

**Biodiversity
of
Cill Chiaráin Bay, Co. Galway**

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Introduction

Kilkieran Bay (Cuain Chill Cháráin) stretches 13½ miles in length from Birmore (Bior Mór) Island at its mouth to the upper tidal reaches of the Screeb (Scríb) river. It is defined on its western edge by the Iorras Aintheach peninsula, dominated by the sharp 1,1,00ft ridge of Cnoc Mordáin. The southern side of the bay is defined by an archipelago of islands, now linked by causeways, known as Ceantar na n'Oileáin. At its north eastern corner the bay forks around the large peninsula of Ros Muc where it enters Camus Bay (Cuain Chamais) from which one narrow finger of water runs south through Cinn Mhara and Leitir Mucu almost reaching Cashel Bay (Cuain Cashla). Camus Bay is dominated by Camus Hill (Cnoc Chamais). Two important rivers flow into the Cill Chiaráin and Camus Bays from the north, the Invermore (Inbhear Mór) and the Screeb. The Invermore formed the eastern boundary of Connemara from the Thirteenth Century. The bays had more than twenty inhabited islands in the nineteenth century the bulk of which have now been abandoned. Cill Chiaráin Bay is surrounded by a number of communities and population centers, e.g. Ardmore and Cill Chiaráin, on the western shore, and Rosmuc, Camus, Cinn Mhara, Béal an Daingean, Leitir Móir, Eanach Mheáin and Leitir Mealláin.

Cill Chiaráin Bay is a repository and a focal point for a very rich biodiversity (Box 1). Many aspects of local biodiversity are expressed through individuals' and the community's involvement with Cill Chiaráin Bay and the role it has played in the maintenance of livelihoods, past and present. All of the land area and islands lying in and around Cill Chiaráin Bay are part of the Connemara Gaeltacht. Its' Irish speaking communities form the core of the strongest remaining Gaeltacht region in Ireland. Past populations have been largely dependent on croftering, a livelihood which enshrines principles of sustainability. This lifestyle is still a feature within local communities today and accordingly, unique aspects of Irish croftering life are preserved into modern times.

Box 1. Biodiversity

The Convention on Biological Diversity (CBD) was negotiated under the auspices of the United Nations Environment Programme (UNEP) at the 1992 Earth Summit in Rio de Janeiro. The CBD was signed by Ireland in June 1992 and ratified in 1996.

Biological diversity – or biodiversity – is the term given to the variety of life on earth and the natural patterns that it forms. Biological diversity is often misunderstood as a concept that aims to facilitate the protection of our natural world, often at the expense of those that dwell within it. However, biodiversity involves a much wider concept that includes the human race, its cultures and traditions and the sustainability of its livelihoods in unison with the natural world.

It is the combination of different life forms and their interactions with each other and with the rest of the environment that has made the Earth a uniquely habitable place for humans. Biodiversity provides a large number of goods and services that sustain our lives and as such warrants the protection of those that benefit from it so that in return our livelihoods can be sustained.

Aspects of natural, archaeological, historical and maritime heritage also contribute significantly to the biodiversity of the area. The entire marine area forms part of the Cill Chiaráin Bay and Islands candidate Special Area of Conservation (cSAC), a designation which incorporates many of the islands within the bay. Much of the land area surrounding the bay lies within one of a number of terrestrial cSACs (principally Connemara Bog Complex). The Connemara Bog Complex is also designated a proposed Natural Heritage Area (pNHA).

Historically, many of the islands within the bay were inhabited and the network of islands and communities formed the basis of a local economy in itself. Being a mainly marine area, a unique maritime heritage has developed within the area and aspects of this heritage are still evident and celebrated locally today. There are many recorded monuments and sites of archaeological significance within Cill Chiaráin Bay and these provide evidence of the existence of populations in earlier times. The presence of significant archaeological sites and features in the inter-tidal zone are of increasing interest and heritage importance.

Aim and Scope

The project has been conceived to raise the profile of the heritage value of Cill Chiaráin Bay and the surrounding area through a presentation on the biodiversity occurring within and around the bay. It is hoped that the dissemination of data on biodiversity will promote conservation mindedness and awareness at national level and, more importantly, at local level amongst those whose lives are somehow connected with the bay. Acknowledging the rich biodiversity of this area in the proposed manner will stimulate and enhance the incorporation of the principle of sustainability into developments that may affect Cill Chiaráin Bay.

The project aims to collate and disseminate data on all aspects of the rich biodiversity of the area through a website and CD-ROM. This report represents the first phase of the project; namely, the collation of on key subject areas:

- Archaeology
- Culture
- Local History
- Human activity
- Physical environment
- Natural heritage

This data will include statistics, official records, photographs, published and unpublished texts, literature and will be sought from national, regional and local sources.

Phase II (2006 funding dependant) of the project will develop a bi-lingual website and CD-ROM describing the biodiversity in Cill Chiaráin Bay.

The objectives of the project are in keeping with national priorities for heritage protection and reflect the local authorities' policy in relation to heritage. The Galway County Development Plan provides for the protection of natural heritage through the adoption of clear policies aimed at protecting the natural environment. The plan aims to promote policies for 'the protection, preservation and sustainable use of the built, natural and cultural heritage'. Large efforts to halt a decline in biodiversity are being implemented at local, regional, national and international level. This project will make a contribution towards preserving biodiversity at a local level.

Study Area

Definition of Study Area

The study area (Cill Chiaráin Bay) is defined as follows:

The southernmost point of the study area is the small island of Loughcarrick Island (Muiltín an Oileáin), just south of Gorumna Island (Garmna). From here the southern and western boundary extends to Golam Head (Ceann Gúam), Birmore Island (Bior Mór) and then to Ardmore Point. It then runs inland to a high point on Iorras Aitheach peninsula at An Ghualainn (184m) and follows along the top of the ridge to Cnoc Mordáin. From here the boundary runs to the crossroads on R340 at Inbhear and along the R340 (but includes the lagoon at Loch an tSáile) to the junction with R336. It then runs along the R336 to the top of the tidal limits of Camus Bay at Loch Cara Fionnla where it turns west to Bealadangan (Béal an Daingin). From here it runs out along Greatman's Bay (Cuan an Fhir Mhóir) to Loughcarrick Island (Muiltín an Oileáin) incorporating all of the islands to the west of Greatman's Bay (Annaghvaan - Eanach Mheáin; Lettermore – Leitir Móir; Gorumna – Garmna; and Lettermullan – Leitir Mealláin) but excluding Greatman's Bay itself.

N.B. This definition of the study area is indicative only. In some instances the text may refer to areas outside of, but in close proximity to, these boundaries.

Description of Study Area

Cill Chiaráin Bay, which opens into the North Sound of Galway Bay, is a complex marine inlet subject to high wave exposure towards the entrance, and with extremely sheltered areas at the head of the bay. The bay has many islands and islets resulting in narrow sounds and channels subject to high tidal streams. The bay consists of four major basins, the most northerly Leckin Basin, Roskeeda Bay, the outer Cill Chiaráin Basin, Camus Bay at the eastern end of Gurraig Sound and Casheen Bay. Camus Bay is in itself a complex indented shallow bay that extends as far east as Furnace Bridge on the R336 and has tidal lakes and channels extending from Kinvarra (Cinn Mhara) almost as far south as Costelloe (Casla).

The main channel connecting the four basins runs for approximately 17 km along the western side of the bay in a roughly northeast to southwest direction. The mouth of the bay - the line between Golam Head and Ardmore Point (for the purposes of the present study) – is approximately 7km wide. However, the bay proper begins at a line joining the southern tip of Birmore Island (Bior Mór) to the eastern tip of Dinish Island (Daighinis), a distance of just over 2 km. This is the major outlet of the bay, which is also connected to Greatman's Bay to the east

by a series of channels between the mainland, Annaghvaan, Lettermore and Gorumna islands. A narrow channel also connects Coonawilleen Bay (Cuan an Mhulinn) to Kiggaul Bay (Cuan Choigéil), which is exposed to the greater Galway Bay.

Inner Cill Chiaráin Bay, including Camus Bay, is relatively shallow with depths ranging from 2-12m (BCD – below chart datum) and the bottom gently shelves to 25m at the mouth. At the entrance to Gurraig Sound depth increases to 15-20m. The main channel of the sound ranges in depth from 5 to 15m with some deeper holes of 20-35m. There are a number of deeper holes, up to 40m, located within the bay; e.g. between Ardmore Point and Illaunmaan and in the Gurraig Sound.



Plate 1. Cill Chiaráin Bay, northern shore; looking west to the hills of Cnoc Mordáin.
(Photo: Louise Scally)

The shoreline around the entire bay is predominantly rocky and low-lying, with the notable exception of a small sandy beach on the Ardmore Peninsula. Beyond the shoreline the topography of much of the area surrounding Cill Chiaráin Bay is irregular and, except on the west, just north of Cill Chiaráin, where the Cnoc Mordáin hills rise to 350m, is predominantly low lying blanket peat bog. On the islands to the east of the bay (Annaghvaan, Lettermore; Gorumna and Lettermullan), which are connected to the mainland by a series of bridges/causeways, the landscape is flat, open, rough grass and scrub with frequent rocky outcrops. The Invermore River, which drains a large peatland area south of the Recess (Sraith Salach) on the Galway-Clifden Road through a series of lakes, enters the bay at its extreme northern limit. The Screebe river system drains a similar area to the east, south of Maam Cross (An Teach Dóite), and enters the bay in the northern part of Camus Bay. A number of smaller lakes and streams also drain

into the bay along the western and eastern shores. Invermore, Inverbeg and Screebe systems are Salmon and Sea Trout rivers. There are a number of saline lagoons situated to the north of inner Cill Chiaráin Bay and south of Camus Bay.



Plate 2. A view across Connemara bog at the northern end of Cill Chiaráin Bay to the Twelve Bens.
(Photo: Steve Waldren)

Temperature and Salinity

In general, Cill Chiaráin Bay is poorly mixed, with large temperature differences between the upper and lower bay. The upper bay, north of a line between Lettermore Island and Cill Chiaráin Point is typically colder and less saline in the winter months, particularly during prolonged rainfall and freshwater runoff from the surrounding land, than the lower, outer, bay. Occasionally, very low temperatures of around 2°C have been recorded from the upper reaches of Cill Chiaráin Bay in winter. Winter temperatures in the outer bay are more stable and higher - at around 8°C. Seasonal maximum temperatures occur in August and vary from 15-18°C offshore and are warmer inshore.

In mid-Spring, surface water temperatures increase and the temperature of the shallow inner bay rises faster than that of the deeper waters in the outer bay and beyond. As the surface layer becomes warmer relative to deeper waters a vertical temperature difference (approx 4-6°C) occurs beyond the Skerd Rocks and occasionally deep colder water extends into the entrances of the bay. As the bottom water warms up and the colder water retreats further offshore, from July onwards, the vertical temperature difference decreases.

Salinities are generally within the range expected for inshore waters along the western seaboard (30-35S), but during prolonged rainfall, freshwater run off from surrounding land can reduce surface salinities in the inner reaches of the bay (to 26-27S) (Wilson, 1987).

The inner, northern, part of the bay also has lower nutrient levels than the northern part of the bay. The surface waters of the outer bay are under the direct influence of the North Atlantic Drift current and there are frequent intrusions of cold nutrient-rich oceanic water into the outer parts of the bay.

Tides and Water Circulation

In general, water circulation in the bay is related to the topography of the numerous channels and small bays. Inner Cill Chiaráin Bay is subject to strong tidal currents, caused by the tide funnelling through the many channels and islands. Water exchange is by tidal movement through these channels with strong linear currents for much of the tidal cycle. The main channels of the bay have a 1.5 knot flood tide and a 2 knot ebb tide. The mean spring and neap tidal ranges are approximately 4m and 2m, respectively, and the maximum tidal range is 4.5m.

In the outer bay, current movement is generally weaker, and the extent of movement is dependent on the hydrodynamic processes particular to each bay. However, the outer region is exposed to the prevailing south-westerly winds, resulting in considerable turbulence in stormy weather. This movement is reflected in the deposit substrates on the sea floor - in the form of ripples and dunes. The ripples on the sediment surface of the bay suggest that the overall sediment transport within the bay is shorewards¹.

Landscapes and Seascapes

Landscapes

The area surrounding Cill Chiaráin Bay encompasses three landscape character areas (See Box 2) as defined by the Galway County Landscape Character Assessment (Galway County Council, 2004):

- Lettermore and Gorumna Islands
- West Foothills of East Connemara Mountains
- Carraroe (Cashla Bay to Glencoh)

¹ Deeny, D.E. (1975). The Sediments of Cill Chiaráin Bay (Co. Galway) between Cill Chiaráin and Dinish Shoals. M. Sc. Thesis, Dept. of Geology, University College Galway.

All of these areas are rated as being of high landscape value and Special (Class 4) or High (Class 3) landscape sensitivity.

Box 2. Landscape Character Assessment

Landscape characterisation focuses on what makes one area different from the next, or what makes a unique 'sense of place'. This involves analysing combinations of landscape elements and features to define the distinctive characteristics and types. An assessment of the landscape of County Galway has been carried out indicating landscape character rating, landscape value rating and landscape sensitivity rating.

Landscape Character is a combination of landform, land cover and visual units, which are attractive in the landscape.

Landscape Values are responses of the perceptions that communities have of the landscape they inhabit. The perceptions arise from intrinsic attributes such as visual beauty, ecology, archaeology, social history, religious sites, and mythology. Landscape values are assigned as outstanding, high low or medium.

Landscape Sensitivity is a measure of the ability of the landscape to accommodate change or intervention without suffering unacceptable effects to its character and values. Sensitivity ratings are derived from a combination of landscape values and landscape character. Landscape sensitivity is rated on a scale of 1 (Low) to 5 (Unique).

Seascapes

Seascape assessment is an extension of landscape character assessment. Seascape is defined literally as 'a picture or view of the sea'. However, a broader definition includes

- Views from land to sea
- Views from sea to land
- Views along coastline
- The effects on landscape of the conjunction of sea and land (Hill et al., 2001).

In this respect the varied coastline of Cill Chiaráin Bay clearly possess rich assets. Although the Landscape Character Assessment for Galway County does not specifically include assessment of seascapes the County Development Plan recognises the need to 'protect any views of special amenity value along the coastline'. The plan lists several such 'focal points/views' around Cill Chiaráin Bay, e.g. Cnoc Mordáin, views to Finnish Island and small beach, Gorumna Island and views across water and islands north of Lettermore Island. The views from the sea to land over much of the bay, not included in the plan, are clearly spectacular, e.g. encompassing the Twelve Bens and Maumturk mountains to the north and the Aran Islands and Skerd Rocks to the south.

The Geology of Cill Chiaráin Bay and Surrounding Area

Regional Setting

Two of the best indicators of the geology of an area are its topography and vegetation. This topographical variation is particularly acute on the journey between Oughterard and Clifden. To the north of this line lies Lough Corrib, which is underlain predominantly by **Limestone** rocks of **Carboniferous** age. Further to the west of Lough Corrib the topography changes dramatically as the older **Dalradian** rocks of the Maumturk mountains rise from the shores of the lake. These uplands continue westwards to the western shores of Connemara and are bisected by the glaciated Inagh Valley - the dividing line between the Beanna Beola (or Twelve Bens) and the Maumturks - that runs south from Kylemore to Recess. .

To the south of the Oughterard to Clifden line, and in the immediate area surrounding Cill Chiaráin Bay, the landscape is considerably flatter. While the topography is undulating it is patterned by lakes that may be undistinguishable from the numerous inlets on its southern coast. There are some more prominent topographic features such as Cashel hill and Errisbeg, which rise above the undulations of this landscape. The rocks of this area are dominated by **granites** of **Ordovician** age in the south and these are in contact with a band of metamorphic rocks, which bridges the gap between the granites and the older rocks forming the Maumturks and the Beanna Beola. The geological evolution of the region is outlined in Appendix I.

Local Geology

Cill Chiaráin Bay is surrounded predominantly by granite rock; with the exception of the southern shores of the island of Gorumna and Lettermullen which, are composed of **volcanic** and **sedimentary** rocks

A detailed geological map of Cill Chiaráin Bay is presented in Figure 1 - from the Geological Survey of Ireland's 1:100,000 geological map of Connemara. There are five different granite types to be found in the Cill Chiaráin Bay area. These are:

The Lettermore Granodiorites	GaLe
The Carna Type	GaCn
The Murvey Granite	GaMu
The Errisbeg townland Granite	GaEb
The Callowfinish Granite	GaCf

Lettermore Granodiorites

The Lettermore Granodiorites crop out on the western end and southeastern corner of Lettermore Island. Minor outcrops are also to be found on the western side of Inishlay and the northeastern tip of Inchaghaun. This is described as a named body of the Galway Granite, "a grey, medium grained granodiorite" (Morris et al., 1995). A granodiorite is similar to granite but has a slightly different mineralogy in that it contains more plagioclase (a type of feldspar) and mafic minerals.

Carna Type

The Carna type crops out on the Mweenish Bay areas, on the western part of Cill Chiaráin Bay. It composes all but a minor part of the western part of Finish Island and the northern part of Birmore Island and Birbeg Island. Outcrops are to be found on the eastern half of St. Macdara's Island and the northwestern part of Mason Island. This is another body of the Galway Granite described by Morris et al. (1995) as a "grey coloured granodiorite with some large feldspar crystals."

Plate 3. Galway Granite. Large pink Feldspar crystals (up to 20mm across) in a matrix of pale coloured feldspars and quartz and dark coloured biotite and hornblende. (From Sleeman et al., 2004 – permission pending)

Murvey Granite

The Murvey granite occurs on the boundary between the Errisbeg Townland granite and the older metagabbros in the northeast of the study area. In the south of the study area it is sandwiched between the Errisbeg Townland Granite and the Gorumna formations on the islands of Gorumna and Lettermullen. Other outcrops include those on the north of Gorumna, the hill to the west of Cill Chiaráin village and an elongated outcrop on the hill northwest of Cill Chiaráin village.

Errisbeg Townland Granite.

This is the most dominant rock type within the bay area. It is found on all of the islands north of Lettermore Island and it also dominates the inland geology. Outcrops are also found on the south of Lettermore, the northern part of Gorumna, Inishbarra, Inisherik, Freaghillaun beg, Creappagh, Eagle rock and the northernmost tip of Fraghillaunmore.

Callowfinish Granite

The Callowfinish Granite borders the Errisbeg Townland granite to the north, where it is faulted against the Murvey Granite on its western margin and is terminated by the SM Fault to the east. West of Cill Chiaráin it encases another outcrop of the Murvey Granite and forms the southern

boundary to the other outcrop of the Murvey granite found northwest of Cill Chiaráin. Other outcrops occur in the central area of Lettermore and east-northeast side of Gorumna.

Quaternary Geology

Terrestrial Deposits

Following the emplacement of the Galway Granite, south Connemara is devoid of any other rock other than the more recent (i.e. 15,000 to 10,000yrs) covering of Quaternary deposits. This covering is composed primarily of glaciated tills and blanket bog.

One of the more important quaternary sites lies within the study area. Two quarries on the granite upland of Cnoc Mordáin (grid references L871397 and L875395) provide insights into the geomorphology of Western Ireland at the close of the Tertiary period (Coxon, 2001). The evidence from these sites suggests the hummocky nature of the bedrock exposure may owe its morphology to Tertiary weathering rather than the more recent glaciation.

Submarine Deposits - Sediments of Cill Chiaráin Bay

The sediments of Cill Chiaráin Bay range from mud to sand and gravel to areas of extensive maërl. Overall, the sediments are regarded as a temperate water, inshore, shelf, biogenic² carbonate type; formally described as a FORAMOL (Foraminifera and Mollusc) association³. The biogenic sediments have an algal and a non-algal component. The algal component of the sediments is composed of crustose coralline algae; collectively known as maërl. Those areas with the greatest maërl content are the area south of Illaunmaan (Oileán Meana); east of the Ardmore peninsula; near the Lettercallow spit; and NW of Illauneeragh (An tOileán Iatharach).

The non-algal component, also high in calcium carbonate, is composed of bivalve shell, barnacles, foraminifera, ostracods, echinoid spines and sponge spicules. Non-carbonate, silt-mud sediments in the bay derive from the igneous rocks around bay. These fine grains tend to accumulate in bay heads, close to shore.

Economic Geology

Mineralisation is frequently found associated with granite intrusions; the Galway granite is no exception. Presently there are no proven deposits with the study area or the Galway granite. O'Reilly et al. (1997) have identified a number of styles of mineralisation within the Galway granite, indicating that not all of the mineralisation is related to the separation of magmatic fluids

² Sediments composed of the remains of plant and animal life such as shells

³ Lees, A and Buller, A. T. (1972). Modern temperate-water and warm-water shelf carbonate sediments contrasted. *Marine Geology*, **13**: 67-73.

at the end-stages of crystallisation. The most common minerals found within the granites of the study area are Molybdenum, Lead, Barium and Iron.

Archaeology

An Overview of the Settlement History and Archaeology of Cuain Chill Chíaráin and its environs

Introduction

The Cill Chiaráin Bay area is one of the more archaeologically challenging in Galway with few diagnostic sites or recorded finds. Nevertheless, it has a variety of site types, many of them extremely unusual and an unparalleled wealth of vernacular maritime archaeology. Work here offers the opportunity to explore the archaeologically neglected world of the eighteenth and nineteenth century when Irelands population reached its zenith and living standards reached their nadir. The now submerged prehistoric landscapes of the bay also offer the potential to rewrite the early history of south Connemara in a way that land based archaeology may never be able to. Research here is still in its infancy but has a bright future.

This section provides an overview of the settlement history and archaeology of Cuain Chill Chíaráin and its environs. It is compiled from a wide range of published and unpublished information, field visits (as part of the current study), an aerial photography survey and the considerable local knowledge of the author.

The known archaeological sites in the Cill Chiaráin Bay area from the Archaeological Inventory of West Galway (Gosling, 1993) are listed in Appendix III. A geo-referenced inventory of photographs taken during field and aerial surveys for the purposes of the present study is listed in Appendix IV and is supplied on CD-ROM.

Mesolithic C.7,000 BC-4,000 BC

To date, no confirmed Mesolithic artefacts have been found in the immediate area of Cill Chiaráin Bay. In the wider west Connacht area there have been a number of significant later Mesolithic finds, however. The diagnostic artefacts consist of Bann Flakes, spearheads of stone used by Hunter Gatherers in the later Mesolithic c.5000-4000BC. These have been found in coastal and riverine environments across western Connacht including, Streamstown Bay in west Connemara, at the mouth of the Owenriff River at Oughterard, Wood Quay and Quay Street in Galway and a large number of finds have been made by divers on the bed of the river Corrib. The Connemara Bann Flakes were made from honey flint, which may have been imported into the region or found in the matrix of glacial till. It is likely that local quartz deposits were also utilised as artefacts (pers. Comm Prof Frank Mitchell RIP) but these are extremely difficult to identify without excavation.

Pollen analysis by researchers from the Botany Department of NUIG on a small lake close to the Pilgrimage Site at Mám Éan (in the Maamturk Mountains 12 Km to the north) has revealed clear evidence of major human impact on the native fauna in both the Neolithic and Bronze Age. It also revealed more tentative evidence for later Mesolithic woodland clearance. More recent work by Peter Coxon and Fiona Kelly of Trinity College Dublin has been carried out on a peat basin close to the early Christian site on Cashel hill, where a stone platform had been identified buried deep in the peat. Work is ongoing on this important site and both Iron Age and early Christian dates from above and below the platform respectively are an important addition to the small number of dated archaeological structures in Connemara. When fully processed this will provide a complementary set of information to the pollen cores from Mám Éan, which will help to elucidate the general environment of Cill Chiaráin Bay throughout prehistoric and early historic times.

Given the bay's rich marine resources, especially of salmon and eel runs on the Invermore and Screeb fisheries, as well as the presence of such groups on river systems and bays elsewhere on the same coast there is every likelihood that the presence of a Mesolithic Hunter-Gatherer population will be identified here as well. There have been substantial rises in sea level (5m+) since 4,000BC, see below, and these have substantially altered the shape of the coastline. It is likely that Cill Chiaráin Bay existed at this time but was doubtless substantially smaller and shallower and contained a smaller number of larger islands. This environment would have been conducive to a lifestyle based on shallow water fishing, shellfish collection, fowling and possibly sealing. The presence of rich oyster beds in the bay would provide an additional attraction. There is every likelihood that Mesolithic sites/hunter gather campsites are located within the area now encompassed by Cill Chiaráin Bay. It is likely that artefacts and indeed structures, such as fish traps and weirs are still intact along the now submerged paleochannels of Cill Chiaráin Bay. The partially drowned peat deposits which are visible along the waterline and in the intertidal zone all along the bay provide dramatic evidence of this submerged landscape. Good examples can be found on Illauneeragh West (An t'Oileáin Iarthach) where the remains of a Bronze Age forest are visible embedded in coastal peat. The potential of these drowned landscapes is highlighted by the discovery of a Neolithic boat on the shore at Barna in what was then a freshwater lagoon.

There is also a light scattering of polished stone axes across the south Connemara landscape, from Roundstone to Lettermullan (Leitir Mealláin) and on to Spiddal (An Spidéal). These axes are normally of mudstone and they have been found at various points around Cashel Bay and further east at Indreabháin. These may have been imported from an axe factory at Fisherstreet near Doolin, Co. Clare (see below), either directly or via-Aran where many similar axes have been discovered. Traditionally, polished stone axes have been seen as Neolithic artefacts but recent excavations at the Hermitage in Limerick appear to have identified them in an early-Mesolithic

context so it is possible that the examples from South Connemara also date to this period (Pers Comm Peter Woodman).

There is one additional site type on the south Connemara coast, which can date from, as early as the Mesolithic. This is the midden or ancient rubbish heap, consisting of burnt stone, shell and bone. One of these sites was recorded on Gorumna (Garmna) Island in the nineteenth century although no trace now survives. Most middens are confined to the surviving machair dune landscape which runs from Feenish (Fínis) Island to Ballyconneely, although intact middens are likely to be preserved on Inshmuskerry (Inis Mhuscraí). The remains of middens can be seen on MacDara's, Feenish and Mweenish (Maínis) islands and a fragment of a midden site now survives at the southern tip of the Carraroe (an Cheathru Rua) peninsula where it is known locally as An Caislean Cruinn (Gosling, 1993). The remains of an ancient village were discovered at Dog's Bay in the 1830's although no trace is now visible. None of these have been scientifically dated but recent research, using RC dating and finds analysis, has dated Oyster middens at Ballyconneely to the early Bronze Age; although the bulk of the recognised examples date from the early Christian period (McCormick et al., 1996). Four midden sites in Connemara have produced evidence of the exploitation of Dog Whelk, possibly for the production of a purple dye known as purpura in Classical times, large quantities of Dog Whelk were discovered at a Mesolithic site at Ferriter's Cove in Co Kerry so it is possible that this technique was also utilised in prehistoric times. Sea levels have risen by up to 5m in the last 6,000 years however, so earlier coastal midden sites and their related landscapes are likely to have been drowned. The relative shortage of middens, around a bay rich in shellfish, may also have been contributed to by the use of midden remains as a bonding agent in mortar and as a fertiliser.

Neolithic/Bronze Age (4,000BC – 600BC)

Neolithic Settlement in Ireland begins with the introduction of agriculture c. 4,000BC and the mechanics of the transition are still poorly understood. Pollen evidence gathered at Lough Sheeauns near Cleggan indicates that wheat was cultivated and forestry extensively cleared after c.3,880 BC but that tree cover re-established itself after only c.150 years (Allen, Whelan and Stout, 1997). Both the Neolithic and Bronze Ages (between 4,000 B.C and 600 BC) are poorly represented in South Connemara with no diagnostic field monuments known in the coastal areas between Carna and Barna. The nearest Neolithic or Bronze Age monuments are a wedge tomb on the side of Cashel Hill (12 km to the north-west) and a pair of standing stones from Oorid (6 km to the north).

Despite the apparent absence of field monuments, there is finds evidence for Neolithic settlement in the general area. Stone axes are recorded from Glinsk, Leitir Mealláin, Carraroe, Rossaveal Leitir Mucu and Indreabháin.

The mudstone axes mentioned above from Rossaveal, Indreabhain and from the sheltered glen at Glann Mor one mile east of Carraroe (where there is a pocket of glacial till) may be the result of Neolithic settlement. A spectacular polished porcellanite stone axe, from a short distance to the north at Cashel is almost certain to be Neolithic in date. It was found 60 years ago by Sean O Loideáin, when cutting turf in Portach Seanamhac. The axe, one of the finest ever found in Co Galway, was described as having been placed edge down into a cleft in the rock and may have been a symbolic or ritual offering rather than simply a misplaced tool (Pers Comm S. O Loideáin).

The porcellanite axe is identical to a famous hoard of axes from the Malone Road in Belfast, now on exhibit in the Ulster Museum, and it may have formed part of a triangular trade involving mudstone from Clare, Porcellanite and honey flint from the Antrim Plateau and marble beads, axe heads, marble beads and soapstone from Connemara. Beads made of Connemara marble were discovered in the Neolithic layers at Lough Gur, Co Limerick. The nearest and largest deposits of Connemara marble are found only 10 km northwest of Cill Chiaráin Bay at Lios Uachtar and it is possible, given the difficulties of long distance overland travel, that trade items such as the beads were shipped along a coastal route via Aran.

In Connemara, diagnostic Neolithic and Bronze Age field monuments tend to be found in areas where glacial till is found in combination with lime rich rock, typically areas where lake marble formations are exposed. These conditions are, for the most part, absent from South Connemara which is almost entirely dominated by various igneous rocks with very poor soil development which in turn has been overlaid by large tracts of blanket peat. However, small pockets of glacial till occur erratically across the area, notably on the site of village of Cill Chiaráin, on the shore opposite at Lettercallow and on the southern side of Ballynakill Lough, on Gorumna Island. There is a strong likelihood that these three areas were settled during the Neolithic and Bronze Age.

Large-scale turf cutting has cleared the Blanket Bogs which once covered a vast area of South Connemara and the area has been visited and surveyed by a succession of scholars. In spite of this, little evidence for a Neolithic or Bronze Age landscape has come to light. The author's own recent field survey did however, note a number of field walls and hut sites which may possibly be of Neolithic or Bronze Age date, although it is impossible to be certain. These include a number of stretches of walls on Inishmuskerry Island, at the western edge of the Bay. At least one of these runs into a marsh in the lee of the dunes, similar in context to others discovered in intertidal peat (which suggests an early date) on Inishkea North (Co. Mayo) which was part of a larger landscape. To the south, on the Aran Islands at Trá Mhór, there is a large intertidal field system which may also provide a possible parallel as it is also in a machair dune environment. Three other stretches of pre-bog wall, two on a terrace immediately above and to the southwest of the

modern village of Cill Chiaráin and the other in An Droim townland on the south coast of Gorumna Island, may also be of Bronze Age date.

As with evidence for Mesolithic settlement it is likely that much of the Neolithic and Bronze Age landscapes have been inundated by rising sea levels although dredging or sports diving may bring some evidence of them to light.

Iron Age/Early Christian Period (C.500BC-800AD)

As is the case elsewhere in Ireland the pollen evidence indicates the existence of a late Iron Age lull (c.100B-200AD) in human habitation. The nature of settlement at this period is unclear but recent discoveries including those mentioned above at Cashel, are beginning to shed some light on the period. There are no sites or monuments known to date from this period in the Cill Chiaráin Bay area however.

The overall number of Iron Age/Early Christian sites in South Connemara is, quite low, with only one ring-fort (at Cashel), and only one major Early Christian Monastic sites surviving (on St MacDara's Island). This low number of diagnostic sites is a feature of the Connemara granite landscape. However, this cannot be taken as a definite indication of the absence of settlement. Traditionally, early Christian settlement in Ireland is indicated by the presence of ringforts or crannógs which are traditionally considered to date from this period but it is likely that the distinctive terrain of Connemara featured different forms of settlement to those found elsewhere. One of these may have been the Island Cashel or crannóg built on a small man-adapted island.

These lake dwellings are likely to be part of the elusive settlement evidence for this period. To the north and east of Carraroe there are examples on Loch an Mhuilinn and Loch na Tulai. On Gorumna Island there is one on Loch Hoirbeaird, one on Loch an Bhalla and a possible example on Ballinakil Lough (Plate 4). To the west of Cill Chiaráin Bay there are four examples, three on Loch na Scainimhe and one on Loch Síoduch. The examples on Loch na Scainimhe vary dramatically in size and form and are some of the most impressive of their type in the country. As is the case elsewhere the location of these crannogs can be shown to be related to adjacent pockets of better soil. These dwellings are part of a wider, more extended group, which represents a very particular Connemara response to their lake-strewn and glacially scoured environment. The lake dwellings suggest the presence of a sizeable population in the early Christian period, a view that is supported by the pollen evidence which shows renewed woodland clearance at this time, indicative of a surging population. A number of place names suggest the presence of more typical ringforts or cashels, such as at Dunmanas, Béal an Daingin and Daighinis Island but there is no surviving archaeological evidence to support these and place

name evidence isn't necessarily conclusive. Unenclosed early Christian settlement also survives elsewhere on the coastal dunes of west Connemara and is likely to have been present in Cill Chiaráin Bay as well.



Plate 4. Possible Crannóg on Ballynakill Lough (Gorumna Island). (Photo: Michael Gibbons)

There are likely to be other, similar, lake dwellings lying undiscovered in the lakes of South Connemara and there is a strong possibility that inter-tidal zone crannógs may exist in the greater Cill Chiaráin Bay area although none have been identified as of yet. One possible example of an intertidal Crannóg can be seen on Salt Lake, south of Clifden, and other examples are known from Scotland.

A note of caution is advisable here as similar looking lake dwellings in the outer Hebrides in Scotland date from as early as the Neolithic in 3,000 - 4,000 B.C. and in Connemara such sites were reused in the Medieval Period and indeed in the 19th Century when the Martins used them to build the largest poitín still in Connemara on the island of Ballynahinch.

Holy Wells and Ecclesiastical Remains

While the general district has few diagnostic sites it does have a number of important Ritual and Cult sites that may have their origins in the pagan Iron Age and continue in use into the early historic and on into the modern period. These sites, Holy Wells for the most part, are the most

numerous archaeological sites nearby with over twenty examples in the general area. Many are named after early saints. There are many tidal holy wells along the coast of Connemara as well as sacred lakes such as Loch Beannaithe in An Ceathru Rua, Both this lake and the Holy Wells have parallels throughout Iron-Age Europe and there are numerous classical references to sacred pools and wells being used by non-Roman people in Gaul and Britain. Loch na Naomh, also in An Ceathru Rua, is located on top of Cnoc an Phobail where a midnight bonfire is traditionally lit. The lighting of bonfires on high places is in itself an ancient and possibly pre-Christian practice. The two holy wells of Cill Chíaráin are Tobar Ciaráin to the north of the Church and Tobar Mhuire to the south.

At the western edge of the study area there are three monastic islands, one of national importance. St MacDara's Island and Mason Island have visible remains dating to the early Christian period. St. MacDara's Island features an exquisite oratory, an early rectangular enclosure containing an early graveyard, a large clochán and numerous early Christian and medieval cross fragments together with a relict landscape and holy well. In the inter-tidal zone to the east of the church a possible tidal mill site has recently been discovered in the area called An Aill Bhuí. On nearby Mason Island a less well known, but also important, island monastery survives, this sits within a rectangular enclosure with an early oratory. A face cross with features of Coptic art is also known from the site (Higgins, 1987).

Traditionally, a Church dedicated to Saint Ciarain gives its name to Cill Chiaráin Bay. The remains described as an oratory in the Galway Inventory (Appendix III) are likely to be much later and related to a penitential round. No early remains survive except, possibly, for the remains of a small leacht (within the old graveyard) and of a holy well. The traditional site sits on one of the few patches of arable land, in a commanding and yet sheltered position overlooking the bay. The presence of an early name and its similarity in siting to early Christian sites on Aran in particular, where many of the monastic sites share a similar combination of a commanding position sited on arable land, suggest that the original foundation of the site dates to the early Christian period. Due to the fact that the site has been in continuous use and remains in use as a graveyard it is likely that the early remains have long been put to other uses and full elucidation of the site will require full excavation.

A number of early and medieval and Church sites are no longer extant on the Connemara coast and survive only as place names. The use of place names to identify sites is necessarily speculative but in the absence of other evidence can serve as an important indicator. Several sites on Cill Chiaráin Bay may date from the early Christian period although the surviving remains at each of these date from later periods. Early remains may have been either buried or removed during the massive population explosion of the eighteenth and early nineteenth century.

Possible early sites include Cill Bhriocáin and Cill Eoin on the Rosmuc peninsula, Ballynakill on Gorumna Island and a burial ground on the shore north of the towerhouse at Leitir Mealláin. Cill Bhriocáin is located in a spectacular ridge top location overlooking the inner reaches of Cill Chiaráin Bay and shares the name of its founder Saint with Teampall Bhreacan on Aran. Both Ciaráin and Breacan are well known Aran Saints and the presence of their cult in Cill Chiaráin Bay attests to the perceived power of Aran's sanctity in early Christian Connemara. The present church at Cill Bhriocáin is late Medieval/early modern in date. Immediately to the west of the church however are traces of a larger building, possibly the medieval church, which was later foreshortened when the present church was built and the close proximity of a holy well may also point to an early date.

The name Ballynakill (hamlet of the church) suggests the presence of an early church (possibly related to the suspected crannóg on the lake immediately to the north) at this location. At present there is no archaeological evidence to support this, and the surviving church remains date to the 16th century, as does the late medieval church at Trá Bhán (Plate 5). Cill Eoin is a small burial ground on the Rosmuc peninsula. At Cill Eoin the name itself is suggestive of an early date, although the burials are either undated or late in date. The modern burial ground at Leitir Meallain is possibly also the medieval burial ground associated with the 16th century O'Flaherty Castle a few hundred metres to the south (see below).

It has also been proposed that the name Inis Bearacháin (Inishbarra Island) is derived from that of an early Christian saint. No archaeological remains survive to support this contention however. The name itself may be indicative of the presence of a hermit's cell on the island, possibly on the site of the later children's burial ground on the northern side of the island.



Plate 5. Late Medieval church at Trá Bháin (Gorumna Island). (Photo. Michael Gibbons).

Connemara, is named after the Conmaice Mara (Dog Sons of the Sea) a sept of the wider Conmaicne grouping. Among the principal families of the Conmaicne were the O' Cadhla who were displaced by the O'Flahertys as they were pushed westward out of their traditional lands and waters of Lough Corrib during the 13th century, (losing their title as lords of Inner Galway Bay) by the growing power of the Burkes and O'Connors. Between 1235-c.1500 the Gaelic elite are virtually invisible in the archaeological record, as they do not appear to have built any large-scale castles or forts that one can recognise today. At least one Medieval Church site at Moyrus has surviving remains dating to this period. These feature limestone imported from Aran which would also become a feature of later O'Flaherty Churches. Limestone Crosses, probably from Aran, are present at the early Christian sites on Inish Nee, Mason and Saint MacDara's Islands so the use of this resource by the O'Flahertys was a continuation of a long tradition which would survive into the nineteenth century.

Late Medieval/Early Modern Period

Between 1235 and the 1653 when they were dispossessed, South Connemara was part of the O'Flaherty maritime lordship. Historical evidence from this period is extremely limited and there are few diagnostic archaeological remains, so much of the settlement history must be reconstructed from the placename record and by deductions from later physical remains. Access to the area would have been almost entirely by boat and entry to Cill Chiaráin Bay would have

been controlled by the towerhouses at Leitir Mealláin and Aird. Access overland probably followed an old, probably medieval, roadway which can still be traced running northward from Gort Mór through the hills around Cnoc Uraid for four miles in the direction of Maam Cross. This route linked up with a network of bridle paths which led into the Maam valley and along the shore of Lough Corrib.

There is some physical evidence of both secular and religious habitation. The remains of Leitir Mealláin Castle overlook both a sheltered anchorage and the southern entrance to Cill Chiaráin Bay, the passage between Leitir Mealláin and Gorumna Islands. Along the entire west coast, Gaelic policy was based on visually controlling locally significant fishing grounds and anchorages by the construction of small fortifications (Breen, 2001). The Leitir Mealláin example is associated with the MacHugh O'Flahertys and is one of a string 15th century coastal fortresses at Aughanure, Hen's Castle, Renvyle, Doon, Ballynahinch, Bunowen, Aird, and Indreabhán. These castles would have been supported by the Gaelic galley, originally based on Viking longships these needed minimal harbour facilities. The towerhouse at Aird is associated with Tadhg "na Buile" O'Flaherty. There was also a Burke Castle located on the shore at Minna. Walter Fadda Burke was murdered here in 1549.

Leitir Mealláin was later utilised by the English garrison at Killeany on Aran which was installed in the 1650s. A small garrison from Galway was based at Leitir Mealláin from which the Killeany garrison fetched 'firing' (presumably turf and possibly bog deal.) This trade with Killeany continued until at least 1663 when the new commander on Aran petitioned for a new turf-collecting boat. Between the 1690s when it is shown as a military position and the present day when only a small corner of the wall survives Leitir Mealláin Castle has been thoroughly cannibalised for stone – most likely to build the network of causeways or nineteenth century signal towers (or field walls). Under Cromwellian occupation the garrison would have been responsible for enforcing the edict that "the state shall suffer no Irish to keep any boats whatsoever on the coast of Iar-Chonnacht or the adjacent islands."

Gaelic towerhouses were positioned so as to guarantee control of both local shipping lanes and of the resources available from the shore. In Connemara and Cill Chiaráin Bay these would have included both wrecks and ambergris⁴. An Inquisition of 1607 referred to the collection of both "wreck of the sea" and ambergris as an O'Flaherty monopoly with a penalty of seven cows for those who took either from the shore without permission from the O'Flaherty or his lieutenants. The Lord's control of resources cast up on the shore was a longstanding one in Gaelic Law and, in

⁴ A precious substance derived from sperm whales and used in medicine and as a perfume.

this case, was retained by the Martin's after their acquisition of O'Flaherty lands. Trade between Galway and Spain in the late 16th and early 17th centuries included a trade in ambergris. There are periodic records of ambergris being washed ashore on the Atlantic coast and it is likely that this was brought from the O'Flaherty territories to Galway from where it was shipped on to the world market (Fairley, 1981).

A small number of shards of Spanish/Portuguese pottery are known from the Northern tip of Finish Island. These may represent evidence of trade with the Iberian peninsula, either direct or through Galway or alternatively they may represent loot taken by the islanders from the wreck of the Concepcion, one of at least two Spanish Armada Galleons wrecked off the Connemara Coast. The Concepcion went down on "Duirling na Spáinneach" off Mace Head and may have been the wreck referred to in the earliest reference to mariculture on the west coast. Sir George Carew was an Elizabethan official who, after the failure of the Armada, engaged in recovering guns and ordnance from the remains of the Spanish ships. He wrote in 1589 to the Lord Deputy to request an Oyster dredge for his men, probably after the discovery of Oyster beds by his diving teams.

Information on the inner bay is particularly spartan during the medieval period with only diagnostic late-medieval building surviving in the upper region of Cill Chiaráin, the tiny church at Cill Bhriocán (Plate 6).



Plate 6. Church at Cill Bhriocán. (Photo: Michael Gibbons)

The lack of any other evidence may reflect an actual absence of settlement during the period or else may be indicative of the lowly economic status of the area which was unable to support a large monastic population. The northern half of the bay appears to have been peripheral to the main focal settlement nodes which were located further south around the late medieval Churches at Trá Ban and Ballynakill on Gorumna Island and the towerhouse on Leitir Mealláin Islands.

It is likely that scattered settlement clusters, which often survive in the placename record as sean sráid or sean bhaille, once existed around both the castle and the medieval religious establishments. The remains of such a cluster may still be visible at an tSeanbhaille, several hundred metres to south of the Ballynakill Church (see above) on what may be a medieval route way leading to the shore (Plate 7). The Galway Inventory (Appendix III) records only one building which is traditionally believed to have belonged to the O'Flahertys. On closer inspection there are at least three in at least two separate phases. The buildings are of an extremely simple form and hence difficult to assign any date to on architectural grounds but the rectangular house in the Inventory is likely to be of later construction (perhaps 18th century) with the two earlier buildings belonging to the original settlement cluster. Four buildings are visible here on mid-19th century Admiralty charts.



Plate 7. Aerial view of house cluster near Ballynakill (Gorumna Island). (Photo: Michael Gibbons)

A French Hydrographic chart of 1690 shows what appear to be stylised representations of such settlements. Six representations of prominent buildings are marked on Gorumna, Leitir Mór and Leitir Mealláin Islands. These may represent settlement clusters as a similar symbol in Barraderry townland on the Carraroe peninsula is shown as three buildings in the *Petit Flambeau de la Mer* (a popular guide to navigation) of 1684. This suggests that the buildings shown are intended to represent small settlements rather than individual structures. A possible anchorage is also shown in Casheen Bay along with depth soundings, which indicate that the area had been surveyed (Conroy, 1997).

Oral history records the existence of a metalworking industry in the placenames Droichead na Foirnéise and Loch na Foirnéise. These names appear to refer to the processing of bog iron. This is associated in the folklore record with Richard "an iarainn," the first husband of Grace O'Malley although no surface remains are now extant. Bog Iron was both processed and traded from Connemara throughout the eighteenth and nineteenth century so it is likely that the tradition has a basis in fact. The date at which metalworking began here remains unclear although Robinson (1990) mentions a tradition that weapons were forged in the area for the 1798 rebellion. The only such site with surviving remains, at Shinnanagh between Clifden and Cleggan, has been destroyed by forestry in the last twenty years.

The placename Cuan an Mhuilinn (the Bay of the Mill) records the presence of a mill site on the eastern side of Gorumna Island. The stream running into the bay from Loch an Mhuilinn has been canalised but no trace remains of the mill itself. The only surviving mill on Cill Chiaráin Bay is approximately 1½ km north of Cill Chiaráin on Abhainn an Mhuilinn (Robinson, 2002). The present mill buildings date to the nineteenth century and both traces of the millrace and the mill dam (c.400m upslope from the mill buildings) are still intact (Plate 8). French records from the 1680s/90s record milling further east and it is possible that these sites were in use at least as early as the 16th and 17th centuries.



Plate 8. Mill buildings at Abhainn an Mhuillin near Cill Chiaráin. (Photo: Michael Gibbons)

The eastern edge of Cashel Bay marked the outer reaches of the territories of the main branch of the O'Flahertys based at Aughanure Castle and it is likely that a cycle of transhumance or booleying was practiced in the area. Cattle would have been taken from the better lands further east to spend the summer at the eastern edges of Cill Chiaráin Bay to graze on the open moorland and bogland. This practice, together with the hunting of red deer, was still current among the, much reduced, Gaelic elite, as late as 1693 when John Dunton an English traveller reported it in Glanlosh in the Maam Valley. Transhumance continued in this area into the nineteenth century. By the later period however the practice was reversed. Cattle were brought from the coastal areas into the hills and southward to Aran. People engaged in the practice lived in temporary huts known as brachaí but these have a very low visibility in the archaeological record and no definitive examples have been identified.

18th & 19th Centuries

The close of the O'Flaherty period was followed in Connemara by a shift in ownership of land, initially to State Officials or English Adventurers such as the Cromwellian Commissioner Thomas Meredith and then progressively into the hands of the Martins who gradually acquired much of the area. Land owning families such as Mansergh St Georges, the Comerfords and Lynches owned the lands and lived off the rents but in remote areas such as Gorumna and Leitir Mealláin

local authority was placed in the hands of native middlemen such as Éamon O'Flaherty or Raymond Mór MacDonchadh and his son Antoine.

For the bulk of the 18th Century and early 19th century local infrastructure and day-to-day state authority remained non-existent and the commercial world of South Connemara was dominated by a number of smuggling families with close connections to the landed elites. The most famous of these were the O'Malleys who lived in Dimeain in Carraroe, of whom Mairtin Mór O'Mháille was the most celebrated. The export trade in wool, butter and hide brought tobacco, wine and brandy into the area and provided a valuable source of income. A number of place names, including Brandy Cove, Brandy Harbour, Duirling an Eabhair (Ivory Shore) and Duirling an Chadáis (Cotton Shore) doubtless date to this period, as do some of the small quays, harbours and slips.

Illicit distillation, wrecking, kelp production, oyster harvesting and the export of peat to Aran constitutes the other economic activities of the period, augmenting subsistence agriculture which included fishing, farming and the harvesting of vast quantities of seaweed in order to produce kelp for export. These supported a sharply growing population, both in Connemara and on Aran, massive amounts of turf were required resulting in the denudation of virtually the entire coastal districts of Connemara. The large-scale export of turf to Galway, Aran and elsewhere, has had a highly visible and extremely negative impact on the environment of south Connemara. The seemingly inexhaustible supply of peat was gradually whittled away.

The bulk of the surviving landscape remains around Cill Chiaráin Bay, including the surviving network of archaeological remains date to the eighteenth and early nineteenth century population surge. This left its most dramatic mark in the extensive network of field boundaries and in the tiny quays, harbours and slips that cover the coast. Some of these are presumably on the sites of earlier quays or landing places but it is likely that most date to this period. The larger quays, bridges and pieces of local infrastructure are principally the result of state action from the 1830s and later. From an archaeological perspective this landscape is the largest legacy that these generations have passed on to us. Prior to the famine of the 1840s/50s the population was concentrated in the coastal littoral area along the shore in order to take advantage of available supplies of seaweed. Population densities reached as high as 500 people per square mile, the highest rural density in Western Europe. This growth was enabled (fuelled) by the adoption of the potato crop, which could grow on acid, boggy soils, provided it got sufficient nutrients.

Turf stands and kelp kilns survive in the landscape and relate directly to 19th century subsistence agriculture. Turf would have been placed within these forming a protective base. They are common through the bog lands of Connemara and are still used on some of the Connemara uplands and offshore islands including Cnoc Mordáin and on Inishboffin and Clare islands. A

series of kelp kilns were identified on the southern shore of Gorumna during fieldwork carried out as part of this study (Plate 9).



Plate 9. Kelp kiln at An Trá Bháin (Gorumna Island). (Photo: Michael Gibbons)

Official Catholic practice was suppressed for the bulk of the period which left the population dependant on local practices and the rare visits of itinerant priests for spiritual sustenance. While the date at which the holy wells and children's burial grounds (cilíns) originally came into use is impossible to determine it is certain that they played a crucial role in local religious practice throughout the eighteenth and nineteenth century with some of them remaining significant up until the present day. Unfortunately these wells can easily be damaged through well intentioned attempts to improve or renovate them as appears to have happened to the beautifully sited example at Ail na Brón where the accompanying leacht has been removed (Plate X10. The memory, if not the reality, of earlier religious and spiritual links was also retained in the cultural practices of pilgrimages to Saint MacDara's Island and other places of previous importance as well as in the folklore record. Sub-sea saint's roads (Bóthair na Naomh) were said to link Leitir Mealáin and Ceann Golam to Aran – continuing the tradition originally established by Bhreacan and Cíaráin. In addition to these another Saints road is said to go from Daighnis to St Mac Dara's Island.



Plate 10. Ail na Brón holy well near Cill Chiaráin. (Photo: Michael Gibbons)

There are at least eight children's burial grounds in Cill Chiaráin Bay. These are almost impossible to date and many more are likely to remain unrecorded given the sensitivity around these sites. Given their secretive and local nature they can easily be destroyed or removed as one, on Inis Treabhair, appears to have been during recent reclamation work as it proved impossible to locate. They are often deliberately located in boundary areas between land and sea as illustrated by the most visible example at Leitir Mór. Elsewhere these sites are often located within earlier, long abandoned, ecclesiastical sites although with the possible exception of the example on Inis Bearachain this does not appear to be the case here.

Government Projects

The nineteenth century saw a gradual expansion of state authority, which began with military motive during the Revolutionary/Napoleonic Wars and expanded first into law enforcement and then into local infrastructure as the State's consciousness of the dire poverty in the area increased. Crop failures and periods of serious distress (notably in 1822, 1831-2, 1835, 1839-42, 1845-52, 1859-62) led to an episodic programme of relief efforts and public works by a variety of State and private bodies.

Military Monuments

The threat of French invasion in the late 1790s and early 1800s was countered by the construction of a coastal defence system. The surviving signal tower on Golam Head (Plate 11) dates to this period (1804-6) and formed part of the wider network. It was complemented by a Martello Tower built at Rossaveal between 1810 and 1814 and other semaphore stations, such as those at An Coillin west of Carna and Bunowen south of Ballyconneely.



Plate 11. Semaphore Station on Golam Head. (Photo: Michael Gibbons)

The expansion of the coastguard system, including a new station on Leitir Mór was principally intended to protect government revenues against smuggling and to suppress the illegal trade in poitín. Smuggling seems to have gone into decline in the 1820s but the use of illegal stills in South Connemara remained a major factor in the local economy into the 1850s and continued in a minor way into the twentieth century.

Civil Projects: Quays and Causeways

The bulk of the causeways and larger quays visible today date to the nineteenth and early twentieth centuries. They fit into a pattern of improvements to local communications inaugurated by both Government and private charity as relief works designed to provide employment and improve local infrastructure. The first large scale efforts of this type began in response to a minor famine in 1822 and continued intermittently and under various different bodies until the abolition

of the Congested Districts Board after Independence. A series of quays were constructed by the Fisheries Board and then supplemented and improved by the Board of Works and the Congested Districts Board.

Quays

The building of coast guard stations around the coast went hand in hand with the construction of new quays and harbours, many of the Connemara examples were designed and built by Alexander Nimmo. Cill Chiaráin Bay has many fine examples of harbours displaying considerable variety in form and design. Among the finest are Caladh na Leice at Garfean in Ros Muc (Plate 12) which was used by the O'Conaires, a locally important mercantile family (Robinson, 1990) and another example at Ros Dubh, also in Ros Muc.



Plate 12. Caladh na Leice, Gairfeán. (Photo: Michael Gibbons)

The bulk of the larger piers visible today do not seem to have been extant prior to the 1820s. They are not visible on the early Admiralty Charts of the bay although Lewis describes up to 200 vessels at a time waiting for high tide to pass over the shallow waters at Béal an Daingin. The principal route for small vessels travelling along the coast is likely to have run inside the islands of Ceantar na n'Oileain at the times as it is unlikely that all of these vessels were based in Cill Chiaráin Bay.

Lewis (1837) records one quay on Gorumna, originally constructed by the fisheries board and later rebuilt and notes a plan to clear the passage of the “rocky Pass of Dangan” and build piers to facilitate boat traffic carrying turf, seaweed and sand to Galway and elsewhere. The piers referred to here are probably represented on the ground by the spectacular example at Annaghvaan (Eanach Mheáin) which overlays the nearby causeway (Plate 13).

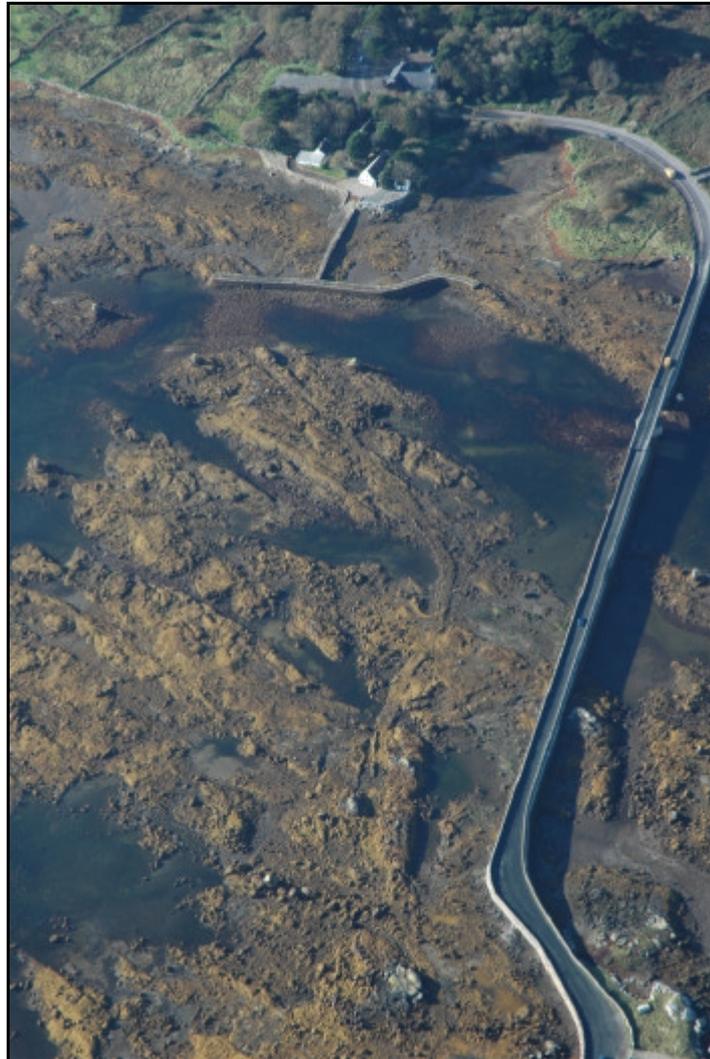


Plate 13. Pier at Eanach Mheáin with evidence of an inter-tidal causeway. (Photo: Michael Gibbons)

Prior to its construction there was a smaller pier on the shore of Leighon Island (An Laighean) which is visible on the earliest Admiralty charts. The quay at Máimín at the northern end of Gorumna Island probably also dates to this period and is visible on the First Edition Ordnance Survey Map. It was clearly built in two separate phases. The earlier phase appears to have been a comparatively rough rubble construction over 100m in length of which a portion was later improved, probably by the Congested Districts Board, with faced stonework and ashlar block construction leaving the final 20m or so in their original condition.

Innumerable smaller slips and quays are to be found on the islands, in particular Inis Treabhair, where over twenty were identified (Plate 14). Some of these are clearly turf quays where turf was imported from the bogs to the north of the bay from the newly constructed quays at Bun Inbhir when the islanders had exhausted their own turf supplies. Dating these simple structures is very problematic, although a number of clearly medieval harbours have been identified in Connemara and Aran in recent years. A number of simple slips and quays, possibly of late medieval date but indistinguishable in form from many of the later examples, are visible beneath Leitir Mealláin Castle. As the coastal bogs were exhausted new bog roads were pushed deeper into the hills surrounding the bay and turf quays were also constructed on the some of the bog bound lakes of Iorras Aitheach, one is visible on Loch Padhbram.



Plate 14. Small pier on Inis Treabhair. (Photo: Michael Gibbons)

Intertidal Causeways

The larger islands of Ceantar na n'Oileáin are linked to the Connemara mainland by a system of causeways. Béal an Daingin is linked to Eanach Mheáin and on to Leitir Mór which is in turn linked to Gorumna and Leitir Mealláin and then on to Fuirnis (a famine relief project from 1847). The largest single causeway is that between Eanach Mheáin and Leitir Mór (Droichead na d'Tráchtá).

These form part of the modern road network but the remains of an earlier network are visible in several places in the intertidal zone. The widest and most impressive of these is a series of

discontinuous stretches of causeway called Bóthair na n'Oileáin which links Gorumna Island with Inis Bearcháin via a series of three smaller islands (Oileáin an Phocaide, an t-Oileáin Mór and na Rua Oileáin) (Plate 15). The surviving remains are over 6m wide by 1m high with a combined length of c.200m.



Plate 15. Bóthair na n'Oileáin causeway. (Photo: Michael Gibbons)

The longest continuous example (c.400m long 3-4m in width up to 1m high – built in 1891), which constitutes a combination of causeway and intertidal zone road/clearway is that running westward/southwestwards between Béal an Dangan and Eanach Mheáin. Three phases of causeway development are visible between LeitirMór Island and Eanach Mheáin. The modern road is accompanied by the remains of an earlier but still substantial example (built in 1891) and a much smaller example is visible in the intertidal zone to the west at low tide. This last links the small island of Oileáin na d'Tráchta with Eanach Mheáin (Plate 16)



Plate 16. Three phases of causeway development between Béal an Dangan and Eanach Mheáin (Photo: Michael Gibbons)

Running westward from Cill Bhreacáin, there are four slighter causeways. These connect Cill Bhreacain with an t-Oileáin Mór, an t-Oileáin Mór with an t-Oileáin Iarach and Oileáin na gCapall and as t-Oileáin Iarach with An Cró. Other causeways link Inis Treabhair with na Beitheach (a low lying islet to its north) and Leitir Caladh with Inse Gainimh. The smaller examples are little more than raised footpaths or cosáins which can be as narrow as 70cm across and up to 1m high. They are combined with a 'sunken way' adjacent to them which is usable during times of low water (Plate 17). The best examples of this are to be seen on the routes linking an t-Oileáin Mór with Oileáin na gCapall and Inis Treabhair with an Beitheach. It is possible that some of the smaller examples may either have doubled as fish traps or else been designed with this function in mind as they bear a close resemblance to fish traps identified on Strangford Lough.

Two further causeways, left incomplete, were attempted. One was planned, together with a possible ferry, to cross the narrows of Cuan Camas at Dun Manas, the abutment of the causeways are visible at Snámh Bó and on an a small island in the bay. The other was commenced but was left unfinished crossing deep bog and a narrow tidal inlet linking a small island called an t'Aibhinn Mór with the mainland at An Droimín at the mouth of a small inlet Loch an Aibhinn between Béal an Dangan and Muiceanach idir dhá Sháile. This is not visible on the Second Edition Ordnance Survey Map of 1898 and thus probably belongs to the early twentieth century.

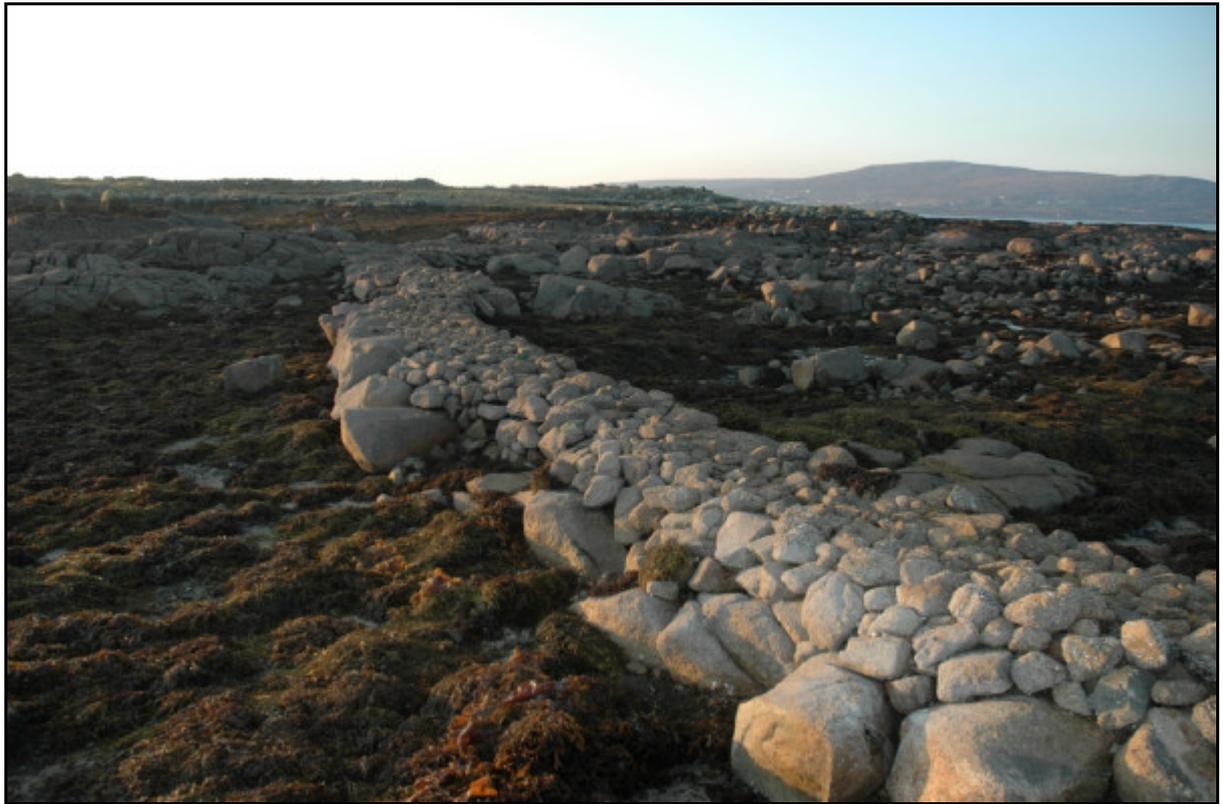


Plate 17. Causeway and associated 'sunken way' at Inse Ghainimhe. (Photo: Michael Gibbons)

Together these constitute the largest and greatest variety of intertidal zone causeways in the country. The earlier examples represent an important new site type to add to the corpus of archaeological and architectural features in the Irish intertidal zone and they have been described by one expert as a "very significant part of the engineering history of the County" (pers. comm. Paul Duffy). The earlier examples are essentially improvements to the route between the islands at extreme low tide and these routes have doubtless been in use in one form or another for as long as the islands have been inhabited. Given the fact that the entire area has been inundated by the sea over the millennia (with as much as 5m sea level rise) it is possible that the tradition of building causeways may be of considerable antiquity.

The route between Béal an Daingin and Eathnach Mhean, described as 'an seanbhóthair' by a local man, was clearly in existence and in use in the 1830s. The surviving quay there features an arch, which was clearly designed to allow the continued use of the causeway after construction. The Quay was still under consideration in the early 1830s but is marked on the First Edition Ordnance Survey Map as complete, which indicates that the underlying causeway is certainly earlier than this. Lewis (1837) recorded that all of the islands could be reached on foot at low tides in the 1830s which suggests that earlier versions of the modern causeway routes were in use at this period.

Churches

In addition to state projects, the nineteenth century also saw resurgence in the construction of Catholic Churches which replaced a number of earlier, possibly pre-Reformation, vernacular Catholic Churches. The best preserved of these, little studied, pieces of ecclesiastical history is to be found at the possibly 18th century church of Sálalaoí in Turlach Beg townland (Plate 17).



Plate 18. Vernacular church at Sálalaoí (Turlach Beag). (Photo: Michael Gibbons)

Natural Heritage – Flora, Fauna & Habitats

Introduction

The natural landscapes of Connemara are characterised by mountains, extensive bogs, rolling lowlands, numerous lakes and streams and a meandering coastline.

The most obvious features of the Connemara terrain are the Twelve Bens and Maumturk Mountains in the north and the large area of low lying undulating blanket bog and rolling lowland that lies between the mountains and the coastline to the south. This lowland area extends southwards to encompass most of the land area adjacent to the waters of Cill Chiaráin Bay. This terrain, which is broken by numerous lakes and streams and by countless rocky outcrops, supports a diverse range of animals and plants which have made their homes in one of the many contrasting habitats that occur here.

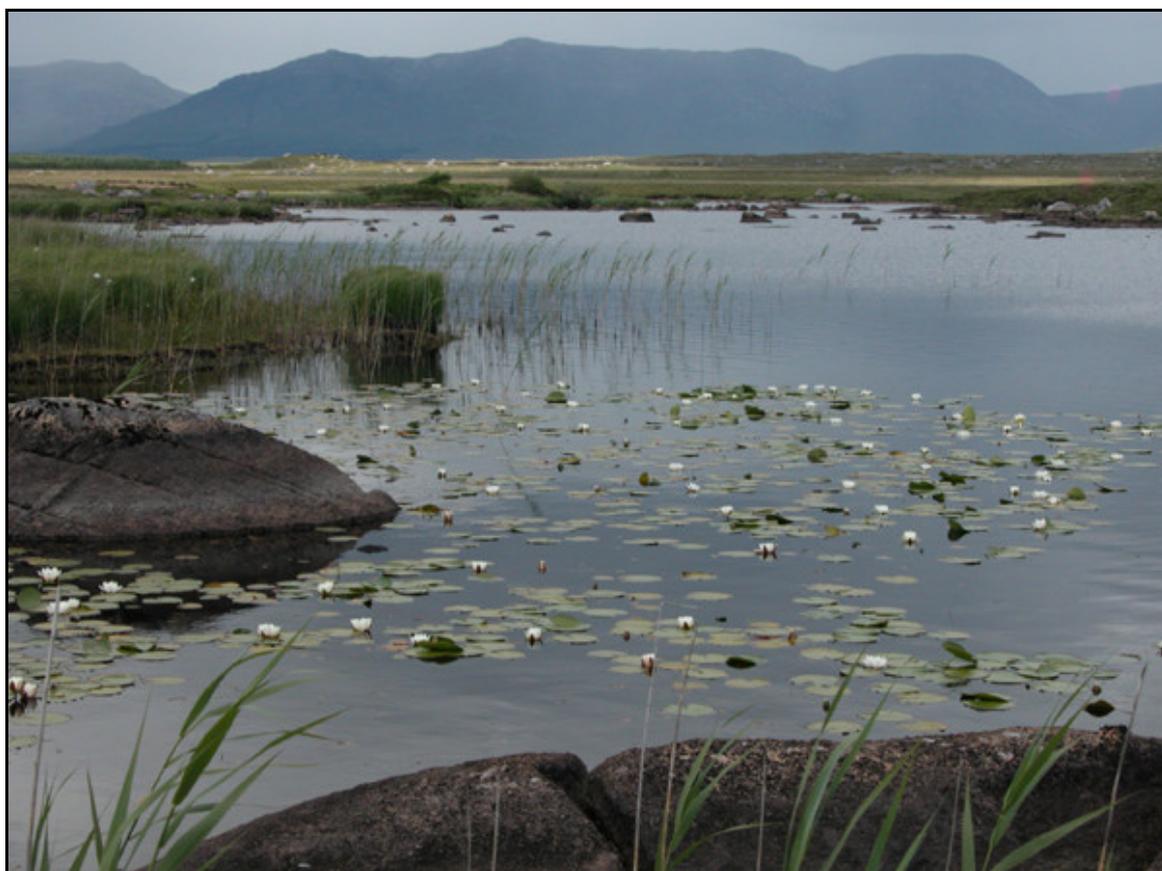


Plate 19. Looking north from the head of Cill Chiaráin Bay towards the mountains of Connemara.

(Photo: Steve Waldren)

The most obvious coastal features of the Connemara landscape are its sheltered bays and numerous offshore islands. Cill Chiaráin Bay is one of the largest and most pronounced bays within Connemara and features large areas of tidal foreshore as well as numerous coastal and

offshore islands and islets. These features make for an extensive area of coastline within which contrasting coastal and aquatic habitats such as rocky shores, sea cliffs, reefs, beaches and salt marshes proliferate.

Because of the presence of many different terrestrial and aquatic habitats, Cill Chiaráin Bay and the surrounding terrain of south Connemara is host to an exceptionally diverse range of animal and plant life. The waters of Cill Chiaráin Bay are home to many rare and several very rare species of invertebrate animals, as well as several species of rare marine algae. A number of coastal lagoons also occur around Cill Chiaráin Bay and these are considered exceptional in the context of the species of animals and plants that occur within them. The bogs and salt marshes of the surrounding area are also nationally and internationally important natural habitats, which support a wide variety of animal and plant species.

The marine habitats found within Cill Chiaráin Bay are of very high conservation value. There is a wide range of habitats and very high species diversity. Within Ireland, only Kenmare River has a greater diversity of marine life than Cill Chiaráin Bay, and a very high number of species that are rare or considered to be worthy of conservation in Ireland occur in the area.

Complimenting the high diversity of animals and plants in this unique area is the fact that many of the habitats within which they live are in a very natural condition and show little impact from human activity. Overall, this makes Cill Chiaráin Bay and south Connemara a very rich environment free from many of the impacts that have left their marks on much of the Irish landscape.

This uniqueness is now recognised and efforts are well underway at national and European Union level to afford a level of protection to these and other unique environments in all corners of the European Union. This is being achieved through a site designation process, the aims of which are to conserve the best examples of our remaining natural heritage, as well as to preserve biodiversity by preventing the further loss of habitat, animal and plant species.

Habitats of South Connemara and Cill Chiaráin Bay

Many of the best examples of the natural habitats, animals and plants that occur in Cill Chiaráin Bay and south Connemara have been afforded protection through the designation of areas as either NHAs and/or SACs and SPAs (Appendix V). The best way of summarising the rich floral and faunal biodiversity of this region therefore is to look in detail at these areas and to consider the habitats and species that occur in each of them. The most important sites within the Cill Chiaráin Bay area have been designated as cSACs. The main cSACs in the area are Kilkieran Bay and Islands cSAC and the Connemara Bog Complex cSAC. Other designated sites also occur in

the region. These are mainly NHA sites which are less noteworthy in the context of protected habitats and species than are the SACs, but which are nonetheless important because individually they may feature significantly in the ecology of individual or groups of animals and plants, or because they are host to examples of largely undisturbed and intact natural habitats.

Kilkieran Bay and Islands cSAC

Cill Chiaráin Bay has been designated a cSAC because it contains good examples of eight habitats listed under Annex I and one species listed under Annex II of the EU Habitats Directive. These habitats comprise some of the best examples of their type in Ireland, due to the great diversity of habitats and species found within them. Many of the species found are rare in Ireland and have a very limited distribution outside of Cill Chiaráin Bay.

All of the sea area up to and including the mean high water mark within Cill Chiaráin Bay is part of the Kilkieran Bay and Islands cSAC. The boundary also takes in all of Lettermore Island, Gorumna Island, Lettermullan, Greatmans and Kiggaul Bays as well as the many islands located within Cill Chiaráin Bay itself, including Birmor, Birbeg, Inishmuskerry, Duck Island, Feenish Island and Mweenish Island. The seaward boundary starts at Keeraun Point just east of Greatmans Bay and continues west to the south of Golam Head and Carricknamacken before turning northwest as far as Mason Island.

The eight habitat types listed in Annex I of the Habitats Directive which occur within Cill Chiaráin Bay are:

- Lowland hay meadows
- Machair⁵
- Atlantic salt marshes
- Mediterranean salt marshes
- Coastal lagoons
- Mudflats and sandflats not covered by sea water at low tide
- Large shallow inlets and bays
- Reefs

Lowland Hay Meadows

Lowland Hay Meadows, an Annex I habitat under the Habitats Directive, are now rare in Ireland. These meadows are rarely fertilised or grazed, and are mown only once or twice a year for hay. Most have been improved for agriculture and this type of grassland is now most common on

⁵ Machair and Coastal Lagoons are both considered priority habitats for conservation.

grassy verges along roadside, on the margins of tilled fields, on disused railway embankments, as well as in churchyards, cemeteries and neglected fields and gardens. While these grasslands may occasionally be cut, there is no regular grazing and more often than not no grazing at all and there is no fertiliser application either. This pattern of use leads to grassland with a high proportion of tall, coarse and tussocky grasses such as False Oat-grass (*Arrhenatherum elatius*) and Cock's-foot (*Dactylis glomerata*). Other grasses that occur may include Yorkshire-fog (*Holcus lanatus*), Smooth Meadow-grass (*Poa pratensis*), and Meadow Foxtail (*Alopecurus pratensis*). Alongside the grass varieties, tall broadleaved herbs such as Cow Parsley (*Anthriscus sylvestris*), Hogweed (*Heracleum sphondylium*), Goat's-beard (*Tragopogon pratensis*), Nettle (*Urtica dioica*) and Common Knapweed (*Centaurea nigra*), are characteristic species of lowland hay meadows. Broadleaved herbs which climb the stems of others and which are commonly found in this habitat include Bush Vetch (*Vicia sepium*) and Meadow Vetchling (*Lathyrus pratensis*).

Lowland Hay Meadows are rich in flowers and are generally not cut before the grasses flower and even then, are only cut once or twice per year. Lowland Hay Meadows are relatively rare around Cill Chiaráin Bay, but some good examples are known. The habitat is most commonly found in small, unimproved fields located behind beaches, which are influenced by blown sand. Perhaps the most extensive area of the habitat is to be found at Ardmore Point. A species-rich mixture of grasses and low- to medium-sized forbs dominates the vegetation here. A number of relatively rare orchids and other vascular plants have been recorded from this area. The lowland hay meadow habitat is the also basis of the designation of the Ardmore Point Grasslands NHA.

This type of grassland habitat is very susceptible to alteration by intensive use and the heavy application of fertilizers. Where large amounts of fertilizers are applied, the species diversity rapidly declines.

Machair

This habitat is listed on Annex I of the E.U. Habitats Directive with priority status. The Gaelic word Machair is used to describe a distinctive type of coastal grassland found in the north and west of Scotland, and in western Ireland from Galway Bay to Malin Head in Co. Donegal. It is restricted in Europe to these two areas along the northwestern seaboard. It is associated with calcareous sand, blown inland by very strong prevailing winds from beaches and sand dunes. In Ireland and Scotland machair forms when a dune system initially consisting of ridges becomes eroded down to water table level producing a flat surface. The erosion that causes this situation is due to a combination of severe exposure to strong wind, coupled with heavy grazing pressure.

Globally it is estimated that only 25,000 hectares of machair still exists. Of this, there is approximately 7,500 ha in Ireland and 17,500 ha in Scotland. Machair systems are complex features in terms of origin, development, processes, local habitat types and management.

There is a wide range of vegetation types present within a machair system due to the numerous different habitats that occur within it. These vegetation types gradually merge into each other providing different zones of vegetation from the front of the system through to the plain behind. Although these zones do not occur as broad bands across the system but rather provide a mosaic of different habitats, such as dunes interspersed with wetland areas depending on the exact position of the water table through out the system. Many plant species that would normally not be found on the west coast of Ireland and areas such as Cill Chiaráin Bay occur in machair systems. This is because the peatlands surrounding the bay are extremely nutrient poor and cannot support many of our native plants. Such plants, especially those which like a calcium rich environment can find a niche within the machair system, as these areas are generally more nutrient rich thus providing a source of food for the different plant communities that thrive within them. Machair systems are unique among the acid peatlands as they are composed of calcium rich soils generally formed from the large proportion of shell fragments contained within them.

While human influences such as using machair for grazing has been a major contributing factor in the formation of machair, it has also become threatened in recent times by changes in agricultural practices. For example, early cutting of grass for silage rather than hay prevents plants from setting seed thus contributing to their disappearance from the system and has also resulted in destroying the nesting sites of birds such as the Corncrake. Fertilisation of the system, drainage and stock feeding can also reduce the sward height thus reducing the number and type of species that occur. On the other hand under-grazing allows the proliferation of weedy species within the system resulting in species poor grassland.

Given that machair is in serious decline globally, the occurrence of this habitat in Cill Chiaráin Bay and Islands cSAC is significant in the context of this sites cSAC designation. Machair occurs most extensively on Mweenish Island, Feenish Island and Mason Island, which lie in the west of the area. These machair areas appear to be the remains of formerly more extensive systems; they are some of the most southerly machair systems in the country and are of conservation value from both vegetational and geomorphological perspectives.

Atlantic and Mediterranean salt marsh

Salt marshes are transitional areas between land and water, occurring along the intertidal shore of estuaries and bays where salinity (salt content) ranges from near ocean strength to near fresh water strength in upriver marshes. Generally salt marshes occur in areas between the upper and

lower levels of neap and spring tides in sheltered bays and estuaries when sediments become deposited on the intertidal areas.

Sometimes salt marshes can develop on coastal peat deposits (Plate 20), often occurring in areas where the blanket bog has been encroached by the sea as a result of rising sea levels over long periods of time, frequently combined with the more recent cutting of peat and this is the case for all of the salt marshes which occur within *Cill Chiaráin* Bay (Appendix VI).

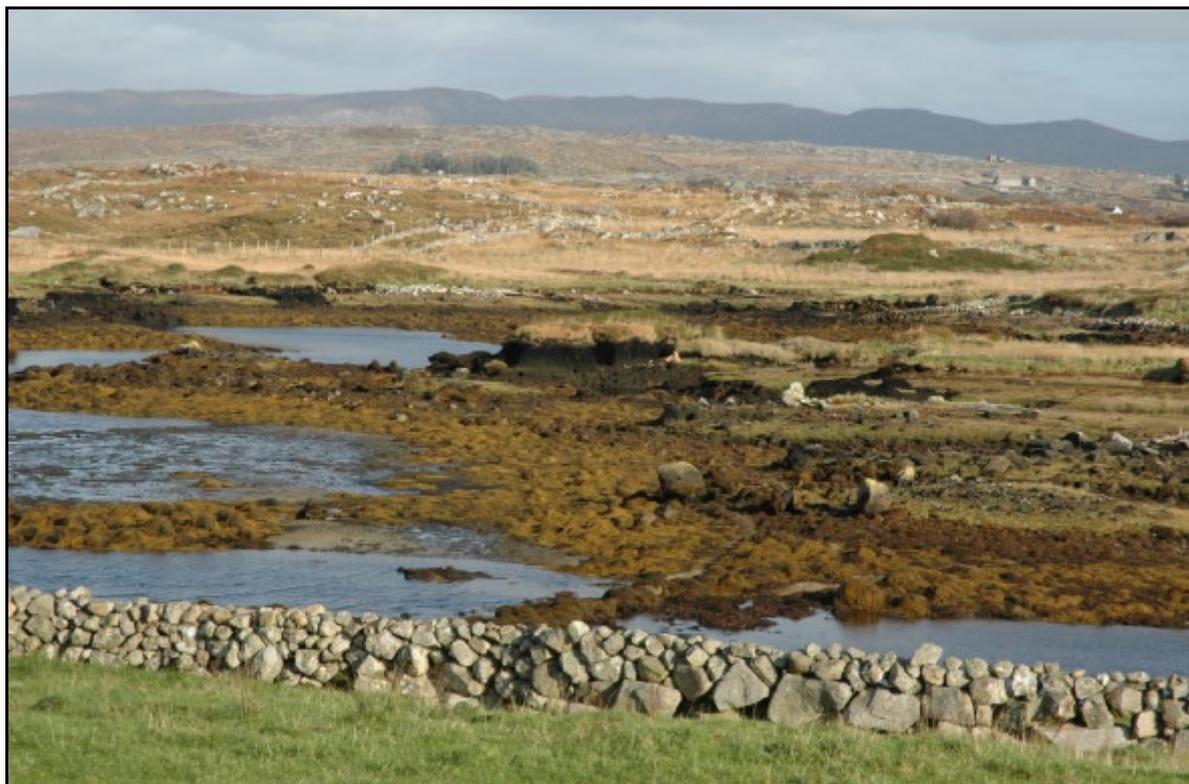


Plate 20. Inter-tidal peat between Ros Muc and An Claidhneach. (Photo. Michael Gibbons)

Salt marshes are a common feature within *Cill Chiaráin* bay and a thin fringe of salt marsh is found along most stretches of the coastline. Larger areas of salt marsh occur in the more sheltered bays along the eastern shores of the bay, where the building of causeways to connect the islands has provided ideal conditions for the formation of salt marsh in the lee of the causeways. The cumulative area of salt marsh within *Cill Chiaráin* Bay is considered to represent the largest area of salt marsh occurring on peat in the country.

The salt marshes on the site include both the Atlantic and Mediterranean types of salt marsh both of which are listed on Annex I of the E.U. Habitats Directive. Such designation indicates the conservation importance of these salt marshes, which although common in this area, are threatened throughout much of Ireland and mainland Europe. Irish salt marshes are less species rich than their British or European counterparts, partially due to the greater latitudinal range over

which salt marshes occur in Britain and also because of the absence from the Irish flora of certain species.

Cill Chiaráin Bay contains thirteen significant areas of salt marsh as well as the smaller areas of fringing salt marsh. Those areas of note include Derryrush, Turloughbeg, Loughaunultera, Kinvarra, Bealadangan, Lettermore North, Lettermore South, Glentrasna; Gorumna, Lettermullan; Casheen Bay, Lettermullan West, Teeranea, Garryroe and Costelloe. These salt marshes within *Cill Chiaráin* Bay are of particular conservation importance as they display some of the characteristics that are unique due to their occurrence in areas where lowland blanket bog is found at sea level, a phenomena that only occurs in Ireland and Scotland. Most of the salt marshes of *Cill Chiaráin* Bay have formed as a result of rises in sea level rather than a drop in land level due to glaciation events. One of the few other areas where salt marshes on peat occur in Britain and Ireland is in western Scotland. However, the Connemara salt marshes in common with some other areas of western Ireland occur over much deeper peat deposits than those found in Scotland. In addition, the presence of tree stumps in eroding peat is a common feature in many of the submerged peat salt marshes of *Cill Chiaráin* Bay.

Salt marshes vary in the type of plant and animal communities that they support depending on a number of physical and environmental conditions pertaining to a particular site. Salinity, frequency and extent of flooding and the type of substrate upon which the marsh has formed all determine the types of plants and animals found there. Animals and plants live within different zones of the marsh, depending on how well they are adapted to either the drier conditions of the upper marsh or the wet conditions that regularly occur in the lower marsh.

In general the lower reaches of the salt marshes are characterised by the occurrence of more salt tolerant plants, as this is the area most frequently covered by seawater. Species common of the lower salt marsh include Common salt marsh grass (*Puccinellia maritima*), the Yellow Glasswort (*Salicornia fragilis*) and cord-grasses such as *Spartina x townsendii* and *S. anglica*. Common salt marsh grass in particular is an important food source for over wintering wildfowl such as Barnacle Geese that occur within *Cill Chiaráin* Bay.

The upper, drier and less saline areas of the salt marsh is home to Rushes, particularly *Juncus maritimus* and *J. gerardii* and grasses such as Red Fescue (*Festuca rubra*) and Creeping Bent (*Agrostis stolonifera*) which is often locally abundant in the more water logged areas of this zone. Many of the salt marshes surrounding *Cill Chiaráin* bay are unusual in that the upper reaches of the salt marsh often merge into heathland and the heathers in these areas often have a blackish appearance due to the high salt content of the peat. Another interesting aspect of the salt marshes within the area is their gradation into lagoons in some areas, such as at Kinvarra on the

north eastern shore of the bay. Species of note that occur in this area include Sea plantain (*Plantago maritima*), Thrift or sea pink (*Armeria maritima*), Fiorin-grass (*Agrostis stolonifera*), Salt marsh flat sedge (*Blasmus rufus*) and Hawkbit (*Leontodon autumnalis*).

Many of the salt marshes within the bay are used for grazing, generally by cattle and while there is currently little evidence of any damage, other than poaching (trampling of the ground) the effects of grazing appear to be beneficial for the grazing of over wintering geese which prefer the shorter turf that occurs following grazing.

Coastal Lagoons

Coastal lagoons are considered as priority habitats for conservation and are listed in Annex I of the Habitats Directive. Lagoons are expanses of shallow coastal salt water, of varying salinity and size, which are completely or partially separated from the sea by sand banks or shingle, or less frequently by rocks. The salinity may vary from brackish water to hypersalinity, depending on rainfall, evaporation and through the addition of fresh seawater during storms, temporary flooding of the sea during winter or periods of extreme tidal events. Coastal lagoons are a particularly vulnerable habitat due largely to the low exchange rate of water in these systems and the possibility for the hydrology of the systems to be altered through mechanical interventions such as road and causeway construction. Lagoons are also subject to eutrophication mainly arising from organic enrichment of the waters through animal wastes and fertilizer run-off. Their continued existence is dependent on controlling development and effective management of sources of organic wastes.

Cill Chiaráin Bay is extremely important for the number of coastal lagoons that occur around the bay - it is considered to be the best site in the country for this habitat and is an excellent example of a particularly unusual type of saline lake lagoon situated on peat, which appear to be rare in Europe but characteristic of south Connemara (Appendix VI). Examples of lagoons in the site include Lettermullen Pool, Lough Tanai, Mill Lough, Loch an Ghadaí, Loch an tSaile, Loch Cara na gCaorach, Loch Conaortha, Loch Doire Bhanbh, Carafinla Lough, the Lough Fhada complex and Loch an Aibhín.

Most of the lagoons are located to the north of inner Cill Chiaráin Bay. Some of the lagoons are of exceptional conservation value, many include a diverse flora and fauna and a high percentage of lagoonal specialist organisms. A number of the lagoons (L. Aibhín, L. Fada and L. Tanai) are interconnected and effectively constitute a single lagoon. Some of the lagoons exhibit exceptional species richness and unique assemblages of flora and fauna. L. Aibhín is very large and undisturbed and includes excellent Foxtail Stonewort (*Lamprothamnium papulosum*) and eel grass communities (*Zostera marina*). A number of species rare to Ireland are included within the

lagoon systems of Cill Chiaráin Bay. These include a small lagoonal snail (*Littorina tenebrosa*). This species, which is closely related to *Littorina saxatilis* has unique habitat requirements and only occurs on permanently submerged macro-algae. The estuarine bryozoan (*Conopeum seurati*), and the marine isopod (*Jaera forsmanni*) also occur in some of the lagoons. Lettermullan Pool demonstrates one of the best examples of a saline lagoon overlying peat to be found in Ireland. This type of lagoon is very rare in Europe. In Cill Chiaráin Bay, the only record for *Laomedea angulata* - a colonial hydroid is from eel grass in Lettermullan Pool.

Mudflats and sandflats not covered by sea water at low tide

This habitat includes sandflats - shores where most of the sand is medium or fine and where muds (silt/clay) make up no more than 30% of the total sediments. Muddy sand usually occurs as gently sloping flats in sheltered areas. Sandflats in general will remain water-saturated throughout the tidal cycle even though the tide may not cover them at low water. Characteristic components of the fauna of sandflats include communities of lugworms (*Arenicola marina*) and bivalve molluscs, particularly the Edible Cockle (*Cerastoderma edule*). Sandflats may also support beds of Eel Grass (*Zostera marina*). Eelgrasses are vascular plants whose root networks tend to stabilise seabed sediments and provide a colonising surface for other marine species. Muddy sand shores frequently occur at the seaward edge of salt marshes.

Mudflats mainly comprise very fine sediments and normally occur along the most sheltered sections of coastline, such as in estuaries, at the apex of sheltered bays and in tidal lagoons. The silt/clay content of muddy sediments is in excess of 30%, while small amounts of coarser materials including gravel, pebbles and broken shell are commonly found mixed in with, or on the surface of mud flats. The greater the silt/clay component of the sediment, the more toward mud is its classification. Mudflats are often exposed to fluctuating salinity conditions due to their exposure to rainfall and freshwater run-off during low tide. Mudflat surfaces are often characterised by networks of narrow channels and rivulets, which are associated with drainage of surface waters. Mudflat habitats usually support communities of polychaete worms (*Hediste diversicolor*, *Nephtys hombergii*, *Pygospio elegans*), bivalve molluscs (*Macoma balthica*, *Scrobicularia plana*, *Cerastoderma edule*, *Mya arenaria*), mud snails (*Hydrobia* spp.) and small crustaceans (*Corophium* spp.). Oligochaete worms are also characteristic if there is a significant freshwater influence.

Both sandflats and mudflats are sensitive to changes in surface topography and water flow regimes, which may cause erosion of the mud. Similarly, changes in water flow characteristics may also cause increased deposition over mudflats.

Limited areas of mudflats and sandflats can be found in Cill Chiaráin and the adjoining Greatmans and Kiggaul Bays. Many of the species associated with this habitat are characteristic of Irish mudflats and include species such as the polychaetes worms *Malacoceros fuliginosus*, and *Marphysa bellii*. The Razor Shell (*Ensis arcuatus*) and the Edible Cockle are also common. The outer parts of Cill Chiaráin Bay have sandy areas that support populations of polychaetes, burrowing anemones and bivalves. There is a good pattern of zonation from the higher shore towards the low shore, the latter being more species rich and containing a variety of polychaete worms as well as a range of bivalve molluscs.

In the context of the Habitats Directive, sands and muds, their connected seas and associated lagoons, which are not covered by seawater at low tide are of particularly important as feeding grounds for many species of wildfowl and waders.

Large shallow inlets and bays

Large shallow inlets and bays contrast with estuaries because there is only a limited influx of freshwater. These bays are characterized by shelter from wave action and they frequently contain a great diversity of sediments and substrates with a well-developed zonation of benthic (seabed) animal communities. These communities generally have very high species diversity.

Cill Chiaráin Bay has a range of subtidal sediment habitats ranging from fine mud and sand through gravel and pebbles to maërl. The area contains a wide variety of subtidal animal and algal communities in a range of habitats that are sheltered from wave action but which remain exposed to moderate to strong tidal streams. Some of these communities are rare in Ireland.

Of particular importance are the extensive beds of the free-living red calcareous algae, maërl (also known locally as 'coral') that occur throughout Cill Chiaráin and Greatmans Bays. Cill Chiaráin Bay is one of three known localities in Ireland where the maërl species *Lithothamnion corallioides*, *Lithophyllum dentatum* and *Lithophyllum fasciculatum* co-occur (Plate 21). Extensive beds of eel grass also occur at a number of sites within Cill Chiaráin Bay and Greatmans Bay and in some areas these co-occur with maërl. This association is known from only a limited number of sites in Ireland and has not been recorded elsewhere. Important eel grass beds are to be found in Ard Bay, Mweenish Bay, Birmor Island, off Lettercallow and as well as at further locations within Cill Chiaráin Bay itself.

An excellent example of the Seapen (*Virgularia mirabilis*) community occurs in fine mud in shallow water. The very rare tube dwelling Fireworks anemone (*Pachycerianthus multiplicatus* – Plate 22) also occurs in fine mud in two deeper depressions in Roskeeda Bay. This species is known from

only three other localities in Ireland. The Fireworks anemone is known to occur alongside Seapens in Roskeeda, which is also considered a rare co-occurrence.

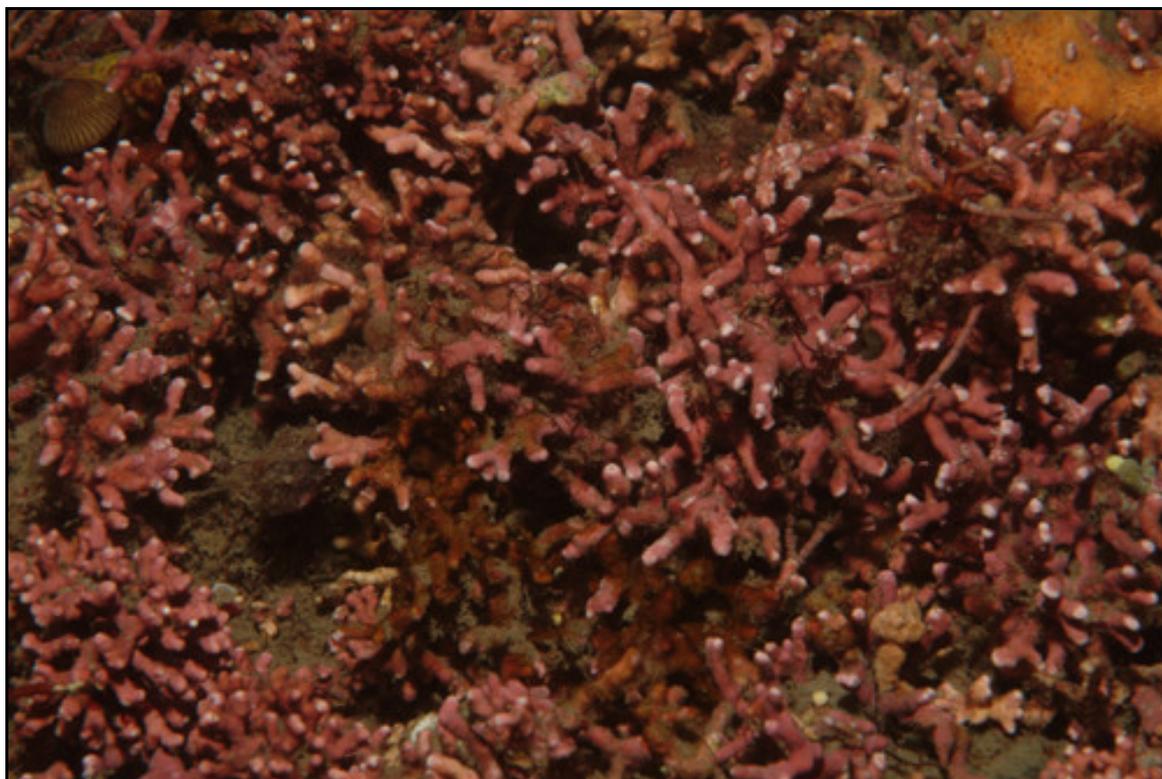


Plate 21. Live Maerl in Cill Chiaráin Bay. (Photo: Louise Scally).

The burrowing anemone communities of Cill Chiaráin Bay, which include *Helcampoides elongatus*, *Scolanthus callimorphus*, *Mesacmea elongates* and *Aureliania heterocera* are rare in Ireland. The last-named species is rare in Ireland, being known only from Donegal Bay and Cill Chiaráin Bay, as well as a number of areas on the north-east coast; the population in the site is the largest on the west coast. Cill Chiaráin Bay is the only known Irish locality for *Mesacmaea mitchellii*. *Scolanthus callimorphus* is known only from Cill Chiaráin Bay, Valentia Harbour, Co. Kerry and the Dorset coast in the U.K. The very rare anemone *Halcampoides elongatus*, known only from Kilkeran Bay and Ards Bay in Ireland, occurs in a narrow bed of clean dead maërl at the edges of some of the live maërl beds.

The best recorded example in Ireland and likely within its entire biogeographical range, of the community characterised by the burrowing sea cucumber *Neopentadactyla mixta* occurs in the banks of dead maërl of Cill Chiaráin Bay. This species is recorded in very large numbers from the maërl beds at Ardmore Point as well as in the dead maërl dunes on Lettercallow Spit.

Beds of the native oyster *Ostrea edulis* occur in Inner Cill Chiaráin Bay near Kilbricken, Roskeeda and Rosmuc.

The rocky intertidal shores of Cill Chiaráin Bay are comprised of bedrock or a mixture of bedrock, boulders and gravel. These shores support a very wide variety of marine communities, and the wide variation in the degree of shelter of different shores is reflected in the zonation of communities. This is typical of shores that range from being exposed to wave action through to extremely sheltered shores and some tide-swept shores. Those shores which are exposed to wave action have Channel wrack *Pelvetia canaliculata* and barnacles in the upper shore, with Bladder wrack *Fucus vesiculosus* and barnacles in the mid shore, Serrated wrack *Fucus serratus* in the low shore and the giant kelp *Laminaria hyperborea* on the very low shore. Sheltered shores have the mid shore dominated by Knotted wrack *Ascophyllum nodosum*. Knotted wrack is harvested extensively by hand in the upper reaches of Cill Chiaráin. In the inner part of the bay the brown alga *Ascophyllum nodosum* var. *mackii*, which has very specific habitat requirements, is found. The rapids at Carrickagegaun Bridge, Lettermore Island, are extremely species-rich and no less than 119 species were recorded during the BioMar survey (Picton & Costello, 1998). The rarely-recorded star fish *Asterina phylactica* was recorded at this location. This was the highest number of species recorded on any shore in this survey which was carried out in 1994.

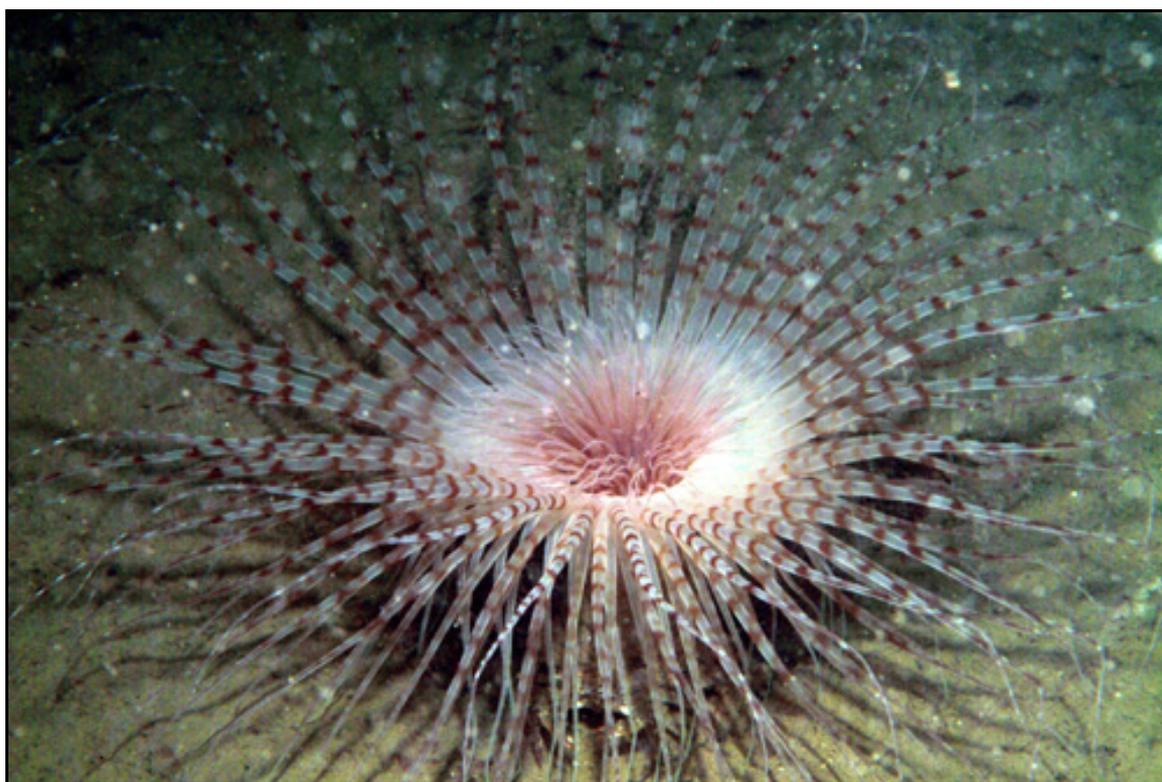


Plate 22. Fireworks anemone (*Pachycerianthus multiplicatus*). (Photo: Louise Scally).

The rare alga *Dermocorymus montagnei* is recorded in Ireland only from the very sheltered narrow inlet known as Coill Saile Creek on the northern shore of Cill Chiaráin Bay and a handful of sites in Brittany. Also in this creek are large plants of the maërl species *Phymatolithon*

polymorphum on which the rare, creeping red alga *Gelidiella calcicola* and the recently described *Gelidium maggsiae* (Rico & Guiry, 1977) occur. The status of the latter species however is uncertain, due to the impacts resulting from the construction of a temporary causeway at Flannery Bridge in 1994. Although subsequently removed, it is thought that this caused major disturbance to the inter-tidal communities in Coill Saile creek.

Coill Saile is also unusual for its large population of the red alga *Meredithia microphylla*, which is more characteristic of exposed areas and which occurs in the more sheltered waters on the inner inlet. Coill Saile is also known for the large form of the sea slug *Akera bullata* var. *farrani* (which may be a separate species).

Cill Chiaráin Bay contains a high diversity of fish species. The Butterfly Blenny, *Blennius ocellaris*, which is rare around the coasts of Ireland and Britain, has been recorded from two sites within Cill Chiaráin Bay. The Reticulated Dragonet (*Callionymus reticulatus*), previously only recorded from Mweenish Bay in 1967 was recorded at a number of sites throughout Cill Chiaráin Bay during the BioMar survey suggesting a widespread distribution within the area.

Other records for Cill Chiaráin Bay include a species of marine worm previously unrecorded in Irish waters (*Fabricola* sp.). *Fabricola* sp. has recently been recorded close to Árd West pier. An amphipod new to science, *Stenothoe elachistoides*, has also been recorded from maerl beds in Cill Chiaráin Bay.

Reefs

Reef communities in Cill Chiaráin Bay range from exposed to extremely sheltered, with many reefs also exposed to strong tidal streams. The intertidal reef communities show clear vertical zonation. Lichens at the top give way to a narrow band of Channel Wrack and barnacles. The mid-shore is characterised by Bladder Wrack and the low shore by a zone of Serrated Wrack. The Sea Squirt (*Dendrodia grossularia*) and Porcelain Crabs (*Porcellana platycheles*) are found under the boulders. On the very low shore, the Oarweed kelp (*Laminaria digitata*) with a thick coralline crust colonises the surfaces of the top of boulders. Under the boulders are abundant spirorbid worm tubes with the Starfish, *Asterina gibbosa*, porcelain crabs and encrusting sponges, particularly *Halichondria panicea* and *Ophlitaspongia seriata*. In more sheltered areas, intertidal reef communities are dominated by Knotted Wrack. Sheltered reef communities are subject to strong tidal streams and have a rich fauna, sponges and ascidians being particularly diverse.

The shallow water reef communities in Cill Chiaráin bay can be divided into three associations with shallow exposed communities dominated by *Laminaria hyperborea*, shallow sheltered communities dominated by Sugar Kelp (*Laminaria saccharina*) with sponges and ascidians and the

slightly deeper communities characterised by foliose red algae. Subtidal reefs in more exposed situations and deeper water show good examples of the cup sponge community with the Sea Fan (*Eunicella verrucosa*).

Deeper subtidal reefs range from being exposed to wave action to extremely sheltered but exposed to tidal currents ranging from weak to very strong. More exposed areas; such as the Namackan Rocks have excellent examples of the cup sponge community. In more sheltered areas with weak tidal streams the reefs are covered with deposits of silt and are characterised by solitary ascidians (Sea squirts). In sheltered areas with strong tidal streams, such as at Gurraig sound, excellent examples of the sponge/sea squirt, *Raspailia romosa*/*Corella parallelogramma* community are to be found. The rare sponges *Plakortis simplex* and *Tricheurypon viride* are also found in this community. These are the best examples of this community recorded for any area in Ireland. The rare nudibranch, *Haucockia uncinata* has also been recorded from Cill Chiaráin Bay.

The Connemara Bog Complex SAC

The Connemara Bog Complex is one of the most important lowland blanket bogs still existing in Ireland today. The site includes the majority of the south Connemara lowlands and extends from the Galway-Clifden road to the north and extends eastwards to the Moycullen-Spiddal road. The southern reaches of the Connemara bog complex run along the shores of Cill Chiaráin bay.

Box 3. Why Blanket Bogs are Important

Bogs can be divided into two different types; raised bogs and blanket bogs. Atlantic blanket bog occurs at altitudes below 200m and mountain blanket bog above 200m. Raised bogs occur in the midlands of Ireland where rainfall is between 800 and 900mm per year. Blanket bogs are found along the west coast of Ireland and in mountainous areas around the country where rainfall is 1,200mm per year or more. Much of the hinterland surrounding Cill Chiaráin bay and many of the islands that fall within the bay are composed of lowland blanket bog.

Ireland's blanket bogs are particularly important in a world context. Blanket bog habitats cover 10 million hectares of the earth's surface. Ireland possesses 8% of the world's blanket bogs and is the most important country in Europe for this type of habitat. Blanket bogs provide an archive of our past history, pollen is very well preserved in bogs and our pollen record provides us with a wealth of information on past land use and vegetation patterns through time. Some of the most important archaeological finds in Ireland today including boats, weapons, religious artefacts and even entire human remains have occurred in bogs. The most common agricultural use of bogs, particularly the blanket bogs of the west of Ireland, has been to provide year round grazing for cattle and sheep. This activity can be sustainable if stocking densities are kept to very low levels. Many bog plants were traditionally used in folk medicine, brewing and for food. Today new uses are emerging for bog plants such as biofilters. Because of the low nutrient levels characteristic of bogs many plants and animals have adapted to survive in such nutrient poor conditions. For example heathers such as Bell heather (*Erica cinerea*) and Ling heather (*Erica tetralix*) have adapted very well to the nutrient poor conditions of peat bogs, so much so that following the Chernobyl disaster in 1986 their scavenging capacity allowed them to uptake the caesium-137 radioactive isotope carried to Ireland on the prevailing winds which then accumulated in some heathers to such an extent that sheep grazing on these heathers had to be further grazed in more grassy lowland areas to allow the level of contamination in their bodies to reduce to a safe level before they could be slaughtered. The adaptation of certain plants to the bog habitat make them unique and any further loss of the habitat can only result in further losses of these species from the natural flora of Ireland.

The Connemara Bog Complex is characterized by areas of deeper peat surrounded by rocky granite outcrops, covered by heath vegetation. The deeper peat areas are often covered by lakes and river systems. A mosaic of different communities therefore exists. These include, hummock/hollow systems, inter-connecting pools, Atlantic blanket bog pools, flushes (nutrient rich pools), transition and quaking mires (areas where the water level is very close to the surface of the bog), freshwater marshes, lakeshore, lake and river systems. The key plant species of lowland blanket bog are Black Bog-rush (*Schoenus nigricans*), Purple Moor-grass (*Molinia*

caerulea), Cross-leaved Heath (*Erica tetralix* - Plate 23), Deergrass (*Scirpus cespitosus*), Common Cottongrass (*Eriophorum angustifolium*), Bog Asphodel (*Narthecium ossifragum*), White Beak-sedge (*Rhynchospora alba*) and Bog Moss (*Sphagnum*) species. In addition the Connemara bog complex contains a number of species that are considered rare in Ireland and are therefore afforded protection under the Flora (Protection) Order, 1999. Forked Spleenwort (*Asplenium septentrionale*), Parsley Fern (*Cryptogramma crispa*), Bog Hair-grass (*Deschampsia setacea*), Slender Cottongrass (*Eriophorum gracile*), Bog Orchid (*Hammarbya paludosa*), Slender Naiad (*Najas flexilis*), Heath Cudweed (*Omalotheca sylvatica*), Pillwort (*Pilularia globulifera*) and Pale Dog-violet (*Viola lactea*) all occur within the Connemara bog complex.



Plate 23. Cross-leaved Heath (*Erica tetralix*). (Photo: Steve Waldren)

The rare and threatened species, Dorset Heath (*Erica ciliaris*), Mackay's Heath (*Erica mackaiana*) and Green-winged Orchid (*Orchis morio*) also occurs within this site. All the above species are

listed in the Irish Red Data Book and Slender Naiad is listed on Annex II of the EU Habitats Directive. Although many of the species listed above occur in the areas of the bog closer to Roundstone (an area known as Roundstone bog) the importance of maintaining the integrity of the site as a whole is necessary as any drainage for roadwork's or peat cutting can impact on the bog as a whole, causing it to become drier and thus altering its species composition.

Peatlands are sensitive habitats that are easily affected by both natural and human factors. Natural processes that affect peatlands in Ireland include erosion and climate change. Human activities including peat cutting, burning and overgrazing can make these natural factors worse, threatening the biodiversity and often the very existence of peatlands. While hand-cutting of peat which is common in the areas surrounding Cill Chiaráin Bay is not too damaging, the introduction of so called "Sausage machines", which excavate large tracks of peat and alter the drainage characteristics of the site is particularly damaging. Research has shown that machine cutting decreases the height and biomass of the vegetation and rapidly reduces the invertebrate populations. Animals further up the food chain such as birds and mammals are directly affected as there is less food and poor cover for nesting.

Natural Heritage Areas – NHAs

The NHAs that occur in and around Cill Chiaráin Bay are summarised in Table 1.

Table 1. Natural Heritage Areas in and around Cill Chiaráin Bay.

NHA Code	Location	Terrain type
264	Duck Island	Small rocky Island
269	Geabhrog Island	Marine islets
314	Oilean na nGeabhrog (Illaungurraig)	v.small island/rocky shore, sea stack
1241	Carna Heath & Bog	Heath and bog
1261	Eagle Rock	Sea stacks
1318	St. Macdara's Island	Lowland dry grassland
1974	Inishmuskery	Small islet
1126	Ardmore Point Grassland	Lowland dry grassland
1302	Mason Island Machair	Machair
1306	Mweenish Island Machair	Machair
1266	Finish Island Machair	Machair
2075	Kinvarra Saltmarsh	Saltmarsh
2034	Connemara Bog Complex	Lowland Atlantic blanket bog

Carna Heath and Bog NHA is a mosaic of lowland blanket bog and heath habitat situated approximately 1.5 km east of Carna village along the Carna - Cill Chiaráin road in Connemara, Co. Galway. It lies near sea level (altitude 8 m) and is located entirely within the townland of Rusheenamanagh. The northern, western and eastern margins of the site are bounded by a track and a minor road while the southern boundary is marked by the edge of enclosed agricultural land. Carna Heath and Bog NHA is a site of considerable conservation significance. It comprises a mosaic of heath, lake, pools and streams and supports a good diversity of blanket bog microhabitats, including hummock/hollow complexes, flushes and regenerating cutover.

St. Macdara's Island is a small, uninhabited, marine island situated about 3 km south-west of Mace Head. The island is of interest for its colonies of seabirds, which include Great Black-backed Gull (40 pairs in 1970), Lesser Black-backed Gull (50 pairs in 1970), Herring Gull (200 pairs in 1970) and Common Gull (2 pairs in 1970). Unspecified numbers of Arctic Tern and Little Tern have also been reported from the island.

Ardmore Point NHA is designated because of the occurrence of good example of lowland hay meadows, which are an Annex I habitat.

The Connemara Bog Complex NHA is by far the largest NHA in the region and the site is also designated as an SAC. In summary, this NHA encompasses a large area of relatively undamaged lowland Atlantic blanket bog of high conservation significance to Ireland as well as Europe. The site has nine protected and threatened Irish Red Data Book plant species. The site is internationally important for Cormorants and nationally important for Greenland White-fronted Geese and contains nesting sites for Golden Plover. The site supports several bird species listed on Annex I of the EU Birds Directive and a range of plant and animal species listed on Annex II of the EU Habitats Directive.

Other Noteworthy and Protected Species of Flora and Fauna

Mammals

Cill Chiaráin Bay is also home to the European Otter. The European Otter has all but disappeared from mainland Europe, and otters are commonly seen in many parts of Cill Chiaráin Bay, indicating their continued presence in reasonable numbers. Otter has also been recorded as occurring in the Connemara Bog Complex.

Grey Seal is another species that has been recorded from parts of Cill Chiaráin Bay, although not in large numbers. Grey Seal have been recorded from Seal Rock, Redflag Island and Eagle Rock. Cill Chiaráin Bay is also used by a small population of breeding Common Seals and these can be seen in Cill Chiaráin Bay itself as far north as Rosmuc. These species are listed under the Habitats Directive as species whose continued abundance and range is endangered. Bottlenose dolphins are known to visit the bay occasionally, especially during the spring months. These have the same status as both Grey and Common Seal and are listed under the Habitats Directive.

Irish Hare, a mammal listed in the Red Data Book, occurs in moderate numbers on the site.

Amphibians

The Common Frog breeds on the site. It is listed in the Irish Red Data Book as internationally important and on Annex V of the EU Habitats Directive.

Birds

Cill Chiaráin Bay is also known for its populations of seabirds and over wintering geese. There are nine tern-nesting sites within Cill Chiaráin Bay cSAC. These include Sandwich Terns, Common Terns, Arctic Terns and Little Terns all of which are listed as priority species in the Birds Directive.

The Barnacle Goose is also a priority species and occurs on Inishmuskerry Island and Birmore Island during the winter months. It is thought very likely that Barnacle Geese over winter on other islands in Cill Chiaráin Bay also. Eagle Rock is known for its population of Black Guillemot. Herring Gull, Great Black-backed Gull and Black-headed Gull are all known to occur widely within Cill Chiaráin Bay and adjacent sea areas. . Significant numbers of Mute Swans also occur in the upper reaches of Cill Chiaráin Bay and close to the tidal waters in Rosmuc Bay. Their presences is mainly seasonal but Mute Swans have been recorded year round.

A number of sites within Cill Chiaráin Bay have been visited as part of the Irish Wetland Birds Surveys (I-WeBS) - Ballynakill Lough (Gorumna Island); Birmore Island; Camus Bay; Inishmuskerry; and Loughaunavneen/Loch Tanaí (Camus). Whilst these sites are not considered to be either nationally or internationally important they are locally important; with species such as Great Northern Diver, Red-Breasted Merganser, Wigeon, Mute Swan, and Barnacle Geeses occurring.

Fish

The Atlantic Salmon which is recorded from Cill Chiaráin Bay and the Screeb and Invermore Fisheries is a listed species under Annex II of the Habitats Directive in so far that this relates only to the fresh water life history of the salmon. Arctic Charr occur in a number of lakes within the Cill Chiaráin Bay area: Ballynahinch Lake, Glenicmurrin Lough and Lough Shindilla. The species has also been reported from Lough Oorid and Lough Glendollagh in the past, but has not been recorded from these lakes in recent years. Arctic Charr is listed in the Irish Red Data Book as being threatened.

Flora

Daboecia cantabrica (St. Dabeoc's heath or Fraoch gallda) is frequent in Connemara including the Cill Chiaráin Bay area but is unknown elsewhere in Ireland. *Lobelia dortmanna* (water lobelia – Plate 24) is an aquatic plant which occurs on lake margins. It is frequent in the extreme west of Ireland but rare elsewhere. It has been recorded from the area beside where the Invermore river enters the bay on the northern shore of Cill Chiaráin Bay.



Plate 24. Water Lobelia (*Lobelia dortmanna*). (Photo: Steve Waldren)

The Pipewort *Eriocaulon aquaticum* (Plate 25) occurs in bog pools and lakes on the west coast and is recorded from where the Invermore river enters the bay on the northern shore. This is considered to be a very localized species.



Plate 25. Pipewort (*Eriocaulon aquaticum*). (Photo: Steve Waldren)

Folklore & Traditions

Folklore and traditions are often specific to a particular area rather than the country as a whole and provide us with an insight into the livelihoods and beliefs that form part of our traditional past. These traditions are intrinsically linked to a way of life that once existed and provide us with an understanding of both the livelihoods of the communities and also the natural history of an area. The following section documents some of these traditions that are unique to Chill Chiaráin Bay and its hinterland. Sadly, many of these stories are becoming lost as they were never recorded and were simply passed down from generation to generation. Research and documentation of such information should be a priority before it is lost from our archives for future generations.

Introduction

“Tá an dá bhealach ann - An Daingean agus An Ceann”

The above saying pertains to the time that sailboats Huicéirí, Gleoteoga, Púcáin were the workhorses and sometimes the only lifeline for the population around Cuan Chill Chiaráin. There are two ways to sail, go to An Daingean or around Ceann Gúlam. Sailing through An Daingean meant navigating through narrow, shallow and sheltered inlets. The wide-open deep seas around Ceann Gúlam (with its' 19th century signal tower) offered more room to manoeuvre, but wilder conditions. The bay was rich with fish but life was not easy as people worked and toiled on land and on sea. This was the only way to sustain an existence, work the small holdings, growing potatoes, rearing cattle and sheep and supplementing it with making kelp, lobster fishing and so on. One other important staple of the diet was that of the salted wrasse, a sweet tasting fish which provided the people with a source of nutrition during the winter months.

Nearly all of the islands were inhabited more for the reason of the shortage of land than say the romantic notions of living on islands that abounds in these days of plenty. Life was tough on these islands. It was hard enough to eke out a living on the mainland but to live on an island where things like going to the shop or fetching the doctor or cutting and saving turf and bringing the yearly supply to the island, took up a lot of precious time. Island life also had the added work of moving cattle in and out to the mainland. It was not good for cattle to always be year round in the same place so at times during the year they would have to be put out on the mountain or slanú (replenishing) as this was called. The onset of bad weather must have had a claustrophobic effect on the people.

The population around Cuan Chill Chiaráin lived and still live within a short distance of the coast. There was constant movement in the bay, people going for example from the island of Fínis to

Doire Iorrais to cut and harvest sally rods to make their lobster pots. Poitín (moonshine) would be another reason to make trips, particularly to and from the islands around Garomna. All of this movement would enrich the lore and the different songs, stories and trades. The network extended from the islands of Ros Muc to the islands off Leitir Calaidh then to the outer reaches of the bay and the islands around Garomna, and to the north islands off the Carna coast. This is what they left us they had nothing of material wealth to pass on but they made up for it with the wealth of language that they transformed into an art form. They have left us with beautiful songs ranging from the sad to the risqué and the flamenco style sean nós dance form. They have left us with trades like boatbuilding and also with a unique and great animal that is the Capaillín Chonamara (Connemara Pony).

The environment that surrounds us must have a bearing on our being. It moulds us and it conspires to make us what we are. The barren land and the unforgiving Atlantic Ocean must leave a print on the mind of people living at its mercy. This would be more so in the past than now as today we are entering a world where we are more removed from nature. It is hard to generalise but one thing about the people that lived and still live around Cuan Chill Chiaráin that their most common attribute would be their love of beauty for boats, song or dance. It is as if they have lived in an art gallery and seen the sculptures and paintings, visited the theatre and heard the music. They have been witnesses to the power of strength, replenishment and beauty.

Placenames

Some of placenames in and around Cuan Chill Chiaráin derive from and are a corruption of old Gaeilge. Finding the meaning is a specialised subject although some of them are self explanatory. The following is a sample of the derivation of some placenames within the study area:

An Ghearóg - This is found near Inis Treabhair named after the tern. The tern arrives from foreign lands in and around late March and builds it's nest after the last big spring tide until the autumn. This spring tide is called Rabharta mór na n-éan (The Birds' Spring Tide).

Carraig a Meachain - Rock of Taproot, is on the outer edges of Cuan Cill Chiaráin.

Carraig an Chumair - The rock of the steep sided channel is close to the inlet at Flannery Bridge.

Carraig Chuan na bPortán - The rock of the bay of crabs is between Finís and Maínis.

Carraig Iolar - Eagle Rock is found at the entrance to Cuan Chill Chiaráin. There is a deep channel between it and Ceann Golam. Creathnach (Dulse - edible seaweed) is to be found on the island which has a natural harbour on the north side.

Céibh an Ghairfean (Plate 12)- This pier was one of the most important piers on Cuan Chill Chiaráin. It was only after the Second World War, when the rationing was over, that the use of

the sailboat as a workboat began to wane. It was the emergence of the lorry that spelled the end of the sailboat as a familiar sight on the Connemara coast. All the major shops and stores were close to the sea and piers and Ceibh an Ghairfean was no exception. It was used by the Conroy family who owned a drapery, a grocery and hardware shop. They hired local seamen to bring the likes of flour, oil, sugar, tea, roofing material etc., from Galway with the beautiful Casey-built 40 foot Huicéara St Patrick. Gairfean means 'rough ground'.

Céibh an tSrutháin Bhuí - The pier of the yellow stream is known for a very famous song called Cuairt an tSrutháin Bhuí (The Mansion of Sruthán Buí). It seems that a file or poet by the name of Colm De Bháilís took shelter from the rain in a decrepit shack and passed the time away composing a song. Then he passed the song off to another poet called Micil Dhiarmaid a' Clocharta. Micil Dhiarmada made his contribution to the song. Then Micil Dhiarmada brought the song to another poet Seán Bacach Ó Guairim and Seán Bacach added his bit in which he prophesised that Droichead an Daingin (An Daingean had a wooden bridge that could be opened to let the sailboats pass through) would be closed and they would have to have only Ceann Gúlam to go to Galway. Here one gets three compositions of the same song by the three eminent poets of their day.

Céibh Chill Chiaráin - Céibh Áill na Cuaiche (the cuckoo's perch) and Céibh na Draighní (Draighean meaning Blackthorn tree), were the original names associated with this pier, one of the most sheltered deep piers on the Connemara coast. There was a mail boat from Galway coming to Céibh Chill Chiaráin in the late 1800s. Turf was brought to Oileáin Arann (Aran Islands) from here and it also had a kelp- weighing station. During the Second World War and late forties there was a huge amount of scallops brought ashore on this pier which boosted the local economy. Arramara Teo a seaweed based company set up its business near the pier mainly because of the suitability of the pier.

Crompán Na Muice - This is found on Inis Bearachain. Crompán means creek and muice could mean a hill or a protrusion, for example, a sand reef is called muic ghainnimh.

Leic an Ruathair - The Rock of the Onrush is on the south side of Bior Mór Island.

Stopóg na hEascaine - Stopóg is a rocky area on the seafloor with oarweed growing and has usually plenty of crevices for fish to hide in and to ambush other fish for their meal. Eascainn is an eel that is fond of the stopóg. Stopóg na hEascaine is situated between Fínis and Inis Mhúscraí.

Maritime Traditions

The Boat Builders

There is a riddle that is often asked by people around these shores; what is the difference between a Boatwright and a cooper? And the answer is the cooper makes vessels to keep water in and the Boatwright make vessels to keep the water out.

The boat builders or boatwright who supplied the fishermen and sailors around Cuan Chill Chiaráin were the most important, and had most responsibility, of all of the trades. They had the fate of many lives in their hands if their workmanship was not up to scratch; and to their credit it has never been reported of a boat that caused any loss of life due to bad workmanship. Indeed it's the high standard that the boats were built to that is responsible for their longevity and has in turn given us the honour of witnessing them in the present day. The high regard that they were held in is evidenced by verses in songs of praise. The names of boatwrights include Na Cathasaigh, Na Ráinne, Muintír Ghuairim, Na Clochachtaigh, Ned Ó Béartha, Seán Ó Laighe, Muintir Uaithnín, Colm Trayers, Muintír Mhaoilchiaráin and Seán Ó Nia. The Flahertys are the names most known to us today that lived along the coast of Cuan Chill Chiaráin. The boats they built were in the days gone were **Báid Iomartha, Púcáin, Gleoiteóga, Leath Bháid** and an **Húicéara** or **Bád Mór** then known as the **Nobby** or **Zulu**. There were canvas currachs along the coast to the east of **Ceann Gúlam** and to the west of Roundstone, but because of the shelter provided for and the features of the landscape, wooden boats were more prevalent in and around **Cuan Chill Chiarain**.

The Bád Iomartha – This was the smallest of the boats until the arrival of the wooden **Currach** in the early 1900s. It was a row boat with a deep keel almost like a sailboat. It was used for cutting seaweed to fertilise the land and could measure up to 22 feet.

Pucán - The next one up and was the cheaper of the sail boats to rig because of the design of the sail. The single-mast boat used only two sails, the mainsail and a jib, and along with the gleoiteóg was used for lobster fishing.

Gleoiteóg - The Gleoiteóg and Pucán could be the same length, 23 to 27 feet, but the difference between them would be that the Gleoiteóg had three sails and was easier to handle, but it meant having to purchase more blocks and halyards adding expense to rigging the boat.

Leath-Bhád - The leath-Bhád is approximately between 27 and 32 feet in length and had the same style of sail as the Gleoiteóg and the Bád Mór. This boat was used for the dredging of scallops, but mainly it was used for transporting turf to the Aran Islands.

Huicéara or **Bád Mór** These boats had basically three uses; one to bring cargos of goods and merchandise from Galway to shops along the Bay and also for the turf trade with the Aran Islands and Co. Clare. It also brought seaweed to farmers in Co Clare for the farmer's to use on the land. The length of these boats varied between 33 feet and 44 feet.

Nobbies and Zulus The plans for these boats were bought to the area by **The Congested Districts Board** as a decked vessel making it safer for more extensive work in the fishing of herring and mackerel which did entail night time fishing. The Nobbie, which was around 47 feet, had an added feature - a sail was called a mizen which kept the boat upwind for shooting and hauling in the nets.

The Currach The curach is the latest evolution in the case of wooden boats. It was roughly modelled on the canvas Currach and became most popular for the easy way it could be launched and the flexibility in manoeuvring it in close quarters. It took over the role of the Bád Iomartha which was seen to be clumsier than the curach.

Box 4. Some Maritime Superstitions

The red-haired woman is not the greatest friend of the fisherman or sailor. She is supposed to bring bad luck and lower the catch. The true believers in this superstition would not go out to sea if they would meet the red-haired woman.

The fox (another red-haired fellow) is not high on the list of morning sightings.

There was a fear of the hare; he, by all accounts, was the guiltiest of animals in using his supernatural powers against the fisherman and sailor.

Whistling is forbidden or the talking about any animals on board ship.

If you want to stave off the evil eye as you sail carelessly across the seas all you need is a stick or a piece of the mountain ash or rowan tree. This simple preventive action has saved many a seaman especially against the curse of a scorned widow.

If you lose or drop anything overboard for example your cap, it is bad luck to bring it back on board. If the sea want or needs something then do not deny her or she will come looking for a soul next time.

On leaving the harbour always turn the boat clockwise with the sun. This is a mark of respect to God who created the sun.

Counting fish is forbidden until you come ashore. They say that the Boatwright knew if a boat would be lucky or not, by the way that the first shaving of wood cut by the adze landed.

May Day is not the best day to start the fishing season. If you have started the season already there is no harm but avoid Mayday if you are starting. Never start anything on a Thursday on land or sea.

It's not advisable to start sticking or stabbing a knife into the mast of a sailing ship. You are opening a Pandora's Box of evil spirits just with that action alone.'

Razor Clams

The ebb tide recedes $\frac{3}{4}$ of a mile on the **Roisín na Mainiach** side of **Fínis** during a spring tide. These **tránna móra** (Big Strands) usually occur during late Autumn and Spring time. There is a great variety of sea life to be found in this environment but the most popular for the local people are shellfish such as periwinkles, scallops, limpets, clams and razor clams. The days that most people of the local area tend to visit the strand to gather these delicious shellfish are Ash Wednesday and Good Friday. The system that the Church has in choosing Easter Sunday is this; it's the first Sunday after the first full moon after the spring equinox. This then in turn means that there are always two tides on Good Friday which helps your chances of landing delicious, fresh fish. The tradition of visiting the strand on these days is alive and well especially in the case of Good Friday where people thought that to get live fish gave this very solemn occasion more reverence.

To gather limpets all you need is a sharp instrument like a trowel or a strong knife to pry the limpets from the rock and drop them into a bucket. The best limpets to gather are the ones covered with seaweed as the ones out in the open tend to be more rubbery and tough to eat

because they have no protection from the sun. The limpet, according to the folklore of the area, has the cleanest diet and, as such, is purer than other shellfish.

What fish is the sailor most afraid of?

The limpet. If he sees the limpet he is too close to the rocks.

To gather periwinkles all you need is a bucket and a strong back. The slate blue coloured shell of the periwinkle is found under seaweed (most likely decaying seaweed) where it munches and devours away the seaweed like a snail eats cabbage. The most common meal people used to have on Good Friday was the combination of limpet and periwinkle which was made into soup.

Box 5. Limpet and Periwinkle Soup

To prepare, you bring them both to the boil and just when the white frothy foam appears, take them off the boil and strain the stock into a container. The limpet is easy to prepare as it falls out of the shell automatically. But to get the periwinkle ready is tedious work where one begins by removing the soft flesh of the periwinkle from the shell. A sewing needle is required to remove the lannach or the protective shield it has at the opening of the shell. Next the flesh is extracted in a spirally movement. After the last one is done you add the limpets and periwinkles back with the stock, add onions, carrots, parsnips and flour to thicken it up and then you have a meal to die for.

The biggest change that has come about in harvesting shellfish is in the way that the razor clam is caught. Before this people tended to go down to the strand in daytime with their pitchforks, look for the distinctive markings and dig down, like a 'smash and grab' approach. This is hard work and it works better if there are two people, one digging and one catching them, before they disappear into the sand again. This was the way it was done for generations, clusters of people down at the ocean's edge trying to outmanoeuvre a mollusc surviving just by instinct. But around thirty years ago things changed. It is said that a man by the name of Folan from the townland of Caladh Mhaínse discovered that the razor clam rose out of the sand depths on moonlit nights to bask in the soft glow of the moon. In what's both eerie and magical is the sight of hundreds of razor clams rising out of the sand. It is as if that they are showing off to the moon or maybe they are more practical and know that's it is safer at night time to reveal themselves. To catch them all you need is a flashlight and to keep quiet because the razor clam is very sensitive to sound or vibrations. Preferably two people are better than one. The first person holding and shining the flashlight and the other grabbing them with precision for the razor clam will not give you a second chance if you don't grab him correctly. He will disappear into the sandy depths in a fraction of a second. The razor clam can be eaten raw as well as cooked. Indeed it does not need much cooking as with any food that is fresh it is beautiful just on its own cooked on top of a stove. This way of gathering razor clam means that the razor clam will never be over fished and the treat of a razor clam dinner, although rare, makes it more special.

Trading with Guernsey

In the brilliant book by Seán Mac Giollarnáth *Annála Beaga as Iorras Aithneach* there is a lot of information on the trading with Guernsey. Mac Giollarnáth was a District Court Judge who collected and gathered stories, anecdotes of local history from the finest seanchaoi of the area. This was more of a labour of love for MacGiollarnáth but it has turned out to be a most important book and is responsible for keeping a link alive with the past that would definitely be forgotten. It has recorded practices and events that otherwise may have been doubted, e.g. the trading with Guernsey.

The main reason that there was trading at all is that the powers that be in Guernsey did not charge any excise tax on certain goods, making it attractive for smugglers. They brought tobacco, alcohol and clothes (actually the Gaelic name for sweater is *Geansaí* a derivative of the word Guernsey) from Guernsey and the trip would last on average two weeks. The clothes that they bought back were fancy clothes and were more for the gentry; the likes of the Martin family, the landlords of the Barony of Balinahinch. The style that they bought back was of long coats and tall hats for the men called Carolines and linen hats with lace fringes for the women. There were a lot of smugglers in the area and the various nooks and crannies in Cuan Chill Chiaráin made capturing the smugglers by the authorities a formidable challenge. Indeed the authorities, in this case the British navy, tried and with the use of the cutter, a small fast sail ship, which would lay in wait and try and ambush the sloops (one mast ship with fore and aft sails) used by the smugglers. The smugglers had a system to try and circumvent the efforts of the British navy to catch them. They had accomplices ashore who, when the coast was clear, would light fires to give signal that the navy was not in the area. This was called *tine chomhartha* (fire sign). There is a place in **Leitir Móir** that is still called Brandy Harbour (on the north shore, roughly 11 mile from the causeway) and the name goes back to the time when the importers were being chased by a cutter. The cutter was designed for the chase and was catching up with the heavily-laden sloop. The sloop made its way through the archipelago of islands that lies close to **Leitir Móir**, took down the mast and hid as the cutter sailed up the bay. They offloaded the cargo which consisted of brandy, hence this unassuming place being given the name of Brandy Harbour.

Folk Tales

A Ghostly Visit on Inis Mhúscraí

During the First World War there was a good price for kelp. On the outer edges of Cuan Chill Chiaráin on the northern side is an island called Inis Mhúscraí or known more commonly by its nickname **Spike**. The seabed that surrounds Inis Mhúscraí is most suitable for strapweed or oarweed which grows in abundance around this island of 18 acres. On an ebb tide and when the sea recedes the whole sea floor in this vicinity is full of crevices and recesses. At this time there

used to be a flotilla of boats such as Baid Iomartha and Púcáin toiling away cutting the seaweed with a croisín (a long pole with a sharp sickle like a hook). To make life easier for themselves people stayed overnight on Inis Mhúscraí. They used to bring some hens with them to this island to get extra sustenance from the eggs for the hard laborious work they were involved in. In most cases there would be two working per boat and usually one would bring the seaweed ashore onto the mainland whilst the other would have stayed on Inis Mhúscraí. At this time there was only one house on the island and the only inhabitant was a woman who lived alone on the island through the year. Máire Choilmín or Máire Mac Donnchadha had no boat to leave the island. When she needed assistance or wanted to go to the mainland she would hoist a piece of cloth above a certain rock to signal to come and fetch her. The name of that rock is still called Aill na Brataí or the rock of the flag.



Plate 26. A sunken house on Inis Mhúscraí. (Photo: Michael Gibbons)

A man by the name of Padhraic Pháidín from Roisín Na Mainiach was cutting seaweed to make kelp around the island of **Inis Mhúscraí**. He was a brother of the well known seanchaí (Custodian of Tradition, Historian and Reciter of Ancient Lore) Micilín Pháidín Mac Donnachda. Padhraic decided to stay on the island this night and he was offered a seat or a chair by Máire in her humble abode. The house that she lived in was built into the sand so that the house was submerged halfway into the white fine sand which made the house very insulated. The house had only one door and had no latch but a block of wood to keep the door shut on windy occasions. The whole house consisted of one room with a fireplace and a table. Underneath the table Máire

would have kept her hens. So as night fell Pádhraic bade farewell to his fellow boatman and made his way to Máire's house. Máire was on a chair on one side of the fire and Pádhraic on the other. Both of them, Pádhraic and Máire, came from families who were most respected for their knowledge and were renowned for being seanchaithe. One can only imagine the level of conversation these two people delved into as they probably chatted away about the last remnants of the Gaelic way of life. For what we know from Padhraic is that they shared the pipe while they chatted. As night fell Máire fell into a deep sleep on the chair by the fire which in itself was not unusual. Suddenly Padhraic's senses were drawn to a whooshing sound making it's way towards the door. This sound, he used to say, was that of a person that his clothes and shoes were wet. Pádhraic thought that someone else decided to stay the night on the island and since that there were no oilskins, wellingtons or any sort of waterproof gear, this sound was not unusual. As the sound came closer to the door, a hand entered through a gap between the door and the frame, grabbed the block of wood that was keeping the door closed, pushed it back, opened the door and entered. A big, tall man came into the house; Pádhraic, who had a fair idea of all the people who would be in the area, did not recognise this man. The man came down to the fire and sat on a chair in the middle between Pádhraic and Máire. He did not speak and he acted like this was not the first time he had made this incursion. Pádhraic at this time was in a state of utter paralysis and he was looking across at Máire hoping that she would wake up but to Pádhraic she seemed to be in a trance. At some point during the night the fire lit up as is usual when some remnants of wood or turf catches fire and it glows lighting up the whole house and when this happened the dreancaidí mara (sandhoppers) came out. Then the hens which were under the table came down to the fire and started picking and eating the dreancaidí mara. When a hen would get too close to the fire the man would shoo them away with his hand. The man made no attempt to speak and it seemed that Pádhraic was invisible to him. As the day was about to break the man stood up, opened the door, put the wood block back as he found it and left.

Máire arose from her deep sleep and asked Pádhraic for a smoke of his pipe. Padhraic told her of the events of the night and she said that as long as she was living on the island she had never had such an eerie episode. The night events had a profound effect on Pádhraic and he left the house and went down to the shore and signalled to the first boat to fetch him and bring him onto the mainland. Pádhraic was never to go to sea again and never make kelp again. As soon as he came ashore he packed his bag and left the area and went working for farmers in east Galway. Pádhraic stayed in east Galway all his working life and returned home and lived with his nephews and nieces at the end of his life.

The Last Request of the Maínis Woman

A sean nós song that has become most popular around the Conamara area in the last fifty years has been the song "Amhrán Mhaínse". It's the longing and wish of a woman from Maínis

(Mweenish) who was married on the other side of Cuan Chill Chiaráin in a place called Leitir Calaidh to be buried amongst her own people in the graveyard in Maínis. The song is now sung at funerals all over Conamara where they replace the name of Maínis' graveyard with the name of the graveyard that their deceased is being buried in. The melancholy strain of the air of the song, in itself, is haunting.

Box 6. Amhrán Mhaínse

Dá nbeinn trí léig i bhfarraige nó ar shléibhte i bhfad ó thír
Is gan aon neach beo mo thimpeall ach an rathneach ghlas is fraoch
An sneachta bheith á shéideadh ó thuaidh is ó dheas agus an ghaoth dhá fhuadach dhíom
Ach me a bheith ag comhrá le mo Taimín Bán is níorbh fhada uaim an oíche
Is a Mhuire dhílis ceard a dhéanfas mé leis an teach seo is a bhfuil ann
Is a Mhuire dhílis céard a dhéanfas mé tá an gheimhreadh seo ag tíocht fuar
Nach óg a stór a d'ímigh tú le linn na huairé bhreá
Nuair a thosódh an chuach ag seinm ceoil is gach duilliúr glas ag fás
Is dá mbeadh mo chlann sa mbaile agam an oíche a bhfaighinnse bás
Ó chaoineoidís go fiúntach mé trí oíche is trí lá
Bheadh na piopaí fada cailce acu agus na ceaigeannaí is iad lán
Is thiúrfadh Páidín Mór go Maínis mé nó is garbh a bheadh an Lá
Is gearraigí amach mo chónra dhom as fíorscoth gheal na glár
Is má tá Seán Ó hEidhin i Maínis biodh sí déanta óna dhá láimh
Bíodh mo ribín is mo chaipín déanta is iad go ródheas ar mo cheann
Is triúr ban óg o shliabh isteach le mé chaoineadh os cionn cláir*
Is ag dul siar le hInse Ghainnimh dhom beidh an fharraige ag éirí ard
Is ná tugaigí go leiter Caladh mé mar ní ann atá mo dhream
Ach tugaigí siar go Maínis mé san áit a gcaoinfear mé as ard
Beidh soilse ar na duachanna is ní bheidh aon uaigneas orm ann.

*The fourth verse can be found in a book of songs that was published in 1906 by Micheál Ó Tiománaidhe called Amhráin Ghaeilge an Iarthair which he collected in North West Mayo. (Reprinted by Cló Iar-Chonnachta).

In the first verse she says that if she was three leagues out to sea, or on faraway hills, with no earthly being, or with no shelter in a blizzard, in all these inhospitable conditions if she just could talk with her Taimín Bán (fair haired Tom) she would not feel the night pass by.

The song goes on to express her wish that Páidín Mór (Big Pat) would bring her remains to Maínis in his sailboat and that her coffin be made of the finest pale wood, and if he is still living there, that the coffin be made by the hands of Seán Ó hEidhin of Maínis.

In the final verse she is imagining her final journey across Cuan Chill Chiaráin towards her final resting place in Maínis. At Inse Ghainnimh, an island off Leiter Caladh, there will be a big swell and her wish is not to be brought there as her people are not there. Instead she wishes to be brought to Maínis in a place that the resounding cry of the people will be heard. There will be lights on sand hills and hence she will not feel lonely there.

Some of the Signs to Weather Forecasting

These are some of the signs people looked for when they were trying to forecast the weather around Cuan Chill Chiaráin long ago. The people had no other way of predicting the weather except the knowledge that was handed down to them by their forefathers. Here are just some of them:

- When there is frost on the way the stars are jumping in the sky and are very bright.
- When the swallows fly close to the ground the good weather is on the way.
- When the Milky Way is bright in the night sky it's a sign of good weather.
- When the smoke rises straight out of the chimney that means bad weather is on the way.
- When the mouth of the moon is under, rain is coming (when the moons crescent is turning downwards).
- When a dog eats grass, rain is on the way.
- When the hens start grooming themselves, the bad weather is just around the corner.
- When the light of the lighthouse is brighter than usual bad weather is on the way.
- When the rocks out to sea make a reflection good weather is forecast.
- When the cat turns his back to the fire there is going to be stormy weather.

And then there is Na Breandáin, the mountains of Kerry. On certain days these mountains can be seen in the vicinity surrounding Cuan Chill Chiaráin. There are weather signs relating to them, but are contradicting opinions as to their meaning. Some people say that it's a sign of good weather; some say it's a sign of bad weather. Then some say it's a sign of a change in the weather. There is a man whose house is on a hillock and has a prime view of Na Breandáin. When they are in view he says he has the right way to ascertain all the knowledge from these sporadic occurrences. "It's the moon" he says. "It's all about the phases of the moon." He goes to some lengths to explain: if you see Na Breandáin between the new moon phase and the first quarter there is going to be change in the weather; if it's between the first phase and full moon the weather will improve or between the full moon phase and the last quarter but if you see Na Breandáin between the last quarter and the next new moon, hold on to your hat!

The Lynch's of Bearna

There was a landlord in Bearna by the name of Lynch who owned a vast amount of land on both sides of Cuan Chill Chiaráin which included Leitir Mealláin and Coill Sáile in Cill Chiaráin and he

had two sons. He decided to divide between his sons all of his land and all of his money. With all of his wisdom and what he deemed to be fair he chose to bequeath all of his lands to one of his sons and all of his money to the other. Time passed on and the father fell on hard times and he became penniless. In this, his hour of need, he approached the son to whom he had given the land. "You only left me the land, why don't you ask the son that you left the money to" was the answer that was given. When he approached the second son he was given more or less the same answer. It is said that he cursed his own sons that they would only have one son that would live. For generations afterwards it is said that for these particular Lynch's only one son survived.

People and Livelihoods

This section examines the present day human activities and livelihoods that make the area unique in terms of the sustainability of livelihoods, and aims to explore how these activities can be retained for future generations in the context of a more contemporary way of life.

The Cill Chiaráin Bay area, as well as the whole of County Galway fall within what is known as an Objective 1 region under the European Support Framework. This framework is designed to aid the development of regions where the Gross Domestic Product (GDP) has been less than 75% of the EU average. The Structural Funds are provided to help such regions whose development is lagging behind, in order to reduce the differences between regions and create a better economic and social balance within and between Member States of the EU. Within an Objective 1 region the three priorities for assistance under Structural and Cohesion funds are as follows:

- Increasing the competitiveness of regional economies, in order to create sustainable jobs;
- Strengthening social cohesion and employment by upgrading human resources; and
- Promoting urban and rural development in the context of a balanced European territory.

This funding is being delivered as part of the National Development Plan, 2000-2006. Much of the funding available from this fund is administered through regional and state agencies such as Údarás na Gaeltachta, Teagasc, Bord Iascaigh Mhara (BIM) and FÁS.

Population

The seven District Electoral Divisions -DEDs (Box 7) - that surround Cill Chiaráin bay are: Skannive, Owengowla, Turlough, Crumpaun, Gorumna and Lettermore (Figure 2). Population statistics used for this report are taken from these seven District Electoral Divisions and data from the 2002 Census of Ireland.

Box 7. District Electoral Divisions

District Electoral Divisions originated as subdivisions of Poor Law Unions. In this system a number of townlands were grouped together, primarily to elect members to a Poor Law Board of Guardians and the boundaries of these divisions were drawn up by a Poor Law Boundary Commission. The initial intention was to group lands with an approximately equal rateable value and this has resulted in many cases of boundaries that bear little relationship to natural or even townland boundaries. District Electoral Divisions are still used in Ireland today for the purpose of compiling statistics on the general demographics of an area and for electing members to County Councils and Urban and Rural District Councils.

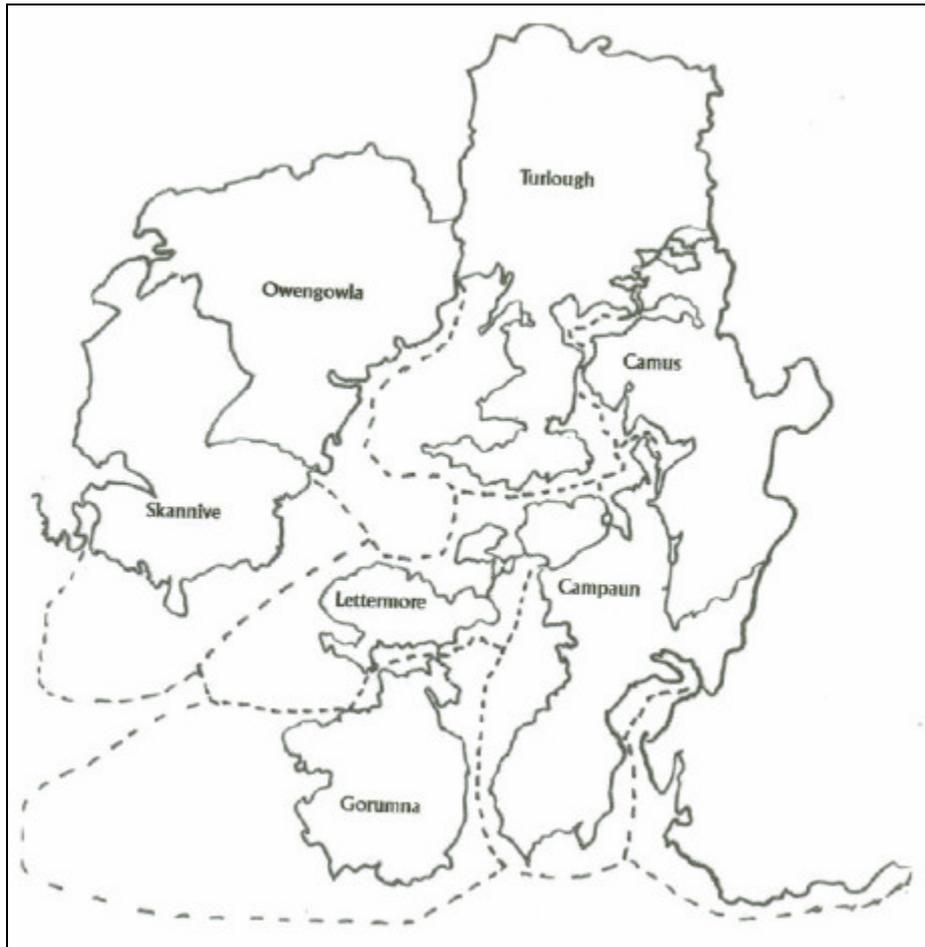


Figure 2. Boundaries of the District Electoral Divisions adjoining Cill Chiaráin Bay.

Within the period of 1996 to 2002, the years of the two most recent census audits, the area of Cill Chiaráin Bay and its seven DEDs showed no significant change in population (Table 2).

Table 2. 2002 population in District Electoral Divisions (DEDs) around Cill Chiaráin Bay, and change since 1996. (Source: CSO).

DED	Population 2002	% Change since 1996
Skannive	648	-2.8
Owengowla	341	+2.0
Turlough	477	-12
Crumpaun	2,266	+4.6
Camus	388	-7.2
Gorumna	1,290	-2.3
Lettermore	812	0
TOTAL	6,222	-0.3

In 1996, the population of the area was recorded as 6,239, while the 2002 census recorded a population of 6,222. This compares with a significant increase in the population of the rest of County Galway, especially in areas surrounding the main urban centres and also in particular

parts of Connemara, which are most notable in a zone extending from Oughterard to Roundstone in north Connemara. The pattern of population change in Galway County shows an increasing shift towards urban centres. Recurrent factors cited in research indicate that rural depopulation is caused by lack of employment, lack of access to services and the movement of the population, particularly the young to urban areas.

Employment

A recent study by Teagasc which examined resources in the Gorumna area of Cill Chiaráin Bay indicated that for household heads at work in off-farm employment a wide range of occupations were represented but in general they tended towards unskilled jobs or state assisted schemes. Spouses in the main had more skilled employments. Commuting more than 30 miles to work was not unusual, especially for heads of households. The study went on to further state that only a minority of households derived an income from the unique resources of the community such as landscape, the sea or the Irish language. The contribution of tourism or language related activities either in employment or income was very small. Sea fishing, especially salmon, was an income source in about one-fifth of households.

The seven DEDs of Cill Chiaráin Bay all show relatively high rates of unemployment; with an average unemployment rate in 2002 of 23%. Compounding the high unemployment rate is the large number of people with low skills levels and qualifications, outdated skills or only limited work experience. A number of studies such as the case studies of Horizon (disadvantaged) and Integra Projects in Gaeltacht areas have highlighted the reasons for low unemployment. In general, these studies have indicated that issues such as remoteness, diseconomies of scale, the decline in the agricultural sector and globalisation of industrial processes are the main factors in the high unemployment of rural Gaeltacht communities. Rural social exclusion is also highlighted as a factor in high unemployment. However, rural social exclusion often lies hidden, disguised and compounded by de-population, unemployment, poor infrastructure (especially transport), and inadequate and declining access to services.

Farming

The smallest farms in County Galway are situated in the southwest Connemara Local Electoral Area. This is an area of peatland, poor soils and historically mixed, subsistence farming. The physical factors of this area have never been favourable to farming as a viable livelihood.

In coastal districts, such as those surrounding Cill Chiaráin Bay, man has been drawing shelly sand and seaweed from the shore and spreading it on fields to improve the fertility and drainage of the soils since at least the 12th century. It was only this practice that made farming possible along much of the western and southern fringe of the country. In many areas the sand was first

used as bedding for cattle, where after it had absorbed large quantities of dung it was spread on the fields. Although this practice has largely disappeared today the improved soils are still in evidence throughout much of the Cill Chiaráin Bay area. Despite such labour intensive efforts to improve soils over a number of centuries the area is still typified by poor agricultural land, which has never provided for more than subsistence farming throughout much of the area and it is unlikely that this situation will change significantly in the future.

Box 8. Farming in the 1890s – A Snapshot

1892 Report of the Congested Districts Board for Ireland by Major Robert Rutledge-Fair, inspector for the Carna region.

'In the Islands of Mweenish, Finish and Mason, where the soil is sandy, potatoes are planted in February. Seaweed is the chief manure, and better-off people mix it with farm-yard manure. Potatoes followed by oats are the only rotation, but in many cases potatoes are sown year after year.

Both cattle and sheep in the district are small, stunted and difficult to fatten. A considerable improvement could be effected by crossing the country breeds with Kyloe or Galloway bulls and black faced rams; but all soft-bred pedigree bulls or rams should be avoided, the land being too poor to maintain really good class animals.

Cockerels that had been distributed by the board in the winter of 1891 had not survived, many had died and others did not thrive.

The only place in the area where fairs are held, is the village of Cill Chiaráin and no markets are held anywhere in the area. Cattle and sheep have to be taken to Clifden for sale which is over 25 miles away. The lack of markets in the area makes it difficult for locals to sell surplus produce if any.'

Traditionally, fishing and peat cutting supplemented subsistence farming in providing for the basic needs of the population of the area. One of the few areas where fulltime farming was practiced was in the more mountainous region of Callowfinish (Caladh Mhaínse) and Ardmore (An Aird Mhóir) in the Skannive DED. The mountains of this area provided for better grazing which was sufficient to support the livelihoods of those owning land in the region. This area was and still is known for the breeding of Connemara ponies, an activity that continues today.

The present day scale of farming continues to be very low with over half of farmers farming 5ha or less and an average farm size of 8.5ha. Almost all farming within this area relies on suckling or dry stock farming and arable farming is practically non-existent, other than for private use. The lack of mountain areas in this part of Connemara also excludes the practice of sheep farming and more recently, forestry, which is widely practiced in the more mountainous regions of north Connemara.

Farm incomes are very low with the majority of farmers earning €5,000 per annum or less in 2002. Despite the low farm income in the area very few farming households had an income from other earned sources and were reliant on either pensions or welfare payments. Unemployment

rates of farmers are greatest in farms with less than 30ha, where in 2002 a total of 54 farmers with less than 30ha were unemployed. In 2002 only 50 fulltime farmers were recorded as employed within the area and of this number 27 were farming less than 30ha. Table 3 shows the total area farmed in the region.

Table 3. Area farmed in each District Electoral Division (Source: CSO - 2002 Census of Ireland).

DED	Area farmed (ha)
Skannive	1,844
Owengowla	1,241
Turlough	1,939
Crumpaun	809
Camus	975
Gorumna	1,553
Lettermore	799

Fishing

The entrance to Cill Chiaráin Bay faces the prevailing southwesterly winds. However, the numerous islands and islets within the bay lead to a complex geography that in turn provides a sheltered fishing ground. The generally enclosed physical nature of much of the bay lends itself extremely well to fishing. Most of the fishing grounds within the bay are in close proximity of the shore and the generally sheltered conditions allow fishing to take place in weather conditions that would have most fishing boats returning to port. These conditions also allow for the use of smaller fishing boats and currachs that would not be as suitable for open sea conditions, especially in adverse weather conditions. It is this natural asset and a lack of any other natural assets in the area that has allowed fishing to enshrine itself as one of the most sustainable livelihoods in the area both in past and present times.

There are 38 quays, piers and slipways within Cill Chiaráin Bay, many of which were built under the auspices of the Congested District Board, which was also responsible for the building of the bridges that interconnect many of the larger islands in the bay. However, many of these piers are in a state of disrepair and are unusable today. Notwithstanding this fact, there are a number of relatively good piers and slipways in the area where boats can be tied up or launched from. In recent years a number of piers have been extensively upgraded such as at Roskeeda, Cill Chiaráin, Lettercallow, Ardmore and Kilbricken and there are currently plans for the upgrading of further piers in the area. The piers at Cill Chiaráin and Eanach Mheain have been recommended as strategic Gaeltacht piers in the Galway County Development Plan.

Box 9. Fishing in the 1890s – A Snapshot

1892 Report of the Congested Districts Board for Ireland by Major Robert Rutledge-Fair, inspector for the Carna region.

There are 186 men and 62 boats employed in lobster fishing, it is estimated that the men in average years can earn £8 each or £24 per boat. Lobsters are principally sold at Roundstone. The industry is an important one, and might be developed by establishing a depot at Roundstone, where some trustworthy person might be engaged to purchase lobsters for a fixed price, and send them to approved Liverpool and Manchester fish merchants for sale.

The number of bona-fide fishermen in the area are few, but on the other hand a large number of families fish "off and on" especially during the autumn months when fish are plenty. The people living on the islands, such as Mace, are, I think, the most experienced fishermen, at least they fish more continuously than the people who live further up the numerous bays and recesses which intersect the coast. The success of sea-fishing seems to me to depend on the establishment of a market, where people can always count on disposing of their fish at a reasonable price. If that difficulty was overcome, I believe fishing will become a chief factor in the circumstances of the people.

There are 436 boats in the district, almost all third class, a few only being large hookers which bring goods from Galway. There are practically no currachs.

Potting for lobster (Gliomach), crab (Portán Rua) and shrimp (Ribe Róibéis) is a traditional activity within the area but the shrimp fishery has declined substantially in recent years and now offers very little return for those employed in this activity. Shrimp potting is largely concentrated within the sheltered bay areas during September to December. There are currently approximately 18 boats taking part in this fishery and landings vary considerably from year to year. In 2001, 10.5 tonnes of shrimp were landed (source BIM). Lobster and crab potting is practiced by 40-50 boats (approximately 23 half-deckers and the remainder currachs). Landings for lobster from this fishery for 2001 were 35 tonnes (source BIM). The season for this fishery is generally 6-10 months, with the longer season concentrating on the more sheltered waters. Edible crab landings for 2001 were 51 tonnes. Velvet Swimming Crab (Luaineachán) is also fished in the bay.

The bay has significant scallop (Muirín) and oyster (Oisre) beds and these have provided a major source of income to local fishermen down through the years (Box 10). The original (non cultivated) oyster fishery within Cill Chiaráin Bay is over 200 years old. During the season, scallops are dredged (standard rigid dredge), by approximately 20 boats. The season varies from 3 to 6 weeks per year and a rotational system is used with some beds closed in any given year. It is difficult to predict which areas of the bay will be dredged from season to season, but this is largely a winter or early spring fishery. Scallop landings vary considerably (2001 landings were 4.8 tonnes) with historical landings of over 100 tonnes in the 1950s. Quotas, days at sea, minimum sizes and rotation of beds are used as management tools to ensure the viability of the scallop fishery within the bay.

Box 10. Scallop Fishing in Cill Chiaráin Bay

Prior to 1963, scallop fishing occurred in the bay in a rather ad hoc manner, along the lines of “every man for himself”. However, following an exceptionally cold winter in 1963, all this changed. The effect that the cold winter had in the bay was especially noticeable in the case of the scallop fishery. Scallops were traditionally fished throughout the bay, but during the winter of 1963 many scallops died, especially in the shallow waters of the inner bay where the effects of the cold weather were most pronounced in the water temperature. Local fishermen had to travel increasingly further out to the deeper waters towards the outer bay to find living scallops. It took an estimated five years before scallop numbers in the bay returned to pre-1963 levels.

Following the cold spell of weather in 1963 scallops became scarce and high prices were being offered for scallops of any size, even undersized scallops now had a market and whereas these would normally not have been fished, hard times prevailed and buyers were prepared to pay for undersized scallops. This practice began to cause concern amongst some fishermen in the area who predicted that the practice could only have long-term negative implications for the fishery. This resulted in the formation of the first fisherman’s co-operative in the area. The underlying principle of this co-operative was two-fold, firstly to protect the fishery by ensuring it was fished in a sustainable manner and secondly to protect the interests of the local fishermen. In 1985 this co-operative was divided into a number of different co-operatives and today Comharchumann Sliogeisc Chonamara Teó is the co-operative that regulates fishing practices in the bay under licence from the Department of Communications, Marine and Natural Resources.

There is a tradition of periwinkle (Seilmide Cladaigh) picking in the area that goes back many generations and is still practiced today. This activity is practiced by men, women and children and is particularly common at Christmas and Easter time when prices are high. 132 tonnes were landed in 2000 and 65 tonnes in 2001, although this is likely to be an under-estimate as the fishery is fragmented and hard to quantify. It is likely that up to 100 people are involved in periwinkle harvesting in the area.

Native oysters are dredged in the upper parts of Cill Chiaráin Bay, usually for 10-15 days in the months of October and November. Landings vary from 20 tonnes to 80 tonnes (2001 landings were 36 tonnes) with an average of 50 tonnes in recent years. An average of 60 boats and 120 fishermen are employed in this fishery

Razor clams (Scian Mhara) are dredged under licence within the bay. Tangle netting for Crayfish (Gabhal Mara) is practiced in the open waters to the south west of the site.

Wild salmon (Bradán) are fished by drift net under the control of the Western Fisheries Board. Estimated landings for 2002 were 4.8 tonnes. There are approximately 14 drift net licences in operation. No draft netting occurs within Cill Chiaráin Bay. Current debate surrounding the

sustainability of the drift net fishery is ongoing. The forth report on Salmon Drift netting, Draft netting and Angling by the joint committee on Communications, Marine and Natural Resources has made a number of recommendations regarding the use of drift nets throughout the country. The main recommendation of this report is that a move should be made towards single stock management. A number of other recommendations within the report suggest how this may be achieved with a view to protection of both the drift net fishermen and the survival of the species.

Limited pelagic and demersal fishing is practiced in the open waters to the south west of the site.

Finfish Farming

Salmon farming in Cill Chiaráin Bay began over twenty years ago. There are currently 21 salmon farm licences pertaining to Cill Chiaráin Bay. However, there are currently only two active sites within the bay. Factors cited for the decline in salmon farming in recent years include the outbreak of Pancreas Disease and economic factors such as the falling price of farmed salmon due to cheaper imports.

A survey commissioned by the Marine Institute in 1999 indicated that over one third of a total of 126 random respondents from a target population of 2,418 in the DEDs adjacent to Cill Chiaráin Bay had a direct or indirect family member involved in the aquaculture industry. Given the recent decline in the industry this is likely to have decreased over the last number of years.

In 1998 a Co-ordinated Local Aquaculture Management Systems (CLAMS) plan was developed for Cill Chiaráin Bay. CLAMS are a nationwide initiative designed to manage the development of aquaculture in bays and inshore waters throughout Ireland at a local level taking into account the views and needs of fishermen as well as members of the local community not directly employed in the industry. In each case, the plan fully integrates aquaculture interests with relevant national policies. CLAMS allows for successful integration of aquaculture into the coastal zone, taking cognisance of the need to improve environmental compliance, product quality and consumer confidence. Such plans are designed to take into account conservation issues within the bay as well as the sustainability of the aquaculture activity.

Box 11 - Other fisheries related activity within Cill Chiaráin Bay area

- The Martin Ryan Institute (NUI Galway) - conducts scientific research within the bay as part of its activities at the Carna Laboratories. This facility has been in operation since 1974 and during this period has gathered a wealth of scientific information on Cill Chiaráin Bay. The work carried out includes trials for cultivation of Abalone, Lobsters, Sea Urchin (Cuán Mara) and seaweeds.
- Arramara Teo. (Cill Chiaráin) - one of the longest established industries in Connemara. The company processes seaweeds cut locally, and exports the dried milled weed to Scotland. The company has 15-20 full-time employees and supports approximately 100 weed cutters in the bay.
- Morenet Teo. (Tir an Fhia) - manufactures nets for fish cages as well as supplying other related services such as net repairs and washing. The company employs 5-10 staff.
- Irish Seaspray (Lettermore) - produces smoked salmon for export to Europe. The company employs over 50 people with additional temporary positions during peak periods.
- Cill Chiaráin Salmon (Cill Chiaráin) - a salmon packing factory, employing up to 50 full time workers at times of high production.
- Taighde Mara Teo. (Carna) - a subsidiary of Údarás na Gealtachta, supports the aquaculture industry through research and development relating to novel species, new techniques and business entities, from the research phase, through innovation and pilot scale trials to commercialisation and the integration of the individual aquaculture enterprise into both the wider industry and the locale.
- Saotharlann Chonamara Teó (Rosmuc) - a company that provides analytical laboratory services to the aquaculture industry in Cill Chiaráin Bay.

Seaweed Harvesting

The south Connemara coast is one of the richest areas in Ireland for seaweed potential as well as utilisation. Out of a total of 36,000 tonnes (wet) of Knotted Wrack (Feamainn Bhuí) harvested nationally in 1996, 8-10,000 were harvested in and around Cill Chiaráin Bay (Hession et al., 1998). The potential sustainable yield within the bay was estimated as over 10-15,000 tonnes per annum, out of a total national potential yield of 75,000 tonnes.



Plate 27. Extensive coverage of Knotted Wrack (Feamainn Bhuí) near Béal an Daingin. (Photo: Michael Gibbons).

In addition, there is an abundant unharvested kelp resources off the southern shores of Cill Chiaráin Bay. The resource comprises dense beds of mixed kelp which cover all suitable substrate off the southern coastline of Gurumna Island from TrawbaunPoint to Kiggaul Bay, Lettermullan and the western coasts of the islands lying off Golam Head and Dinish.

In 1998 it was estimated that Arramara Teoranta Ireland's largest seaweed processing factory supported in excess of 120 harvesters in the surrounding area and processed an average of 600 tonnes of fresh weed each week.

Other Industry

Other than those activities relating to fishing and aquaculture there is little industry in the area. Boat building, which was a traditional activity in the area, still occurs at Carna, where a small Galway Hooker building facility is situated. From 1995 to 1997 an initiative known as Saortha Bád Chonamara was implemented in the area by Cumann Húicéirí na Gaillimhe. Nine participants participated in a training programme that consisted of practical 'hands-on' experience in boat building, repair and restoration with training being provided by experienced local boat builders. The participants built two Galway Hookers. The participants received accreditation from the

National Council for Vocational Awards (Level 2). All participants are in employment with four being self-employed building and restoring boats.

Box 12. Other Economic Activity in the 1890s – A Snapshot

1892 Report of the Congested Districts Board for Ireland by Major Robert Rutledge-Fair, inspector for the Carna region.

'Knitting is on altogether a different footing in this district owing to the efforts of the Connemara Industries Company, who some three years ago introduced some skilled teachers from Donegal, and trained a large number of girls. Vests, underclothing and jerseys are now knitted by these girls, of whom 200 are employed from time to time, and the improvement which has been effected in a short time in knitting is something wonderful. They earn from 6d to 8d per day without interfering with their usual employment.

Carna is also a great centre for the kelp industry; 360 families, or more than a third of the population of the entire district, are employed and it is estimated that more than 1,800 tons will be made this season. The price per ton has risen in the past number of years and now £5 per ton of kelp is being offered.'

Tourism

Cill Chiaráin Bay and its hinterland remains today one of the most beautiful, rugged and unspoiled areas of natural beauty in Ireland. Despite this, the majority of tourists visiting Connemara generally visit areas of north Connemara such as Roundstone, Clifden and Letterfrack. There is a very simple reason for this disparity in tourist numbers between the two areas and that is lack of infrastructure or information of the most basic kind. Without investment in adequate infrastructure and readily available information on the area it is difficult for the area to benefit from tourism, which could provide a seasonal but sustainable livelihood for many of the residents.

Cill Chiaráin Bay and its islands fall within a candidate Special Area of Conservation (SAC – EU Habitats Directive, 1992) and parts of the terrestrial hinterland of Cill Chiaráin Bay are designated as Natural Heritage Areas. However, there is no signage to provide information on the conservation status of the area. Many locals and visitors to the area are unaware of the natural history of the area and the species and habitats within it that are part of the areas natural heritage. "Eco-tourism" has increased in many areas in recent years, even in areas with limited facilities such as Lough Hyne Nature Reserve in Co. Cork and Wexford Wildfowl Reserve. Both of these areas have extensive signage and information on their importance as areas of natural conservation value.

Currently, much of income generated from tourism in the area is derived from students spending the summer at one of the Irish Colleges in the area. Students studying at these colleges generally stay with local families. A recent initiative by Údarás na Gaeltachta, is the formation of

GaelSaoire⁶. This is an initiative dedicated to the development and promotion of cultural tourism in Gaeltacht areas. The Authority's objective is to brand and promote the Gaeltacht areas as very different holiday destinations because of the Irish language, spoken as a community language, and because of the distinctive culture and ethos of the Gaeltacht, reflected in its music, song and dance in areas naturally endowed with some of Ireland's finest scenery. The GaelSaoire website provides the visitor to the area with information on accommodation, places, events and activities in the region.

Tourism-related activities in the area include:

Sea Angling

Sea Angling is a popular pursuit in the area, with good catches of the predominant species of Pollack, Cod, Bass, Flatfish and indeed good Blue Shark fishing during the summer months. Shore fishing is possible from almost anywhere on the coast. However, there are very few licensed boat operators with the capacity to take out sea anglers in the area.

Scuba-diving

Scuba diving is a very popular pursuit within Cill Chiaráin Bay, especially in the area around Annaghvaan. Diving clubs from Galway and Dublin frequently travel to the area, often spending weekends or up to a week in the area.

Golf

The Connemara Golf Course, situated at Annaghvaan (Eanach Mheáin), is a 9-hole course.

Education

There are 12 primary schools and three secondary schools in the area. However, 2002 census indicates that almost 20% of the population in the seven DEDs within the Cill Chiaráin Bay area of age 15 or more had ceased education by the age of 15 or less. Both second and third level educational attainments in the area are also low with only an average of 3.5% of the population having received a third level education.

To address the problem of leaving school at a young age the Lettermore Youthreach Centre was established to encourage and provide an opportunity for those who have left school at a young age to return to education. This centre can cater for up to 25 students in the 15 to 18 year age bracket. The Vocational Training Opportunities Scheme (VTOS)⁷ also runs training programmes

⁶ <http://www.gaelsaoire.ie/>

⁷ The Vocational Training Opportunities Scheme (VTOS) is a European Social Fund supported intervention in the Irish labour market to enable, as a priority group, unemployed people who have been on the Live Register for at least six months to access education and training with a view to progression to employment.

for fisherman within the area through a partnership with An Bord Iascaigh Mhara (BIM). The VTOS Centre in Ros Muc can currently cater for 20 students.

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A Guide to Habitats in Ireland <http://heritagecouncil.ie/publications/habitats/>

[To Be Expanded Considerably]

Appendix I - Geological Evolution of the Study Area

Geologically, the area surrounding Greater Galway Bay is composed of 1) limestones that dominate the Burren to the south of Galway Bay; 2) granites that dominate the northern shores of Galway Bay; and 3) Metamorphic rocks that occur to the north of the granites. In addition, there is a veneer of peat and soils which in themselves are rock and they in turn conceal some of their much older relatives.

Dalradian rocks occur around the northern margin of the granite with minor outcrops to be found near the southern margin of the granite near Cill Chiaráin Bay. These are part of the Dalradian **Supergroup** which are a grouping of rocks which stretch from Connemara and Donegal in the west of Ireland through Tyrone and on into Scotland, from where the name derives, from the Dal Riada.

The Dalradian rocks were laid down during the beginnings of a period of continental rifting which began approximately 800 million years ago. This gave rise to the formation of a basin in which the Dalradian sediments began accumulating. As the basin became more stretched, **volcanism** accompanied the rifting. Finally, the continent ruptured and a new ocean, 'The Iapetus', began to form, separating two major landmasses, **Gondwanaland** and **Laurentia**. Ireland (as we presently know it) was in two parts at this stage.

As these two landmasses eventually began to converge, the associated **subduction** produced the rock sequences of the **Ordovician** and **Silurian** periods, these rock may be seen in the Slieve Aughty Mountains in East Galway, with a minor outcrop on Gorumna on the North side of Galway Bay. The intervening oceanic crust was subsumed through **subduction**, thus bringing the two landmasses into collision, and giving rise to intense deformation and subsequent mountain building, or **orogenesis**. This is known as the **Caledonian** orogeny. This is the scenario that occurred when India collided with Asia. As the mountains formed large volumes of molten rock were intruded into the earth's crust to cool slowly and subsequently form granites. Slight variations in the composition and the cooling rates of the different granites gave rise to the different granite complexes that we see today, e.g. the Galway granite, Donegal Granite and Leinster Granite. It also accounts for the differentiation that we see within these granites.

The mountains of the Caledonian belt have long since been eroded away during the **Devonian** and **Carboniferous** periods. Only the remains of the rocks that would once have formed the roots of these mountains remain.

The Caledonian mountains have a northeast-southwest trend, this trend is clearly seen in the hills in Donegal and up into Scotland and Scandinavia. The same trend may also be delineated on into Greenland and in the Appalachian mountains on the east coast of America.

The suture line where the two plates collided to form Ireland is thought to be along a line running from the Shannon Estuary to Navan and on out past Clogher Head in Co. Louth. Once again this suture has a NE-SW trend. Evidence for this suture has been derived indirectly since millions of years of erosion of the Caledonian mountains and other later rocks have resulted in sediment being deposited over the probable junction.

The Devonian rocks deposited as a result of the erosion of Caledonian mountains may be seen in East Clare. Overlying these are the Carboniferous Limestones, which were deposited in a shallow sea, which had covered most of Ireland at this stage. The limestones deposited during this period now compose the Burren uplands as well as the Gort lowlands, and obliterate the southern margin of the granite; though marine geophysical studies confirm that the Granite does extend under the limestone. Following the Carboniferous there are no other deposits until the quaternary, which could provide us with an insight into the geological evolution of the immediate region.

Figure 1. A model of a subduction zone such as that found along the western margin of South America today. The orange blob within the continental crust represents a plutonic intrusion which will eventually cool to form a granite or similar rock type. A similar type subduction zone once existed across Ireland, see Figure 2. (From Sleeman et al., 2004 – Permission Pending)

Two major granitic **plutonic** complexes occur in Connemara, these are the Galway granite and its associated satellite plutons. A **pluton** is an **igneous** intrusion usually circular–elliptical in shape which was intruded/emplaced into the earth at depth. Initially molten, the plutons cool over time and solidify to form an **igneous** rock. The type of rock is usually determined by both the **mineralogy** of the initial molten material and the duration over which the intrusion cooled. Over millions of years the overlying rock is weathered and eroded away to reveal the rock that was once emplaced at depth.

The two principle domes in south Connemara are the Carna Dome to the west and the Kilkerrin-Galway Dome to the east. Part of the Kilkerrin-Galway Dome occupies the area of interest to this study.

Long et al. (1995) provide an overview of some of the studies that have been done on the area. These studies have ranged from work to determine the age of the granite, to studies looking at

the emplacement mechanism, to mineralogical studies. Presently the granite is thought to be approximately 420 ± 20 million years (Ma). The Granite is thought to have been emplaced along existing lines of weakness within the rock which were probably associated with the closure of the Iapetus during terminal subduction activity (Long et al., 1995).

Figure 2. The tectonic setting of Ireland and the position of the Iapetus ocean during late Ordovician/early Devonian times. (From Sleeman et al., 2004 – Permission pending).

Geological Time

It is worth gaining an appreciation of geological time in order to put the formation of the study area in context. Without this it may seem impossible for us to grasp the magnitude of the time involved in constructing and evolving a landscape.

The Earth is thought to be between 4,500,000,000 and 4,600,000,000 years old. If one were to compress the entire history of the earth into a 24-hour time interval, the day would have happened along the line of the following:

The first gene probably emerged in the predawn hours, before 5:00 am. Later that morning the first sun-fed photosynthetic cells appeared, followed that afternoon by cells that carry their genes inside a membrane-bound nucleus, and later that evening by the first of many multicellular organisms. The first modern human beings, members of *Homo sapiens*, would not arrive on the evolutionary scene until about the last 30 seconds of this long day, and all of recorded history took place during the last tenth of the last second before the stroke of midnight.

(http://jan.ucc.nau.edu/~lrm22/lessons/timeline/24_hours.html 2005)

An easier way to represent geological time is as a geological timescale ([Following Page](#)).

Geological Timescale

Eon	Era	Period		Epoch	Abs. Age (Ma)	Age of	Events	
Phanerozoic	Cenozoic	Quaternary		Holocene	0-2	Mammals	Humans	
				Pleistocene			Scabland Floods	
		Tertiary	Neogene		Pliocene	2-5		
					Miocene	5-24		Columbia Basalts
					Oligocene	24-37		
			Paleogene		Eocene	37-58		
					Paleocene	58-66		Extinction of Dinosaurs
		Mesozoic	Cretaceous				66-144	Reptiles
	Jurassic					144-208		1 st Birds/Mammals
	Triassic					208-245		1 st Dinosaurs
	Paleozoic	Permian				245-286	Amphibians	Extinction of Trilobites
		Carboniferous	Upper			286-320		1 st Reptiles
			Lower			320-360		Large Primitive Trees
		Devonian				360-408	Fishes	1 st Amphibians
		Silurian				408-438		1 st Land Plants
		Ordovician				438-505	Invertebrates	1 st Fish
Cambrian					505-540		1 st Shells, Trilobites	
Proterozoic	Precambrian				540-2,500		1 st Multicelled organisms	
Archean					2,500-3,800		1 st One-celled organisms	
Hadean					3,800-4,600		Origin of the Earth	

Modified from www.casdn.neu.edu/~geology/department/staff/colgan/iceland/time

Appendix II - Glossary of Geological Terms

Amphibole: mineral which is widespread in igneous and metamorphic rocks.

Biotite: a dark shiny coloured mineral from the mica group of minerals

Caledonian: An orogeny that occurred during the Cambrian and continued into the Ordovician.

Carboniferous: a period of geological time that lasted from 286ma –360ma approximately.

Dalradian: The Dalradian refers to a group of metamorphosed sediments laid down between 800 and 600 million years ago (Ma). These rocks span the Cambrian and part of the Ordovician periods.

Devonian: a period of geological time that lasted from 360ma to 408ma.

Fault: a planar fracture in rocks across which there has usually been some displacement

Gondwanaland: the name given to the hypothetical southern hemisphere super continent consisting of Africa, South America, India Arabia, Madagascar, Malaya, Guinea, Australia and Antarctica

Granite: coarsely crystalline intrusive igneous rock, pale in colour.

Granodiorite: igneous rock similar to granite but contains more mafic minerals and more feldspars.

Hornblende: usually black dark green or brown, the most common mineral of the amphibole group

Igneous: rock that has solidified from magma, it may be extrusive or intrusive.

Limestone: A sedimentary rock composed of calcium carbonate, often containing fossils.

Magma: molten rock that will crystallise on cooling to form igneous rock.

Metamorphic: rocks that have been altered by either heat or pressure or a combination of both. This alteration is often accompanied by a deformation.

Mica: a group of layer-lattice minerals, that have a flaky nature and are shiny, they occur from shades of black to brown to transparent.

Ordovician: a period of geological time that lasted from 438ma to 505ma.

Orogenesis: the process of mountain formation.

Quaternary: the second time period of the Cenozoic era, thought to cover the last two or three million years and extending into the present.

Sedimentary: lithified accumulation of clastic detritus, organic or chemically precipitated mineral grains. These rock usually have a layered appearance.

Sediments: accumulations of clastic debris or detritus.

Structural: relates to folding and faulting process which alters the way rock bodies relate or lie relative to each other.

Subduction: a process by which a tectonic plate is subsumed under another tectonic plate. Usually heavier oceanic crust is subducted under the less dense continental crust.

Volcanic: igneous rocks that have been ejected /extruded onto the earth's surface.

Volcanism: activity associated with the events of a volcano.

Appendix III – Archaeological Inventory

Known Archaeological Sites in Cill Chiaráin Bay Area from the Archaeological Inventory of West Galway (Gosling, 1993)

[Copyright issues to be clarified]

Early Christian

564 Kilkieran (Cill Chiarain) Map 11

OS 077:7:3(63.2,42.3) Indicated 'St Kieran's Church (in Ruins)' OD 100-200 08423,23138 Oratory On E-facing slope of An Bhinn Bhui overlooking Cuan Cill Chiarain. Traditionally the site of an E. Chr. church founded by St Chiaráin, the remains consist of a small, poorly preserved, oratory (E-W; L 3.8m, Wth 2.8m) with only the foundation and one or two courses of stonework visible. No architectural features survive. A small burial ground to ENE contains a roughly rectangular drystone shrine (L 1.75m, Wth 1.35m, H 0.8m). A holy well lies to ENE (No. 707). (Killanin 1954, 103; O'Flanagan 1927a, Vol. 3, 115, 125; Robinson 1985, 55).

SMR 077:016 22/08/1983

261 Clynagh (Cladhnach) Map 15

OS078: 16:6(89.2,LO) Hachured OD 0-50 09667,22683

Unclassified earthwork On a knoll of rock outcrop, close to seashore on the inner reaches of Cuan Chasla. Marked on 1st ed. of OS map as a circular enclosure (D c. 25m). No visible surface trace survives.

SMR 078:007 13/11/1989

Late Medieval/Early Modern

924 Lettermullan Island (Leitir Meallain) Map 12

OS 089:12:4 (72.3,19.7) Indicated 'Castle (Site of)' ODO-50 08507,22257 Castle Close to seashore on E side of Oilean Leitir Meallaun, commanding the narrow tidal channel connecting Cuan Chuige'il and Cuan Chaisin. In existence in 1574 when it was in the possession of 'Ochaghy' (Nolan 1901, 116): in 1584 it is recorded as the residence of Morogh MacHugh (Hardiman 1846, 64). Apparently demolished by time of OS Letters (O'Flanagan 1927a Vol. 3, 84, 86-7). All that survives today is a fragment of a once-substantial mortared wall (L 5.2m, Wth 1.25m, H 3m), running E-W, the inner face of which has been completely robbed. (Killanin and Duignan 1967, 348).

SMR 089:018 17/10/1983

Indeterminate Dates in use in Eighteenth Century and later

Holy Wells

725 Leighon Island (Laighean) Map 15

OS 078:6:2 (31.8,42.3) Not Marked OD 0-5009067, 23128

Holy well Near LWM off W end of the island. Known locally as Tobar Naomh Seosaimh, though one man called it Tobar Crom Dubh. It consists of a natural pothole frequented on last Sunday in July (info. T. Robinson). Not visited.

SMR 078:013

723 Kylesalia (Coill Saile) Map 11

OS 064:16:5(80.7,5.6) Not Marked OD 0-50 08612,23387

Holy well Just below HWM at the head of a small inlet on W side of Cuan Chill Chiaráin. Known locally as Tobar Cholmcille, it consists of a natural smooth pothole (D 0.3m) with a shallower extension adjoining its rim, said to be the knee-print of the saint. No offerings are visible, but it was frequented in the last generation; seven rounds would be made and a pebble cast into the well on each round. Not visited. (Robinson 1985, 57).

SMR 064:004

724 Kylesalia (Coill Saile) Map 11

OS 077:4:2 (81.6,56.4) Not Marked OD 0-50 08620, 23284

Holy well At HWM at easternmost tip of Ros Dugain Point. Known locally as Tobar Cholmcille, it consisted of a natural, smooth, bowl-shaped pothole (D 0.25m) with a low semicircular dry stone surround on W. (Robinson 1985, 56-7).

SMR 077:019 14/08/1984

730 Letter Callow (Leitir Calaidh) Map 11

OS 077:12:5 (80.5,20.9) Not Marked OD 0-50 08602, 22909

Holy well On the shore at HWM on E side of Cuan Chill Chiaráin. Known locally as Tobain'n na Leacracha, it consists of a natural shallow rock basin (D 0.2m) with a modern belt buckle set into its rim. A small canopy of concrete blocks has been built over it, opening towards W, and many modern offerings are visible (info. T. Robinson). Not visited.

SMR 077:020

707 Kilkieran (Cill Chiarain) Map 11

OS 077:7:3 (63.3,43.3) Indicated 'Toberkieran'

ODO-100 08425,23148

Holy well Some 195m N of and downslope from a church (No. 564). Known locally as Tobar Chiaráin, it consists of a natural spring in a fine stone-revetted basin, now surmounted by concrete and railings. Frequented on 9th September, the saint's day. (Robinson 1985, 55; O'Flanagan 1927a, Vol. 3, 115, 125; Killanin 1954, 103).

SMR 077:015 22/08/1983

732 Lettermore (Killannin P.) Leitir Mór (P. Cill Aithneann) Map 15

OS 078:14:2 (31.5,13.6) Not Marked OD 0-50 09059, 22825

Holy well Near LWM on W side of Cuan an Fhir Mhóir. Known locally as Tobar Cholmcille, it consists of a natural pothole (D 0.3m) which is said to have had a lid inscribed with the saint's name, but it was broken by 'the sappers, the soupers, the Tans or some other lot like them' (info. T. Robinson). Not visited.

SMR 078:015

645 Beagh Island North (An Bheitheach Thuaidh) Map 15

OS 078:1:6(20.6,48.3) Not Marked OD 0-50 08949,23193

Holy well On S shore c. 40m from E tip of the island. It consists of two round potholes side by side (Ds c. 0.3m) with coins and rosaries stuck into a cleft above each. Said to have been made by a saint as fonts for baptising the local heathens. The saint's footprint is pointed out on the rock nearby. Frequented on Ld Mhuire and other holy days (info. T. Robinson). Not visited.

SMR 078:001

654 Carrowroe West (An Cheathru Rua Thiar) Map 15

OS 078:11:5(57.6,15.4) Indicated OD 0-50 09335,22840

Holy well Close to seashore at An Tuairin Mm, on N bank of a stream. Known locally as Tobar Naomh Thomdis, it consists of a small natural spring with a roughly built stone shrine beside it. Visited on 20th December: it is reputed to have had a cure for eyes (info. T. Robinson). Not visited.

SMR 078:005

647 Birmore Rock (Bior Mor) Map 12

OS 089:2:1(25.1,55.8) Not Marked OD 0-50 08013,22646

Holy well On a rock called An tfeárnáin, to W of Birmore Island. Known locally as Tobar Bhréannáin, it consists of a natural pothole, exposed at low water, said to be a holy well. Not visited. (Robinson 1985,53).

SMR 089:001

672 Dinish Island (Daighinis) Map 12

OS 089:3:4(49.8,46.1) Not Marked OD 0-50 08273,22539

Holy well On W shore of the island below HWM. It consists of a small natural round pothole near the outer end of a dyke of dark porphyry called Bóthar na Naomh, which is regarded as the road a saint took in walking to Oilcan Mhic Dara (No. 613) (info. T. Robinson). Not visited.

SMR 089:007A

683 Furnace Island (Foirnis) Map 12

OS 089:7:5 (55.5,35.7) Not Marked OD 0-50 08332,22429

Holy well Below HWM on E coast of the island just S of a small inlet called Crompdn an Mhaide Mhoir. Known locally as Tobar Cholmcille, it consists of a small round pothole, not to be confused with a tub-sized pothole higher up on the shore which many mistake for the holy well (info. T. Robinson). Not visited.

SMR 089:011

684 Furnace Island (Foirnis) Map 12

OS 089:7:5 (55.9,30.8) Not Marked OD 0-50 08335,22377

Holy well Below HWM on E coast of the island c. 100m S of an inlet called Crompan na Teorann. Known locally as Tobar Cholmcille, it consists of a small natural round pothole (info. T. Robinson). Not visited.

SMR 089:012

699 Inishmuskerry (Inis Muscraí) Map 12

OS 089:1:2(9.2,54.5) Not Marked OD 0-50 07846, 22635

Holy well On the rocks at E point of the island. A natural pothole below HWM which is regarded locally as a holy well (info. T. Robinson). Not visited.

SMR 089:015

737 Maumeen (An Maimin) Map 12

Not Marked OD 0-100

OS 089:8:6 (91.6,30.7) 08712,22370

Holy well On S bank of a stream, which also marks the townland boundary, c. 150m upstream from Loch an Mhuilinn. Known locally as Tobairin an Atha Leacaigh, it consists of a small natural triangular hollow in a broad flagstone close to an obvious crossing-point on the stream (info. T. Robinson). Not visited.

SMR 089:032

673 Dog Island (Oilean An Mhadaidh) Map 12

OS 089:15:6 (NPL) Not Marked OD 0-50

Holy well On N shore of the island below HWM. It consists of a natural pothole reputed to cure pains in the bones. Regarded by local tradition as a holy well made by St Columcille when he hid there, pursued by the saints of Oiledin Arainn (info. T. Robinson). Not visited. (Ui Fhlatharta 1985).

SMR 089:009

734 Lettermullan Island (Leitir Meallain) Map 12

OS 089:15:1(48.5,7.6) Not Marked OD 0-50 08253, 22134

Holy well On rocks below HWM at SW tip of Leitir Mealldin. Known locally as Tobar na Cailli, it consists of a natural pothole, discovered, according to local tradition, by a woman from Bó Bhrocháin who had dreamed she would be cured of pains in the bones at this spot. Between this well and another c. 310m to SE (No. 733) are two porphyry (quartz) dykes running N-S, regarded as the roads the saints took to Oiledin Arann (info. T. Robinson). Not visited.

SMR 089:023

735 Maumeen (An Maimin) Map 12

Not Marked OD 0-50

OS 089:16:6 (88.8,4.5) 08678, 22094

Holy well On shore below HWM c. 300m SW of the quay called Ceibh Poll Ui Mhuirín. It consists of a natural round pothole, in a smooth sloping channel, on the outer flank of a sloping rock. It contains a single coin (info. T. Robinson). Not visited.

SMR 089:027

736 Maumeen (An Maimin) Map 12

OS 089:16:2 (78.7,10.2) Not Marked OD 0-50 08573,22156

Holy well At HWM on SW side of a small island called Oilea'n Ros na nEas. Known locally as Tobairín Ri an Domhnaigh, it consists of a natural pothole (D 0.3m) in W-facing slope of a ridge of rock. Also known as Tobar an Oiledin and Tobar Cholmcille, and frequented on 9 June (info. T. Robinson). Not visited.

SMR 089:028

688 Golam Island (Ceann Gulam) Map 12

OS 089:14:3(44.3,8.0) Not Marked ODO-50 08209,22138

Holy well In S part of the island c. 130m E of the

signal tower (No. 938). Known locally as Tobar Cholmcille, it consists of a round pothole in a rock cleft which leads up a small fault-scarp. The saint's footprints are pointed out in the scarp face to N of the well, and to S of it is a broad band of whitish porphyry (a quartz dyke) called Bothar na Naomh: this is the road the saints took in marching out to Oiledin Arainn (info. T. Robinson). Not visited.

SMR 089:014A

733 Lettermullan Island (Leitir Meallain) Map 12

OS 089:15:4(50.8,5.9) Not Marked OD 0-50 08278,22115

Holy well Among the rocks just above HWM at SW end of Leitir Meallain. Known locally as Tobar an Tóin Dubh, it consists of a round pothole with part of the rim extending into a broad point on one side. According to local custom, it should be visited on a Monday and a Friday, making nine rounds each time (info. T. Robinson). Not visited.

SMR 089:020

19th Century Military

938 Golam Island (Ceann Gulam)

OS 089:14:3(43.1,8.1) 0-100 08196,22139 Signal tower At highest point (94ft OD) of Ceann Gulam, a small island off Leitir Meallain. Well-preserved rectangular two-story tower, built 1804-6 (pers. comm. P. Kerrigan). There is a doorway in SW wall at 1st-floor level, a machicolation above at parapet level, and bartizans on same level at N and E corners. Mistakenly described as a Martello tower by Killanin and Duignan (1967, 347). Inspected from mainland only. (Kerrigan 1982, 40-1; Killanin 1947, 125).

SMR 089:013 14/10/1983

Children's Burial Grounds

881 Inishbarra (Inis Bearachain) Map 11

OD 0-100 OS 077:16:5(77.5,0.7) Not Marked 08567,22696

Children's burial ground In an overgrown hollow, known as An Gleann Thuaidh, in N part of the island, and c. 75m from shore. A small circular area with traces of an enclosing wall which has a gap at SE. Many small boulders are visible in the interior as well as a pine tree. Said to have been used for the burial of children and possibly Famine victims (info. T. Robinson). Not visited. (Robinson 1985,46).

SMR 077:032

876 Furnace Island Foirnis Map 12

OS 089:11:2 (60.8, 28.7) Not Marked OD 0-50 08385, 22352

Children's burial ground On W side of road c. 400m N of the bridge to Leitir Meallain. Known locally as Clochar na bPaisti, it has been damaged by roadworks and is difficult to make out (info. T. Robinson). Not visited.

882 Inishtravin (Inis Treabhair) Map 15

OS 078:5:2(8.1,41.6) Not Marked OD 0-50 08816,23124

Children's burial ground In W part of the island c. 90m from shore. Known locally as Reilig na bPa"isti Marbha. According to local sources, it consists of a slight unenclosed mound with small boulders as grave-markers. Not used for 35 years or more (info. T. Robinson). Not visited. (Robinson 1985,46).

SMR 078:010

847 Bealadangan (Beal An Daingin)

OS 078:6:3 (44.3,43.4) Not Marked OD 0-50 09199,23138

Children's burial ground On a small hillock on seashore, to NW of the new graveyard. Known locally as Cnocan na Leanbh, it consists of an area of small set boulders delimited by a slight wall (info. T. Robinson). Not visited. (Robinson 1985, 46).

SMR 078:002

849 Camus Eighter (Camas Iochtair) Map 15

OS 065:16:2(81.6,9.7) Not Marked OD 0-50 09598,23416

Children's burial ground On a small coastal promontory on inner reaches of Cuan Chamais. Known locally as Aill na bPaisti, it consists of a small rocky knoll on which small set stones are visible (info. T. Robinson). Not visited. (Robinson 1985,46).

SMR 065:002

850 Camus Oughter (Camas Uachtair) Map 15

OS 065:8:4(71.1,37.1) Not Marked OD 0-50 09490,23707

Children's burial ground Close to seashore at N foot of Cnoc Chamais on inner reaches of Cuan Chamais. An ill-defined unenclosed area, now totally overgrown with dense scrub, but held in local tradition to be a CBG (info. T. Robinson). Not visited.

SMR 065:003

868 Derrynea (Doire An Fheich) Map 15

OS 078:16:2(83.8,8.8) Not Marked OD 0-100 09611,22766

Children's burial ground On N side of coast road, immediately E of Droichead an Chroisin which stands on W boundary of the td. A small unenclosed plot within which many small set stones are visible (info. T. Robinson). Not visited. (Robinson 1985,46).

SMR 078:009

890 Lettermore (Killannin P.) Leitir Mh6ir (P. Cill Aithneann) Map 15

OS 078:13:3 (20.3,8.7) Not Marked OD 0-50 08941, 22775

Children's burial ground On a small headland on seashore to W of Droichead Charraig an Lugain. A slight unenclosed mound on which small set stones are visible (info. T. Robinson). Not visited.

SMR 078:014

Appendix IV – Archaeological Photographs

The following is a list of photographs taken during field visits as part of the current study. The photos are provided on CD-ROM.

All photos – Michael Gibbons.

Leitir Padbhram			
1a:	Turf Quay	L. Padbhram	NGR 814336
1b:	Possible Crannóg	House in foreground	
Inismuskerry			
2a:	Sunken House		NGR 783264
2b:	Sunken House		
2c:	Rectangular structure		
2d:	Sub-rectangular enclosure		
2e:	Field wall		
2f:	Aerial View		
Kilkieran			
3a:	Pre-Bog Walls		NGR 843313
3b:	Pre-Bog Walls		NGR 843313
Inisbearachain			
5:	Causeway (Puck Island to Oileán Mór)		NGR 868265
6a:	Causeway (Bóthair na n'Oileán)		NGR 869258
6b:	Causeway (Bóthair na n'Oileán)		NGR 869258
Inse Ghainimhe			
7a:	Causeway and adjoining hollow way		NGR 858258
7b:	Causeway and adjoining hollow way		NGR 858258
7c:	Causeway and adjoining hollow way		NGR 858258
An Cnapach			
8a:	Causeway		NGR 837226
8b:	Causeway		NGR 837226
Ballynakill Lough			
9a:	Possible Crannóg		NGR 865226
9b:	Possible Crannóg		NGR 865226
Snámh Bó			
10a:	Incomplete causeway	Snámh Bó - Dunmánas Island	NGR 933358
10b:	Causeway from NE	Snámh Bó - Dunmánas Island	NGR 933358

Archaeological Photographs (Cont.)

An tOileán Mór

11:	Causeway	Chil Bhriocán – Oileán Mór	NGR 905351
	Causeway and hollow way incomplete in several places		
11b:	Causeway	Chil Bhriocán – Oileán Mór	NGR 905351
	Causeway and hollow way incomplete in several places		
12:	Causeway	Oileán Mór – Oileán na gCapall	NGR 899354
	Causeway with hollow way		
13:	Causeway	Oileán Mór – an t'Oileán Iatharach	NGR 893346
	Causeway and hollow way.		
14a:	Causeway	an t'Oileán Iatharach – An Cró	NGR 888351
	Footpath/cosáin (short section)		
14b:	Causeway	t'Oileán Iatharach – An Cró	NGR 888351
	Footpath/cosáin (short section)		

Muiceanach idir dhá Sháile

15a:	Causeway	Across an Droimín	NGR 946322
	Causeway and roadway unfinished		
15b:	Causeway	Across an Droimín	NGR 946322
	Causeway and roadway unfinished		

An Turlach Beg

16a:	Vernacular church	Sálalaoí	NGR 918339
16b:	Vernacular church	Sálalaoí	NGR 918339

Gairfeán

17:	Quay	Caladh na Leice	NGR 909325
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Inis Treabhair

18:	Causeway	Inis Treabhair – na Beitheacha	NGR 892317
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Béal an Daingin

19a:	Causeway	Béal an Daingin – Eanach Mheáin	NGR 913303
19b:	Causeway	Béal an Daingin – Eanach Mheáin	NGR 913303
19c:	Causeway	Béal an Daingin – Eanach Mheáin	NGR 913303
19d:	Causeway	Béal an Daingin – Eanach Mheáin	NGR 913303
20a:	Quay		NGR 918302
20b:	Quay		NGR 918302

Lettermore

21a:	Multi-stage Causeway	Eanach Mheáin – Leitir Móir	NGR 910295
21b:	Multi-stage Causeway	Eanach Mheáin – Leitir Móir	NGR 910295

An Trá Bhán

22:	Kelp Kiln		NGR 896211
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Cnoc Garbh

23:	Kelp Kiln		NGR 889207
24a:	Kelp Kiln		NGR 889207
24b:	Kelp Kiln		NGR 889207
25a:	House Cluster	2 buildings	NGR 885212
25b:	House Cluster	2 buildings	NGR 885212

An Droim

26:	Pre-Bog Wall		NGR 885207
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Archaeological Photographs (Cont.)

Ballynakill			
27a:	House Cluster	4 buildings	NGR 864216
27b:	House Cluster	4 buildings	NGR 864216
27c:	House Cluster	4 buildings	NGR 864216
Leitir Meallain			
28a:	Towerhouse	In ruins	NGR 850226
28b:	Towerhouse	In ruins	NGR 850226
29a:	Boat slips/quay		NGR 850226
29b:	Boat slips/quay		NGR 850226
Cill Chiaráin			
30:	Church Site		NGR 842231
31:	burial ground		NGR 842231
32:	holy well		NGR 842231
33:	Holy Well	Ail na Brón	NGR 842306
35:	Mill		NGR 850331
36:	Mill Dam		NGR 845334
Doire Iorais			
37:	Quay	Bun Inbhir	NGR 899383
Cill Bhriocáin			
38:	Church		NGR 917355
Ros Muc			
39a:	Quay	An Siléar	NGR 939331
39b:	Small Quay and slip		NGR 935338
An Cnoc			
40:	Quay		NGR 863253
Ballynakill			
41:	Church (with crannog in Background)		NGR 865219
An Máimín			
42:	Island Cashel	Loch an Bhalla	NGR 873232
43:	Quay	Máimín Quay	NGR 897267
An Trá Bháin			
44:	Medieval Church		NGR 898216
Roisín na Manach			
45:	Island Cashels	Loch na Scainnimhe	NGR 806317
Ros Muc			
46:	Quay and Causeway	Ros Dubh	NGR 910371
Inis Eilte			
47:	Quay and House		NGR 934347
Maimín			
48:	Crannog	L. Hoirbeaird	NGR 884230

Archaeological Photographs (Cont.)

Inis Treabhair

49: Quay NGR 880315

50: Quay

51: Quay

52: Quay Caladh O Dheas NGR 883312

Leitir Meallain (Cuain Chuigéil)

53: Quay and Trackway Adjoining the Graveyard NGR 853228

Between Ros Muc and an Claidhneach

54: Intertidal peat NGR 937336

Ceann Gólaim

55: Semaphore Station NGR 819213

Appendix V – Irish and EU Nature Conservation Designations

With a view to conserving many of the best features of our natural history, three main categories of conservation designation are in existence in Ireland. The main designations are:

- Natural Heritage Areas (NHA)
- Special Areas of Conservation (SAC)
- Special Protection Areas (SPA)

The website of the National Parks and Wildlife Service provides extensive information on Nature Conservation designations and legislation, including some examples of designated sites in the coastal zone; information on the designation process; and the implications of site designation. Maps of designated sites can also be downloaded.

[[Alternatively, the Heritage Council Marine & Coastal Heritage Website provides extensive information on Nature Conservation designation and legislation and extensive links to further information.](#)]

Natural Heritage Area (NHA)

Prior to the passing of new legislation in 2000, NHAs were a proposed designation, established following the review survey of Areas of Scientific Interest (ASIs), and which forms the basic site network for habitat conservation. Under the Wildlife Amendment Act (2000) proposed NHAs are given legal protection as designated areas. NHAs are the basic designation for wildlife conservation and there are currently over 1,100 proposed NHAs in Ireland covering approximately 113,000 hectares. Some of these may be very small, intended only to provide protection to something as small as a roosting station for rare bats. Other NHAs can be very large, such as an entire blanket bog. The Geological Survey of Ireland is presently compiling a list of sites of geological importance, which are in need of future protection. Such sites include limestone or 'karst' and early fossil sites. It is anticipated that this process will lead to the designation of further NHAs in the future. The process of formal designation of NHAs commenced in December 2002. Many of the coastal pNHAs are important as feeding and/or breeding sites for birds and are also designated as SPAs and/or cSACs. At present, only a small number of NHAs have been formally designated; all of these are raised bogs, located mainly in midland counties.

Special Area of Conservation (SAC)

Candidate SACs (cSACs) are prime wildlife conservation areas, which are considered to be important on a European level as well as on a national level. SACs are chosen from pNHAs, although some other sites which are not pNHAs but are nevertheless of particular conservation

interest have been selected. The legal basis on which SACs are selected and designated is the EU Habitats Directive (92/43/EEC)⁸.

SACs are identified as being representative examples of either prescribed habitat types or natural or semi natural areas which are important in the context of maintaining biodiversity and/or the survival of particular species (other than birds). Under the Habitats Directive, it is the responsibility of each member state to designate SACs to protect particular habitats and species of animals and plants that are listed in Annexes I and II of the Directive. It is also the responsibility of each member state to ensure that designated sites are maintained at or restored to 'favorable conservation status' across their biogeographical range.

Special Protection Area (SPA)

SPA is the designation used for areas of importance to birds. This designation has its legal basis in the EU Birds Directive (79/409/EEC). The Birds Directive requires that areas be designated for listed rare and vulnerable species, regularly occurring migratory species and wetlands which attract large numbers of migratory birds each year.

⁸ COUNCIL DIRECTIVE 92/43/EEC of 1992 on the conservation of natural habitats and of wild fauna and flora (commonly referred to as the 'Habitats Directive') seeks to establish a network of protected areas throughout the European Community. The **Wildlife Act of 1976** is the main statute governing the protection of wildlife in Ireland. It is the principal Act of the **European Communities (Natural Habitats) Regulations, 1997** through which the Habitats Directive was transposed into Irish law. The Regulations provide the legal basis on which candidate Special Areas of Conservation (cSAC's) are selected and designated in Ireland.

Appendix VI – Saltmarshes & Lagoons

Salt Marshes around Cill Chiaráin Bay

Site	Grid Ref	Saltmarsh Type	Substrate
Derryrush	L898387	Fringe	Peat
Turloughbeg	L918345	Fringe	Peat
Loughaunultera	L946350	Fringe	Peat
Kinvarra	L960330	Fringe	Peat
Bealadangan	L925300	Fringe	Peat
Lettermore North	L910290	Fringe	Peat
Lettermore South	L885278	Fringe	Peat:stumps
Glentrasna, Gorumna	L874258	Fringe	Peat
Lettermullan, Casheen Bay	L840248	Fringe	Peat
Lettermullan West	L835226	Fringe	Peat
Teeranea	L892262	Fringe	Peat:stumps

Lagoons around Cill Chiaráin Bay

Site	Grid Ref	Type	Area (ha)
Lettermullen Pool	L827213	Rock Lagoon	1
Loch Fhada upper pools	L930300	Saline pools	2
Loch and Ghadaí	L934299	Saline lake	5
Loch Fhada	L939305	Saline lake	8
Loch Tanaí	L950305	Saline lake	11
Loch and Aibhnín	L947315	Saline lake	55
Loch Cara Fionnla	L963290	Saline lake	14
Loch Cara na cGaorach	L964305	Saline lake	60
Loch Doire Bhanbh	L961384	Saline lake	1.5
Loch an tSáile	L954390	Saline lake	90
Loch Conaorcha	L875369	Saline lake	28

Appendix VII – Marine Flora & Fauna

A Glossary of Important Marine Flora and Fauna in Cill Chiaráin Bay

Flora

Ascophyllum nodosum var *Mackii*: An unusual unattached form of this species was found at two sites within Kilkeran Bay. This species is **common** in Ireland, but is normally attached to rocks and boulders.

Chaetomorpha mediterranea: A green algae recorded at some of the lagoons in Cill Chiaráin bay.

Dermocorynus montagnei: The inlet at Coill Saile is the only known location in Ireland for this species.

Gelidiella calcicola: This **rare** creeping algae has been found in Cill Chiaráin bay in association with *Phymatolithon polymorphum*

Gelidium maggsiae: A previously undescribed species, found at Coill Saile.

Lamprothamnium papulosum: A Charophyte, characteristic species of more saline coastal lagoons.

Lithothamnion corallioides: is a free-living maërl forming species belonging to the family Corallinaceae. It is confined to the west coast of Ireland where it forms extensive maerl beds. This species is listed under Annex V of the E.U Habitats Directive.

Lithothamnion dendatum: A rare species of coralline algae.

Lithothamnion fasciculatum: Co-occurs with both *L.corallioides* and *L. dendatum* in Kilkeiran bay, this association is one of only three localities in Ireland where these three species occur together.

Meredithia microphylla: This **rare** red algae is usually associated with exposed marine cliffs occurs in the sheltered waters of the inner inlet at Coill Saile.

Phymatolithon polymorphum: This is the only maërl forming species of this genus found in Ireland.

Zostera marina: The genus *Zostera* is the only genus of angiosperm found in a submerged marine environment. This species is locally frequent in Ireland. It forms large beds with which are associated other specialised communities. *Zostera* is an important bioindicator. Its distribution in Britain has declined to such an extent that it is now protected.

Fauna

Akera bullata: an ephemeral population of sea slug recorded at L. Tanaí.

Armina loveni: A nudibranch which is always found in mud, in sheltered locations where it feeds on *Virgularia mirabilis* **Population status: Very Rare**

Asterina phylactica: A recently recognised species of starfish, recorded only from the west coast and from Strangford lough. **Population status: Rare**

Aureliania heterocera: Only previously recorded in Ireland at Strangford Lough, Rathlin Island and two other mainland sites in northern Ireland. It was found to be common in Kilkieran Bay

Population status: Rare

Blennius ocellaris: The Butterfly Blenny. Only recorded elsewhere in Ireland at two other locations. **Population status: Rare**

Cerastoderma glaucum: A lagoon cockle. **Population status: common**

Chelonaplysilla noevus: Recorded. **Population status: Rare**

Crimora papillata: A nudibranch usually associated with the bryozoan species Chartella papyracea.

Population status: Common

Halcampoides elongates: This very rare burrowing anemone only expands at night. It has only been recorded at one other site in Ireland. **Population status: Very Rare**

Hancockia uncinata: This rare nudibranch has only been recorded from two other sites in Ireland, Killary Harbour, Co. Galway and St. Johns Point, Co. Donegal. BioMar found this species at two sites within Kilkieran Bay. **Population status: Rare**

Hormathia coronata: Recorded. **Population status: Rare**

Laomedea angulata: A colonial hydroid recorded only from on eel grass. Recorded from Lettermullen pool lagoon. **Population status: Rare**

Mesacmea mitchelli: Anemone. The only record for Ireland is Kilkieran Bay. **Population status: Rare**

Molgula oculata: A species of ascidian that is classified as nationally rare and scarce in Britain. BioMar recorded three specimens, two in Co. Donegal and one in Cill Chiaráin Bay.

Population status: Rare

Ostrea edulis: This native oyster has significant economic value and is important for its substratum forming role. Its distribution has decreased due to exploitation and disease.

Population status: Occasional, extinct in some areas.

Pachycerianthus multiplicatus: Occurs at two sites in Cill Chiaráin Bay. This is a species with a northern distribution. It has previously only been recorded from three other sites in Ireland and is believed to be at the southern limit of its distribution. **Population status: Rare**

Paracentrotus lividus: This sea urchin is commonly found along the west coast of Ireland. However, many of the largest populations have been harvested for export to France, it is therefore important to conserve the species, as it is vulnerable to exploitation. **Population status: Common**

Pycnoclavella aurilucens: A seasquirt with a Lusitanian distribution. **Population status: Common**

Raspailia aculeate: Recorded. **Population status Rare.**

Scolanthus callimorphus: Anemone. Only two positive records in the British Isles, the coast of Dorset and Cill Chiaráin Bay, but may be frequent in the English Channel. **Population status: Rare**

Stryphnus ponderosus: This species was found at one site to the south of Inis Travin Island, Kilkeran Bay. It was recorded by BioMar at three other localities in Ireland. **Population status Rare.**

Syngnathus typhle: Deep-snouted pipefish. **Population status: common**