

8. Analysis of method of originally locating sites

The purpose of this section is to provide a summary of the original method of locating sites which have been recorded within the desk based research. Parts of Angus, including the coast, have been subject to systematic archaeological survey in the past, as noted in section 5.1. This has included a detailed examination of aerial photographs in order to identify military remains associated with the two World Wars; detailed examination of crop mark sites around Lunan Bay as part of the Angus and South Aberdeenshire Field School activities; and archaeological survey of the military area of Barry Buddon (McLeod, 2004; Dalland & Scott, 2008). Due to the high quality of the NMRS and SMR records, it was decided to record the method in which sites were originally located during the desk based assessment. This was noted regardless of whether the sites are currently recorded within the NMRS, the local HER, or were found by other means. The method of location of sites is usually either recorded within the description field of the HER record or can be deduced.

Recording the method of discovery has allowed a comparison of the different ways that archaeological sites were initially discovered, which may help to inform methods of site discovery in areas which have not been subject to such detailed exploration.

Method of original location	Number of sites	% of total number of sites
Total number of sites in desk based assessment	713	100%
Historical sources relating to wreck sites	218	31%
Sites identified on aerial photographs	200	28%
Standing building/monument	146	20%
Find spots and chance finds	83	12%
Sites identified on Ordnance Survey maps	29	4%
Archaeological event	20	3%
Historic sources (excluding wrecks)	17	2%

Table 1: Original method of location of sites recorded within this desk based assessment

The desk based assessment noted 713 known sites within 1km of the coast edge, excluding sites within urban areas. Of these, 31% are historical records of grounded or wrecked vessels, the vast majority 19th and early 20th century in date. It should be noted that in many cases, the precise location of the wreck site is not known, and in many cases the vessel was salvaged or re-floated leaving no archaeological record. Identification of sites through examination of aerial photographs is the most important source of information in the Angus record accounting for the discovery of 28% of the total number of records on the HER. This includes many sites noted on photographs taken during and immediately after World War II. In some cases, the sites referred to have been subsequently demolished, in others, the remains still exist, but have been covered in drifting sand.

9. Assessment of present and future vulnerability to coastal change

Currently the majority of the Angus coastline is assessed to be relatively stable with areas of localised erosion and accretion taking place within a context of a general state of dynamic equilibrium within the coastal cell units. According to current evidence, the areas most vulnerable to erosion are:

- Monifieth Caravan Park to the outfall of Buddon Burn.
- The northern end of the east facing Barry Sands to Carnoustie.
- The beach south of Arbroath.
- The southern half of Montrose Bay.

The built-up frontages at Monifieth, Carnoustie and Arbroath are defended by a combination of groynes, rock revetments and gabions (information from Ramsay and Brampton, 2000), which mitigates the impact of erosion here, but does not extend to the beach areas, except for the east facing Barry Sands which is defended.

However, the majority of the coastline lies below 5m OD and so under current and future relative sea level rise projections and under Dawson's scenarios of the scale and frequency of extreme sea level events by 2050, will be directly impacted by climate driven coastal environmental change. Currently much of the Angus coastline is protected by the extensive rock platform, which dissipates wave energy before it reaches the coastline. This is highly dependant upon water depths over the rock platform and so even a modest rise in relative sea level will have an impact on the rate of coastal change behind the platform. Until now, the coastal zone and the cultural heritage within it has been assumed to have been largely protected from erosion by the sea because of a regime of relative falling sea level in this area. However, the most likely future scenario for the Angus coast is that the rate and scale of coastal change will increase in line with observed and modelled changes in sea level and climate, and this will have an impact on all physical coastal heritage.

10. Sources consulted

Historic Maps

Mapmaker	Date	Title	Source
Marr, John and Collins, Greenville,	1693 (?)	The Sea coast from Fiffnesse to Montros / was Survey'd by Mr. Mar, an injenious Marriner [sic] of Dundee. Sea coast from Fife Ness to Montrose.	National Library of Scotland http://www.nls.uk/maps/coasts/index.html
Marr, John	c. 1666	A chart of the mouth of the Firth of Tay	National Library of Scotland http://www.nls.uk/maps/coasts/index.html
Adair, John	1703	The Frith and River of Tay with all the Rocks, Sands, Shoals, &c., Survey'd by John Adair	
Adair, John	1703	The Town and Water of Montross with the neighbouring Country & Coast from the Red-head to the North-water. Survey'd and Navigated by John Adair.	
Great Britain. Hydrographic Office	1842	Arbroath Harbour. Montrose Harbour	National Library of Scotland http://www.nls.uk/maps/coasts/admiralty_charts_list.html
Great Britain. Hydrographic Office	1884	Montrose Harbour	National Library of Scotland http://www.nls.uk/maps/coasts/admiralty_charts_list.html
Roy, William	1747 - 1755	Roy Military Survey of Scotland	Main Library, University of St. Andrews
Ordnance Survey	1865	First edition, 1:10,560 map sheets: LV, LI, LII, XLVI, XLI (Includes Inset XLVII), XXXV, XXVIII	RCHAMS and NLS
Ordnance Survey	1904	First revision 1904, 1:10,560 map sheets: LV: NE, SE, NW LI: SE LII: NE, SW NW XLVI: NE, SE XLVII: NW XLI: SW, NW XXXV: NE, SE, SW XXVIII: NE, SE	RCHAMS

Aerial Photographs

Aberdeen Historic Environment Record

Sortie	Date	Scale	Aberdeen HER Reference
<u>Pathfinder 313 Montrose No 65/75</u>			
106G/Scot/UK/42	11 July 1946	1:10,000	Run 1: 2125
F22.540.RAF.986	16 January 1953	1:10,000	Run 7: 0278
F22.540.RAF.986	16 January 1953	1:10,000	Run 7: 0280
F22.540.RAF.986	16 January 1953	1:10,000	Run 7: 0284
F22.540.RAF.986	16 January 1953	1:10,000	Run 8: 0177
F22.540.RAF.986	16 January 1953	1:10,000	Run 8: 0177
F22.540.RAF.986	16 January 1953	1:10,000	Run 8: 0182
F22.540.RAF.986	16 January 1953	1:10,000	Run 8: 0185
F22.540.RAF.986	16 January 1953	1:10,000	Run 8: 0187
F22.540.RAF.986	16 January 1953	1:10,000	Run 8: 0190
F21.540.RAF.986	16 January 1953	1:10,000	Run 9: 0177
F21.540.RAF.986	16 January 1953	1:10,000	Run 9: 0180
F21.540.RAF.986	16 January 1953	1:10,000	Run 9: 0182
F21.540.RAF.986	16 January 1953	1:10,000	Run 9: 0189
<u>Pathfinder 339 Dundee East No. 43</u>			
F21.58.RAF.2098.5	05 February 1957	1:10,000	Run 9: 0044
F21.58.RAF.2098.5	05 February 1957	1:10,000	Run 9: 0046

RCHAMS Collection

Sortie	Frames	Date	Scale	Reference
106.G/Scot/UK.128	6001 - 6003	25 June 1946	1:0,000	B49
106.G/Scot/UK.128	6113 - 6117	25 June 1946	1:0,000	B49
106.G/Scot/UK.128	6231 - 6238	25 June 1946	1:0,000	B49
106.G/Scot/UK.128	6367 - 6363	25 June 1946	1:0,000	B49
106.G/Scot/UK.128	6421 - 6425	25 June 1946	1:0,000	B49
106.G/Scot/UK.128	6428 - 6430	25 June 1946	1:0,000	B49
CPE/Scot/UK/218	3042 - 3046	25 June 1947	1:10,000	B128
CPE/Scot/UK/218	3111 - 3116	25 June 1947	1:10,000	B128
CPE/Scot/UK/218	3169 - 3172	25 June 1947	1:10,000	B128
CPE/Scot/UK/218	3177 - 3184	25 June 1947	1:10,000	B128
CPE/Scot/UK/218	3185 - 3213	25 June 1947	1:10,000	B128
106G/Scot/UK/142	5124 - 5133	11 July 1946	1:10,000	B44
	All relevant	1967	1:7,500	OS/67/048
	All relevant	1967	1:7,500	OS/63/028
	All relevant	1973	1:10,000	B741 Film 3
		1973	1:10,000	B742 Film 4
	All relevant	1988	1:24,0000	C253/634/88
	All relevant	1988	1:24,0000	C261/501/88

Sortie	Frames	Date	Scale	Reference
	All relevant	1988	1:24,0000	C262/502/88
	All relevant	1988	1:24,0000	C264/504/88
	All relevant	1988	1:24,0000	C277/517/88
	All relevant	1988	1:24,0000	C280/520/88
	All relevant	1989	1:24,0000	C282/06/89

Geological maps

British Geological Survey Sheet 49	Arbroath	Solid/Drift	1:50,000
British Geological Survey Sheet 57	Montrose	Solid	1:50,000 (out of print)

Available GIS datasets

British Geological Survey, 1977. 1:625 000 scale United Kingdom Geological Maps (Bedrock Geology UK north, Quaternary UK north). Available as the DiGMapGB-625 dataset from http://www.bgs.ac.uk/products/digitalmaps/data_625k.html

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