

## 4. Analysis

### 4.1 Introduction

In this section the results of the fieldwork are synthesised and preliminary findings concerning the erosional history of the coastline and regional settlement are discussed. It is important to state at this point that the survey has been a rapid assessment based on accessible sources of data which **vary in quality**, and as such any conclusions must be considered tentative suggestions **rather than firm judgements**. Future studies with a more detailed or specialised approach **may well arrive** at different conclusions.

### 4.2 Erosional Condition

In this section the contribution of the **local geology** and geomorphological processes on the erosional condition and its **potential effect** on the future management of the built heritage are synthesised and discussed.

#### 4.2.1 Survey Results

The results of the survey clearly indicate that erosion is the dominant process active in the study area (Table 1). A discussion of these results is located later in the report (Section 4.2.3).

<i>Coastal measurements in km</i>								
<i>Survey Map</i>	<i>Definitely Accreting</i>	<i>Accreting or stable</i>	<i>Stable</i>	<i>Eroding or stable</i>	<i>Definitely eroding</i>	<i>Both accreting and eroding</i>	<i>Total</i>	<i>Land below 10m ASL<sup>3</sup></i>
1	0.00	0.68	1.32	3.98	1.02	0.00	7.00	0.2 km <sup>2</sup>
2	0.00	0.46	2.70	2.1	0.00	5.10	10.36	1.0 km <sup>2</sup>
3	0.00	0.00	0.00	5.34	0.00	0.00	5.34	< 0.1 km <sup>2</sup>
4	0.00	0.00	0.80	6.28	0.00	0.00	7.08	0.2 km <sup>2</sup>
5	0.00	0.00	2.46	4.78	0.70	0.00	7.94	0.8 km <sup>2</sup>
6	0.00	0.42	3.12	7.28	0.00	0.00	10.82	0.1 km <sup>2</sup>
7	0.00	0.00	2.62	7.02	4.22	1.92	15.78	0.2 km <sup>2</sup>
8	0.00	0.00	1.22	7.54	2.74	3.64	15.14	1.2 km <sup>2</sup>
9	0.00	0.00	1.38	6.30	0.00	0.72	8.40	0.5 km <sup>2</sup>
10	0.00	0.00	3.03	12.20	1.30	0.00	16.53	0.2 km <sup>2</sup>
11	0.00	0.00	1.88	9.56	0.00	1.72	13.16	0.3 km <sup>2</sup>
Total	0.00	1.56	20.53	70.49	9.98	13.10	115.66	4.8 km <sup>2</sup>
%	0.00	1.3	17.9	60.9	8.6	11.3	100	

Table 1: *Analysis of Erosional Character by Survey Map.*

<sup>3</sup>Note this figure includes all non-tidal land below 10m ASL, regardless of proximity to the coast edge.

In general the coastline was considered to be either stable or eroding (87.4%) with a negligible rate of regression. This state was accentuated by variations in the degree of exposure and bedrock resistance. There was very little evidence of active accretion (1.3%), and this was entirely represented by the development of small spits at river mouths. In complex estuarine environments (11.3%) both accretion and erosion was occurring, which is effectively amounting to a superficially stable situation, though minor coast edge erosion was frequently occurring to surrounding drift deposits. Approximately 4.8km<sup>2</sup> of the hinterland is situated below 10m ASL, and much of this is located in a few extensive river valleys (e.g. Strath Kanaird). The majority of the hinterland is composed of steep rocky hills, which compared to lowland areas is not seriously threatened by the prospect of marine transgression.

#### 4.2.2 Potential Impact on the Built Environment

In the following section the potential affects of the specific categories defined by Historic Scotland as threats to the archaeology and built heritage of the coastal zone (Ashmore 1994, 6-9) are addressed in relation to the study area.

##### 4.2.2.1 Sea Level Change

The study area contains ample evidence of a post-glacial rise in relative sea level, notably the unmistakable underlying form of a drowned, glaciated landscape. This inundation has been followed by a series of partial drops in relative sea level caused by isostatic uplift, as represented by the frequent occurrence of raised beaches of varying height.

A comparison between the current coastline and 18th century maps of the area indicates that very little change has occurred to the coastline during the intervening period (cf. Murdoch Mackenzie's coastal survey; 1755, and Peter May's map of the Barony of Coigach; 1756). This has generally been corroborated by field observations, though in two estuarine locations evidence of recent tidal incursion was observed. At Achnahaird Bay two sections of stone and turf dyke (NC 2018 2127, Plates 11 & 13) are now located below the HWM, and at the head of the River Kanaird Estuary (Map 2) a causeway had been recently constructed to prevent inundation of adjacent low lying land. At Loch Kirkaig (Map 10), another inlet with estuarine characteristics, erosion to coast edge deposits was observed on the north shore, further illustrating this effect.

It is not clear whether these examples represent regional trends or merely the effects of local factors within estuarine environments, however they do illustrate the vulnerability of much of the cultural landscape in this region. Approximately 75% of recorded sites and most archaeologically sensitive areas were either wholly or partially located below 10m ASL. The area has not received any detailed geomorphological studies (Price 1983, 164), and for this reason it is difficult to conclusively determine the current trend in sea level fluctuation. It is possible the rate of eustatic sea level rise is currently either matched or outstripped by isostatic uplift as raised beach deposits were generally observed to be intact, with few indications of active erosion or inundation. Therefore it is probably safe to conclude that relative sea level is fairly constant, and that with the exception of certain estuarine situations

which characteristically have high tidal ranges (Hansom 1988, 17-20), the trend of slow land surface re-emergence is probably continuing.

#### 4.2.2.2 Erosional Potential of the Sea

In general the coastline is sheltered from the full effects of longshore wave activity by a group of offshore islands (The **Summer Isles**), however some exposed headlands do display clear evidence of **mechanical erosion**. In general the underlying bedrock is highly resistant to erosion, though **substantial** raised beach deposits are located throughout the study area which **would be highly** vulnerable to concerted wave activity under adverse climatic **conditions**. These deposits are often located in relatively exposed situations, such as the **densely** settled Achiltibuie / Badenscallie area (Map 5). In this area several **archaeological sites** are located along the coast edge. In particular, a structure at Port Allt a' Ruistéal (NC 2019 9090) (Plate 9), is currently collapsing as a result of wave **erosion**. Unfortunately there have been no detailed geomorphological studies into **wave or tidal behaviour** in this area (Bryan 1994, 3.1-3.5), and so the full extent of this **potential problem** is difficult to assess. In particular, the normal limit of the **wave effected zone** under storm conditions and the documented effects of extreme **events on the coast edge** are not known.

#### 4.2.2.3 Stability of Fragile Coastal Dune Systems

Achnahaird Sands (Map 8) comprises the only coastal dune system located in the study area. A small quantity of blown sand also occurs above HWM at Acheninver (Map 4), but there is no evidence of **dune or machair** development. Both these areas contain disturbed **archaeological deposits**, though the disturbance at Acheninver is purely a result of artificial **sand extraction**, rather than natural processes. Elsewhere occasional exposures of sand **exist in the intertidal zone**, but no significant deposits have formed inland.

Achnahaird Sands (Crofts & Mather 1972) **has experienced** ongoing dune disturbance in the form of point erosion, **rabbit burrowing**, livestock trampling, and human interference. In particular, **excesssive erosion is occurring** at the southern end of the dune system. Here the back **dunes have been destabilised** and dispersed by wind action, revealing an underlying **palaeosol and structural complex** dating to the 16th / 17th centuries and earlier. **Behind this zone a machair surface** is also actively receding across a scarp 1-2m in height. **In the absence of a detailed** geomorphological study the cause of this erosion is as **uncertain, but the situation** has definitely been worsened by destabilisation caused by rabbit burrows and the use of a gully in the dunes as a stock track since the 1960s.

#### 4.2.2.4 Human Impacts

Human impacts on the coastal zone in the study area take four principal forms; residential development, coastal defences or harbour facilities, tourist visitation and rural industrial activity. The affects of these impacts on the archaeological record of the coastal zone in the Minch area have been briefly assessed by Bryan (1994, 23.2-23.4). These will be dealt with separately in relation to the study area as follows:

1. *Residential development*:- there are a number of locations where recently constructed tourist facilities (e.g. caravan and chalet parks) were observed during the study, in particular in the vicinity

of established settlements (e.g. Ardair, Inverkirkaig and Strathan). In addition, the recent excavation of building foundations was noted on land north west of the Ullapool River, effectively extending the modern settlement of Morefield.

2. *Coastal defences and harbour facilities*:-Lochinver harbour has been substantially enlarged in recent years with the construction of new piers, roadway and harbour defences. An associated complex of new quarries has also been developed at Aird Ghlas at the mouth of the harbour. No other harbour related construction was noted, though occasional small, revetment walls, causeways and gabions adjacent to private houses and farmland indicate the prevalence of unofficial, small scale coastal defences throughout the area. Occasionally makeshift solutions had been employed to control small, isolated sections of eroding shoreline (e.g. concrete blocks at Lùib na Mór-choille, Map 1 or Port na Bà, Map 11; Plate 10).
3. *Tourist visitation*: this impact was primarily present at Achnahaird Sands (NC 01 SW 2), where an adjacent caravan park has encouraged a large seasonal population into a fragile dune system containing significant archaeological deposits.
4. *Rural industrial activity*: these consist of salmon farm facilities, coastal agricultural activities (e.g. grazing and cultivation) and localised quarrying activities. Overall the affects of these activities were minor, though consistently present throughout all the inhabited parts of the study area. No particular incidence stands out as being a serious threat to the archaeological record, though the clearly the cumulative effect of these processes will cause site degradation in the long term..

Except where discussed in individual site entries (Sections 5.1 & 5.2), it is clear that the archaeological record of this region is not badly affected by major developments or human interference, though the isolation of the area has tended to create a situation where it is difficult to monitor activities likely to cause disturbance. It is considered that the number of detailed surveys conducted in recent years will serve to highlight the archaeology of the region, and facilitate the site management and planning process.

#### 4.2.3 Discussion

The overall geological and geomorphological characteristics of the study area indicate a slowly developing erosional landscape in a relatively early stage of evolution. The process of glaciation has defined the topography and morphology of the region and the subsequent drowning of the landscape in the postglacial period has in essence emphasised this underlying form, rather than creating a coast edge with an entirely different character. This is a result of the relatively recent occurrence of this marine transgression (ca. 6000 bp; Price 1983, 164) and the high degree of resistance in the dominant local bedrocks, which primarily comprised Torridonian Group sedimentary rocks in the central and southern sections (Johnstone & Mykura 1989, 3-41) and Lewisian gneiss in the north of the study area (*Ibid.* 17-18).

These two rock types have created coastlines with a distinctly different character, however both do display similarities; for instance, the overall rarity of major coastal cliffs and wide wave cut platforms, weak wave notch development and the prevalence of sub-aerial weathering processes actively affecting the underlying glacial landforms. The resulting coastal landforms are characterised by glacially smoothed surfaces or scree slopes with low, sloping rock platforms or shelves at sea level. Strong coastal cliff development displaying evidence of bedrock failure is restricted to exposed

headlands (e.g. Rubha Còigeach) and offshore islands (Hamblin 1985, 298), particularly in Torridonian sandstone areas.

The frequent bays and inlets situated around the coast are considered a reflection of the underlying topography, as opposed to **the cumulative** effects of mechanical wave action on weaknesses in the bedrock. **This is supported** by the strong correlation between the distribution of these bays and **raised** beach deposits. On a smaller scale, however, wave action has resulted in the formation of narrow, steep sided inlets (geos) and caves in exposed areas.

The faster pace of coastal erosion on the western side of Rubha Còigeach is demonstrated by the occurrence of wide wave cut platforms, sea stacks, caves, geos and steep cliffs, and the occurrence of **small, eroding** residual raised beach deposits on the edge of cliff tops. The occurrence of **raised beach** and other drift deposits (e.g. peat and glacial till) over more resistant **bedrock has** frequently resulted in active cliff top erosion in the form of slumping and **deflation**. This probably comprises a greater threat to the built heritage in the short **term than the** slower effects of wave action (e.g. Geodha na Glaic Bàine (NC 1970 9138), where structures and cultivation are located on the cliff edge).

Offshore islands immediately adjacent to the mainland are frequently by cobble bars or tombolos (e.g. Loch of Reiff) formed by longshore drift or under storm conditions. The presence of substantial storm bars composed of massive boulders stands as testimony to the activity of high energy waves in the past. There was little evidence of recent storm bar construction, though indications of potentially earlier storm bar development do exist. For example, at Achlochan, a broch (NC 00 NW 3) may have been constructed onto a pre-existing storm bar, which would indicate that the bar was formed before ca. 2000 BP.

It can often be problematical to determine whether a tidal cliff is a result of wave action or merely an earlier glacial outcrop which has been superficially modified the sea (e.g. the Creag Dearg / Ben Mòr Coigach coastline on Map 3). In particular, the coasts of the northern Lewisian gneiss sections (Maps 9-11) appear to be almost totally unaffected by wave action, with the exception of the formation of a small, sloping rock platform. This type of coast has been termed by Price (1991, 96) as a 'skerry' coast, and is typified by a highly fractal outline with frequent offshore islands and reefs.

The influence of isostatic uplift in the area between *ca.* 5,000 and 2,000 BP has resulted in the formation of raised beach deposits along coastal shelves throughout the study area (Price 1983, 182-183). It is also apparent that the process of storm bar formation was either associated with, or immediately post-dated this period. Storm bars are certainly a feature associated with the modern coast edge, and have not been observed above raised beach deposits. Active accretion is currently a very rare occurrence in the study area, and has only been observed in estuaries or at the mouths of river valleys; often these deposits have been reworked by longshore currents, sometimes forming into small spits.

The human impact on the basic form of the coastline is negligible, though clearly the coast has created a focus for activity throughout the past and into the modern period. There are very few coastal defences located in the study area and with the exception of modern harbour constructions (e.g. Lochinver), these are often small and makeshift attempts to prevent minor point erosion and / or inundation.

To summarise, the overall resistance of the underlying bedrocks in the study area has effectively set a very slow rate of regression, and consequently mechanical wave action has a negligible affect on archaeological sites at the coast edge; however, sites situated on less resistant drift deposits overlying the bedrock are susceptible to erosion in the form of sub-aerial weathering.

The widespread occurrence of stable deposits of raised beach material above the current foreshore is indicative of an overall pace of isostatic uplift that is currently matching or outpacing any eustatic rise in sea level; however, there is evidence in estuarine situations that the tidal range has increased over the past 120 years, and may be indicative of a relatively recent rise in relative sea level documented elsewhere around the British coastline (Lamb 1995, 278-279). The possibility of sustained sea level rise perhaps represents the single most serious long term erosional threat to the archaeology of the study area, much of the majority of sites in the coastal zone are situated in highly vulnerable and / or low lying locations.

### 4.3 Archaeology

In this section the results of the archaeological field survey are described, and the preliminary findings concerning site location, distribution and significance are discussed. The criteria which defined a site for the purposes of this study are stated earlier in this report (Section 2.3.2). All sites are briefly listed in their geomorphological and erosional context (Section 3), and described in greater detail in Appendix 1.

#### 4.3.1 Introduction

On conclusion of the field survey, there were 195 documented archaeological sites in the study area<sup>4</sup>. The site catalogue can be represented in the following manner;

• New sites and landscape elements recorded during the course of the survey	136
• Previously documented sites inspected (in some cases additional elements were recorded)	56
<hr/>	
<i>Sub-total</i>	192
• Less - Previously documented sites considered to be natural features (Rubha a' Chàirn, NC 01 NW 1).	1
• Plus - Previously documented sites not relocated; (probably obscured by dense ground cover)	4
<hr/>	
<i>Total</i>	195

<sup>4</sup> Shipwreck sites located in the marine zone have been excluded from the site population as it has not been possible to fully assess them at this stage.

In summary, 192 sites were inspected, one of which was rejected from the site population on the basis that as it was clearly a natural feature, leaving a total of 191 cultural sites. A further 4 sites recorded by the ALS were not relocated by the survey team; however, there are no good grounds to reject these structures from the site population, given the rigorous field identification and documentation procedure employed by the RCAHMS. As the approximate locations of these sites were clearly not affected by coastal processes, this omission will not influence the site management component of the assessment. The total number of sites located within the coastal zone is therefore calculated at 195 individual sites or cultural landscape features.

For reasons stated above (Section 2.3.4) the recorded site catalogue is considered a sample, rather than a reflection of the total site population. This is particularly in the case for evidence of prehistoric occupation in the study area. Furthermore, it was often highly problematic to determine precisely what constituted a site, and some inconsistencies may exist between individual recordings.

A single listed building (NC 00 NW 27) and a protected ancient monument (NC 10 SW 1) are the only scheduled sites in the entire study area. It would appear from the results of this survey and the published scheduling criteria (Historic Scotland 1995) that several additional sites warrant scheduling (Section 5).

A total of 5 sites situated at the coast edge are considered to be either at risk or actively eroding as a result of coastal processes. Furthermore, all shipwrecks / hulk sites are considered at risk due to the vulnerability of their material fabric to weathering and erosion, and demonstrated exposure to coastal processes (see Section 5 for discussion).

For analytical purposes the recorded sites are described in terms of four broad categories. Owing to the occurrence of elements relating to more than one different period at each site, these categories are not considered to be discrete. The categories are:

1. *Prehistoric sites*- defined as sites containing demonstrable prehistoric structural or artefactual elements, such as hut circles, duns and burial cairns (ca. 5000 BC - 500 AD).
2. *Pre-improvement sites*- defined as sites containing elements that are not demonstrably prehistoric in origin, but probably pre-date the period of Highland improvements. An approximate date range for these sites can be set at ca. 500 - 1760 AD, and can generally be described as MOLARS. Sites in this category were generally established prior to the mid-18th century, when the first detailed estate documentation occurred (e.g. Forfeited Estate Papers). Morphologically, these sites often do not have obvious diagnostic features that can be ascribed to a particular period. Lazy bed cultivation is considered pre-improvement in origin, though the practice undoubtedly continued into at least the 19th century.
3. *Post-improvement sites*- defined as sites containing elements which were constructed after the start of the improvement period (ca. 1760 AD - present date), such as stone walled fields, crofting townships, kelp kilns and sheepfolds. There is likely to be considerable overlap between pre- and post-improvement site elements, as the process of improvement was gradual and occurred at different times throughout the region.

4. *Intertidal and marine zone sites*- defined as sites containing elements within the intertidal and marine zones irrespective of time. This category contains all hulks, regardless of position in relation to the coast edge.

### 4.3.2 Prehistoric Sites

A total of 15 sites (7.7% of the site population) consisted of elements considered prehistoric in origin (Figure 2, Table 2). These are classified as follows:

<i>Site Type</i>	<i>No.</i>	<i>Period</i>	<i>Ref.</i>
Hut circles	6	Bronze / Iron Age	NC 00 SW 2, NC 00 SW 3, NB 1975 9131, NC 2023 9127, NC 2023 9128, NC 2039 9137
Duns	2	Iron Age	NC 10 SW 1, NC 01 SW 3
Vitrified Fort	1	Iron Age	NC 01 NE 1
Broch	1	Iron Age	NC 00 NW 3
Burial Cairns	2	Bronze Age ?	NC 1984 9102, NB 1970 9138
Rock Shelter	1	Mesolithic ?	NH 19 NW 1
Standing Stone	1	Bronze Age ?	NC 2065 9206
Artefact Scatter	1	Late Iron Age (1st - 5th C AD ?)	NC 01 SW 2

Table 2: *Prehistoric Sites recorded in the Study Area.*

The majority of these sites were recorded prior to the field survey, and generally consist of large, obtrusive monuments that are clearly visible in the landscape. In the absence of a well researched regional context and artefactual or scientific dating evidence, it is currently difficult to ascribe a precise interpretation or date to most of these sites. The periods defined above are based on previous research in other regions, and should be considered conjectural.

The fort, duns and brochs occupy defensive positions on rocky promontories, or in the case of Achlochan Broch (NC 00 NW 3), on a narrow storm bar between a shallow loch and the open sea. The hut circles are located on relatively flat terraces at a distance of approximately 50m from the coast edge. The only discernible concentration of prehistoric sites in the coastal zone occurs around the sheltered beach of Achnahaird Sands, where 4 sites are located. Detailed fieldwork in the hinterland of the Coigach Peninsula has demonstrated the presence of extensive upland settlement in the form of hut circles, enclosures and burnt mounds, potentially dating to the bronze or early iron age (1st - 2nd millennia BC). In the absence of detailed investigations it is impossible to date these with certainty, however the occupation of similar sites in other parts of the Highlands has been demonstrated to occur within this period.

It is uncertain at this stage what effects postglacial marine transgression have had in determining the location and subsequent survival of early prehistoric sites in this area, since no detailed investigations have been conducted. The only recorded site with



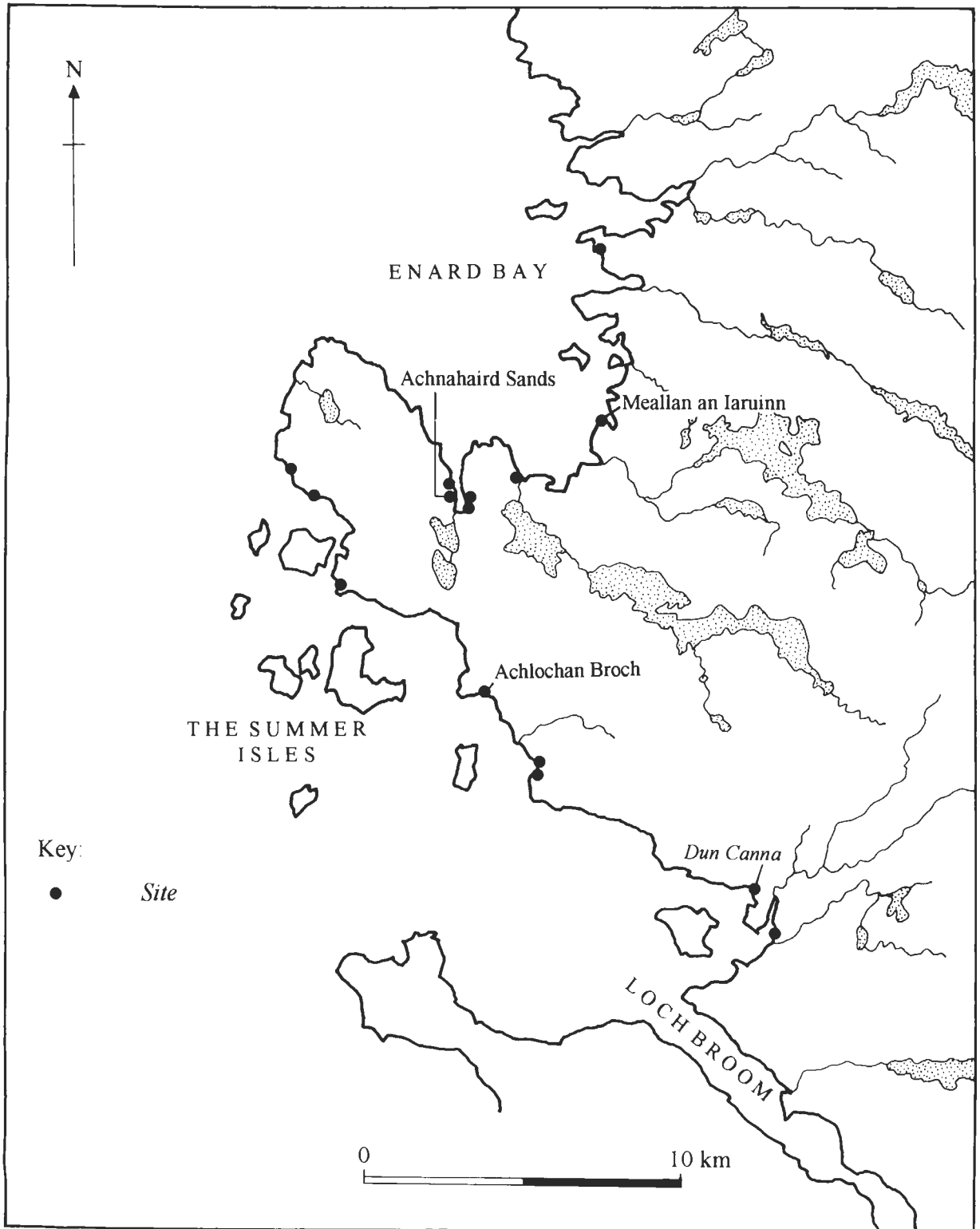


Figure 2: Distribution of Prehistoric Sites in the Study Area.

potential Mesolithic associations was a rock shelter at Buaile Ghlas (NH 19 NW 1). Comparative studies from other parts of the highlands suggests that Mesolithic settlement is clustered along the coastline (Price 1983, 177-178), suggesting that Holocene raised beach deposits are archaeologically sensitive locations for sites of this period.

It is probable that a large number of inobtrusive prehistoric sites have been obscured by later drift deposits (e.g. peat and blown sand) or vegetation. Some recorded structures during this survey were only identified as a result of recent disturbance (e.g. peat cuttings at Alltan Dubh NB 1975 9131 (Plate 4)).

### 4.3.3 Pre-Improvement Sites

A total of 55 sites (28.2% of the site population) consisted of elements considered pre-improvement in origin (Figure 3, Table 3). These can be classified as follows:

<i>Site Type</i>	<i>No.</i>	<i>Description</i>
Structures	12	These vary from subrectangular longhouses, small circular 'sheiling'-type features and other asymmetrical or crudely built structures.
Enclosures	3	Generally crude, asymmetrical and atypical stone constructions (e.g. NB 1964 9147, NC 2038 9141 & NC 2065 9205)
Fish traps / weirs	3	Documented pre-1756 salmon creaves (NC 2039 9137 & NC 01 SE 1) and a large, boulder construction similar to the 'Yairs' of Loch Broom ( NC 2111 9009) (Bathgate 1949). A further salmon fishing site was noted by Peter May in 1756 on his map of the Barony of Coigach (SRO/RHP 85395) at the mouth of the Ullapool River (NH 2122 8948), but the remains of this complex have not been positively identified in the field.
Lazy Bed cultivation/ Turf or stone dykes	37	Characteristic hand cultivated rigs and associated dyke systems.

*Table 3: Pre-improvement Sites recorded in the Study Area.*

These sites have been defined according to an assessment of various factors, including site function, form, construction method, and documentary or artefactual associations. It is probable that the use or occupation of these sites continued into the 19th century. Furthermore, it is possible that pre-improvement features survive within area occupied by later crofting townships (e.g. Reiff). It is clear that the survival of lazy bed cultivation is influenced by the extent of later landuse patterns, indicating that other earlier features may be obscured or disturbed in a similar manner.

It is possible that some sites or site elements in this category could date to the medieval period, however given the overall absence of diagnostic artefactual evidence this is difficult to demonstrate. The principal exception is an extensive collection of late medieval and early post-medieval (16th-17th centuries) artefactual material from Achnahaird Sands (NC 01 SW 2), which clearly indicates a medieval date for the occupation of the site.

The distribution of pre-improvement sites is very extensive, and, allowing for the influence of later disturbance, actually covers a greater frontage of coastline than the

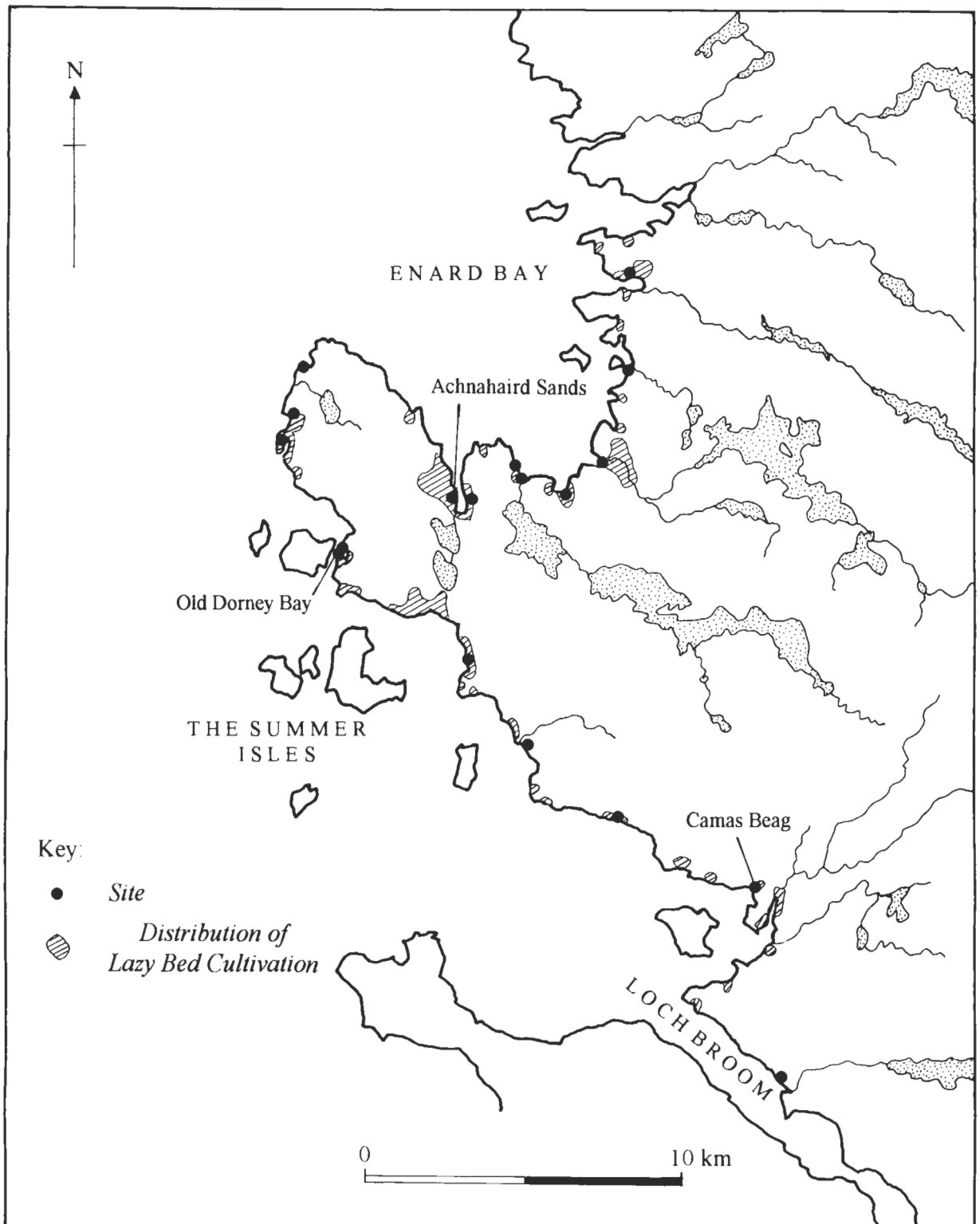


Figure 3: Distribution of Pre-improvement Sites in the Study Area.

post-improvement sites. Structural complexes are closely associated with raised beach deposits, though the distribution of **lazy bed** cultivation is very wide and plots are frequently located in highly marginal and inaccessible land (e.g. Creag an Airgid, NC 2096 9001 & NC 2095 9002). **These plots may be** the result of a later expansion of the communities in the late 18th / mid 19th centuries at the time of maximum population growth (Baldwin 1994, 292).

#### 4.3.4 Post-Improvement Sites

A total of 168 sites (86.1% of site population) contained elements considered post-improvement in origin (Figure 4, Table 4). The majority of these sites consist of a variety of elements (e.g. buildings, **field systems**, peat cuttings and trackways). For analytical purposes the site data has **been presented** below according to the occurrence of individual elements:

<i>Site Elements</i>	<i>No. of Sites containing each Element</i>	<i>Description</i>
Structures	88	Rectangular buildings, boat nausts, church / chapels, mills and other documented constructions
Enclosures	7	Pens or sheepfolds
Foot bridges	3	Small stone or concrete constructions
Trackways	6	Sections of embanked, enclosed or revetted trackway leading to or along the shoreline
Fords	3	River crossings consisting of piled stone embankments or cuttings
Kelp kilns / storage pits	12	Circular or rectangular pit features
Rock shelter	1	'Cave' containing 19th century artefacts
Burials	2	Burial grounds and documented burial sites
Historic middens	2	Artefact and kitchen waste dumps
Cairn	1	1st ed. Ordnance Survey trigonometric cairn
Peat cuttings	27	Areas containing any evidence of past peat cutting
Weirs	6	Concrete or stone barriers, presumably for use as fish traps
Oyster farm	1	Evidence of recent oyster farming
Quarries	2	Stone extraction sites, sometimes associated with particular buildings
Field systems	30	Stone field boundaries or revetment walls, and field clearance activity, sometimes defining the boundaries ofcrofting townships.

Table 4: *Post-improvement Site Elements recorded in the Study Area.*

These site elements are the most frequently occurring cultural feature present in the coastal zone. This is considered a reflection of their comparatively recent construction (many buildings and structures are still in use) and the degree to which this latest phase of land use has obscured evidence of earlier settlement.

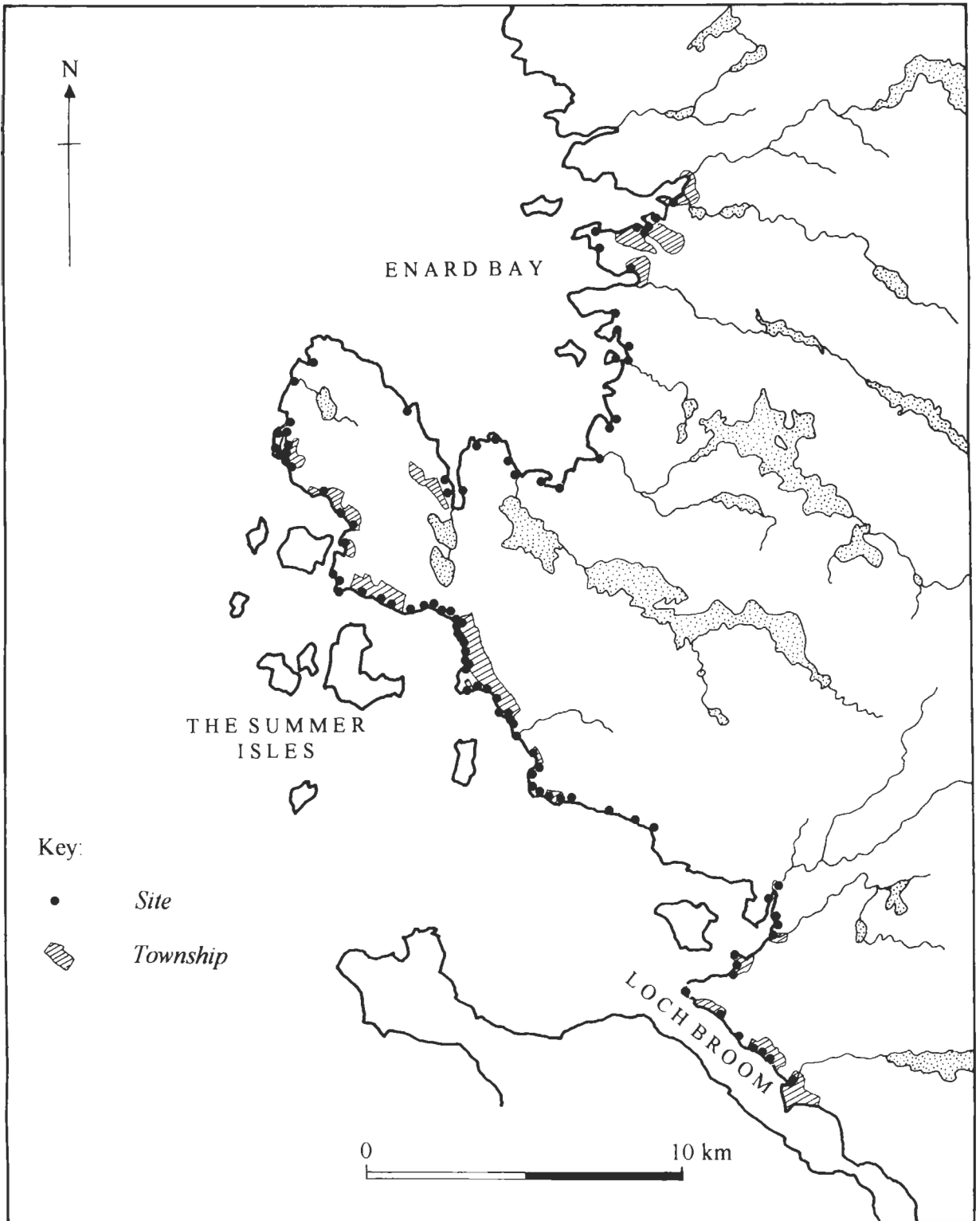


Figure 4: Distribution of Post-improvement Sites in the Study Area.

The distribution of post-improvement sites is very wide, and especially dense in the Achiltibuie / Badenscallie area. The **distribution of features** is perhaps less extensive than the pre-improvement landscape **and may indicate** the contraction of settlement in the area brought about by improvements to the Cromatie estate in the 19th century. Township sites have a close association with raised beach deposits and alluvial valleys, which represent the best **cultivable land** in the region. The form and distribution of this settlement pattern is corroborated by an examination of contemporary map and documentary sources (e.g. 1st & 2nd edition OS maps and the Statistical Accounts). It is also reasonable to assume that to a certain degree the post-improvement settlement pattern reflects elements of the pre-existing medieval and post-medieval patterns. A comparison between the settlement pattern depicted on Peter May's map of the Barony of Coigach (1756) and the crofting townships shown on the 1st edition OS map coverage of the region (1875) demonstrates that post-improvement settlement continued in the same approximate locations, though with a different mode of organisation.

#### 4.3.5 Intertidal and Marine Zone Sites

This category consists of abandoned hulks, shipwrecks and slipways (Figure 5, Table 5). These occur in the following number of locations;

<i>Site Type</i>	<i>No. sites</i>	<i>Description</i>
Hulks (or fragments)	11 (5.6%)	Generally small 20th C rowing and fishing boats abandoned at or just above the HWM. Often associated with boat nausts or slipways
Shipwrecks	2	Documented but unassessed wreck sites located in the marine zone adjacent to the study area.
Slipways	25 (12.8%)	Generally consist of cleared passageways across cobble / boulder beaches or rock platforms delineated by rows of boulders in the inter-tidal zone and at the marine zone interface. Occasionally concrete slipways were noted. Generally associated with boat naust complexes.

Table 5: *Intertidal and Marine Zone Sites recorded in the Study Area.*

In general the hulks examined were mid-late 20th century in date and of low significance, however a single vessel at the mouth of the Ullapool River (NH 2123 8947) is considered to be 19th century in origin (Plate 8). In the vicinity of this vessel a number of timber posts in the intertidal zone (NH 2122 8948), may indicate the existence of a fish trap or fence of unknown age (probably 18th - 20th century). Peter May (1756) indicates the location of a salmon fishing site in this location (SRO/RHP 85395).

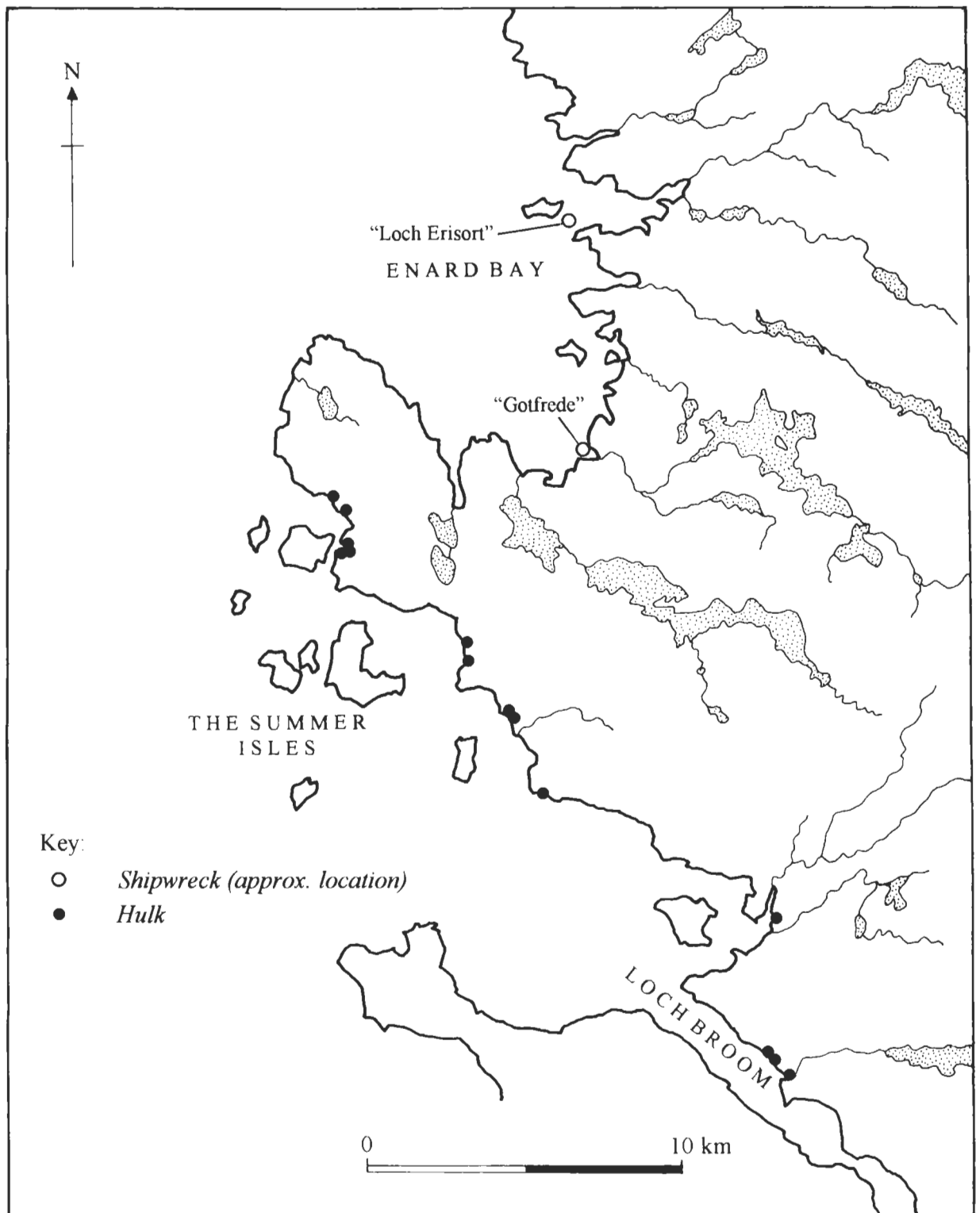


Figure 5: Distribution of Shipwrecks and Hulks in the Study Area.

## 5. Summary and Recommendations

It has been demonstrated throughout **this study** that in general the coastline between Ullapool and Lochinver is a slowly **eroding** environment, but there are few significant sites under immediate threat from **coastal** erosion or related processes. This is considered a reflection of the **sheltered aspect** of much of the coastline, the resistance of the underlying bedrock, the **limited effects** of sea level change, the restricted number of fragile coastal dune systems and low level of coastal development in the region. There is a very high **proportion of** sites situated in the study area with a specific coastal-related function (e.g. **boat nausts** and kelp kilns). Furthermore, it is clear that at any given point in time **proximity** to the sea was a highly important site location factor, allowing ease of **access to** a wider range of resources, the use of boat for transportation and the availability of good soils for cultivation on raised beach deposits.

It is consequently unsurprising that some sites are located in highly exposed situations on the coast edge (e.g. Achlochan Broch, NC 00 NW 3) and may be vulnerable to coastal erosion if there is a general worsening in climatic conditions, a rise in sea level or during extreme storm events. Approximately 75% of all recorded sites are located in a zone below 10m ASL, including extensive settlements and field systems occupying low lying river valleys which extend a considerable distance from the coastline (e.g. Strath Kanaid). These sites in these locations may be at risk from marine transgression.

### 5.1 Site Erosion

There was observable evidence of active erosion at various points along the coast, and 5 sites (2% of site population) are considered to be under threat from coastal erosion or related processes (Figure 6, Table 6). These are:

<i>Site location</i>	<i>Site number</i>	<i>Report ref.</i>	<i>Type</i>	<i>Threat</i>
Acheninver	NC 00 NW 2	Map 4/18	Structures	Sand and gravel excavation along the shoreline
Port Allt a' Ruistéal	NC 2019 9090	Map 5/11.9	Structure	Wave erosion
Achnahaird	NC 01 SW 3	Map 8/4	Dun	Visitation and rabbit activity
Achnahaird Sands	NC 01 SW 2, NC 2015 9131	Map 8/5	Structures, field systems & midden	Visitation, wind erosion, marine transgression, rabbit and stock activity
Port na Bà	NC 2074 9198	Map 11/1.3	Historic midden	Wave erosion

Table 6: *Eroding Sites recorded in the Study Area*

In general it is considered that the threats to these sites are minimal, and the generally low significance of the archaeology does not warrant immediate intervention. However, the site of Achnahaird Sands (NC 01 SW 2) is considered of exceptionally high significance and the threat to the exposed structures and deposits is immediate.



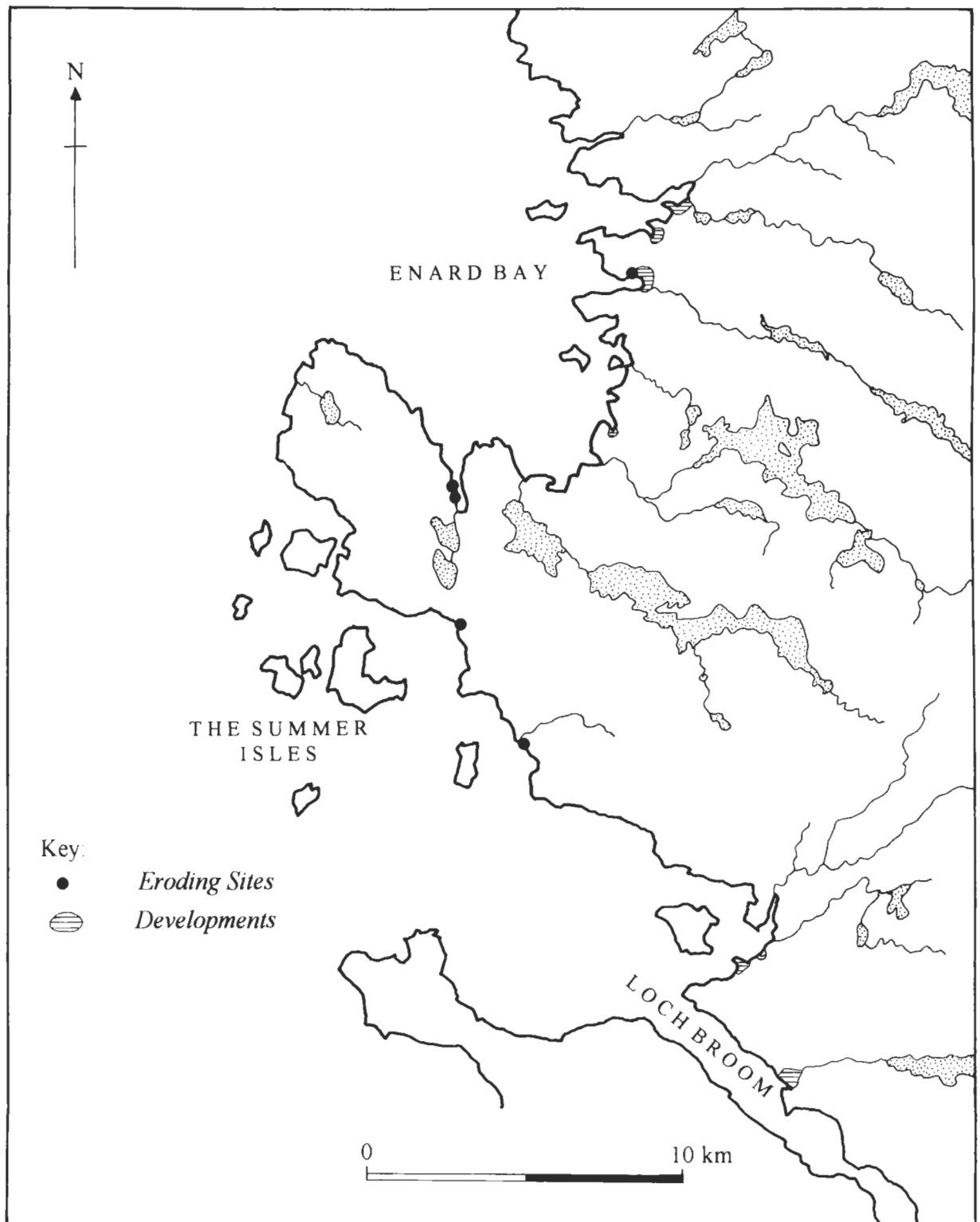


Figure 6: Distribution of eroding Sites and the Impact of Recent Developments in the Study Area.

The geomorphology and topographic setting of this site is unique throughout the study area, and the exceptional site exposure is providing a remarkable opportunity to study the late prehistoric - post-medieval occupation of the Highlands at a single site. It is recommended that an intensive site survey, environmental sampling programme and salvage excavation be conducted to retrieve scientific information prior to the imminent destruction of the site (see Appendix 1).

In addition the structure at Acheninver (NC 00 NW 2) has not yet received a full assessment, and requires sub-surface testing and / or trial trenching to determine its full significance. It is located in a fragile environment and it is possible that sand quarrying will re-commence and further disturb the structural remains.

## 5.2 Developmental Impacts

In addition, a total of 7 areas have been defined as having either experienced recent developments, have developments in progress or have further developmental potential. The list below has been provided to indicate the nature of coastal developments in the study area and thus provide a basis on which such activities can be monitored.

1. *Morefield*- Building sites are under construction on the north side of the Ullapool River. This area contains documented 18th century settlement.
2. *Ardmair Point*- Recent caravan and chalet park constructed on the site of an 18th / 19th century township and fishing depot.
3. *Poll a' Chreadha*- Recent salmon farm depot constructed on the site of lazy bed cultivation plots and a possible structure.
4. *Lochan Sàl*- Recent salmon farm complex occupying site of an 18th / 19th century building.
5. *Inverkirkaig*- Recent chalet construction in the area of an 18th / 19th century township.
6. *Strathan*- Recent chalet construction in the area of an 18th / 19th century township.
7. *Lochinver*- Recent construction of new harbour facilities.

In general very few site elements have been directly affected by land development, however much of this activity has occurred on raised beach deposits in the proximity of documented townships and associated field systems. It is suggested that these areas have acted as a focus for settlement since formation in the period 5,000 -2,000 BP, and therefore have high archaeological sensitivity.

## 5.3 General Recommendations

1. It is recommended that further work should involve an examination of the marine zone, concentrating on selected slipway and boat naust complexes in the area (e.g. Old Dorney Bay; NB 1985 9113). There was a high correlation between the occurrence of recent boat remains and these sites, and it may be possible to demonstrate an early phase of use for these features through an examination of the marine zone in conjunction with local oral research and the excavation of selected nausts. This is considered of particular value given that sites on the coast edge are especially vulnerable to mechanical wave erosion.

2. The offshore islands (e.g. The Summer Isles) require a separate investigation to establish the nature of the archaeology and built environment in these locations, and the affect of coastal processes on the natural and human environment. It is postulated that a greater degree of erosion will be observed due to their increased exposure, particularly on the western coasts. The sheltered nature of much of the mainland coast is due in part to the interruption to longshore wave activity caused by offshore islands. To date there has been no systematic survey of these islands though several important chance discoveries have been made, including early Christian sculpture (NH 09 NE 1) and a large steatite bowl (NB 90 NE 4).
3. Any future developments involving extensive ground disturbance to raised beach deposits should be monitored closely given the clear association between these locations and past human activity. This is particularly important given the current poor understanding of human occupation in the Highlands, besides the immediately evident 18th / 19th century settlement pattern.
4. In future studies of this nature in the Highlands it is recommended that the survey area be expanded to include all land below 10m ASL. This study has demonstrated the correlation between settlement and the flat, low lying land suitable for cultivation on raised beaches and in river valleys, and the degree to which this land extends inland from the immediate coastal strip. The potential risk to these sites would be high in the event of marine transgression.