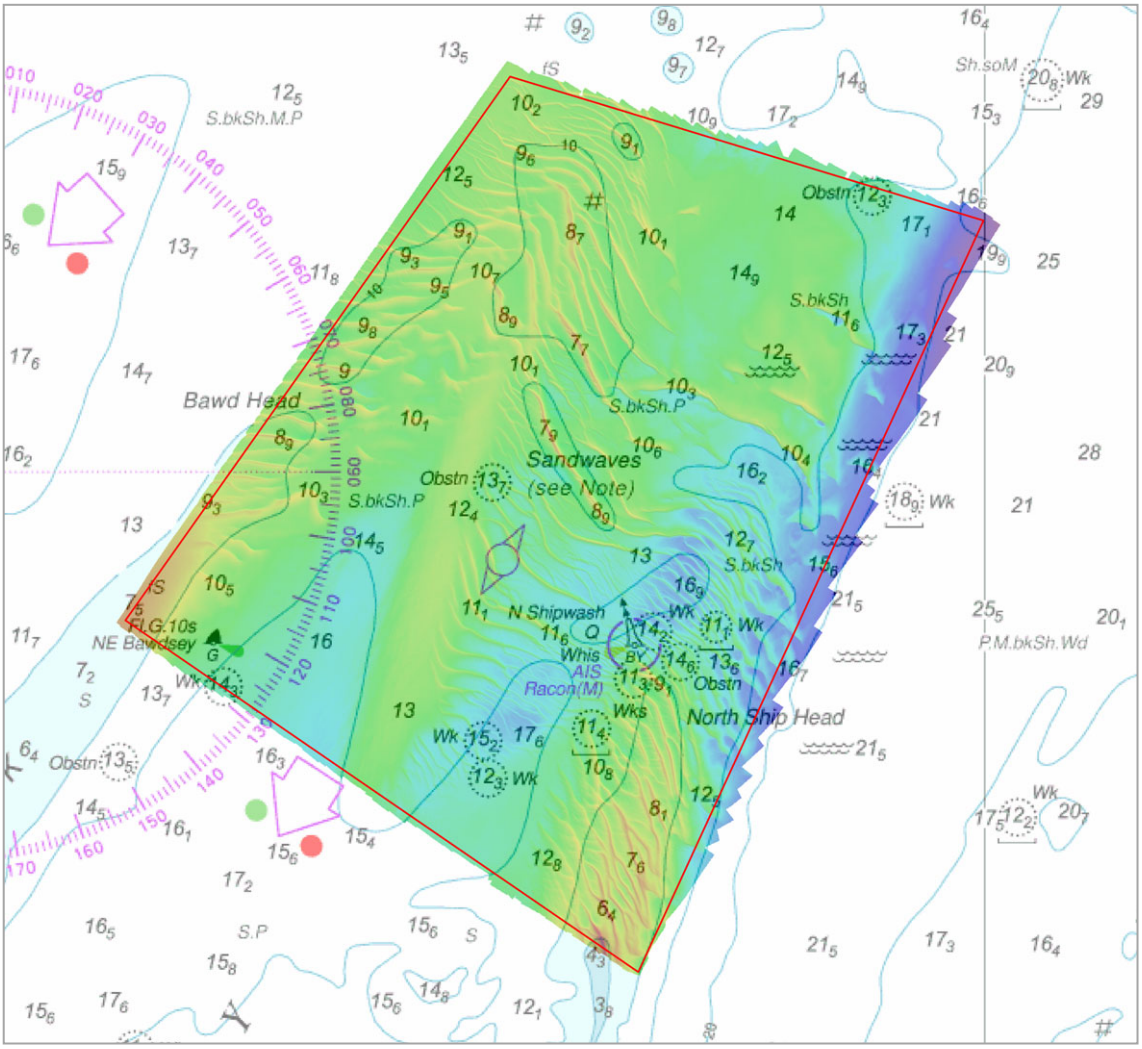
United Kingdom
Hydrographic Office

THAMES ESTUARY

NORTH SHIPWASH

ASSESSMENT ON THE ANALYSIS OF ROUTINE RESURVEY AREA TE2A FROM THE 2012 SURVEY



June 2013

THAMES ESTUARY

NORTH SHIPWASH

Assessment TE2A/2012

An assessment of the 2012 hydrographic survey of the area: to monitor recent seabed movement; to identify any implications for shipping; and to make recommendations for future surveys.

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.

CONTENTS

ANNEXES

NORTH SHIPWASH, 2012

1. EXECUTIVE SUMMARY

The Area and Recent Changes

1.1 Area TE2A covers a sandwave field at the entrance to Shipway, which forms a northern approach to the Harwich Haven ports and is principally used by Ro-Ro traffic and ferry services.

1.2 The area is currently surveyed every 3 years under the programme, although the survey scheduled for 2011 was postponed until 2012 for operational reasons.

1.3 Sandwaves cover much of the area, with a maximum height of 6 metres. In the 2012 survey, the minimum depth within the shipping route was 7.7 metres.

1.4 Sandwaves have opposing asymmetries across the area, indicating differing net sediment transport across the area and changes in their height and position is particularly variable.

1.5 The entrance to Shipway remains adequately marked by Northeast Bawdsey and North Shipwash buoys. Depths over sandwaves within the shipping routes have changed since last surveyed and one region shows a long-term trend towards shoaling over the last 34 years.

1.6 Shipway forms a potential exit route for deep draught vessels aborting their southern approach to the Harwich Haven ports. Use of this route is dependent on charted depths in Shipway and its northern approach; for this reason the Harwich Haven Authority Harbour Master considers there to be a requirement for depths on the route to be accurately charted.

Reasons for Continuing to Resurvey the Area

1.7 The area covers a dynamic sandwave field providing controlling depths at the entrance to Shipway. Minimum depths and position of the sandwaves change over time and require resurveying to ensure the chart reflects these changes.

Recommendations

1.8 The current 3 year survey interval should be extended to 4 years.

1.9 The survey limits should be revised slightly to remove the southern area which, away from the buoyed North Ship Head, is devoid of significant sandwaves. The western limit should be extended slightly to cover the 10 metre contour at the northern end of Bawdsey Bank.

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 TE2A is the most northerly area in the Thames Estuary routine resurvey scheme. It was established in 1980 with a 3 year survey interval, as part of a re-organisation of the Thames Estuary scheme. Area TE2B, which was to be surveyed 6 yearly, covered most of Shipway to the south-west of TE2A. Area TE1, covered the inshore channel of Sledway to the west and was to be surveyed 12 yearly. Both these areas have since been removed from the programme.

3.2 Following assessment of the 1993 survey, the southern limit was extended to include more of the sandwave area. Following the 2002 survey, the northern limits were extended slightly, to cover the 10 metre contour.

3.3 The 2012 survey is the third multibeam survey of the area under the programme.

3.4 Area specifications, including the survey history, are at Annex A. Limits of the area are shown at Annex C.

4. DESCRIPTION OF THE AREA

4.1 The area encompasses the northern entrance to Shipway, a shipping channel used by vessels approaching the Harwich Haven ports from the north and east. The channel is bounded by Bawdsey Bank to the west and Shipwash to the east, the northern extents of which are covered by area TE2A. It comprises an area of 4.0 sq NM (13.7 sq km).

4.2 The seabed within the area comprises of terrigenous sediments, ranging in grade from fine sand to pebbles.

4.3 Although Shipway forms a single channel from the perspective of navigation, morphologically, the head of the channel is bisected by a low lying ridge, effectively creating two broad ebb and flood channels, as shown in Annex C.

4.4 Much of the area is covered by sandwaves up to 6 metres in height, with dense sandwaves lying across Bawd Head at the northern end of Bawdsey Bank and across the northern end of Shipwash bank. The general distribution of sandwaves across the area is also shown in Annex C. These sandwaves have opposing asymmetries across the area, indicating differing net sediment transport across the area.

5. SHIPPING IN THE AREA

5.1 Shipping uses Shipway channel en-route to and from the Harwich Haven ports. As shown in Annex B, most departing ships bear east towards Dutch and German ports immediately after passing north of North Shipwash buoy, although some continue in a northerly direction towards the East Coast ports and aggregate dredging areas or along a Harwich to Esbjerg ferry route.

5.2 Most of the shipping traffic is Ro-Ro vessels and ferry services. Although generally used by vessels drawing less than 7 metres, vessels drawing up to a reported 10.1 metres have been observed.

5.3 A small number of vessels, drawing up to 4.5 metres, are shown passing across the top of Bawd Head into and out of Sledway channel to the west.

5.4 Approach to the ports for deep draught vessels and vessels approaching from the south lies to the south of Shipwash, through the Harwich Deep Water Channel (dredged to 14.5 metres). However, the lower end of Shipway is used as an abort point for ultra-large deep draught

container vessels which, due to circumstances, are required to abort their transit prior to passing the HA buoy. Should their draft permit, an option for these vessels is to depart to the north through Shipway, dependent on charted depths in Shipway and its northerly approach. For this reason, the Harwich Haven Authority Harbour Master considers there to be a requirement for depths on the route to be accurately charted.

6. 2008 SURVEY DETAILS

6.1 The survey was conducted from 20 to 28 September, with data gathered on seven days. Sea states 2-3 were generally experienced during the period.

6.2 Survey data was acquired using a Kongsberg Maritime EM3000D multibeam echosounder system. The survey is referred to the International Terrestrial Reference Framework 2000 (ITRF2000) Datum.

6.3 The survey met IHO S44 (Edition 4) Order 1 standards.

7. 2012 SURVEY DETAILS

7.1 The main survey was conducted from 6 to 9 October, with wreck investigation work completed on 5 December. Sea states 1-2 were generally experienced during the period, but increased to sea state 4 towards the end of the survey.

7.2 Survey data was acquired using a Kongsberg Maritime EM3000D multibeam echosounder system. The survey is referred to the European Terrestrial Reference Framework 1989 (ETRF89) Datum and met IHO S44 (Edition 5) Order 1a standards. The final dataset was in the form of a 1-metre gridded CUBE surface.

7.3 In both surveys, the Vertical Offshore Reference Frame (VORF) and GPS heighting were used to reduce depths to Chart Datum.

8. DESCRIPTION OF RECENT BATHYMETRIC CHANGE

8.1 Colour banded depth plots of the 2008 and 2012 surveys are at Annexes F and G respectively. A variability plot showing changes between the two surveys is at Annex H. Comparison plots of the 10 and 15 metre contours are at Annexes I and J respectively.

8.2 The minimum depth in the sandwave area that lies north of North Shipwash buoy is similar in the 2008 and 2012 surveys, with depths of 7.6 and 7.7 metres respectively found over the same sandwave. However, sandwaves have generally undergone notable change, with both changes in position and height of sandwaves. This is shown in the cross-section at Annexes D and E, with cross-section A-B showing both the migration and change in height that can occur.

8.3 Minimum depths in selected areas, shown in Annex K, have been examined in historical surveys and details shown in Annex L. Although depths vary between surveys, only area B shows a long term trend towards shoaling. In this area there is currently a 5 metre high sandwave with a minimum depth of 8.9 metres, which lies 875 metres to the north of North Shipwash buoy. Since 1978, the minimum depth in the area has reduced by an average 0.24 metres between 3 year surveys. Depths in area D, slightly to the north of area B, shows shoaling in the last three surveys, although this may in part be due to these surveys being conducted as multibeam surveys.

9. IMPLICATIONS FOR SHIPPING

9.1 The entrance to Shipway remains adequately marked by Northeast Bawdsey and North Shipwash buoys. Depths over sandwaves within the shipping routes have changed since last surveyed but remain deeper than most of the shipping understood to use the route. A 'sandwave note' on the largest scale chart highlights the potential for depths to be less than charted in the entrance to Shipway.

10. RECOMMENDATIONS FOR FUTURE SURVEYS

10.1 Due to the changes in depth over the sandwaves within the shipping route, the area should remain in the programme. The survey frequency should be extended from 3 to 4 years, taking into account the historical shoaling by an average 0.32 metres over a 4 year period of the sandwave area 875 metres to the north of North Shipwash buoy.

10.2 The survey limits should be revised slightly to remove the southern area which, away from the buoyed North Ship Head, is devoid of significant sandwaves. The western limit should be extended slightly to cover the 10 metre contour at the northern end of Bawdsey Bank. The recommended limits are given below and shown in Annex L.

	Latitude	Longitude
1	52.05833N	001.62667E
2	52.05083N	001.66667E
3	52.02500N	001.64675E
4	52.02853N	001.58700E

10.3 The combination of reducing the survey area from 4.0 sq NM to 3.45 sq NM and extending the survey frequency from 3 to 4 years will result in a 35% overall reduction in survey effort.

AREA SPECIFICATIONS

(Including Survey History)

REGION: Thames Estuary **NAME:** North Shipwash **AREA:** TE2A

LIMITS:
a) 52°.05833N, 1°.62667E
b) 52°.05083N, 1°.66667E
c) 52°.01167N, 1°.63750E
d) 52°.03000N, 1°.59417E

Area co-ordinates are referred to WGS84 Datum

AREA SIZE: 4.0 SQ NM (13.7 SQ km)

SURVEY INTERVAL: 3 yrs

PREVIOUS SURVEYS: (conducted at 1:25,000 scale (not applicable to multibeam surveys))

Year	Survey	File Ref	Data	Year	Survey	File Ref	Data
1972	K6654			1993	M2122	HH090/572/01	s.t.d.
1972	K6655			1996	M2625	HH090/689/01	s.d.
1978	K8128			1999	M3221	HH090/850/01	s.t.d.
1981	K8860	H1940/80	s.t.	2002	M3730	HH090/992/01	s.t.d.
1984	K9565	H2914/83	s.t.	2005	M4327	HH091/114/01	m
1987	M1083	H4027/86	s.t.	2008	HI1262	-	m
1990	M1568	HH090/493/01	s.t.d.	2012	HI1398	SDRA2012117404	m

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

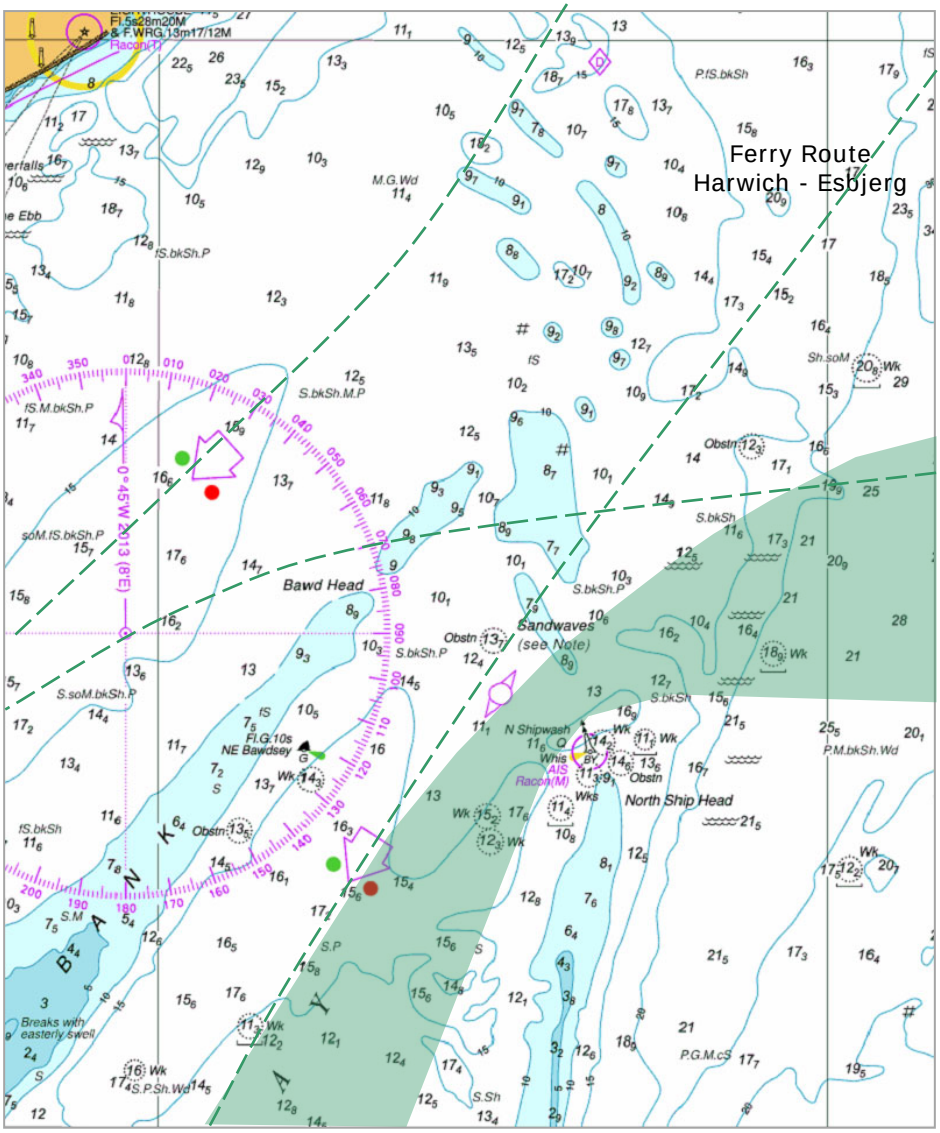
REPORTS:
1994 Latest survey included M2122 (HA145/02/03/04-E7)
2000 Latest survey included M3221 (HA145/02/01/02)

ASSESSMENTS:
1996 M2625 (HA145/010/005/01)
1999 M3221
2002 M3730
2005 M4327

REMARKS:
1977 Report covering old area B (no reference)
1979 Report covering old area B (H2279/74)
1980 Area 2A established (H3911/80)
1994 Report amended SW limit to include sandwaves in former area 2b. Survey interval unchanged. Dept of Transport accepted this recommendation on 27 June'94 (HA145/02/03/04-E10)
2002 Limits extended slightly to cover shoal depth.

LARGEST SCALE CHART: BA 2052 (1:50,000)

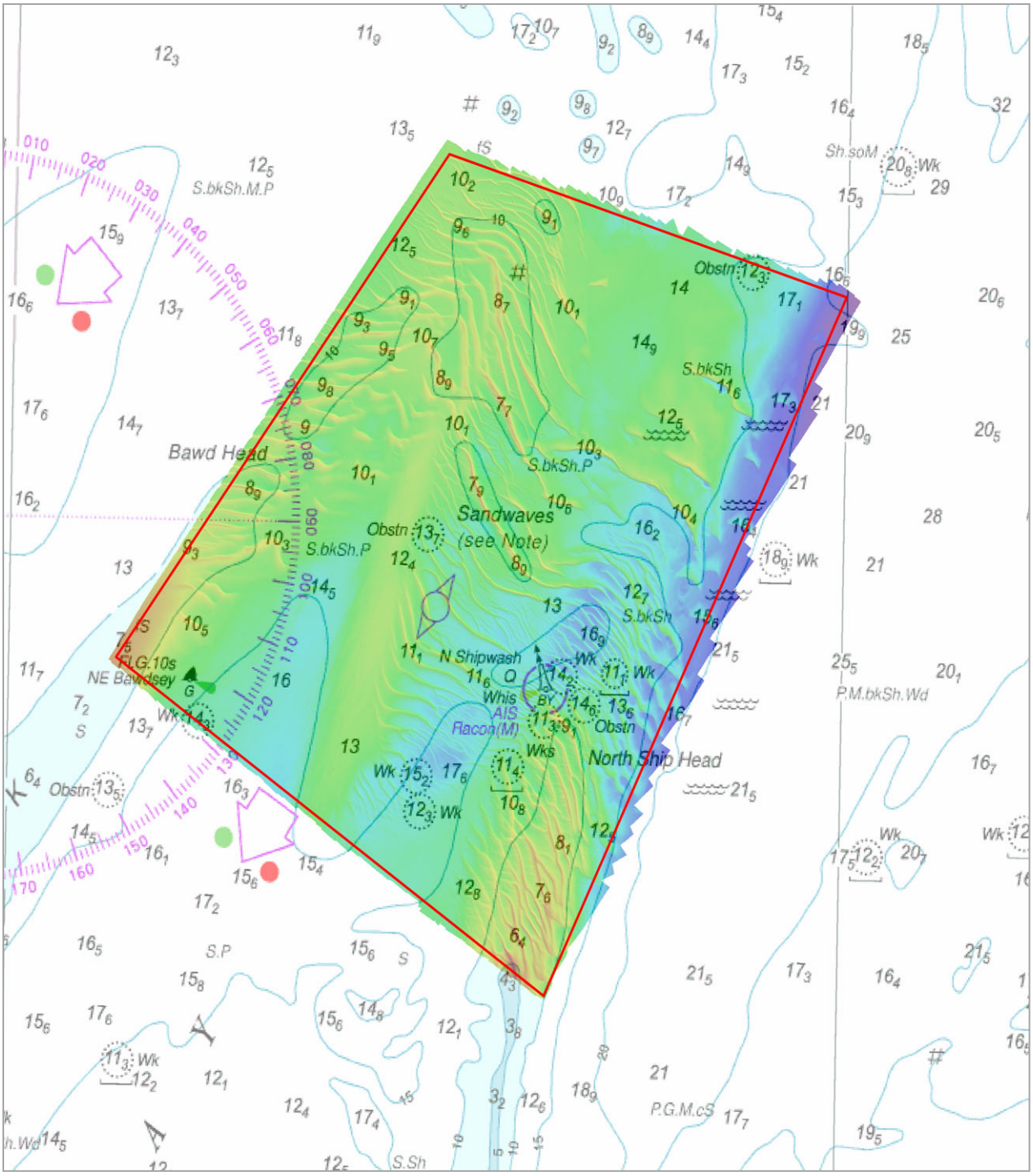
SHIPPING ROUTES



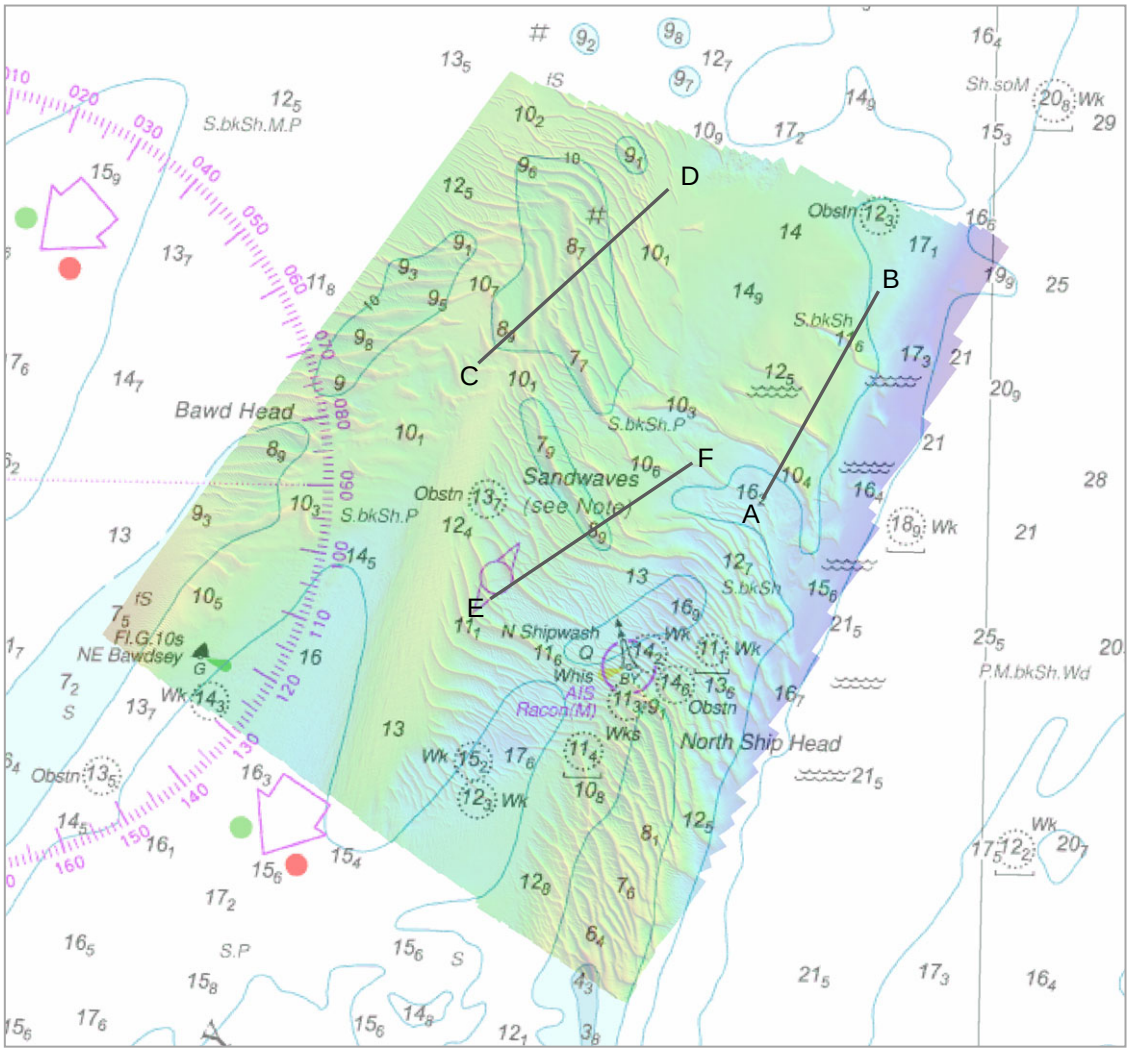
Main traffic route

Lower density traffic routes

2012 SURVEY DATA OVERLAID ON CHART 2052

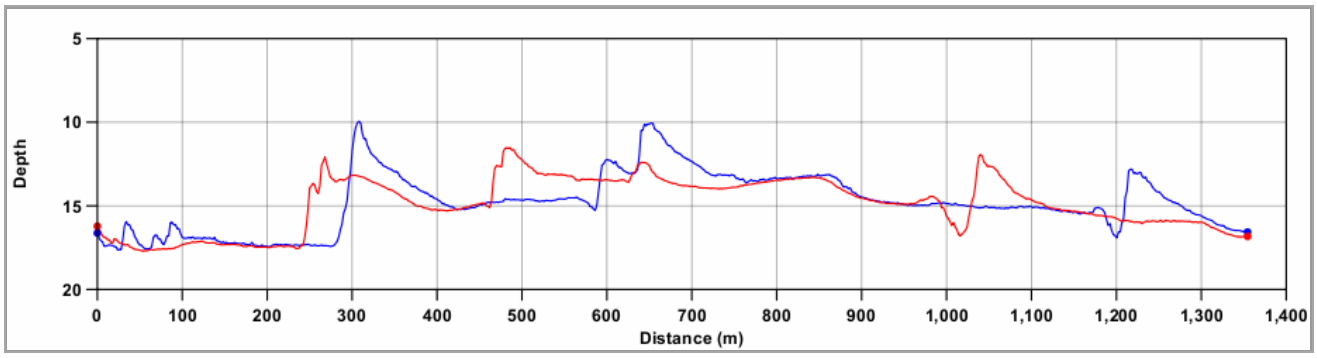


2012 SURVEY SHOWING THE LOCATION OF THE 2008 AND 2012 CROSS SECTION COMPARISONS SHOWN AT ANNEX E

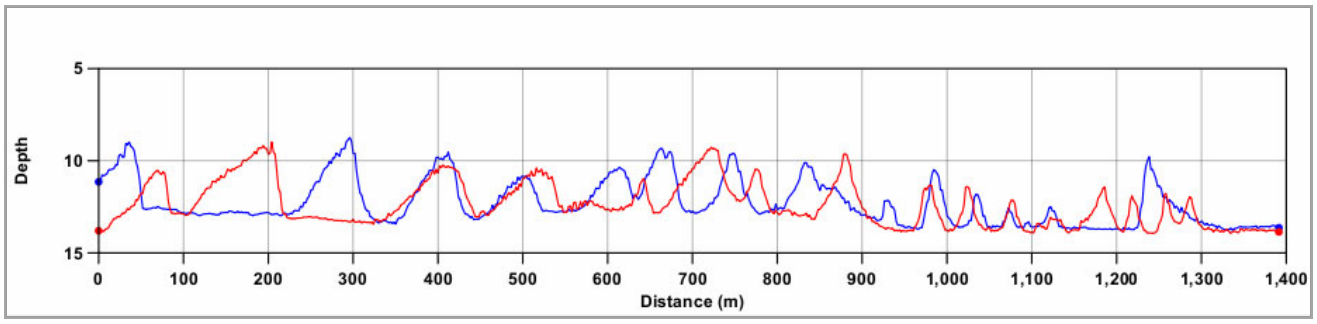


CROSS SECTIONS FROM THE 2008 AND 2012 SURVEYS

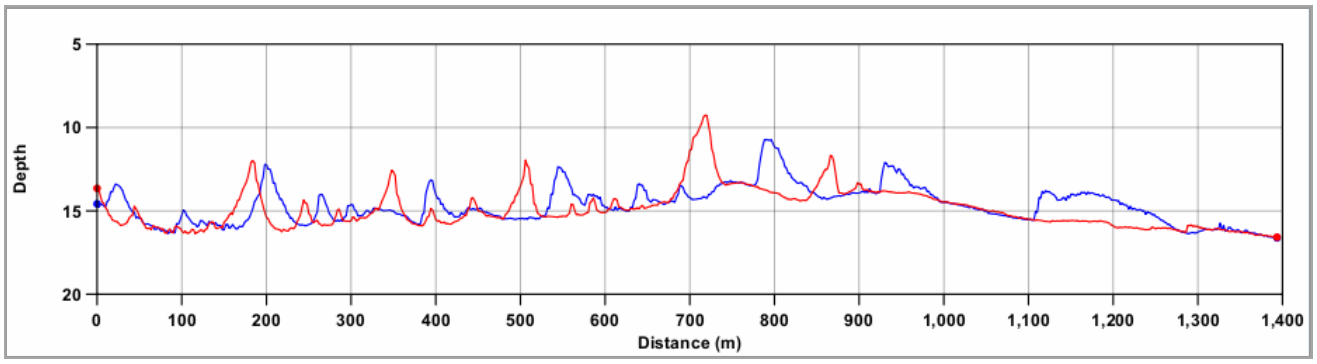
(See Annex D for locations)



A Profile A-B B



C Profile C-D D



E Profile E-F F

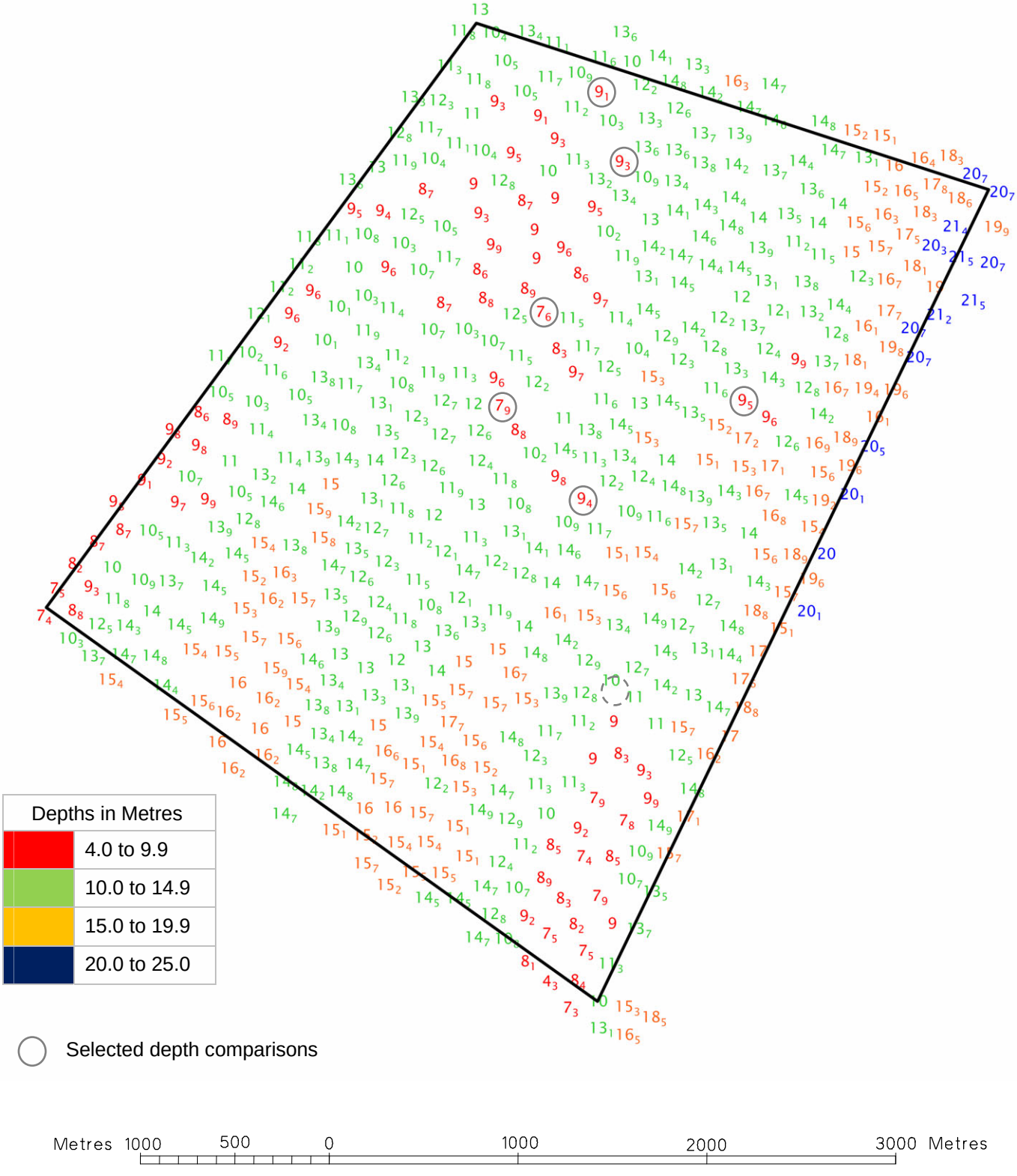
Year of Survey	
	2012
	2008

COLOUR BANDED DEPTH PLOT

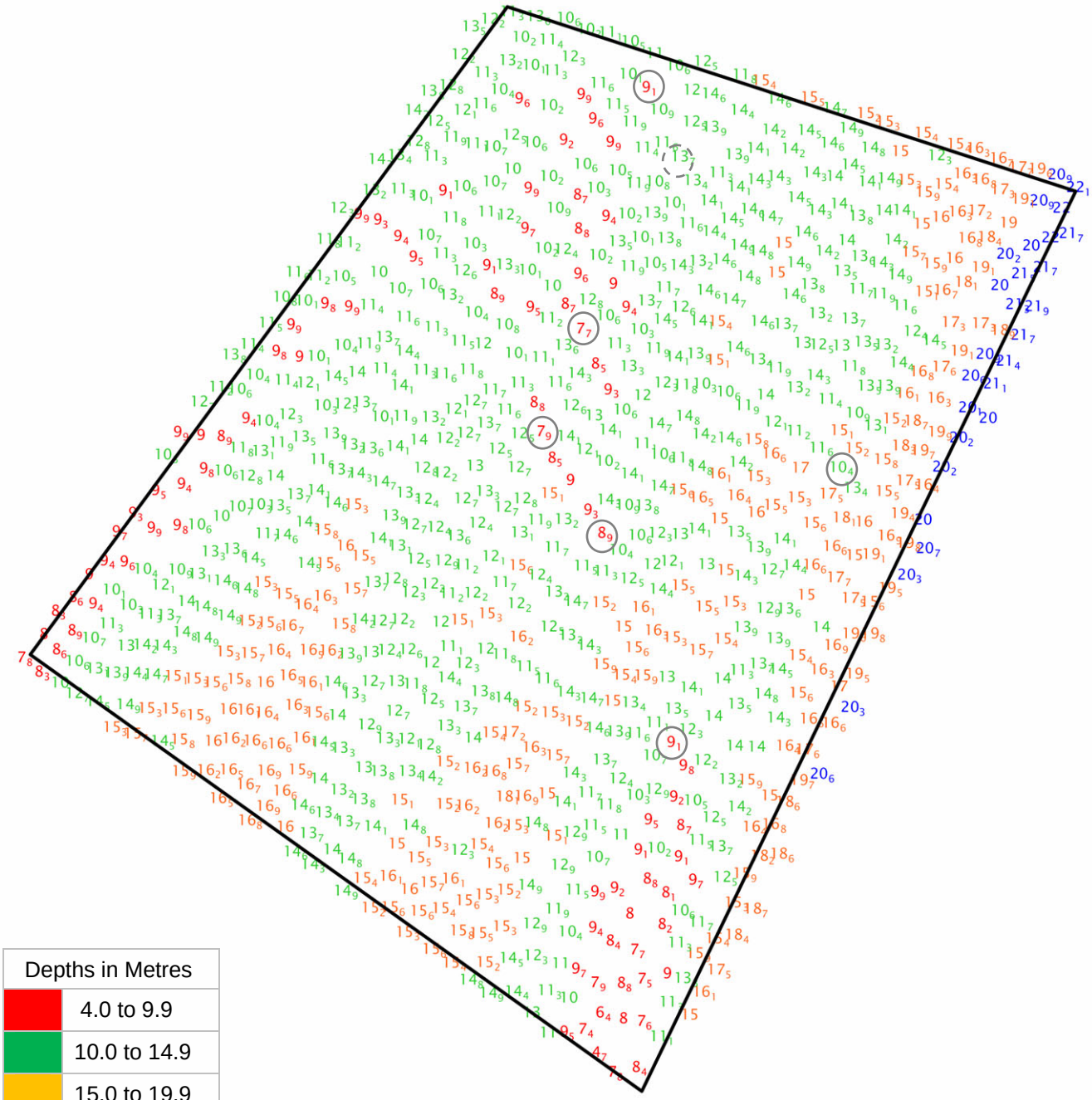
FROM THE 2008 SURVEY

SHOWING SELECTED DEPTHS

SCALE 1:30,000



COLOUR BANDED DEPTH PLOT
FROM THE 2012 SURVEY
SHOWING SELECTED DEPTHS
SCALE 1:30,000

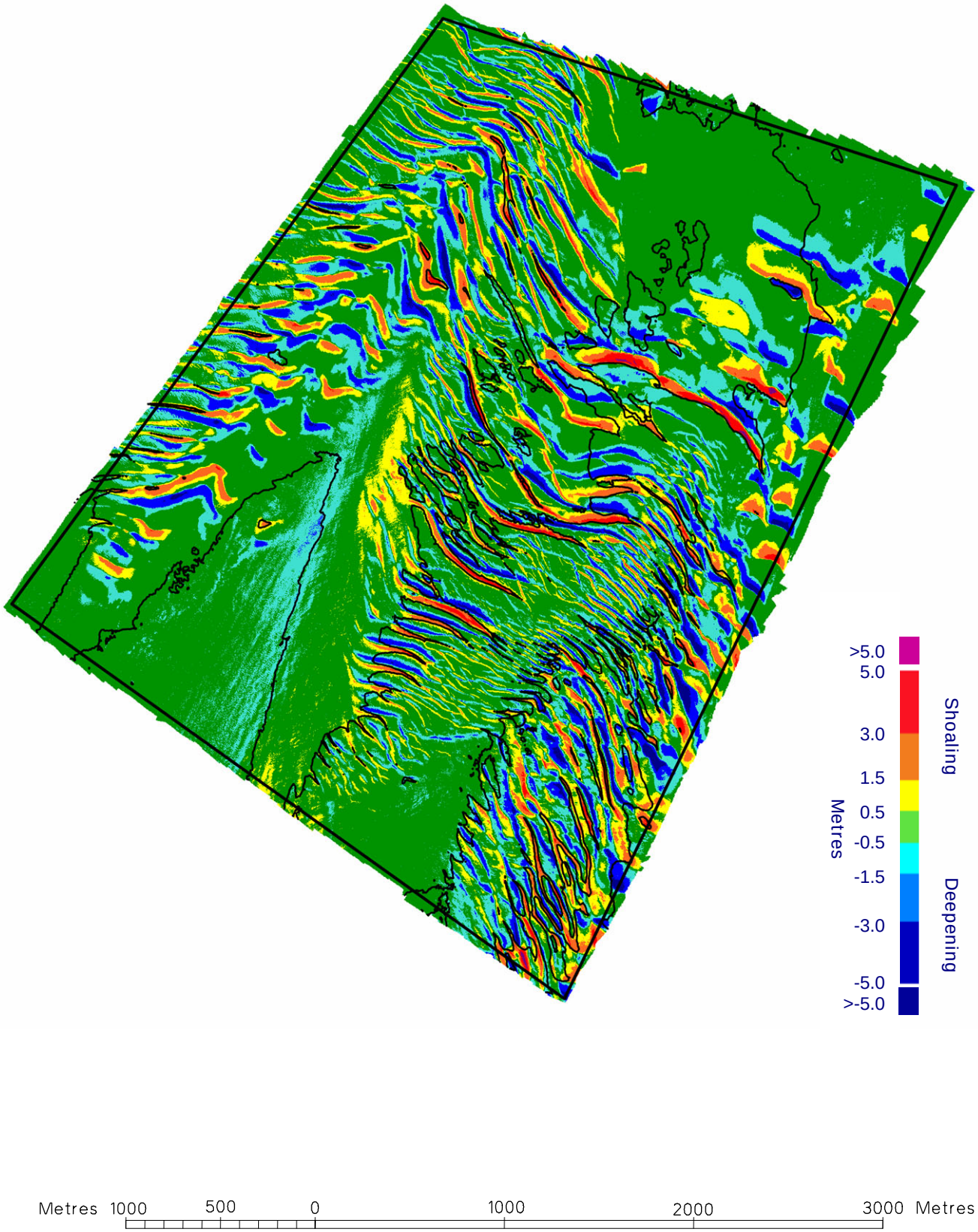


Depths in Metres	
	4.0 to 9.9
	10.0 to 14.9
	15.0 to 19.9
	20.0 to 25.0

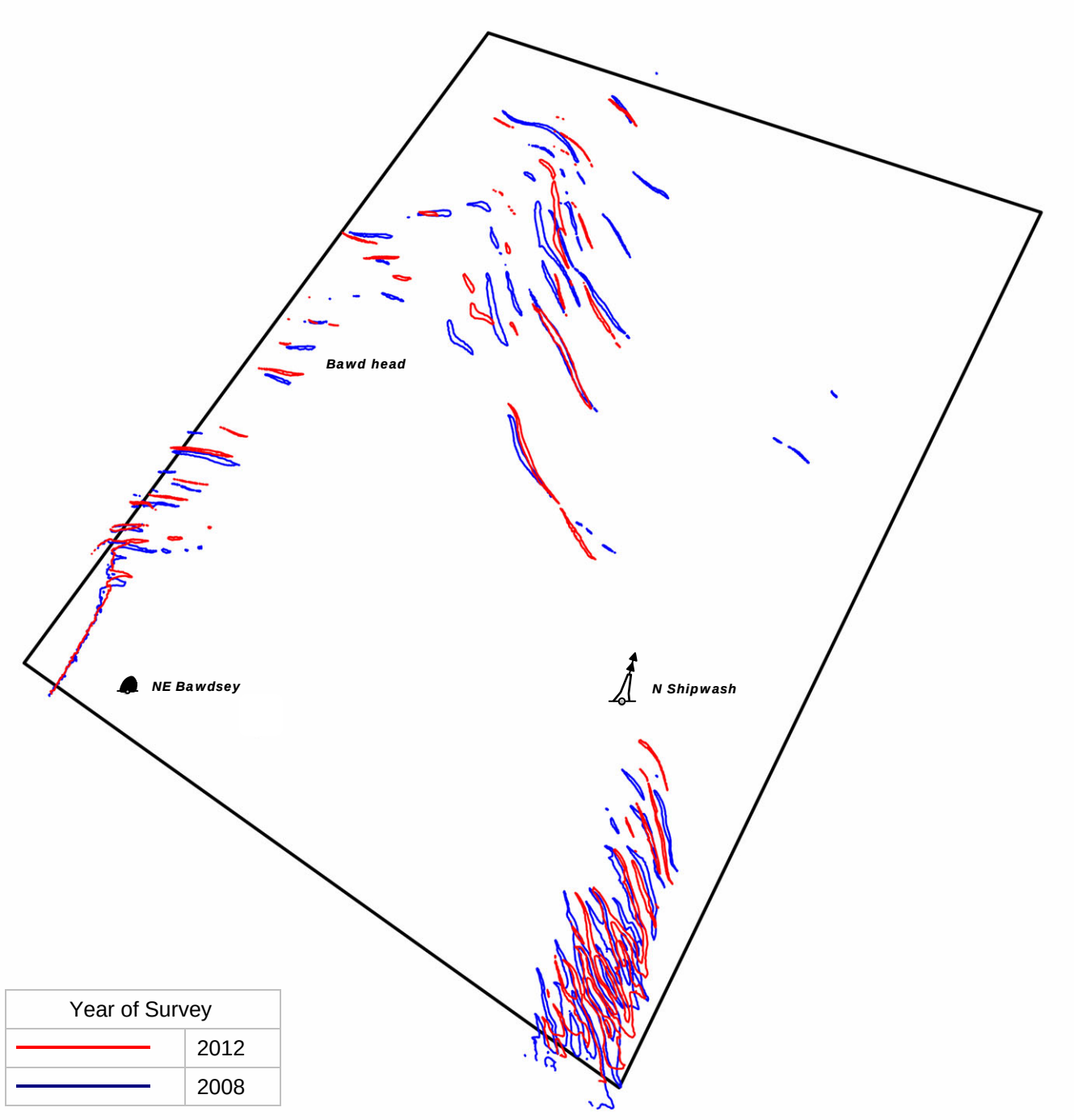
Selected depth comparisons

Metres 1000 500 0 1000 2000 3000 Metres

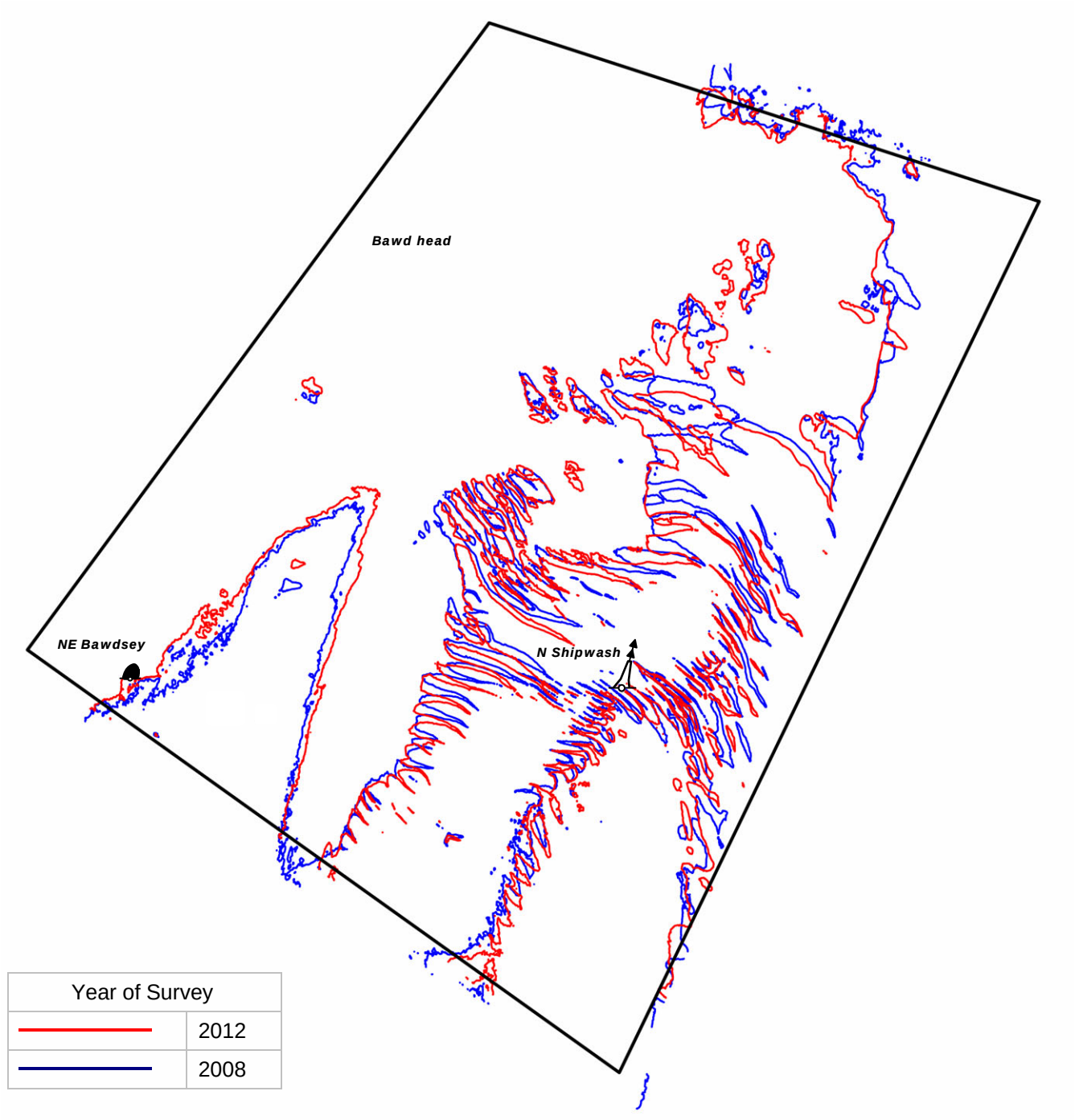
VARIABILITY PLOT SHOWING
BATHYMETRIC CHANGES BETWEEN THE 2008 AND 2012 SURVEYS
AND CHARTED CONTOURS FROM THE 2012 SURVEY
SCALE 1:30,000



COMPOSITE DIAGRAM OF THE
10 METRE CONTOUR FROM THE 2008 AND 2012 SURVEYS
SCALE 1:30,000

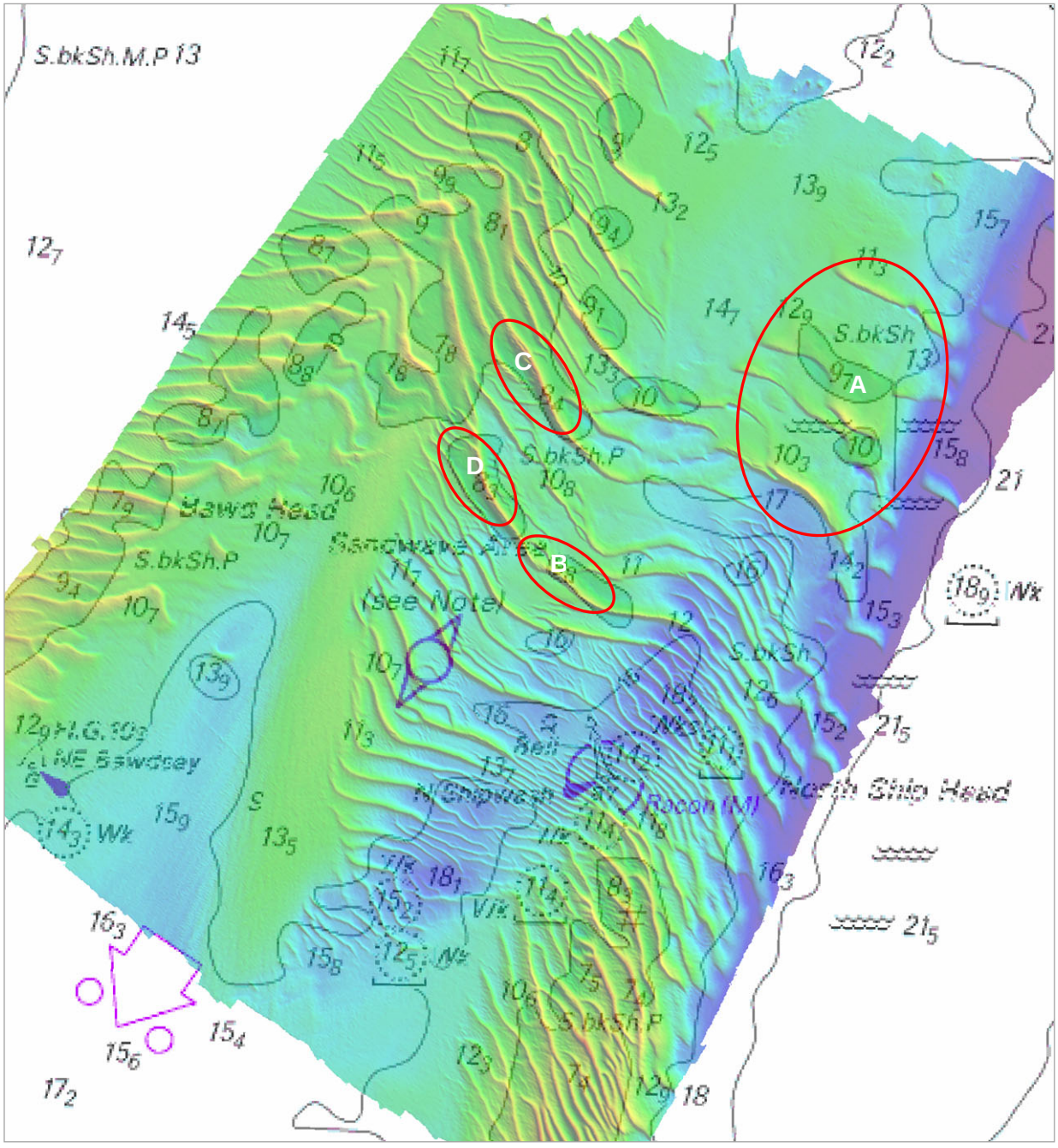


COMPOSITE DIAGRAM OF THE
15 METRE CONTOUR FROM THE 2008 AND 2012 SURVEYS
SCALE 1:30,000



LOCATION OF HISTORICAL DEPTH COMPARISONS

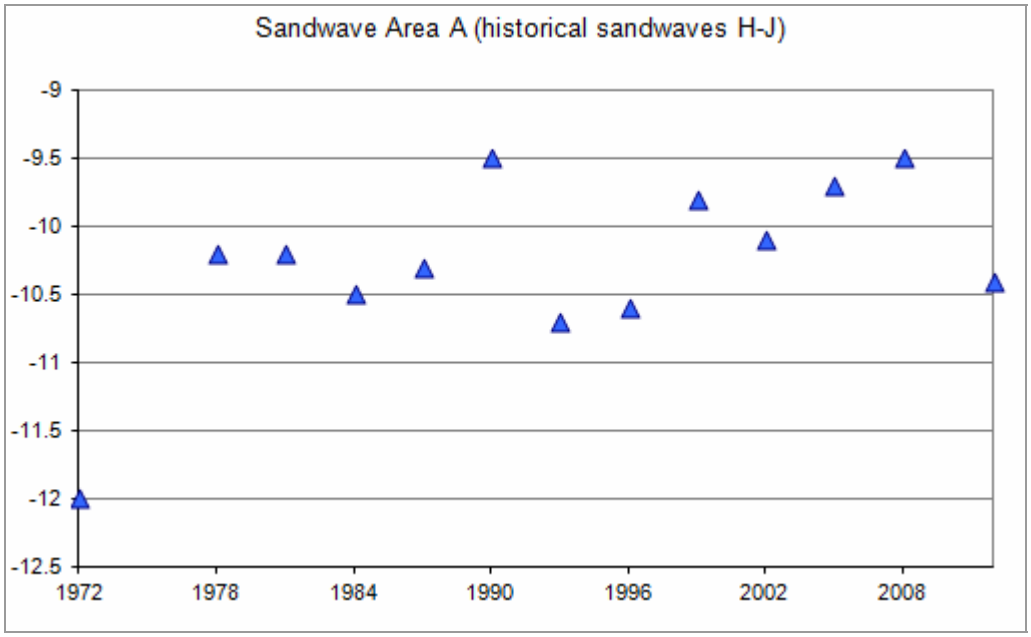
(see Annex L for Comparisons)

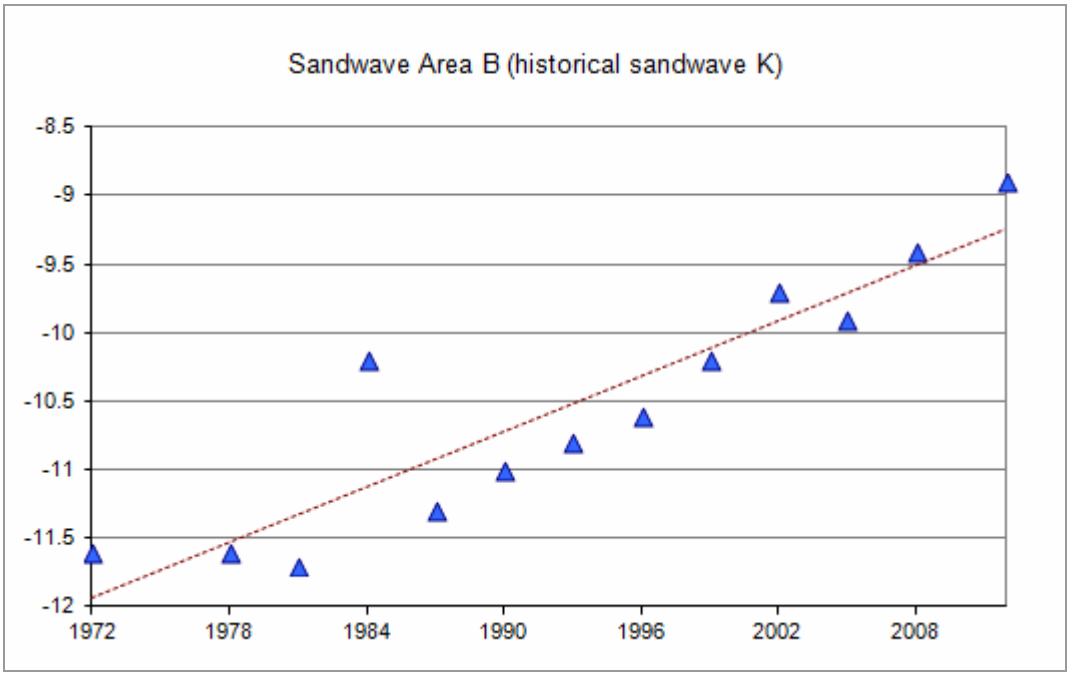


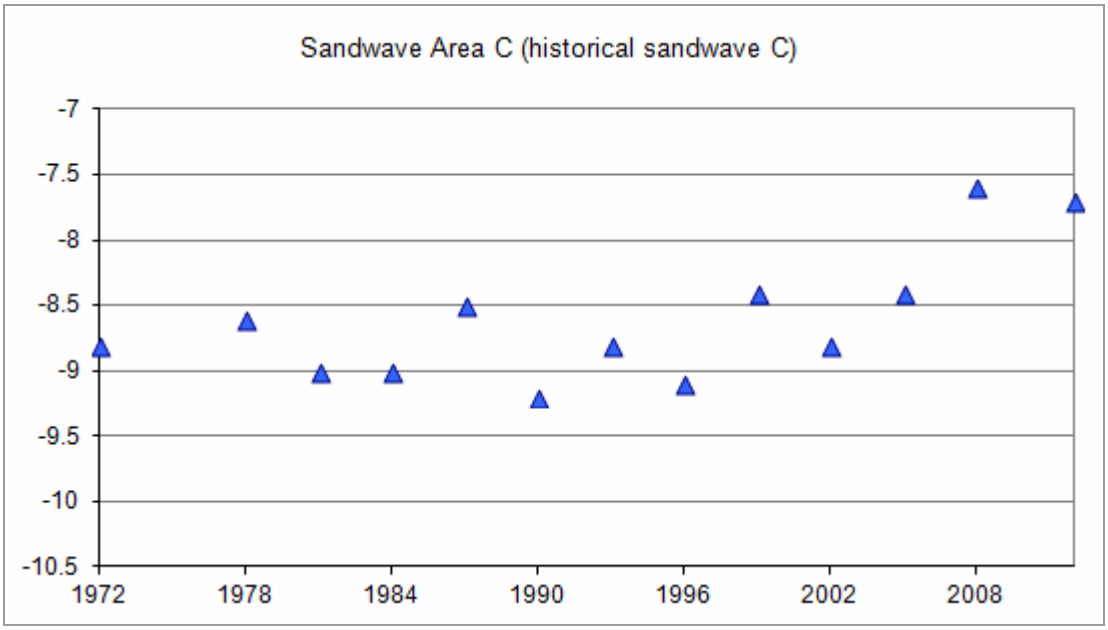
HISTORICAL DEPTH COMPARISONS

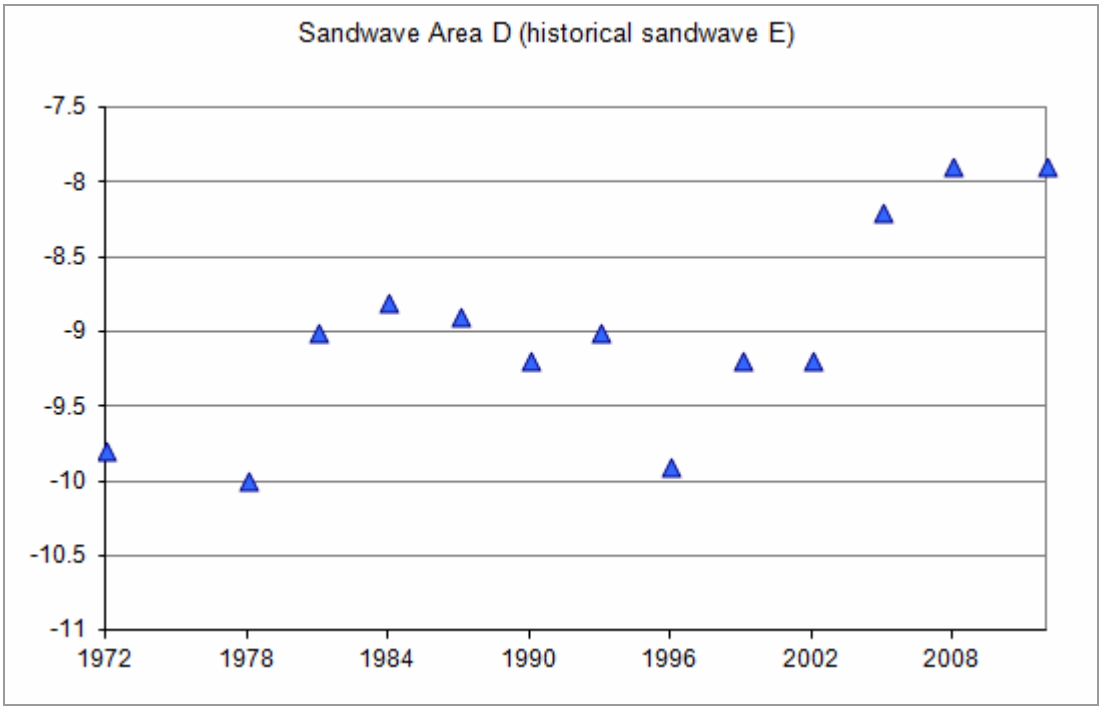
(see Annex K for Locations)

Historical sandwave references relate to letters assigned to sandwaves in the 1994 Routine Resurvey Analysis Report

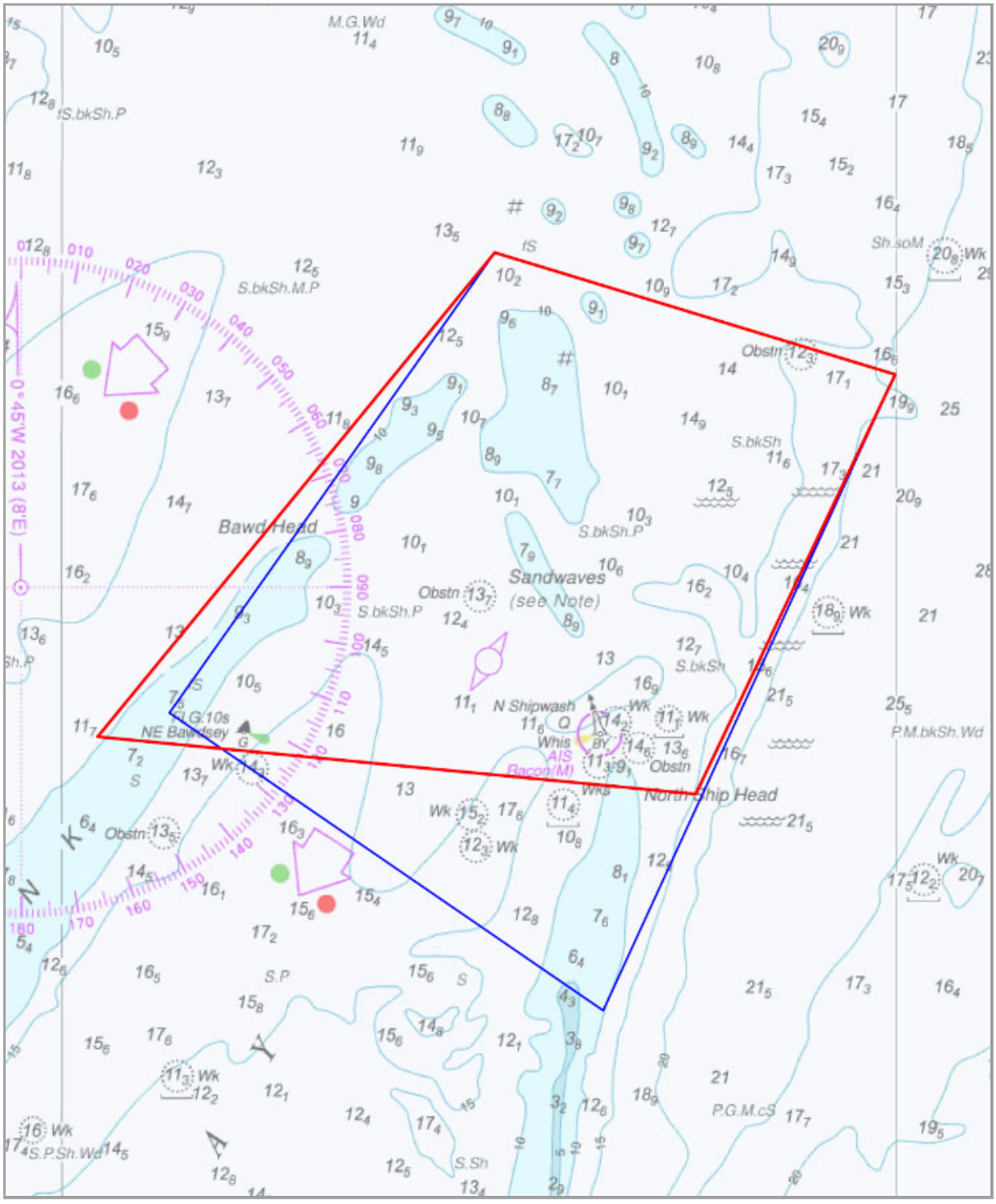





Sandwave Area C (historical sandwave C)
-7
-7.5
-8
-8.5
-9
-9.5
-10
-10.5
1972
1978
1984
1990
1996
2002
2008


Sandwave Area D (historical sandwave E)
-7.5
-8
-8.5
-9
-9.5
-10
-10.5
-11
1972
1978
1984
1990
1996
2002
2008

PROPOSED REVISED LIMITS



	Existing 3 Year Limit
	Proposed 4 Year Limit