Agency (MCA).
- 2.2 Analysis of the Routine Resurvey Areas forms part of the Civil Hydrography Programme and the reports are made available to members of the Committee On Shipping Hydrography (COSH) through the UKHO website, before being 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).

3. HISTORY

- 3.1 The original area TE3 was created in 1980, based on parts of existing areas C and E, as a result of a re-organisation of the Thames Estuary routine resurvey areas. The first report on the new area was produced in 1983.
- 3.2 The area has since undergone a number of revisions, including a reduction in the area following analysis of the 2008 survey.
- 3.3 The main approach to the Harwich Deep Water Channel is covered by area TE3A, which is fully surveyed every 2 years, with an intervening focused survey along the Harwich Deep Water track.
- 3.4 TE3 is currently scheduled for re-surveying every 6 years. Details of the area, including the survey history, are at [Annex A](#).

4. DESCRIPTION OF THE AREA

- 4.1 TE3 comprises the southern end of the Shipwash, including South Ship Head. The western limit abuts the seaward limit of the Harwich Haven Authority.
- 4.2 The shallowest depths within TE3 are found on Shipwash bank. Sandwaves up to 5 metres high lie along its seaward side; these sandwaves are asymmetrical and lie at right angles to the bank, with the lee slope facing south-west. At the southern end of the bank, an 8 metre high sandwave extends in a southeast direction. The top of the bank is marked by a ridge, which provides the minimum depths in the area.

5. SHIPPING IN THE AREA

- 5.1 Much of the area falls inside an area where entry is restricted to vessels of less than 20 metres in length, sailing vessels, vessels engaged in fishing activity and vessels meeting certain pilotage requirements. No vessel may leave this restricted area by crossing the western limit between Walker and South Shipwash buoys. This limits the use of TE3 by merchant vessels.
- 5.2 Shipping entering and leaving the Harwich Deep Water Channel passes to the south and west of the area. Some vessels permitted to pass through the Restricted Entry Area pass to the east of South Ship Head and the southern part of South Ship Head is transited by shallow draught pilot vessels. A general representation of routes is shown at [Annex B](#).

6. 2008 SURVEY DETAILS

- 6.1 The survey was conducted on 20 September under sea state 2-3 conditions.
- 6.2 Survey data was acquired using a Kongsberg Simrad EM3000D multibeam echosounder. The primary reference position was provided by an Applanix POS MV system, supplied with GPS data from C-Nav, a dynamic GPS Precise Point Positioning System. The POS MV combined GPS and Inertial measurement Unit (IMU) data into an integrated navigation solution and the survey referred to the International Terrestrial Reference Framework 2000 (ITRF2000) datum.
- 6.3 Observations from GPS heighting were combined with VORF (Vertical Offshore Reference Framework) to reduce depths to Chart Datum.
- 6.4 The survey is considered to have met IHO Order 1 (S44 4th Edition) standard.

7. 2014 SURVEY DETAILS

- 7.1 The survey was conducted from 11 – 16 July under variable weather conditions.
- 7.2 Survey data was acquired using a Kongsberg EM3002D Multibeam Echosounder. The primary reference position was supplied by an Applanix POS MV 320E system, supplied with GPS data from C-Nav, a dynamic GPS Precise Point measuring system. The survey is referred to the International Terrestrial Reference Framework 2008 (ITRF2008) datum.
- 7.3 Observations from GPS heighting were combined with VORF (Vertical Offshore Reference Framework) to reduce depths to Chart Datum. The final deliverable was a 1 metre CUBE (Combined Uncertainty and Bathymetric Estimator) Surface.
- 7.4 The Survey is considered to have achieved IHO Order 1a (S44 5th Edition) standard. The surface overlaid on chart 2692 is shown at [Annex C](#).

8. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

- 8.1 Colour banded depth plots of the 2008 and 2014 surveys, produced to allow visual comparisons, are at Annexes F and G respectively.
- 8.2 A variability plot, at Annex H, shows the changes in depths between the 2008 and 2014 surveys.
- 8.3 Comparison plots of the 5, 10 and 15 metre contours are at Annexes I, J and K respectively. The 5 and 10 metre contours show a slight westward migration towards the Harwich Deep Water Channel, with the 10 metre contour migrating 50 metres in the vicinity of Walker buoy. This westward migration is shown in cross-section A-B in Annex E, with the location of the cross-section shown in Annex D, along with an indication of sediment transport.
- 8.4 Minimum depths across the area are broadly similar to those found in the 2008 survey.

9. IMPLICATIONS FOR SHIPPING

- 9.1 Shipwash remains adequately marked by South Shipwash and walker buoys. Although depths adjacent to Walker buoy are around 1.4 metres shoaler than those in the 2008 survey.

10. RECOMMENDATIONS FOR FUTURE SURVEYS

- 10.1 The 6 year survey frequency should be retained and the survey conducted as an extension to the full survey of adjacent area TE3A. The area limits were greatly reduced following analysis of the 2008 survey and remain appropriate.

AREA SPECIFICATIONS
(Including Survey History)

AREA: TE3**REGION:** Thames Estuary**NAME:** South Ship Head**LIMITS:**

A	51°55'.00N	1°34'.68E
B	51°55'.00N	1°35'.60E
C	51°54'.00N	1°36'.00E
D	51°53'.00N	1°35'.30E
E	51°53'.00N	1°33'.95E
F	51°53'.85N	1°33'.95E

Area co-ordinates are referred to WGS 84 Datum

AREA SIZE: 1.9 Sq NM (6.5 Sq km)**SURVEY INTERVAL:** 6 yrs**SURVEYS:** Conducted at 1:25,000 scale unless indicated (not applicable to multibeam surveys)

Year	Survey	File Ref	Data	Year	Survey	File Ref	Data
1981	K8862	H1955/80	s.t.	2002	M3739	HH090/993/01	s.t.d
1984	K9461	H2931/83	s.t.	2005	M4334	HH091/115/01	m
1987	M1121	H4024/86	s.t.	2008	HI1263	2008-026406	m
1989	M1386	H3933/88	s.t.d.	2014	HI1459	2014-153152	m
1990	M1580	HH090/494/01	s.t.d.				
1993	M2129	HH090/573/01	s.d.				
1996	M2631	HH090/690/01	s.t.d				
1999	M3225	HH090/993/01	s.t.d				

KEY: s = sonar sweep, t = seabed texture tracing, d = digital data, m = multibeam digital data

REPORTS: 1983 Latest survey included K8862 (H3911/80)
 1985 Latest survey included K9461 (H0423/85)
 1997 Latest survey included M2631 (HA145/002/003/07)
 2002 Latest survey included M3739
 2005 Latest survey included M4334
 2008 Latest survey included HI1263

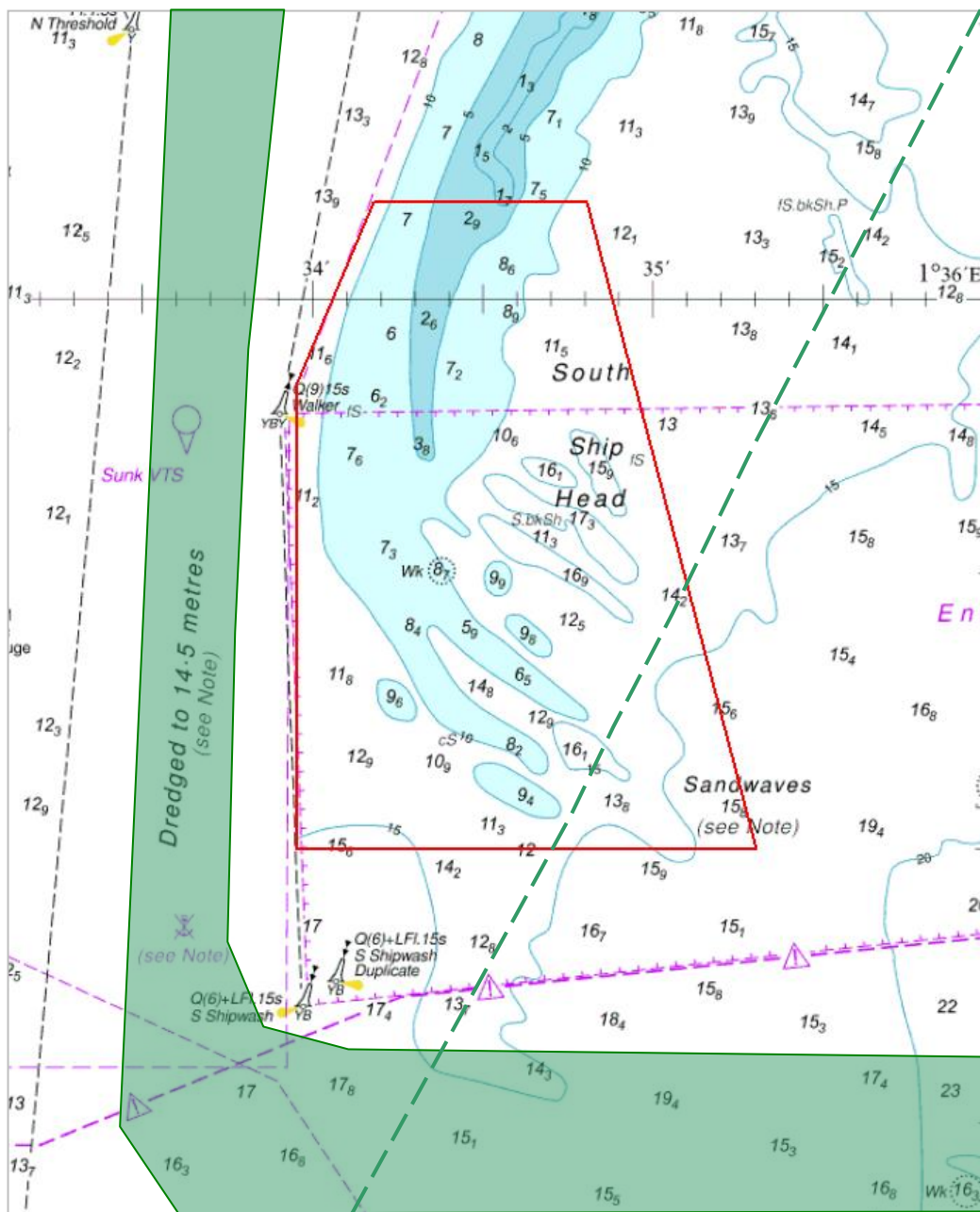
ASSESSMENTS: 1999 M3225 (HA145/010/039/01)
 2003 M3739 (HA145/010/074/01 – E4)




REMARKS: 1980 Area TE3 established. Part of old areas C & E (H3911/80)
 1992 Amendment to NW limit to meet Harwich Haven Authority limits (HH090/573/01)
 1993 Harwich Harbour Authority limits extended. BA NM 3018/93 (HH242/470/01)
 1996 Dredging in this area (HH242/168/06 E23)
 1998 North & South areas created due to expansion of RRA TE3A
 2000 TE3 South incorporated into RRA TE7
 2003 Recommended revision of limits to better encompass South Ship Head, and restrict surveying to areas of significant change. Extended frequency to 6 years
 2008 Area limits reduced

LARGEST SCALE CHART: BA 2692 (1:25,000)

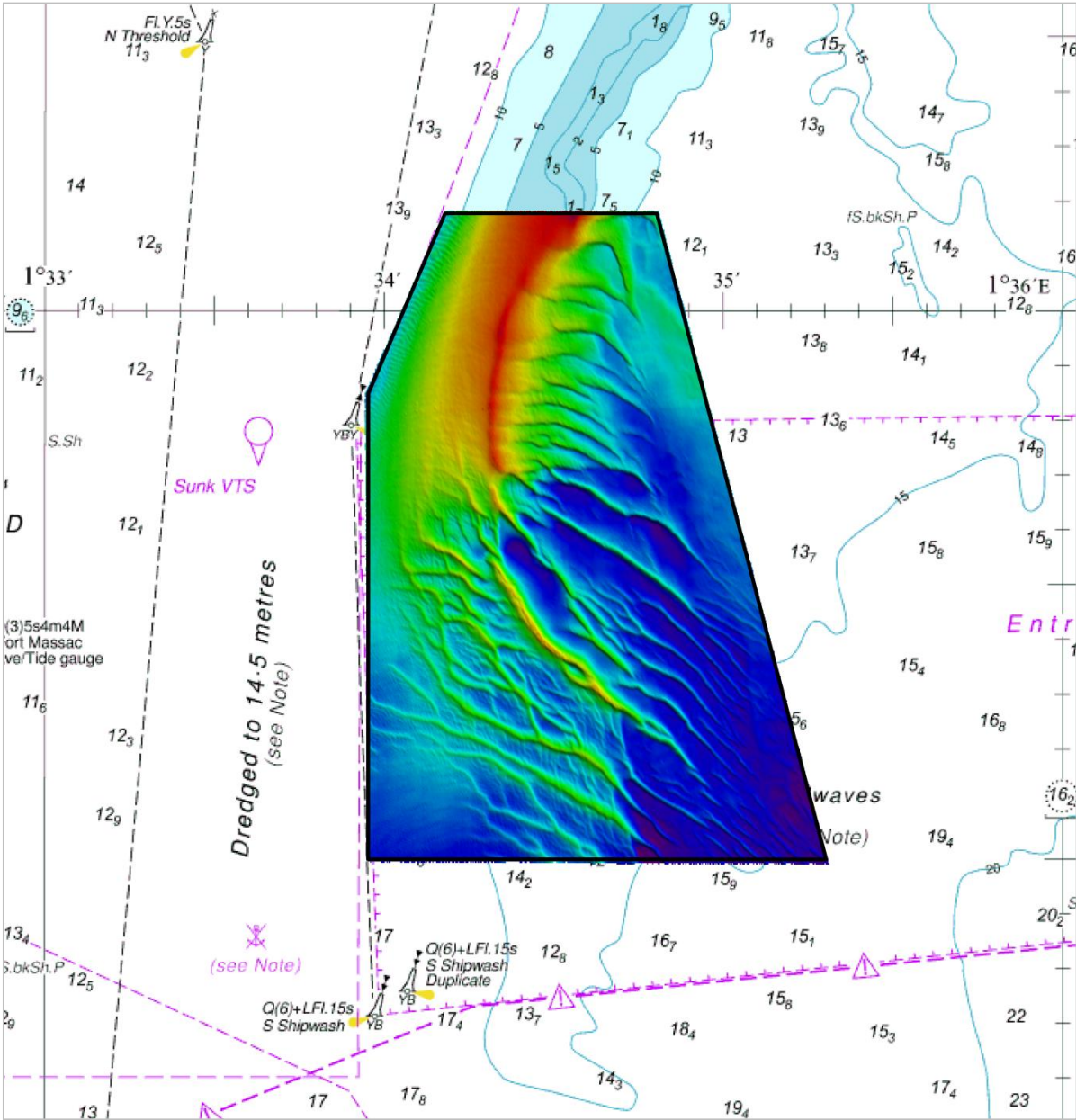
KEY: s sonar sweep
 t bottom texture tracing
 d digital data available
 m multibeam

SHIPPING

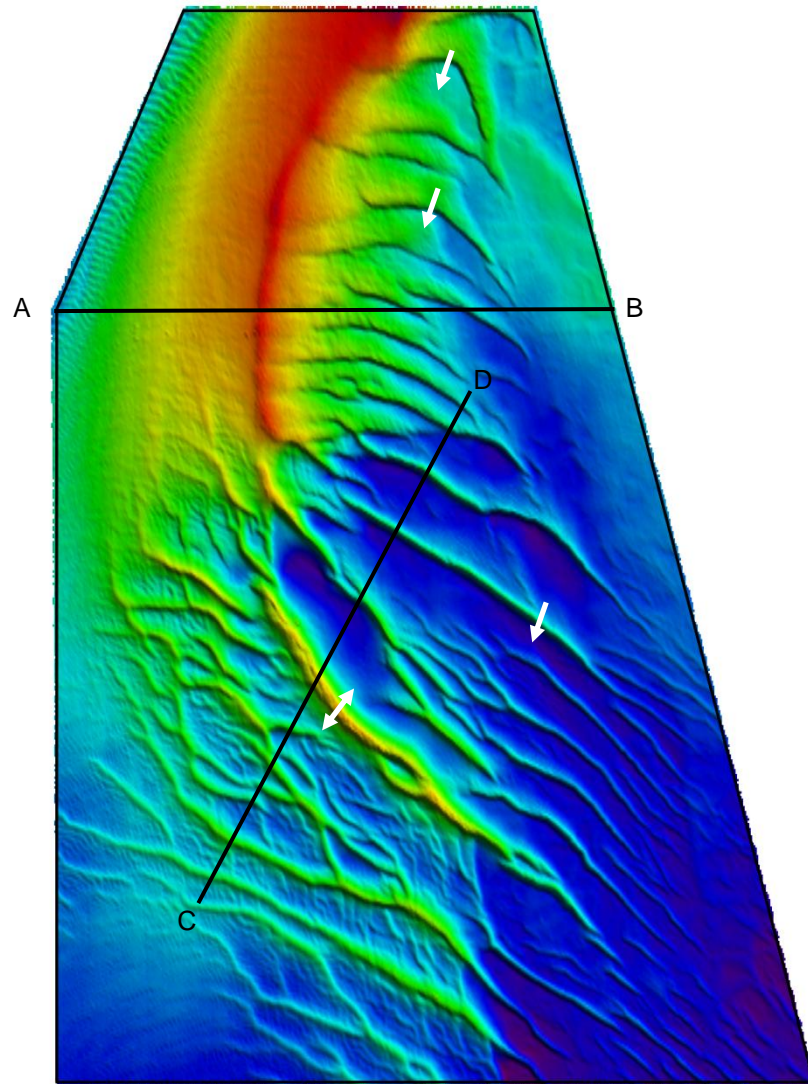


Key	
	Limits of area surveyed
	Main shipping route
	Indicative lower density route east of South Ship Head (certain vessels permitted to cross the Entry Restricted Area)

2014 SURVEY DATA OVERLAID ON CHART 2692

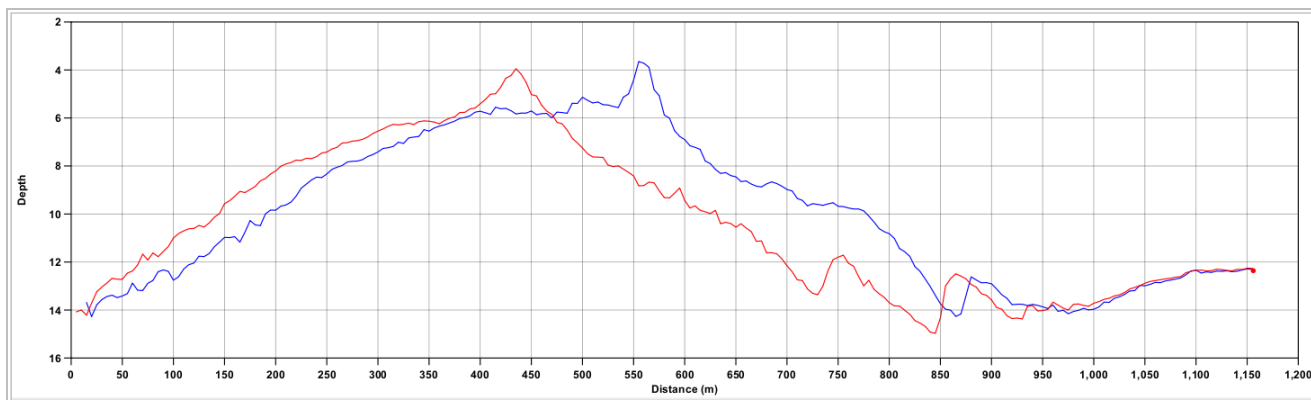


SUN ILLUMINATED VIEW OF THE 2014 SURVEY
AND
LOCATON OF CROSS SECTIONS SHOWN AT ANNEX E



→ Sediment transport based on sandwave asymmetry

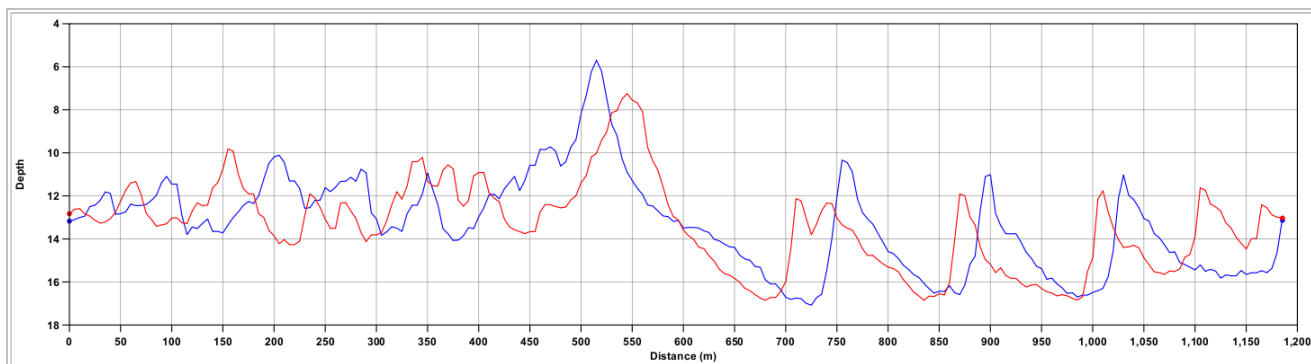
CROSS SECTIONS FROM THE 2008 and 2014 SURVEYS
 (See Annexe D for locations)



A

Profile A-B



B



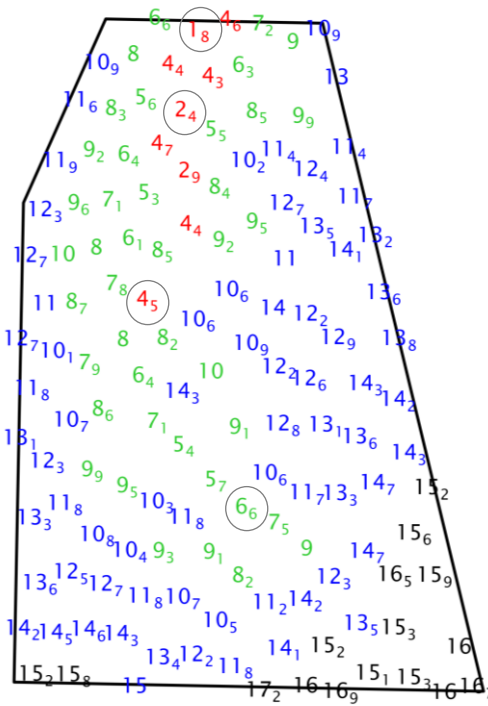
C

Profile C-D

D

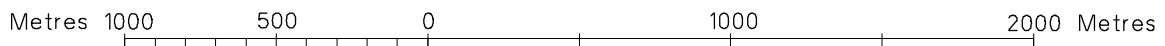
Year of Survey	
	2014
	2008

COLOUR BANDED DEPTH PLOT
 FROM THE 2008 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000

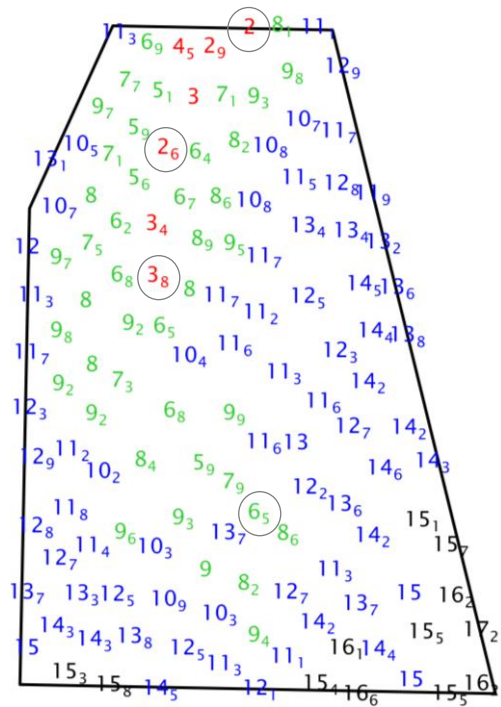


○ Selected depth comparisons

Depths in Metres	
	1.8 to 5.0
	5.1 to 10.0
	10.1 to 15.0
	> 15.0

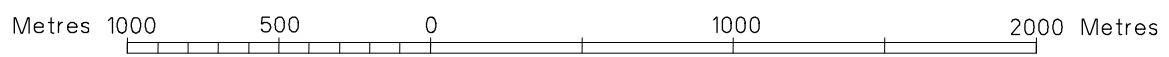


COLOUR BANDED DEPTH PLOT
 FROM THE 2014 SURVEY
 SHOWING SELECTED DEPTHS
 SCALE 1:25,000

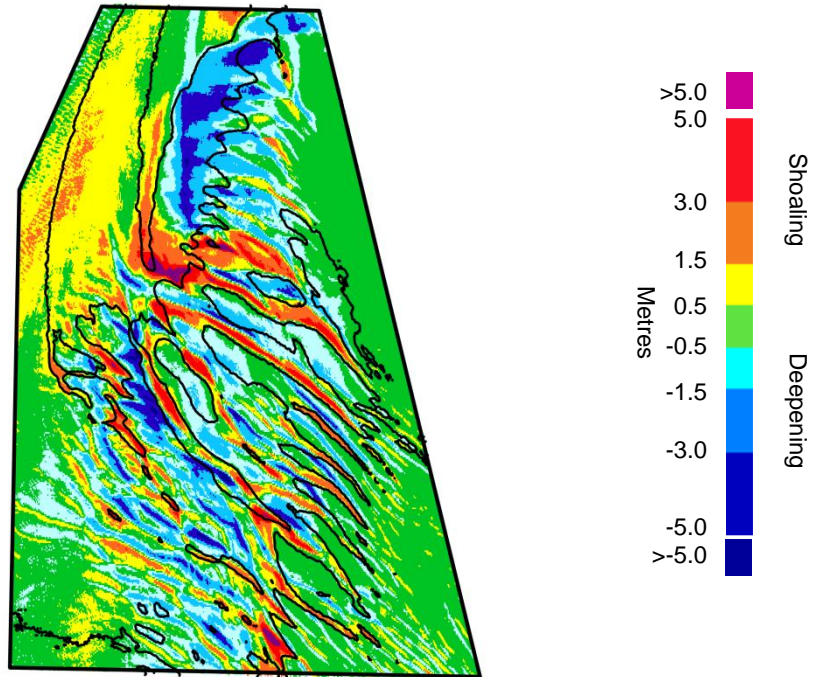


○ Selected depth comparisons

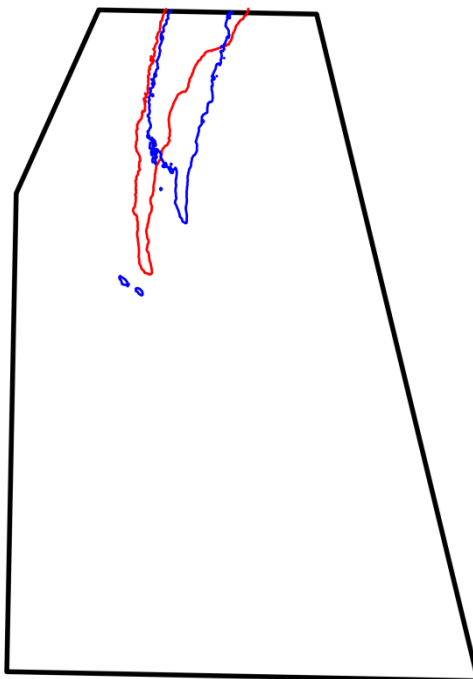
Depths in Metres	
	2.0 to 5.0
	5.1 to 10.0
	10.1 to 15.0
	> 15.0





VARIABILITY PLOT SHOWING
BATHYMETRIC CHANGES BETWEEN THE 2008 AND 2014 SURVEY DATA
AND CHARTED CONTOURS FROM THE 2014 SURVEY
SCALE 1:25,000



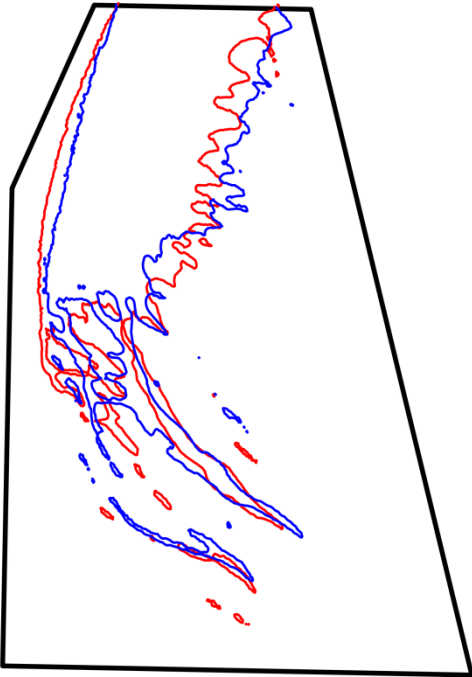
COMPOSITE DIAGRAM OF THE
5 METRE CONTOUR FROM THE 2008 AND 2014 SURVEYS
SCALE 1:25,000





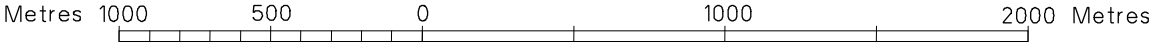
Year of Survey	
	2014
	2008



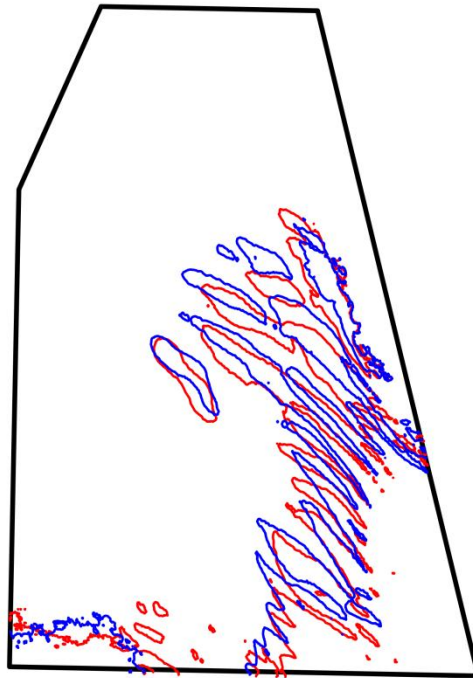
COMPOSITE DIAGRAM OF THE
10 METRE CONTOUR FROM THE 2008 AND 2014 SURVEYS
SCALE 1:25,000





Year of Survey	
	2014
	2008



COMPOSITE DIAGRAM OF THE
15 METRE CONTOUR FROM THE 2008 AND 2014 SURVEYS
SCALE 1:25,000



Year of Survey	
	2014
	2008

