

3 THE FORMATION AND LOCATION OF STACKS IN LEWIS

3.1 Geological formation of stacks

A study of the coastal sites of Lewis must take into account the geological and geomorphological processes of site formation. The topography of the Lewis coastline is determined in part by the islands' underlying geology. The physical structure of the rocks at the shore determines the formation of stacks and inlets. Although in summary the solid geology of Lewis is relatively uniform, comprising Lewisian gneiss with metasediments and conglomerates in more localised areas, in reality, the more closely it is studied, the more complex it becomes (Angus 1997, 8).

However, the geology is only the medium from which the sculptured shoreline is made. The creation of the stacks, geos (inlets) and reefs of Lewis is also determined by other variables, including the pre-Pleistocene landform, climate, marine variability, sea level rise and the availability of marine and organic sediment (Angus 1997, 84). The erosion of the coasts by the sea is the main influence acting on these variables. During severe winters the west coast of Lewis will be subject to breaking waves exerting a pressure exceeding 24 tonnes/m² (ibid, 87).

This continual bombardment of the coastline eventually compromises weak bedding planes and soft rocks, leading to the formation of a variety of different features depending on the geological structure of the bedrock. Where weaker or softer strata lie parallel to the shoreline across a peninsula, sea caves will form and eventually meet, leading to the creation of an arch, and following the collapse of the arch, to an isolated stack. If weaker rocks are perpendicular to the shoreline, geos and inlets will form.

The term 'stack' is difficult to define, but usually refers to an isolated pinnacle of rock entirely surrounded by the sea at high tide (Mellor 2002, 2). If its summit has a larger diameter than its height, then it is an island. Many of the sites included in this project are islands or promontories, despite being described as 'stacks' by their place names. For instance, Stac Domhnuill Chaim (see Section 6), and Stac a'Chaisteal (see Section 7), are both permanently joined to the mainland. The literal translation of the Gaelic *stac* given by 'Dwelly's dictionary' is 'precipice, steep, high cliff or hill' (Dwelly 1994), and usually applies to any topographic feature which has a pinnacle-like or hay-stack-like shape, including the mountains Stacaiseal, Lewis (NB 3065 3740) and Stac Pollaidh (NC 108 105) and Beinn Stac (NC 270 422) in the north-west Highlands.

3.2 Location of stack sites in Lewis

Chris Burgess undertook a large amount of research on promontory enclosures in Lewis throughout the 1990s (Burgess 1999, 2000); a research interest that developed from his work surveying the coastline of Lewis during the Coastal Erosion Assessment (Burgess 1999, 93). He admitted that the 'promontory enclosure' description of these sites may well be an inaccurate one: many of the sites are not 'enclosed' but merely 'barred' (ibid), and tidal stack sites are also included in the overall term. He does however divide his general terminology into four sub-categories: promontories, headlands (both barred), coastal enclosures and stacks (which may be linked to or separated from the shore; ibid 96).

The CEAL survey classified 80 sites as promontory enclosures (Burgess 1999, 94). The general distribution of these sites covers much of the Lewis coastline but Burgess divided them into five general areas (ibid, 95–96).

Area 1 – Brenish, Islivig and Camas Uig (17 sites): typified by high eroding sea cliffs with a mixture of high and low promontories and several knife-edge stacks.

Area 2 – Bernera and the Loch Roag complex (12 sites): typified by low eroding edges punctuated by shingle beaches. This area includes Bernera and the Bhaltois Peninsula.

Area 3 – Garenin to Barvas (13 sites): dominated by high Atlantic cliffs with frequent promontories, interspersed with small bays of sand and shingle.

Area 4 – North Galson, Ness and Skigersta (16 sites): dominated by machair to the west and high cliffs to the east all backed with flat croft land, this area is the smallest of the five. The coastline has a combination of extensive, low promontories and large eroding stacks on which sites are situated.

Area 5 – Tolsta, Broad Bay and the Eye Peninsula (14 sites): this area is the most dispersed and covers the biggest geographic area, with high eroding sea cliffs to the north at Tolsta, and low eroding cliffs formed from soft conglomerate rocks in the Broad Bay area. The Eye Peninsula also has many high sea cliffs punctuated by stacks and promontories, with a change further south as the terrain becomes one of low eroding edges and gentle stacks.

Burgess noted that stacks and promontory enclosures are most common in Area 4, forming 25% of the

sites there, with Area 1 having only slightly fewer. When the areas are combined, stacks and promontory enclosures make up 13% of all sites. As noted on the table of stacks ([table 1](#)), five of the sites chosen for study by the STAC project fall into Burgess' Area 4, which he found to have a very high frequency of stack sites. The rest are distributed evenly across the other areas described above.

3.3 *Sea level rise and erosion*

The relative sea level has an obvious bearing on the interpretation of the types of site being studied, especially as we now know that there was activity in such places as long ago as the Neolithic (see [Discussion Section 17](#), and the report on Dunasbroc Part III [Section 18](#)). Were the archaeological structures built upon positions similar to what we now see, or were the structures built upon sites that were subsequently eroded into their present shape? There are two forms of evidence available to help answer this question – the scientific study of sea levels and coastal morphology, and the archaeology remaining on each site itself. Evidence for the latter will be discussed in the section on each site.

Differential isostatic uplift in northern Britain during the Holocene has combined with the general eustatic rise in sea level to create varying coastal effects. In an area encompassing the central belt and much of the Highlands of Scotland, sea level is falling in relation to the land, due to sea level rise being outpaced by the isostatic uplift. This uplift grades out to a zero isobase outside which the sea level is rising relative to the land.

There is consensus that the Western Isles are sinking into the sea. However, the rate at which this is happening seems to be a matter of debate. Professor J. Hansom, in Dawson ([2003](#), 10) gives the figure as 0.7mm per annum for recent sea level rises

in Stornoway (modified after [Carter 1988](#)). However, this needs to be added to the figure for isostatic submergence to attain the relative sea level. New research in this field is likely to lead to significant changes to these figures (J Hansom pers comm). As a working figure pending these changes, Ritchie ([1985](#)) estimates a coastal submergence of between 3m and 5m since *c* 5164 BP for the Uists, which he translates as an average relative sea level rise of less than 1mm per year. There is, as yet, no data relating specifically to the north of Lewis (Professor A Dawson, pers comm).

The average of the above figures is *c* 2mm per year. From this it is possible to estimate that in the Iron Age the sea was *c* 2m lower; in the Bronze Age *c* 4m and in the Neolithic *c* 5–7m. Detailed research into the seabed in each study area, combined with sea-level changes, could demonstrate the differences in coastline plan, for example, at Baile Sear, North Uist ([Barber et al 2003](#)). Unfortunately, high-definition surveys of the inshore waters around Lewis are very rare and it was not possible to find sufficient data to attempt any kind of reconstruction coastal modelling which could have been added to the digital terrain modelling of each stack. However, in most cases (other than Caisteal a' Mhorair and Stac Mor Garrabost, see [Sections 15](#) and [16](#)) the sea bed appears to fall steeply away immediately from the stacks, leading to the working assumption that eight of the eleven sites may not have looked radically different from their present-day appearance, but they were a little taller.

Erosion has had a significant effect, as it would seem likely that the majority of the sites were joined to the mainland in prehistory, and probably started their lives as headlands or promontories, and some may even have had arches. Part of the attraction of such sites in prehistory, as it is today, was likely to have been their height, isolation and liminal placement on the boundary between sea and land.

Table 1 Gazetteer of all stack sites

Name	Location	Translation of place-name	NGR #	Eastings	Northings
Braigh an Stac	Leurbost	bràigh is one of the words which suggests upper part – sometimes translated as braes	NB	42795	24119
Braigh nan Stacannan	Little Bernera	as above but this will be <i>of the stacs</i>	NB	13500	41200
Caisteal a Mhorair*	North Tolsta	<i>nobleman's castle</i> morair can be <i>Earl</i> which sounds like Norse jarl (Taigh nam Mòrairean/ House of Lords)	NB	53670	49700
Caolas Stac an Tuill	Bearasay	same as caol – Caolas Scalpaigh/ Kyles Scalpay <i>the channel of the stac with the hole</i>	NB	11900	42500
Cleit a Stac	Bearasay	Norse klettr for <i>rock/cliff/crag</i> This is one instance of two words meaning <i>rock</i> Another definition of cleit is a small drystone hut roofed with living turf, used for storing crops, hay or fuel as on St Kilda (often beehive bothies)	NB	11900	42500
Crois Eilean	Cromor	<i>cross and island</i>	NB	39270	21960
Dun Armistean*	North Dell	Norse proper name Orn?/stein for <i>stone</i>	NB	48850	62675
Dun Bharclin	Crosbost	unknown	NB	39449	23275
Dun Eistean*	Knockaird	presumably Norse proper name?	NB	53500	65100
Dun Eòradail*	Eorodale	Norse eyrar for <i>shore?</i> / dair for <i>field/plain</i> . Norse proper name	NB	54300	63000
Dun Othail*	North Tolsta	there is a Gaelic word 'othail' which means something like rushing around madly – dictionary also gives tumult – but here very likely personal name.	NB	54200	51500
Dun Stuaigh*	Great Bernera	unfamiliar – the closest rock word would be stuaadh, which suggests height	NB	15400	40260
Dunasbroc*	Aird Dell	Norse tun? dùn usually <i>fortress</i> but is often used for a <i>hillock</i> or a heap of stones such as a <i>cairn</i> . One of the terms in everyday use for peatstacks and haystacks – + cruach/sìg	NB	47100	62000
Geo Staca na Gall	Clibhe	<i>cove of the rock of the foreigner</i> (usually meant Norseman)	NB	08400	37650
Luchruban*	Butt of Lewis	literally <i>pygmy</i> – leprechaun in Ireland	NB	50750	66000
Sgeir Leathann	Bac	<i>broad rock</i> Norse sker for <i>rock in the sea</i> Sule Skerry/Sulasgeir (gannet rock) have heard it used for <i>reef, cliff</i> and <i>rock shelf</i>	NB	50550	40931
Stac a Bhaigh	Eilean Luibhaid	<i>of the bay</i>	NB	38409	09461
Stac a Chais	Holm	could suggest steepness	NB	45991	30397
Stac a Chais	Mangersta	as above	NB	00500	30900
Stac a Chaise	Carloway	as above	NB	17700	42300
Stac a Chaisteil	Gearrannan	Norse stakkr stac can be a rock or a hill but is usually steep – this one is <i>of the castle</i>	NB	20200	45500
Stac a Chomhraig	Lemreway	<i>of the battle</i>	NB	41499	11264
Stac a Chonuil	Gress	<i>of Connal</i> ? proper name.	NB	50662	41817
Stac a Geodha Ruaidhe	Arnol	<i>of the red cove</i>	NB	31700	50500

Table 1 (cont.)

Name	Location	Translation of place-name	NGR #	Eastings	Northings
Stac a Phris	Gearrannan	the most common usage of preas is for shrub – <i>of the shrub?</i>	NB	21700	45700
Stac a Ruta	Clibhe	<i>of the ram</i> is the first that springs to mind	NB	08450	37000
Stac an Arbhair	Leurbost	<i>of the corn?</i>	NB	40530	23454
Stac an Fhir Mhaoil	Calbost	<i>of the fear</i> ; maol in everyday language would suggest <i>of the bald-headed man</i> the other familiar use for the adjective maol is blunt the noun maol can be the <i>brow of a rock</i> or it can be a headland, as in Mull of Kintyre	NB	42503	16773
Stac an Sgornain	Great Bernera	the only meaning I know for sgörnain is <i>throat</i>	NB	13400	38400
Stac an Taoid	Islivig	taod = rope or halter – <i>of the rope?</i>	NA	98050	27450
Stac an Tuamachain	Clibhe	tuam is used for mound, particularly tomb, but have not met it with this ending before	NB	07500	37100
Stac an Tuill	Bearasay	<i>of the hole</i>	NB	11900	42500
Stac an Tuill	Islivig	as above	NA	98150	27900
Stac Caol Geodha Mhaoir	Arnol	caol can be adjective meaning <i>narrow</i> and also noun meaning <i>narrows / strait / sound / channel</i> – caol Muile/sound of Mull	NB	31200	50200
Stac Domhnaill Chaim*	Mangersta	suggests <i>narrow</i> <i>stac in the cove of the factor</i> (the most common usage of maor but can be any official keeper of something e.g. maor-sithe – <i>police man/maor-caille</i> – <i>forest ranger/maor-cladaich</i> – <i>coastguard</i> <i>of Domhnaill Can</i>	NB	00190	31500
Stac Leathann	Islivig	<i>broad stac</i>	NA	98200	28200
Stac mor Garrabost*	Garrabost	unknown	NB	49776	33130
Stac na Beiridhe*	Timsгарry	Norse berg for a <i>hill?</i> seems there is a Berry in Orkney	NB	03060	35970
Stac na Caillich	Barvas	cailleach is usually <i>old woman</i>	NB	35800	53900
Stac na Caoratach Lachduimne	Carloway	<i>of the dark-coloured sheep</i>	NB	17200	42700
Stac na Faoileig	Barvas	<i>of the seagull</i>	NB	34900	52700
Stac na Faoileig	Bragar	as above	NB	27400	49700
Stac nam Balg	Old Hill Isle	balg can be used for a <i>bag</i> or a <i>blister</i>	NB	11500	43500
Stac nan Crubag	Aird Uig	<i>of the crabs</i>	NB	05080	38150
Stac nan Eilean	Bearasay	<i>of the islands</i>	NB	11900	42500
Stac nan Eun	Bragar	<i>of the birds</i>	NB	26900	49400
Stac nan Gabhar	Tong	<i>of the goats</i>	NB	56407	35252
Stac nan Scargh	Calbost	Norse skari for <i>young seagull</i> or skarfr for <i>cormorant</i> Stac nan Sgarbh in Gress, Bragar and Mangersta is the word we use for cormorant and this one could well have a bird connection e.g. Eilean na Sgarbh (Isle of the Scarts) or Scart Rock as it is known locally	NB	42216	15671
Stac nan Sgarbh	Bragar	<i>of the cormorants</i>	NB	28300	49800
Stac nan Sgarbh	Gress	as above	NB	51861	43550

Table 1 (cont.)

Name	Location	Translation of place-name	NGR #	Eastings	Northings
Stac nan Sgarbh	Mangersta	as above	NB	00380	30900
Stac nan Uamhannan	Mangersta	immediately suggests <i>of the caves</i> the spelling is more like the plural of uamhamm meaning <i>terror / dread</i> but may be due to incorrect spelling on map	NB	00060	32000
Stac Shuardail	Knock	<i>of Swordale</i>	NB	48910	30221
Staca Bearnach	Carloway	suggests <i>jagged</i>	NB	17200	42700
Staca Biorach	Islivig	biorach suggests <i>pointed or sharp</i> biorach is also the word for <i>dogfish</i> , but more likely to be former	NB	99150	29100
Staca Coal na Ribh Uarach	Shawbost	<i>narrow stac of the upper reef?</i> – ribh spelt this way means ‘to you’ as in ‘speaking to you’, so this is just a guess – ríof is the usual spelling	NB	23400	47300
Staca Corr	Islivig	<i>pointed or peaked stac</i>	NA	98150	28050
Staca Liath	Liongam	liath is certainly a light colour but it varies according to context I use it for grey hair (Ness) – in Skye it is pale blue – and it is used to describe hoar frost	NA	99500	19800
Staca Mharstaig	Aird Uig		NB	06670	38200
Staca Mhic Cubhaig	Borve		NB	39800	56500
Staca na Bodaich	Aird Uig	bodaich usually <i>old man</i>	NB	06050	38450
Staca na Geodha Glaise	Shawbost	<i>of the green cone</i>	NB	24200	47600
Stacageo	Islivig	suggests <i>stac</i> and <i>geodha</i> (<i>creek or cove formed by surrounding rocks</i>)	NB	99500	29300
Stacan a Leothaid Ghlais	Gearrannan	<i>-an</i> ending can be a plural or a diminutive – <i>little stac?</i> – this suggests <i>of the green slope</i> i.e. Glas Maol is grey-green hill	NB	21700	45700
Stacanan Dubha	Carloway	<i>black</i>	NB	17900	42300
Stacanan Fudrigeo	Aird Uig	geo(dha)?	NB	05500	38300
Stacanan Neidacliv	Aird Uig	Cliff placename in Uig and <i>nead / nid</i> (nest/nests) – probably has no connection whatsoever	NB	05700	38480
Stacannan Chrois Geodha	Islivig	Norse cross for <i>cross/gia</i> for <i>chasm</i> suggests <i>more than one hill or rock and cross and a narrow creek or cove between rocks</i>	NB	99700	29400
Stacannan Chuido	Mangersta		NB	00200	31600

NB All sites listed from consulting the Ordnance Survey 1st edition and most recent 1:10,000 map sheets, unless otherwise specified.

All Gaelic translations undertaken by Mrs Aggie Murray, Ness.

* Sites included in [Burgess & Church 1997](#)