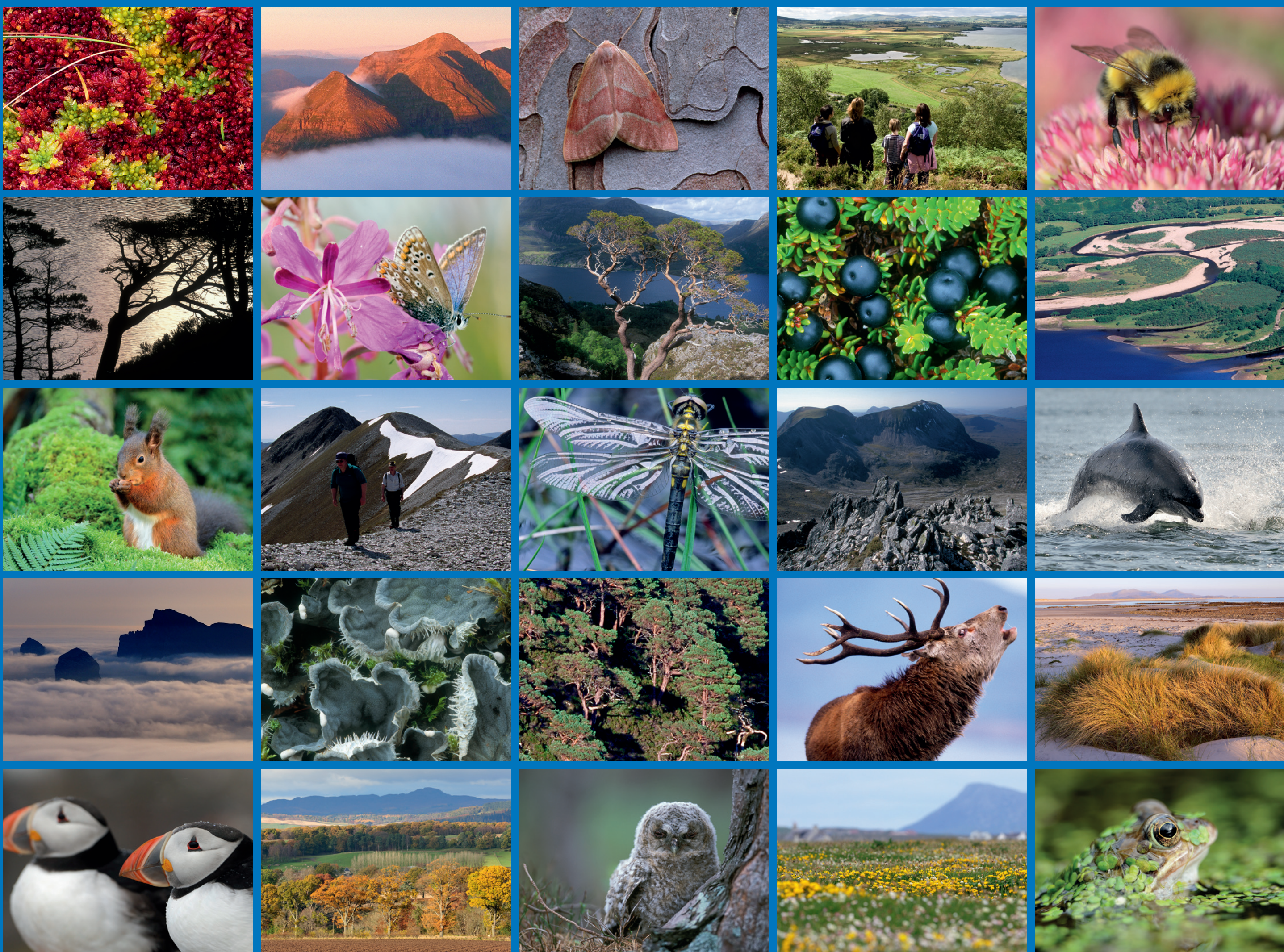
Scottish Natural Heritage
Research Report No. 1044

The establishment of site condition monitoring of the sea caves of the St Kilda and North Rona Special Areas of Conservation with supplementary data from Loch Eriboll



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RESEARCH REPORT

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The establishment of site condition monitoring of the sea caves of the St Kilda and North Rona Special Areas of Conservation with supplementary data from Loch Eriboll

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RESEARCH REPORT
Summary

The establishment of site condition monitoring of the sea caves of the St Kilda and North Rona Special Areas of Conservation with supplementary data from Loch Eriboll

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Keywords

benthos; monitoring; condition; sea caves; SAC; SCM; marine

Background

The purpose of the current study was to initiate site condition monitoring of the sea caves within the St Kilda and North Rona SACs. This was done to establish a baseline biological data set that would facilitate the assessment of the condition of the habitats in the future and to allow a judgement to be formed on the current condition of these habitats. Due to the extreme wave exposure of the target sites, it was necessary to consider a series of contingency survey targets in the event of weather conditions preventing access to the primary targets. Weather conditions severely limited time available for surveying the primary targets so attention was diverted to the contingency targets of Loch nam Madadh and Loch Laxford (reported separately). Additionally, cave sites in Loch Eriboll were surveyed while sheltering from strong winds and three rocky reef sites were surveyed at St Kilda when wave surge prevented access to the caves.

Main findings

St Kilda

- A total of 85 potential cave sites have been identified within the SAC based on a combination of historical records and direct observation. All available information on caves has been collated into a cave inventory.
- Four caves were subject to SCM. One was fully intertidal, one was fully subtidal and the remaining two included both intertidal and subtidal components although monitoring effort was focussed on the subtidal in both cases.
- Cave biota tended to be heavily modified by the effects of scour on and near the floor of the caves. A more profuse biota was present on the upper subtidal walls and this tended to be characterised by bryozoan (crisid) turf, sponges and aggregations of anemones. Littoral and supralittoral zones appeared impoverished (relative to the open coast) within the caves.
- The biota recorded by the cave SCM was broadly consistent with prior data recorded from St Kilda caves and broadly similar to that recorded from comparable cave sites elsewhere in Scotland.
- Two intertidal and three subtidal reef sites were subject to SCM.
- Intertidal reef sites showed communities indicative of high exposure levels with vertically expanded supralittoral zones and exposure tolerant species present in the eulittoral.

- Subtidal reef biota on upward facing surfaces was characterised by kelp forests. The occasional presence of opportunistic kelp species indicated periodic disturbance events (i.e. storm damage). Vertical faces were characterised by bryozoan (crisid) turfs and aggregations of anemones.
- The biota recorded by the reef SCM was broadly consistent with prior data recorded from St Kilda reefs.
- A new species of soft coral (*Clavularia*) was discovered (and will be described separately).
- No evidence of anthropogenic impacts or of anthropogenic activities with potential to impact the cave or reef features was observed.
- Based on available data it should be concluded that the cave and reef features were in good condition.

North Rona

- A total of 27 potential cave sites have been identified within the SAC based on a combination of historical records and direct observation. All available information on caves has been collated into a cave inventory.
- Three caves were subject to SCM. Each included both intertidal and subtidal components although monitoring effort was focussed on the subtidal.
- Cave biota tended to be heavily modified by the effects of scour on and near the floor of the caves. Less intensely scoured areas were characterised by a community of spirorbin worms and turfs of small sabellid tubes. A more profuse biota was present on the upper subtidal walls and this tended to be characterised by sponges, aggregations of anemones and colonial ascidians. Littoral and supralittoral zones appeared impoverished (relative to the open coast) within the caves.
- The biota recorded by the SCM was broadly similar to that recorded from comparable cave sites elsewhere in Scotland.
- No evidence of anthropogenic impacts or of anthropogenic activities with potential to impact the cave or reef features was observed.
- Based on available data it should be concluded that the cave feature was in good condition

Loch Eriboll

- A total of 27 potential cave sites have been identified within Loch Eriboll based on a combination of historical records and direct observation. All available information on caves has been collated into a cave inventory.
- Two caves were surveyed using SCM methodology. These included both intertidal and subtidal components although monitoring effort was focussed on the subtidal.
- Cave biota tended to be heavily modified by the effects of scour on and near the floor of the caves. Less intensely scoured areas were characterised by a community of spirorbin worms and turfs of small sabellid tubes. A more profuse biota was present on the upper subtidal walls and this tended to be characterised by sponges and aggregations of the solitary ascidian Dendrodoa. Littoral and supralittoral zones appeared impoverished (relative to the open coast) within the caves.
- The biota recorded was broadly similar to that recorded from comparable cave sites elsewhere in Scotland.
- No evidence of anthropogenic impacts or of anthropogenic activities with potential to impact the cave or reef features was observed.

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Dedication

Christine Howson (Aquatic Survey & Monitoring Ltd) played a key role in the biological surveys described in this report. She had been under treatment for cancer for about ten years and sadly passed away in September 2016. She was good company during long days on the boat and her expertise was invaluable to this project. Christine was legendary as a marine field biologist and her death is a great loss to those of us who seek to understand the rich and varied marine life in British seas.

Acknowledgements

We would like to express our gratitude to Ben James and Laura Steel (SNH) for their contribution to the planning and management of this survey. Thank you to Rob Cook (HWU) for general assistance with the diving, boat maintenance and survey datum line deployment. Thank you to Andrew Want (HWU) for intertidal biological surveys. Thank you to Richard Shucksmith and George Stoyle for their exhaustive efforts in photographically documenting the survey sites. We are also very grateful to Bob Anderson and the crew of the Halton for ensuring we made the best use of the limited opportunities offered by the weather and for accommodating long working hours when required. Thank you to Chrystalla Karamita for assistance with sponge identification. Thanks to Sankurie Pye (NMS) for identification of the molluscs. Thank you to Lewis Press (NMS) for assistance with crustacean identification. Thank you to Mary Spencer Jones (British Natural History Museum) for assistance with bryozoan identification.

1. INTRODUCTION

The purpose of this study was to initiate site condition monitoring of the sea caves within the St Kilda and North Rona SACs (Figure 1). This was done to establish a baseline biological data set that would facilitate the assessment of the condition of the habitats in the future and to allow a judgement to be formed on the current condition of these habitats. Due to the extreme wave exposure of the target sites, it was necessary to consider a series of contingency survey targets in the event of weather conditions preventing access to the primary targets. Weather conditions severely limited time available for surveying the primary targets so attention was diverted to the contingency targets of Loch nam Madadh and Loch Laxford (reported separately in Moore *et al*. 2016 & Moore *et al*. 2017). Additionally, two cave sites in Loch Eriboll were surveyed while sheltering from strong winds and three rocky reef sites were surveyed at St Kilda when wave surge prevented access to the caves. The term 'sea cave' is defined on page 11 of this report.

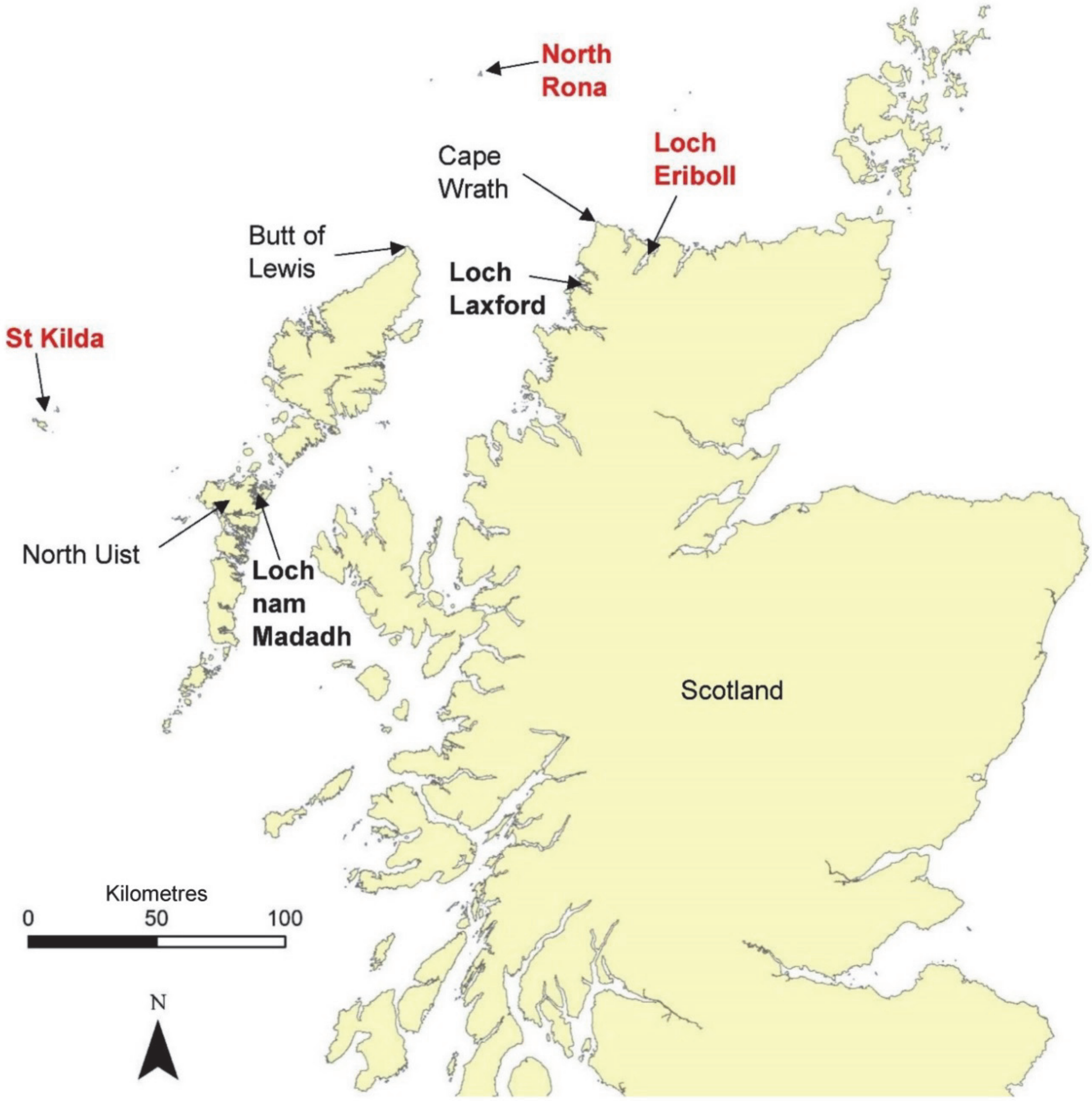

Figure 1. Map indicating location of survey locations covered by this report (bold, red font), contingency survey targets (bold, black font) and other locations mentioned in the text (normal font).

1.1 St Kilda

1.1.1 The physical environment

St Kilda is an isolated archipelago located some 64 km west-northwest of North Uist (Figures 1 and 2). It is formed from the eroded remnants of an ancient volcano and the topography is spectacularly rugged and steep. The largest of the islands is Hirta (670 ha), which has the highest sea cliffs in the United Kingdom. Two smaller islands lie close to Hirta with Soay (99 ha) to the north west and Dun (~30 ha) to the south east. Boreray (86 ha) lies some 6 km north east of Hirta. In addition to these larger islands, there are numerous small islands and rock outcrops including spectacular features such as Stac Lee and Stac an Armin, which are the highest sea stacks in Britain.

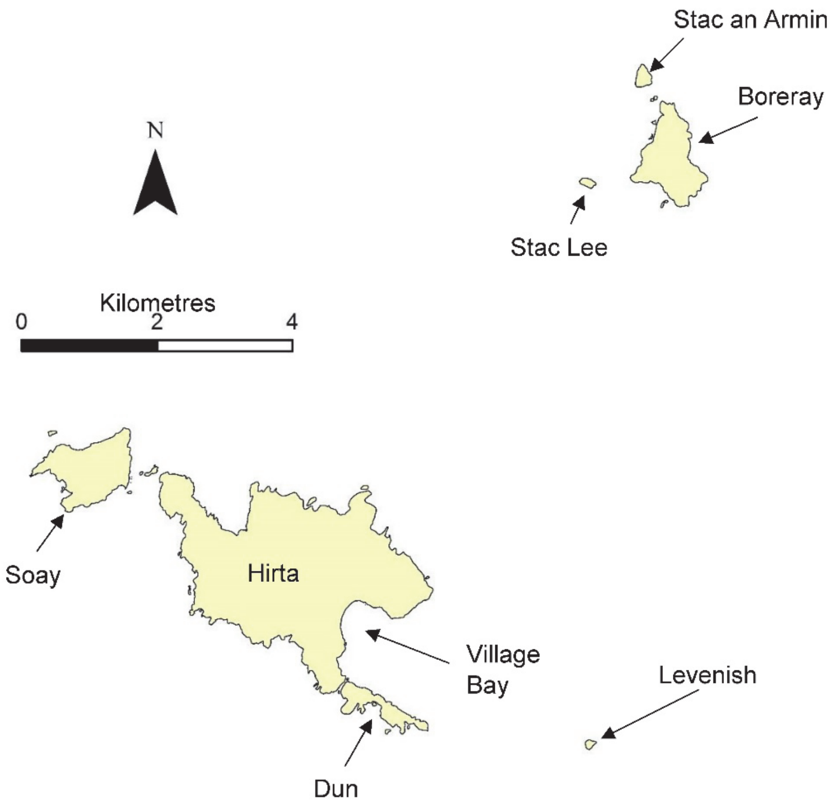

Figure 2. Outline map of the St Kilda archipelago

The archipelago is extremely exposed to wave action, frequently experiencing gales and ocean swells of 5 m or more. The coastline is almost entirely made up of imposing sea cliffs that often continue underwater down to an ancient submerged wave-cut platform at a depth of 40 or 50 m. The cliffs are composed of a range of volcanic rocks and the extreme wave action has formed numerous caves, tunnels and rock arches. The caves are formed through erosion of weak points and existing fractures in the rock and occur around all coasts of the islands. One unusual feature of the caves is that many are partially or entirely submerged. This is a consequence of the subsidence of these islands below the sea surface, which is in contrast to the glacial rebound typical of mainland Scotland. Sea caves are generally formed at sea level where the erosive power of the waves is greatest. Where glacial rebound occurs the caves may be almost entirely intertidal or become elevated features at the rear of ‘raised beaches’. In subsiding areas such as St Kilda the converse occurs and caves may have a deep cave floor or become entirely submerged ‘fossil’ features comparable to the ‘fossil’ caves of raised beaches on the west coast of Scotland.

1.1.2 Previous marine biological studies

Benthic survey work around St Kilda prior to 1997 has been reviewed by Posford Duvivier Environment (1997) and the following account is taken largely from that report.

The intertidal zone around St Kilda largely takes the form of steeply sloping cliffs and rocky shores. Gauld *et al.* (1953) described the zonation of rocky shores in 1952. In the lower littoral zone, *Lithothamnion* encrusted rock supported *Alaria esculenta*, together with sponges, anemones and *Calliostoma* spp. In more sheltered locations extensive areas of *Laminaria* spp. encroached onto the shore. The mid-littoral zone was colonised by barnacles and small numbers of mussels, together with *Gigartina* spp. (assume *Mastocarpus*) and *Patella* spp., in more sheltered areas. The supralittoral zone was dominated by *Patella* spp., and *Porphyra* spp. Watling *et al.* (1970) also examined the littoral algae of St Kilda and described the zonation of almost the entire island as uniformly typical of the most extreme conditions, with the exception of the sheltered Village Bay.

The fauna found in the sand at Village Bay by Gauld *et al.* (1953) was described as sparse and consisted of only four or five species, comprising amphipods, isopods and a polychaete. Dredge sampling of the shallow sublittoral in the bay revealed a sandy substrate extending to 12 m containing a fauna of *Nephtys cirrosa* and *Liocarcinus marmoreus*. Beyond this, the sand graded into shell gravel and the fauna became more diverse and abundant.

In 1984, a sublittoral diving survey of St. Kilda was undertaken, which was designed to include a representative range of habitats (Howson and Picton, 1985). Sixteen sites were surveyed, most of which were located around Soay, Dun and Boreray. Overall habitat diversity was found to be low due to the extremely exposed nature of the islands, with species diversity higher in more sheltered locations. The extreme exposure was evidenced by the virtual absence of species with upright, branching growth forms and the dominance of sponges and encrusting bryozoans. The exceptional water clarity enabled *Laminaria hyperborea* to grow as deep as 35 m. The influence of the North Atlantic Drift allowed for the presence of many species of predominantly southern and western distribution in the British Isles.

Around much of the coastline, sea cliffs were found to continue underwater to depths of 40 - 50 m, before giving way to a boulder slope. *Alaria esculenta* was recorded in the sublittoral fringe being replaced by a forest of *Laminaria hyperborea* generally extending to depths of 25 - 30 m. The rock supported an understorey of thick encrusting sponges such as *Myxilla (Myxilla) incrustans*, colonial ascidians and foliose red algae. Below the kelp forest, the lower infralittoral was characterised by dense *Metridium dianthus* and *Sagartia elegans*, with *Myxilla (Myxilla) incrustans*, *Dictyota dichotoma* and foliose red algae. Circalittoral bedrock was dominated by anemones and sponges, especially *M. dianthus* and *S. elegans*, with *Corynactis viridis*, *Myxilla* spp. and *Alcyonium digitatum* important locally. Deep bedrock plains below 45 m were encrusted with pink coralline algae and supported *C. viridis*, *Caryophyllia (Caryophyllia) smithii* and ophiuroids.

Howson and Picton (1985) identified the tunnels, gullies, caves and arches as constituting the most remarkable features of the islands, noting, "virtually every rock has a tunnel or cave". In shallow waters the effects of surge and scour were extremely apparent, with the walls blanketed with little else than *Myxilla (Myxilla) incrustans*. Where there was some shelter from the surge such as in the tunnel at Rubha Bhrengadal (the southern tip of Boreray), thin encrusting sponges, bryozoans, *Corynactis viridis* and *Sagartia elegans* were abundant. In Sgarbh Stac Arch (Boreray) where the effects of surge are reduced by the size of the arch, *Tubularia indivisa* was found to dominate the biota. The floors of most of the tunnels and caves were found to be lined with boulders, bare in shallower water but supporting *Caryophyllia (Caryophyllia) smithii*, serpulid worms and *Echinus esculentus* in deeper water. *Galathea strigosa*, *G. nexa* and *Bathynectes longipes* were recorded amongst the boulders.

The marine habitats of St Kilda have been mapped by Posford Duvivier Environment (1997), based largely on surveys carried out in 1997. Littoral biotopes are described within nine geographical sectors of the coastline based on records of zonation at 58 sites. The 1997 biotope classification system was employed (Connor *et al*., 1997) and the shore records have not been deposited in Marine Recorder.

Posford Duvivier Environment (1997) also mapped the subtidal habitats using RoxAnn with groundtruthing by ROV at 55 sites (carried out by SNH) and diver MNCR phase 2 surveys at 39 sites (carried out by JNCC). Rather than biotopes, only broad habitat types (*e.g.* rough rock, smooth bedrock, sand) and life forms (*e.g.* faunal turf, kelp) were mapped. Both the ROV and diver groundtruth records, together with 2004 biotope codes, have been incorporated into Marine Recorder.

Twelve of the 39 MNCR phase 2 dive surveys included caves, tunnels or arches. The cave walls were reported to display a faunal turf comprising a diversity of species including the bryozoans *Bugulina flabellata* and *Cradoscrupocellaria reptans*, the ascidians *Polyclinum aurantium* and *Botrylloides leachii*, the anemones *Metridium dianthus* and *Sagartia elegans* and the sponges *Haliclona (Haliclona) urceolus* and *Polymastia mamillaris*. Several hydroid species were also commonly found including *Tubularia indivisa* and *Plumularia setacea*. The base of the caves was often scoured by boulders, which in certain areas were covered in bryozoans, *Spirobranchus triqueter* and *Caryophyllia (Caryophyllia) smithii*. Many of the caves also supported crustaceans and molluscs including squat lobsters, crabs, barnacles, caprellids, topshells and nudibranchs. Overhangs within caves were colonised by dense sponge crusts, anemones, ascidians and bryozoans. The upper surfaces of some of the caves were colonised by short sparse kelp and foliose red algae. Within the caves and above the waterline the rock was dominated by the barnacles *Verruca stroemia* and *Balanus crenatus*.

A second broadscale mapping survey of habitats around St Kilda was carried out in 2000 by Fisheries Research Services, Aberdeen and SNH. The survey employed a range of acoustic survey techniques including RoxAnn, multibeam swathe bathymetry and side-scan sonar, together with groundtruthing by towed video, ROV and grab sampling. Eleven records of ROV observations have been incorporated into Marine Recorder, although these only include physical descriptions of the habitat. SeaMap were subsequently contracted by SNH to create a single interpretation of the distribution of habitats and biotopes around the islands based on data from both the 1997 and 2000 broadscale surveys (Foster-Smith, 2001). As in the case of the 1997 survey, only broad habitat types and life forms were mapped.

Five Seasearch surveys have been carried out between 2005 and 2011, and the data entered into Marine Recorder. Sixteen of these records relate to caves, tunnels or arches.

Marine recorder records for St Kilda surveys are presented in Annex 13. Annex 13a provides a summary of all St Kilda surveys that are included in Marine Recorder, Annex 13b provides the physical sample data and Annex 13c provides the biological sample data. Cave records have been extracted from this dataset. These records are presented in a Cave Inventory (Annex 1) together with data from a variety of other sources.

1.1.3 Conservation designations

The conservation value of the archipelago has been long recognised. In 1957, it was designated as a National Nature Reserve and in 1986, it was designated as a World

Heritage Site on the basis of both natural and cultural importance. It also holds designations as a Scheduled Ancient Monument, National Scenic Area, Site of Special Scientific Interest and EU Special Protection Area. It is under the stewardship of the National Trust for Scotland.

The St Kilda archipelago was designated as a Special Area of Conservation (St Kilda SAC) in 2005 based on the presence of three qualifying features, one terrestrial (vegetated sea cliffs) and two marine: reefs and submerged or partially submerged sea caves.

1.1.4 Human impacts

Archaeological evidence indicates that a small human population has been present on Hirta for most of the time over at least the last 2,000 years. The island was however evacuated in 1930 and since then there have been no permanent residents although there is a small transient population of conservation workers, archaeologists and military personnel maintaining the communications base. In historical times the sustenance of St Kilda inhabitants relied heavily on harvesting the large populations of sea birds as well as some limited agriculture and possibly a small amount of fishing. Since the evacuation of the island, there has been evidence of some ecological change to former agricultural land and to sea bird colonies. However, it is likely that secondary impacts on marine benthic communities due to the sea bird harvesting and the limited fishing activities of the St Kilda residents would have been negligible and any change arising from the cessation of these activities will not be detectable.

There is no evidence that the St Kilda residents engaged in any activities with potential to impact directly on the biota of sea caves. Reference to the use of sea caves is limited to occasional (possibly apocryphal) accounts of caves being used for shelter when caught at sea in small boats with deteriorating weather.

Current potential human impacts on the marine environment relate largely to commercial fishing operations. Up to 12 large vivier crabbers target the more offshore ground including St Kilda (Outer Hebrides Inshore Fisheries Group, 2013), with brown crabs and lobsters being landed from St Kilda. Howson and Picton (1985) state that boats from Cornwall and France were reported to have fished intensively for lobster and crayfish around St Kilda for short periods over the summer.

Scotmap data (Scottish Government, 2014) indicates that few (<4) small crab and lobster creel boats (<15 m in length) target the waters around St. Kilda. There are no equivalent data regarding small trawlers or dredgers at St Kilda.

According to the National Trust for Scotland (2010):

"The marine environment around St Kilda is in near-pristine condition with very little impact from local human activities. Anchoring is limited to a small number of yachts each year and is concentrated in Village Bay where the soft seabed provides good holding ground and results in minimal damage. There is only a small amount of creel fishing in the area for lobsters or crabs. It is not known whether the catch levels are sustainable. The use of mobile gear within the World Heritage Site is occasionally reported, with a scallop trawler being sighted in 2007".

"The main identified threats to the marine WHS, its habitats and species arise from both inside and outwith the WHS, namely from changes in the marine ecosystem (possibly related to climate change); oil and fuel spills; litter; inappropriate discharge of sewage or disposal of food waste; physical damage caused by unsustainable fishing methods, over fishing and marine invasive species, carried on the hulls of visiting boats/ships."

"One of the main threats to the littoral and benthic habitats is from inappropriate fishing methods, particularly mobile gear, which could cause damage to fragile sessile organisms".

These accounts indicate that the level of current fishing activity is relatively light and in any event, it is highly unlikely to impact directly on cave environments. Recreational Scuba diving represents another potential source of disturbance and the sea caves provide attractive dive sites. However, it seems likely that natural disturbance impacts from the frequent storms are likely to far outweigh the limited physical disturbance from occasional divers. The cave biota is adapted to an extremely high-energy environment and it is very unlikely that current levels of diver-induced disturbance would be sufficient to cause any change in community composition.

1.2 North Rona

1.2.1 The physical environment

North Rona is a remote island located some 65 km north-northeast of the Butt of Lewis in the Outer Hebrides (Figure 1 and Annex 6B). It is relatively small (109 ha) and low profile (108 m maximum elevation). The island is formed of highly metamorphosed Precambrian (Lewisian) rocks similar to those of the Outer Hebrides and north west Scotland.

The island is extremely exposed to wave action and the coast is predominantly rocky with substantial sea cliffs in the more elevated southern part of the island. Weaknesses and fractures of the rock have been scoured out by wave action in some areas forming substantial sea caves and geos. At least some of the caves extend subtidally to a significant depth while others appear to be predominantly intertidal.

1.2.2 Previous marine biological studies

Its remote location and difficult access has resulted in little available published information on marine benthic habitats and biota. A 1972 survey of the littoral algae of the island by Gilbert *et al.* (1973) found the shore communities to be similar to those on Fair Isle, Lewis and northern Scotland. The shore flora included *Alaria esculenta*, *Mastocarpus stellatus*, *Palmaria palmata*, *Polysiphonia stricta*, *Porphyra umbilicalis* and *Fucus spiralis* in its *nana* form. Another fucoid, the northern *Fucus distichus edentatus* (*i.e. Fucus edentatus*), has its southern limit on North Rona, and another subspecies, *anceps* (*i.e. Fucus distichus*), is also found here (Powell 1957, 1958).

Some information on the sublittoral benthic habitats around Rona is available from expeditions by amateur surveyors. A 1985 BSAC expedition examined 14 sites around North Rona and found the sublittoral habitats and communities to be comparable to those around St. Kilda (Brown, 1985); two cold-water species, the wolf fish *Anarhichas lupus* and the anemone *Phellia gausapata* were recorded from both locations. A 2010 Seasearch survey (Seasearch, 2010) recorded habitat descriptions at four sites with biotopes allocated at three of them.

Mapping of the sublittoral habitats around Rona was carried out in 2009 (Axelsson *et al.*, 2010) using sidescan sonar with groundtruthing by video and still photography. The survey revealed a heterogeneous seabed environment dominated by bedrock with predominantly coarse sand and gravel in the gullies and channels between rocky outcrops. The shallower seabed environment off the east of the island was dominated by kelp biotopes such as **IR.HIR.KFaR.LhypR.Ft** and **LhypR.Pk**, whereas the generally deeper area off the west coast supported mostly faunal crust communities, particularly **CR.MCR.EcCr.FaAlCr.Bri** and **CR.MCR.EcCr.FaAlCr.Car**. Little groundtruthing was carried out off the south coast and this is reflected in the ascription of a higher biotope complex (**CR.MCR**) to much of this area.

Although the objectives of the 2009 broadscale survey also included mapping of the intertidal area and the sea caves, logistical problems prevented achievement of these targets. However, the location of some of the caves was apparently discernible on the sidescan imagery and the areas containing the main caves were indicated by polygons in the report. No accounts of any of the North Rona sea caves have been identified. The 1:10,000 Ordnance Survey map indicates the location of two coastal rock arches and 13 coastal caves, although some of these may not be sea caves.

Marine recorder records for North Rona surveys are presented in Annex 14. Annex 14a provides the physical sample data and Annex 14b provides the biological sample data. Cave records have been extracted from this dataset and together with data from a variety of other sources are presented in a Cave Inventory (Annex 6).

1.2.3 Conservation designations

The island of North Rona and the adjacent inshore area was designated as a Special Area of Conservation (North Rona SAC) in 2005, principally for the protection of the grey seal population, but with reefs and submerged or partially submerged sea caves as additional marine qualifying features. The designation also includes the terrestrial interest feature of Vegetated Sea Cliffs. The island is also encompassed by other designations such as Rona and Sula Sgeir National Nature Reserve, North Rona and Sula Sgeir Special Protection Area, and North Rona and Sula Sgeir SSSI. These designations are focussed on sea bird conservation rather than marine habitats.

1.2.4 Human impacts

Archaeological and historical evidence indicates that very small resident human populations have occupied North Rona at various times in the past. This occupancy has been punctuated by periods of depopulation due to disease or famine and there have been no permanent residents since the 1880s. It is unlikely that the activities of the residents (mostly sheep rearing & sea bird harvesting) would have had any significant impact on the marine benthos, and they are of no conceivable relevance to the current state of the marine biota.

Current potential human impacts on the marine environment relate largely to commercial fishing operations. Up to 12 large vivier crabbers target the more offshore ground including North Rona (Outer Hebrides Inshore Fisheries Group, 2013), with brown crabs and lobsters being landed from North Rona.

Scotmap data (Scottish Government, 2014) provides no data on fishing activity by small (<15 m in length) creel boats or small trawlers or dredgers at North Rona.

These accounts indicate that the level of current fishing activity is relatively light and in any event, it is highly unlikely to impact directly on cave environments. Recreational Scuba diving represents another potential source of disturbance and the sea caves provide attractive dive sites. However, it seems likely that natural disturbance impacts from the frequent storms are likely to far outweigh the limited physical disturbance from the few divers who make it out to North Rona. The cave biota is adapted to an extremely high-energy environment and it is very unlikely that current levels of diver-induced disturbance would be sufficient to cause any change in community composition.

1.3 Loch Eriboll

1.3.1 The physical environment

Loch Eriboll is located on the northern coast of Scotland some 20 km east of Cape Wrath (Figure 1 and Annex 9B) and has been used by vessels for centuries as a refuge from the often rough seas of the Pentland Firth and Cape Wrath. The loch is approximately aligned south west to north east and is about 15 km in length and 2 to 3 km in width.

Most of the loch shore is formed of Cambrian quartzite but significant stretches of the eastern shore are composed of Cambrian limestone as well as areas of Lewisian gneiss. There is a wide variety of shore types around the loch ranging from imposing sea cliffs to extensive sandy beaches. Exposure levels are also varied with generally sheltered conditions prevailing in the inner parts of the loch while many of the shores at the mouth of the loch are highly exposed. Sea caves are present in the exposed outer areas, particularly in the quartzite sea cliffs south of Whiten Head.

1.3.2 Previous marine biological studies

A number of benthic surveys of varying intensity have been conducted within Loch Eriboll although none have specifically targeted sea caves. In 1974, the shores of the loch were surveyed by the University of Dundee (Jones 1975). Eleven sites were surveyed within the loch, none of which included sea caves. Unsurprisingly, no sites were surveyed on the steep inaccessible rocky shores of the north east coast of the loch where many sea caves are present. The overall conclusion of the survey was that the coast of the outer part of the loch was predominantly rocky and characterised by communities dominated by barnacles and *Mytilus*. In the more sheltered areas further within the loch (where the presence of caves is unlikely), the shore substrates are more variable in composition and there is increasing dominance of rocky substrates by fucoid algae.

In 1986, a sublittoral survey was conducted within the loch by University of Manchester (Moss 1986). Some 35 sites were surveyed at selected locations throughout the loch system. The records mention ‘caves’ at two locations. One of these is at an unexpected location on the northern tip of Eilean Choraidh in the relatively sheltered inner part of the loch. However, a scrutiny of the description indicates that the feature (“a shallow cave”) was an overhanging part of a rock wall rather than a genuine sea cave. The other location was at Mol Mhor on Whiten Head. Two distinct features are described. Again, the site sketches indicate that the first feature refers to the undercut base of a rock wall (“overhanging 'cave' at 13 - 14 m BCD”). The second feature appears to be a genuine sea cave (“sea cave with entrance about 5 m above water”). It appears to be limited in extent (“Cave narrowed rapidly to water level in a gully about 6 - 7 m long” based on Marine Recorder record) with walls dominated by encrusting sponges and colonial ascidians. The survey indicated a wide range of sublittoral communities within the loch. In the outer part of the loch forests of *Laminaria hyperborea* tend to dominate rocky substrates and were reported to be subject to moderate levels of grazing by *Echinus*. Diversity of epibiota was not regarded as particularly high in the area but the range of ascidians present at the more exposed sites was remarked upon.

Additional data is available from a number of Seasearch surveys. In 2002, there are records from 6 locations, 1 location in 2010, 15 locations in 2011 and 2 locations in 2012. Only two records (both from 2011) include reference to sea caves. The first was at Freisgill Head and includes records from well-illuminated bedrock in the “mouth of large cave/gully”. The biota was characterised as “short animal turf consisting of various sponges, hydroids and sea squirts”. It appears that the cave itself was not entered. The second was from a site on Whiten Head and merely notes that “sea caves present but not surveyed”.

The deeper areas of the seabed of the loch have been surveyed by drop-down video in 2011 and 2012 (Moore 2012; Moore & Atkinson 2012). These surveys were obviously not conducted in environments likely to include sea caves and provide no additional records of sea caves. They concluded that the majority of the deeper seabed of the inner loch is composed of burrowed mud (**SS.SMu.CFiMu.SpnMeg**) whereas coarser sediments

(**SS.SSa.CFiSa**) with occasional rocky outcrops (**CR.MCR.EcCr.FaAlCr**) predominate in the outer loch.

The few other records present in Marine Recorder include the survey of a saline lagoon at the head of the loch in 1994 and a record from Whiten Head based on archived photographs.

Marine recorder records for Loch Eriboll surveys are presented in Annex 15. Annex 15a provides the physical sample data and Annex 15b provides the biological sample data. Cave records have been extracted from this dataset and together with data from a variety of other sources are presented in a Cave Inventory (Annex 9).

1.3.3 Conservation designations

Loch Eriboll includes two SSSIs and was formerly designated as a Marine Consultation Area with marine habitats, birds and seals underpinning the citation. One of the SSSIs is on the eastern shore of the middle part of the loch and is designated for geology and terrestrial botany interests. The other SSSI is Eilean Hoan in the outer loch, which is designated for bird interests and also forms part of a wider SPA.

1.3.4 Human impacts

The area surrounding Loch Eriboll is sparsely populated and human impacts are likely to be minimal. This is particularly the case in the exposed outer loch where the caves are located. Recreational divers visit this area but the intensity of diving is probably minimal and unlikely to have an impact on the benthic communities.

Some aquaculture activities are conducted but are restricted to more sheltered areas in the inner loch. Development of quarrying on the west shore of the loch has been under consideration in the past but has not come to fruition. The loch has a history of military use, being intensively used as an anchorage during both world wars and more recently during training exercises. A *Nephrops* fishery exists in the central area of the loch and a limited amount of creeling for lobster and crab occurs in the outer part of the loch.

1.4 Condition monitoring of sea caves

Site Condition Monitoring (SCM) is undertaken to determine whether the biological condition of the interest feature (submerged or partially submerged sea caves) is being maintained and to guide site management action where appropriate. The purpose of the current study was to initiate SCM of the sea caves of the St Kilda and North Rona SACs. This inaugural work was undertaken in such a way as to achieve the following objectives:

- to establish a baseline biological data set that will facilitate the assessment of the favourable condition status of the habitats in the future; and
- to allow Scottish Natural Heritage to form a judgement on the current condition of the habitats in the light of existing SAC management measures.

To fulfil these objectives sea cave distribution was examined, and for selected caves, the topography was mapped and the biotopes surveyed by MNCR phase 2 methodology at relocatable points along the cave system.

Common Standards Monitoring (CSM) guidance has been drawn up in order to ensure a uniform approach to the monitoring of the condition of features (Anon, 1998). Thus, for the purposes of monitoring, each feature is represented by a series of attributes, which are measurable indicators of the condition of the feature at the site. For each attribute (*e.g.*

extent of a habitat or presence of representative / notable biotopes), a target is set which is considered to correspond to the favourable condition of the feature.

The Common Standards Monitoring guidance produced for sea caves (JNCC, 2004) lists attributes of the habitat together with the corresponding targets that should form the basis of the site condition monitoring (Table 1).

Table 1. Site attributes that should be utilised to define the condition of sea cave features in site condition monitoring (JNCC, 2004). All attributes are discretionary.

Attribute	Target
Extent of cave(s)	No change in dimensions of a cave, allowing for natural change that is part of a wider coastal geomorphological management regime.
Number of caves in site	No reduction in the number of caves within a site allowing for natural change.
Biotope composition of a cave	Maintain the variety of biotopes identified for the cave, allowing for natural succession or known cyclical change.
Presence of representative/ notable biotopes	Maintain the presence of the specified biotope, allowing for natural succession/ known cyclical change.
Species composition of representative or notable biotopes	No decline in biotope quality due to change in species composition or loss of notable species, allowing for natural succession/ known cyclical change.
Presence and/or abundance of specified species	Maintain presence and/or abundance of the specified desirable species. Absence of the specified undesirable species (such as an invasive non-native species).

In this project, the attribute ‘Extent of cave(s)’ is addressed by the topographic surveys conducted within selected caves. The attribute ‘Number of caves in site’ is addressed by the cave inventories compiled for each location. Remaining attributes are supported by the biological data collected within each of the surveyed caves.

It is necessary to consider what features characterise a ‘cave’. Although the term ‘cave’ is generally understood the distinction between rock arches, alcoves, rock overhangs and caves can be blurred. The Interpretation Manual of European Union Habitats (European Commission, 2007) does not attempt to define the term ‘cave’. It provides a definition of a sea cave that could be paraphrased as a cave that is wholly or partially within the sea (‘Caves situated under the sea or opened to it, at least at high tide, including partially submerged sea caves. Their bottom and sides harbour communities of marine invertebrates and algae.’). Common standards monitoring guidance refers to a working definition of a cave proposed by Bunker and Holt (2003) who state that “a cave must be large enough to get a surveyor fully into the cave, turn round and exit without damaging the attached flora and fauna”. However, this definition is sufficiently broad to encompass large rock alcoves and overhangs where environmental conditions and biotic communities are likely to be indistinguishable from those of the open coast. The only biologically relevant parameter that consistently distinguishes caves from similar features is light. Surge gullies, rock arches, alcoves and rock overhangs are usually relatively well illuminated, whereas caves are typically dark. Chapman (1993) has proposed a useful biological definition of caves as “perpetually-dark voids, bounded by rock or similar inorganic materials and filled with gas and/or water”. Accordingly, we regard ‘caves’ which are fully illuminated due to large entrances to be a poor example of the feature and have attempted to concentrate efforts on sites where there is a significant reduction of light intensity within the cave.

2. METHODS

2.1 Cave surveys

Detailed biological and physical surveys were conducted at four cave sites on St Kilda, three at North Rona and two at Loch Eriboll. The intended criteria for selecting specific caves for detailed survey included the requirement that individual caves should represent the broadest available range of cave habitats (*i.e.* longer, extensive caves with a large depth range). Ideally, sites would also represent a wide range of environmental conditions (*i.e.* caves from different parts of the coasts, caves of differing exposure levels etc.). However, choice of sites was severely constrained by weather conditions. Consequently, the choice of survey sites was limited to those that could be located and safely accessed in the brief time intervals of relatively calm sea.

Where sea conditions were suitable, the coast was systematically examined at close quarters from an inflatable boat. All inlets, alcoves or other potential cave sites were investigated. Cave entrances were photographed and coordinates recorded. Where time and sea conditions allowed, the caves were entered by a snorkeler to gather information on passage length and main biota. For St Kilda and North Rona this process involved checking a number of sites noted in pre-existing literature and on ordnance survey maps. The purpose of this exercise was to work towards developing a comprehensive inventory of the caves around each site. This inventory provides a basis for selecting the most suitable sites for detailed monitoring surveys and also addresses the monitoring attribute ‘number of caves in site’.

Monitoring surveys of caves were initiated by conducting a physical survey and deploying a relocatable fixed datum line for precise spatial mapping of biotopes. Methods are adapted from Ellis (1988) and have formerly been used in Berwickshire (ERT, 2004), on Papa Stour (ERT, 2005) and on Mousa (Harries *et al.*, 2009). The physical survey addresses the attribute ‘extent of cave(s)’. It also provides a means of defining the location of points within the cave from which biological data was recorded and enables those points to be relocated by subsequent monitoring surveys.

A point on the upper shore/supralittoral just outside the cave entrance was marked with a galvanized metal piton hammered into a rock crevice. The position of the marker was fixed by dGPS and several photographs taken of it from different viewpoints, with the position of the camera recorded by dGPS and the bearing to the marker taken with a sight-bearing compass. This piton provided the relocation point for a fixed line that was set up within the cave to act as a datum line to define the position of points within the cave. The line was set up to run in straight line sections with additional pitons positioned between each section as required to prevent the line being forced into a curve by obstructions or changes in the direction of the cave passage. The compass bearing and length of each section of line was recorded and the height/depth of the individual pitons was noted at the beginning and end of the section. An approximate plan view sketch was produced of the cave floor with notes on the composition of the substrate. At selected points along the line the cross-sectional shape of the passage was sketched and the cross sectional dimensions (*e.g.* distance to floor, ceiling and both walls) was estimated in relation to the fixed datum line. The arrangement of the datum line is typically a near vertical descent from the relocation piton to a start piton located below the water surface. The line then continues along a single wall when possible, following the main axis of the cave. Pitons were photographed or videoed to aid future surveyors in repositioning the datum line.

Following the physical survey, an assessment was made of changes in biological communities along the length of the cave and a series of locations were identified for subsequent collection of biological data from cross sections of the cave passage. Typically, two biological cross section surveys were conducted in each cave at the specified distances along the datum line. The biological surveys were conducted within a 2 m wide band up one wall of the passage. Where appropriate, the wall was subdivided into biological zones and the depth of the zone boundaries recorded. Within each biological zone, the abundance of each component species was estimated using the MNCR SACFOR scale and notes made on the nature and inclination of the substrate. Where appropriate, samples were collected to establish the identity of difficult, cryptic or morphologically variable biota.

Video footage was obtained along the length of the cave using the datum line for orientation and detailed footage was obtained of the biota at each of the biological cross sectional survey locations. Additional underwater wide angle and macro digital still images were taken to illustrate the biota at the biological cross sectional survey locations.

Excessive wave surge necessitated modifications to the methodology at a number of sites. Such modifications are noted in the Results section and typically consisted of the avoidance of shallower areas due to wave surge and inability to place an intertidal relocation piton.

Where the terms ‘left’ and ‘right’ are used in the context of cave descriptions the orientation is as viewed into the cave

2.2 Reef surveys

Reef surveys were conducted at three locations on St Kilda. The aim was to survey the biota along a relocatable transect running contiguously from the supralittoral into the sublittoral.

To mark the transect, fixed, relocatable points were established at the top of the shore. Transect markers consisted of a galvanized metal piton hammered into a rock crevice. The position of the marker was fixed by dGPS and several photographs taken of it from different viewpoints, with the position of the camera recorded by dGPS and the bearing to the marker taken with a sight-bearing compass. The route of the transect was marked by a 200 m graduated line attached to the transect marker. The line followed a constant bearing down the shore and extended into the subtidal, where it was laid along the seabed by diver, with the addition of weights at strategic points. The transect extended to a maximum depth of 20 m unless constrained by other factors.

The transect was split up into a series of zones which were defined in terms of differences in the composition of the biological community and/or by changes in substrate type. Zone boundaries along the transect were recorded in terms of distance along the graduated line and vertical height relative to the station marker. Intertidally, this height was determined using an inclinometer; subtidally, the depth of water was measured. Subtidally, the depth and distance was also measured at intervals enabling a topographic profile of the transect to be drawn subsequently.

A band 2 m either side of the tape was surveyed by two workers intertidally and two workers subtidally. Within each zone, records were taken of substrate type and biota abundance, with collection of material for laboratory examination where *in situ* identification was not possible. Video footage was obtained along the length of the transect using the datum line for orientation. Additional digital still images were taken to illustrate the biota of the transect zones.

Sea conditions and time constraints necessitated some modifications to the methodology and such modifications are noted in the Results section.

All coordinates were generated by differential GPS receivers (Garmin Montana 600) set to the WGS84 datum. Depths and heights were related to chart datum by determination of the tidal rise using TotalTide software (Hydrographic Office, Taunton). The secondary port of 'Hirta' was used for the St Kilda sites, 'Rona' used for North Rona and 'Portnancon' used for Loch Eriboll. In the text of this report, the heights / depths of locations are refered to as metres 'ACD' (above chart datum) or metres 'BCD' (below chart datum) as appropriate.

Surface stills photography and video were recorded using Nikon Coolpix S32 cameras. Underwater stills photography was taken with a Nikon D4 and a Nikon D700 camera. Wide-angle photographs utilised a 15 mm lens and macro photographs were taken with a 105 mm lens. Underwater video footage was taken with a Canon Legria HF S30 video camera.

2.3 Data processing

2.3.1 Cave inventory

Historical records from cave sites were plotted using ArcGIS 10.2.2 and cross-referenced with information noted in 2015. Erroneous coordinates and duplicate records of the same cave were identified and corrected where possible by scrutiny of descriptive accounts and published maps of cave locations. All accessible records were collated to produce a detailed geo-referenced cave inventory for each of the three areas. Caves were categorised based on the degree of certainty that a cave is present and based on the availability of biological data.

2.3.2 Physical data

Recorded distances between points along the cave physical surveys and reef transects were converted to horizontal distances by trigonometry and the physical data used to construct cave floor plans, cave profiles and reef profiles. These were plotted manually on graph paper and subsequently digitised for annotation summarising the substrate type, dominant biota and biotopes within the surveyed areas.

2.3.3 Voucher specimens

Whenever possible, voucher specimens were treated with an appropriate relaxant (menthol, carbonated water or magnesium chloride) before preservation in formaldehyde or ethanol. Some material was preserved directly in absolute ethanol to allow for the potential of future molecular taxonomic study.

Over 650 voucher specimens were collected for validation of *in-situ* records. Sponges were an important component of the biota at many sites and the collection includes ~175 sponge specimens. Spicules were extracted using nitric acid in the case of silicaceous sponges and bleach in the case of calcareous sponges. Canada balsam was used to make permanent mounts of the spicules, several representative images were taken of each microscope slide and eyepiece graticule measurements made of a range of spicules where appropriate. Identifications utilised Ackers *et al.* (2007). Cnidarians were represented by ~55 specimens with anthozoans and hydroids composing a significant component of the biota at some sites. Identifications were made using Manuel (1981) for the anthozoa, Schuchert (2012) for athecate hydroids and Cornelius (1995) for thecate hydroids. All specimens were examined using a dissection microscope and in the case of certain hydroids temporary slides prepared for examination with compound microscope. Within the polychaetes (~50 specimens), small sabellids and spirorbins were a prominent component at many sites. These were examined using a combination of dissection and compound microscopy and identified using Hayward & Ryland (1990). Within the Crustacea (~95 specimens), tube dwelling amphipods were a significant component of the biota at certain sites. Identifications were made at NMS using appropriate microscopy and literature including Lincoln (1979) for the amphipods. Molluscs were represented by ~60 specimens identified at NMS using appropriate literature and microscopy. Bryozoans were represented by ~95 specimens. Crisid turf was a significant component of the cave biota at a number of sites. Crisids were identified using Hayward & Ryland (1990). Other bryozoan taxa were identified using Ryland & Hayward (1977), Hayward & Ryland (1979) and Hayward (1985). Echinoderms were represented by 25 specimens and were identified with Southward & Campbell (2006). Ascidians were represented by ~75 specimens with didemnid and polyclinid ascidians forming an important component of the biota at a number of sites. Identifications were made by dissecting zooids out from the tunic and examining under the compound microscope. Identification literature was primarily Millar (1970). Taxon names were synonymised to correspond to WoRMS (2017).

2.3.4 Biological data

Wherever possible, *in-situ* species identifications were validated (and corrected where appropriate) by detailed cross-referencing with the identifications of the voucher specimens and with macro photographs. *In-situ* abundance records were also validated (and adjusted where appropriate) by detailed cross-referencing with video footage and stills images. Abundance scales were assigned using the MNCR SACFOR scale. Similarly, site descriptions were cross-referenced with video and stills imagery for consistency and validation. Biotopes were assigned based on the classification scheme of Connor *et al.* (2004).

2.3.5 Site coding

Surveyed sites have been allocated a formal site code and a site name relating to neighbouring geographic features (where possible). The format of the site code includes an initial pair of characters to indicate location (i.e, ‘SK’ denotes St Kilda, ‘NR’ denotes North Rona and ‘LE’ denotes Loch Eriboll), a second pair of characters denotes the year of survey (*i.e.* ‘15’ denotes 2015) and a third pair of characters denotes the feature surveyed (*i.e.* ‘CV’ denotes cave, ‘IR’ denotes intertidal reef and ‘SR’ denotes subtidal reef). The final pair of characters identifies the specific site such that ‘SK15CV02’ indicates the second cave site surveyed at St Kilda in 2015.

Individual zones within reef sites are identified by a suffix identifying the number of the zone (*i.e.* ‘SK15SR02.1’ denotes ‘zone 1’ of the second subtidal reef site at St Kilda). For cave sites the suffix indicates both the cross section number and zone number (*i.e.* ‘SK15CV01.2.3’ denotes the third zone on the second cross section of the first cave surveyed at St Kilda).

During the survey fieldwork, cave sites were allocated a ‘cave inventory code’ (CI1, CI2 etc) when initially examined. Those selected for survey were referred to by a ‘field reference’ name or code which was used on the written labels of the voucher collection. The ‘field reference’ and ‘cave inventory code’ are cited in the Results section and in appropriate appendices to ensure specimens and field records can be linked to the relevant survey location.

3. RESULTS

3.1 St Kilda Caves

Ideally, the 2015 survey would have covered a much greater area of the coastline in the search for caves and those surveyed would have been selected from a greater range of sites to give wider geographical coverage. However, the survey period was constrained by weather conditions to a period of less than three days and the majority of the coastline remained inaccessible over this period due to wave surge. Consequently, the search for caves was limited to parts of the eastern coasts of Hirta and Boreray (Figures 3 and 5) and the selection of caves for survey was limited to the very few sites that could be located and safely entered in the prevailing conditions. Nevertheless, the four surveyed caves were distinctly different in position and physical structure and hence represented a range of different cave habitats. SK15CV01 was an exposed and extensive shallow subtidal site, SK15CV02 was a somewhat less exposed and less extensive shallow subtidal site, SK15CV03 was an entirely submerged deep-water cave and SK15CV04 was an entirely intertidal cave. All four were in the general vicinity of Village Bay on Hirta (Figure 3) which was unsatisfactory in terms of geographic spread but does provide an advantage in terms of accessibility for repeat monitoring surveys.

3.1.1 Cave inventory

An examination of existing literature and ordnance survey maps produced a total of some 113 records relating to cave sites distributed around the islands of the St Kilda archipelago. A further 15 records were added during the 2015 survey to give a total of 128 cave related records. It should however be noted that some of the historical records are undoubtedly duplicate records of the same site. Duplications may not be readily identifiable because descriptive accounts of the sites may vary in their detail and in their accuracy. It should also be noted that prior to the availability of dGPS the coordinates of the recorded sites may be approximations and it may not be obvious that two or more records actually refer to the same feature. Prior to the switching off of ‘selective availability’ in May 2000, coordinates derived from non-differential GPS units could be up to 100 m inaccurate. Even today, the position of the caves at the base of tall cliffs may limit the accuracy of the GPS coordinates. Caves noted on ordnance survey maps do not always have their position precisely defined. It is also likely that some of these will not have been examined at close range before being marked on the maps. In at least one case, a cave noted on an ordnance survey map turned out to be a dark shadow at the base of a cliff which only appeared to be a cave when viewed from a distance. The records were scrutinised to identify duplications and correct coordinate errors where appropriate. This reduced the inventory to a list of 85 potential separate cave sites. The records were also categorised in relation to the degree of confidence that a cave is actually present and the availability of biological data. This information is summarised in table 2 and the cave locations are shown in figures 3, 4 and 5. The full list of cave related records is presented in Annex 1.

Table 2. A breakdown of the numbers of cave records contained in the Cave Inventory arranged by island. Shows separate figures for total records of individual caves, records that indicate a high level of confidence in cave presence and records with associated biological data or notes.

Area	Number of potential cave sites	Number of cave sites where there is high certainty of cave presence	Number of cave sites for which there are biological records
Dun	15	12	4
Hirta	40	21	6
Soay (& assoc. stacks)	12	9	2
Boreray (& assoc. stacks)	16	12	5
Levenish	2	1	1
TOTAL	**85**	**55**	**18**

In summary, of the 85 identified sites there is reasonable confidence that 'caves' of some sort are present at 55 of them. However, this does not imply they will be good examples of the feature and some may be short in extent, impassably narrow, or fully illuminated. Only a direct assessment of each site would allow for an assessment of their representativeness as cave habitats. The remaining 30 sites are also worthy of examination as some may provide good examples of cave habitats. Biological records are available from 18 separate cave sites. However, the level of detail of information is not uniform for these 18 sites and in some cases inconsistencies in geographic coordinates create uncertainty regarding the location at which the biological data was collected.

It should be noted that the Cave Inventory is almost entirely limited to caves that are visible from the surface. Many of the Kilda caves have a substantial subtidal component and some are known to be entirely subtidal (*e.g.* SK15 CV03). Such caves are likely to be very difficult to detect and will only be discovered if divers encounter them by chance. A systematic search for subtidal caves around the islands is impractical and it is likely that many will remain undetected. Consequently, it is probable that the total number of caves is likely to be underestimated. However, it should also be considered that the number of extensive caves providing a good example of the habitat is likely to be much lower than the actual number of caves present. Many are likely to be short in extent or be fully illuminated and hence not representative of the interest feature.

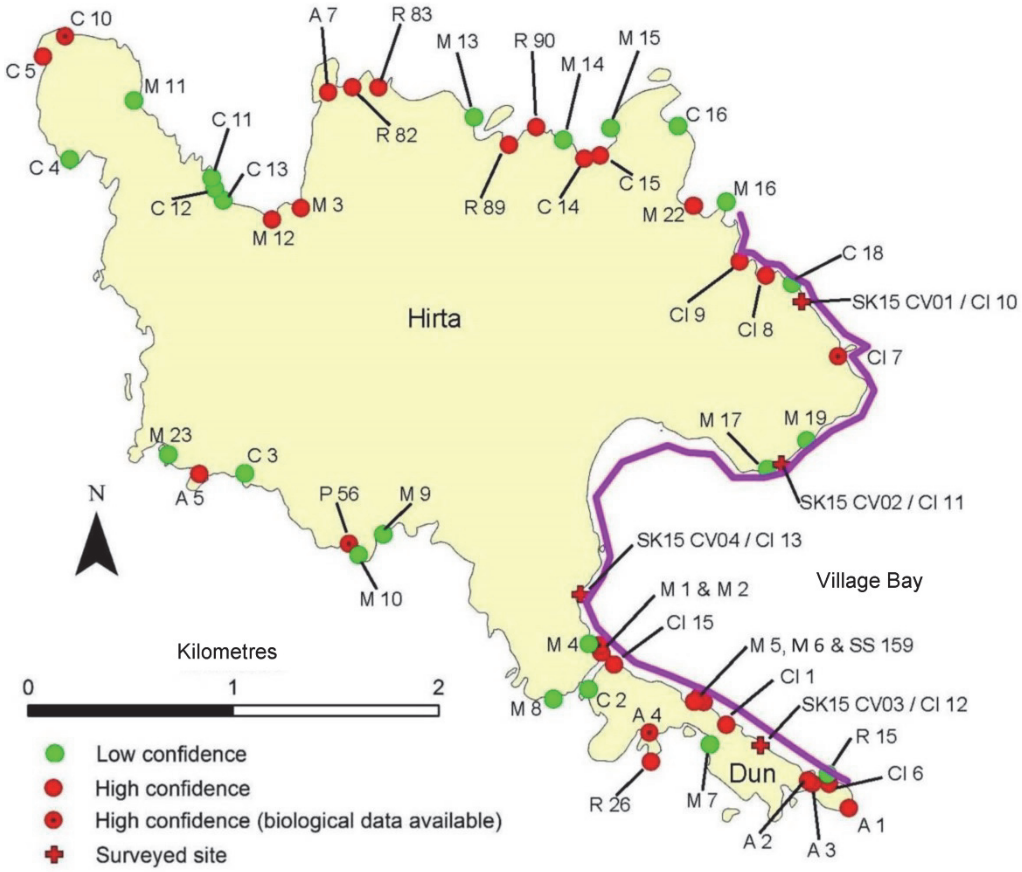

Figure 3. Outline map of Hirta showing location of cave sites based on historical records and direct observation. Symbols indicate level of confidence in evidence of cave presence and availability of biological data (see legend). Site codes relate to entries in Cave Inventory table (Annex 1). Purple line denotes area of coast directly assessed for cave presence in 2015.

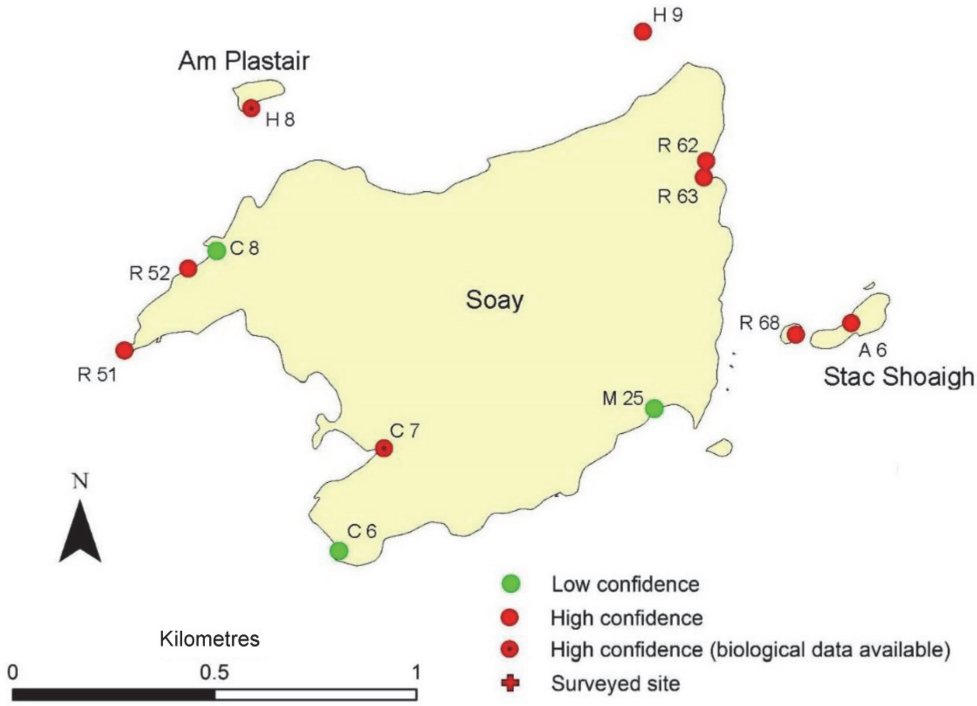

Figure 4. Outline map of Soay showing location of cave sites based on historical records and direct observation. Symbols indicate level of confidence in evidence of cave presence and availability of biological data (see legend). Site codes relate to entries in Cave Inventory table (Annex 1).

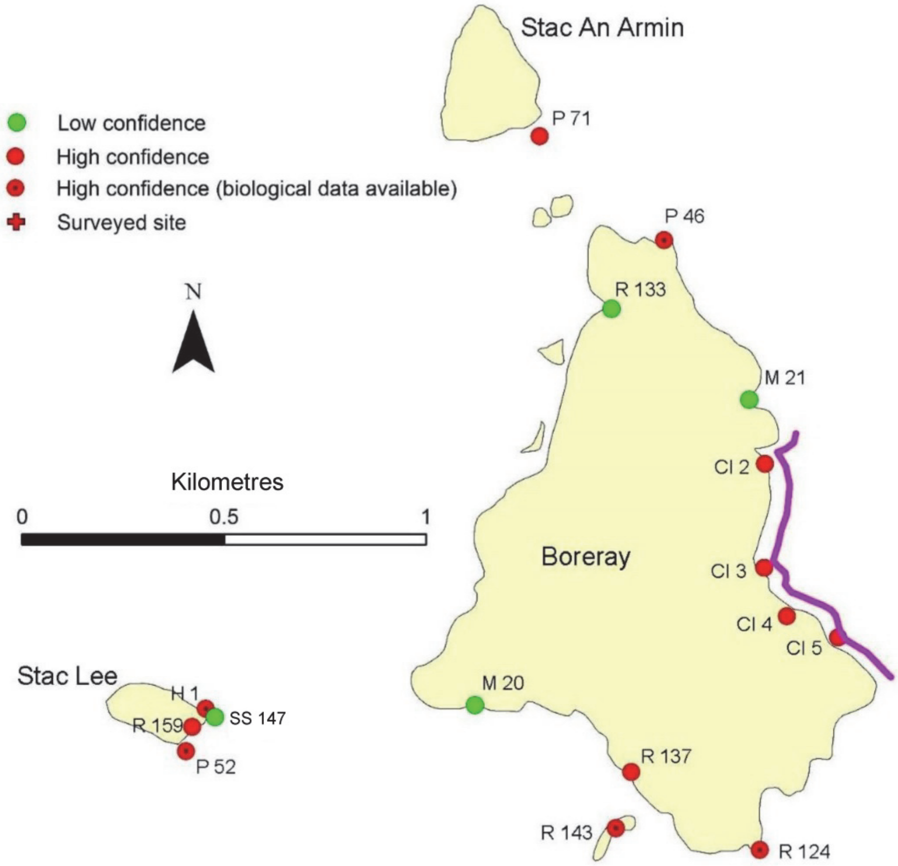

Figure 5. Outline map of Boreray showing location of cave sites based on historical records and direct observation. Symbols indicate level of confidence in evidence of cave presence and availability of biological data (see legend). Site codes relate to entries in Cave Inventory table (Annex 1). Purple line denotes area of coast directly assessed for cave presence in 2015.

3.1.2 SK15 CV01 – Geo na Muirbhuaile

(field ref. 'Seal Cave'; cave inv. code 'CI10')

Physical
A large arched entrance at the base of the high cliffs on the east side of Hirta gave access to a large and generally linear cave passage that extended into the island approximately westward for more than 100 m. The first 100 m of this passage were surveyed.

The floor of the passage was at a depth of ~25 m BCD at the entrance and rose gradually to a depth of 12.5 m BCD at a point 100 m in from the entrance. The majority of the cave floor was composed of well rounded, mobile boulders and cobbles. In places there were bedrock outcrops and pinnacles (*e.g.* at ~90 m from the entrance) but all surfaces in the floor area were smoothly rounded.

Most sublittoral passage walls were steep bedrock with relatively few significant ledges. Intertidal passage walls and the ceiling in the entrance area were all steep or overhanging bedrock with the cave ceiling estimated to be at about 8 m ACD. Further within the cave the surveyors avoided these shallower and surface areas due to excessive wave surge.

Biological
The boulder floor showed clear signs of the effects of scour throughout the cave and this was also clearly evident on the lower walls (for up to ~1 m above the floor). In these areas much of the rock surface was barren apart from some sparse bryozoan crusts and small patches of tube turf (mainly formed by *Jassa falcata*), particularly where crevices provided some level of protection from the scour (**IR.FIR.SG.CC.Mo**).

Subtidal parts of the cave walls were generally dominated by a dense and extensive bryozoan turf principally composed of crisids (*Crisia eburnea* and *Crisidia cornuta* in particular) (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**). However, a diverse range of other encrusting biota were also present in relatively low abundance. Sponges were a major component of the biota with a range of species present (*Halichondria (Halichondria) panicea* and species of Calcarea in particular). Colonial ascidians were widespread with *Polyclinum aurantium* being particularly prevalent. Bryozoan crusts were a significant component of the community and scattered *Dendrodoa grossularia* were present in some areas although not forming the dense carpets reported from other sites. A turf of tubes formed by the amphipod *Jassa falcata* (sometimes also including small sabellids of the genus *Amphicorina*) was often interspersed with the bryozoan turf and in the inner part of the cave this tube turf dominated the lower part of the cave walls.

Some evidence of vertical zonation was apparent on the subtidal cave walls. At 25 m from the entrance, the base of the cave wall was heavily scoured and bryozoan turf dominated most areas above the scoured zone. But on the shallower upper areas of the wall the cover of bryozoan turf was diminished and more patchy. In this area *Tubularia indivisa*, *Metridium dianthus*, bryozoan crusts and crusts of coralline algae were more prominent than noted on deeper parts of the wall. The base of the wall at 85 m within the cave was also scoured and relatively barren. Moving up the wall the biota became more profuse, initially only in protected crevices but then expanding over all surfaces as the influence of scour diminished. The tube turf (*Jassa falcata* & *Amphicorina* sp.) dominated most of the surfaces initially but with increasing height on the wall the dominance shifted from the tube turf to a dense bryozoan (crisid) turf. Large sponge patches occurred over much of the wall with overall abundance peaking in the mid areas of the wall. Polyclinids and other colonial ascidians were widespread but total abundance was limited. Sparse *Tubularia indivisa* was present on upper parts of the wall. An undescribed species of *Clavularia* (a soft coral) was discovered on the upper part of the cave wall 85 m within the cave.

Wave surge prevented access to the intertidal and shallower areas in most parts of the cave but these zones were superficially assessed in the entrance area. In this region the lower intertidal was dominated by extensive crusts of coralline algae with relatively sparse biota (**LR.HLR.FR.Coff**). Above this was a narrow band of *Semibalanus balanoides* and *Patella* sp. (**LR.HLR.MusB.Sem.Sem**) while the upper walls and ceiling were dominated by crusts of *Hildenbrandia* sp. and *Verrucaria* sp. (**LR.FLR.CvOv.VmucHil**).

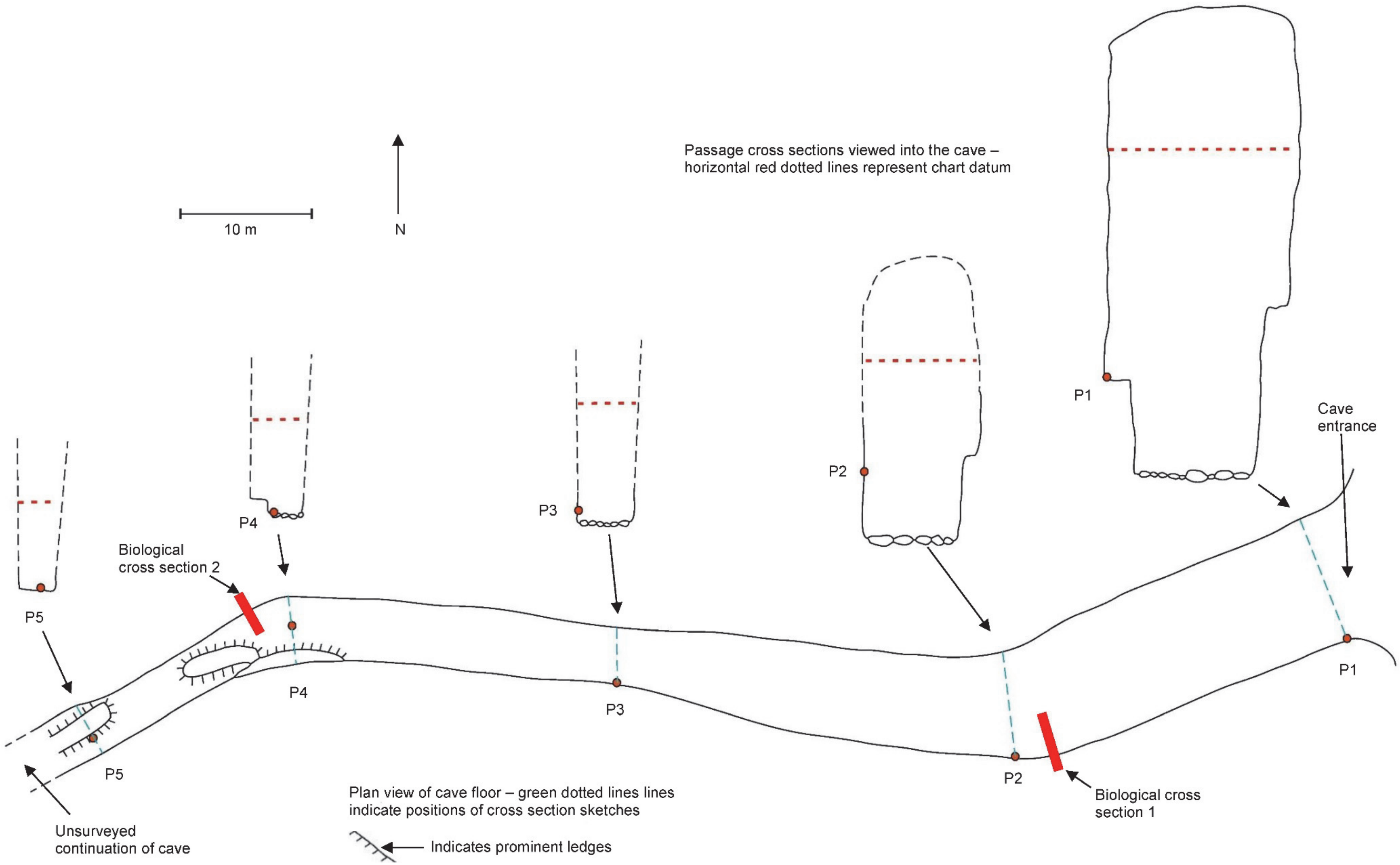

Figure 6. SK15 CV01 - Geo na Muirbhuaile ('Seal Cave'; 'CI10') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-5 are fixed points of the survey line, associated biological data is provided in tables 3 & 4)

Table 3. SK15 CV01 – Geo na Muirbhuaile ('Seal Cave'; 'CI10') – Biological summary – cross section 1 (left wall, ~25 m from entrance, 25 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Supralittoral rock walls & ceiling. Steep & overhanging rock.	+8.3	+3.8	Abundant crusts of *Hildenbrandia* sp. and frequent *Verrucaria* sp. over many rock surfaces.	**LR.FLR.CvOv.VmucHil**
2	Eulittoral rock wall. Predominantly vertical.	+3.8	+3.3	Abundant *Semibalanus balanoides* with frequent *Patella* sp.	**LR.HLR.MusB.Sem.Sem**
3	Eulittoral rock wall. Predominantly vertical.	+3.3	+0.8	Superabundant crusts of coralline algae with frequent *Patella* sp., occasional *Corallina officinalis* and *Mytilus edulis*.	**LR.HLR.FR.Coff** (NB not a close match because of low *Corallina* abundance)
4	Upper sublittoral rock wall. Predominantly vertical.	+0.8	-4.2	Mixed faunal turfs. Abundant bryozoan (crisid) turf with locally abundant crusts of coralline algae. Common *Tubularia indivisa* and frequent *Metridium dianthus* and bryozoan crusts.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
5	Lower sublittoral rock wall. Predominantly vertical.	-4.2	-17.2	Mixed faunal turfs. Superabundant bryozoan (crisid) turf over most of the wall. Sponge patches (particularly *Halichondria (Halichondria) panicea*) frequent and locally common.. Frequent *Dendrodoa grossularia* with occasional colonial ascidians and bryozoan crusts.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
6	Lower sublittoral rock wall & floor. Scoured rock & cobbles.	~-24	~-25	Scoured rock surfaces. Biota very sparse. Rare tube turf (*Jassa falcata* & *Amphicorina* sp.) and bryozoan crusts.	**IR.FIR.SG.CC.Mo**

Table 4. SK15 CV01 – Geo na Muirbhuaile ('Seal Cave'; 'CI10') – Biological summary – cross section 2 (right wall, ~85 m from entrance, 85 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral rock wall. Predominantly vertical.	-7.1	-12.7	Mixed faunal turfs. Abundant bryozoan (crisid) turf over most of the wall. Common tube turf (*Jassa falcata* & *Amphicorina* sp.) on lower areas of the wall. Occasional to frequent sponges (variety of species) in mid areas of the wall. Colonial ascidians (particularly *Polyclinum aurantium*) also prominent but in low abundance (rare to occasional). Patches of *Tubularia indivisa* locally common on upper wall.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
2	Lower sublittoral rock wall & floor. Scoured rock & cobbles.	-12.7	-14.2	Scoured rock surfaces. Biota very sparse. Rare tube turf (*Jassa falcata* & *Amphicorina* sp.) and bryozoan crusts.	**IR.FIR.SG.CC.Mo**

3.1.3 SK15 CV02 – Geodha Glann Neill

(field ref. 'Neil's Cave'; cave inv. code 'CI11')

Physical

The cave entrance was in the base of the cliffs just north of Village Bay on Hirta. The entrance formed a large broad arch with the bedding of the rock aligned with the left hand (southern) wall. This wall continued to follow the angle of the bedding underwater and was distinctly overhanging. The right hand (northern) wall had a different profile and consisted of steep, stepped bedrock.

The cave floor was composed of rounded boulders and cobbles. Depth below the roof closure was ~15 m BCD with the floor sloping up to the back of the cave to reach a depth of ~11 m BCD. The apparent back of the cave was within ~30 m of the roof closure and in plan view the boulder floor was approximately semi-circular.

However, on the left hand side of the apparent back of the cave there was an inclined, high, narrow (~1.5 m wide) rift continuing into the rock and ascending towards the surface. This inclined rocky passage was followed to a point ~45 m from the entrance at a depth of ~5 m BCD at which point it became impassable. The rift continued above and appeared to reach the surface but this was not followed due to wave surge. A comparable ascending rift also appeared to be present on the right at the back of the cave but this was not entered.

Biological

The boulder floor showed evidence of scour (**IR.FIR.SG.CC.Mo**) although this was distinctly less pronounced than in the corresponding areas of SK15 CV01. Sparse patchy bryozoan crusts were present on the boulders along with *Spirobranchus triqueter* and spirorbin worms. *Echinus esculentus* were comparatively numerous (frequent) grazing on the boulder surfaces. A similar community occurred on the lower part of the cave walls extending one or two metres above the cave floor. In this area, the abundances of bryozoans and tube worms were distinctly higher than on the floor boulders reflecting the reduced levels of scour on the walls.

Above the scoured zone, the cave walls displayed a profuse mosaic of epibiota of variable composition (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**). In the lower areas, bryozoan crusts, *Spirobranchus triqueter* and spirorbins were prominent but their abundance tended to decline with increasing height on the walls. A rich variety of sponges were present with abundances peaking on the mid-levels of the walls before declining again in the upper areas. In some areas, there were large dense patches of anemones formed by either *Sagartia elegans*, *Metridium dianthus* or *Corynactis viridis*. *Metridium dianthus* tended to be particularly abundant on the upper areas of the walls and these areas were also characterised by dense bryozoan (crisid) turf and *Tubularia indivisa*. Shallow areas of the wall could not be closely assessed due to wave surge but the crisid bryozoan and *Tubularia indivisa* community appeared to continue to ~0 m BCD above which point the biota on the walls appeared considerably more sparse.

The biota within the ascending rift (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**) was distinctly less profuse than that on the walls of the outer part of the cave. The overhanging left hand wall was characterised by a crisid bryozoan turf (similar to that seen at a corresponding height in the outer cave) and *Parazoanthus anguicomus*. The upward facing right hand wall was also characterised by a faunal turf. On the lower parts of the wall, this turf was short and composed of a mixture of crisid bryozoans, sabellid worms, spirorbins and stunted tubular calcareous sponges (*Clathrina coriacea* or *Leucosolenia complicata*). The turf in this lower area also contained a substantial amount of detritus. On more elevated areas of this wall the turf was more profuse and more distinctly dominated by crisid bryozoans. Other taxa prominent on the right hand wall included *Caryophyllia (Caryophyllia) smithii*, *Corynactis viridis* and a variety of sponge crusts. An undescribed species of *Clavularia* (a soft coral) was discovered within the rift 45 m within the cave.

The upper part of the rift could not be fully assessed due to wave surge but stills images indicate a shift from the bryozoan turf dominated community to one characterised by high abundances of spirorbins and *Verruca stroemia*.

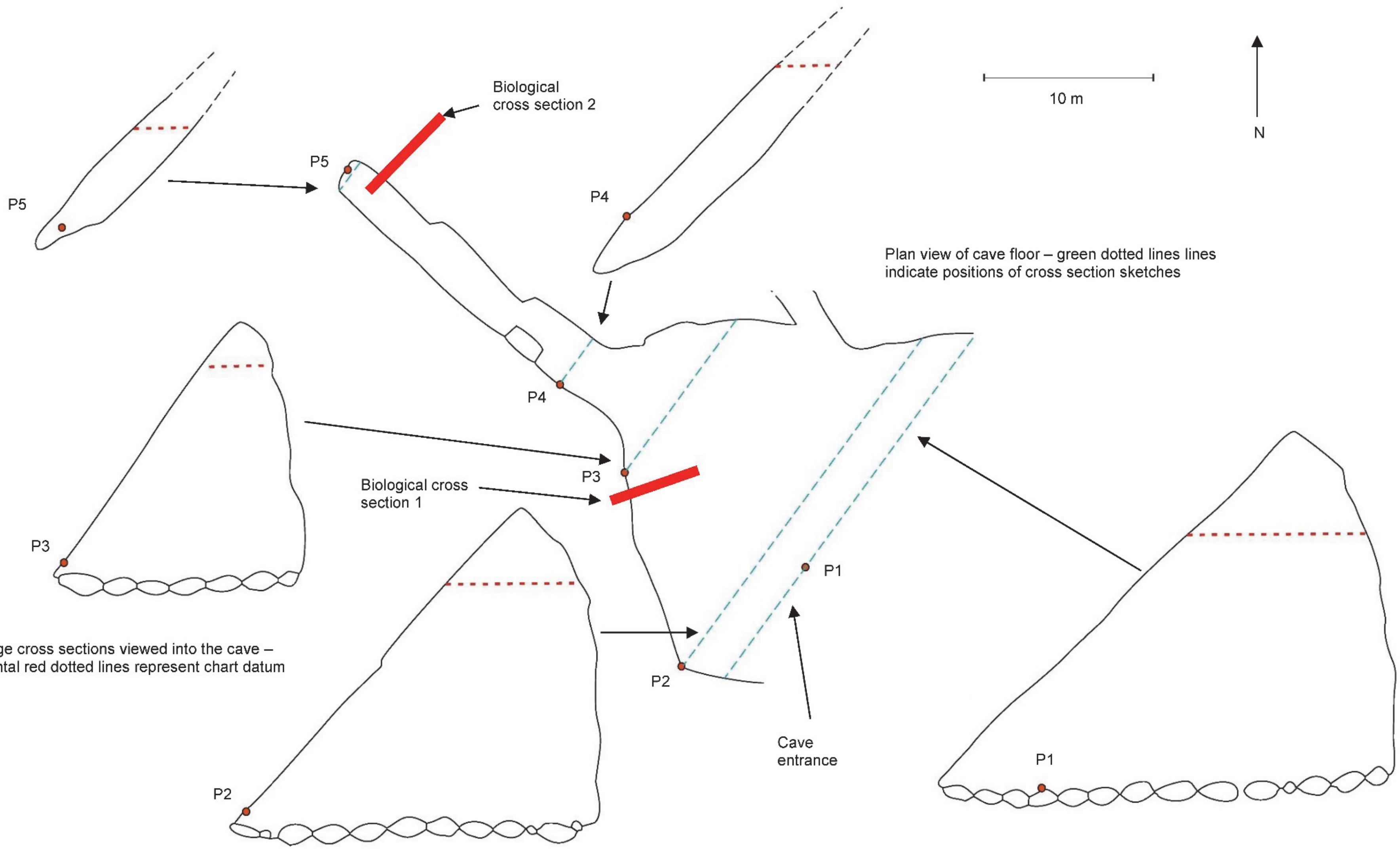

Figure 7. SK15 CV02 – Geodha Glann Neill ('Neil's Cave'; 'CI11') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-5 are fixed points of the survey line, associated biological data is provided in tables 5 & 6)

Table 5. SK15 CV02 – Geodha Glann Neill ('Neil's Cave'; 'CI11') – Biological summary – cross section 1 (left wall, ~20 m from entrance, 20 m on tape

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral wall. Overhanging (estimated as 35-45° from vertical).	~0	-10.3	Rich mosaic of faunal turfs & crusts. Dominated by bryozoans, sponges and cnidarians but community composition varied considerably over the area of the wall. Areas near the base of the wall with evidence of scour, characterised by common *Spirobranchus triqueter* and spirorbins with frequent bryozoan crusts. This relatively impoverished biota graded into a community (at about 10 m BCD) with increased sponge cover (common overall), frequent *Sagartia elegans* (locally common) and occasional *Alcyonium digitatum*. A further transition occured at about 6.5 m BCD with a further increase in sponge cover (abundant overall), a reduction in bryozoan crusts (to occasional), the appearance of extensive patches of crisid bryozoan turf (abundant), and large areas of *Metridium dianthus* (common, locally abundant). In shallower areas of the wall (from about 4.5 m BCD) there was a reduction in the abundance of sponges (to occasional overall) and *Metridium dianthus* (to frequent), an increased dominance of crisid bryozoan turf (to superabundant) and extensive areas of *Tubularia indivisa* (abundant, locally superabundant) with abundant *Caprella linearis*. Wave surge prevented close examination of shallower areas but video footage indicated this community continued to about 0 m BCD and above it there was a sparse community of unknown composition.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
2	Base of wall and cave floor of rounded boulders & cobbles.	-10.3	~-12	Floor boulders with sparse bryozoan crusts (occasional), *Spirobranchus triqueter* (frequent, locally common) and spirorbins (frequent, locally common). A similar community occured on the lower 1 or 2 metres of the wall but in slightly higher abundances due to the reduction in scour intensity (bryozoan crusts (frequent, locally common), *Spirobranchus triqueter* (common, locally abundant) and spirorbins (common)).	**IR.FIR.SG.CC.Mo**

Table 6. SK15 CV02 – Geodha Glann Neill ('Neil's Cave'; 'CI11') – Biological summary – cross section 2 (mostly right wall (some notes on left), ~45 m from entrance, 45 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral wall. Inclined (~45°), narrow (~1 m wide) rift extending from ~6 m BCD and leading up towards surface.	~0	-6.1	Mixed faunal turfs. Abundant bryozoan (crisid) turf dominated the overhanging left hand wall and some of the shallower (~ 2 m BCD) areas of the upward facing right hand wall. A faunal turf also dominated deeper parts of the right hand wall but was less clearly dominated by bryozoans and contained frequent small sabellids and spirorbins as well as large amounts of detritus and widespread but stunted and sparse (rare) calcareous sponges (*Leucosolenia complicata* or *Clathrina coriacea)*. Cnidarians were numerous with frequent *Caryophyllia (Caryophyllia) smithii* (locally common) and *Corynactis viridis* (locally abundant) dominant on the right wall and locally abundant *Parazoanthus anguicomus* on the left wall. A range of sponge species were present with patchy cover (occasional to frequent) in most areas. In wave surged shallow (~0 m BCD) areas (assessed only from images) there was a shift in the community with reduced cover of turf, abundant spirorbins and common *Verruca stroemia*.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)

3.1.4 SK15 CV03 – Christine's Cave

(field ref. 'Christine's Cave'; cave inv. code 'CI12')

Physical

The cave was located off the north-eastern coast of Dun. It was entirely subtidal with the entrance at a depth of ~23 m BCD at the base of a subtidal cliff. The entrance was broad (estimated 25 m wide) and low (~3m high) and this broad, low profile characterised the remainder of the cave.

The cave floor was composed of slightly angular boulders and cobbles with occasional small patches of gravel. Patches of gravel and sand became more frequent towards the rear of the cave. The floor was roughly horizontal for the first several metres of the cave passage but then sloped gently upwards to a depth of ~20 m BCD before levelling off again beyond ~16 m from the entrance. At ~20 m from the entrance the roof lowered to ~1 m above the floor and the passage was seen to continue for about another 3 m before the roof closed down to meet the floor.

Over most of the surveyed area the roof was 2 to 3 m above the floor but typically became lower towards the sides of the passage such that the cave walls were generally overhanging and the margins of the passage were awkward to access.

Biological

Broadly speaking, the biota was of a similar composition throughout the surveyed area of the cave and community composition of the floor boulders and the roof was only slightly different (**IR.FIR.SG.CCBalPom**). The dominant taxa included bryozoan crusts, spirorbin worms, *Spirobranchus triqueter* and *Caryophyllia (Caryophyllia) smithii.*

The spirorbins and the *Spirobranchus triqueter* tended to be slightly more common on the cave roof than on the floor although both were numerous on the sides of certain boulders. Pale bryozoan crusts (probably multiple species) were prominent throughout the cave and also tended to be distinctly more common on the cave roof than on the floor. Pink bryozoan crusts (*Escharoides coccinea*) were also prominent. They were most common nearer the entrance area and appeared to favour the steep lower walls and the sides of larger boulders over the general floor area.

Caryophyllia (Caryophyllia) smithii showed a converse trend and were considerably more common on the cave floor than on the roof. They were particularly numerous near the cave entrance and became slightly less common further into the cave.

Other taxa of interest included *Echinus esculentus* which were common on the cave roof but sparse on the floor. Saddle oysters (Anomiidae) were locally common in some areas further into the cave and *Parazoanthus anguicomus* formed large colonies on the cave roof of the entrance area. The community differences between the floor and ceiling are likely to owe more to the tendency of sessile suspension feeders to select steep surfaces for settlement rather than to the effects of scour. The cave was relatively deep and the floor areas did not have the distinctly rounded boulders and impoverished floor communities typical of the shallower and more intensely scoured caves surveyed elsewhere. The calcareous skeleton of the *Caryophyllia (Caryophyllia) smithii* allows them to grow upward from the rock surface which presumably minimises the consequences of siltation that might temporarily smother bryozoan crusts and spirorbin worms. The slight trend of higher abundances near the cave entrance (*Escharoides coccinea*, *Caryophyllia (Caryophyllia) smithii* and *Parazoanthus anguicomus*) was possibly due to the greater amount of water movement & hence increased food supply relative to the stiller waters in the inner part of the cave.

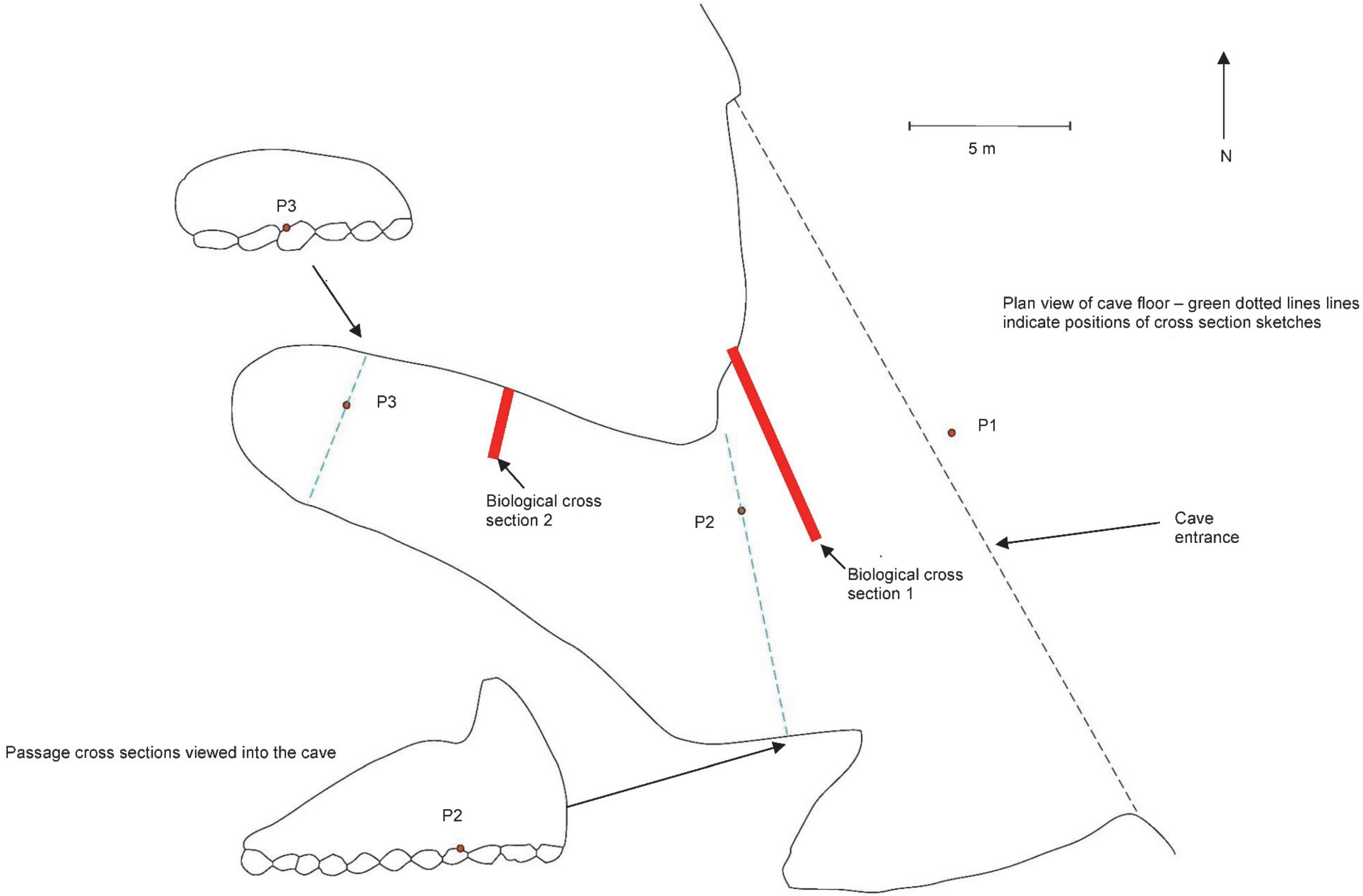

Figure 8. SK15 CV03 – Christine's Cave ('Christine's Cave'; 'CI12') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-3 are fixed points of the survey line, associated biological data is provided in tables 7 & 8)

Table 7. SK15 CV03 – Christine's Cave ('Christine's Cave'; 'CI12') – Biological summary – cross section 1 (right wall, ~5 m from entrance, 5 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral cave. Floor of irregular boulders & cobbles with small gravel patches. Broad ceiling & low overhanging walls.	-20	-23	Biota was of similar composition over the entire cross section with bryozoan crusts, spirorbins, *Spirobranchus triqueter* and *Caryophyllia (Caryophyllia) smithii* dominating the biota. However some biota showed a tendency towards higher abundance on the ceiling than on the floor. Both spirorbins and *Spirobranchus triqueter* were generally numerous (common) on the ceiling but more sparse (frequent) on the floor. Similarly, pale bryozoan crusts (of mixed species composition) and *Echinus esculentus* were prominent (common) on the ceiling but sparse (rare) on the floor. Conversely, *Caryophyllia (Caryophyllia) smithii* tended to be more numerous (common, locally abundant) on the floor than on the ceiling (locally frequent). Pink bryozoan crusts (including *Escharoides coccinea* & *Schizomavella (Schizomavella) linearis*) also showed some variation in abundance being distinctly more profuse (common) on certain large boulders and on the lower walls than they were elsewhere (frequent). *Parazoanthus anguicomus* was locally frequent forming large patches on some parts of the ceiling.	**IR.FIR.SG.CCBalPom** (not a clear match to any biotope)

Table 8. SK15 CV03 – Christine's Cave ('Christine's Cave'; 'CI12') – Biological summary – cross section 2 (right wall, ~15 m from entrance, 15 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral cave. Floor of irregular boulders & cobbles with small gravel patches. Broad ceiling & low overhanging walls.	-18	-20	Biota was of similar composition over the entire cross section with bryozoan crusts, spirorbins, *Spirobranchus triqueter* and *Caryophyllia (Caryophyllia) smithii* dominating the biota. However some biota showed a tendency towards higher abundance on the ceiling than on the floor. Both spirorbins and *Spirobranchus triqueter* appeared slightly more numerous on the ceiling than on the floor. Both were common overall but spirorbins were more sparse (locally frequent) in some floor areas and *Spirobranchus triqueter* was more numerous (locally abundant) on some floor boulders and on the ceiling. Similarly, pale bryozoan crusts (of mixed species composition) and *Echinus esculentus* were prominent (common) on the ceiling but sparse (bryozoans occasional, *Echinus* rare) on the floor. Conversely, *Caryophyllia (Caryophyllia) smithii* tended to be more numerous (frequent, locally common) on the floor and were not recorded from the ceiling.	**IR.FIR.SG.CCBalPom** (not a clear match to any biotope)

3.1.5 SK15 CV04 – Uamh Cailleach Bheag Ruaival

(field ref. 'Cave of the Old Woman'; cave inv. code 'CI13')

Physical
The cave entrance was large and was estimated to be ~25 m wide and ~12 m high. The rock bedding sloped down at an angle of ~25º from southwest to northeast. Consequently, the passage shape was roughly triangular in cross section. The roof tended to be higher on the left hand (western) side of the cave and sloped down gradually to meet the floor on the right hand side of the cave. The wall on the left hand side of the cave was generally steep with broad upward facing slabs in the upper part of the wall, which mirrored the slope of the roof bedding.

The cave was predominantly intertidal. In plan view, the cave floor tapered back from the wide entrance with right and left walls converging towards the rear of the cave. In the entrance area, the cave floor had a number of very large low profile boulders and low rounded bedrock outcrops which provided a stable substrate. Such outcrops also occurred further back in the cave but here the floor was predominantly composed of very well rounded small boulders which diminished in size as the floor sloped up towards the cobbles that predominated at the rear of the cave.

Biological
The impacts of wave exposure and scour were evident in lower shore areas throughout the cave. In the entrance area, the stable rock areas of the cave floor were almost entirely dominated by pink coralline crusts and patchy *Alaria esculenta*. This algal cover diminished with increasing distance into the cave and stable rock amongst the boulders and cobbles of the cave floor was extremely scoured and almost entirely barren of life.

At the mouth of the cave (~7 m on tape) the base of the cave wall was almost entirely covered by pink coralline crusts with patchy *Alaria esculenta* and common *Patella* sp. (**IR.HIR.KFaR.Ala**). Towards the upper margin of the coralline crusts there was a narrow band of patchy *Mastocarpus stellatus* (**LR.HLR.FR.Mas**) and above this a zone characterised by small patches of dense *Mytilus edulis* **(LR.HLR.MusB.Cht**). Above the *Mytilus edulis* zone there was a zone characterised by patches of *Palmaria palmata* below a band of dense green algal turf (**LR.FLR.CvOv.AudCla**).

The foliose algal cover on the lower wall diminished rapidly with increasing distance into the cave and both *Alaria esculenta* and *Mastocarpus stellatus* were sparse or absent after about 15 m along the tape. The other zones continued further back into the cave. At 22 m along the tape, the lower wall was characterised by pink coralline crusts and common *Patella* sp. (**LR.FLR.CvOv.ScrFa**) with Mytilus (**LR.HLR.MusB.Cht**) and *Palmaria palmata* and green algal (**LR.FLR.CvOv.AudCla**) zones above.

At 36 m along the tape, the cave floor adjacent to the wall was composed of cobbles and there was a distinct area of scour along the base of the wall (**LR.FLR.CvOv.BarCv**). Above the scour zone the coralline crusts still persisted although *Patella* sp. was less abundant than in areas closer to the entrance (**LR.FLR.CvOv.ScrFa**). By this point the *Mytilus edulis* and *Palmaria palmata* had tapered out but the dense green algae zone (**LR.FLR.CvOv.AudCla**) was still well developed.

The biota of the lower wall areas was generally impoverished, presumably due to the effects of scour. There were a limited number of shallow crevices offering some protection from the scour where a few additional species were able to persist. Barnacles were present in most parts of the lower walls but in most places they were sparse. The majority were the exposure tolerant *Chthamalus stellatus* but juvenile *Semibalanus balanoides* were also present in some areas.

The zone of green algae on the upper part of the wall was a distinctive feature of the cave. It included extensive areas of dense *Cladophora rupestris* as well as areas dominated by *Ulva intestinalis*. Some of these areas appeared to be influenced by freshwater seepage from the rock and so showed some characteristics of the biotope **LR.FLR.EphEnt**.

Upper walls and ceilings supported a variety of lichen and algal crusts. *Verrucaria maura* (**LR.FLR.Lic.Ver**) was widespread both within and above the green algal zone and yellow lichens (**LR.FLR.Lic.YG**) were present in some areas. Some areas of the broad upward facing slabs of the upper wall supported extensive turfs of *Audouinella* sp. (**LR.FLR.CvOv.AudCla**) and areas of green algal stains (**LR.FLR.CvOv.GCv**) were widespread on the cave ceiling.

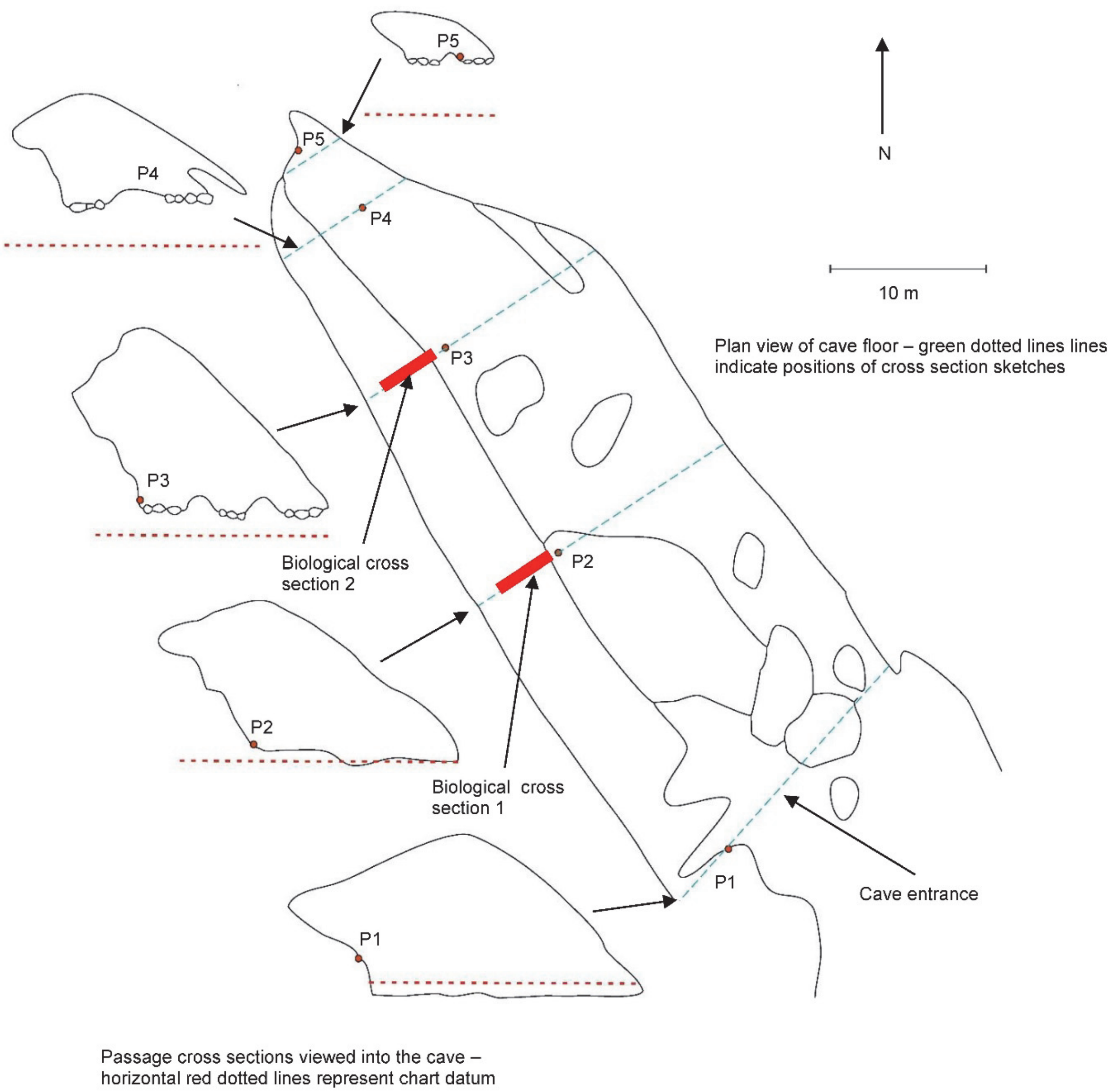

Figure 9. SK15 CV04 – Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman'; 'CI13') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-5 are fixed points of the survey line, associated biological data is provided in tables 9 & 10)

Table 9. SK15 CV04 – Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman'; 'CI13') – Biological summary – cross section 1 (left wall, ~22 m from entrance, 22 m on tape)

Zone	Physical notes	Upper limit (est. above floor)	Lower limit (est. above floor)	Biological notes	Biotope
1	Steep irregular rock with vertical faces and sloping rock slabs (approx 25 deg).	5	4	Abundant *Verrucaria maura* on largely dry rock surfaces.	**LR.FLR.Lic.Ver**
2	Steeply sloping rock slabs and short (~30 cm) vertical faces.	4	2.5	Zone dominated by a dense growth of green algae. Superabundant *Ulva intestinalis* dominated the upper zone and abundant *Cladophora rupestris* dominated the lower zone. The area appeared wet through freshwater seepage.	**LR.FLR.EphEnt & LR.FLR.CvOv.AudCla**
3	Steeply sloping rock with several shallow fissures.	2.5	1.3	Poorly defined zone with biota relatively sparse and irregularly distributed. The upper part of the zone characterised by common clumps of *Palmaria palmata* which graded into and overlaped with a zone of abundant *Cladophora rupestris* above. Frequent extensive patches of coralline algae crusts. Lower part of zone with frequent *Patella* sp. and rare *Chthamalus stellatus*.	**LR.HLR.MusB.Cht (impoverished)**
4	Steeply sloping rock ledge with several shallow fissures.	1.3	1	Common coralline algae crusts on steep rock with frequent patches of *Mytilus edulis*. Common *Patella* sp. and occasional *Chthamalus stellatus*.	**LR.HLR.MusB.Cht**
5	An undulating platform of well rounded rock on the cave floor leading to near vertical rock in the lower part of the cave wall. Occasional shallow fissures are present in rock surfaces.	1	0	Abundant coralline algae crusts with common *Patella* sp. and rare *Chthamalus stellatus*.	**LR.FLR.CvOv.ScrFa**

Table 10. SK15 CV04 – Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman'; 'CI13') – Biological summary – cross section 2 (left wall, ~36 m from entrance, 36 m on tape)

Zone	Physical notes	Upper limit (est. above floor)	Lower limit (est. above floor)	Biological notes	Biotope
1	Broad sloping (~25 deg) ledge.	5	2.8	Dominated by abundant supralittoral yellow lichens in the upper part of the zone and by abundant *Audouinella* sp. in the lower part of the zone.	**LR.FLR.Lic.YG & LR.FLR.CvOv.AudCla**
2	Mostly vertical rock face with several shallow fissures.	2.8	2	Dominated by superabundant *Verrucaria maura* with occasional *Cladophora rupestris* in crevices.	**LR.FLR.Lic.Ver (LR.FLR.CvOv.AudCla)**
3	Steeply sloping ledge with several fissures. Steeper (vertical) rock occurs both above and below the ledge.	2	1.5	Dominated by superabundant *Cladophora rupestris* with frequent *Patella* sp. and occasional coralline algae crusts.	**LR.FLR.CvOv.AudCla**
4	Mostly vertical rock face with several shallow fissures. Scoured by mobile substrate and wave erosion.	1.5	0.5	Abundant coralline algal crusts with frequent *Patella* sp.	**LR.FLR.CvOv.ScrFa**
5	Mostly vertical rock face with several shallow fissures. Directly adjacent to cave floor of well rounded mobile cobbles.	0.5	0	Largely barren zone of bare scoured rock. Sparse biota in protected crevices.	**LR.FLR.CvOv.BarCv**

3.2 St Kilda Reefs

Three reef sites were surveyed on an opportunistic basis around St Kilda during periods when caves could not be accessed. Two of these sites were on Dun and the other on Boreray. The location of the sites as well as a summary of their physical and biological characteristics is presented in Annex 4. SACFOR abundances of the biota are presented in Annex 5.

3.2.1 SK15 IR01 & SK15 SR01 – Reef site at Geo Shunadal, Boreray

SK15 IR01 (field ref. 'Boreray WP245')

Physical
Intertidal area of steeply sloping (~ 40°) bedrock with small crevices and ledges. Above the shore was a steep cliff with rocky outcrops and grassy sloping ledges.

Biological
High above the shore, the steep inaccessible rock had obvious areas of yellow and grey supralittoral lichens (**LR.FLR.Lic.YG**) in addition to large patches of rock that appeared to be stained white by the guano of the seabirds. Below these areas was a broad band of *Verrucaria maura* with profuse cover of green algae (**LR.FLR.Lic.Ver**). The eulittoral was characterised by superabundant barnacles with a narrow band of dense *Porphyra umbilicalis* along the upper margin. *Chthamalus stellatus* was dominant in upper areas (**LR.HLR.MusB.Cht**) and *Semibalanus balanoides* was dominant in the lower areas (**LR.HLR.MusB.Sem**). Along the lower margin of the barnacles there was a narrow band with abundant patches of *Mytilus edulis* (**LR.HLR.MusB.MytB**). Dense *Alaria esculenta* (**IR.HIR.KFaR.Ala**) was visible below the barnacle zone but could not be approached due to hazardous wave surge.

SK15 SR01 (field ref. 'Boreray WP244')

Physical
An irregular rocky seabed of bedrock and very large boulders. Many vertical to overhanging areas of rock were present on the sides of the boulders but the majority of the surfaces were upward facing.

Biological
Upward facing boulders in deeper areas (>20 m BCD) appeared to be prone to periodic disturbance probably due to scour from the adjacent pebble infill. They were characterised by a mixed kelp canopy of *Laminaria hyperborea*, *Saccharina latissima* and *Desmarestia aculeata* (**IR.HIR.Ksed.XKScrR**). The upward facing rock in shallower areas had more pronounced dominance of *Laminaria hyperborea* and rock surfaces commonly supported dense *Corynactis viridis* and bryozoan turf (**IR.HIR.KFaR.LhypFa**).

Vertical or overhanging rock surfaces were typically dominated by a variety of anemones and by bryozoan (crisid) turf. In most areas, the most abundant anemones were *Sagartia elegans* but there were also dense patches of *Corynactis viridis*, *Actinothoe sphyrodeta* and *Metridium dianthus* (**CR.HCR.Xfa.CvirCri**).

Table 11. SK15 IR01 – Reef site at Geo Shunadal, Boreray ('Boreray WP245') – Biological summary

Zone	**Tape distance (m)**		**Height (m CD)**		**Substrate**	**Biological notes**	**Biotopes**
	upper	**lower**	**max**	**min**			
1	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges.	Extensive areas of yellow and grey lichens but inaccessible due to steepness of rock slope.	**LR.FLR.Lic.YG**
2	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges.	Broad (estimated ~5 m wide) zone of abundant *Verrucaria maura* with broad patches of abundant *Ulva intestinalis*.	**LR.FLR.Lic.Ver**
3	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges.	Narrow (estimated ~1 m wide) zone of superabundant *Porphyra umbilicalis* running along the upper margin of the barnacle zone with common *Chthamalus stellatus*.	**LR.HLR.MusB.Cht**
4	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges.	Broad (estimated ~3 m wide) zone of dense barnacles. Upper parts of the zone dominated by superabundant *Chthamalus stellatus* and lower parts by superabundant *Semibalanus balanoides*.	**LR.HLR.MusB.Cht & LR.HLR.MusB.Sem**
5	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges.	Narrow (estimated ~1 m wide) zone of abundant *Mytilus edulis* running along the lower margin of the barnacle zone with common *Semibalanus balanoides.*	**LR.HLR.MusB.MytB**
6	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges.	Zone of dense *Alaria esculenta* visible but inaccessible due to wave surge.	**IR.HIR.KFaR.Ala**

(NB – tidal heights were not measured at this site)

Table 12. SK15 SR01 – Reef site at Geo Shunadal, Boreray ('Boreray WP244') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	**lower**	**max**	**min**			
1	N/A	N/A	-5	-10	Steep rock slope.	*Laminaria hyperborea* forest (superabundant). Rock surfaces with abundant *Corynactis viridis* and common to abundant bryozoan turf formed by *Crisia* spp., *Cradoscrupocellaria reptans* and *Scrupocellaria scruposa*.	**IR.HIR.KFaR.LhypFa**
2	N/A	N/A	-10	-20	Vertical rock with crevices and ledges.	Frequent to common bryozoan turf formed by *Crisia spp.*. Abundant *Corynactis viridis* and common *Sagartia elegans*.	**CR.HCR.Xfa.CvirCri**
3	N/A	N/A	-20	-21	Overhanging side of very large boulder.	Common to abundant bryozoan turf formed by *Crisia spp.*, *Cradoscrupocellaria reptans* and *Scrupocellaria scruposa*. Common *Corynactis viridis* and frequent *Sagartia elegans*.	**CR.HCR.Xfa.CvirCri**
4	N/A	N/A	-20	>-24	Large boulders with infill of cobbles & pebbles.	A mixed kelp canopy with abundant *Laminaria hyperborea* and *Saccharina latissima* with common *Desmarestia aculeata*. Foliose red algae locally abundant and and a variety of anemones locally common.	**IR.HIR.Ksed.XKScrR**

3.2.2 SK15 IR02 & SK15 SR02 – Reef site at Village Bay, Dun

(field ref. 'Dun transect')

Physical
The site was located on the SE shore of the island of Dun. It was a steep (~40°) bedrock slope extending from high in the supralittoral to a depth of over 20 m BCD. The profile of the slope was relatively even but there were occasional small (~1-2 m high) rock walls and horizontal ledges.

Biological
The composition and zonation of the biota clearly reflected the exposed nature of the site. The supralittoral lichen zones were broad and well developed. The yellow and grey lichen zone (**LR.FLR.Lic.YG**) was not accessed due to the steepness of the rock but was clearly visible. The lower margin was at approximately 12 m ACD and the zone extended for 10s of metres further up the rock slope before meeting the turf of maritime terrestrial vegetation which covered the lower slopes of the island. The *Verrucaria maura* zone (**LR.FLR.Lic.Ver**) extended from about 5 m ACD to 12 m ACD. In the lower areas of the zone, patches of green algae were apparent and were particularly developed in crevices and moist pockets on the rock surface. It is likely that nitrogenous enrichment from the guano of seabirds nesting on the upper slopes of the island was a factor in the development of these algal patches.

The eulittoral was relatively narrow and three zones could be distinguished. The upper zone was chiefly characterised by the presence of scattered patches of the exposure-tolerant fucoids, *Fucus distichus* and *Fucus spiralis f. nana* (**LR.HLR.FR.Fdis**). Other significant biota within the zone included extensive crusts of *Verrucaria maura*, numerous patches of ephemeral algae (*e.g. Porphyra umbilicalis* and *Ulva intestinalis*) as well as limpets (mainly *Patella ulyssiponensis*) and littorinids (mainly *Melarhaphe neritoides*). Below this zone, there was increased abundance of barnacles most of which were the exposure-tolerant species *Chthamalus stellatus*. *Patella ulyssiponensis* were numerous amongst the barnacles and there were many patches of *Mytilus edulis* (**LR.HLR.MusB.Cht**). The lower shore supported a narrow zone of pink coralline algal crusts with profuse growths of *Corallina officinalis* (**LR.HLR.FR.Coff**).

Dense *Alaria esculenta* **(IR.HIR.KFaR.Ala**) was clearly visible at the base of the shore but could not be safely accessed by the intertidal surveyors due to the wave surge. The subtidal survey divers encountered similar difficulties and wave surge prevented a detailed biological survey within the *Alaria esculenta* zone. Dense, well-developed *Alaria esculenta* dominated rock surfaces down to a depth of about 7 m BCD before grading into a *Laminaria hyperborea* forest (**IR.HIR.KFaR.LhypR.Ft**) which continued down the slope beyond the end of the transect at ~20 m BCD. The rock below the kelp canopy had well-developed coralline algal crusts but foliose red algae was relatively sparse. This lack of dense foliose red algae gave the appearance of a grazed habitat but although *Echinus esculentus* were present, their numbers were low. The site was not a close match to the **IR.HIR.KFaR.LhypR** biotope but although it also showed some characteristics of **IR.HIR.KFaR.LhypFa** it lacked the expected dense faunal turf. It is possible that the sparse understory of red algae was a consequence of moderate intermittent scour. This is also suggested by the presence within the *Laminaria hyperborea* canopy of low abundances of opportunistic species of kelp such as *Saccharina latissima*, *Desmarestia aculeata*, *Saccorhiza polyschides* and *Alaria esculenta*. Small rock walls occurred within the kelp forest and supported mixed assemblages of biota including *Corynactis viridis*, bryozoan (crisid) turfs, bryozoan crusts, *Spirobranchus triqueter*, *Caryophyllia (Caryophyllia) smithii* and *Antedon bifida*.

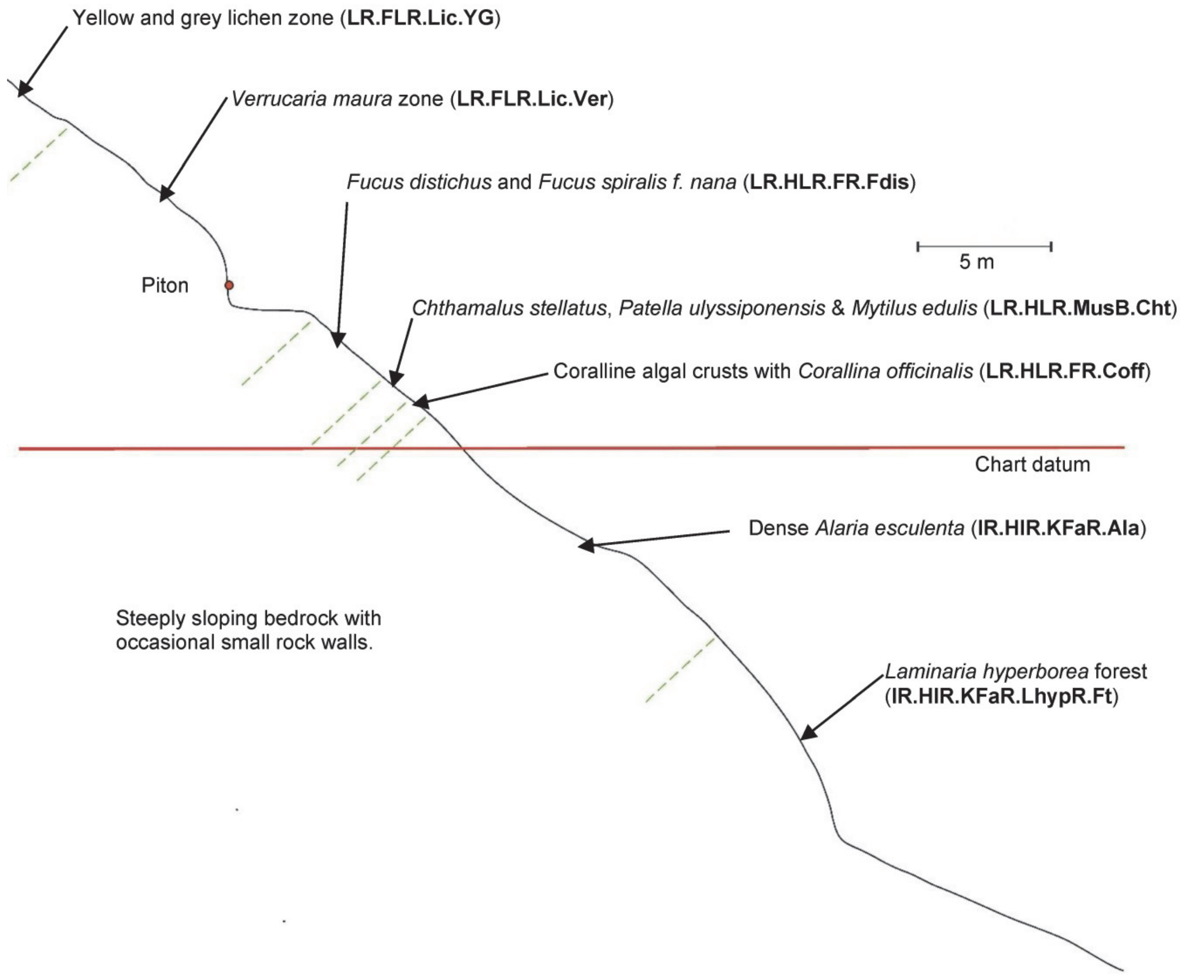

Figure 10. SK15 IR02 & SK15 SR02 – Reef site at Village Bay, Dun ('Dun transect') – reef profile with summary of the substrates, dominant biota and biotopes recorded within the component zones.

Table 13. SK15 IR02 – Reef site at Village Bay, Dun ('Dun transect') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	lower	max	min			
1	not measured	8.55	not measured	+12.1	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Extensive areas of yellow and grey lichens but inaccessible due to steepness of rock slope.	**LR.FLR.Lic.YG**
2	8.55	3.5	+12.1	+4.7	Steeply sloping (~40°) rocky shore with small ledges and fissures. In lower part of zone there is a broad (~2 m wide) ledge.	Broad zone of common *Verrucaria maura* with frequent patches of green algae and occasional *Porphyra umbilicalis* present in crevices particularly in lower parts of the zone.	**LR.FLR.Lic.Ver**
3	3.5	6.88	+4.7	+2.5	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Zone characterised by locally frequent clumps of *Fucus distichus* and *Fucus spiralis f. nana*. Common *Verrucaria maura*, *Porphyra umbilicalis* and *Ulva intestinalis*. Frequent *Patella* sp., common *Melarhaphe neritoides* and occasional *Littorina saxatilis*.	**LR.HLR.FR.Fdis**
4	6.88	8.2	+2.5	+1.8	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Zone characterised by common *Chthamalus stellatus* and *Mytilus edulis*. Abundant *Patella* sp. and numerous patches of algae including common *Aglaothamnion sepositum*.	**LR.HLR.MusB.Cht**
5	8.2	9.36	+1.8	+1.1	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Zone characterised by superabundant *Corallina officinalis* and abundant coralline algal crusts. Abundant *Patella* sp. and occasional *Alaria esculenta*.	**LR.HLR.FR.Coff**

Table 14. SK15 SR02 – Reef site at Village Bay, Dun ('Dun transect') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	lower	max	min			
1	9.36	23	+1.1	-7.1	Steeply sloping (~40°) bedrock with ledges.	Superabundant *Alaria esculenta* (not surveyed due to wave surge).	**IR.HIR.KFaR.Ala**
2	23	43	-7.1	-19.3	Steeply sloping (~40°) bedrock with ledges.	Superabundant *Laminaria hyperborea* with frequent coralline algal crusts and foliose red seaweeds.	**IR.HIR.KFaR.LhypR.Ft**

3.2.3 SK15 SR03 – Reef site at Dun Arch, Dun

(field ref. ‘Dun Arch’)

Physical
The site was below a large obvious rock arch cutting through the south eastern tip of Dun. A surge gully effectively cut through the tip of the island with the roof of the arch high overhead. The south eastern (left, viewed from Village Bay) wall of the gully was surveyed. The vertical bedrock visible above the water continued subtidally reaching the floor of the gully at a depth of ~13 to 14 m BCD. The floor of the gully consisted of extremely large stable boulders.

Biological
The steepness of the rock combined with wave surge prevented a close examination of the intertidal zone but a supralittoral zone of *Verrucaria maura* and green algal stains (**LR.FLR.Lic.Ver**) could be seen above a zone of dense barnacles (**LR.HLR.MusB.Cht?**). Below the barnacles, a band of pink coralline algal crusts and *Corallina officinalis* (**LR.HLR.FR.Coff**) graded into the *Alaria esculenta* of the sublittoral fringe.

The *Alaria esculenta* zone (**IR.HIR.KFaR.Ala**) was not examined closely due to wave surge. The *Alaria esculenta* itself was somewhat sparse and tattered (although still abundant) and interspersed with *Corallina officinalis* and foliose red algae with coralline algal crusts on the rock surfaces.

Below the *Alaria esculenta* zone was a zone of very dense *Tubularia indivisa* (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**) with numerous *Metridium dianthus* and a relatively sparse crisid bryozoan turf. With increasing depth the *Tubularia indivisa* graded into a zone dominated by a very dense crisid bryozoan turf (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**). This zone also supported numerous anemones. Their distribution was patchy and irregular with extensive dense patches of *Metridium dianthus* and *Corynactis viridis* on various parts of the wall. The same is true to a lesser extent of *Phellia gausapata* and *Sagartia elegans* which were numerous in some areas. A range of sponges and colonial ascidians were also present but occurred in relatively low abundance.

Towards the base of the wall there was a slight change in the community with reduced cover of crisid bryozoan turf and an increase in bryozoan crusts and *Spirobranchus triqueter* perhaps indicating a small degree of scour from debris on the gully floor.

The community on the boulders of the gully floor showed some similarity to that of the wall (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**) but the dominance of crisid bryozoan turf was much reduced and algae much more prominent. Brown algal crusts were a major feature of the upward facing surfaces of the boulders and there was a sparse cover of foliose red algae. Crisid bryozoan turf and amphipod (*Jassa falcata*) tubes were interspersed with the algae and anemones such as *Metridium dianthus* and *Actinothoe sphyrodeta* were scattered over the rock surfaces. In some places there were dense patches of *Corynactis viridis*. These were particularly well developed on the walls of some of the larger boulders. In the neighbouring area of the gully floor it could be seen that the tops of some of these boulders were colonised by kelp forests.

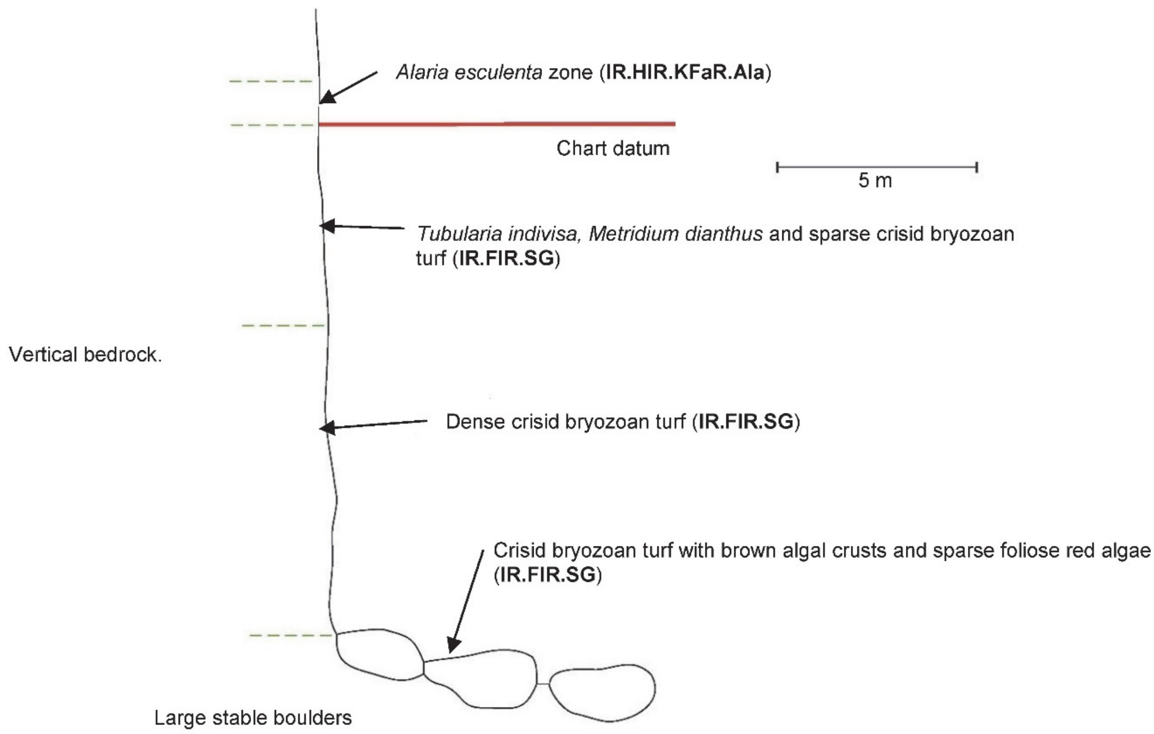

Figure 11. SK15 SR03 – Reef site at Dun Arch, Dun ('Dun Arch') – reef profile with summary of the substrates, dominant biota and biotopes recorded within the component zones

Table 15. SK15 SR03 – Reef site at Dun Arch, Dun ('Dun Arch') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	**lower**	**max**	**min**			
1	N/A	N/A	+1	0	Vertical rock wall	Abundant *Alaria esculenta* and coralline algal crusts. Common foliose red algae and frequent *Corallina officinalis*.	**IR.HIR.KFaR.Ala**
2	N/A	N/A	0	-4.9	Vertical rock wall	Zone characterised by superabundant *Tubularia indivisa* with common *Metridium dianthus* and a sparse (frequent) turf of crisid bryozoans. Foliose red algae frequent near the upper boundary of the zone.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
3	N/A	N/A	-4.9	-12.5	Vertical rock wall	The zone was characterised by a bryozoan (crisid) turf and a variety of anemones. The bryozoan turf was abundant on the lower wall but became more dense (superabundant) with increasing height above the gully floor. *Metridium dianthus* and *Corynactis viridis* were locally abundant in extensive dense patches on various parts of the wall. *Phellia gausapata* and *Sagartia elegans* were less prominent but nevertheless locally common in some areas. A range of sponges and colonial ascidians were also present in relatively low abundance (frequent sponges and occasional ascidians).	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
4	N/A	N/A	-12.5	-13.5	Very large boulders in floor of gully.	Mixed biota with common brown algal crusts, occasional turfs of foliose red algae, frequent turf of crisid bryozoans and *Jassa falcata* tubes. Scattered *Metridium dianthus* and *Actinothoe sphyrodeta* were frequent with some locally abundant patches of *Corynactis viridi*s.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**

3.3 North Rona Caves

3.3.1 Cave inventory

An examination of existing literature and ordnance survey maps produced a total of 15 records indicating cave sites around North Rona. All were noted on ordnance survey maps and a few were also mentioned by other sources. “Tunnel Cave” (CI 10) was frequently mentioned and some information on the physical dimensions provided. Some historical references mention caves but do not identify specific sites. For example, Nisbet (1961) states “The southeastern block of the island, however, is penetrated by deep caves and geos eroded along dislocations which have been described as crush-planes. The strike of these dislocations is north-south to north-north-east—south-south-west, and they are vertical or steeply inclined to the east.” No existing biological data was located relating to any cave sites on North Rona.

In 2015 the entire island was circumnavigated in an inflatable boat seeking cave sites. However, there was insufficient time (survey conducted in a single day) for a detailed scrutiny of the entire coast so inconspicuous or small cave entrances may have been overlooked in some areas. As well as investigating 12 of the 15 cave sites from the ordnance survey map, this search noted a further 12 potential cave entrances yielding a total of 27 potential cave sites. However, many could not be closely assessed due to wave surge and to lack of time. Some may not be good examples of the feature and may be short in extent, impassably narrow or fully illuminated. Examples include 2 short rock arches and 5 sites which appeared to be relatively short intertidal features. Out of the remaining 20 sites, 6 appear to be reasonably substantial caves and biological surveys were conducted within 3 of these. At the remaining 14 sites entrances were documented but not entered (Annex 6).

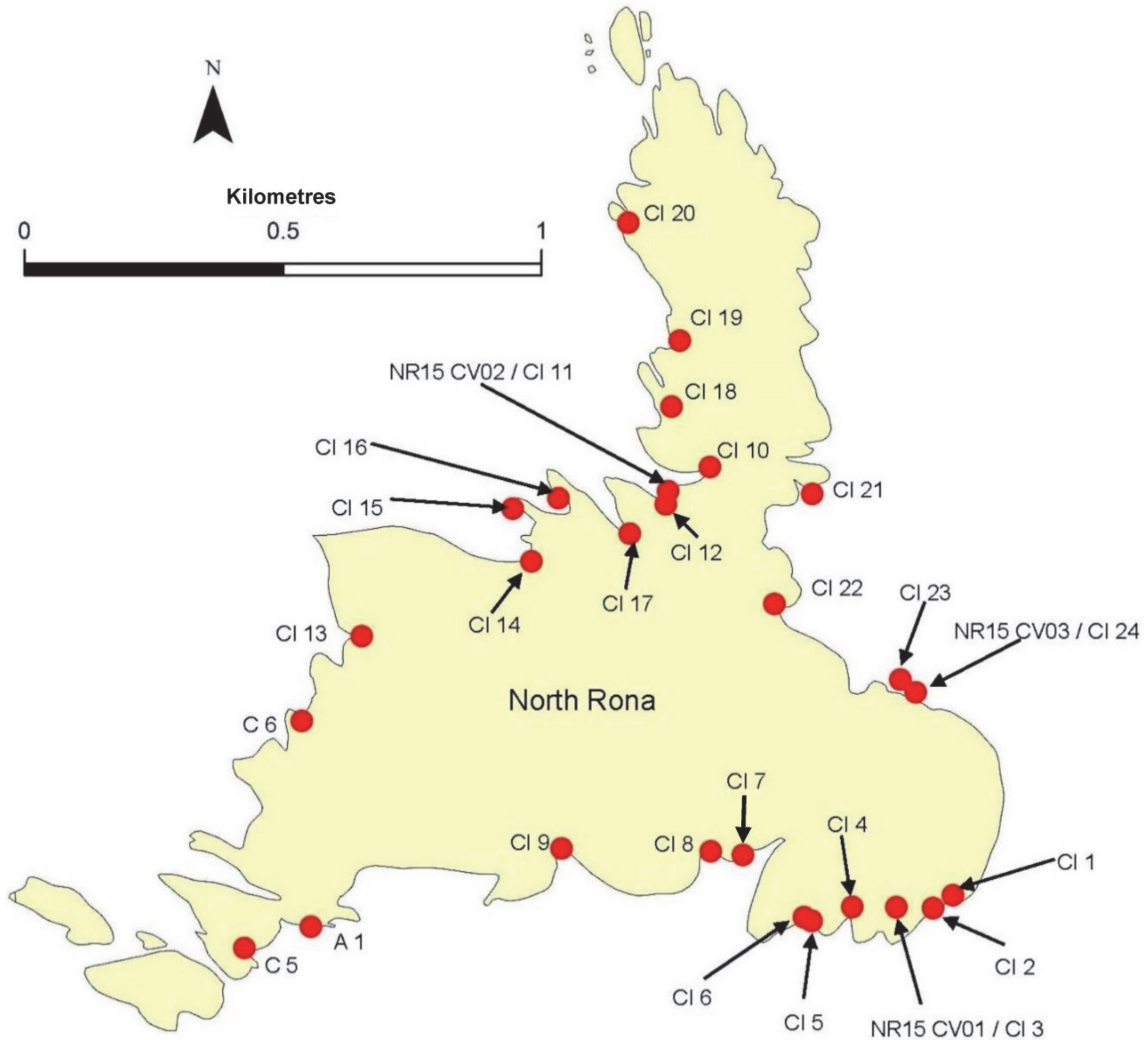

Figure 12. Outline map of North Rona showing location of cave sites based on historical records and direct observation. Site codes relate to entries in Cave Inventory table (Annex 6).

3.3.2 NR15 CV01 – Cleit an t-Sionnaich E1

(field ref. ‘C2’; cave inv. code ‘CI3’)

Physical
A deep (~20 m BCD) narrow (~2 m wide) canyon extended in for >50 m before it became roofed over forming a sea cave. Within 5 m of the roof closure a slope of very large jammed boulders ran up to the back of the cave where the floor was at a depth of ~6 m BCD at a distance of ~20 m from the entrance.

The floor of the cave itself was composed of very large stable jammed boulders with rounded edges. The floor of the surge gully leading to the entrance was not closely examined (due to depth) but appeared to be largely composed of rounded boulders.

In plan view, the entrance gully and cave were linear. In cross section, the walls were essentially vertical with a slight tilt towards the left such that vertical and overhanging surfaces were more prevalent on the right wall. However, the walls were not even, and rounded bulges to the walls formed overhanging or upward facing surfaces on localised areas of either wall.

Biological
Because of the extent and depth of the site it was not possible to get a full understanding of the pattern of biological communities throughout both the cave and the entrance surge gully.

In the outer part (from at least 30 m to 50 m on the tape) of the surge gully the lower parts (~10-20 m BCD) of the steeper right hand wall were characterised by a complex and rich mosaic of sponges and colonial ascidians (mostly didemnids). Sponges were most abundant in the upper parts of this zone (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**). In shallower (<10 m BCD) illuminated areas there was increased dominance of coralline algal crusts with patches of foliose red algae (**IR.FIR.SG.FoSwCC**). The shallow sublittoral fringe supported a dense but narrow band of *Alaria esculenta* (**IR.HIR.KFaR.Ala**). Further into the surge gully (*e.g.* left wall from 20-25 m on tape) the wall biota of the deeper wall areas appeared more sparse (**IR.FIR.SG.CC**) and was dominated by bryozoan crusts. There was however considerable variation in biota with illuminated surfaces sometimes supporting coralline algal crusts (*e.g.* left wall at ~15 m BCD, 62 m on tape) and relatively sparse communities dominated by bryozoan crusts appearing in other areas (**IR.FIR.SG.CC**).

This general pattern was reflected by the sequence of communities seen on the surveyed cross section at 50 m on the tape. The lower wall was characterised by an extremely complex and rich mosaic of sponges and colonial ascidians. A range of colonial ascidians were present with *Didemnum maculosum* particularly prominent. With increasing height on the wall (above about 13 m BCD), there was a shift towards an increasing dominance of sponges and there was an increase in the frequency of anemones such as *Corynactis viridis*, *Sagartia elegans* and *Metridium dianthus* (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**). Above ~10 m BCD patches of coralline algal crusts with sparse foliose red algae began to appear and became increasingly dominant further up the wall (**IR.FIR.SG.FoSwCC**). By ~5 m BCD the coralline algal crusts and foliose red algae dominated most areas of the wall although significant patches of sponge and sparse colonial ascidians still occurred (**IR.FIR.SG.FoSwCC**). Between ~1 m BCD and 0.5 m ACD there was a band of dense *Alaria esculenta* with rock surfaces covered in pink coralline algal crusts (**IR.HIR.KFaR.Ala**). Above the *Alaria esculenta* there was a zone of dense barnacles extending up to about 3 m ACD (**LR.HLR.MusB.Sem**).

Just within the cave entrance, shaded walls and sides of boulders were characterised by a relatively sparse biota of bryozoan crusts with areas of thin sponge crusts (**IR.FIR.SG.CC**).

Illuminated surfaces such as the upper surfaces of the floor boulders were densely encrusted with pink coralline algae, with extensive cover of thin sponge crusts in some areas. This pattern extended to the rear of the cave where coralline algal crusts predominated on the cave floor and on illuminated areas of the upper wall with relatively sparse biota elsewhere (**IR.FIR.SG.CrSp**).

At the rear of the cave (0 m on tape), the cave floor was composed of large rounded boulders which were densely covered by coralline algal crusts and a variable cover of thin crusts of yellow sponge (*Halichondria (Halichondria) panicea*). Otherwise, the biota appeared quite sparse with the exception of scattered spirorbins. The cave walls showed a trend of increasing cover of coralline algal crusts with increasing height on the wall. At the base of the walls, the crusts were very sparse but about 2 m further up they dominated the wall. The thin crusts of yellow sponge showed a similar trend being sparse near the wall base but increasing in cover in shallower depths. Spirorbins, *Jassa falcata* tube turf and sparse barnacles were notable on the lower wall but less numerous in the upper areas of dense coralline algal crusts. Anemones and various colonial ascidians also occurred in low abundances on the wall (**IR.FIR.SG.CrSp**).

The shallowest parts of the wall were not surveyed due to wave surge but at <1 m BCD there was a transition into an area of dense *Semibalanus*. On the outer faces of some of the rock slabs coralline algal crusts dominated and *Semibalanus* were sparse while on ledges and other surfaces the converse was true (**LR.HLR.MusB.Sem**).

The intertidal area of the surge gulley and cave was not examined closely due to wave surge but the eulittoral appeared to be dominated by a band of dense barnacles (**LR.HLR.MusB.Sem**) that extended from the outer part of the surge gully to the rear of the cave.

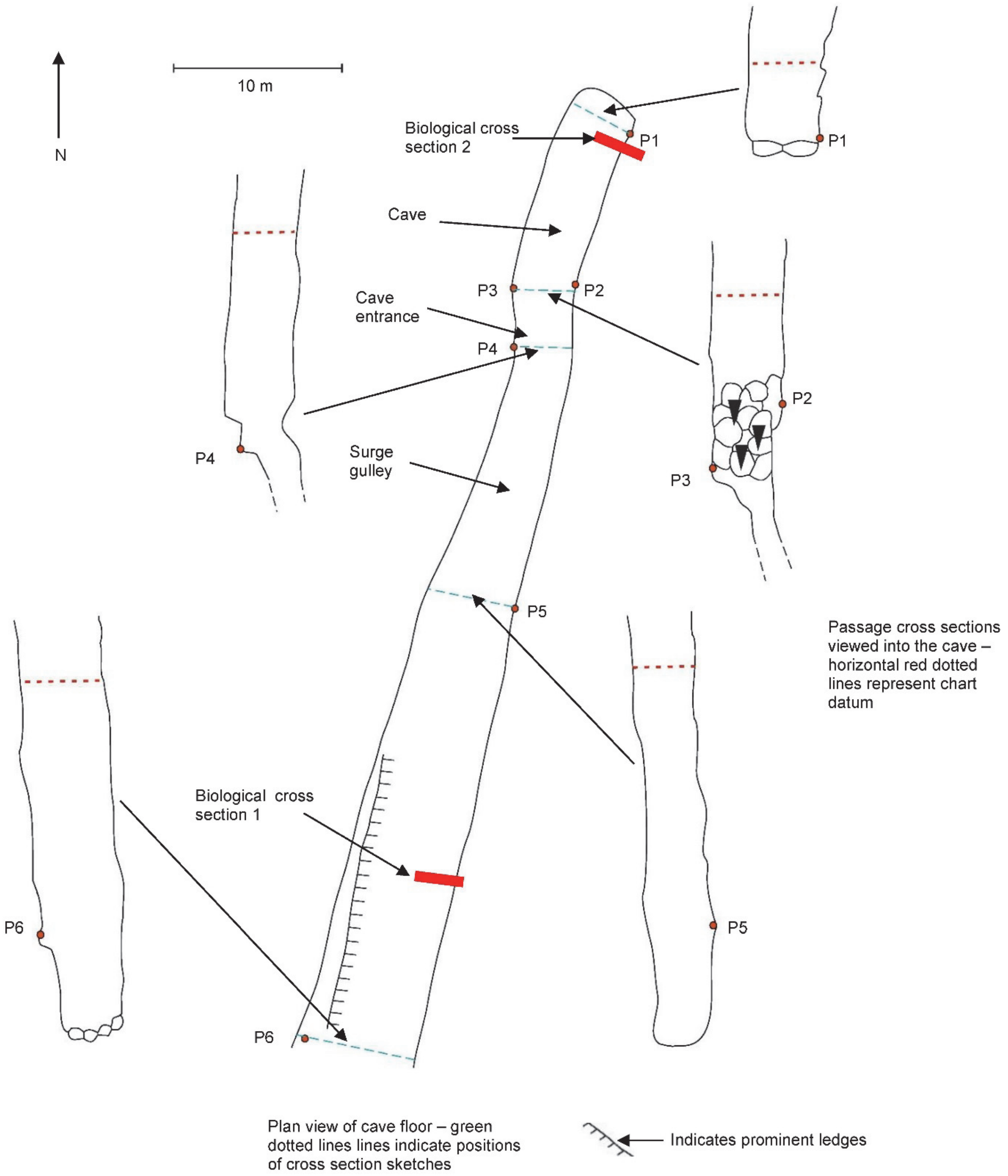

Figure 13. NR15 CV01 – Cleit an t-Sionnaich E1 (‘C2’; ‘CI3’) – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-6 are fixed points of the survey line, associated biological data is provided in tables 16 & 17)

Table 16. NR15 CV01 – Cleit an t-Sionnaich E1 ('C2'; 'CI3') – Biological summary – cross section 1 (right wall, ~30 m outside of entrance in surge gulley, 50 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Predominantly vertical rock wall in intertidal.	+2.9	+0.7	Abundant *Semibalanus balanoides* with common *Patella* sp. and tufts of *Porphyra* sp.	**LR.HLR.MusB.Sem**
2	Predominantly vertical rock wall in sublittoral fringe.	+0.7	-1	Superabundant coralline algal crusts and *Alaria esculenta*. Frequent *Corallina officinalis*, *Halichondria (Halichondria) panicea*, *Metridium dianthus*, *Patella* sp. and *Semibalanus balanoides*.	**IR.HIR.KFaR.Ala**
3	Sublittoral rock wall. Predominantly vertical.	-1	-4.8	Abundant coralline algal crusts and foliose red algae. Some limited areas of frequent to common sponge crusts.	**IR.FIR.SG.FoSwCC**
4	Sublittoral rock wall. Predominantly vertical.	-4.8	-9.7	Sponge dominated community with anemones & colonial ascidians. Sponge crusts were common overall and included frequent *Halichondria (Halichondria) panicea* and *Amphilectus fucorum*. Anemones included *Metridium dianthus*, *Corynactis viridis* and *Sagartia elegans* each of which were frequent overall but common in some areas. A range of colonial ascidians were present with frequent *Didemnum maculosum* being particularly prominent. Coralline algal crusts and foliose red algae were common in some patches within the zone.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
5	Sublittoral rock wall. Predominantly vertical.	-9.7	-19.7	Complex mosaic of colonial ascidians and sponge crusts in the lower (>13 m BCD) part of the zone. Increased dominance of sponges and increased anemones in the upper (<13 m BCD) part of the zone. A range of colonial ascidians were present including *Didemnum maculosum* which were locally common. Sponge crusts were common and locally abundant in the upper zone with *Halichondria (Halichondria) panicea* and *Amphilectus fucorum* being particularly prominent. Anemones included *Metridium dianthus* and *Corynactis viridis* (locally common in the upper part of the zone) and *Sagartia elegans* (locally frequent in the upper part of the zone).	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**

Table 17. NR15 CV01 – Cleit an t-Sionnaich E1 ('C2'; 'CI3') – Biological summary – cross section 2 (right wall, ~20 m from entrance, 0 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Floor of large, rounded, jammed boulders. Near vertical rock wall with some irregular sloping rock slabs in shallows forming small ledges.	~-1.5	~-5.5	The boulders of the cave floor were densely coated by superabundant coralline algal crusts with occasional patches (locally common) of thin yellow sponge crusts (*Halichondria (Halichondria) panicea*). Other biota were sparse with the exception of frequent scattered spirorbins. The base of the walls supported a richer community with abundant spirorbins, common *Jassa falcata* tube turf and locally frequent barnacles. Anemones and a range of colonial ascidians were also present in low abundance. About 2 m above the base of the wall the abundances of these taxa were reduced and the community became dominated by abundant coralline algal crusts with frequent patches of thin yellow sponge crusts (*Halichondria (Halichondria) panicea*).	**IR.FIR.SG.CrSp**

3.3.3 NR15 CV02 – Sgeildige M

(field ref. 'C11'; cave inv. code 'CI11')

Physical
The site consisted of two large adjacent entrances in the base of the cliff. The left hand (NE) entrance was broader than the right hand (SW) entrance and the two were separated by a distance of less than 10 m. The left entrance was selected for survey as the narrower right hand entrance was more severely wave surged at the time of survey and could not be entered safely. The passages leading off from the entrances appeared to be roughly parallel and it is possible that they connected at the back of the cave. During the initial assessment of the site, a snorkeler noted narrow shallow passages leading off from the right hand wall near the rear of the cave accessed from the left hand entrance. These passages could not be entered due to wave surge but it is possible they connect to the cave behind the right hand entrance.

The cave consisted of a tall, broad, square cut passage that was roughly linear in plan view and extended in for over 65 m from the point of roof closure. The cave floor was at a depth of ~9 m BCD near the cave entrance rising gradually to ~2 m BCD at a point 65 m within the cave. The composition of the cave floor was variable with areas of mobile sand predominating in the entrance area, and cobbles, boulders and bedrock ridges predominating in the shallower areas further into the cave. The boulders of the cave floor were rather variable in size including some large stable boulders as well as more mobile smaller boulders. Although rounded, the boulders of the cave floor were somewhat angular in shape perhaps indicating a lower level of boulder mobility than seen at some other sites. The cave walls were generally vertical but the left wall showed a bit more variability with significant ledges and overhangs occurring in some parts of the passage.

Biological
There was evidence of scour throughout the cave with spirorbins and tube turf formed by both sabellid worms and *Jassa falcata* prominent throughout and other biota often sparse and concentrated in rock crevices.

The scour was most evident on or near the cave floor where large quantities of drift algae were present at the time of survey. This algal mat was mainly composed of *Alaria esculenta* and was some 30 cm deep across the entire sandy cave floor near the entrance. It was loose and mobile and did not appear to be resulting in any obvious anoxia. The mobile cobbles and small boulders of the cave floor were virtually barren but on the larger boulders and on the base of the cave walls there was a substantial population of *Spirorbis (Spirorbis) tridentatus*. Although the tubes were widely separated, they were numerous and abundances were elevated in crevices and other protected areas. *Actinia equina* were also a prominent component of the cave floor fauna with small groups present in protected areas between boulders or in rock crevices (**IR.FIR.SG.CC.Mo**).

The community on the walls a little further above the cave floor became progressively more abundant and diverse reflecting the reduced effects of scour. The transition was most evident at the cross section at 20 m where the impoverished spirorbin community at the wall base graded into a zone with increasing cover of tube turf (mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* also present) and patchy thin sponge crusts (**IR.FIR.SG.CC.BalPom**). Anemones and further sponges appeared in crevices as the zone graded into an upper wall community with a greater abundance and variety of species of sponges and anemones. *Leuconia johnstoni*, *Halichondria (Halichondria) panicea, Myxilla (Myxilla) incrustans* and *Grantia compressa* were prominent among the sponges and *Corynactis viridis* occurred in a few dense patches. Colonial ascidians were also present but tended to be relatively low in abundance. In the shallower (~0 m BCD) areas there was a sparse cover of foliose red algae, elevated abundances of dwarf *Metridium dianthus* and a few small patches of *Tubularia indivisa* (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**).

A similar pattern was also evident near the rear of the cave at 55 m on the tape. However, the community was less rich due to scour from the relatively shallow cave floor. Like the cave entrance, the wall base was characterised by an impoverished spirorbin community (**IR.FIR.SG.CC.Mo**) and sabellid tube turf became increasingly abundant with increasing height on the wall. Sponges and anemones also increased in diversity and abundance on the upper wall (**IR.FIR.SG / IR.FIR.SG.CrSpAsAn**) but this was less pronounced than at the entrance area of the cave and they were more obviously restricted to rock crevices. *Sagartia elegans*, *Actinia equina*, *Phellia gausapata* & *Corynactis viridis* were prominent. *Halichondria (Halichondria) panicea*, *Leuconia johnstoni* & *Grantia compressa* were major components of the sponge community. As was the case for the entrance area, there were increased numbers of *Metridium dianthus* and a few small patches of *Tubularia indivisa* on the upper parts of the wall. No coralline algal crusts or foliose red algae persisted at this distance into the cave.

The intertidal and supralittoral were not evaluated due to time constraints and wave surge. However, in the cave entrance, green algal stains (**LR.FLR.CvOv.GCv**) were obvious on the upper walls and ceiling, a community of barnacles and limpets formed a mid shorel zone (**LR.HLR.MusB.Sem**?), coralline algal crusts formed a distinct pink zone (**LR.HLR.FR.Coff**?) in the lower shore and *Alaria esculenta* was present in the sublittoral fringe (**IR.HIR.KFaR.Ala**). In the inner part of the cave, the lower part of the intertidal zone appeared to be largely dominated by spirorbins (**LR.FLR.CvOv.ScrFa**?).

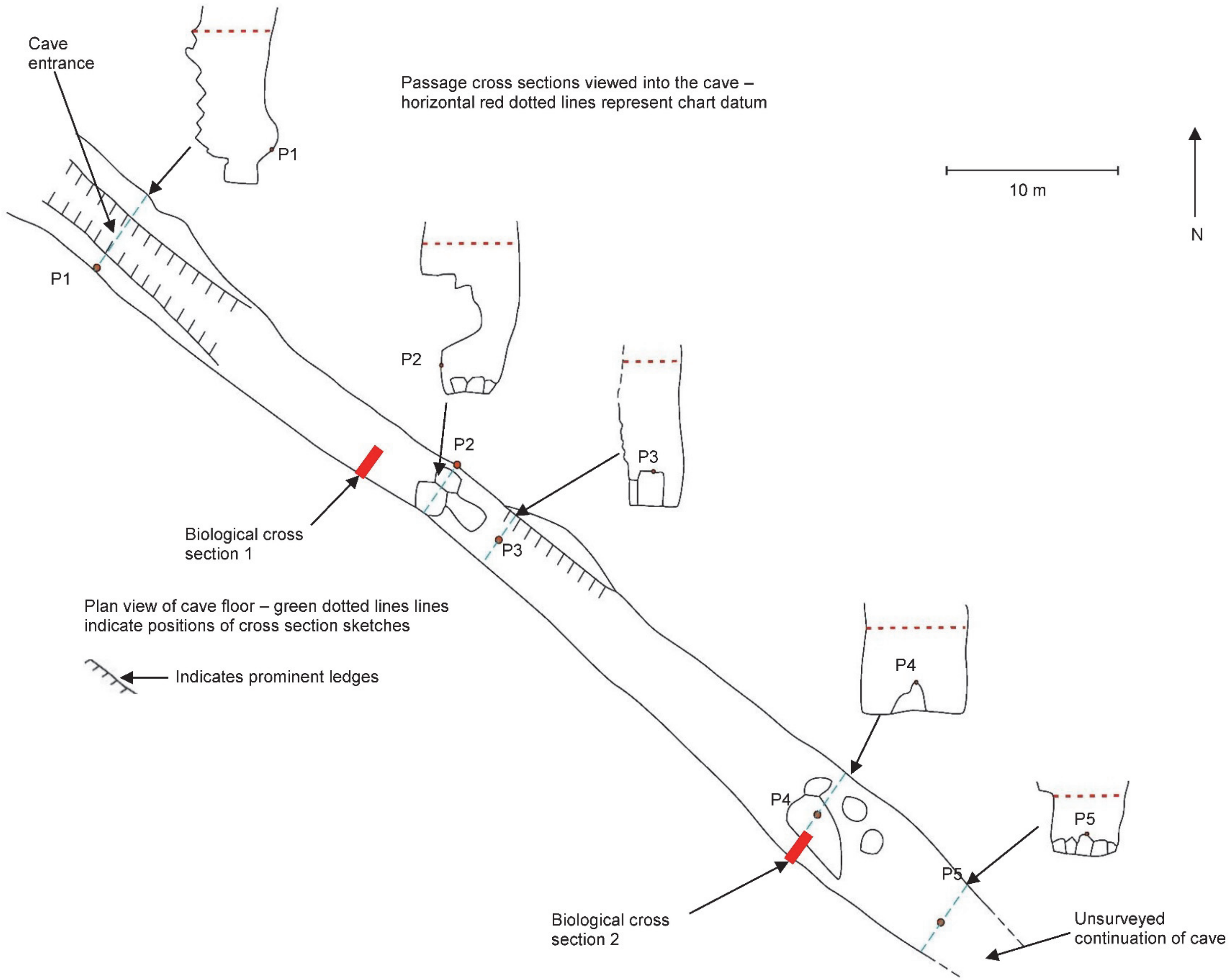

Figure 14. NR15 CV02 – Sgeildige M ('C11'; 'CI11') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-5 are fixed points of the survey line, associated biological data is provided in tables 18 & 19)

Table 18. NR15 CV02 – Sgeildige M (‘C11’; ‘CI11’) – Biological summary – cross section 1 (right wall, ~20 m from entrance, 20 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral rock wall. Mainly vertical.	+0.7	-4.3	Cave walls with tube turf, *Spirorbis (Spirorbis) tridentatus*, sponges, anemones & colonial ascidians. The tube turf was abundant but patchy. It appeared to be mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* were also present. *Spirorbis (Spirorbis) tridentatus* were frequent (locally common) and in most areas they were widely spaced rather than forming a continuous crust. A range of sponges were present. Frequent taxa included *Leuconia johnstoni* (locally abundant), *Grantia compressa* (locally common), *Halichondria (Halichondria) panicea* and *Myxilla (Myxilla) incrustans*. Among the anemones *Corynactis viridis* were frequent and occured in a few dense patches. *Metridium dianthus* were also frequent but tended to increase in density (becoming locally common) towards the top of the zone . A range of colonial ascidians were present and they were frequent overall. In the upper part of the zone there was also occasional foliose red algae and a locally frequent *Tubularia indivisa*.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
2	Sublittoral rock wall. Mainly vertical.	-4.3	-7.8	Cave wall with common *Spirorbis (Spirorbis) tridentatus* which were widely spaced rather than forming a continuous crust. Tube turf was common but patchy. It appeared to be mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* were also present. Thin sponge crusts (*Halichondria (Halichondria) panicea*) were frequent but other biota were sparse.	**IR.FIR.SG.CC.BalPom**
3	Sandy floor of cave and base of walls to ~1.5 m above floor.	-7.8	-9.3	Cave floor with 100% cover of drift algae (mostly *Alaria esculenta*) to a thickness of ~30 cm. This drift algae was mobile in the wave surge and not obviously causing anoxia. Rock surfaces with with common *Spirorbis (Spirorbis) tridentatus* which were widely spaced rather than forming a continuous crust. Very little other obvious biota.	**IR.FIR.SG.CC.Mo**

Table 19. NR15 CV02 – Sgeildige M ('C11'; 'CI11') – Biological summary – cross section 2 (right wall, ~55 m from entrance, 55 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral rock wall. Mainly vertical.	0	-3.5	*Spirorbis (Spirorbis) tridentatus* were common (and locally abundant) but widely spaced at all levels of the wall. Tube turf was a major component with abundances ranging from common in lower parts of the zone to superabundant in upper areas. It appeared to be mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* were also present. Other biota tended to be concentrated in crevices and major representatives included generally frequent anemones (*Sagartia elegans*, *Actinia equina*, *Phellia gausapata* & *Corynactis viridis*) and generally occasional sponges (*Halichondria (Halichondria) panicea*, *Leuconia johnstoni* & *Grantia compressa*). In upper parts of the wall there were increased numbers of *Metridium dianthus* (locally common) and a few small patches of *Tubularia indivisa* (rare).	**IR.FIR.SG.CC.BalPom** (locally becoming **IR.FIR.SG.CrSpAsAn)**
2	Cave floor of cobbles, boulders & bedrock. Also including cave walls to ~1 m above floor.	-3.5	-4.5	Unstable boulders & cobbles were virtually barren. Larger boulders and bases of walls with common but widely spaced *Spirorbis (Spirorbis) tridentatus*. Other biota generally sparse and restricted to crevices & protected gaps between boulders. Numerous small groups of *Actinia equina* (frequent) and occasional small patches of sponge.	**IR.FIR.SG.CC.Mo**

3.3.4 NR15 CV03 – Geodha Mairi E

(field ref. 'Jo's Cave'; cave inv. code 'CI24')

Physical
The cave consisted of a narrow (~2 – 3 m wide) canyon. It opened directly into the base of the cliff and ran approximately south for over 65 m into the island. It was not followed beyond this point due to wave surge and time constraints. The cave passage was approximately linear in plan view, tended to be broader near the floor, and tended to become narrower overhead.

The floor was at a depth of ~17.5 m BCD at the entrance rising to ~11 m BCD 65 m into the cave. It was composed of rounded boulders and bedrock outcrops with patches of mobile sand. The cave walls were generally steep being mainly vertical or slightly overhanging although small ledges were also present in some areas.

Biological
The biota of the cave floor and lower walls (up to ~1 m above the floor) appeared fairly consistent over the surveyed area. The effects of scour were apparent and biota was sparse consisting of scattered or patchy tubes of *Spirorbis (Spirorbis) tridentatus* and groups of *Actinia equina* in gaps between boulders and in protected crevices (**IR.FIR.SG.CC.Mo**). At the time of survey there were accumulations of loose mobile drift algae over many parts of the cave floor.

The cave wall of the entrance area, for at least the first 20 m within the cave, was characterised by a rich and profuse community of sponges and colonial ascidians with scattered *Spirorbis (Spirorbis) tridentatus* and a tube turf formed by a mix of *Amphicorina* sp. and *Jassa falcata*. The influence of scour was reflected in a trend of increased abundances at higher levels on the wall. Nearer the cave floor there were more bryozoan crusts and relatively sparse sponges. But within 2 – 3 m elevation above the floor the community became increasingly rich with extensive sheets of *Halichondria (Halichondria) panicea*, patches of *Didemnum maculosum* and *Sagartia elegans* as well as a diverse array of other encrusting biota (**IR.FIR.SG.CrSpAsAn**).

Further within the cave the diversity of the wall community decreased. Most of the sponge and ascidian community was absent or rare and cave walls tended to be dominated by *Spirorbis (Spirorbis) tridentatus*. The cover was variable, often being sparse or patchy on the lower walls but having more even and abundant cover on the less scoured upper areas. *Halichondria (Halichondria) panicea* remained prominent in the inner cave often forming extensive patches particularly in elevated areas with reduced scour. Similarly, tube turf was widespread and showed the same scour related trend in abundance as *Halichondria*. Other biota tended to be sparse but localised pockets of anemones, sponges and colonial ascidians occurred in protected crevices (**IR.FIR.SG.CC.BalPom**). Wave surge prevented an examination of the shallower parts of the cave walls and no detailed records were made any shallower than 6 m BCD.

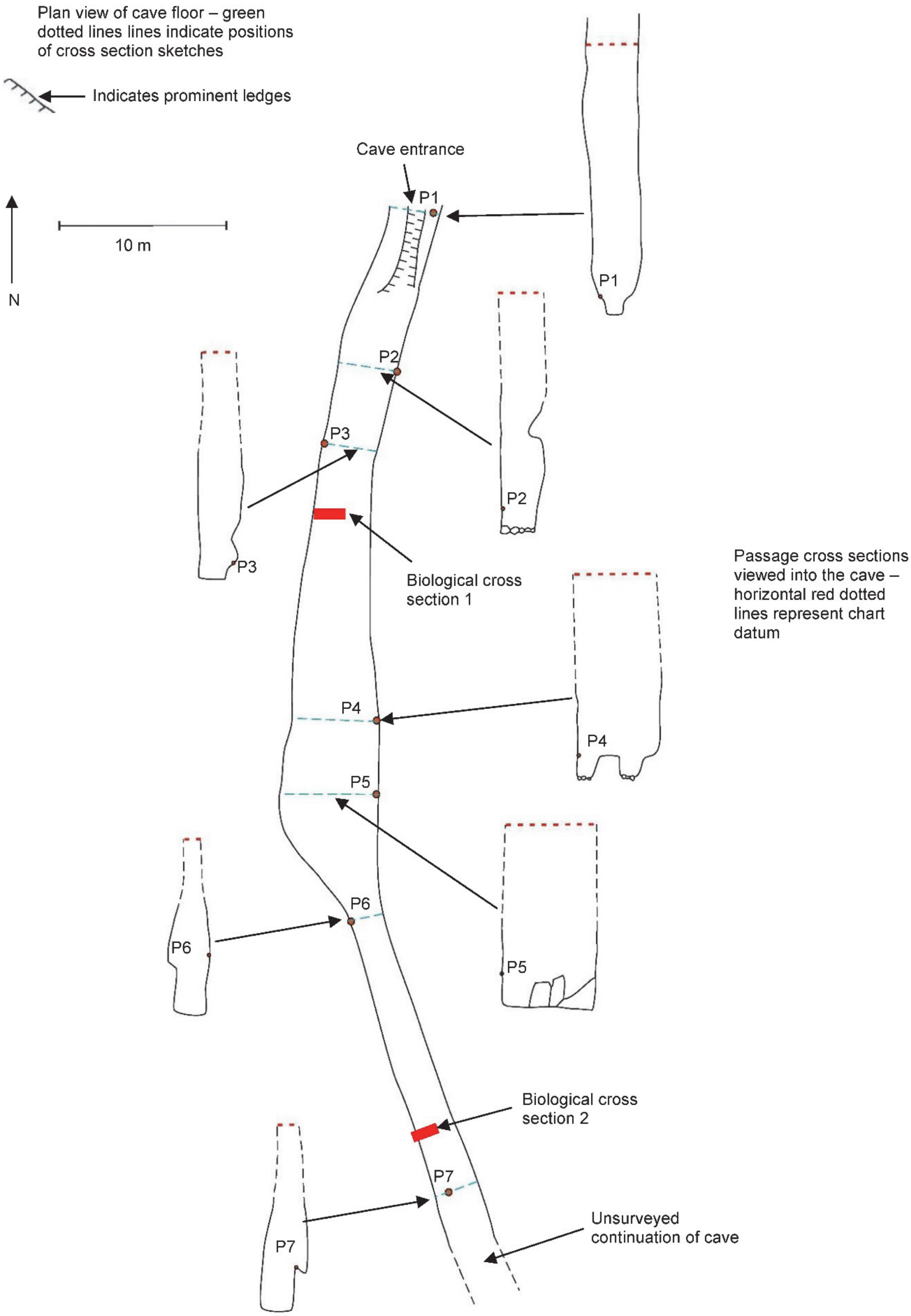

Figure 15. NR15 CV03 – Geodha Mairi E ('Jo's Cave'; 'CI24') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-7 are fixed points of the survey line, associated biological data is provided in tables 20 & 21)

Table 20. NR15 CV03 - Geodha Mairi E ('Jo's Cave'; 'CI24') – Biological summary – cross section 1 (right wall, ~20 m from entrance, 20 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Cave wall. Predominantly vertical.	-1	-14	Overall, the cave wall was a complex mosaic of sponges & colonial ascidians with a trend of increasing diversity and abundance with increasing height on the wall. The lower ~2 m of the zone had a relatively sparse biota with *Spirorbis (Spirorbis) tridentatus* common (as they were over most parts of the zone), bryozoan crusts more abundant (frequent) than in the upper parts of the zone and other taxa (tube turf of *Amphicorina* sp & *Jassa falcata* (occasional), various sponge crusts (occasional overall) and dideminids (rare)) less abundant than they were in the upper parts of the zone. Above ~12 m BCD the biota became distinctly more diverse and profuse. Sponge crusts became frequent rising to abundant further up the wall with *Halichondria (Halichondria) panicea* predominating. Other taxa increasing in abundance included *Didemnum maculosum* (locally frequent), tube turf of *Amphicorina* sp & *Jassa falcata* (locally abundant), *Grantia compressa* (locally common) and *Sagartia elegans* (locally common). Sparse *Metridium dianthus* (occasional) and *Tubularia indivisa* (rare) also appeared in the shallower part of the zone.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
2	Floor with drift algae and rounded boulders. Zone also covering cave walls to ~1 m above floor.	-14	-15	Rock surfaces virtually barren. Sparse *Spirorbis (Spirorbis) tridentatus* (frequent) were present on the lower wall as well as groups of *Actinia equina* (frequent) .	**IR.FIR.SG.CC.Mo**

Table 21. NR15 CV03 – Geodha Mairi E (‘Jo’s Cave’; ‘CI24’) – Biological summary – cross section 2 (right wall, ~60 m from entrance, 60 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Cave wall. Predominantly vertical.	-5	-9	In the lower part of the zone (below ~7.5 m BCD) there were patches of dense *Spirorbis (Spirorbis) tridentatus* (common, locally superabundant) covering 20-30% of the rock surface, numerous *Actinia equina* (frequent, locally common) concentrated in protected crevices and a sparse cover (occasional) of tube turf of *Amphicorina* sp & *Jassa falcata*. In the upper part of the zone (above ~7.5 m BCD) the *Spirorbis (Spirorbis) tridentatus* cover became more continuous (abundant, locally superabundant), there were fewer *Actinia equina* (occasional) and slightly more tube turf (frequent). Other biota was generally sparse and the community appeared impoverished.	**IR.FIR.SG.CC.BalPom**
2	Floor with sand patches and rounded boulders. Zone also covering cave walls to ~1 m above floor.	-9	-11	Rock surfaces virtually barren. Sparse *Spirorbis (Spirorbis) tridentatus* (frequent) were present on the lower wall and groups of *Actinia equina* (frequent) occured in protected crevices.	**IR.FIR.SG.CC.Mo**

3.4 Loch Eriboll Caves

3.4.1 Cave inventory

Sea caves are known to be numerous along the northern coast of Scotland where Loch Eriboll is located and these include the well-known Smoo Cave at Dornoch a few kilometres west of Loch Eriboll. An examination of existing literature produced a total of 12 records, each indicating one or more cave sites within Loch Eriboll and in the immediate vicinity of the entrance. However, some of these records are imprecise and note only that caves are present in the general area of the cited coordinates. Nevertheless, these records indicate the presence of at least 23 caves and it is probable that many more are present.

In 2015 there was insufficient time for a systematic search of the coastline but some limited areas were investigated (Figure 16). The coast of the small rocky island of Eilean Cluimhrig was examined and 5 additional potential cave sites were noted although none could be entered due to wave surge. Several possible cave entrances were seen from a distance along the coast on the eastern side of the loch entrance north from Freisgill towards Whiten Head. A cave was visited directly adjacent to the large natural arch just north of Rubh' Ard an t-Siuil but was not surveyed due to wave surge. Two caves were investigated on the coast in the vicinity of Freisgill and biological surveys were conducted in both. One of these sites (CV01) appears to correspond to historical records of "Uamh Freisgill". But if so, some of these accounts appear to exaggerate the dimensions of the cave and it may have been partly confused with accounts of the large natural arch just north of Rubh' Ard an t-Siuil.

The collated cave inventory for the site is very incomplete but it indicates a minimum of 27 potential cave sites in the area (Annex 9).

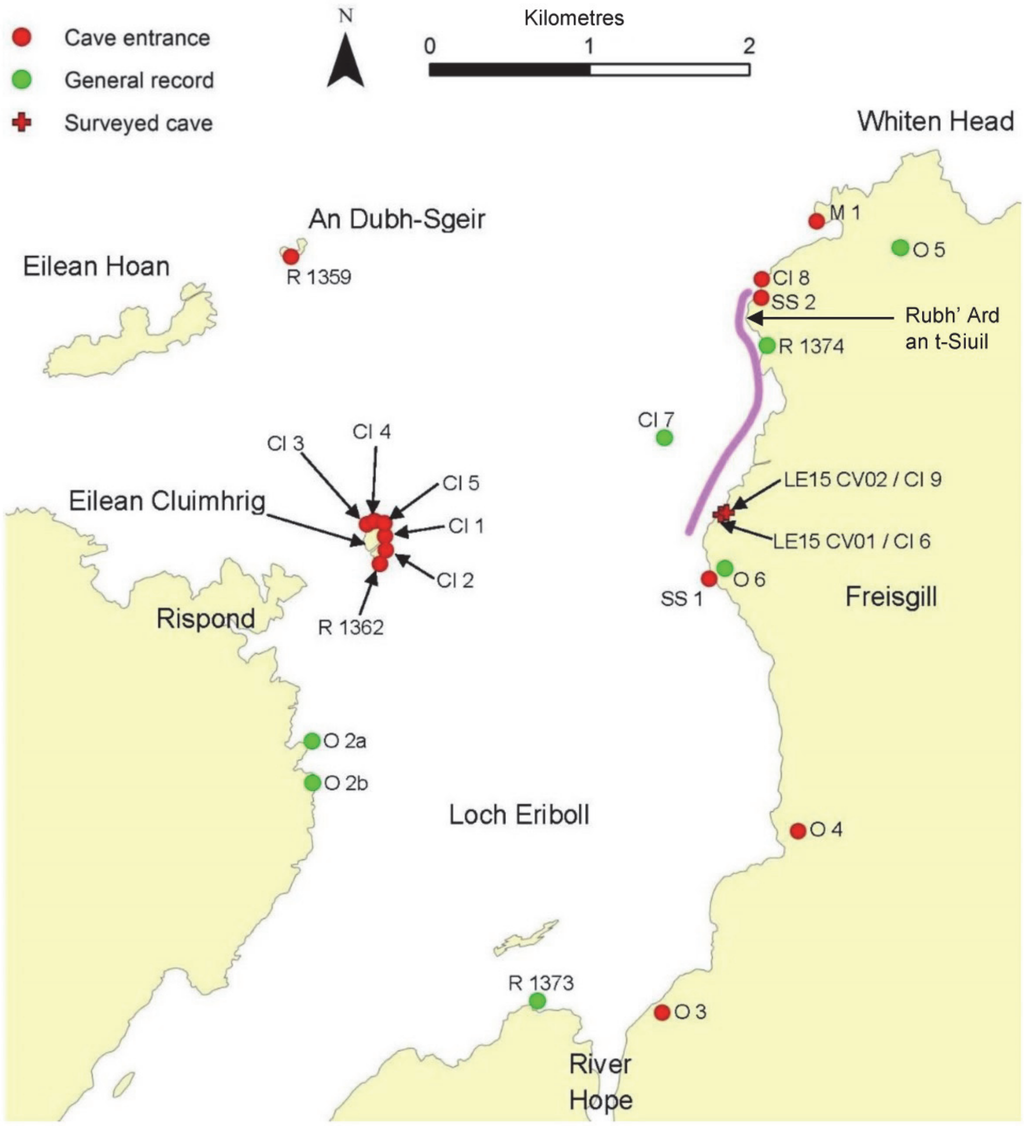

Figure 16. Outline map of Loch Eriboll showing location of cave sites based on historical records and direct observation. Purple line shows coastal panorama viewed from location CI 7 and depicted in Annex 9C. Site codes relate to entries in Cave Inventory table (Annex 9).

3.4.2 LE15 CV01 – Uamh Freasgill 1

(field ref. 'Eriboll Cave 1'; cave inv. code 'CI6')

Physical
An obvious entrance at the base of a low quartzite cliff gave access to a large and generally linear cave passage that extended into the quartzite in an approximately south eastwards direction for more than 140 m. The first 100 m of this passage were surveyed.

The floor of the passage was at a depth of ~13 m BCD at the entrance and rose gradually to a depth of ~3 m BCD at a point some 100 m in from the entrance. The majority of the cave floor was composed of well-rounded, mobile quartzite boulders and cobbles. In places there were larger, more stable boulders and bedrock outcrops (*e.g.* at ~50 m from the entrance) but all surfaces in the floor area were smoothly rounded.

The passage walls were generally steep bedrock but were somewhat variable in profile including some overhanging sections and ledges. This was particularly true of the areas near the entrance where broad (2 - 3 m wide) ledges were present on both walls at a depth of about 7 m BCD. These ledges effectively created the appearance of a 'false floor' with a relatively narrow (~3 m wide) trough dropping down a further 6 m to the boulder floor of the cave. Above the ledges, there were some substantial areas of overhanging wall at a depth of about 1-3 m BCD. Further into the cave (beyond about 40 m) the walls tended to be less variable in profile and consisted of steep rock with occasional narrow ledges. On the right wall about 70 m within the cave an apparent side passage was noted but was not investigated.

The cave ceiling was well above the waterline throughout the surveyed area. At the entrance, the ceiling was estimated to be at about 20 m ACD although this rapidly lowered to a height of about 10 m ACD within the first few metres of the cave and varied from 6 to 8 m ACD along the whole length of the passage.

Biological
The boulder floor showed clear signs of the effects of scour (**IR.FIR.SG.CC.Mo**) throughout the cave and this was also clearly evident on the lower walls (for up to 1 or 2 m above the floor). In these areas encrusting biota was very sparse with considerably less than 5% of the available surface colonised in most places. Mobile biota were also sparse, generally consisting of decapod crustaceans such as *Cancer pagurus*. Small patches of *Urticina felina* were also present in the more protected crevices at the margins of the floor.

The subtidal areas of the cave walls in the outer part of the cave were highly diverse with rock surfaces entirely covered by a range of sponges, colonial ascidians and other encrusting biota (**IR.FIR.SG.CrSpAsDenB**). This biological community was complex and patchy with various areas dominated by different taxa making it difficult to confidently describe clear gradients in the biological communities. Overall, there was an apparent trend of reduced abundance and reduced diversity with increasing distance into the cave. A similar trend also appeared to occur with increasing depth on the cave wall. The profuse and diverse communities on the upper walls became discernibly sparser on the lower parts of the walls presumably relating to past scour impacts from the cobbles of the cave floor.

Macroalgae were present on the walls of the entrance area and persisted some distance into the cave where light levels were sufficiently high. By 15 m into the cave the algae were already reduced to sparse cover (~10-20%) and restricted to the shallower (<1 m BCD) better illuminated sections of the walls. Macroalgae were entirely absent in surveyed areas within the dark zone further into the cave.

Extensive areas of dense *Dendrodoa grossularia*, often associated with *Clathrina coriacea* crusts, were a prominent feature of the cave wall community (**IR.FIR.SG.DenCcor**). These were present at the entrance area (15 m within the cave) but became increasingly prominent further into the cave and dominated the cave walls at a distance of 70 m from the entrance. Beyond this point, the dominance of the *Dendrodoa* / *Clathrina* community tended to decrease and by about 100 m into the cave the dominant biota on the walls tended to be dense crusts of *Spirorbis (Spirorbis) tridentatus* (**IR.FIR.SG.CC.BalPom**).

Sponge crusts (particularly *Halichondria (Halichondria) panicea*) were also a prominent component of the wall biota. They were present in variable abundance throughout the cave but abundances tended to be higher on the walls near the entrance. Similarly, some of the walls in the entrance area (15 m within the cave) had patches of dense hydroid turf, which was less abundant further into the cave.

Eulittoral areas of the cave wall were characterised by dense *Semibalanus balanoides* throughout most of the cave although in the inner part (100 m within cave) the barnacle abundance was considerably reduced (**LR.HLR.MusB.Sem.Sem**). Other biota characteristic of exposed rocky environments such as *Patella* sp., *Actinia equina* and *Mytilus edulis* were also present, particularly in the outer part of the cave.

Supralittoral parts of the cave wall in the illuminated outer part of the cave supported extensive crusts of *Hildenbrandia* sp. and *Verrucaria* sp (**LR.FLR.CvOv.VmucHil**) but these diminished with increasing distance into the cave where there was no apparent biota on the supralittoral walls and cave ceiling.

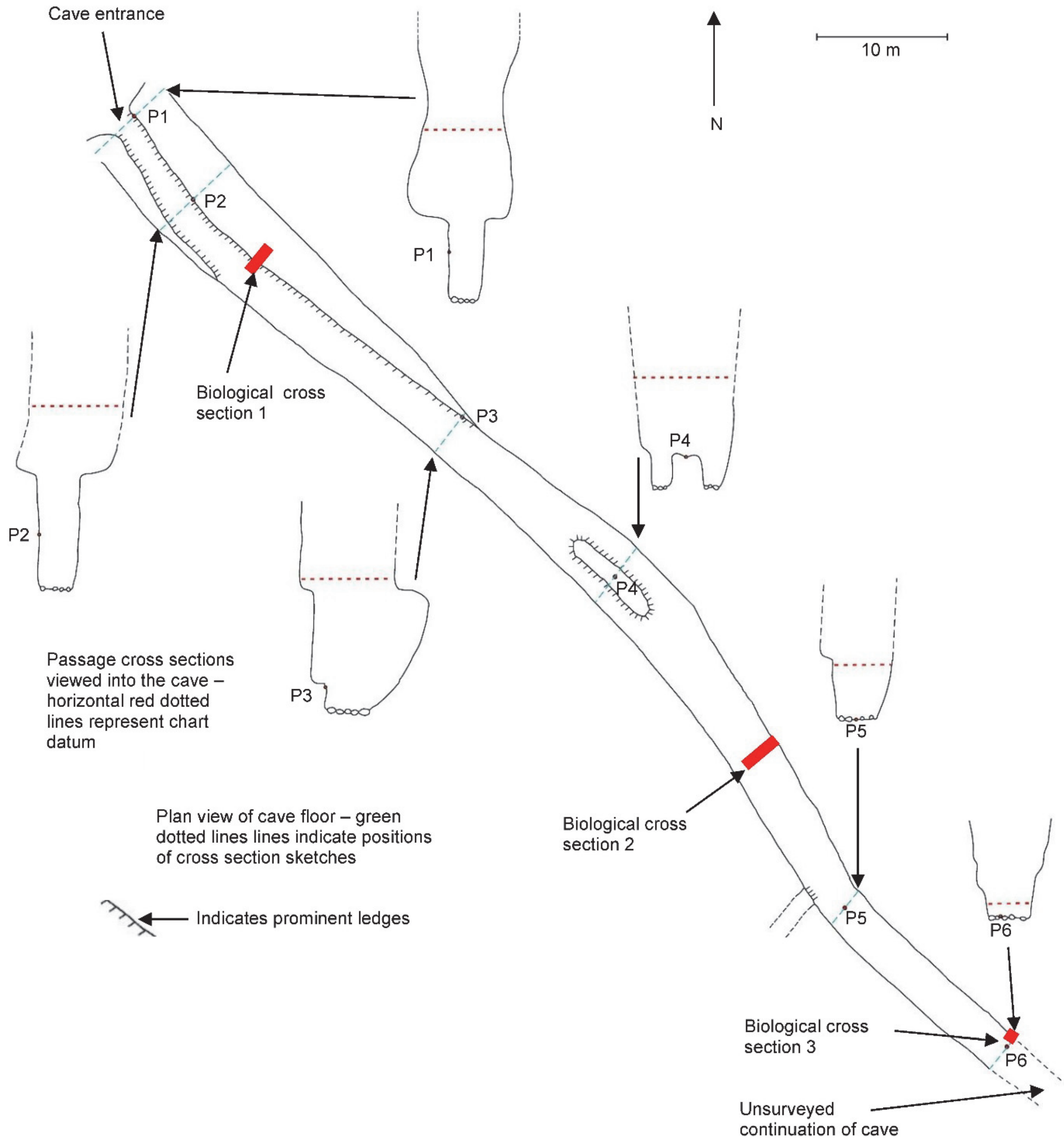

Figure 17. LE15 CV01 – Uamh Freasgill 1 ('Eriboll Cave 1'; 'CI6') – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-6 are fixed points of the survey line, associated biological data is provided in tables 22 - 24)

Table 22. LE15 CV01 – Uamh Freasgill 1 ('Eriboll Cave 1'; 'CI6') – Biological summary – cross section 1 (left wall, ~15 m from entrance, 15 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Supralittoral walls & ceiling. Steep & overhanging bedrock	~+9.5	+4.5	Common or abundant crusts of *Hildenbrandia* sp. & *Verrucaria* sp.	**LR.FLR.CvOv.VmucHil** Barren Rock
2	Supralittoral wall. Predominantly vertical.	+4.5	+4.2	Abundant *Verrucaria* sp., common *Hildenbrandia* sp. and occasional *Semibalanus balanoides*.	**LR.FLR.CvOv.VmucHil**
3	Eulittoral wall. Predominantly vertical.	+4.2	+1.5	Abundant *Semibalanus balanoides*, frequent *Patella vulgata* and occasional juvenile *Mytilus edulis*.	**LR.HLR.MusB.Sem.Sem**
4	Upper sublittoral wall. Predominantly vertical.	+1.5	-11.7	Mixed faunal crusts dominated by frequent colonial ascidians and a variety of sponges which were most abundant in the upper part of the zone. *Halichondria (Halichondria) panicea* in particular was locally common on the upper wall. Clumps of foliose red algae were frequent in shallow areas.	**IR.FIR.SG.CrSpAsDenB**
5	Lower sublittoral wall & floor. Scoured rock & cobbles.	-11.7	-13.8	Scoured rock surfaces. Sessile epibiota very sparse. Rare mobile epibiota included *Cancer pagurus* and *Asterias rubens*.	**IR.FIR.SG.CC.Mo**

Table 23. LE15 CV01 – Uamh Freasgill 1 ('Eriboll Cave 1'; 'CI6') – Biological summary – cross section 2 (left wall, ~70 m from entrance, 70 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Eulittoral wall. Predominantly vertical.	+4.2	+1.2	Superabundant *Semibalanus balanoides*.	**LR.HLR.MusB.Sem.Sem**
2	Upper sublittoral wall. Predominantly vertical.	+1.2	-4.3	Abundant *Dendrodoa grossularia* with common *Clathrina coriacea* dominated most areas. Occasional colonial ascidians, sponges and *Spirorbis (Spirorbis) tridentatus*.	**IR.FIR.SG.DenCcor**
3	Lower sublittoral wall & floor. Scoured rock & cobbles.	-4.3	-5.8	Scoured rock surfaces. Sessile epibiota very sparse.	**IR.FIR.SG.CC.Mo**

Table 24. LE15 CV01 – Uamh Freasgill 1 ('Eriboll Cave 1'; 'CI6') – Biological summary – cross section 3 (left wall, ~100 m from entrance, 100 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Eulittoral wall. Predominantly vertical.	+3.9	+2.4	Occasional *Semibalanus balanoides* and frequent *Actinia equina*.	**LR.HLR.MusB.Sem.Sem**
2	Upper sublittoral wall. Predominantly vertical.	+2.4	-3.1	Common *Spirorbis (Spirorbis) tridentatus* tubes and abundant tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*) dominated most surfaces. Occasional sponge crusts and colonial ascidians.	**IR.FIR.SG.CC.BalPom**
3	Lower sublittoral wall & floor. Scoured rock & cobbles.	-3.1	-3.6	Scoured rock surfaces. Sessile epibiota very sparse.	**IR.FIR.SG.CC.Mo**

3.4.3 LE15 CV02 – Uamh Freasgill 2

(field ref. 'Eriboll Cave 2'; cave inv. code 'CI9')

Physical
The cave entrance lay at the rear of a surge gulley which ran approximately south eastwards into the northern side of a rounded rocky headland. The coastline was composed of low quartzite cliffs and the cave entrance was only visible on entering the gulley. The cave was an extension of the approach gulley and was generally linear with large passage dimensions. The first 65 m of the cave were surveyed but it continued beyond this point and two side passages were noted to lead off the right wall.

The depth of the cave floor was ~5 m BCD near the entrance and rose gradually to a depth of ~1 m BCD at 65 m within the cave. The floor was composed of varying combinations of bedrock, boulders of all sizes, cobbles, pebbles and small patches of gravelly sand infill.

The level of scour and abrasion appeared to be less intense than seen in LE15 CV01. The bedrock and boulders of the cave floor were more angular and less well rounded. Additionally, patches of sandy material between boulders were more common than seen in LE15 CV01.

The cave walls were generally steep but their profile was variable and showed no obvious pattern along the length of the cave. The walls were often slightly undercut at their base and overhanging sections were often present.

The cave ceiling was well above the waterline throughout the surveyed area. Near the entrance the ceiling was ~9 m ACD but reduced to only a few metres high just a short distance into the cave.

Biological
The effects of scour on the cave floor and bases of the walls was obvious throughout the surveyed area (**IR.FIR.SG.CC.Mo**). In the entrance area there was sufficient light to support abundant crusts of coralline algae but beyond ~20 m from the entrance they became sparse, then absent as light levels fell. Other biota was generally sparse on the cave floor. There was a well-developed turf of tubes (mainly *Fabricia stellaris* with some *Jassa falcata*) near the entrance and *Spirorbis (Spirorbis) tridentatus* persisted in protected crevices. Patches of *Urticina felina* occasionally occured between the cobbles of the cave floor.

The submerged parts of the cave walls above the scoured zone showed a relatively sparse biota overall (compared to LE15 CV1). Throughout most of the cave, the walls were characterised by high abundances of *Spirorbis (Spirorbis) tridentatus* tubes. A turf of brown tubes (mainly *Fabricia stellaris* with some *Jassa falcata*) was also widespread and often in high abundance. On the upper parts of the walls (lower subtidal & sublittoral fringe) the biota was dominated by dense aggregations of *Dendrodoa grossularia*. These areas also supported abundant *Grantia compressa* and *Halichondria (Halichondria) panicea* was prominent with large patches sometimes occurring within and below the *Dendrodoa* zone (**LR.FLR.CvOv.SpR.Den**). This account is generally applicable to the cave walls throughout the surveyed area with some variation due to the reduced height of the walls in the inner parts of the cave. A further difference was that the darker inner areas lack the algal growth seen at the cave entrance. Some areas of the lower walls near the entrance supported abundant coralline algal crusts and sparse patches of foliose red algae but these only extended a limited distance into the cave as light levels fell (**IR.FIR.SG.CC.BalPom**).

Intertidal parts of the cave wall near the entrance had a distinct zone of dense *Semibalanus balanoides* and *Patella* sp. with patches of encrusting coralline algae

(**LR.HLR.MusB.Sem.Sem**). This zone became much less well-defined with increasing distance into the cave as the abundance of *Semibalanus* decreased markedly and the coralline algal crusts were no longer present.

Upper supralittoral walls and ceilings lacked obvious biota in the dark inner parts of the cave. In better-illuminated areas near the entrance the rock surfaces were dominated by crusts of *Hildenbrandia* sp. and *Verrucaria* sp. (**LR.FLR.CvOv.VmucHil**).

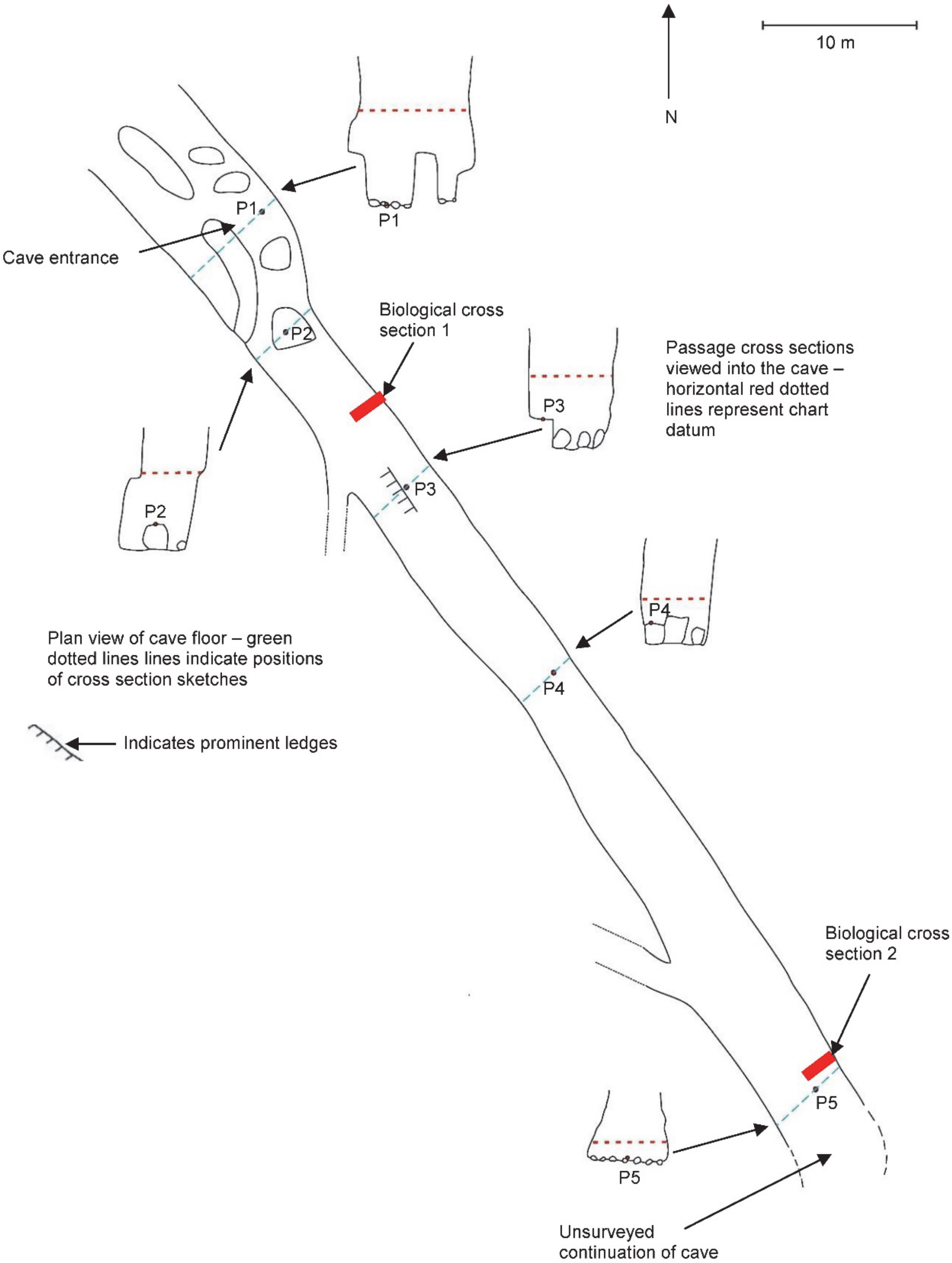

Figure 18. LE15 CV02 – Uamh Freasgill 2 (‘Eriboll Cave 2’; ‘CI9’) – Physical survey (scale bar applies to both floor plan and passage cross sections, P1-5 are fixed points of the survey line, associated biological data is provided in tables 25 & 26).

Table 25. LE15 CV02 – Uamh Freasgill 2 ('Eriboll Cave 2'; 'CI9') – Biological summary – cross section 1 (left wall, ~15 m from entrance, 15 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Supralittoral walls & ceiling. Steep & overhanging bedrock	~+8.0	+4.3	Superabundant crusts of *Hildenbrandia* sp. and frequent *Verrucaria* sp.	**LR.FLR.CvOv.VmucHil** Barren Rock
2	Supralittoral wall. Predominantly vertical.	+4.3	+3.8	Sparse biota. Rare *Verrucaria* sp., *Semibalanus balanoides* and *Patella* sp.	**LR.FLR.CvOv.VmucHil**
3	Eulittoral wall. Predominantly vertical.	+3.8	+1.8	Abundant *Semibalanus balanoides* and coralline algal crusts with common *Patella* sp.	**LR.HLR.MusB.Sem.Sem**
4	Upper sublittoral wall. Predominantly vertical.	+1.8	0	Superabundant *Dendrodoa grossularia* with common *Grantia compressa* and frequent patches of *Halichondria (Halichondria) panicea*.	**LR.FLR.CvOv.SpR.Den**
5	Mid sublittoral wall. Predominantly vertical.	0	-3.1	Dominated by common coralline algal crusts and abundant tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*). Foliose algae locally common. A variety of sponges present with *Halichondria (Halichondria) panicea* common.	**IR.FIR.SG.CC.BalPom**
6	Lower sublittoral wall & floor. Scoured rock & cobbles.	-3.1	-4.3	Scoured rock surfaces. Sessile epibiota sparse. Dominated by abundant coralline algal crusts and common tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*).	**IR.FIR.SG.CC.Mo**

Table 26. LE15 CV02 – Uamh Freasgill 2 ('Eriboll Cave 2'; 'CI9') – Biological summary – cross section 2 (left wall, ~65 m from entrance, 65 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Eulittoral wall. Predominantly vertical.	+3.8	+1.7	Frequent *Spirorbis (Spirorbis) tridentatus* with occasional *Dendrodoa grossularia* and *Halichondria (Halichondria) panicea*.	**LR.FLR.CvOv.SpR.Den** (impoverished)
2	Upper sublittoral wall. Predominantly vertical.	+1.7	-0.2	Abundant *Dendrodoa grossularia* with common *Grantia compressa* and *Halichondria (Halichondria) panicea*. Common *Spirorbis (Spirorbis) tridentatus* with frequent tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*).	**LR.FLR.CvOv.SpR.Den**
3	Lower sublittoral wall & floor. Scoured rock & cobbles.	-0.2	-0.8	Scoured rock surfaces. Sessile epibiota very sparse. Patches of anemones with common *Urticina felina* and frequent *Actinia equina*.	**IR.FIR.SG.CC.Mo**

4. DISCUSSION

4.1 St Kilda Caves

4.1.1 St Kilda Caves – extent & number of caves

The monitoring attributes of 'extent' of individual caves and 'number of caves' at the site are yet to be fully assessed for St Kilda. The coastline is complex, frequently inaccessible due to wave surge and features numerous caves some of which are entirely submerged 'fossil' structures. This combination of factors creates a significant challenge in compiling a complete and reliable inventory of the caves at the site. An examination of historical records of St Kilda sea caves revealed that some were duplicate records of the same site (*e.g.* favoured recreational dive sites) and others were of uncertain validity due to positional inaccuracies or lack of clear information. Once duplicate records are removed, the original list of 128 records is reduced to 85 possible separate caves. However, 30 of these are of dubious validity leaving only 55 locations where there are grounds for high or moderate confidence that a cave is present. The majority of these caves have not been entered and assessed so it is uncertain what proportion of them are sufficiently extensive to provide good representative examples of sea cave habitats.

In 2015, sections of the eastern coasts of Dun, Hirta and Boreray were examined at close quarters from an inflatable boat (see Figures 3 and 5). We have high confidence that this will have yielded a complete record of any caves visible above the waterline for these sections of coast. However, subtidal caves will have remained undetected and the proportion of coastline covered is relatively low (~34% for Dun, ~23% for Hirta and ~17% for Boreray). It is clear that existing knowledge of the number of caves around St Kilda is far from complete.

Assessment of the extent of individual caves also poses significant challenges in some cases. Even a small amount of groundswell can create hazardous levels of surge in shallower areas of caves and this is exacerbated in situations where the cave passage is constricted. From 2015 we have high confidence in the assessment of the extent of the fully intertidal CV04 (~52 m length) and the fully subtidal CV03 (~23 m length). But the extent of the other two sites was not fully assessed due to levels of wave surge in shallower water. CV02 was measured at 45 m in length but a passage at the back of the cave was not investigated due to time constraints, and excessive wave surge prevented full assessment of areas shallower than 5 m near the rear of the cave. CV01 is over 100 m in length but the survey did not extend further (or include shallow / intertidal areas) due to a combination of time constraints and concern about wave surge.

It is of value to consider factors with the potential to alter the extent of individual caves or the total number of caves at the site. It is then possible to assess the requirement and scope for moderating those factors through site management action. The potential for anthropogenic activities to directly impact these attributes is very low. Major engineering projects could conceivably modify or destroy existing caves but the likelihood of such projects being proposed (or approved) at this site is extremely low. Natural factors have rather more potential to impact on these attributes. St Kilda is an extremely high-energy site and winter storms have the potential to shift boulders either into or out of the caves thus modifying the extent of the habitat. Rockfall from the cliffs also has the potential to block or modify the extent of the caves and significant rockfalls have been recorded on a number of occasions at St Kilda (Love 2009). So there is potential for change in these attributes (extent & total number of caves) but mediation of such change is surely beyond the scope of any conservation management strategy, especially since most factors which could cause such change are part of natural processes.

4.1.2 St Kilda Caves – biotopes & species

The potential for drawing general conclusions on the biota of the St Kilda caves is limited by the small number of caves assessed and the environmental differences between those caves. CV04 is entirely intertidal and the biota is correspondingly distinct from that of the 3 subtidal caves surveyed. There are also distinct differences between CV03 and the remaining two caves due to the fact that CV03 is an entirely submerged cave at ~20 m depth. CV03 is consequently less subject to wave surge than CV01 and CV02 and is clearly a lower energy environment with sediment present on the cave floor. CV03 lacks the crisid bryozoan turf (which is a characteristic feature of most sites) and the sponge community is impoverished in relation to other sites.

Scour effects on the floor and lower walls of caves appears to be a common feature. The intense wave action is clearly capable of mobilising boulders and cobbles with consequent abrasion of rock surfaces. Where this is particularly intense, it results in smooth, rounded rock surfaces almost entirely devoid of life (*e.g.* CV04). With slightly less intense scour a sparse biota may appear, often restricted to crevices which offer some protection from the abrasion (*e.g.* CV01). Further reduction in scour levels may allow the development of a rather more abundant biota of scour tolerant taxa such as bryozoan crusts, *Spirobranchus triqueter* and spirorbin worms (*e.g.* CV02 and CV03). Such scour effects are also mentioned in some previous accounts of cave biota at St Kilda (*e.g.* see Table 27).

As mentioned previously, the biota of the intertidal CV04 is entirely distinct from that of the subtidal caves. The floor of the cave is largely composed of boulders and cobbles and is clearly subject to a considerable degree of scour. The entire cave is well illuminated due to the large broad entrance so in this respect it cannot be regarded as a good representative of cave habitats. The light level allows for the development of lichens, algal crusts and turfs on the scour-free upper walls throughout most of the cave. Communities near the mouth of the cave include a number of typical high-energy intertidal biotopes. These become increasingly impoverished towards the rear of the cave presumably as a consequence of increasing scour intensity as the cobble floor of the cave rises. No previous biological records of St Kilda intertidal caves are available for comparison although the communities and zonation patterns seen in CV04 are in broad correspondence to those described by earlier intertidal surveyors (Gauld *et al.* 1953, Watling *et al.* 1970).

Ten biotopes were noted in the intertidal CV04 whereas only three biotopes were recognised in the subtidal area of the other three caves. This might convey the impression of greater diversity of habitats in the intertidal cave but it is certainly an artefact of the biotope categorisation scheme. The biotope categories for intertidal rock and caves are generally a closer match to field data than is the case for subtidal cave biotopes. This may be partly due to the greater complexity of the subtidal communities and partly due to limitations on the amount of subtidal cave community data available to the architects of the biotope classification scheme. For CV01 and CV02 the heavily scoured floors and bases of the walls were a reasonably close match to **IR.FIR.SG.CC.Mo** but the cave wall communities were complex and variable and have been tentatively assigned to **IR.FIR.SG.CrSpAsAn**. Bryozoan turfs were a particularly notable feature of the cave walls. These were often spatially dominant and were primarily composed of crisids (*Crisia eburnea* & *Crisidia cornuta* in particular) but also included other erect bryozoans (*e.g. Bugula* & *Scrupocellaria*). In many areas, sponge crusts (particularly *Halichondria*) and / or dense areas of anemones (*Sagartia*, *Corynactis* or dwarf *Metridium*) dominated the walls. In shallow (sublittoral fringe) areas there was often a community dominated by *Tubularia* and other athecate hydroids often interspersed with dwarf *Metridium*. The biota of CV03 differed from this pattern and was characterised by a relatively sparse community throughout (**IR.FIR.SG.CC.BalPom**). The relatively low levels of scour on the floor of CV03 are assumed to be a consequence of the greater depth of CV03 relative to CV01 and CV02.

Previous records exist for CV03 and CV02. The 2015 records from CV03 are not a close match to previous records (Howson & Picton 1985). The dominant components of the community noted in 2015 (bryozoan crusts, spirorbins, *Spirobranchus* and *Caryophyllia*) were not mentioned in 1984. Conversely, the 1984 record mentions some unexpected taxa (*Sabella*, *Cerianthus* and *Bathynectes*) which were not noted in 2015. It is more probable that this difference is related to differences in the approach to surveying than to a real change in the biota. In 2015 the focus was on characterising the biological community as fully as possible whereas in 1984 the attention of the surveyors may have been more focussed on distinguishing unusual components of the biota. Previous records from CV02 (Posford Duvivier Environment 1997) are in broad accordance with records taken in 2015. In both cases bryozoan turf, anemones and sponge crusts were noted as significant components of the biota.

Previous records from other caves broadly support the 2015 assessment of the typical composition of the communities and this is summarised in Table 27. The larger number of records mentioning anemones and sponge crusts may be a consequence of the visual impact of such assemblages rather than an indication that they are a more typical component than bryozoan turf or other community components.

Table 27. Summary of previous St Kilda cave records mentioning notable components of the biological communities.

Biota	Sites where the biota has been noted previously (Cave inventory codes, Annex 1)
Scoured communities	A4, CI7, P56, C7, P46, R124
Bryozoan turf communities	CI7, C10, C7, P71, R143, R124
Anemone aggregations	A4, CI6, A2, P56, A6, H9, H8, C7, P71, H1, P52, P147, R143, R124
Sponge crusts	A4, CI6, A2, CI7, C10, P56, H8, C7, R109, P46, H1, P52, R143, R124
Dense *Tubularia*	A4, CI7, P56, P52, R143, R124

4.1.3 St Kilda Caves – anthropogenic impacts

No evidence of anthropogenic impacts were noted in the caves during the 2015 survey. It is likely that the caves have very limited vulnerability to direct anthropogenic disturbance. Fishing activities are generally minimal in the area and would not in any case be conducted at cave sites. The caves are generally inaccessible and are likely to be visited only on an infrequent basis and only by recreational divers. There is potential for such divers to cause damage to the biota by accidental contact with the cave walls but this level of disturbance is surely negligible when compared to the disturbance caused by scour and surge during the frequent storms in the area. An oil spill would have potential to create significant damage if one were to make contact with this coast. But the high-energy environment might be expected to rapidly disperse the oil and it is probable that these disturbance tolerant communities would regenerate rapidly.

4.1.4 St Kilda Caves – recommendations

Existing data on the location, extent and biota of the St Kilda caves is limited. Gathering such data poses a considerable challenge because of the difficulty of accessing these sites in the generally rough sea conditions of the area. A possible solution to this problem might involve engaging citizen science in the form of the recreational diving community. Dive boat operators might be offered the cave inventory section of this report and a brief proforma for recording key information on cave location and extent. Divers could be invited to submit this information together with associated imagery to be collated into an ongoing cave inventory for St Kilda. The cost of collation of this information could be minimised by engaging the support of citizen science volunteers from the diving or caving community. This approach has potential to greatly improve our understanding of the number and extent of the St Kilda caves but detailed biological monitoring is likely to require a team of experienced field biologists. Future monitoring should of course include a re-assessment of the 4 caves surveyed on Hirta in 2015 but might also incorporate well-developed caves from elsewhere if these can be identified from data provided by citizen science volunteers.

A dedicated ROV survey would make it possible to establish at least the number of entrances to subtidal caves around St Kilda. Such surveys are currently outside the scope of statutory nature conservation, but the iconic status of St Kilda might make such work attractive to e.g. commercial media outlets.

4.2 St Kilda Reefs

4.2.1 St Kilda Reefs – extent

In 2015, reefs on St Kilda were surveyed on an opportunistic basis during periods when sea conditions prevented access to the sea caves. They include two sites on Dun and one on Boreray. Clearly, this approach does not provide the data to allow any assessment of the attribute of reef extent. An assessment of reef extent would be best delivered by an extensive drop-down video survey ideally with an associated acoustic seabed survey. This was not within the remit of the primary objectives of the 2015 project.

4.2.2 St Kilda Reefs – biotopes & species

Intertidal biota were assessed at IR01 on Boreray and at IR02 on Dun. Both shores consisted of the steep rock that characterises most of the intertidal zone around St Kilda. The composition and distribution of biota was consistent with that of highly exposed environments. The supralittoral lichen zones covered a large vertical range illustrating the influence of sea spray well above the intertidal zone. The intertidal zone was dominated by barnacles including the exposure tolerant *Chthamalus stellatus*. Dense patches of *Mytilus edulis* were also present and at IR02 the exposure tolerant fucoids *Fucus distichus* and *Fucus spiralis f. nana* were present. The lower part of the shore and the sublittoral fringe were inaccessible due to wave surge but pink coralline algal crusts and *Corallina officinalis* appeared typical of the lower shore in most areas with a sublittoral fringe composed of *Alaria esculenta*. This biotope composition is in broad agreement with that described by previous surveys (*e.g.* Posford Duvivier Environment 1997).

Subtidal biota were assessed at SR01 on Boreray and at SR02 & SR03 on Dun. Seabed topography differed at these three sites and these differences are reflected in the composition of the biota. At SR01 the seabed was an irregular surface of bedrock and boulders, at SR02 there was a ~40° slope of bedrock and at SR03 there was a vertical bedrock wall below a rock arch. Kelp forests dominated at SR01 and SR02. Both were predominantly composed of *Laminaria hyperborea* but also included opportunistic species like *Saccharina latissima* and *Desmarestia aculeata*. The proportion of these opportunistic taxa was markedly greater at SR01 and this is likely to reflect greater levels of scour generated by the patches of pebbles between the boulders at this site. *Alaria esculenta* dominated the sublittoral fringe and shallow infralittoral at both sites but could not be scrutinised in detail due to the level of wave surge. The biota of the vertical wall at SR03 lacked the well-developed kelp canopy and showed more similarity with the biota of the cave sites. A narrow and relatively sparse band of *Alaria esculenta* was present in the sublittoral fringe just above a band of *Tubularia*, but the majority of the wall was dominated by a bryozoan turf with dense aggregations of anemones. This vertical rock community of bryozoan turf with anemones was also prominent on vertical boulder walls at SR01 and to a lesser extent, on small vertical faces at SR02. In general terms these communities appear typical of previous records from St Kilda. *Alaria esculenta* is typical of the sublittoral fringe and *Laminaria hyperborea* forests often show signs of periodic scour disturbance and support opportunistic kelps. Similarly, bryozoan turfs and aggregations of anemones are commonly mentioned in descriptions of communities on vertical rock surfaces.

4.2.3 St Kilda Reefs – anthropogenic impacts

As was the case for caves, these wave swept inaccessible shores would appear not to be vulnerable to anthropogenic impacts excepting those arising from oil spills or other marine accidents. No evidence of anthropogenic impacts was noted during the survey and it is probable that these high-energy communities are relatively resilient to disturbance events.

4.2.4 St Kilda Reefs – recommendations

SCM of the St Kilda reef sites would ideally include a greater number of sites surveyed for biotope and species composition in addition to a drop down video survey covering a broader range of subtidal sites. The frequent wave surge around the shores creates significant difficulties in surveying the lower shore and the shallow sublittoral. Because of these difficulties it might be better to abandon attempts to survey along transects running contiguously from the intertidal into the sublittoral. An alternative approach would be to survey intertidal and subtidal sites separately and avoid the lower shore and shallower sublittoral areas. For the subtidal, shotlines could be placed at pre-defined coordinates at a standard depth (*e.g.* 15 m BCD) and the divers survey either within a defined distance from the shotline or along a transect line originating from the shotline. Spatial accuracy might be less reliable than laying a transect line out from the shore but it would avoid the difficulty of laying a line in wave surged water and improve the chance of successful completion of repeat monitoring surveys. The wave surge also poses problems for intertidal survey work in that landing surveyors on the steep rocky shores may be hazardous. A potential solution would be to take high quality telephoto images of the shores from an inflatable boat. Obviously, this is less than satisfactory in terms of distinguishing the biota but may yield useful information on the biotope distribution in circumstances where it is impossible to land personnel on the shore.

4.3 North Rona Caves

4.3.1 North Rona Caves – extent & number of caves

As was the case in St Kilda, we have an incomplete picture of the extent and number of caves on North Rona. In 2015 we circumnavigated the entire island in an inflatable boat looking for cave entrances. The observations from this are detailed in the cave inventory presented in Annex 6. A total of 27 sites are listed but a combination of time constraints and wave surge prevented a close examination of many of these. Six sites appeared to be reasonably substantial caves, an additional fourteen entrances were recorded but not entered and the remainder appeared to be relatively short intertidal features or rock arches. Time constraints also prevented close scrutiny of the entire shoreline so small or inconspicuous entrances may have been overlooked and of course subtidal entrances would remain undetected.

Uncertainty also exists about the full extent of the surveyed caves. CV01 was surveyed to the back of the cave but an anecdotal account based on previous recreational dives suggested it should have penetrated much further than we recorded. It is possible that overlooked gaps between boulders at the floor of the gulley might lead to a more extensive cave or perhaps one of the adjacent caves is subtidally extensive. CV02 was also surveyed to the rear of the cave but a wave surged side passage was not entered and may have linked into the adjacent parallel cave (CI12). CV03 was surveyed to a point 65 m from the entrance but the passage continued beyond this point. Time constraints and wave surge prevented the team from extending the survey further into the cave.

Overall, our knowledge of extent and number of caves on North Rona is considerably more complete than is the case for St Kilda but many uncertainties still remain.

4.3.2 North Rona Caves – biotopes & species

As was the case for St Kilda, the low number of surveyed caves and topographical differences between these caves creates difficulties in reaching general conclusions on the North Rona cave biota. CV03 is perhaps the best developed of the three assessed caves. It consists of a deep (~17 m BCD at entrance), narrow gulley with vertical walls. The upper parts of the walls in the outer part of the cave are relatively free of scour due to the depth. The cave passage of CV02 is broader and shallower so scour influences a higher proportion of surfaces than is the case for CV03. CV01 is somewhat different from the other two sites. It is a short, well-illuminated shallow cave at the back of a long narrow surge gully. It is likely to be subject to intense wave surge and this is reflected in the biota.

Scour effects are most pronounced on the floor and wall bases of the caves. At CV02 and CV03 this zone was largely barren with the exception of sparse spirorbins and *Actinia equina* (**IR.FIR.SG.CC.Mo**). Scour at reduced intensity extends up the cave walls and is particularly notable where the cave floor is relatively shallow (CV02 and the 60 m cross-section of CV03). The community in these areas tends to be rather sparse and is characterised by spirorbin worms and a turf of short tubes mainly consisting of sabellid polychaetes (**IR.FIR.SG.CC.BalPom**). Where cave walls are sufficiently high the impact of scour is further reduced allowing for the development of a more diverse community (**IR.FIR.SG.CrSpAsAn**). The spirorbin worms and sabellid turf remain a major component of this community but a range of sponges and anemones also become prominent. On the highest walls (*e.g.* 20 m cross section of CV03) didemnid ascidians also become significant components of the community. The shallow sublittoral fringe area of the cave walls sometimes features a sparse band of Tubularia (*e.g.* CV02 & CV03). Intertidal areas were not subject to a meaningful assessment due to the hazard posed by wave surge.

The floor of CV01 lies well above the mobile boulders on the floor of the surge gulley so direct scour may not be as high as at the other sites but wave surge is likely to be intense. The biota is sparse and includes some of the components that were noted at the other two sites (*i.e.* anemones, sponges, didemnids, spirorbins and tube turf). But overall the community is characterised by coralline algal crusts and extensive patches of thin *Halichondria* crusts with bryozoan crusts also prominent in some areas (**IR.FIR.SG.CrSp** & **IR.FIR.SG.CC**). The outer part of the surge gulley at CV01 was also assessed and for the most part was characterised by a complex mosaic of sponges, anemones and colonial ascidians (**IR.FIR.SG.CrSpAsAn**).

No previous records of the biota of the North Rona caves were located and hence it is not possible to draw temporal comparisons for these sites.

4.3.3 North Rona Caves – anthropogenic impacts

No evidence of anthropogenic impacts was noted in the caves during the 2015 survey. It is likely that the caves have very limited vulnerability to direct anthropogenic disturbance. Fishing activities are generally minimal in the area and would not in any case be conducted at cave sites. The caves are generally inaccessible and are likely to be visited only on an infrequent basis and only by recreational divers. There is potential for such divers to cause damage to the biota by accidental contact with the cave walls but this level of disturbance is surely negligible when compared to the disturbance caused by scour and surge during the frequent storms in the area. An oil spill would have potential to create significant damage if one were to make contact with this coast. But the high-energy environment might be expected to rapidly disperse the oil and it is probable that these disturbance tolerant communities would regenerate rapidly.

4.3.4 North Rona Caves – recommendations

As was the case for St Kilda, it may be of value to engage citizen science in the form of the recreational diving community in order to broaden our understanding of the North Rona caves. Future monitoring should certainly include a re-assessment of CV02 and CV03. Due to its short extent and high light levels, CV01 is arguably a poorer representative of cave habitats and might be replaced by an alternative site if one can be located.

4.4 Loch Eriboll Caves

4.4.1 Loch Eriboll Caves – extent & number of caves

Loch Eriboll was not a priority target for the 2015 survey and the caves were visited on an opportunistic basis while sheltering from adverse weather within Loch Eriboll. The area has no conservation designations for sea caves and hence there is no requirement for their monitoring. Nevertheless, the caves are fully assessed here for comparative purposes.

Pre-existing records indicate the presence of at least 22 caves within Loch Eriboll although in most cases there is limited information on their topography and biota. In 2015 we examined a small proportion of the coastline including Eilean Cluimhrig and parts of the north east shore of the loch which yielded a number of additional potential cave entrances. The collated cave inventory for the site (Annex 9) is very incomplete but it indicates a minimum of 27 potential cave sites in the area.

The extent of the caves is unknown. Neither of the two surveyed caves were fully explored because of time constraints and wave surge. CV01 extends for over 140 m and CV02 extends for over 65 m. Both caves were relatively shallow at the furthest point reached and this may indicate that they do not continue much further. However, both are clearly well developed and extensive sea caves.

4.4.2 Loch Eriboll Caves – biotopes & species

The two surveyed caves are in very close proximity to each other so it is unknown if the biota can be considered representative of the Loch Eriboll area in general.

The floors and wall bases of the caves showed clear signs of scour (**IR.FIR.SG.CC.Mo**). This was most severe in CV01 where rock surfaces were very smooth and rounded with very little sessile biota present. In CV02 the rock surfaces were not polished to the same extent and there was a slightly more abundant community characterised by sabellid tubes and scattered anemones.

The sabellid tube turf, often accompanied by spirorbin worms, was a prominent feature of some of the cave walls. This was particularly the case where the cave floor was shallow creating scour effects over a higher proportion of the cave wall. This sabellid / spirorbin community was found interspersed with other biota on the lower walls of CV02 and also in the shallow areas ~100 m within CV01 (**IR.FIR.SG.CC.BalPom**).

Cave walls above the more scoured regions tended to support a rich and complex mosaic of biota with sponges and colonial ascidians as prominent components. However, the solitary ascidian *Dendrodoa* was a striking and characteristic part of the community in both caves (**IR.FIR.SG.CrSpAsDenB** & **LR.FLR.CvOv.SpR.Den**). At some locations, the *Dendrodoa* formed dense aggregations which were associated with extensive patches of the calcareous sponge *Clathrina* (**IR.FIR.SG.DenCcor**).

The eulittoral parts of the cave walls tended to be characterised by barnacles (**LR.HLR.MusB.Sem.Sem**) although this community became increasingly impoverished further into the caves. The supralittoral in illuminated outer parts of the caves was dominated by lichen and algal crusts (**LR.FLR.CvOv.VmucHil**) and appeared barren in the darker inner areas of the caves.

Pre-existing data on the biota of Eriboll sea caves is limited to only one record that appears to be from within a cave. The record is from 1986 and reports on 'walls dominated by encrusting sponges and colonial ascidians', the biotope **IR.FIR.SG.CrSpAsDenB** has been allocated to the Marine Recorder entry. This relates to cave inventory site 'M1' which is located ~500 m to the south of CV01. Given the potential for inaccuracy in the pre-GPS coordinates it may even be the same cave as CV01. In any event, the data corresponds very well with the findings of the 2015 survey.

4.4.3 Loch Eriboll Caves – anthropogenic impacts

No evidence of anthropogenic impacts was noted in the caves during the 2015 survey. It is likely that the caves have very limited vulnerability to direct anthropogenic disturbance. Fishing activities are unlikely to be conducted at cave sites. The caves are generally inaccessible and are likely to be visited only on an infrequent basis and only by recreational divers. There is potential for such divers to cause damage to the biota by accidental contact with the cave walls but this level of disturbance is surely negligible when compared to levels of natural disturbance. The loch is a natural harbour and has been used as an anchorage by the military in the past. Some aquaculture is conducted in the inner part of the loch and a major quarrying development on the western shore had been under consideration in the past. All these activities have potential to affect water quality and hence impact the cave biota but at current levels there is unlikely to be any impacts extending to the exposed outer part of the loch where the caves are located. At existing levels of usage of the loch there are unlikely to be any anthropogenic impacts on the cave biota excepting in the case of nautical accidents creating oil spills.

4.4.4 Loch Eriboll Caves – recommendations

Monitoring recommendations are inappropriate because Loch Eriboll is not currently a designated site for sea caves. However, the caves are extensive and support a rich and distinctive biota. If further Scottish sea cave sites were to be designated then Loch Eriboll should certainly be included in those under consideration.

4.5 Overview of cave communities

All three of the locations surveyed in 2015 included well developed sea caves with a rich associated biota. The biota showed some distinct similarities between the locations but also some distinct differences. These similarities and differences are summarised in Table 28. Due to the limited number of caves assessed at each location it is not appropriate to objectively test the statistical significance of the perceived differences and they should be regarded as provisional observations. Correspondingly, it is not appropriate to speculate on possible reasons causing the differences given the lack of supporting data.

Table 28. Overview of characteristics of sea cave biological communities distinguishing the sites surveyed in 2015.

Characteristic	St Kilda	North Rona	Loch Eriboll
Impoverished biota due to **scour** on cave floor and bases of walls. Impact of scour reducing with increasing height above cave floor.	Characteristic feature of most of the assessed caves.	Characteristic feature of most of the assessed caves.	Characteristic feature of most of the assessed caves.
Sponge crusts forming a significant component of the wall biota.	True of many locations.	True of many locations.	True of many locations.
Dense **aggregations of anemones** forming a significant component of the wall biota.	True of many locations.	True of many locations.	Not well developed
***Tubularia* aggregations** forming a distinct zone on shallower parts of cave walls.	True of many locations.	True of many locations.	Not well developed
Turf of **erect bryozoans (crisids)** forming a significant component of the wall biota.	True of many locations.	Not well developed	Not well developed
Spirorbins and sabellid tube turf forming a significant component of the wall biota.	Not well developed	True of many locations.	True of many locations.
Dendrodoa forming a significant component of the wall biota.	Not well developed	Not well developed	True of many locations.

Comparisons may also be drawn with caves surveyed by similar methods at other sites. A comparison with the sea caves of Mousa in Shetland (Harries *et al.,* 2009) indicates that many of the characteristics assessed in Table 28 were also noted at Mousa. The extent of the influence of scour in the Mousa caves was generally greater than that seen at the 2015 survey locations, sometimes affecting all surfaces within a given cave. This is not an indication of greater wave exposure at Mousa but more a consequence of differences in the topography of the caves. The floor of the Mousa caves tended to be considerably shallower than was the case for most of the caves surveyed in 2015. Consequently, material on the cave floor has greater potential to abrade the entire surface of the cave wall when mobilised by wave action. In addition to barren scoured rock surfaces, the scoured community of spirorbins and sabellid tube turf was present in a number of the Mousa caves similarly to the North Rona and Loch Eriboll caves.

An exception to the general pattern of scour at Mousa was the deeper cave MI08 CV03 where a more diverse community of epibiota was present on the upper wall. This community included a dense turf of crisid bryozoans similar to those noted in St Kilda. It also included dense aggregations of anemones and a shallow band of dense *Tubularia* similar to the caves of both St Kilda and North Rona. The *Dendrodoa* communities typical of the Loch

Eriboll caves also occurred at Mousa although not as profuse and well developed as those seen in Loch Eriboll.

The only distinct difference noted at Mousa was the lack of significant abundances of sponge crusts. Sponges were present, but only at lower abundances than seen in the caves surveyed in 2015.

The 2015 cave surveys can also be justifiably compared to those surveyed at Papa Stour in Shetland (ERT (Scotland) Ltd. 2005). Although there was some variation in community composition between the different Papa Stour caves all of the community characteristics noted in Table 28 were present in one or more of the Papa Stour caves.

Consideration has been given to drawing comparisons with the 2003 survey of the Berwickshire caves (ERT (Scotland) Ltd. 2004). However, the Berwickshire caves are predominantly intertidal with the subtidal examples being very limited in extent. A detailed comparison would be of little value because the Berwickshire cave environment is entirely different from that of the caves surveyed in 2015 and also from that of the Shetland caves.

4.6 General recommendations

Recommendations relating to the specific locations are outlined in sections 4.2.4, 4.3.4 & 4.4.4. Here we outline recommendations of more general relevance.

The scoured areas of cave floors and lower walls tend to have a sparse biota and the biota may show significant temporal variation depending on the frequency of gales that have occurred in the months preceding a survey. Therefore, these scoured zones may not be the best areas to provide an indication of the biological condition of the site. The shallow and intertidal areas of the caves may be inaccessible due to wave surge. Furthermore, the lichen and algal crusts on upper walls and ceilings are inaccessible and difficult to quantify with accuracy. For these reasons, the intertidal and supralittoral zones are also less effective as monitoring targets. In general, the diverse and profuse communities of the mid to upper sublittoral cave walls may offer the most appropriate zone for evaluating the biological condition of a site. Their relative freedom from intermittent scour events may provide a more stable and consistent community composition and they are likely to be more consistently accessible to surveyors as they are below the worst effects of wave surge.

However, these communities are often highly complex and difficult to characterise in the limited time available to the survey diver. Imagery and video was invaluable in aiding the post-survey interpretation of the data from the 2015 surveys. It is recommended that future surveys invest some resources in acquiring high quality video and stills imagery (both macro and wide angle). It is imperative that the imagery is spatially defined so that it can be confidently linked to the in-situ records taken in each zone at each cross section within the cave.

In situ species identification poses considerable challenges and it is strongly recommended that specimens are collected for the post-survey verification of species identity. The collection location of the specimens should be clearly recorded so that they can be confidently linked to the *in-situ* records taken in each zone at each cross section within the cave. The identification of specimens may be a time consuming task and this should be given due consideration when estimating the resources required for the project. Taxa which were significant components of the cave biota and proved difficult to identify accurately in-situ include sponges, colonial ascidians, bryozoan turf, spirorbins and 'tube turf' (may be formed by either amphipods or sabellids).

4.7 Assessment of site condition

A definitive assessment of the condition of the sea cave feature within the St Kilda and North Rona SACs is hampered by lack of baseline data. However, based on available data it should be concluded that the feature is in good condition. This conclusion is based on the following considerations:

- No obvious signs of collapse or rock-fall were noted at either site so recent significant changes in the attributes of cave extent and number of caves is considered unlikely.
- Changes in the attributes of cave extent and number of caves due to anthropogenic factors are considered extremely unlikely.
- No evidence of anthropogenic impacts on the feature were noted during the survey.
- No human activities with potential for significant impact on the features were noted during the survey.
- The cave biota (species composition and biotopes) was of similar composition to that indicated in earlier records where such records were available.
- The cave biota (species composition and biotopes) was of similar composition to that recorded at comparable sites within Scotland.

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ANNEX 1: ST KILDA CAVE INVENTORY

This annex provides summary information on all known St Kilda caves. Summary information is tabulated in Annex 1A. Cave locations are shown in the maps presented in Annex 1B. Details of caves visited in 2015 but not subject to full survey are shown in Annex 1C. Four caves were subject to detailed survey in 2015 and detailed information on these is provided in Annex 2.

Annex 1A – Tabulated records

The sites are ordered on the table according to location as follows: Dun – anticlockwise from NW point of the island; Hirta – anticlockwise from southern end of Village Bay; Soay and associated stacks – anticlockwise from StacShoaigh; Boreray and associated stacks – anticlockwise from SE point of the island. Entries in red font are dubious records or duplications which have been combined in a single record and are not plotted separately on the map. Site codes relate to the source of information as follows: 'CI XX' – visited in 2015; 'C X' - caves from ordnance survey maps; 'A X' - rock arches from ordnance survey maps; 'P X' – Posford (1997); 'R X' – Ridley (1983); 'M X' – Mills (1972); 'SS X' – Seasearch records; 'H X' – Howson & Picton (1985). Quotes from pre-existing records have not been systematically edited and taxonomic nomenclature has not been updated.

Site Code	Name	Island	Source of record	Notes	Lat	Long
C 2	Caolas an Duin	Dun	OS 10K map	Not approached in 2015. Ordnance survey map indicates a cave, no further information.	57.79925	-8.57266
A 4	An Fhaing	Dun	OS 10K map	Not approached in 2015. Ordnance survey map indicates an arch/tunnel of length ~50 m. Probably corresponds to **Ridley site (R 27)** which is described as: "shallow tunnel rises above water as it zigzags 70 m into the beautiful vertically-walled canyon just W of the headland of An Fhaing". Possibly also corresponds to **Posford (1997) sites 8&9 (P 8)** the coordinates of which are clearly incorrect but are within 120 m of A 4. Site 8 is described as: "Shaded infralittoral bedrock in a large gulley/cave system. Strata tilted to produce an overhanging/vertical cliff which ran the whole length of one side of a long cave (100m+). Main species included *Corynactis viridis* over most surfaces, large patches of encrusting sponge - some *Halichondria (Halichondria) panicea*, *Metridium dianthus*, *Sagartia elegans*, *Caryophyllia (Caryophyllia) smithii* and patches of dense *Tubularia indivisa* on the tops of the boulders. Underlying crusts of bryozoans and coralline algae." Site 9 is described as: "Scoured/grazed boulders and bedrock on the floor of a long cave/gulley with little other than coralline and bryozoan crusts. Patches of sparse *Caryophyllia, Corynactis* and large *Urticina felina*."	57.79735	-8.56769

Site Code	Name	Island	Source of record	Notes	Lat	Long
P 8	E A'Chlaisir, Dun (St Kilda)	Dun	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 8 & 9)	Posford (1997) sites 8&9. Corresponds to site **A 4**? Coordinates are wrong but within 120 m of A 4 and no other likely candidates for this site. Site 8 = "Shaded infralittoral bedrock in a large gulley/cave system. Strata tilted to produce an overhanging/vertical cliff which ran the whole length of one side of a long cave (100m+). Main species included *Corynactis viridis* over most surfaces, large patches of encrusting sponge - some *Halichondria (Halichondria) panicea*, *Metridium dianthus*, *Sagartia elegans*, *Caryophyllia (Caryophyllia) smithii* and patches of dense *Tubularia indivisa* on the tops of the boulders. Underlying crusts of bryozoans and coralline algae." Site 9 = Scoured/grazed boulders and bedrock on the floor of a long cave/gulley with little other than coralline and bryozoan crusts. Patches of sparse *Caryophyllia, Corynactis* and large *Urticina felina*."	57.79836	-8.56713
R 26	An Fhaing	Dun	Ridley No. 26	Not approached in 2015. Ridley site 26, description includes: "large cave (15 m deep and 5 m diameter) in the bay at a depth of 20 m". Cited coordinates (57.7965725 N; 8.56680777777778 W) have been modified to correspond to position indicated on the map provided by Ridley.	57.79608	-8.56757
M 7	Geo Ghiasgeir	Dun	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was probably viewed from a distance, perhaps from the clifftops of Hirta. Consequently, it is possible that it is a shadowy overhang with no cave present.	57.79681	-8.56279
A 1	Gob na Muce	Dun	OS 10K map	Not approached in 2015. Ordnance survey map indicates an arch/tunnel of length ~30 m. Mills (in Oldham, 2006) cites Cockburn (1936) as saying “a cave near Gob an Duin is ~46 m long and ~25 m high”. However, this may refer to the rock arches ~200 m west of Gob an Duin.	57.79399	-8.55141
Cl 6	Cave at Na Sgarain / "Saw Cut"	Dun	Assessed by diver 15th Aug 2015.	Assessed by diver in 2015. Severe underwater surge prevented a full exploration. Possibly links into the adjacent tunnel through Dun (site A 2), although the description for site R 17 would indicate otherwise (see below). Cave ~5 m wide and ~17 m BCD depth in approach gulley. Narrows to ~1.5 m wide and shallows to ~16 m BCD at a point where there is a large boulder on the cave floor. Beyond this point the floor drops down to >18 m BCD and the passage appears to continue. Fully illuminated through to this point. Corresponds to **Ridley site (R 17)**, described as: "at the head of a gully emerges a narrow cut 1-3 m wide, 26 m deep, shooting 60 m straight into Dun. The walls are sheer and coated with technicolour jewel, plumose and *Sagartia* anemones, and soft corals. Large boulders, yellow with *Myxilla* sponge, lead up to 10 m at the far end."	57.79506	-8.55301
R 17	Saw Cut	Dun	Ridley No. 17	Ridley site 17, described as: "at the head of a gully emerges a narrow cut 1-3 m wide, 26 m deep, shooting 60 m straight into Dun. The walls are sheer and coated with technicolour jewel, plumose and *Sagartia* anemones, and soft corals. Large boulders, yellow with *Myxilla* sponge, lead up to 10 m at the far end." Corresponds to **site Cl 6**.	57.7954828	-8.5529505
R 15	Just E of entrance to Dun Arch	Dun	Ridley No. 15	Ridley site 15, described as: "The bottom drops to 20m. Swimming from here along the E wall of the tunnel one comes to a small cave, often with a seal in it. Not too interesting a dive."	57.7954828	-8.5531130

Site Code	Name	Island	Source of record	Notes	Lat	Long
A 2	Na Sgarain E	Dun	OS 10K map	Large, open, well-illuminated rock arch. Rock wall of arch surveyed in 2015 but classed as a 'reef' site due to high levels of illumination see **SK15 SR03**, Annex 4). Corresponds to **Ridley site (R 14)** which is described as: "A 20m-high, 10m-wide arch about 50m long and about 10-15m deep through the arch, though there is a large, shallow rock just deeper than awash at high water in the middle of the channel. The boulders in the arch are covered with yellow *Myxilla* sponge and a variety of anemones... There is a very confused and broken water surface with any SW swell running; even in good conditions the dive demands careful boat cover."	57.79507	-8.55441
R 14	Dun natural arch	Dun	Ridley No. 14	Corresponds to **site A 2** (but coordinate error of ~400 m). Described by Ridley as: "A 20m-high, 10m-wide arch about 50m long and about 10-15m deep through the arch, though there is a large, shallow rock just deeper than awash at high water in the middle of the channel. The boulders in the arch are covered with yellow *Myxilla* sponge and a variety of anemones... There is a very confused and broken water surface with any SW swell running; even in good conditions the dive demands careful boat cover."	57.7989653	-8.5554341
A 3	Na Sgarain W	Dun	OS 10K map	Not closely assessed in 2015. Ordnance survey map indicates an arch/tunnel of length ~70 m.	57.79521	-8.55475
SK15 CV03 / CI 12	"Christine's cave"	Dun	Dive survey 17th Aug 2015.	See Annex 2 for detail for **SK15 CV03**. Coordinates differ but description corresponds with that given for **M 24**, **R 12** & **H 13**. For **M 24**, Mills (in Oldham, 2006) says "Miner-Williams (1979) reported subtidal cave at ~26 m. Entrance ~8 m wide by ~4 m high. Continued in for ~30 m then bifurcates. Not taken to conclusion." Description for **R 12** is: "dive to about 25 m …. the cave starts under an overhang and it is gloomy, then black. It is about 25-30 m deep making torches essential, cave divers line a reassurance. The walls are quite bare. ~4 m high at first, cave floor then climbs up a small boulder slope then runs level until too narrow to penetrate further, though the end is clearly in sight a few metres away." Description for **H 13** is: "vertical rock face to 24m, followed by slope of large boulders. Rock dissected with small gullies. Cave with large overhanging entrance at base of cliff, penetrating 25 - 30 m into the rock and sloping upwards. Boulders in base of cave, sandy patches at rear with *Cerianthus lloydii* and *Sabella pavonina*. *Bathynectes longipes* present in boulders at entrance to cave. *Phellia gausapata* and *Parazoanthus anguicomus* frequent".	57.79676	-8.55862
M 24	Cave of worms	Dun	Mills (in Oldham, 2006)	Mills (in Oldham, 2006) says "Miner-Williams (1979) reported subtidal cave at ~26 m. Entrance ~8 m wide by ~4 m high. Continued in for ~30 m then bifurcates. Not taken to conclusion." Coordinates are approximate, Mills gives BNG NA 107 974. Presumed to correspond to **site CI 12**.	57.79603	-8.55607
R 12	Dun Cave	Dun	Ridley No. 12	"dive to about 25 m …. the cave starts under an overhang and it is gloomy, then black. It is about 25-30 m deep making torches essential, cave divers line a reassurance. The walls are quite bare. ~4 m high at first, cave floor then climbs up a small boulder slope then runs level until too narrow to penetrate further, though the end is clearly in sight a few metres away" Presumed to correspond to **site CI 12**.	57.7969203	-8.5601227
H 13	Under Peak, Dun, Village Bay	Dun	Howson & Picton (1985)	"Vertical rock face to 24m, followed by slope of large boulders. Rock dissected with small gullies . Cave with large overhanging entrance at base of cliff, penetrating 25 - 30 m into the rock and sloping upwards. Boulders in base of cave, sandy patches at rear with *Cerianthus lloydii* and *Sabella pavonina*. *Bathynectes longipes* present in boulders at entrance to cave. *Phellia gausapata* and *Parazoanthus anguicomus* frequent." Presumed to correspond to **site CI 12**.	57.79729	-8.55960

Site Code	Name	Island	Source of record	Notes	Lat	Long
CI 1	Cave at Geo na Ruideig	Dun	Assessed by snorkeller & followed up by divers 15th Aug 2015.	Assessed by diver in 2015. Large obvious cave entrance above waterline. Above water the cave extends for <10 m but the left wall is undercut and the cave appears to continue underwater. Divers entered but found that the cave only extends a few metres further and is fully illuminated. Intertidal area of typical barnacles / encrusting coralline algae. Subtidal area not assessed.	57.797674	-8.561421
SS 165	Village Bay, Dunn (west side)	Dun	Marine Recorder - 2010 Seasearch Scotland St Kilda (records 165-169; 170-173; 174-178)	Information derived from Seasearch records retained in Marine Recorder. Records 165-169: "Large cave in the bedrock" Records 170-173: "Small cave with crevices and overhanging areas, the walls mainly covered in jewel anemones" Records 174-178: "rock reef with cave". A single set of coordinates is provided but the descriptions are superficial and appear to refer to 3 separate sites. No cave was found at these coordinates in 2015. Given the very limited information and locational uncertainty it is best to **disregard** these records.	57.79817	-8.56167
M 6	Seilg Geodha 2	Dun	Mills (1972)	Entrance location indicated on map by Mills (1972) - it was not accessible to Mills and no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay. In 2015 notes were made that in this area (at Seilg Geodha) of narrow (1-2 m wide) clefts continuing into the cliff to the limit of visibility but there was too much surge to enter (**CI 14,** see Annex 1C).	57.79867	-8.56328
SS 159	Village Bay, Dunn	Dun	Marine Recorder - 2010 Seasearch Scotland St Kilda (records 159-164; 179-181; 182-185; 192-196)	Not assessed in 2015. Appears to describe a subtidal cave of corresponding type to SK15 CV03. An investigation would be of value but relocation may be time consuming. Information derived from Seasearch records retained in Marine Recorder. Records 159-164: "Cave and various crevices in the rock face 10-28 m?". Records 179-181: "sheer wall from 10m to 22m covered in anemones, with many crevices home to crabs and squat lobsters. Cave at the base of the wall from 22m-23m with plumose anemones covering the ceiling at the entrance and boulders in the bottom." Records 182-185: "Bedrock wall from 18m to 28m with kelp forest phasing into kelp park and giving way to faunal turf at around 25m. Cave at around 26m with plumose anemones covering the ceiling at the entrance". Records 192-196: "steep wall with crevices leading down to a cave at around 25m with cup corals, jewel anemones and dead men's fingers on the walls".	57.79891	-8.56354
M 5	Seilg Geodha 1	Dun	Mills (1972)	Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay. In 2015 notes were made that in this area (at Seilg Geodha) narrow (1-2 m wide) clefts continue into the cliff to the limit of visibility but there was too much surge to enter (**CI 14,** see Annex 1C).	57.79869	-8.56399
CI 15	Cave at Giasgeir	Dun	Assessed from inflatable boat 15th Aug 2015.	Notes were made that in this area (SE of Giasgeir) a narrow entrance penetrates the cliff to the limit of visibility but there was too much surge to enter. No images or coordinates were recorded. The coordinates provided are approximate. The entrance is likely to lie within 50 m of this position.	57.80033	-8.57056
M 2	Dun gap tunnel (south)	Hirta	Mills (1972)	Not approached in 2015. South end of tunnel indicated on map by Mills (1972) - it was accessed and explored intertidally by Mills. Description as follows: "Tunnel estimated at ~60 m in length, cross section inclined about 40 deg towards Hirta, water filled at base. South entrance ~10 m wide and ~4 m high." Corresponds to **Ridley site (R 7)** described as: "A cave to the NE of Duin channel; the natural arch is just boatable at a calm high tide, when the water is 2-3 m deep and gives a scrambly dive".	57.80086	-8.57161

Site Code	Name	Island	Source of record	Notes	Lat	Long
M 1	Dun gap tunnel (north)	Hirta	Mills (1972)	Not approached in 2015. North end of tunnel indicated on map by Mills (1972) - it was accessed and explored intertidally by Mills. Description as follows: "Tunnel estimated at ~60 m in length, cross section inclined about 40 deg towards Hirta, water filled at base. South entrance ~10 m wide and ~4 m high." Corresponds to **Ridley site (R 7)** described as: "A cave to the NE of Duin channel; the natural arch is just boatable at a calm high tide, when the water is 2-3 m deep and gives a scrambly dive".	57.80118	-8.5718
R 7	Geo Leibli	Hirta	Ridley No. 7	Ridley site 7 described as: "A cave to the NE of Duin channel; the natural arch is just boatable at a calm high tide, when the water is 2-3 m deep and gives a scrambly dive". Corresponds to **M 1 & M 2**.	57.8016656	-8.5727988
M 4	Geo Leibli	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills and no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay. Consequently, it is possible that it is a shadowy overhang with no cave present.	57.80124	-8.57261
SK15 CV04 / CI 13	SK15 CV04 / "Cave of the Old Woman (Uamh Cailleach Bheag Ruaival)"	Hirta	Shore survey 16th Aug 2015.	See detail in Annex 2 for **SK15 CV04**. Corresponds to **site (C 1)**. Visited & described by Mills (1972) who provides a physical survey. This shows a wide (~35 m), high (~12 m) entrance, ceiling lowers to ~6 m about 28 m into the cave, rear of cave about 45 m from entrance. Also notes needing to wade through waist deep water to enter the cave.	57.80342	-8.57329
C 1	Uamh Cailleach Bheag Ruaival	Hirta	OS 10K map & Mills (1972)	Visited by Mills (1972) - physical survey provided, shows wide (~35 m), high (~12 m) entrance, ceiling lowers to ~6 m about 28 m into the cave, rear of cave about 45 m from entrance. Also notes needing to wade through waist deep water to enter the cave. Corresponds to **site SK15 CV04**.	57.80406	-8.57286
M 17	Rubha Challa	Hirta	Mills (1972)	Assessed from inflatable boat in 2015. Overhanging rock but no significant cave above waterline. Rear wall meets waterline within <10 m of entrance. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay. Mills (in Oldham, 2006) cites Williamson & Boyd (1960) as mentioning “Rock Doves nested many years earlier in a cave near the Point of Coll”.	57.80884	-8.55792
SK15 CV02 / CI 11	SK15 CV02 / "Neils cave" (Geodha Glann Neill)	Hirta	Dive survey 16th Aug 2015.	See detail in Annex 2 for **SK15 CV02**. Presumed to correspond to **Posfords (1997) site (P 4)** which is described as: "Wide open cave extending above surface and subject to much wave surge - inner zone more or less lacked seaweeds and was covered by a dense turf of *Corynactis* and sponge crusts with large patches of red crust (?*Cruoria pellita*) and intermixed with some short bryozoan turf (*Scrupocellaria*, *Bugula*) and colonial ascidians". Also presumed to correspond with Mills (1972) **site (M 18)** - Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay.	57.809043	-8.556752
P 4	Geodha Glann Neil, Hirta (St Kilda)	Hirta	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (record 4)	Posfords (1997) site 4 which is described as: "Wide open cave extending above surface and subject to much wave surge - inner zone more or less lacked seaweeds and was covered by a dense turf of *Corynactis* and sponge crusts with large patches of red crust (?*Cruoria pellita*) and intermixed with some short bryozoan turf *(Scrupocellaria, Bugula)* and colonial ascidians." Presumed to correspond with **site CI 11.**	57.80886	-8.55572
M 18	Geodha Glann Neill 1	Hirta	Mills (1972)	Entrance location indicated on map by Mills (1972) - it was not accessible to Mills and no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay. Presumed to correspond with **site CI 11.**	57.8092	-8.55644

Site Code	Name	Island	Source of record	Notes	Lat	Long
M 19	Geodha Glann Neill 2	Hirta	Mills (1972)	Assessed from inflatable boat in 2015. Overhanging rock but no significant cave above waterline. Rear wall meets waterline within <10 m of entrance. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay.	57.81009	-8.55467
CI 7	Cave at Geo nan Sgarbh, Hirta	Hirta	Assessed from inflatable boat 16th Aug 2015.	Assessed from inflatable boat in 2015. Depth at entrance ~14 m BCD. Back wall appears to meet waterline about 20-30 m in from ceiling closure. Loud booming & spray from rear. Strongly tideswept at entrance. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles. Probably corresponds to **Posford (1997) site 89 & 90 (P 89)**, the coordinates are within 60 m and no obvious alternative caves were found in the area in 2015. Posford (1997) site 89 description: "*Eudendrium* has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Extensive vertical walls of large cave covered by a low turf of dense bryozoans (crisiids, *Scrupocellaria* sp., *Bugula turbinata*) and polyclinid ascidians (*Polyclinum* sp., *Aplidium punctum*) with lesser cover of sponge crusts (including some large patches). *Polycarpa scuba* and pin head squirt mixed amongst the turf and *Eudendrium* sp. forming a dense low turf in some areas". Posford (1997) site 90 description: "Large area of large very round boulders at base of cave and lower parts of cave walls. Despite the obvious mobility of the boulders they were colonised by a wide variety of species (many probably fast growing). Bryozoan crusts, *Spirobranchus* sp. and *Caryophyllia* sp. were prominent, plus a variety of small ascidians. *Tritia incrassata* and nudibranchs notably common." Also corresponds to **site C 20** from ordnance survey map.	57.813777	-8.55204
P 89	Oiseval Cave Hirta (Cave N of Sgeir Nan Sgarbh) (St	Hirta	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 89 & 90)	Posford (1997) site 89 & 90 description: 89 = "*Eudendrium* has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Extensive vertical walls of large cave covered by a low turf of dense bryozoans (crissiids *Scrupocellaria* sp., *Bugula turbinata*) and polycinid ascidians (*Polyclinum* sp., *Aplidium punctum*) with lesser cover of sponge crusts (including some large patches). *Polycarpa scuba* and pin head squirt mixed amongst the turf and *Eudendrium* sp. forming a dense low turf in some areas."; 90 = "Large area of large very round boulders at base of cave and lower parts of cave walls. Despite the obvious mobility of the boulders they were colonised by a wide variety of species (many probably fast growing). Bryozoan crusts, *Spirobranchus* sp. and *Caryophyllia* sp. were prominent, plus a variety of small ascidians. *Tritia incrassata* and nudibranchs notably common." Assumed to correspond to **site CI 7.**	57.81429	-8.55181
C 20	Geo nan Sgarbh	Hirta	OS 10K map	Corresponds to **site CI 7.**	57.81378	-8.55180
SK15 CV01 / CI 10	SK15 CV01 / "Seal cave" (near Geo na Muirbhuaile)	Hirta	Dive survey 16th Aug 2015.	See detail in Annex 2 for **SK15 CV01**. Corresponds to **site C 19** noted on ordnance survey map and described (but not visited) by Mills (1972). Mills (in Oldham, 2006) cites Williamson & Boyd (1960) as saying "this is one of the finest of all the islands sea caves - Entrance ~15 m high & 21 m wide. Extends in ~50 m where it is dark and ceiling is ~25 m high. Then bifurcates, left branch leading to a beach with seals, right branch narrower and not investigated."	57.816182	-8.55499

Site Code	Name	Island	Source of record	Notes	Lat	Long
C 19	Geo na Muirbhuaile	Hirta	OS 10K map	Noted on ordnance survey map and described (but not visited) by Mills (1972). Mills (in Oldham, 2006) cites Williamson & Boyd (1960) as saying 'this is one of the finest of all the islands sea caves' - Entrance ~15 m high & 21 m wide. Extends in ~50 m where it is dark and ceiling is ~25 m high. Then bifurcates, left branch leading to a beach with seals, right branch narrower and not investigated. Corresponds to **site Cl 10.**	57.81626	-8.55487
R 99	Rubha Ghill	Hirta	Ridley No. 99	Ridley site 99, described as: "Steep undived cliff with caves". This is clearly a general reference to this stretch of coast. No cave was noted at the position of the coordinates when visited in 2015. The caves mentioned may refer to **site Cl 10 or site Cl 8** (each within 200 m either side of the coordinates of R 99.	57.8169861	-8.5553422
C 18	Rhuba Ghill	Hirta	OS 10K map	A cave is noted on ordnance survey map. This stretch of coast was examined from an inflatable boat in 2015 and no cave was found at the coordinates. Possibly a positioning error because a cave is present ~130 m further west or perhaps shadowing on the cliff may have been mistaken for a cave.	57.81697	-8.55577
Cl 8	Cave at Geo na Eaige	Hirta	Assessed from inflatable boat 16th Aug 2015.	A wide low entrance with central rock barrier / pillar. Left hand entrance wedge shaped (tip of wedge to left, base of wedge to right) water appears to meet rock slope on the right only a few metres in from the entrance. White water visible from waves breaking on rock slope. Right hand entrance with rectangular cross section. Could see it extends in for ~30 m but spray, white water & loud booming noise coming from this location. Depth at right hand entrance ~10 m BCD. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.	57.817339	-8.557935
Cl 9	Cave at Geo a Bhroige	Hirta	Assessed from inflatable boat 16th Aug 2015.	Large open cave with steep pebble beach at rear of cave about ~40 m in from the point of roof closure. Appears well illuminated throughout. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles. Position corresponds to **Ridley site (R 98)** but description ("A low cave with seals at the end") is not a close match. Also corresponds to cave marked on ordnance survey map - **site C 17**.	57.817958	-8.560078
R 98	Geo a' Bhroige	Hirta	Ridley No. 98	Ridley site 98 – "A low cave with seals at the end". Position corresponds to **site Cl 9**.	57.8176181	-8.5605213
C 17	Geo a' Bhraige	Hirta	OS 10K map	Cave marked on ordnance survey map. Position corresponds to **site Cl 9.**	57.81780	-8.55986
M 16	Stac a Langa tunnel	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills and no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports. Based on the local coastline it may be a tunnel of ~30 m length.	57.82058	-8.56114
M 22	Mol Ghiasgar	Hirta	Mills (in Oldham, 2006)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills. Mills (in Oldham, 2006) says Cockburn (1936) includes a photo of a cave at the back of the pebble beach in Mol Ghiasgor.	57.82041	-8.56381
C 16	S Leac Mhina Stac	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.82391	-8.56502
M 15	Geo nan Plaidean	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.82384	-8.57057
C 15	Geo na Mol E	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map. Probably corresponds to the first of the two caves mentioned by **Ridley site (R 91)**. Description: "Another undived cave which appears small and narrow. 80m W there is a second cave which is wide and low".	57.82264	-8.57145

Site Code	Name	Island	Source of record	Notes	Lat	Long
C 14	Geo na Mol W	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map. Probably corresponds to the second of the two caves mentioned by **Ridley site (R 91)**. Description: "Another undived cave which appears small and narrow. 80m W there is a second cave which is wide and low".	57.82251	-8.57273
R 91	Geo na Mol	Hirta	Ridley No. 91	Ridley site 91 – "Another undived cave which appears small and narrow. 80m W there is a second cave which is wide and low". Probably corresponds to **sites C 15 & C 14**.	57.8224503	-8.5715327
P 78	Cave W of Mina Stac, Hirta (St Kilda)	Hirta	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 78 & 79)	Posford (1997) survey. Coordinates are clearly wrong and are >100 m from the nearest recorded cave. Site location remains uncertain. It may correspond to **M 15, C 15, C 14 or M 14**. Descriptions given as follows. Record 79: "Walls of a gully leading into a cave were surveyed and characterised by dense sponge crusts with *Corynactis viridis* and a dense short bryozoan turf (crisids and *Scrupocellaria* sp.). Crevices and fissures provided a sheltered refuge for *Sagartia elegans*, *Polyclinum aurantium* and *Cancer pagurus*. Below this zone, the cave floor was boulder scoured and base". Record 78: "End of cave with massive rock mills at the back. The overhanging rock was dominated by dense barnacles (*Verruca stroemia*), sponge crusts, spirorbins and crisidae. Occasional *Tubularia indivisa* and *Metridium dianthus* towards the top".	57.82466	-8.57244
M 14	Geo na Mol	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.82334	-8.57445
R 90	Cliffs ESE of Bradastac	Hirta	Ridley No. 90	Not approached in 2015. Ridley site 90 mentions "There are two undived caves under these cliffs".	57.8239	-8.57667
R 89	Cliffs S of Bradastac	Hirta	Ridley No. 89	Not approached in 2015. Ridley site 89 mentions "These (*i.e.* the cliffs) fall to a cave and overhanging cleft and are unexplored".	57.82313	-8.57893
M 13	Geo Bhradastac	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.82435	-8.58179
R 83	Geo an t-Samh	Hirta	Ridley No. 83	Not approached in 2015. Ridley site 83 mentions "An undived bay with a large cave at the back. The name means 'Bad Smell Cave'".	57.82568	-8.58964
R 82	Geo Oscar	Hirta	Ridley No. 82	Not approached in 2015. Ridley site 82 mentions "A deep cave that has not been explored".	57.8257	-8.59178
A 7	Geo na h-Airde	Hirta	OS 10K map	Not approached in 2015. Arch/tunnel of ~95 m is shown on ordnance survey map. Referred to as "**Tunnel Cave**" in many accounts, named "**Uamh Gob na h-Airde**" by Mills (1972). Visited by Mills (1972) – a physical survey is provided and shows passage length ~67 m, width ~20-25 m and height ~6 m in mid section rising to ~25 m at NE end. Cross section with ~15 deg inclination sloping down to SW. Water filled at base. Mills (in Oldham, 2006) says Cockburn 1936 includes a photo of western entrance. Also notes several other historical references including mention of calcite deposits on floor and inhabitation by seals. Also corresponds to **Ridley site (R 81)**, described as "arch running about 100 m through headland - depths look too shallow for diving".	57.82549	-8.59376
R 81	Geo na h-Airde	Hirta	Ridley No. 81	Ridley site 81, described as "arch running about 100 m through headland - depths look too shallow for diving". Corresponds to **site A 7.**	57.8257783	-8.5940905
M 3	Uamh Geo nan Ron	Hirta	Mills (1972)	Not approached in 2015. Visited by Mills (1972) – a physical survey is provided, shows passage length ~67 m and continuing (requires swimming). Width ~12 m, height ~8 m at 30 m from entrance and ~4 m at 60 m from entrance. Cross section with ~15 deg slope down to SE. Notes it was "inhabited by many seals".	57.82042	-8.59606

Site Code	Name	Island	Source of record	Notes	Lat	Long
M 12	Geo Chruadalian	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. Mills (in Oldham, 2006) cites Williamson & Boyd (1960) as saying "Cave at Geo Chruadalian can be penetrated by a small boat at low tide for ~30 m and continues beyond".	57.81992	-8.59845
C 13	Sgeir na Caraidh S	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.82078	-8.60240
C 12	Sgeir na Caraidh M	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.82129	-8.60309
C 11	Sgeir na Caraidh N	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.82176	-8.60332
M 11	Mol Carn na Liana	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.82517	-8.60968
H 11	N. side Glen Bay, Hirta	Hirta	Howson & Picton (1985)	Site surveyed by Howson & Picton (1985). Description appears to refer to the underside of giant boulders rather than genuine caves. Description as follows: "Slope of house sized boulders with small caves underneath. Dense *Laminaria hyperborea* forest on tops of boulders. Large sheets of *parazoanthus anguicomua*, otherwise relatively barren in comparison to other sites. Seals Present". **Assumed not to refer to a true cave site.**	57.82711	-8.60892
C 10	Geodha Chaluim MhicMhuirich	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map. Possibly corresponds to **Posfords (1997) site (P 101)**. The Coordinates of the site are clearly wrong but the name given to the site is consistent with this location. P 101 record is described as: "Extensive vertical faces on side walls of entrance to open cave with huge boulders blocking part of entrance. Rock very richly colonised with a mosaic of colonial ascidians (especially *Aplidium punctum* and *Polyclinum* sp.) and bryozoan turf (*Bugula turbinata*, *Scrupocellaria* sp. and crisiids) mixed with various calcareous and encrusting sponges. Pinhead squirt and *Aplidium pallidum* notably common".	57.82801	-8.61533
P 101	Cave NE of Cambir, Hirta (St Kilda)	Hirta	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (record 101)	Posfords (1997) site 101 described as: "Extensive vertical faces on side walls of entrance to open cave with huge boulders blocking part of entrance. Rock very richly colonised with a mosaic of colonial ascidians (especially *Aplidium punctum* and *Polyclinum* sp.) and bryozoan turf (*Bugula turbinata*, *Scrupocellaria* sp. and crissiids) mixed with various calcareous and encrusting sponges. Pinhead squirt and *Aplidium pallidum* notably common." Coordinates are clearly wrong but site name indicates it corresponds to **site C 10.**	57.83797	-8.61068
C 5	Geo Chaimbir	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map. Corresponds to **Ridley site (R 46)** described as: "seals in the inlet use the cave under the overhang at the rear of the inlet as a haul out".	57.82712	-8.61714
R 46	Geo Chaimbir	Hirta	Ridley No. 46	Ridley site 46 described as: "seals in the inlet use the cave under the overhang at the rear of the inlet as a haul out". Corresponds to **site C5.**	57.8273178	-8.6163244
C 4	Poll a' Choire	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.82261	-8.61499
M 23	Irishman's Cave	Hirta	Mills (in Oldham, 2006)	Not approached in 2015. Mills (in Oldham, 2006) mentions this site - it was not accessible to Mills & no description is available. Reference to MacGregor (1931 & 1969) tale of wrecked Irishman rescued by locals - position approximate, taken from poorly reproduced map by Heathcote (1900?) presented in Oldham 2006.	57.80965	-8.60704
A 5	Gob Chathaill	Hirta	OS 10K map	Not approached in 2015. Ordnance survey map indicates an arch/tunnel of length ~60 m.	57.80879	-8.60449

Site Code	Name	Island	Source of record	Notes	Lat	Long
C 3	Geo na Capuill	Hirta	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map. Noted in Mills (1972), it was not visited but he says "the only cave not at sea level in the cliffs" - maybe supralittoral rock shelter? Mills (in Oldham, 2006) refers to this as "at the top of the cliffs". So probably **not a sea cave**.	57.80880	-8.60076
P 56	Laimh Rig Nam Gall, Hirta (St Kilda)	Hirta	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 56, 58, 59)	Not approached in 2015. Posford (1997) survey record 56 described as: "Entrance to cave dominated by encrusting (sheets of) yellow sponge, *Halichondria (Halichondria) panicea*, sparse *Tubularia indivisa*, *Diplosoma spongiforme* and anemones, (*Sagartia* sp. and small *Metridium dianthus*). This graded to a scoured base of bedrock (barren) with massive boulders beneath". Record 58 described as: "Extensive vertical wall of a long cave, from about 10 m depth to 3 m bcd, covered by a mosaic of sponge crusts and anemones. Inner zone a mixture of *Corynactis* sp., *Sagartia* sp., and *Phellia* sp. with *Leuconia nivea*, *Clathrina coriacea*, *Dercitus* sp. and occasional *Pachymatisma.* Isolated clumps of *Tubularia indivisa* and *Ectopleura larynx* in shallower zone". Record 59 described as: "The bottom of the cave with boulders and barnacles. The rock had sparse sponges, small *Sagartia elegans* and *Actinia equina*. The boulders appear to be seasonally scoured (by each other) however at time of survey were stable. Long very rounded boulders mostly bare with few anemones. *Actinia* sp. - unusual colours pale greens/pale blue and ordinary red". Assumed to also correspond to Posford (1997) site 57 (**P 57**). This is described as: "Band of dense *Balanus crenatus* and spirorbins at the top (shallow) part of the cave. Small *Metridium* sp. quite common and large amphipods common (*Iphimedia* sp.)". **Mills (in Oldham, 2006)** cites MacGregor (1936 & 1969) as mentioning a cave in this bay in relation to an observation that some of the Hirta caves are >60 m long.	57.80570	-8.59227
P 57	Laimh Rig Nam Gall, Hirta (St Kilda)	Hirta	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (record 57)	"Band of dense *Balanus crenatus* and spirorbins at the top (shallow) part of the cave. Small *Metridium* sp. quite common and large amphipods common (*Iphimedia* sp.)". Assumed to correspond **Posford (1997) sites 56, 58, 59 (P 56)**.	57.80562	-8.59226
M 10	Rubha Mhuirich	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.8052	-8.5915
M 9	Geo Rubha Mhuirich	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. Mills (in Oldham, 2006) cites Williamson & Boyd (1960) as saying Cave at Geo Rudha Mhurid (assumed to be a variant of the same place name) is 'impressive viewed from land or sea'.	57.8061	-8.58945
M 8	Geo na Seanaig	Hirta	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.79884	-8.57555
R 68	Stac Biorach Tunnel	Soay (Stac Biorach)	Ridley No. 68	Not approached in 2015. Ridley site 68 described as: "This lies at the E end of the stac where a large flake of rock butts on to the main stac. The tunnel is 20m long and 4-5m wide. Its floor is at 12m and it is 6m high. When entering the tunnel, the green-blue of the far end can be clearly seen. The surge from swell and tide can cause a very unpleasant pressure effect on the ears. In rough weather this tunnel acts as a blow-hole."	57.82817	-8.62193

Site Code	Name	Island	Source of record	Notes	Lat	Long
A 6	Stac Shoaigh	Soay (Stac Shoaigh)	OS 10K map	Not approached in 2015. Ordnance survey map indicates an arch/tunnel of length ~40 m. Corresponds to **Ridley site (R 71)** which is described as: "The natural arch is 20m high, and has a water depth of 15m shelving to 8m, then to about 5m at the N end, where an underwater 'col' leads to the undercut northern wall of the stac. The E side of the natural arch is heavily undercut and seals are often seen in the cauldron so-formed. The walls are covered with dwarf plumose anemones and the seafloor with sponges and hydroids; there are many nudibranchs to be seen. The seabed falls steadily away to over 30m to the S. A very memorable dive."	57.82842	-8.61962
R 71	Soay Stac Arch	Soay (Stac Shoaigh)	Ridley No. 71	Ridley site 71 which is described as: "The natural arch is 20m high, and has a water depth of 15m shelving to 8m, then to about 5m at the N end, where an underwater 'col' leads to the undercut northern wall of the stac. The E side of the natural arch is heavily undercut and seals are often seen in the cauldron so-formed. The walls are covered with dwarf plumose anemones and the seafloor with sponges and hydroids; there are many nudibranchs to be seen. The seabed falls steadily away to over 30m to the S. A very memorable dive." Corresponds to **site A 6.**	57.8280347	-8.6198336
R 63	Kokelaar's Cave, E Soay	Soay	Ridley No. 63	Not approached in 2015. Ridley site 63 described as: "A few metres S of site 62 there is a 5m wide and 5m high cave entrance with a water depth of 12m. This cave penetrates the cliffs for about 80-100m before the water surface meets the roof and before it really narrows down to a real channel. The cave then penetrates for at least a further 100m, probably much further. As we felt our way in we followed the left wall which in places was undercut. The visibility was very poor and often the right wall was not visible; the depth rose to 2m and then fell steadily to below 4m. The cave appeared to run on for some distance from our farthest penetration and it is not impossible that it penetrates right through Soay, which is about 250m wide at the cave sites. At our deepest point we could not find the right wall by locating our fins on the left wall and stretching out the length of our bodies for the opposite wall. There was quite a surge of water running to and fro in the cave, and it was necessary to hold on to the boulders on the bottom to avoid being bounced around. From our farthest penetration it took 7 minutes of steady finning to reach the cave entrance. An extremely committing and rather frightening dive... In other than very calm conditions it would be impossible to enter these caves with any sort of safety." Corresponds to ordnance survey **site C 9.**	57.8316886	-8.6257416
C 9	N Glamisgeo	Soay	OS 10K map	Cave marked on ordnance survey map. Corresponds to site **R 63.**	57.83168	-8.62579
R 62	Thompson's cave, E Soay	Soay	Ridley No. 62	Not approached in 2015. Ridley site 62 described as: "The first and most northerly of two challenging narrow caves running directly into the towering Soay cliffs. The depth at the entrance to the cave is 10-12m; this depth rises to 2m and then falls a little as the cave is penetrated. There are no known air spaces. The width varied from a few metres at the entrance, through a couple of surgey 'squeezes', to shoulder width at the inner end. The cave swings steadily to the left (S) as one swims in. The bottom consists of boulders, then cobble and pebble, and finally sand, indicating no through-current and therefore, and disappointingly, no connection with the N side of Soay. At the far end, at an estimated penetration of 110m, the width is such that a diver's shoulders are touching both walls; even in conditions of virtually no outside swell there was a very significant surge and a return was indicated. The visibility was quite good at first but soon dropped to about 1m due to stirred bottom sediments; at the furthest penetration the visibility was less than 30cm. An exciting but very committing dive."	57.8320542	-8.62564

Site Code	Name	Island	Source of record	Notes	Lat	Long
H 9	Skerry, N.E. Soay	Soay (stack NW of Geo Ruadh)	Howson & Picton (1985)	Not approached in 2015. Howson & Picton (1985) site 9 is described as: "Steep overhanging cliff dropping to a boulder slope at 47m. A cave with two exit tunnels runs through the base of the stack . Rock faces covered with *Metridium dianthus*, *Corynactis viridis* and encrusting sponges. *Phellia gausapata* and *Parazoanthus anguicomus* frequent. *Berthella plumula* and *Antiopella hyalina* present. "	57.83494	-8.62825
H 8	Am Plastair, N.W. Soay	Soay (Am Plastair)	Howson & Picton (1985)	Not approached in 2015. Howson & Picton (1985) site 8 is described as: "Steep rock slope with large slanting clefts and gullies changes to boulders at 30m. Tunnel pierces the stack, with the NW entrance at 25 m and the SE entrance at 10m. Tunnel walls covered with *Myxilla (Myxilla) incrustans* and *Halichondria (Halichondria) panicea*. Outer rock dominated by *M. senile* to 20m, and then *Alcyonium digitatum*. *Palinurus elephas*, *Homarus gammarus* and *Ophlitaspongia* sp. present. Several seals." Probably corresponds to **Ridley sites (R 54) & (R 56)**. Site R 54 is described as: "The N face is an undulating cliff to 28m with 15m high boulders and rocks just off the wall. These create endless caves and crannies all encrusted with colour and shellfish". Site R 56 is described as: "The tunnel is an angled gash that cuts right through the island, completely underwater. The N entrance is 24m high and 15m wide, narrowing to 8m by 4m wide just below the surface on the S face. The whole 40m tunnel is most impressive…can only be attempted in very calm conditions." Probably also corresponds to **Liddiard (2010) site A 8**, described as: "Exact position unknown. Tunnel through island from N to S, 0-25 m deep."	57.83328	-8.64458
A 8	An Plastair	Soay (Am Plastair)	Liddiard (2010)	Liddiard (2010) site A8, described as: "Exact position unknown. Tunnel through island from N to S, 0-25 m deep." Probably corresponds to site **H 8**.	57.83366	-8.64430
R 54	Am Plastair, N face	Soay (Am Plastair)	Ridley No. 54	Ridley site 54, described as: "The N face is an undulating cliff to 28m with 15m high boulders and rocks just off the wall. These create endless caves and crannies all encrusted with colour and shellfish". Probably corresponds to site **H 8.**	57.8339422	-8.6445663
R 56	Am Plastair tunnel	Soay (Am Plastair)	Ridley No. 56	Ridley site 56, described as: "The tunnel is an angled gash that cuts right through the island, completely underwater. The N entrance is 24m high and 15m wide, narrowing to 8m by 4m wide just below the surface on the S face. The whole 40m tunnel is most impressive…can only be attempted in very calm conditions." Probably corresponds to site **H 8**.	57.8339422	-8.6445663
C 8	E Gob a' Ghaill	Soay	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.83011	-8.64605
R 52	NW cliffs of Soay	Soay	Ridley No. 52	Not approached in 2015. Ridley site 52 described as: "A shallow cave above the surface becomes a large open cave underwater. At 26m the cave bottoms into a gully with a flat ledge and a narrow, deep cleft to the W…abounds with seals…Care should be taken with boats as there is a large rock which submerges, to the W of the grid ref."	57.82972	-8.64724
R 51	Gob a' Ghaill	Soay	Ridley No. 51	Not approached in 2015. Ridley site 51 described as: "The most remote and wild headland of the southern islands…even the caves at 20m on the N face are bare."	57.8279	-8.64992
C 7	Geo Phursan	Soay	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map. Corresponds to **Posfords (1997) sites 20 & 21 (P 20).** Site 20 is described as: "Extensive vertical walls inside cave with dense cover of sponge crusts mixed with patches of *Corynactis viridis*, a few colonial ascidians (*Polyclinum* sp., *Botrylloides* sp.), tufts of crisiids and bryozoan crust. Crevices with *Ophiopholis aculeata* and a single sipunculid (*Phasolosoma*?). Small *Alcyonium* sp. scattered about but more frequent colonies of *Parerythropodium* sp." Site 21 is described as: "Scoured boulders in bottom of cave. Very stable at time of survey but must move in bad weather. Boulders supported *Balanus crenatus* with some *Clavelina lepadiformis*, *Cancer pagurus* and *Asterias rubens*."	57.82571	-8.63911

Site Code	Name	Island	Source of record	Notes	Lat	Long
P 20	Ge? Phursan, Soay (St Kilda)	Soay	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 20 & 21)	Posfords (1997) sites 20 & 21 (P 20). Site 20 is described as: "Extensive vertical walls inside cave with dense cover of sponge crusts mixed with patches of Corynactis viridis, a few colonial ascidians (Polyclinum sp., Botrylloides sp.), tufts of crisiids and bryozoan crust. Crevices with Ophiopholis aculeata and a single sipunculid (Phasolosoma?). Small Alcyonium sp. scattered about but more frequent colonies of Parerythropodium sp." Site 21 is described as: "Scoured boulders in bottom of cave. Very stable at time of survey but must move in bad weather. Boulders supported Balanus crenatus with some Clavelina lepadiformis, Cancer pagurus and Asterias rubens." Corresponds to **site C 7.**	57.82552	-8.64031
C 6	Gob Phursan	Soay	OS 10K map	Not approached in 2015. Cave marked on ordnance survey map.	57.82343	-8.64102
M 25	Geo nan Ron	Soay	Mills (in Oldham, 2006)	Not approached in 2015. Mills (in Oldham, 2006) says MacGregor (1931) says this cave would be famous if more accessible & mentions >30 seals at entrance. Position is approximate, based on the statement “situated under Tigh Dugan”.	57.82656	-8.62785
R 103	Levenish, N face	Levenish	Ridley No. 103	Not approached in 2015. Ridley site 103 described as: "A rough seabed to 26m over gullies and cauldrons full of anemones. A very rough wall, 24m deep, runs along this face with huge boulders and lumpy rocks jut up to 10m just offshore. Caves, overhangs and gullies abound. The rocks are covered with sedentary life." NB the reference to 'caves' is a bit general & may refer to minor features.	57.7922906	-8.5103622
R 109	Levenish Tunnel	Levenish	Ridley No. 109	Not approached in 2015. Ridley site 109 is described as: "It is possible to see a geological fault near to the E end of the NE face of Levenish; dive here and follow to face in and down to 24m. A narrow slot can be entered and followed for about 60m right through Levenish. This cleft is 1m wide, at most, and reaches to within 2-3m of the surface. Even in very calm conditions there is a significant surge running through the tunnel and a 'knees and elbows' jamming technique should be used; in rougher conditions the tunnel cannot be entered in safety. The exit on the SE face of Levenish is via a small cauldron at about 8m and tends to be an ejection rather than an exit! The walls of the tunnel are lined with sponges and anemones." Corresponds to **Howson & Picton (1985) site H 16**, described as: "tunnel - Long narrow slit tunnel runs through east end of stack with vertical walls about 1 m apart widening at base. North entrance is at 25 m, the south resembles a cauldron with the opening at 10 m and a base at 15 m. Boulders and vertical bedrock at both entrances. Tunnel walls covered, with encrusting sponges and bryozoans. East of the stack, the seabed consists of huge boulders and some bedrock. *Laminaria hyperborea* is replaced by *Laminaria saccharina* at 25 m. Kelp forest finishes at 30 m. Seals present." Also corresponds to **Liddiard (2010) site A 9**, described as: "The ‘Letterbox’. Exact position unknown. Tunnel through island <1 m wide".	57.7922272	-8.5098447
H 16	Levenish	Levenish	Howson & Picton (1985)	Howson & Picton (1985) site H16, described as: "tunnel - Long narrow slit tunnel runs through east end of stack with vertical walls about 1 m apart widening at base. North entrance is at 25 m, the south resembles a cauldron with the opening at 10 m and a base at 15 m. Boulders and vertical bedrock at both entrances. Tunnel walls covered, with encrusting sponges and bryozoans. East of the stack, the seabed consists of huge boulders and some bedrock. *Laminaria hyperborea* is replaced by *Laminaria saccharina* at 25 m. Kelp forest finishes at 30 m. seals present." **Corresponds to Ridley site (R 109).**	57.79179	-8.50911
A 9	Levenish	Levenish	Liddiard (2010)	Liddiard (2010) site A 9, described as: "The ‘Letterbox’. Exact position unknown. Tunnel through island <1 m wide". Corresponds to **Ridley site (R 109).**	57.79191	-8.51065

Site Code	Name	Island	Source of record	Notes	Lat	Long
CI 5	Cave north of Creagan na Rubhaig Bana	Boreray	Assessed from inflatable boat 15th Aug 2015.	Cave entrance is a narrow (~1.5 m wide) slot. Obvious wave surge and 'booming' noise from within. Depth ~13.5 m BCD at entrance. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.	57.867924	-8.481863
CI 4	Cave south of Mullach an Tuamail, Boreray.	Boreray	Assessed from inflatable boat 15th Aug 2015.	At the surface, the back wall of the cave is clearly visible. Water depth is ~15.5 m BCD at the entrance but drops to 19.5 m BCD a few metres further into the cave. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.	57.868403	-8.483997
CI 3	Cave near Mullach an Tuamail, Boreray.	Boreray	Assessed by snorkerler 15th Aug 2015. Cave not fully examined.	Wave surge and aggressive seals prevented full examination by snorkeler. Cave appears to become very shallow ~10 m in from the entrance with breaking water & surge visible. Biota not assessed.	57.869485	-8.484925
CI 2	Cave at Geo Shunadal, Boreray.	Boreray	Assessed from inflatable boat 15th Aug 2015. Cave not entered.	Entrance is relatively low and narrow. Could not be entered safely due to wave surge. Biota not assessed.	57.871802	-8.484856
M 21	Udracleit	Boreray	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.87323	-8.48549
P 46	Gearrgeo, Boreray (St Kilda)	Boreray	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (record 46)	Not approached in 2015. Posfords (1997) site 46, described as: "Narrow, tall cave open to strong surge action with loose coarse gravel on the floor. Rock surface close to the floor were scoured clean with no attached fauna. Higher up the cave walls (1 m and above) the rock was covered in *Clathrina coriacea*, orange sponge crusts, *Filograna implexa* and *Spirobranchus triqueter*."	57.87680	-8.48900
P 71	SE Stac an Armin, Boreray (St Kilda)	Boreray (Stac an Armin)	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (record 71)	Not approached in 2015. Posfords (1997) site 71, described as: "Magnificent caves with hole in roof allowing wave surge to pass through. Dense faunal cover of anemones (*Sagartia elegans*, *Corynactis viridis*) and bryozoans, particularily *Scrupocellaria* sp. and dense clusters of *Bugula* sp. Also scatterings of *Caryophyllia (Caryophyllia) smithii* and *Parerythropodium* nearer the back of the cave. Large growths of *Polymastia* sp. and *Alcyonium digitatum* and *Sagartia elegans* around the entrance. The lower cave was 23-25 m bsl approx. 7 m deep by 4 m wide, the shallower cave at 14 m of similar size. The fauna of both was comparable, so have been combined."	57.87914	-8.49416
R 133	Geo na Tarnanach	Boreray	Ridley No. 133	Not approached in 2015. Ridley site 133 described as: "Translated this means 'Thunder Cave'! It is undived."	57.87528	-8.49121
R 159	Geo Lee	Boreray (Stac Lee)	Ridley No. 159	Not approached in 2015. Ridley site 159 described as: "series of entrances, gullies, tunnels & caverns", also, “cleft leading to tunnel opening into lrg (~8 m dia) spherical chamber - floor depth 12 m and air space above - descending tunnel to 38m?"	57.86604	-8.50884
H 1	N.E. of Stac Lee	Boreray (Stac Lee)	Howson & Picton (1985)	Not approached in 2015. Howson & Picton (1985) site H 1, described as: "A vertical cliff face drops to a small ledge at 20 m, and then on down to 40 m. Rock walls dominated by *Metridium dianthus*, *sagartia elegans* and *Myxilla (Myxilla) incrustans*. A cave with a boulder floor extends in about 15 m from the ledge. *Cerianthus lloydi* and *Urticina felina* present in sediment pockets in the cave, with *Galathea nexa* and *G. strigosa* amongst the boulders. *Alcyonium glomeratum* was reported from this site by one diver, but there was no specimen to verify the record."	57.86644	-8.50827

Site Code	Name	Island	Source of record	Notes	Lat	Long
P 52	S Stack Lee, Boreray (St Kilda)	Boreray (Stac Lee)	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 52 & 53)	Not approached in 2015. Posfords (1997) sites 52 & 53 (P 52). Record 52 is described as: "Small cave (3 m wide, 1.5 m tall, 8 m deep) in the infralittoral with encrusting bryozoans and orange encrusting sponge over most surfaces and dense *Corynactis viridis* on the ceiling with a few *Phellia gausapata* amongst them. A small side passage (1.5 m dia) branched off from the side of the cave leading to a chimney, lined with *Tubularia* spp. sponges and *Phellia* sp. which lead up to the kelp forest at around 8 m." Record 53 is described as: "Cave, about 6-8 m wide at entrance and 10 m deep, lying between 12-15 m bcd. Rock dominated by a bryozoan crust which formed frequent nodules with very dense *Caryophyllia (Caryophyllia) smithii* over all surfaces. Calcareous tubeworms (*Serpula* sp., *Spirobranchus* and (?) Hydroids) plentiful, most protruding perpendicularly from the rock. *Galathea strigosa*."	57.86550	-8.50910
SS 147	Stac Lee East Face	Boreray (Stac Lee)	Marine Recorder - 2007 Seasearch Scotland St Kilda (records 147 - 148)	Not approached in 2015. Information derived from Seasearch records retained in Marine Recorder. Records 147-148 (SS 147), described as: "Steep vertical rock face densely covered in jewel anemones and plumose anemones, mixed together, and sagartia. one cave opening with lobsters. Wall vertical from 10m - about 18m bsl, then small ledge and uneven near vertical rock below until small step". NB, reference to cave is brief & tenuous.	57.86625	-8.50788
M 20	Geo an Fheachdaire	Boreray	Mills (1972)	Not approached in 2015. Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was possibly viewed from a distance or noted on the basis of earlier reports.	57.86648	-8.49703
R 137	Geo na Leachan Moire	Boreray	Ridley No. 137	Not approached in 2015. Ridley site 137 is described as: "A twin-entranced cave which can be boated or snorkelled in calm weather. Depth vary from 2m to 13m, but care is required because of the wave surges. There are unusual orange filamentary growths on the walls near the low water mark."	57.86496	-8.49054

Site Code	Name	Island	Source of record	Notes	Lat	Long
R 143	Sgarbhstac Submarine Arch	Boreray (Sgarbh Stac)	Ridley No. 143	Not approached in 2015. Several records with slightly different coordinates all appear to describe the same arch. **Ridley site (R 143)** is described as: "apex of the arch is at a depth of 30m and it then flares out to meet the seabed at 50m; the arch is about 30m long and 20m wide with a broad geological dyke running along the base." **Howson & Picton (1985) site H 6** is described as: "Arch - small stack with vertical walls dropping to 50m. Arch through centre of stack, base at 50m, top at 25m, about 20m wide. Walls of arch dominated by *Tubularia indivisa*, floor of clean scoured bedrock. Walls of stack dominated by *Metridium dianthus* to 20m and then by *Sagartia elegans* and *Corynactis viridis*." **Posford (1997) site 24, 49-50 (P 24).** Record 24 is described as: "Archway at 25-30 m with dense *Tubularia* sp. Ceiling and upper section of tunnel dominated by *Tubularia* spp., and *Metridium dianthus*. Very richly colonised with dense mixture of dideminids and polyclinids with anemones and sponges all covered by numerous giant caprellids." Record 49 is described as: "A small cave in the top of the tunnel forming a cave (approx. 6 m deep. 2-3 m wide and 1.5 m high). The ceiling was covered with dense *Parazoanthus anguicomus*. The base with sheets of yellow sponge and tall columnar *Caryophyllia* sp., barnacle, *Spirobranchus* and bryozoan crusts covered the base of the cave." Record 50 is described as: "Very steep walled high tunnel/arch with *Antedon bifida*, bryozoan and coralline crusts, sponges and *Bugula* sp. at the lower of a large underwater arch." **Seasearch 2005.** Site **121-124 (SS 121)** is described as: "arch at the base rises about 20m from a fairly level seabed at about 50m bsl to about 30m bsl with a cave entrance near the top of the arch. Boulders, cobbles and pebbles on the surrounding seabed and through the arch. park on the shallower part of the walls to about 15m -20m bsl and Dabberlocks, at about 20m bsl. Sea anemones on the deeper walls and an octopus seen at about 30-40m bsl." Site **125-129 (SS 125)** is described as: "stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls." Site **130-134 (SS 130)** is described as: "submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl". **Seasearch 2007, site 145-146 (SS 145)**. Record 145 is described as: "rock wall, vertical, outside archway, below kelp from about 17m bsl. some caves in wall above the archway.- pink, black- orange siphon. 16-29 m." Record 146 is described as: "Walls and ceiling of archway through rock, subject to strong currents. 29-35 m". **Seasearch 2009 site 149-153 (SS 149)** is described as: "Survey to max depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower."	57.8637144	-8.4911988
H 6	Sgarbh Stac arch, Boreray	Boreray (Sgarbh Stac)	Howson & Picton (1985)	"Arch - small stack with vertical walls dropping to 50m. Arch through centre of stack, base at 50m, top at 25m, about 20m wide. Walls of arch dominated by *Tubularia indivisa*, floor of clean scoured bedrock. Walls of stack dominated by *Metridium dianthus* to 20m and then by *Sagartia elegans* and *Corynactis viridis*." **Corresponds to site R 143.**	57.86369	-8.49117

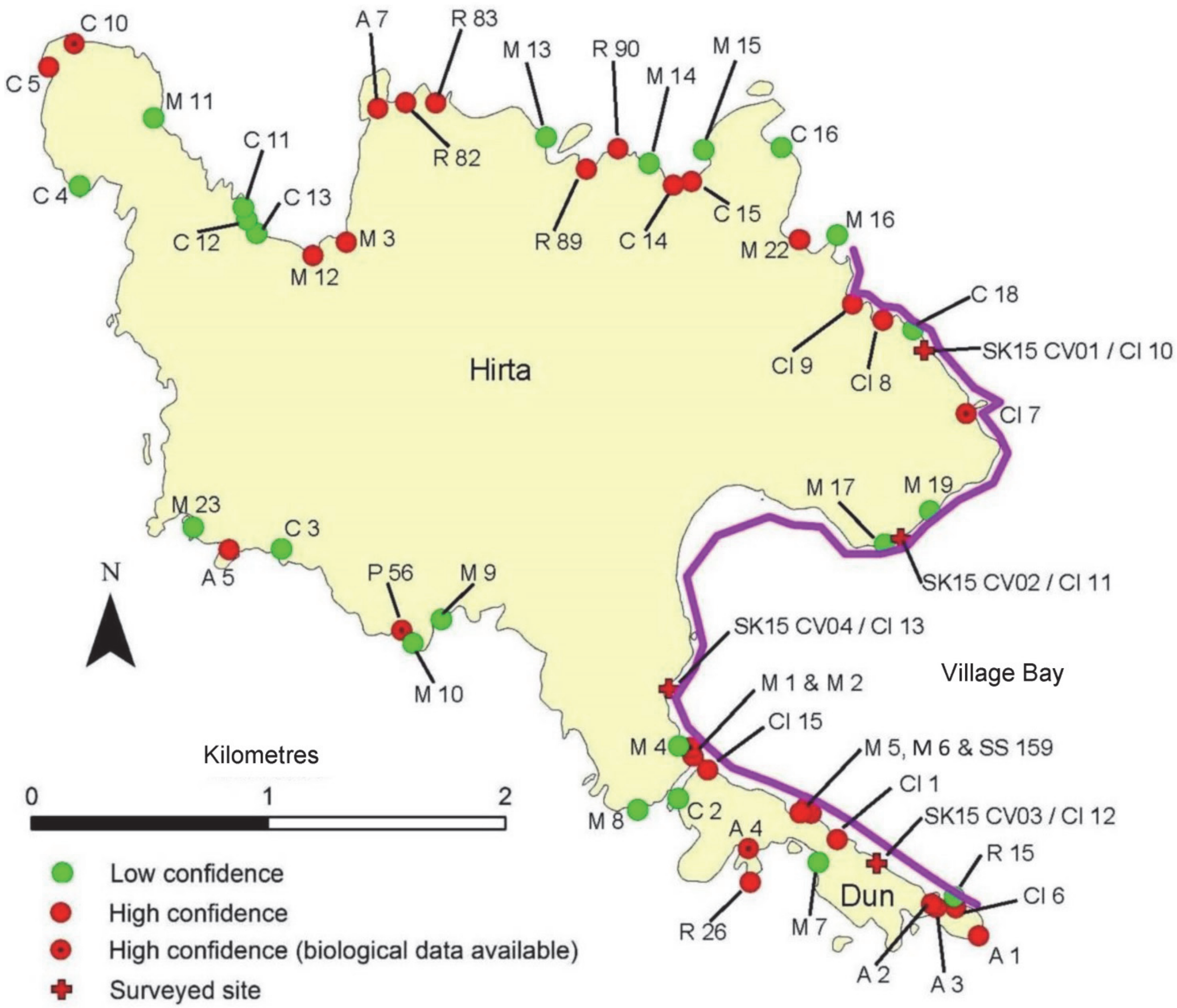
Site Code	Name	Island	Source of record	Notes	Lat	Long
P 24	Scarbh Stack, Boreray (St Kilda)	Boreray (Sgarbh Stac)	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 24, 49-50)	Record 24 = "Archway at 25-30 m with dense *Tubularia* sp. Ceiling and upper section of tunnel dominted by *Tubularia* spp., and *Metridium dianthus*. Very richly colonised with dense mixture of dideminids and polyclinids with anemones and sponges all covered by numerous giant caprellids." Record 49 = "A small cave in the top of the tunnel forming a cave (approx. 6 m deep. 2-3 m wide and 1.5 m high). The ceiling was covered with dense *Parazoanthus anguicomus*. The base with sheets of yellow sponge and tall columnar *Caryophyllia* sp., barnacle, *Spirobranchus* and bryozoan crusts covered the base of the cave." Record 50 = "Very steep walled high tunnel/arch with *Antedon bifida*, bryozoan and coralline crusts, sponges and *Bugula* sp. at the lower of a large underwater arch." **Corresponds to site R 143.**	57.86379	-8.49155
SS 121	Sgarbh Stack	Boreray (Sgarbh Stac)	Marine Recorder - 2005 Seasearch Scotland St Kilda (records 121-124)	Seasearch observation survey on a stack/pinnacle rising above sealevel with near vertical sides. "An arch at the base rises about 20m from a fairly level seabed at about 50m bsl to about 30m bsl with a cave entrance near the top of the arch. Boulders, cobbles and pebbles on the surrounding seabed and through the arch. park on the shallower part of the walls to about 15m -20m bsl and Dabberlocks, at about 20m bsl. Sea anemones on the deeper walls and an octopus seen at about 30-40m bsl. seabed types =dominant rocky reef, also boulders, cobbles and pebbles. litter seen. noteworthy recorded" **Corresponds to site R 143.**	57.86381	-8.49136
SS 125	Scarbh stac	Boreray (Sgarbh Stac)	Marine Recorder - 2005 Seasearch Scotland St Kilda (records 125-129)	"Seasearch observation survey with photographs on a stack off Boraray (south side according to position). 100m wide stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls. seabed types - dominant rocky reef, also boulders. noteworthy recorded litter." **Corresponds to site R 143.**	57.86341	-8.49142
SS 130	Scarbhstac, Submarine Arch	Boreray (Sgarbh Stac)	Marine Recorder - 2005 Seasearch Scotland St Kilda (records 130-134)	"Seasearch observation level survey to 43m bsl (42.3m bcd) on a submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl. events 5 & 6 for further details. is extremely clear, with no pollution. litter observed." **Corresponds to site R 143.**	57.86354	-8.49117
SS 145	Sgarbhstac	Boreray (Sgarbh Stac)	Marine Recorder - 2007 Seasearch Scotland St Kilda (records 145 & 146)	Record 145 = "rock wall, vertical, outside archway, below kelp from about 17m bsl. some caves in wall above the archway.- pink, black- orange siphon. 16-29 m." Record 146 = "Walls and ceiling of archway through rock, subject to strong currents. 29-35 m." **Corresponds to site R 143.**	57.86387	-8.49036
SS 149	Sgarbstac	Boreray (Sgarbh Stac)	Marine Recorder - 2009 Seasearch Scotland Kilda & Skye (records 149-153)	"Survey to max depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower. noteworthy - as above. litter - nothing reported." **Corresponds to site R 143.**	57.86307	-8.49216

Site Code	Name	Island	Source of record	Notes	Lat	Long
R 124	Rubha Bhrengadal	Boreray	Ridley No. 124	Not approached in 2015. Ridley site 124 is described as: "A rock projects just S of the tip of the headland. Dive just W of this to a rather uninteresting seabed at 25 m, and fin E to meet a vertical wall, then follow this N to locate another exciting tunnel. This is about 2 m wide and 50 m long; its deepest point is at 25 m and the roof at 10 m. It is coated with the normal life... The vertical wall to the S of the main tunnel has a secondary tunnel with a depth of 32 m at its roof; it is about 20 m long, and has the shape of a diagonal slot 3 m by 2 m." Probably corresponds to **Howson & Picton (1985) site H 5**, described as: "tunnel - short? Rockslope to 25m, followed by boulderslope. Rock extends to over 30 m to south. At 32 m a narrow tunnel 2 m high and 3 m wide leads through the rock into a gulley with vertical walls 2 m apart rising to the surface and a boulder floor. Gully walls densely covered with encrusting sponges, particularly *Oscurella lobularis*, bryozoans, *Corynactis viridis* and *Sagartia elegans*. Several seals present." Also probably corresponds to **Seasearch 2010 site 216-220 (SS 216)**. Records 216-218 are described as: "Vertical walls and ceilings of caves and overhangs dominated by encrusting sponges but not as well covered as habitat 2. 26-40 m bsl." Records 219-220 are described as: "Cave and overhang floors of bedrock, boulders and cobbles dominated by *Caryophyllia (Caryophyllia) smithii*." May also correspond to **Posford (1997) sites 47, 48 & 72 (P 47)**. Coordinates differ but site name indicates same location. Record 47 is described as: "The entrance walls to the cave, sloping bedrock with *Metridium dianthus* and *Ectopleura larynx* and *Tubulaira indivisa*." Record 48 is described as: "Extensive cave wall, mostly just over the vertical, with a crissiid *Scrupocellaria*/*Leucosolenia* sp. turf, frequent clumps of *Ectopleura larynx* and a variety of other sponges, particularly large sponge crusts, and patches of anemones including *Phellia* sp." Record 72 is described as: "Gravel scoured entrances to two wave surge caves in the infralittoral. Rock surfaces covered by thin patches of bryozoan crust, *Spirobranchus triqueter*, *Caryophyllia (Caryophyllia) smithii*, abundant *Spirorbis* sp. and patches of *Filograna implexa* and thin orange sponge crusts. Some brown and coralline algal crusts in partial shade. Large *Urticina felina* adjacent to patches of coarse gravel and pebbles and one *Halcampa chrysanthellum* in the gravel."	57.8632119	-8.4851927
H 5	Rubha Bhrengadal, S.E. Boreray	Boreray	Howson & Picton (1985)	"tunnel - short? Rockslope to 25 m, followed by boulderslope. Rock extends to over 30 m to south. At 32 m a narrow tunnel 2 m high and 3 m wide leads through the rock into a gulley with vertical walls 2 m apart rising to the surface and a boulder floor. Gully walls densely covered with encrusting sponges, particularly *Oscurella lobularis*, bryozoans, *Corynactis viridis* and *Sagartia elegans*. Several seals present." **Probably corresponds to site R 124**.	57.86344	-8.48495
SS 216	Rubha Bhrengadal	Boreray	Marine Recorder - 2010 Seasearch Scotland St Kilda (records 216-220)	Record 216-218 = "Vertical walls and ceilings of caves and overhangs dominated by encrusting sponges but not as well covered as habitat 2. 26-40m bsl." Record 219-220 = "Cave and overhang floors of bedrock, boulders and cobbles dominated by *Caryophyllia (Caryophyllia) smithii*." **Probably corresponds to site R 124**.	57.86356	-8.48483

Site Code	Name	Island	Source of record	Notes	Lat	Long
P 47	Coinneag Caves, Boreray (St Kilda)	Boreray	1997 MNCR/SNH St Kilda sublittoral survey. Ref: Posford Duvivier Environment (1997) (records 47, 48, 72)	Record 47 = "The entrance walls to the cave, sloping bedrock with *Metridium dianthus* and *Ectopleura larynx* and *Tubulaira indivisa*." Record 48 = "Extensive cave wall, mostly just over the vertical, with a crissiid *Scrupocellaria/Leucosolenia* sp. turf, frequent clumps of *Ectopleura larynx* and a variety of other sponges, particularly large sponge crusts, and patches of anemones including *Phellia* sp." Record 72 = "Gravel scoured entrances to two wave surge caves in the infralittoral. Rock surfaces covered by thin patches of bryozoan crust, *Spirobranchus triqueter*, *Caryophyllia (Caryophyllia) smithii*, abundant *Spirorbis* sp. and patches of *Filograna implexa* and thin orange sponge crusts. Some brown and coralline algal crusts in partial shade. Large *Urticina felina* adjacent to patches of coarse gravel and pebbles and one *Halcampa chrysanthellum* in the gravel." **Probably corresponds to site R 124.**	57.86451	-8.48441

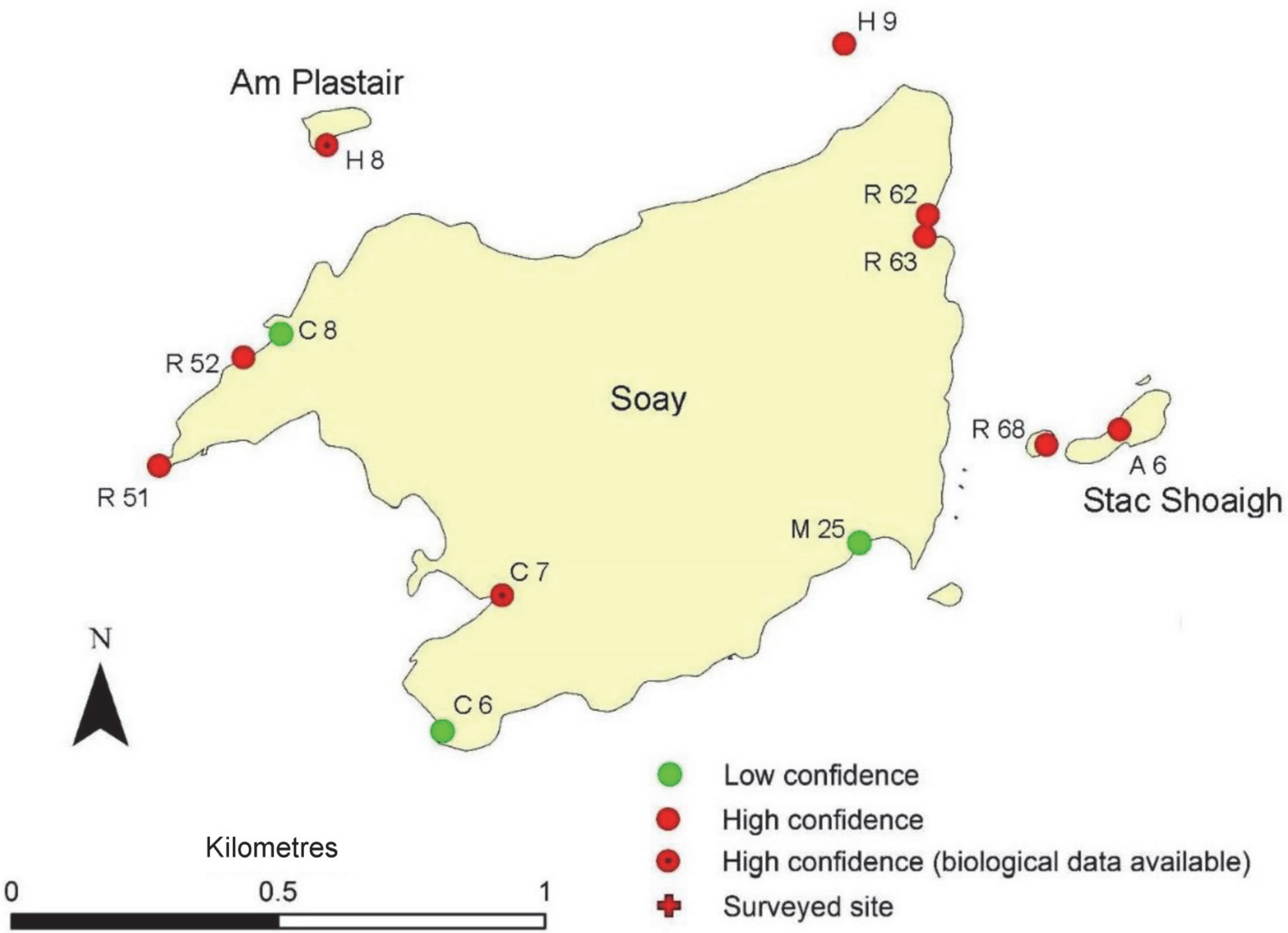
Annex 1B – Location maps

Outline map of Hirta showing location of cave sites based on historical records and direct observation. Symbols indicate level of confidence in evidence of cave presence and availability of biological data (see legend). Purple line denotes area of coast directly assessed for cave presence in 2015.



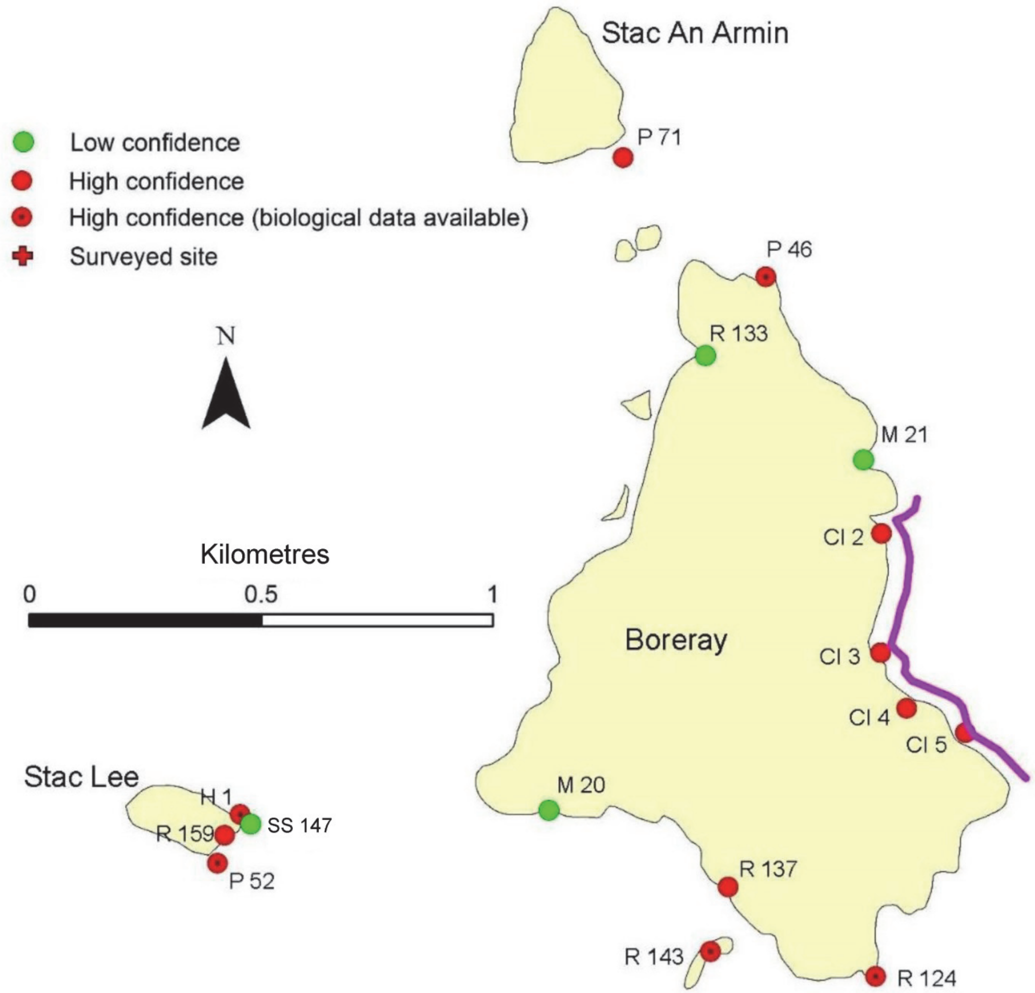
Annex 1B (cont'd)

Outline map of Soay showing location of cave sites based on historical records and direct observation. Symbols indicate level of confidence in evidence of cave presence and availability of biological data (see legend).



Annex 1B (cont'd)

Outline map of Boreray showing location of cave sites based on historical records and direct observation. Symbols indicate level of confidence in evidence of cave presence and availability of biological data (see legend). Purple line denotes area of coast directly assessed for cave presence in 2015.



Annex 1C – Notes and images

Dun
Sites CI 1, CI6, CI 14 & CI 15
(tidal rise ~3 m)

CI 6
Cave at Na Sgarain / "Saw Cut"
Assessed by diver in 2015. Severe underwater surge prevented a full exploration. Cave ~5 m wide and ~17 m BCD depth in approach gulley. Narrows to ~1.5 m wide and shallows to ~16 m BCD at a point where there is a large boulder on the cave floor. Beyond this point the floor drops down to >18 m BCD and the passage appears to continue. Fully illuminated through to this point.

CI 1
Cave at Geo na Ruideig
Assessed by diver in 2015. Large obvious cave entrance above waterline. Above water the cave extends for <10 m but the left wall is undercut and the cave appears to continue underwater. Divers entered but found that the cave only extends a few metres further and is fully illuminated. Intertidal area of typical barnacles / encrusting coralline algae. Subtidal area not assessed.

CI 14
Seilg Geodha 1 & 2
Entrance location indicated on map by Mills (1972) - it was not accessible to Mills & no description is available. It was probably viewed from a distance, perhaps from the opposite side of Village Bay. In 2015 notes were made (CI 14) that in this area (at Seilg Geodha) narrow (1-2 m wide) clefts continue into the cliff to the limit of visibility but there was too much surge to enter.

CI 15
Cave at Giasgeir
Notes were made that in this area (SE of Giasgeir) a narrow entrance penetrates the cliff to the limit of visibility but there was too much surge to enter.

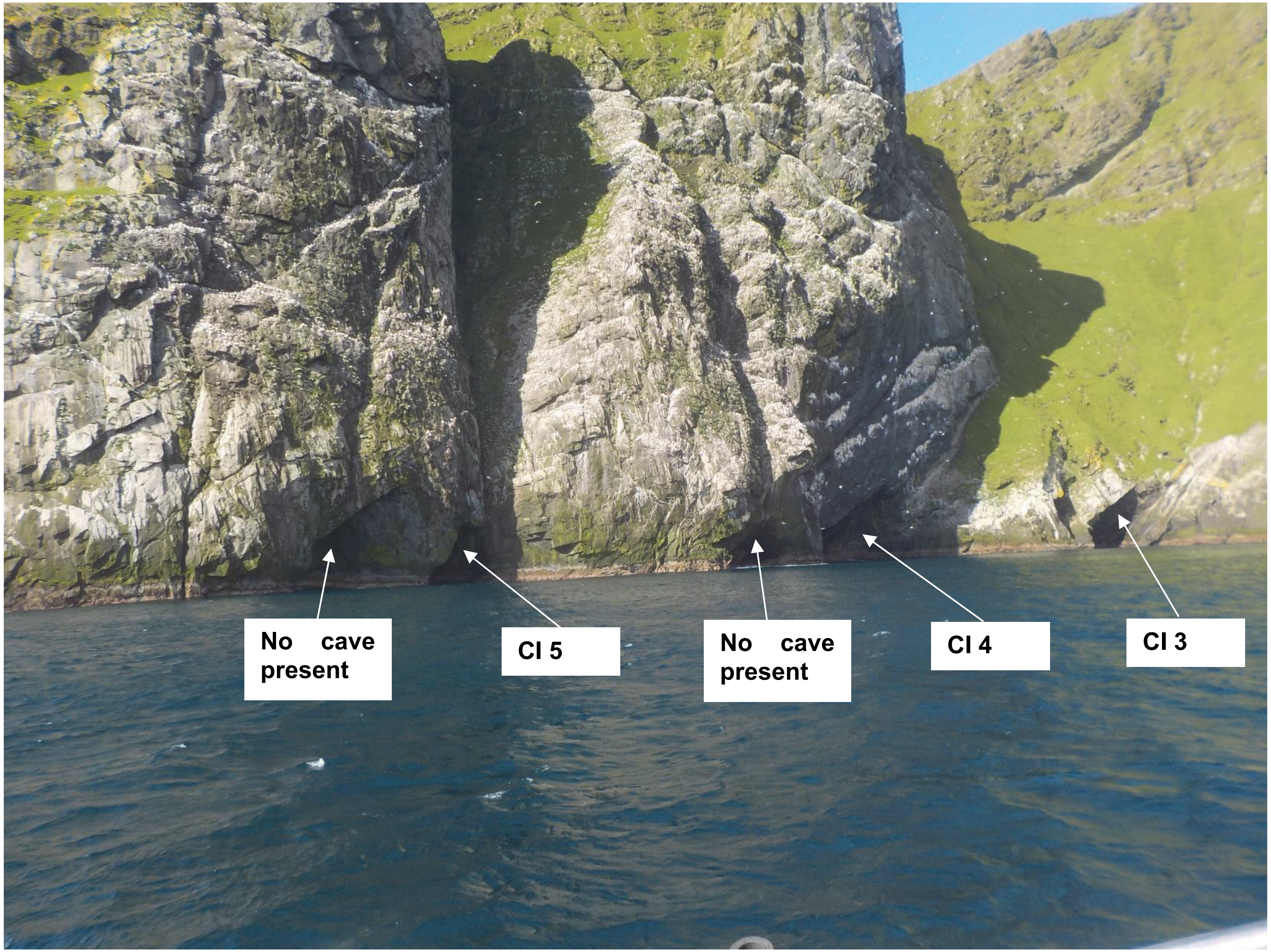
Boreray
Site Cl 2
(tidal rise 1.4 m)

Cave at Geo Shunadal
Viewpoint looking ~N into cave entrance. Entrance is relatively low and narrow. Could not be entered safely due to wave surge. Biota not assessed.

Cl 2

Boreray
Sites CI 3, CI 4 & CI 5
(tidal rise 1.6 m)

Apparent cave entrances on west coast of Boreray
Viewpoint looking ~W from 57.868296° N, 8.477989° W.



Boreray
Site CI 3
(tidal rise 1.4 m)

Cave near Mullach an Tuamail
Viewpoint looking ~S into cave entrance. Wave surge and aggressive seals prevented full examination by snorkerler. Cave appears to become very shallow ~10 m in from the entrance with breaking water & surge visible. Biota not assessed.

Boreray
Site CI 4
(tidal rise 1.3 m)

Cave south of Mullach an Tuamail
Viewpoint looking ~S into cave entrance. At the surface, the back wall of the cave is clearly visible. Water depth is ~15.5 m BCD at the entrance but drops to 19.5 m BCD a few metres furter into the cave. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.

Boreray
Site CI 5
(tidal rise 1.3 m)

Cave north of Creagan na Rubhaig Bana
Viewpoint looking ~SW into cave entrance. Cave entrance is a narrow (~1.5 m wide) slot. Obvious wave surge and 'booming' noise from within. Depth ~13.5 m BCD at entrance. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.

Hirta
Site CI 7
(tidal rise 2.0 m)

Cave at Geo nan Sgarbh
Assessed from inflatable boat in 2015. Depth at entrance ~14 m BCD. Back wall appears to meet waterline about 20-30 m in from ceiling closure. Loud booming & spray from rear. Strongly tideswept at entrance. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.

Hirta
Site CI 8
(tidal rise 1.8 m)

Cave at Geo na Eaige
A wide low entrance with central rock barrier / pillar. Left hand entrance wedge shaped (tip of wedge to left, base of wedge to right) water appears to meet rock slope on the right only a few metres in from the entrance. White water visible from waves breaking on rock slope. Right hand entrance with rectangular cross section. Could see it extends in for ~30 m but spray, white water & loud booming noise coming from this location. Depth at right hand entrance ~10 m BCD. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.

Hirta
Site CI 9
(tidal rise 1.8 m)

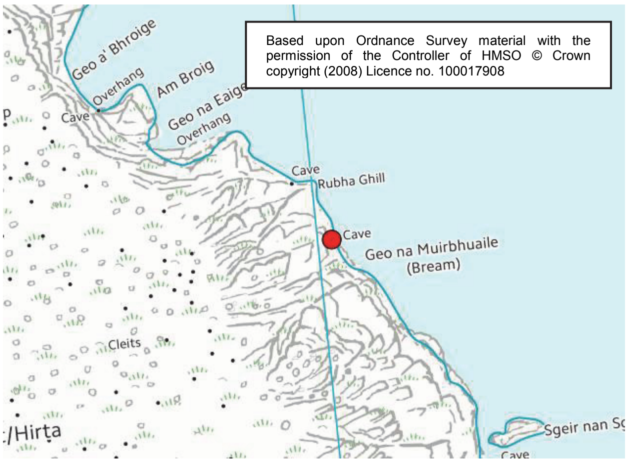
Cave at Geo a Bhroige
Large open cave with steep pebble beach at rear of cave about ~40 m in from the point of roof closure. Appears well illuminated throughout. Biota not assessed. Intertidal zone of pink coralline crusts and barnacles.

ANNEX 2: ST KILDA CAVE SITE RELOCATION DETAILS WITH PHYSICAL AND BIOLOGICAL DATA

Annex 2A – SK15 CV01 – Geo na Muirbhuaile

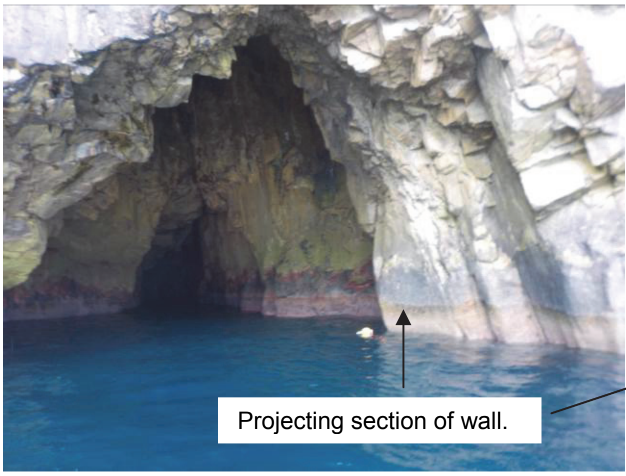
Cave relocation sheet

Cave name	Geo na Muirbhuaile ('Seal Cave')
Site code	SK15 CV01 ('CI 10')
Position of entrance	57.816182° N 8.55499° W
How start point is marked	No fixed marker was placed above the waterline due to steep rock and wave surge. Start point was a shotline deployed near the right hand wall of the cave entrance directly below the roof closure. First piton was placed subtidally on left wall directly opposite this position.
Notes on relocation	Use coordinates provided to locate large obvious cave entrance in base of cliff. Look on right hand (NW) wall just within entrance for prominent vertical fissure just outside of a projecting section of wall. Use photographs to aid orientation in positioning shotline.
Access	by boat

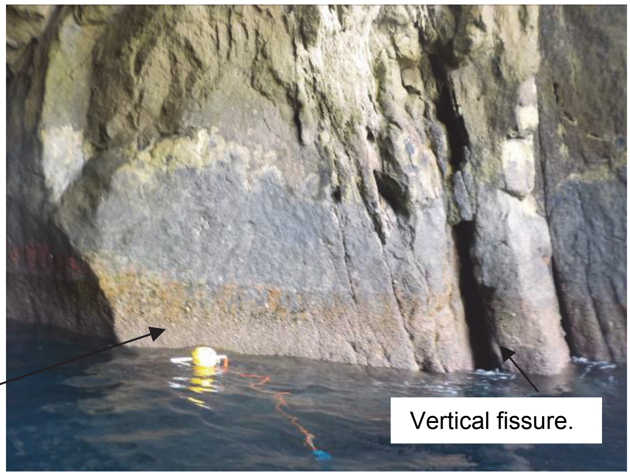


Cave location

View of entrance and shotline looking ~west from 57.816239° N 8.554531° W. Tidal rise ~3.1 m ACD



View of entrance and shotline looking ~west from 57.816106° N 8.554948° W. Tidal rise ~3.1 m ACD



View of features on right hand wall adjacent to shotline. Tidal rise ~3.1 m ACD

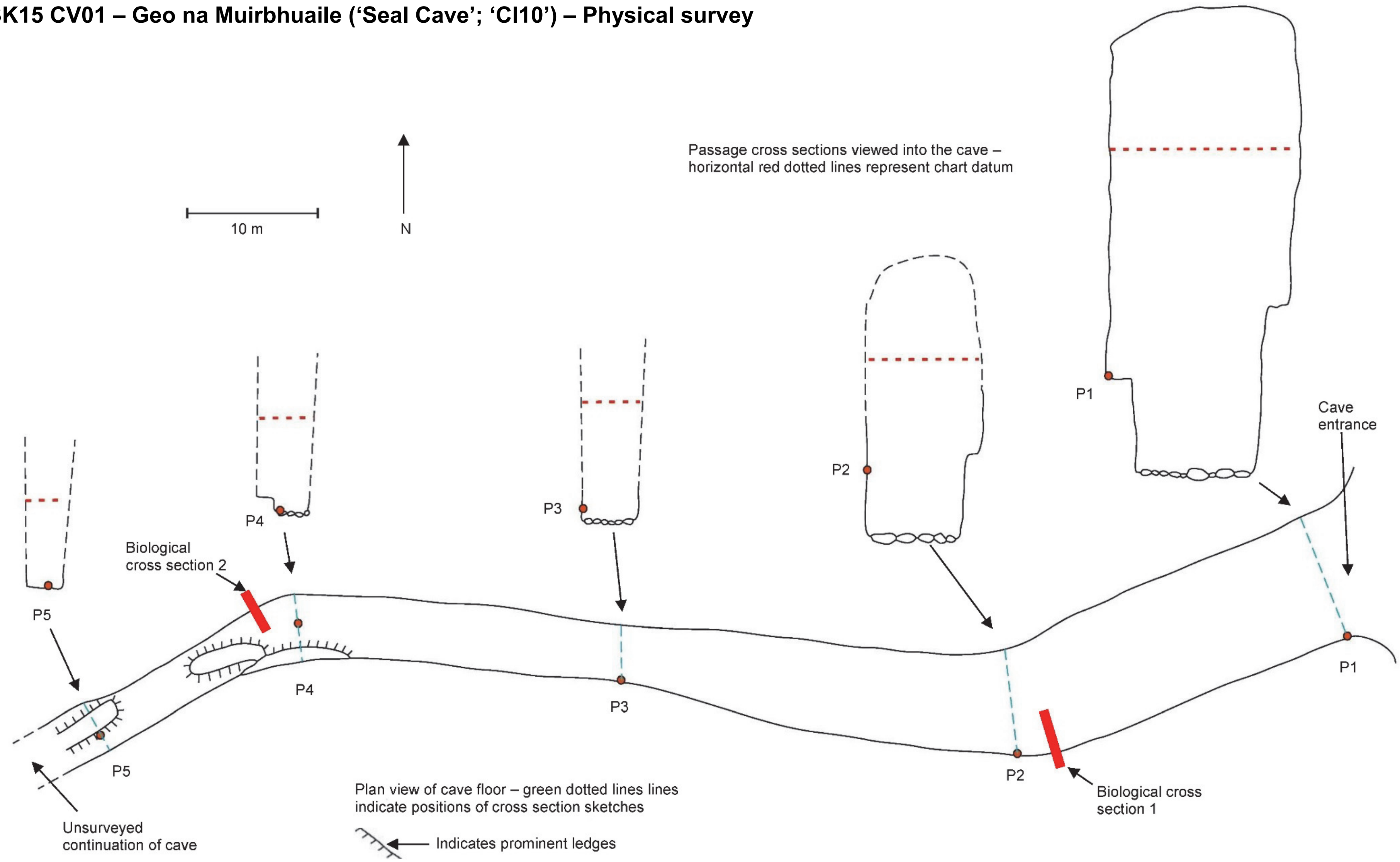
Cave datum line relocation information

Cave name	Geo na Muirbhuaile (‘Seal Cave’)
Site code	SK15 CV01 (‘CI 10’)
Position of piton 1	On left wall opposite position of shotline (search at 17.7 m BCD)

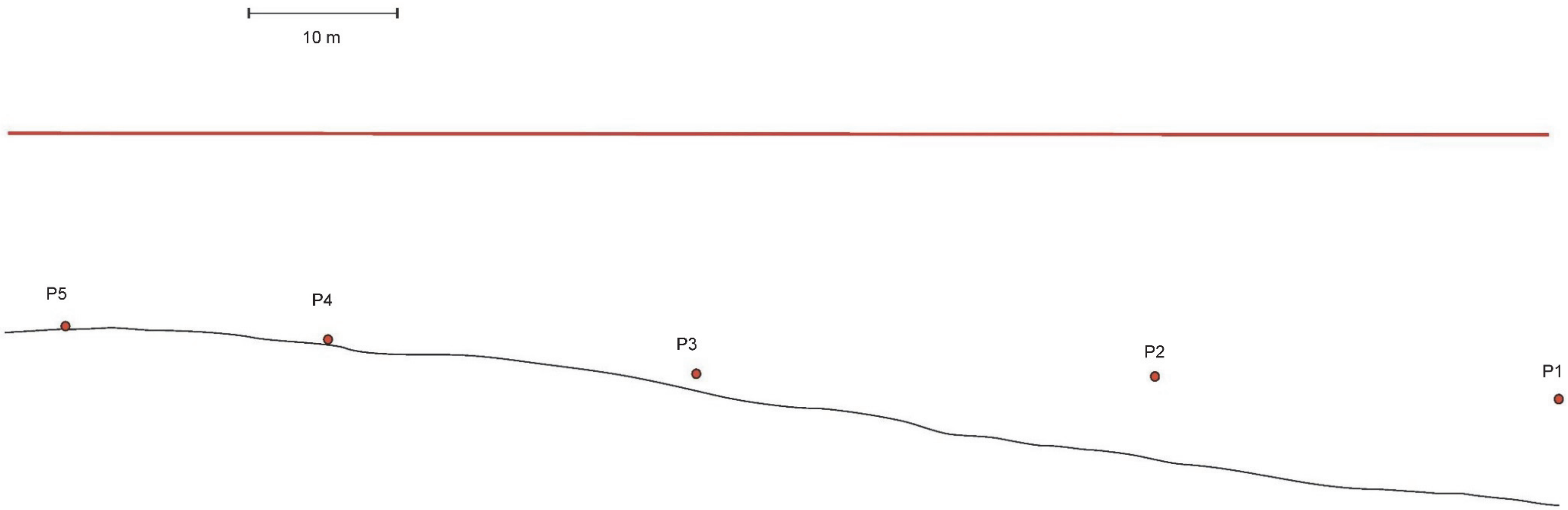
Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1	17.7	27	0	250
Piton 2	16.7	31	27	280
Piton 3	16.0	25	58	280
Piton 4 (floor cobble)	14.0	17	83	240
Piton 5 (floor pinnacle)	12.9	n/a	100	n/a

No images of subtidal pitons available.

SK15 CV01 – Geo na Muirbhuaile ('Seal Cave'; 'CI10') – Physical survey



SK15 CV01 – Geo na Muirbhuaile (‘Seal Cave’; ‘Cl10’) – Physical survey (cont’d)



Side elevation - horizontal red line represents chart datum

SK15 CV01 – Geo na Muirbhuaile (‘Seal Cave’; ‘CI10’) – Biological summary – cross section 1 (left wall, ~25 m from entrance, 25 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Supralittoral rock walls & ceiling. Steep & overhanging rock.	+8.3	+3.8	Abundant crusts of *Hildenbrandia* sp. and frequent *Verrucaria* sp. over many rock surfaces.	**LR.FLR.CvOv.VmucHil**
2	Eulittoral rock wall. Predominantly vertical.	+3.8	+3.3	Abundant *Semibalanus balanoides* with frequent *Patella* sp.	**LR.HLR.MusB.Sem.Sem**
3	Eulittoral rock wall. Predominantly vertical.	+3.3	+0.8	Superabundant crusts of coralline algae with frequent *Patella* sp., occasional *Corallina officinalis* and *Mytilus edulis*.	**LR.HLR.FR.Coff** (NB not a close match because of low *Corallina* abundance)
4	Upper sublittoral rock wall. Predominantly vertical.	+0.8	-4.2	Mixed faunal turfs. Abundant bryozoan (crisid) turf with locally abundant crusts of coralline algae. Common *Tubularia indivisa* and frequent *Metridium dianthus* and bryozoan crusts.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
5	Lower sublittoral rock wall. Predominantly vertical.	-4.2	-17.2	Mixed faunal turfs. Superabundant bryozoan (crisid) turf over most of the wall. Sponge patches (particularly *Halichondria (Halichondria) panicea*) frequent and locally common. Frequent *Dendrodoa grossularia* with occasional colonial ascidians and bryozoan crusts.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
6	Lower sublittoral rock wall & floor. Scoured rock & cobbles.	~-24	~-25	Scoured rock surfaces. Biota very sparse. Rare tube turf (*Jassa falcata* & *Amphicorina* sp.) and bryozoan crusts.	**IR.FIR.SG.CC.Mo**

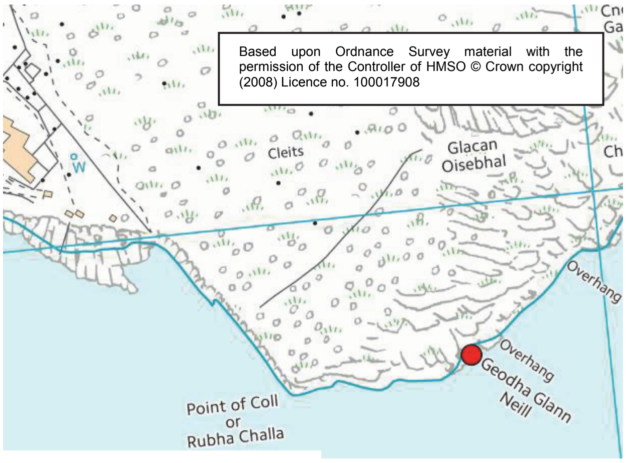
SK15 CV01 – Geo na Muirbhuaile (‘Seal Cave’; ‘CI10’) – Biological summary – cross section 2 (right wall, ~85 m from entrance, 85 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral rock wall. Predominantly vertical.	-7.1	-12.7	Mixed faunal turfs. Abundant bryozoan (crisid) turf over most of the wall. Common tube turf (*Jassa falcata* & *Amphicorina* sp.) on lower areas of the wall. Occasional to frequent sponges (variety of species) in mid areas of the wall. Colonial ascidians (particularly *Polyclinum aurantium*) also prominent but in low abundance (rare to occasional). Patches of *Tubularia indivisa* locally common on upper wall.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
2	Lower sublittoral rock wall & floor. Scoured rock & cobbles.	-12.7	-14.2	Scoured rock surfaces. Biota very sparse. Rare tube turf (*Jassa falcata* & *Amphicorina* sp.) and bryozoan crusts.	**IR.FIR.SG.CC.Mo**

Annex 2B – SK15 CV02 – Geodha Glann Neill

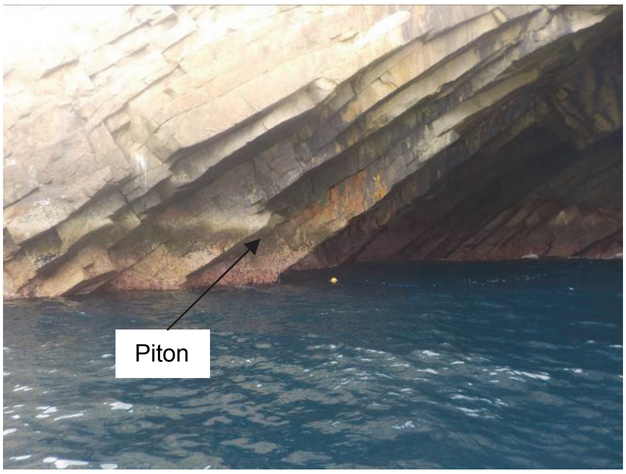
Cave relocation sheet

Cave name	Geodha Glann Neill ('Neil's cave')
Site code	SK15 CV02 ('CI 11')
Position of entrance	57.809043° N 8.556752° W
How start point is marked	The relocation piton is in the outward face of a sloping rock slab on the left (SW) side of the entrance approximately at the point of roof closure. It is located in a sloping (~45°) crevice within the barnacle zone at a height of ~1.3 m ACD.
Notes on relocation	Use coordinates provided to locate large obvious cave entrance in base of cliff. Look on left hand (SW) wall just within entrance for a series of prominent rock slabs. Piton is located in the second slab. Use photographs to aid orientation in relation to features on the rock face.
Access	by boat

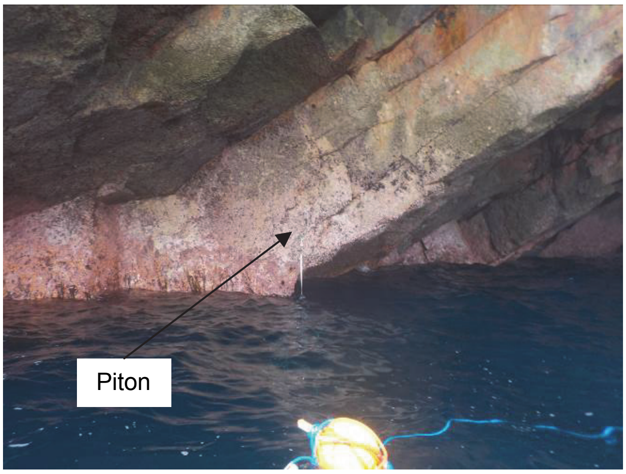


Cave location

Entrance, shotline & piton looking ~north west from 57.808808° N 8.556199° W. Tidal rise ~0.8 m BCD.



View of left wall, shotline & piton looking ~north west from 57.808972° N 8.556615° W Tidal rise ~0.8 m BCD.

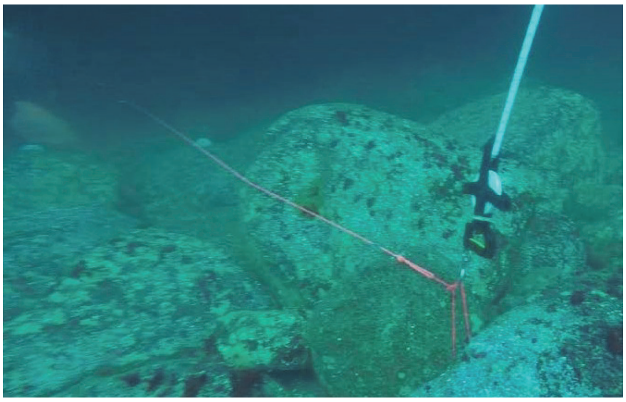


View of left wall, shotline & piton. Tidal rise ~0.8 m BCD.

Cave datum line relocation information

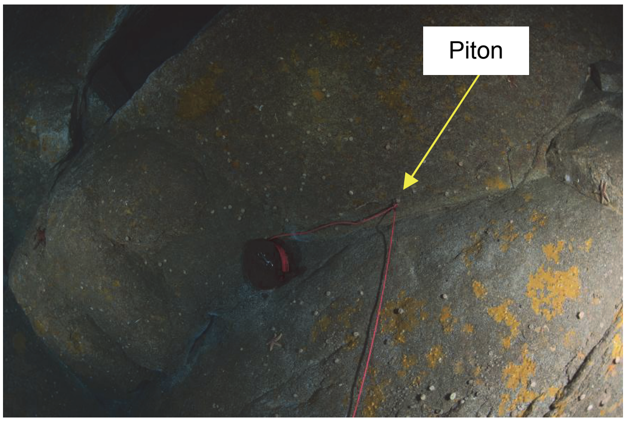
Cave name	Geodha Glann Neill ('Neil's cave')
Site code	SK15 CV02 ('CI 11')
Position of piton 1	On cave floor almost directly below the relocation piton. Distance from relocation piton is ~16.4 m and distance from base of left hand wall is ~4 m.

Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1 (thread between 2 boulders)	14.7	9	0	230
Piton 2	13.5	12	9	345
Piton 3	11.9	7	21	320
Piton 4	8.5	18	28	315
Piton 5	5.5	n/a	46	n/a



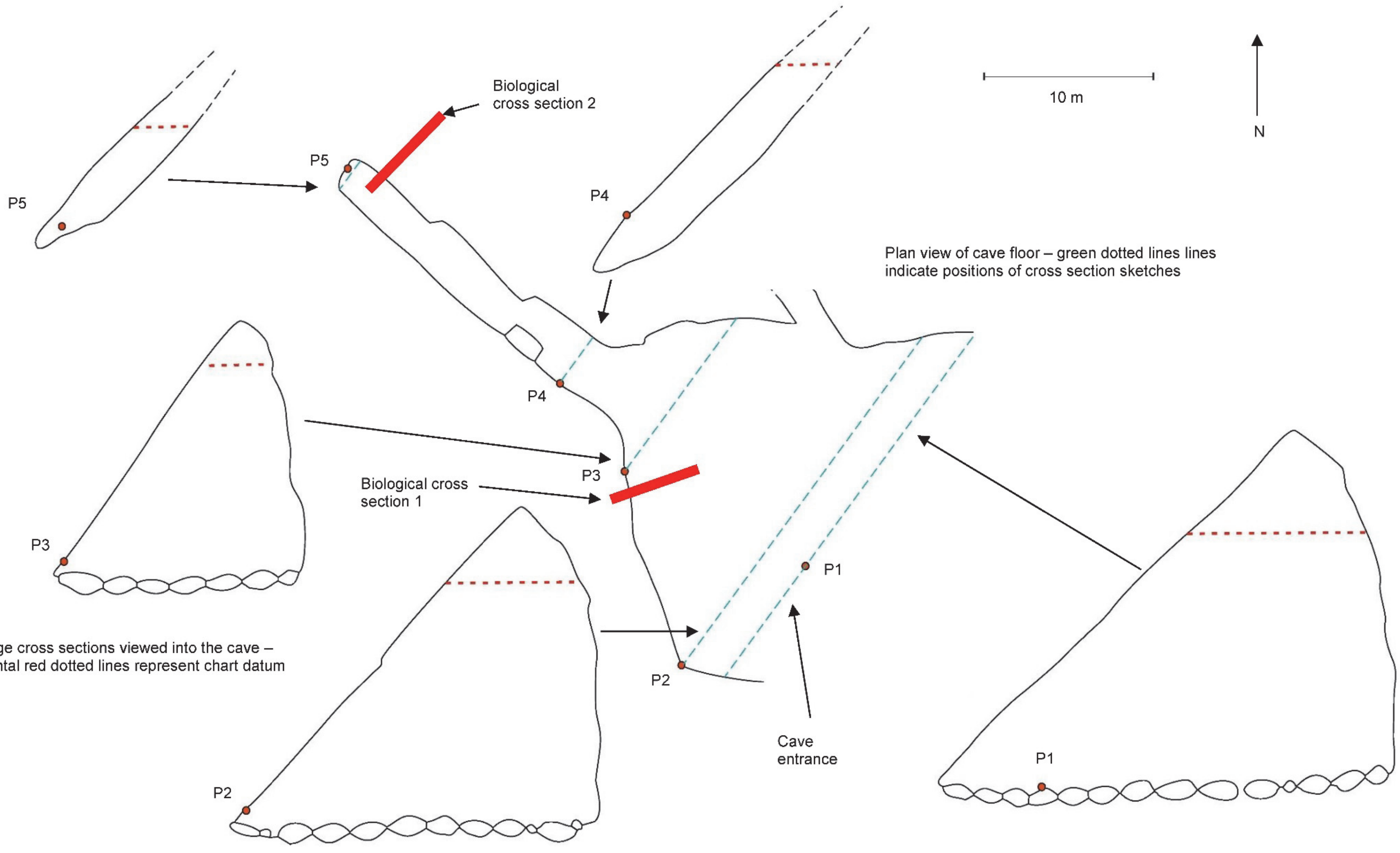
Piton 1 (thread between 2 boulders)

Piton 2



Piton 5

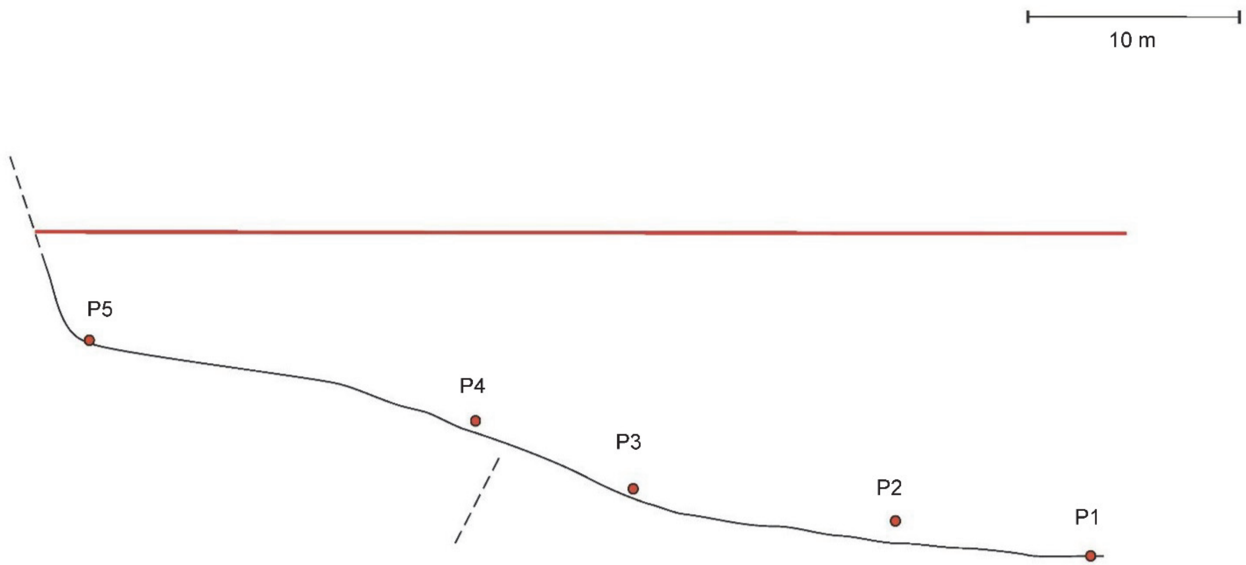
SK15 CV02 – Geodha Glann Neill ('Neil's Cave'; 'CI11') – Physical survey



SK15 CV02 – Geodha Glann Neill ('Neil's Cave'; 'CI11') – Biological summary – cross section 1 (left wall, ~20 m from entrance, 20 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral wall. Overhanging (estimated as 35-45° from vertical).	~0	-10.3	Rich mosaic of faunal turfs & crusts. Dominated by bryozoans, sponges and cnidarians but community composition varied considerably over the area of the wall. Areas near the base of the wall with evidence of scour, characterised by common *Spirobranchus triqueter* and spirorbins with frequent bryozoan crusts. This relatively impoverished biota graded into a community (at about 10 m BCD) with increased sponge cover (common overall), frequent *Sagartia elegans* (locally common) and occasional *Alcyonium digitatum*. A further transition occured at about 6.5 m BCD with a further increase in sponge cover (abundant overall), a reduction in bryozoan crusts (to occasional), the appearance of extensive patches of crisid bryozoan turf (abundant), and large areas of *Metridium dianthus* (common, locally abundant). In shallower areas of the wall (from about 4.5 m BCD) there was a reduction in the abundance of sponges (to occasional overall) and *Metridium dianthus* (to frequent), an increased dominance of crisid bryozoan turf (to superabundant) and extensive areas of *Tubularia indivisa* (abundant, locally superabundant) with abundant *Caprella linearis*. Wave surge prevented close examination of shallower areas but video footage indicated this community continued to about 0 m BCD and above it there was a sparse community of unknown composition.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)
2	Base of wall and cave floor of rounded boulders & cobbles.	-10.3	~-12	Floor boulders with sparse bryozoan crusts (occasional), *Spirobranchus triqueter* (frequent, locally common) and spirorbins (frequent, locally common). A similar community occured on the lower 1 or 2 metres of the wall but in slightly higher abundances due to the reduction in scour intensity (bryozoan crusts (frequent, locally common), *Spirobranchus triqueter* (common, locally abundant) and spirorbins (common)).	**IR.FIR.SG.CC.Mo**

SK15 CV02 – Geodha Glann Neill (‘Neil’s Cave’; ‘CI11’) – Physical survey (cont’d)



Side elevation - horizontal red line represents chart datum

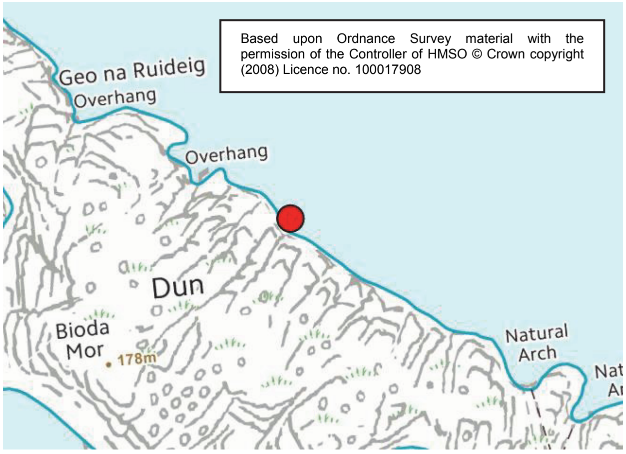
SK15 CV02 – Geodha Glann Neill ('Neil's Cave'; 'CI11') – Biological summary – cross section 2 (mostly right wall (some notes on left), ~45 m from entrance, 45 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral wall. Inclined (~45°), narrow (~1 m wide) rift extending from ~6 m BCD and leading up towards surface.	~0	-6.1	Mixed faunal turfs. Abundant bryozoan (crisid) turf dominated the overhanging left hand wall and some of the shallower (~ 2 m BCD) areas of the upward facing right hand wall. A faunal turf also dominated deeper parts of the right hand wall but was less clearly dominated by bryozoans and contained frequent small sabellids and spirorbins as well as large amounts of detritus and widespread but stunted and sparse (rare) calcareous sponges (*Leucosolenia complicata* or *Clathrina coriacea)*. Cnidarians were numerous with frequent *Caryophyllia (Caryophyllia) smithii* (locally common) and *Corynactis viridis* (locally abundant) dominant on the right wall and locally abundant *Parazoanthus anguicomus* on the left wall. A range of sponge species were present with patchy cover (occasional to frequent) in most areas. In wave surged shallow (~0 m BCD) areas (assessed only from images) there was a shift in the community with reduced cover of turf, abundant spirorbins and common *Verruca stroemia*.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn**)

Annex 2C – SK15 CV03 – Christine's Cave

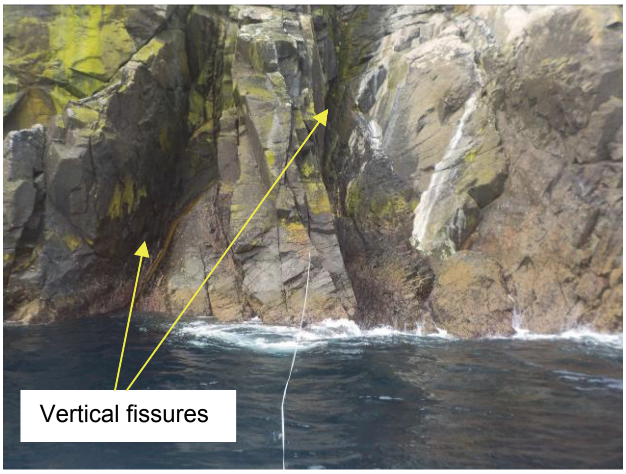
Cave relocation sheet

Cave name	Christine's Cave
Site code	SK15 CV03 ('CI 12')
Position of entrance	57.79676° N 8.55862° W
How start point is marked	The relocation piton is in the outward face of a slight rock ridge lying between two prominent vertical fissures in the cliff face. It is located in a horizontal crevice just above the dense barnacle zone at a height of ~4 m ACD.
Notes on relocation	Use coordinates provided to locate the two obvious large vertical fissures in the cliff face. Use photographs to aid relocation of piton placement in relation to features on the rock face. The cave entrance is subtidal and lies at the base of a rock cliff ~23 m BCD. It is slightly to the NW of the relocation piton and is <50 m distance from the piton (measured directly by tape measure).
Access	by boat

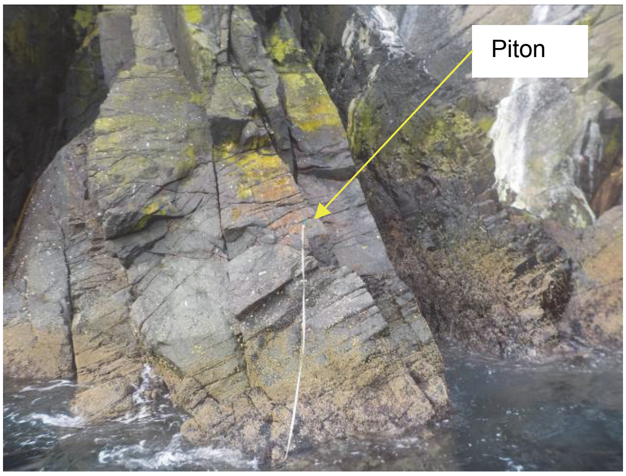


Cave location

Piton placement & shotline. Looking ~south west from 57.797044° N 8.558196° W. Tidal rise ~3.1 m BCD.



Piton placement showing vertical rock fissures.
Looking ~south west from 57.796841° N 8.558496° W
Tidal rise ~3.1 m BCD.

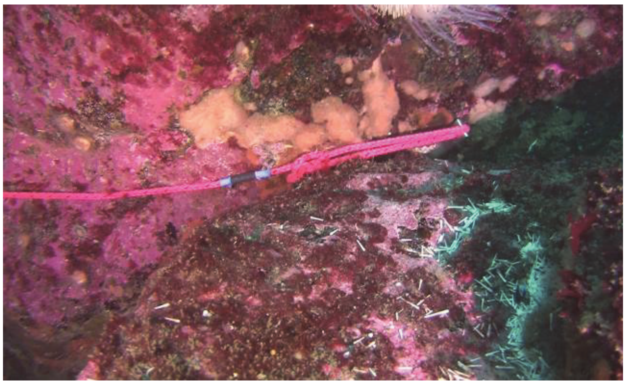


Piton placement. Tidal rise ~3.1 m BCD.

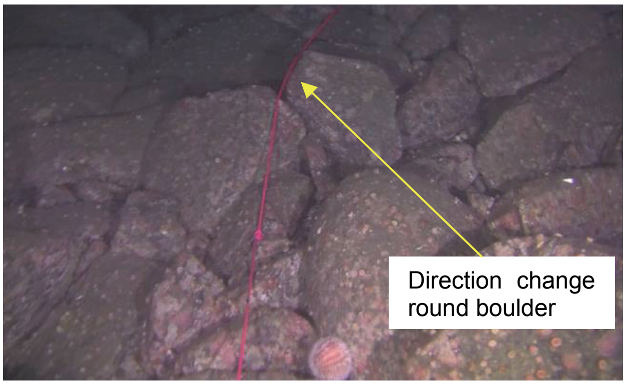
Cave datum line relocation information

Cave name	Christine's Cave
Site code	SK15 CV03 ('CI 12')
Position of piton 1	The line was attached to boulders on the floor just outside the cave entrance. Depth was ~23 m BCD and measured distance from relocation piton was ~50 m. However the tape measure to the relocation piton was not straight. Therefore the actual distance is less than 50 m.

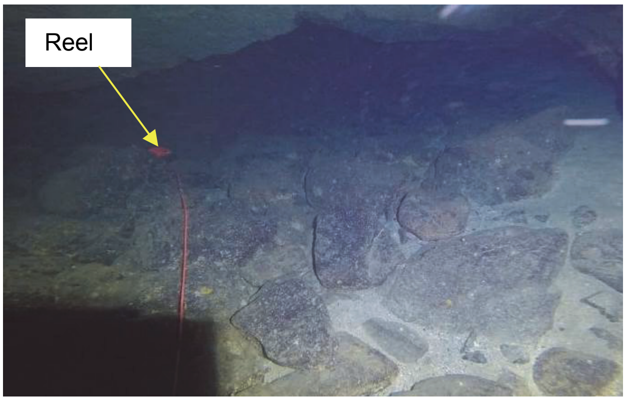
Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1 (between 2 boulders)	22.7	7	0	250
Piton 2 (snagged round boulder)	22.5	13	7	285
Piton 3 (no marker)	18.9	n/a	20	n/a



Piton 1

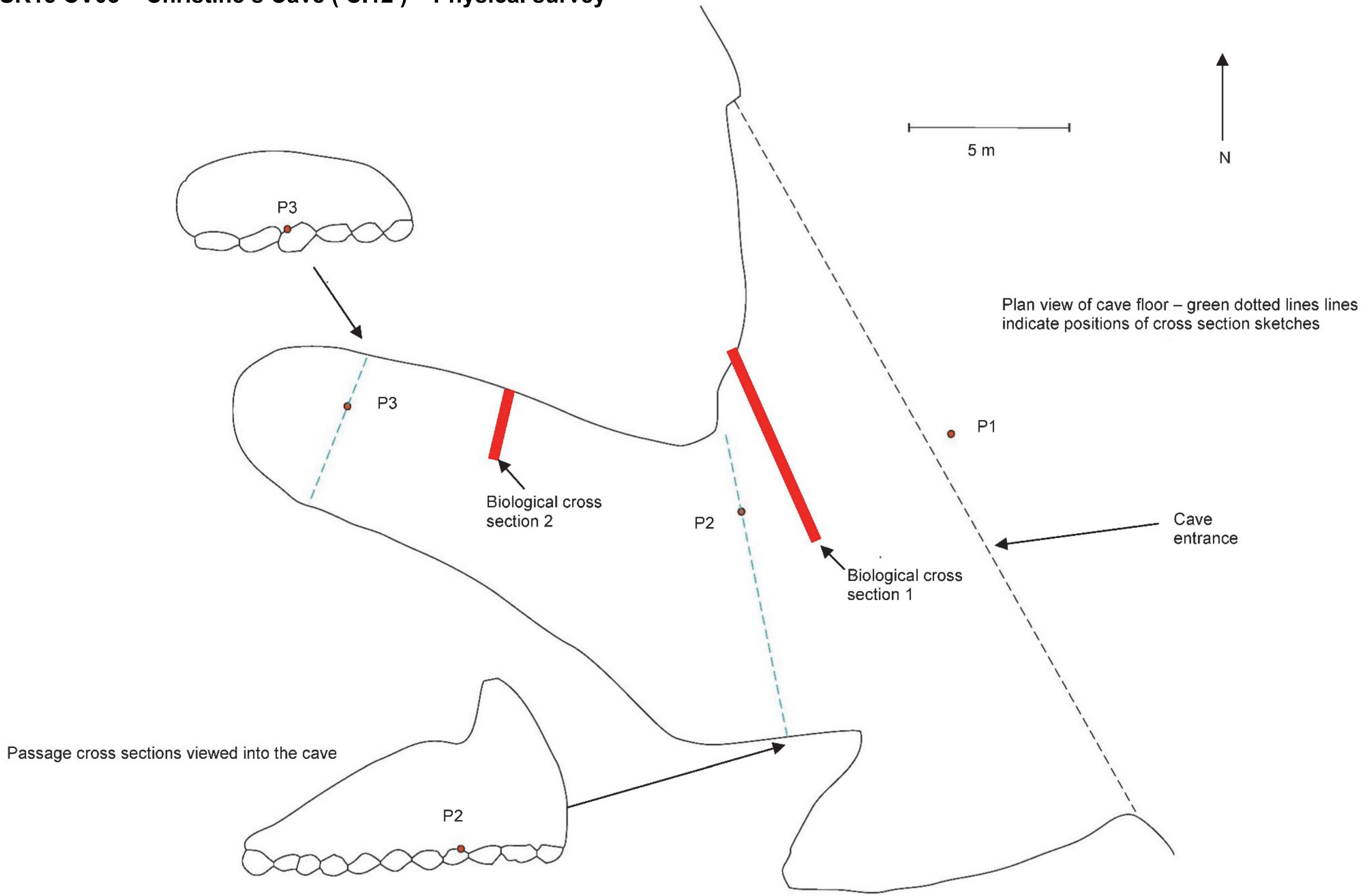


Piton 2

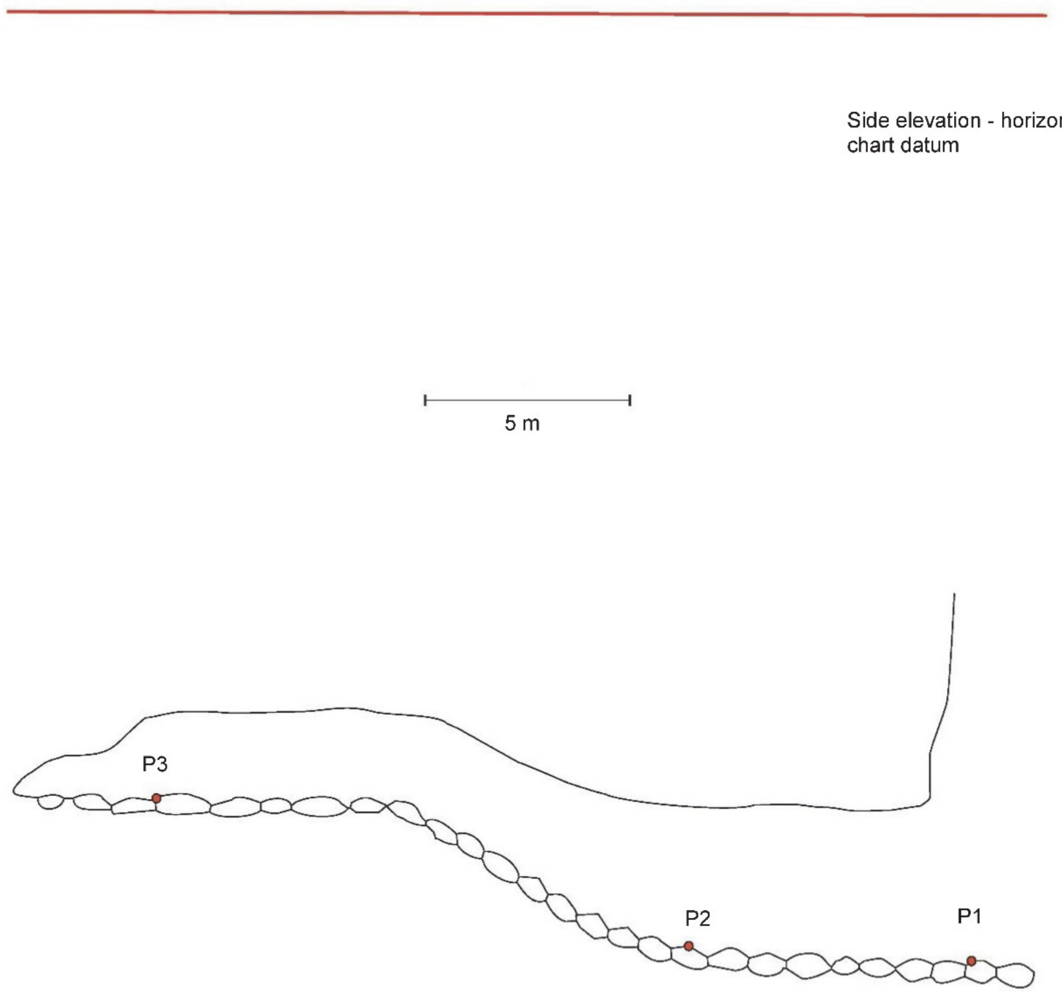


Piton 3

SK15 CV03 – Christine's Cave ('CI12') – Physical survey



SK15 CV03 – Christine's Cave ('CI12') – Physical survey (cont'd)



Side elevation - horizontal red line represents chart datum

SK15 CV03 – Christine's Cave ('CI12') – Biological summary – cross section 1 (right wall, ~5 m from entrance, 5 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral cave. Floor of irregular boulders & cobbles with small gravel patches. Broad ceiling & low overhanging walls.	-20	-23	Biota was of similar composition over the entire cross section with bryozoan crusts, spirorbins, *Spirobranchus triqueter* and *Caryophyllia (Caryophyllia) smithii* dominating the biota. However some biota showed a tendency towards higher abundance on the ceiling than on the floor. Both spirorbins and *Spirobranchus triqueter* were generally numerous (common) on the ceiling but more sparse (frequent) on the floor. Similarly, pale bryozoan crusts (of mixed species composition) and *Echinus esculentus* were prominent (common) on the ceiling but sparse (rare) on the floor. Conversely, *Caryophyllia (Caryophyllia) smithii* tended to be more numerous (common, locally abundant) on the floor than on the ceiling (locally frequent). Pink bryozoan crusts (including *Escharoides coccinea* & *Schizomavella (Schizomavella) linearis*) also showed some variation in abundance being distinctly more profuse (common) on certain large boulders and on the lower walls than they were elsewhere (frequent). *Parazoanthus anguicomus* was locally frequent forming large patches on some parts of the ceiling.	**IR.FIR.SG.CCBalPom** (not a clear match to any biotope)

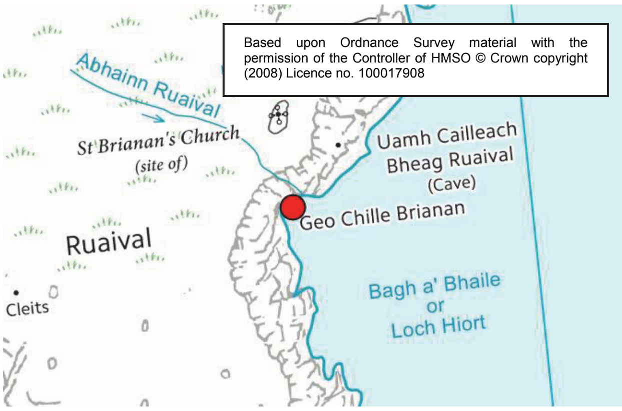
SK15 CV03 – Christine's Cave ('CI12') – Biological summary – cross section 2 (right wall, ~15 m from entrance, 15 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral cave. Floor of irregular boulders & cobbles with small gravel patches. Broad ceiling & low overhanging walls.	18	20	Biota was of similar composition over the entire cross section with bryozoan crusts, spirorbins, *Spirobranchus triqueter* and *Caryophyllia (Caryophyllia) smithii* dominating the biota. However some biota showed a tendency towards higher abundance on the ceiling than on the floor. Both spirorbins and *Spirobranchus triqueter* appeared slightly more numerous on the ceiling than on the floor. Both were common overall but spirorbins were more sparse (locally frequent) in some floor areas and *Spirobranchus triqueter* was more numerous (locally abundant) on some floor boulders and on the ceiling. Similarly, pale bryozoan crusts (of mixed species composition) and *Echinus esculentus* were prominent (common) on the ceiling but sparse (bryozoans occasional, *Echinus* rare) on the floor. Conversely, *Caryophyllia (Caryophyllia) smithii* tended to be more numerous (frequent, locally common) on the floor and were not recorded from the ceiling.	**IR.FIR.SG.CCBalPom** (not a clear match to any biotope)

Annex 2D – SK15 CV04 – Uamh Cailleach Bheag Ruaival

Cave relocation sheet

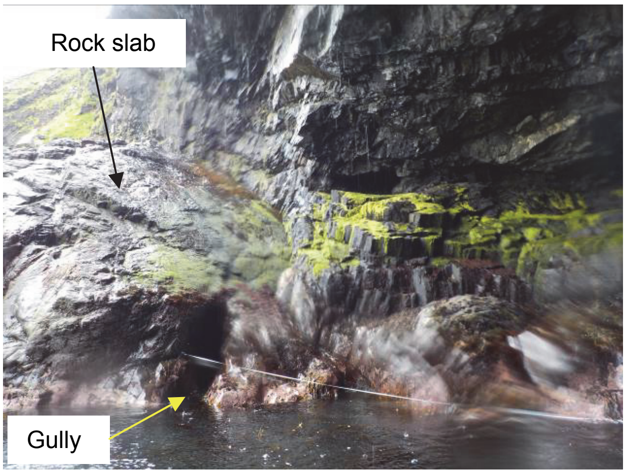
Cave name	Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman')
Site code	SK15 CV04 ('CI 13')
Position of entrance	57.80342° N 8.57329° W
How start point is marked	The relocation piton is in a crevice on the outer side of a large obvious rock gully in the left hand (western) wall of the cave entrance. It is in a zone of sparse barnacles at a height of ~1.5 m ACD.
Notes on relocation	Use coordinates provided to locate the large obvious cave entrance. On the left hand (western) wall at the cave entrance there is a large sloping rock slab with an obvious gully at the base. The relocation piton is positioned on the outer side of this gully.
Access	By boat. Take care of shallow rocks in the entrance area of the cave.



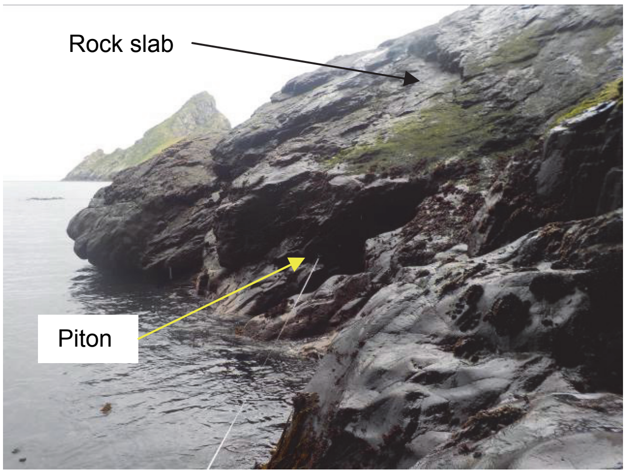
Cave location

Cave entrance. Looking ~north west from 57.803214° N 8.572926° W. Tidal rise ~1.4 m BCD.

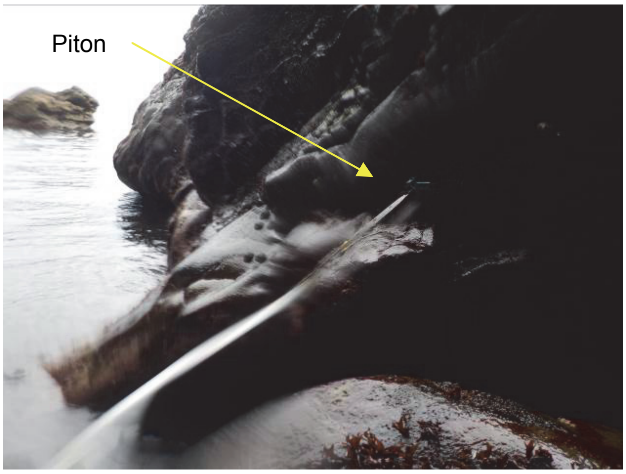
Cave entrance. Looking ~north west from 57.803375° N 8.573566° W. Tidal rise ~1.4 m BCD.



View of of piton placement showing rock gully and sloping rock slab above. Looking ~west from 57.803291° N 8.57305° W. Tidal rise ~0.6 m BCD.



View of of piton placement looking out from inside the cave entrance. Tidal rise ~0.6 m BCD.



View of piton placement. Tidal rise ~0.6 m BCD.

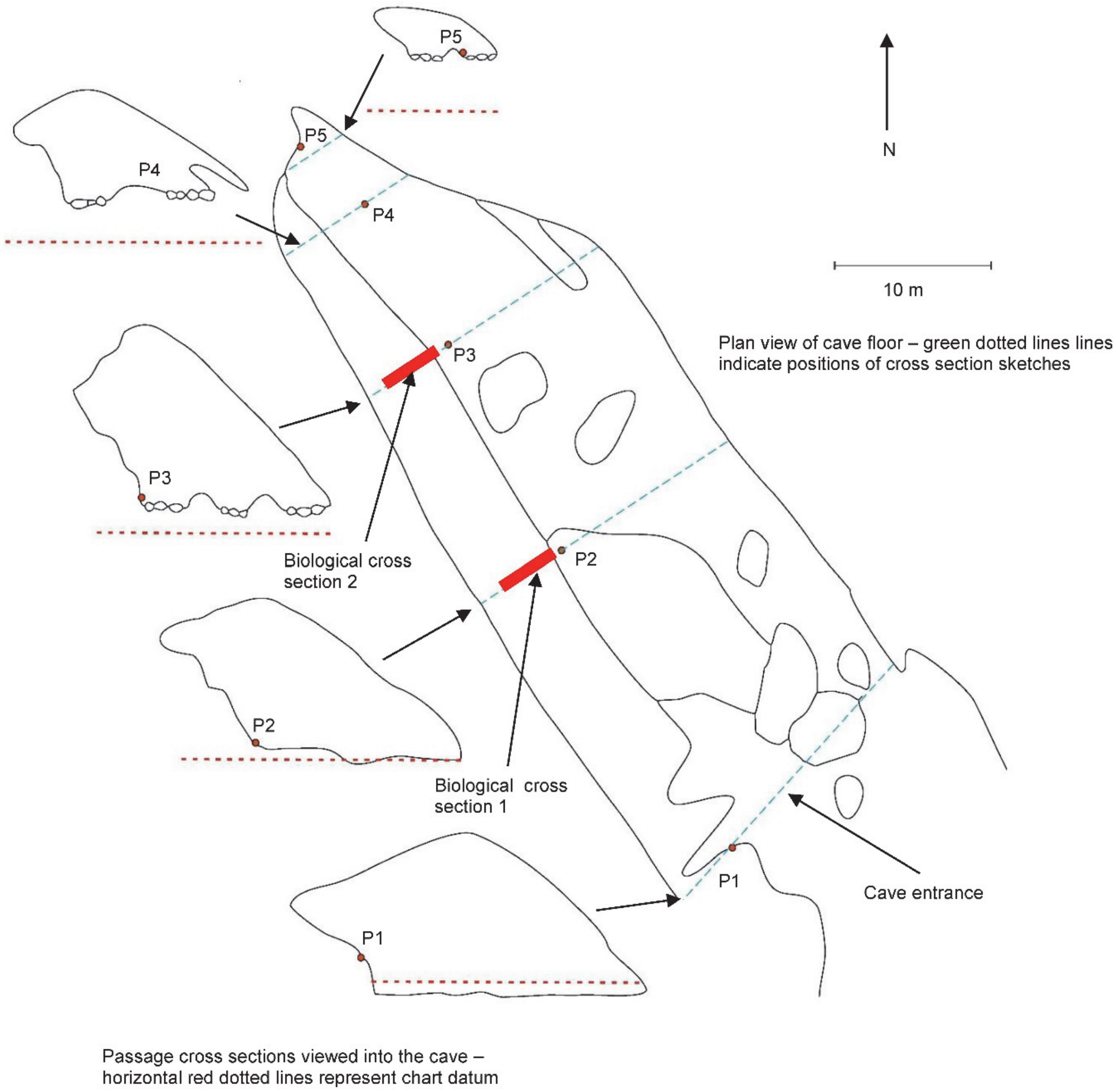
Cave datum line relocation information

Cave name	Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman')
Site code	SK15 CV04 ('CI 13')
Position of piton 1	As for relocation piton.

Piton number	Height of Piton (metres above chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Start piton	1.5	21.9	0	330
Survey station 1	0.7	14.5	21.9	330
Survey station 2	2.0	10.2	36.4	330
Back corner	4.0	5.2	46.6	306
Final leg almost to back wall*	4.9	n/a	51.80	n/a

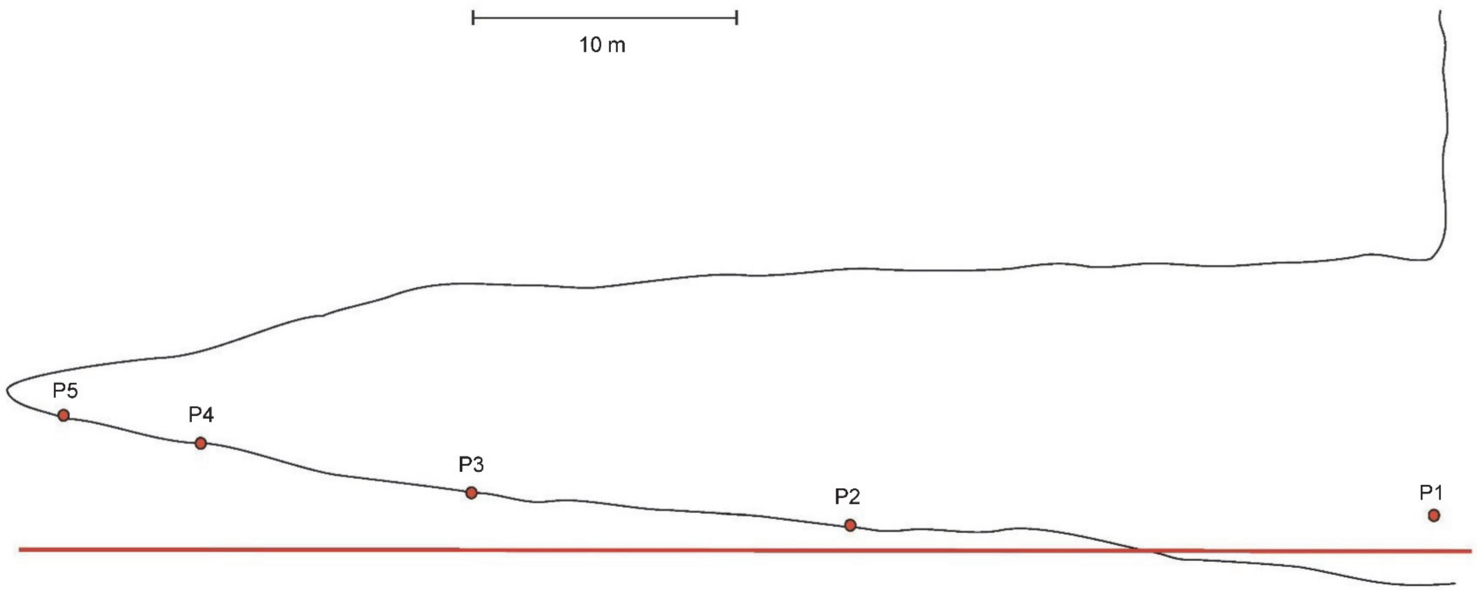
No intermediate attachment points were placed. Tape was run from the relocation piton along the left wall of the cave to a point near the rear of the cave. The survey was extended a short distance from this point using floor cobbles as temporary attachment points for the line.

SK15 CV04 – Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman'; 'CI13') – Physical survey



SK15 CV04 – Uamh Cailleach Bheag Ruaival (‘Cave of the Old Woman’; ‘CI13’) – Physical survey (cont’d)

Side elevation - horizontal red line represents chart datum



SK15 CV04 – Uamh Cailleach Bheag Ruaival ('Cave of the Old Woman'; 'Cl13') – Biological summary – cross section 1 (left wall, ~22 m from entrance, 22 m on tape)

Zone	Physical notes	Upper limit (est. above floor)	Lower limit (est. above floor)	Biological notes	Biotope
1	Steep irregular rock with vertical faces and sloping rock slabs (approx 25 deg).	5	4	Abundant *Verrucaria maura* on largely dry rock surfaces.	**LR.FLR.Lic.Ver**
2	Steeply sloping rock slabs and short (~30 cm) vertical faces.	4	2.5	Zone dominated by a dense growth of green algae. Superabundant *Ulva intestinalis* dominated the upper zone and abundant *Cladophora rupestris* dominated the lower zone. The area appeared wet through freshwater seepage.	**LR.FLR.EphEnt & LR.FLR.CvOv.AudCla**
3	Steeply sloping rock with several shallow fissures.	2.5	1.3	Poorly defined zone with biota relatively sparse and irregularly distributed. The upper part of the zone characterised by common clumps of *Palmaria palmata* which graded into and overlaped with a zone of abundant *Cladophora rupestris* above. Frequent extensive patches of coralline algae crusts. Lower part of zone with frequent *Patella* sp. and rare *Chthamalus stellatus*.	**LR.HLR.MusB.Cht (impoverished)**
4	Steeply sloping rock ledge with several shallow fissures.	1.3	1	Common coralline algae crusts on steep rock with frequent patches of *Mytilus edulis*. Common *Patella* sp. and occasional *Chthamalus stellatus*.	**LR.HLR.MusB.Cht**
5	An undulating platform of well rounded rock on the cave floor leading to near vertical rock in the lower part of the cave wall. Occasionalshallow fissures are present in rock surfaces.	1	0	Abundant coralline algae crusts with common *Patella* sp. and rare *Chthamalus stellatus*.	**LR.FLR.CvOv.ScrFa**

SK15 CV04 – Uamh Cailleach Bheag Ruaival (‘Cave of the Old Woman’; ‘CI13’) – Biological summary – cross section 2 (left wall, ~36 m from entrance, 36 m on tape)

Zone	Physical notes	Upper limit (est. above floor)	Lower limit (est. above floor)	Biological notes	Biotope
1	Broad sloping (~25 deg) ledge.	5	2.8	Dominated by abundant supralittoral yellow lichens in the upper part of the zone and by abundant *Audouinella* sp. in the lower part of the zone.	**LR.FLR.Lic.YG & LR.FLR.CvOv.AudCla**
2	Mostly vertical rock face with several shallow fissures.	2.8	2	Dominated by superabundant *Verrucaria maura* with occasional *Cladophora rupestris* in crevices.	**LR.FLR.Lic.Ver (LR.FLR.CvOv.AudCla)**
3	Steeply sloping ledge with several fissures. Steeper (vertical) rock occurs both above and below the ledge.	2	1.5	Dominated by superabundant *Cladophora rupestris* with frequent *Patella* sp. and occasional coralline algae crusts.	**LR.FLR.CvOv.AudCla**
4	Mostly vertical rock face with several shallow fissures. Scoured by mobile substrate and wave erosion.	1.5	0.5	Abundant coralline algal crusts with frequent *Patella* sp.	**LR.FLR.CvOv.ScrFa**
5	Mostly vertical rock face with several shallow fissures. Directly adjacent to cave floor of well rounded mobile cobbles.	0.5	0	Largely barren zone of bare scoured rock. Sparse biota in protected crevices.	**LR.FLR.CvOv.BarCv**

ANNEX 3: ST KILDA CAVE SPECIES ABUNDANCE DATA (SACFOR)

Annex 3A – SK15CV01

Taxa	CV01.1.1	CV01.1.2	CV01.1.3	CV01.1.4	CV01.1.5	CV01.1.6	CV01.2.1	CV01.2.2
Hildenbrandia	A							
Verrucaria	F							
Algae (green stain)	O							
Corallina officinalis			Loc O (lwr zone)					
Corallinales (crusts)			S	Loc A (upr zone)				
Leuconia johnstoni					O		O	
Clathrina coriacea				R	O		O	
Grantia compressa							R	
Leucosolenia complicata				O (loc F)	O		O	
Halisarca dujardinii							O	
Haliclona (Reniera) cinerea				R (loc O)	R		O	
Amphilectus fucorum					O			
Myxilla (Myxilla) incrustans					O			
Polymastia penicillus					R			
Halichondria (Halichondria) bowerbanki					P		P	
Halichondria (Halichondria) panicea			Loc O (lwr zone)		O (loc F)			
Stryphnus ponderosus					R			
Pachymatisma johnstonia					R		R	
Oscarella lobularis					R			
Clathria (Microciona) strepsitoxa					R			
Porifera (pink)					F		O	
Actinia equina			F					
Urticina felina								P
Metridium dianthus				F (loc C-A)	O		R	
Phellia gausapata					O		R	
Sagartia elegans					O		R	
Alcyonium digitatum					O		R	
Clavularia sp.							R	
Caryophyllia (Caryophyllia) smithii					O		R	
Eudendrium sp.					P		R	
Tubularia indivisa				C	R		Loc C (upr wall)	

Taxa	CV01.1.1	CV01.1.2	CV01.1.3	CV01.1.4	CV01.1.5	CV01.1.6	CV01.2.1	CV01.2.2
Nemertesia ramosa					R			
Sertularella tenella					P		P	
Diphasia cf fallax					P			
Lineus longissimus					R			
Harmothoe sp.							P	
Amphicorina sp. (tube turf)				P	P		P	
Filograna implexa?					R		P	
Spirobranchus triqueter							P	
Circeis spirillum				P				
Caprella linearis				P	P			
Nymphon brevirostre					P			
Jassa falcata (tubes)				P	P	R	loc C (lwr wall)	R
Hyas araneus (juv)					P			
Cancer pagurus				R	R		R	P
Galathea strigosa					O			
Necora puber					O	R		
Semibalanus?		A	R				loc R (upr wall)	
Anomiidae							P?	
Mytilus edulis			O					
Patella sp.		F	F					
Trivia monacha					R			
Tritia sp.					P			
Cadlina laevis					P?			
Facelina auriculata				R	R			
Edmundsella pedata					R			
Polycera quadrilineata				R	O			
Goniodoris nodosa?					P			
Janolus cristatus							R	
Tritonia hombergii				P				
Dendronotus					R			
Aetea anguina							P	
Schizomavella (Schizomavella) linearis					O		O	
Bicellariella ciliata							P	
Bugulina flabellata					R		R	
Cradoscrupocellaria reptans				O	O			
Celleporina sp.					P			

Taxa	**CV01.1.1**	**CV01.1.2**	**CV01.1.3**	**CV01.1.4**	**CV01.1.5**	**CV01.1.6**	**CV01.2.1**	**CV01.2.2**
Turbicellepora magnicostata					P			
Escharoides coccinea							O	
Bryozoa (pink crusts)				F (loc C)	R	R	Loc O (lwr wall)	R
Crisiidae (turf)				A	S		A (upr wall)	
Crisia spp.					A?		F	
Crisidia cornuta					A?		P	
Disporella hispida							O	
Plagioecia patina							O	
Asterias rubens				R	O		P	
Antedon bifida					P		R	
Echinus esculentus							R	
Psammechinus miliaris							P	
Amphipholis squamata					O		P	
Ophiothrix fragilis					P			
Ophiopholis aculeata					P		P	
Ophiocomina nigra							R	
Didemnum maculosum ?					P?			
Diplosoma listerianum				P				
Lissoclinum perforatum				R	O		R	
Lissoclinum argyllense					P			
Aplidium nordmanni					O		R	
Polyclinum aurantium				O	O		O	
Pyura microcosmus							R	
Botrylloides leachii					R			
Botryllus schlosseri							R	
Dendrodoa grossularia					F (loc C)			
Polycarpa gracilis?							P	
Chirolophis ascanii							R	
Taurulus bubalis					O		O	P

Annex 3B – SK15CV02

Taxa	CV02.1.1	CV02.1.2	CV02.2.1
Leuconia johnstoni	loc F (upr wall)		O
Clathrina coriacea	O		R
Grantia compressa			R
Leucosolenia complicata	R		R
Sycon ciliatum	R		
Halisarca dujardinii	R		R
Aplysilla sulfurea			R
Haliclona (Reniera) cinerea	R		R
Antho sp.			R
Microcionidae sp.	R		
Myxilla (Myxilla) incrustans	O		O
Myxilla (Myxilla) rosacea	R		P
Polymastia penicillus			R
Halichondria (Halichondria) bowerbanki	R		
Halichondria (Halichondria) panicea	O		
Pseudosuberites sulphureus			O
Suberites massa?			R
Stryphnus ponderosus	R		O
Pachymatisma johnstonia	R		R
Oscarella lobularis	R		R
Porifera (smooth orange crust)			O
Porifera (pale yellow)			O
Porifera (pink / orange)			O
Halisarca sp.?			R
Urticina felina			R
Metridium dianthus	loc C (mid wall)		R
Phellia gausapata	O		R
Sagartia elegans	F (loc C mid wall)	R	R
Alcyonium digitatum	O		R
Alcyonium hibernicum	R		R
Clavularia sp.			O
Sarcodictyon roseum			O
Corynactis viridis	loc C (lwr wall)		F (loc A)
Caryophyllia (Caryophyllia) smithii	F		F (loc C)
Parazoanthus cf anguicomus	O		Loc A (lft wall)
Tubularia indivisa	loc A-S (upr wall)		
Ectopleura cf larynx	P		
Diphasia cf fallax	P		
Filograna implexa	O		
Spirobranchus triqueter	O (loc C lwr wall)	C (loc A)	F
Spirorbinae indet.	loc C - lwr wall	C	F (loc A @ ~0m BCD)
Circeis spirillum	P		
Amphicorina sp.?			F
Caprella linearis	loc A (upr wall)		F
Jassa falcata (tubes)			O
Cancer pagurus	O		O
Galathea strigosa	O		O
Inachus phalangium			R
Necora puber	O		O
Nymphon? sp	P		
Balanus balanus	R		
Verruca stroemia			R (loc C @ ~0m BCD)

Taxa	CV02.1.1	CV02.1.2	CV02.2.1
Anomiidae	O		O
cf Jorunna tomentosa	P		
Tritonia hombergii	R		
Tritonia lineata			R
Calliostoma zizyphinum	O	R	R
Bryozoa (orange crusts)	loc F (lwr wall)	F	
Bryozoa (pink crusts)		F	
Schizomavella (Schizomavella) linearis	O		O
Amphiblestrum flemingii		P	
Celleporina sp.			P
Turbicellepora magnicostata			P
Membraniporella nitida		P	
Pyripora catenularia		P	
Escharoides coccinea	O		O
Parasmittina trispinosa			O
Nolella sp.			P
Disporella hispida		P	
Crisiidae (turf)	loc S (upr wall)		F (loc S @ ~2m BCD)
Crisia cf eburnea	loc A (upr wall)		F
Crisidia cornuta	loc A (upr wall)		F
Bugulina flabellata	F		
Cradoscrupocellaria reptans	F		O
Asterias rubens	O	P	F
Marthasterias glacialis		P	
Henricia sp.			R
Antedon bifida	O		
Echinus esculentus	O	F (loc C)	R
Amphipholis squamata	P		O
Ophiopholis aculeata	O		
Ophiothrix fragilis	P		
Didemnum maculosum ?	R		
Lissoclinum perforatum	R		R
Botrylloides leachii	R		
Aplidium nordmanni	R		
Polyclinum aurantium	O		
Boltenia echinata			R
Pyura microcosmus			P
Dendrodoa grossularia	R		R
Polycarpa scuba	R		
Ascidiacea indet.			R
Gadidae (juv)	O		
Taurulus bubalis	O		O

Annex 3C – SK15CV03

Taxa	CV03.1.1	CV03.2.1
Corallinales (crusts)	R (floor)	
Hymedesmia (Hymedesmia) paupertas	R	R
Dercitus (Dercitus) bucklandi	R	
Antho sp.?	P (roof)	
Edwardsia timida		R
Edwardsiella carnea	R	
Alcyonium digitatum	R	
Sarcodictyon roseum		R
Caryophyllia (Caryophyllia) smithii	Floor - C (loc A), roof loc F	Floor - F (loc C)
Cerianthus lloydii		R
Parazoanthus anguicomus	Loc F (roof)	
Scyphozoa (Scyphistomae)	R	
Sabellidae indet.	R	
Filograna implexa	O	
Spirobranchus triqueter	F (loc C - roof)	C (loc A - blds & roof)
Spirorbinae indet.	C (loc F - floor)	C (loc F - floor)
Chaetopterus variopedatus	R (floor)	R (floor)
Cancer pagurus	R	
Galathea strigosa	O	
Hyas?		R (on wall)
Macropodia sp.		R
Necora puber	R (floor)	
Balanus balanus	R	
Pododesmus squama	O	F (loc C - lwr walls & blds)
Palliolum tigerinum		R
Tritia sp.	P	
Calliostoma zizyphinum	O (roof)	
Steromphala cineraria	R	R
Novocrania anomala	O	F
Escharoides coccinea	F (loc C - lrg blds & lwr walls)	Floor - R, roof O loc F
Hippothoa flagellum	P	
Nolella sp.	P	
Disporella hispida		P
Bryozoa (white crusts)	Floor - R, roof C	Floor - O loc F, roof C
Asterias rubens	R (roof)	R (floor)
Marthasterias glacialis	R	
Henricia sp.	R (floor)	
Porania (Porania) pulvillus	R (roof)	R (floor)
Echinus esculentus	P (loc C - roof)	P (loc C - roof)
Thorogobius ephippiatus		P
Taurulus bubalis	R	

Annex 3D – SK15CV04

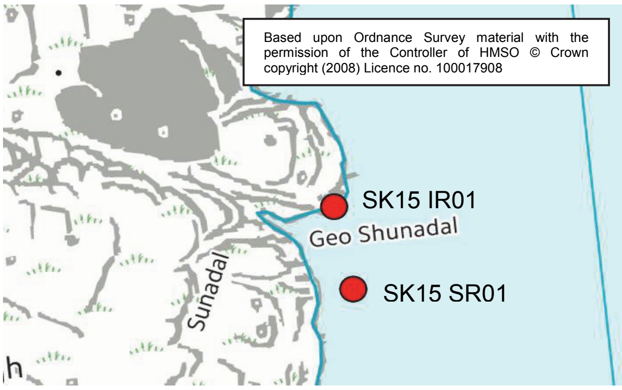
Taxa	CV04.1.1	CV04.1.2	CV04.1.3	CV04.1.4	CV04.1.5	CV04.2.1	CV04.2.2	CV04.2.3	CV04.2.4	CV04.2.5
Verrucaria maura	A	O					S	F		
Lichen (yellow crusts)						loc A (upr)	R			
Audouinella sp.						loc A (lwr)				
Lithothamnion sp.			F	C	A			O	A	R (crev)
Algae (filamentous) indet.			R (crev)							
Ulva intestinalis	F	S				R (crev)				
Ulva lactuca								R		
Cladophora rupestris		A	A				O (crev)	S	R (loc F crev)	
Algae (brown turf) indet.		R								
Palmaria palmata			C	O				O		
Ralfsia sp.								R		
Mastocarpus stellatus				R	F				R (crev)	
Halichondria panacea					R					
Actinia equina				O						
Phellia gausapata					R					
Patella spp.			loc F (lwr)	C	C			F	F	
Littorina saxatilis			R	R			R	R (crev)	R (crev)	R (crev)
Melarhaphe neritoides				A	A					
Nucella lapillus				R						
Mytilus edulis				F	O				R (crev)	R (crev)
Chthamalus stellatus			R	O	R		R	R (loc O)	R (loc O)	
Semibalanus balanoides				R	R					
Diplosoma spongiforme					R					

ANNEX 4: ST KILDA REEF SITE RELOCATION DETAILS WITH PHYSICAL AND BIOLOGICAL DATA

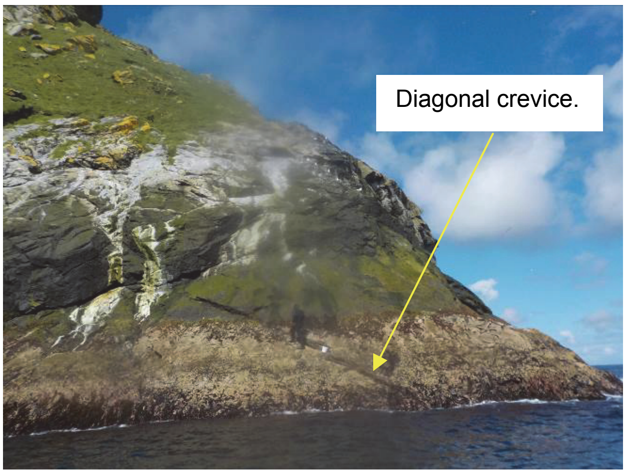
Annex 4A – SK15 IR01 & SK15 SR01 – Reef site at Geo Shunadal, Boreray

Reef relocation sheet

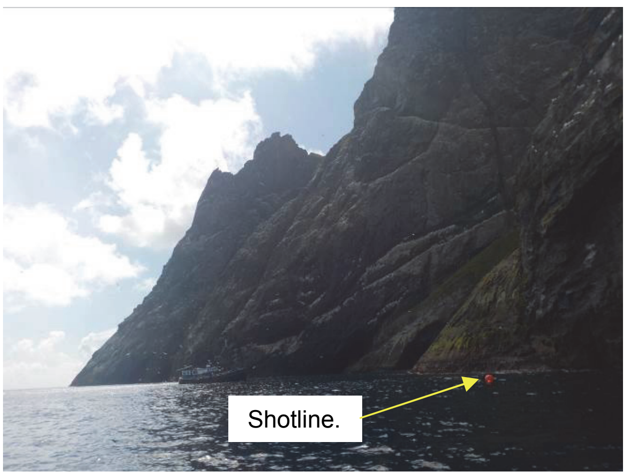
Site name	Reef site at Geo Shunadal, Boreray
Site code	SK15 IR01 & SK15 SR01
Site position	Intertidal: 57.872131° N 8.483987° W Subtidal: 57.871613° N 8.484175° W
Type of marker	No fixed marked was placed. Subtidal survey was made in the vicinity of a shotline placed at the position provided above. Intertidal survey was conducted on an adjacent shore which can be relocated using the coordinates & images.
Bearing of transect from top (°M)	Intertidal – Directly down steep rock slope. Subtidal - towards the shore, approximately west. No physical profile data was gathered from either site.
Notes on relocation	Intertidal - Look for prominent crevice running diagonally down the steeply sloping slabs of the shore (see photos). Subtidal - Place shotline at coordinates.
Access	by boat



Reef location.



SK15 IR01 - View approximately NW from 57.872131° N 8.483987° W. Tidal rise 0.7 m ACD.



SK15 SR01 - View approximately SW from 57.872131° N 8.483987° W. Tidal rise 0.7 m ACD.

SK15 IR01 – Reef site at Geo Shunadal, Boreray ('Boreray WP245') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	**lower**	**max**	**min**			
1	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges	Extensive areas of yellow and grey lichens but inaccessible due to steepness of rock slope.	**LR.FLR.Lic.YG**
2	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges	Broad (estimated ~5 m wide) zone of abundant *Verrucaria maura* with broad patches of abundant *Ulva intestinalis*.	**LR.FLR.Lic.Ver**
3	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges	Narrow (estimated ~1 m wide) zone of superabundant *Porphyra umbilicalis* running along the upper margin of the barnacle zone with common *Chthamalus stellatus*.	**LR.HLR.MusB.Cht**
4	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges	Broad (estimated ~3 m wide) zone of dense barnacles. Upper parts of the zone dominated by superabundant *Chthamalus stellatus* and lower parts by superabundant *Semibalanus balanoides*.	**LR.HLR.MusB.Cht & LR.HLR.MusB.Sem**
5	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges	Narrow (estimated ~1 m wide) zone of abundant *Mytilus edulis* running along the lower margin of the barnacle zone with common *Semibalanus balanoides.*	**LR.HLR.MusB.MytB**
6	N/A	N/A			Steeply sloping (~ 40°) bedrock with small crevices and ledges	Zone of dense *Alaria esculenta* visible but inaccessible due to wave surge.	**IR.HIR.KFaR.Ala**

(NB – tidal heights were not measured at this site)

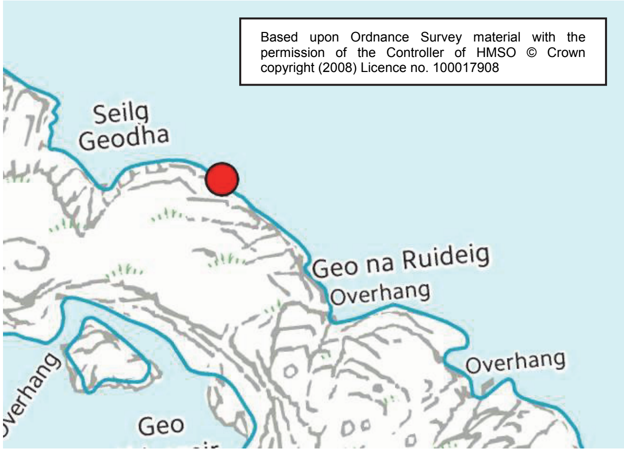
SK15 SR01 – Reef site at Geo Shunadal, Boreray ('Boreray WP244') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	lower	max	min			
1	N/A	N/A	-5	-10	Steep rock slope	*Laminaria hyperborea* forest (superabundant). Rock surfaces with abundant *Corynactis viridis* and common to abundant bryozoan turf formed by *Crisia* spp., *Cradoscrupocellaria reptans* and *Scrupocellaria scruposa*.	**IR.HIR.KFaR.LhypFa**
2	N/A	N/A	-10	-20	Vertical rock with crevices and ledges	Frequent to common bryozoan turf formed by *Crisia spp.*. Abundant *Corynactis viridis* and common *Sagartia elegans*.	**CR.HCR.Xfa.CvirCri**
3	N/A	N/A	-20	-21	Overhanging side of very large boulder	Common to abundant bryozoan turf formed by *Crisia spp.*, *Cradoscrupocellaria reptans* and *Scrupocellaria scruposa*. Common *Corynactis viridis* and frequent *Sagartia elegans*.	**CR.HCR.Xfa.CvirCri**
4	N/A	N/A	-20	>-24	Large boulders with infill of cobbles & pebbles	A mixed kelp canopy with abundant *Laminaria hyperborea* and *Saccharina latissima* with common *Desmarestia aculeata*. Foliose red algae locally abundant and and a variety of anemones locally common.	**IR.HIR.Ksed.XKScrR**

Annex 4B – SK15 IR02 & SK15 SR02 – Reef site at Village Bay, Dun

Reef relocation sheet

Site name	Reef site at Village Bay, Dun ('Dun transect')
Site code	SK15 IR02 & SK15 SR02
Site position	57.798542° N 8.562954° W
Type of marker	Piton in vertical crevice at ~6.2 m ACD in a sloping rock surface within the Verrucaria zone.
Bearing of transect from top (°M)	Intertidal: 39˚ Subtidal: 30˚
Notes on relocation	Shore on NE coast of Dun between Seilg Geodha and Geo na Ruideig. Shore of sloping bedrock. Piton is positioned just above a broad ledge on the rock slope.
Access	by boat



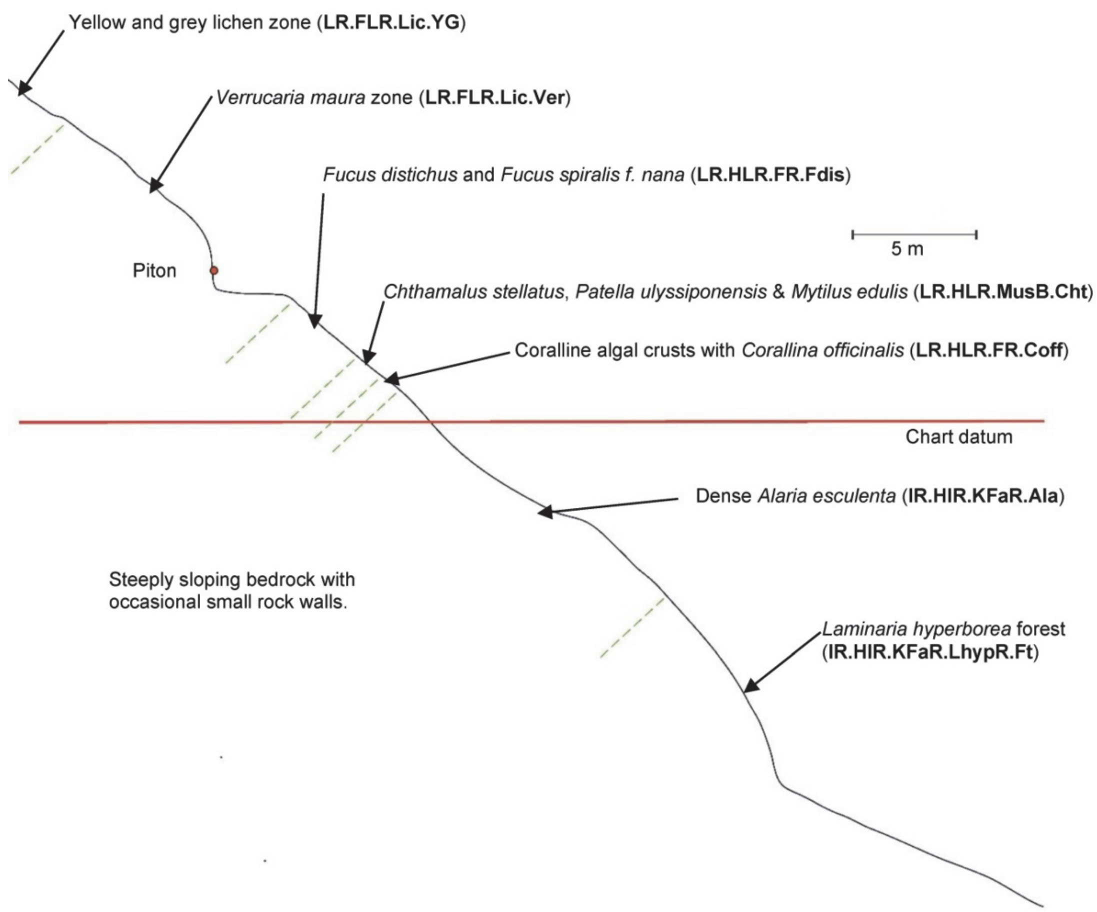
Site location

View approximately SE from 57.79852° N 8.563132° W. Tidal rise 1.1 m ACD

Piton position

Profile data recorded for SK15 IR02 & SK15 SR02

Feature	**Tape distance (m)**	**Height (m CD)**	**Horizontal distance (m)**
TRANSECT: Reef site at Village Bay, Dun **(**SK15 IR02 & SK15 SR02**)**			
Boundary IR02 Zone 1/2 (NB - behind and above the relocation piton)	-8.55	+12.1	-6.16
Piton	0	+6.2	0.00
Boundary IR02 Zone 2/3	3.50	+4.7	3.30
Boundary IR02 Zone 3/4	6.88	+2.5	5.85
Boundary IR02 Zone 4/5	8.20	+1.8	6.94
Boundary IR02 Zone 5 / SR02 Zone 1	9.36	+1.1	7.64
	19	-4.3	15.49
	20	-5.1	16.09
Boundary SR02 Zone 1/2	23	-7.1	18.33
	25	-8.5	19.75
	30	-12.7	22.47
	32	-14.6	23.09
	35	-16.0	25.74
	40	-18.0	30.33
end of transect within SR02 Zone 2	43	-19.3	33.03



SK15 IR02 – Reef site at Village Bay, Dun ('Dun transect') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biogenic features of zone	Biotopes
	upper	lower	max	min			
1	not measured	8.55	not measured	+12.1	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Extensive areas of yellow and grey lichens but inaccessible due to steepness of rock slope.	**LR.FLR.Lic.YG**
2	8.55	3.5	+12.1	+4.7	Steeply sloping (~40°) rocky shore with small ledges and fissures. In lower part of zone there is a broad (~2 m wide) ledge.	Broad zone of common *Verrucaria maura* with frequent patches of green algae and occasional *Porphyra umbilicalis* present in crevices particularly in lower parts of the zone.	**LR.FLR.Lic.Ver**
3	3.5	6.88	+4.7	+2.5	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Zone characterised by locally frequent clumps of *Fucus distichus* and *Fucus spiralis f. nana*. Common *Verrucaria maura*, *Porphyra umbilicalis* and *Ulva intestinalis*. Frequent *Patella* sp., common *Melarhaphe neritoides* and occasional *Littorina saxatilis*.	**LR.HLR.FR.Fdis**
4	6.88	8.2	+2.5	+1.8	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Zone characterised by common *Chthamalus stellatus* and *Mytilus edulis*. Abundant *Patella* sp. and numerous patches of algae including common *Aglaothamnion sepositum*.	**LR.HLR.MusB.Cht**
5	8.2	9.36	+1.8	+1.1	Steeply sloping (~40°) rocky shore with small ledges and fissures.	Zone characterised by superabundant *Corallina officinalis* and abundant coralline algal crusts. Abundant *Patella* sp. and occasional *Alaria esculenta*.	**LR.HLR.FR.Coff**

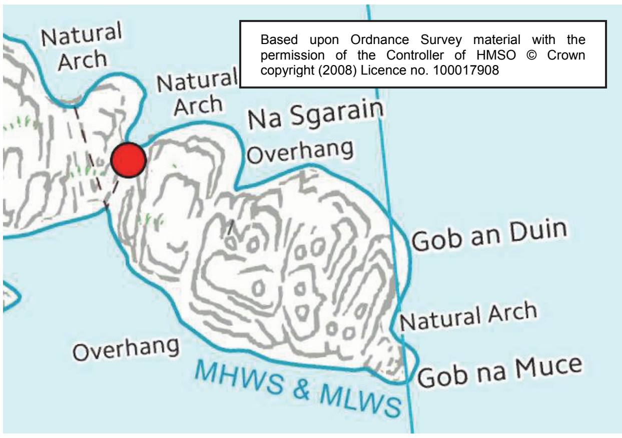
SK15 SR02 – Reef site at Village Bay, Dun ('Dun transect') – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	lower	max	min			
1	9.36	23	+1.1	-7.1	Steeply sloping (~40°) bedrock with ledges.	Superabundant *Alaria esculenta* (not surveyed due to wave surge).	**IR.HIR.KFaR.Ala**
2	23	43	-7.1	-19.3	Steeply sloping (~40°) bedrock with ledges.	Superabundant *Laminaria hyperborea* with frequent coralline algal crusts and foliose red seaweeds.	**IR.HIR.KFaR.LhypR.Ft**

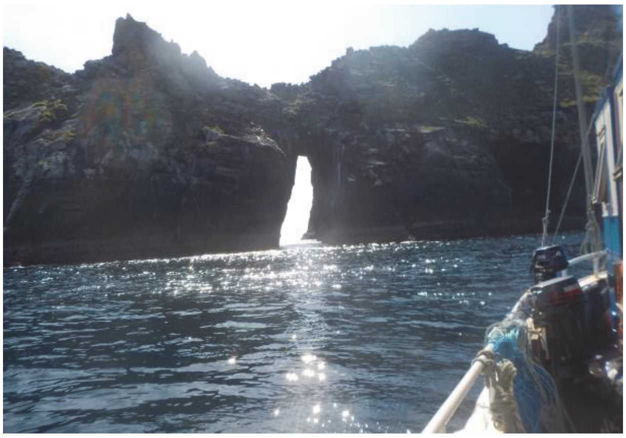
Annex 4C – SK15 SR03 – Reef site at Dun Arch, Dun

Reef relocation sheet

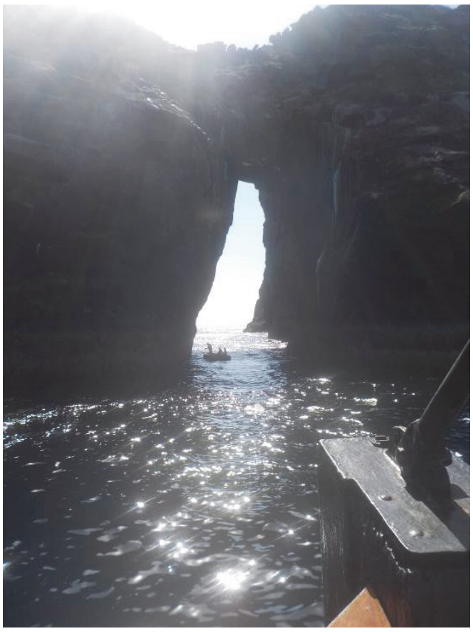
Site name	Reef site at Dun Arch, Dun
Site code	SK15 SR03
Site position	57.795478° N 8.553948° W
Type of marker	Piton in sloping crevice at ~2.2 m ACD in a vertical rock wall within the barnacle zone.
Bearing of transect from top (°M)	0˚ (IE vertical)
Notes on relocation	Large obvious rock arch cutting through the south eastern tip of Dun. Piton is positioned in the south eastern (left) wall of the arch directly below the arch roof.
Access	by boat



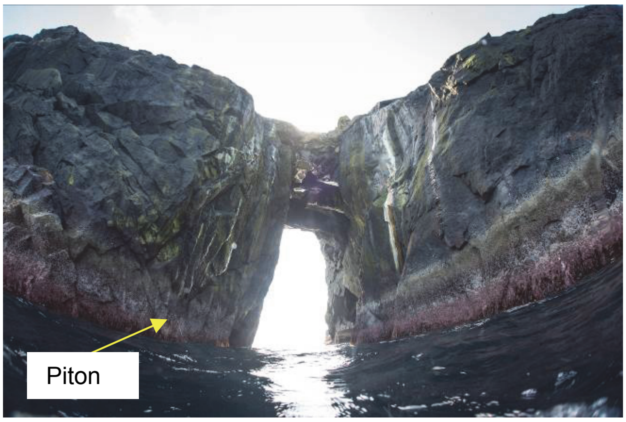
Site location

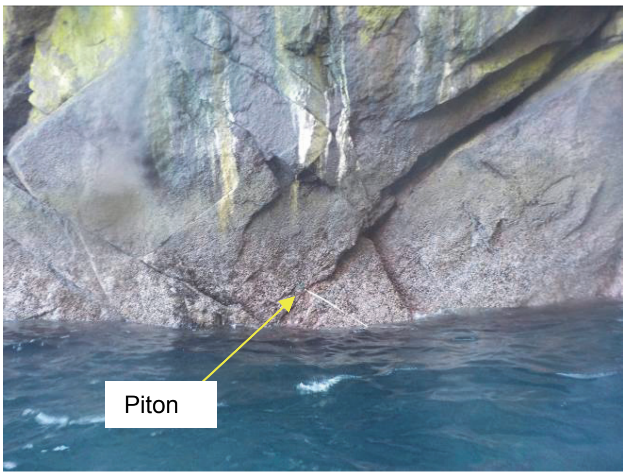


View approximately SW from 57.796287° N 8.552655° W. Tidal rise 0.7 m ACD



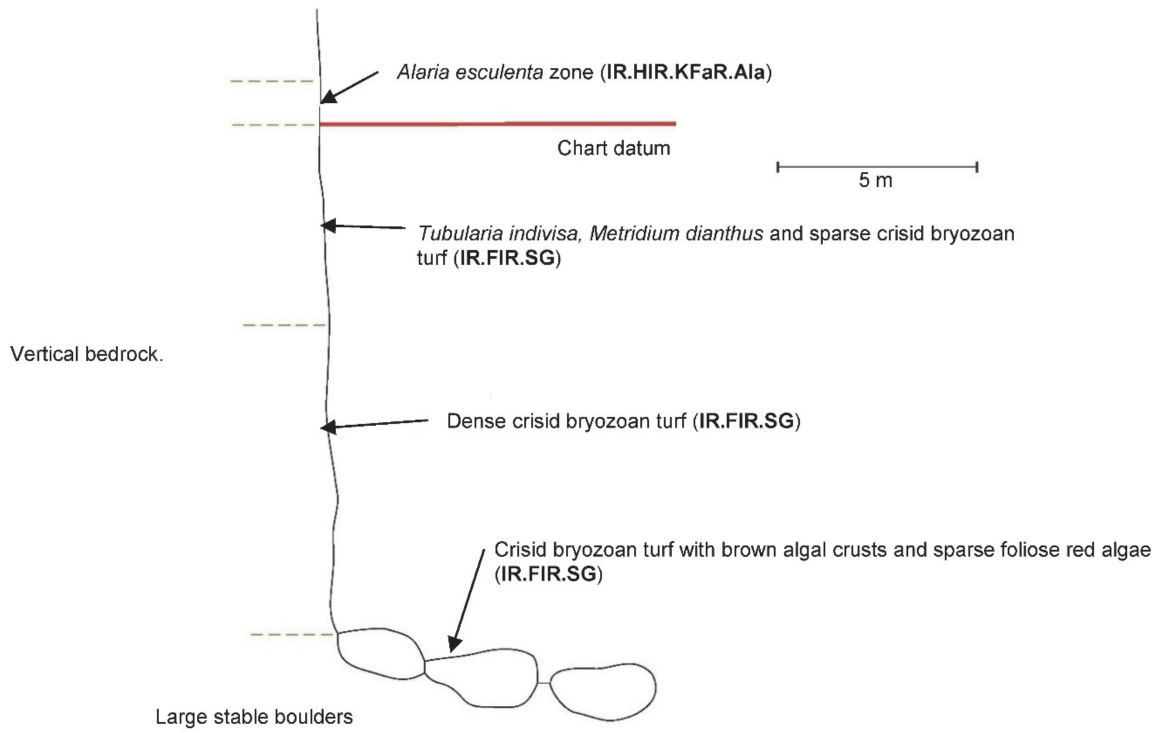
View approximately SW from 57.795708° N 8.553336° W. Tidal rise 0.7 m ACD





Profile data recorded for SK15 *SR03 – Reef site at Dun Arch, Dun*

Time constraints and tidal currents prevented effective survey along tape. Survey was conducted down vertical rock wall below relocation piton and transect profile generated from diver-recorded depth data.



SK15 SR03 – Reef site at Dun Arch, Dun – Biological summary

Zone	Tape distance (m)		Height (m CD)		Substrate	Biological notes	Biotopes
	upper	lower	max	min			
1	N/A	N/A	+1	0	Vertical rock wall	Abundant *Alaria esculenta* and coralline algal crusts. Common foliose red algae and frequent *Corallina officinalis*.	**IR.HIR.KFaR.Ala**
2	N/A	N/A	0	-4.9	Vertical rock wall	Zone characterised by superabundant *Tubularia indivisa* with common *Metridium dianthus* and a sparse (frequent) turf of crisid bryozoans. Foliose red algae become frequent near the upper boundary of the zone.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
3	N/A	N/A	-4.9	-12.5	Vertical rock wall	The zone was characterised by a bryozoan (crisid) turf and a variety of anemones. The bryozoan turf was abundant on the lower wall but became more dense (superabundant) with increasing height above the gully floor. *Metridium dianthus* and *Corynactis viridis* were locally abundant in extensive dense patches on various parts of the wall. *Phellia gausapata* and *Sagartia elegans* were less prominent but nevertheless locally common in some areas. A range of sponges and colonial ascidians were also present in relatively low abundance (frequent sponges and occasional ascidians).	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
4	N/A	N/A	-12.5	-13.5	Very large boulders in floor of gully.	Mixed biota with common brown algal crusts, occasional turfs of foliose red algae, frequent turf of crisid bryozoans and *Jassa falcata* tubes. Scattered *Metridium dianthus* and *Actinothoe sphyrodeta* were frequent with some locally abundant patches of *Corynactis viridi*s.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**

ANNEX 5: ST KILDA REEF SPECIES ABUNDANCE DATA (SACFOR)

Annex 5A – SK15 IR01

Taxa	IR01.2	IR01.3	IR01.4	IR01.5
Verrucaria maura	A			
Ulva intestinalis	A	C		
Porphyra umbilicalis		S	O	
Chthamalus stellatus		C	S (upr)	
Mytilus edulis		O	F	A
Semibalanus balanoides			S (lwr)	C
Patella sp.			C	C
Actinia equina			C (loc crev)	C (loc crev)
Corallina officinalis			F	F
Aglaothamnion sepositum			F (lwr)	
Ceramium shuttleworthianum			O (loc crev)	
Mastocarpus stellatus				F

Annex 5B – SK15 SR01

Taxa	SR01.1	SR01.2	SR01.3	SR01.4
Bonnemaisonia asparagoides	O			F
Callophyllis laciniata				C
Cryptopleura ramosa	F	O		F
Delesseria sanguinea	F	O		O
Desmarestia aculeata				C
Dictyota dichotoma	F	R		F
Dilsea carnosa				R
Corallinales (crusts)	O	O		F
Kallymenia reniformis	F	O		F
Laminaria hyperborea	S			A
Nitophyllum punctatum	F			F
Algae (pink crust)				C
Plocamium cartilagineum				C
Rhodophyllis sp.	O			O
Rhodophyllis divaricata				F
Rhodymenia sp.	O			
Saccharina latissima	F			A
Porifera (orange)				O
Clathrina coriacea	R		R	
Leucosolenia complicata	O			
Haliclona (Reniera) cinerea			R	
?Eudendrium capillare	O			
Obelia geniculata	C			
Alcyonium digitatum		R	R	R
Urticina felina		O		O
Sagartia elegans		C	F	C
Actinothoe sphyrodeta		F		C
Corynactis viridis	A	A	C	F
Caryophyllia (Caryophyllia) smithii		O		C
Spirobranchus triqueter	O	O	O	O
Jassa falcata				F
Caprellidae indet	F	F	F	O
Inachus dorsettensis		R		
Necora puber		R		R
Calliostoma zizyphinum	F	O		F
Patella pellucida	O			O
Polycera quadrilineata	R			

Taxa	SR01.1	SR01.2	SR01.3	SR01.4
Cadlina laevis		R		
Jorunna tomentosa			R	
Crisia spp.	C	F	C	F
Membranipora membranacea	C			F
Electra pilosa	C			
Bugulina flabellata		F	C	O
Cradoscrupocellaria reptans	C		F	
Scrupocellaria scruposa	C		F	
Oshurkovia littoralis	F	F		
Parasmittina trispinosa				C
Antedon bifida				O
Luidia ciliaris				R
Porania (Porania) pulvillus				R
Henricia sanguinolenta				R
Asterias rubens	O	O	O	O
Marthasterias glacialis		R		R
Ophiothrix fragilis		R	R	R
Ophiocomina nigra		O	R	O
Ophiactis balli		O		
Echinus esculentus		O	O	O
Polyclinum aurantium	O			
Aplidium turbinatum	R			
Lissoclinum perforatum	R	R	R	R
Corella parallelogramma				R
Ascidia mentula		R		
Dendrodoa grossularia	R			
Botrylloides leachii	O	O		
Taurulus bubalis				R
Gadidae indet				O

Annex 5C – SK15 IR02

Taxa	IR02.2	IR02.3	IR02.4	IR02.5
Verrucaria maura	C	C		
Verrucaria mucosa	O			
Lichen (yellow crusts)	R			
Ulva intestinalis	O (loc wet areas)	C		
Chlorophyta sp. 1	O (loc wet areas)			
Chlorophyta sp. 2	F (loc dry areas)			
Aglaothamnion sepositum		O	C	
Ceramium shuttleworthianum		O	O	
Corallina officinalis				S
Lithothamnion sp.				A
Ralfsia sp.			P	
Porphyra umbilicalis	O (loc lwr)	C		
Fucus distichus		F (loc upr)		
Fucus spiralis (var. nanus)		F (loc upr)		
Alaria esculenta			R	O
Mastocarpus stellatus		F	O	O
Actinia equina			F (crev)	F (crev)
Melarhaphe neritoides	R	C	A	
Littorina saxatilis		O		
Patella ulyssiponensis		F	A	A
Patella vulgata		P	F	F (crev)
Mytilus edulis		O	C	O
Semibalanus balanoides		R	R	R
Chthamalus stellatus	R	F	C	R

Annex 5D – SK15 SR02

Taxa	SR02.2
Alaria esculenta	A
Vertebrata byssoides	R
Nitophyllum punctatum	F
Rhodymenia sp.	O
Rhodophyllis sp.	R
Bonnemaisonia asparagoides	O
Scinaia sp.	R
Dictyota dichotoma	F
Corallina officinalis	O
Plocamium cartilagineum	O
Callophyllis laciniata	F
Delesseria sanguinea	O
Kallymenia reniformis	F
Laminaria hyperborea	S
Desmarestia aculeata	F
Corallinales (crusts)	F
Rhodophyllis divaricata	F
Saccharina latissima	F
Myxilla (Myxilla) incrustans	R
Cliona celata	R
Leucosolenia complicata	O
Polymastia penicillus	R
Obelia geniculata	C
Corynactis viridis	F
Alcyonium digitatum	O
Caryophyllia (Caryophyllia) smithii	O
Sagartia elegans	O
Phellia gausapata	O
Urticina felina	R
Haliclystus auricula	P
Spirobranchus triqueter	O
Polycera quadrilineata	A
Lacuna vincta	P
Buccinum undatum	P
Patella pellucida	F
Calliostoma zizyphinum	F
Aplysia punctata	O
Crisia eburnea	F
Scrupocellaria scruposa	P
Membranipora membranacea	F
Oshurkovia littoralis	F
Escharoides coccinea	F
Bugulina flabellata	O
Electra pilosa	O
Celleporella hyalina	O
Parasmittina trispinosa	O
Celleporina caliciformis	O
Scruparia chelata	P
Aetea truncata	P
Aetea anguina	P
Crisularia plumosa	R
Asterias rubens	O
Echinus esculentus	O
Marthasterias glacialis	O
Luidia ciliaris	R
Ophiocomina nigra	R

Taxa	SR02.2
Aslia lefevrei	R
Polyclinum aurantium	O
Botrylloides leachii	R
Lissoclinum perforatum	R
Clavelina lepadiformis	R
Aplidium elegans	P
Aplidium punctum	R
Cyclopterus lumpus	R

Annex 5E – SK15 SR03

Taxa	SR03.1	SR03.2	SR03.3	SR03.4
Alaria esculenta	A			
Cryptopleura ramosa				O
Delesseria sanguinea	O	P		
Hypoglossum hypoglossoides				O
Nitophyllum punctatum				O
Symphyocladia parasitica				R
Corallina officinalis	F			P
Rhodophyllis divaricata				O
Callophyllis laciniata				O
Kallymenia reniformis				O
Algae (brown crust)				C
Algae (foliose reds)	C	loc F (upr)	R	
Corallinales (crusts)	A		R (loc O)	F
Laminaria hyperborea		R		
Leuconia johnstoni			F	
Clathrina coriacea		R	R	R
Leucosolenia complicata			F	O
Hymeniacidon perlevis?			P	
Aplysilla sulfurea				R
Haliclona (Haliclona) urceolus			R	
Phorbas fictitius			R	
Clathria (Microciona) spinarcus?			O	
Myxilla (Myxilla) incrustans			O	R
Myxilla (Myxilla) rosacea				R
Polymastia penicillus			R	
Halichondria (Halichondria) bowerbanki			P	
Halichondria (Halichondria) panicea			P	
Pachymatisma johnstonia			R	
Urticina felina				O
Metridium dianthus	F	C (loc A)	C (loc A)	F (loc C)
Actinothoe sphyrodeta			O	F
Phellia gausapata			F (loc C)	
Sagartia elegans			F (loc C)	C
Alcyonium digitatum			O	O
Corynactis viridis		F	F (loc A)	F (loc A)
Caryophyllia (Caryophyllia) smithii				O
Eudendrium sp.			O	O
Coryne pusilla			P	
Tubularia indivisa		S	loc C (upr)	R
Ectopleura larynx			R	
Abietinaria abietina				R
Lineus longissimus			O	
Amphicorina sp.			P	
Filograna implexa			R (loc O)	R

Taxa	SR03.1	SR03.2	SR03.3	SR03.4
Spirobranchus triqueter			O (loc C - lwr)	F
Spirorbinae indet.	F			
Circeis spirillum			P	
Caprella linearis		A	A	A
Dyopedos porrectus				R
Jassa falcata (tubes)		P	F	F (loc C)
Amphipoda indet.				O
Cancer pagurus		R		
Homarus gammarus				R
Nymphon brevirostre				O
Balanus balanus			R	
Edmundsella pedata		P		
Aplysia punctata				R
Trivia monacha			O	O
Aeolidia papillosa				O
Cadlina laevis			R	
Coryphella verrucosa	O	O		
Janolus cristatus			P	
Calliostoma zizyphinum			O	O
Aetea anguina			P	
Schizomavella (Schizomavella) linearis			R (loc O - lwr)	O
Bicellariella ciliata		R		
Bugulina flabellata			O	O
Cradoscrupocellaria reptans			F	P
Scrupocellaria scruposa			P	P
Turbicellepora magnicostata			R (loc O - lwr)	
Electra pilosa		R		
Pyripora catenularia				P
Flustra foliacea				R
Scruparia ambigua			P	P
Parasmittina trispinosa				O
Oshurkovia littoralis		R	R (loc O - lwr)	O
Alcyonidium diaphanum				O
Crisiidae (turf)		F	S	F
Crisia cf eburnea			C	P
Crisidia cornuta			C	
Disporella hispida				R
Plagioecia patina			P	
Asterias rubens			F	F
Leptasterias (Leptasterias) muelleri		O	O	O
Marthasterias glacialis				O
Antedon bifida			O	
Echinus esculentus			F (loc C)	F
Amphipholis squamata		F	F	
Ophiothrix fragilis			R	
Clavelina lepadiformis			R	
Didemnum maculosum ?			R	
Diplosoma spongiforme			R	
Lissoclinum perforatum			R	
Polyclinum aurantium			O	
Aplidium turbinatum			R	
Botrylloides leachii			R	
Botryllus schlosseri			R	
Polycarpa sp.			R	
Taurulus bubalis			O	

ANNEX 6: NORTH RONA CAVE INVENTORY

This annex provides summary information on all known North Rona caves. Summary information is tabulated in Annex 6A. Cave locations are shown on the map presented in Annex 6B. Details of caves visited in 2015 but not subject to full survey are shown in Annex 6C. Three caves were subject to detailed survey in 2015 and detailed information on these is provided in Annex 7.

Annex 6A – Tabulated records

The sites are ordered on the table according to location anticlockwise from the SE point of the island. Sites visited in 2015 are coded 'CI XX' in the order they were visited. Sites identified from ordnance survey maps were allocated the codes 'C X' for caves or 'A X' for rock arches. In cases where these locations were directly assessed in 2015 this original coding has been replaced with the 'CI XX' code.

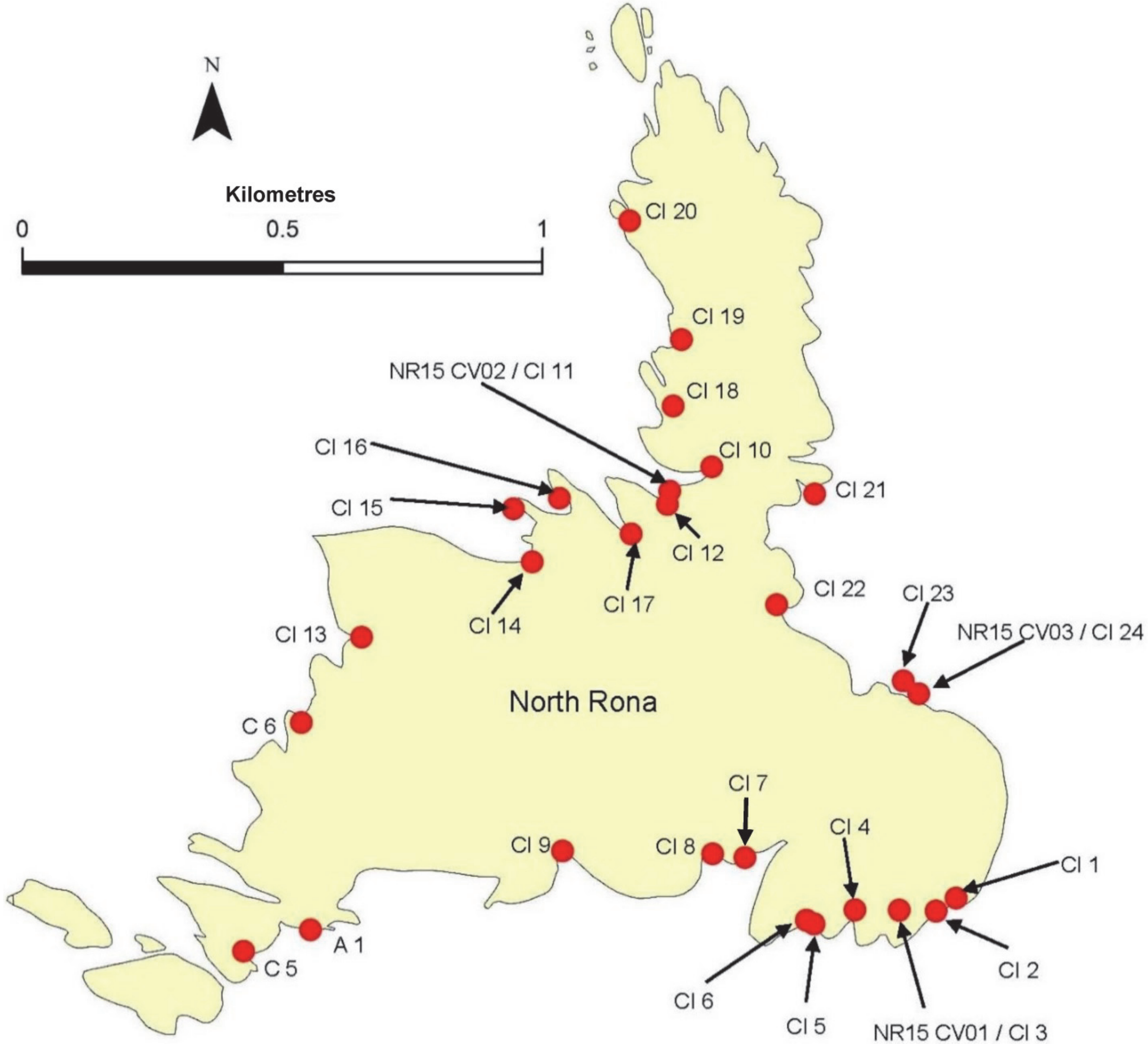
Site Code	Name	Source of record	Notes	Lat	Long
CI 24	Geodha Mairi E	Dive survey 18th Aug 2015.	See detail in Annex 7 for **NR15 CV03**. Narrow canyon passage extending for >65 m.	59.12237	-5.815317
CI 23	Geodha Mairi W	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Rock at waterline within 10 m of roof closure - boulder slope at rear.	59.122582	-5.81585
CI 22	S Geodh' a' Stoth	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 1).	No obvious cave present - overhanging cliff with a slope of giant boulders down to intertidal zone. Coordinates are those of site C 1 derived from ordnance survey map. Our waypoint coordinates were (59.123564 N; 5.818994 W) and indicate photo viewpoint.	59.12381	-5.82021
CI 21	S Geodh' a' Stoth N	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Gulley - possible cave but becomes intertidal before roof closure.	59.125752	-5.819096
CI 20	Geodh an Tuill	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Rock arch is indicated on ordnance survey map (site A 2).	Small rock arch. Uncertain length, estimated as ~13 m from ordnance survey map. Coordinates are those of site A 2 derived from ordnance survey map. Our waypoint coordinates were (59.130258 N; 5.826941 W) and indicate photo viewpoint.	59.13034	-5.82570
CI 19	Pal a' Chleirich 1	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Gulley like entrance - too much surge to investigate.	59.128327	-5.82379
CI 18	Pal a' Chleirich 2	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 13).	Long narrow gully - strong surge - white water & spray at back - possibly a cave at end of gulley - could not enter. Coordinates are those of site C13 derived from ordnance survey map. Our waypoint coordinates were (59.12818 N; 5.824824 W) and indicate photo viewpoint.	59.12717	-5.82397

Site Code	Name	Source of record	Notes	Lat	Long
CI 10	Sgeildige E	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 12).	Cave appears to becomes intertidal within ~30 m of roof closure. ~5 m depth at entrance. Known as 'Tunnel' cave & reportedly links to a 'gloup' (blowhole) some 30 m inland from the cliff edge. Described by Stewart (1932) as: "This tunnel cave is 50 feet high and extends inland for about 100 yards. The south side of the cave is composed of sheer cliff, but the north is for the most part sloping at an angle of twenty to thirty degrees. There is an interesting shaft that extends from the centre of the thin neck of land here and descends into the further end of the cave. The entrance to this shaft is a hole about 3 ft. 6 in. high and 9 feet broad. The shaft itself is 100 feet long and runs down the dip slope of the rock." Also described by Oldham (2006) as: "Length 30 m, with a shaft to the surface half way along". However, this description is in reference to a site named as "Geodha Stoth" (CI 21). Nevertheless it is more probable that the description is based on CI 10. Oldham (2006) provides references to Darling (1939) and Steers (1969) who also mentioned this site.	59.126146	-5.822588
CI 11	Sgeildige M	Dive survey 18th Aug 2015. Cave is indicated on ordnance survey map (site C 11).	See detail in Annex 7 for **NR15 CV02**. Large cave passage - goes in ~60 m. 10 m deep at entrance ~ 5 m deep at rear. Oldham (2006) references Darling (1939) as mentioning "two sea caves" which may refer to CI 11 and CI 12.	59.125695	-5.823964
CI 12	Sgeildige W	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 10).	Entrance directly adjacent to CI 11 (to the right of CI 11) - ~10 m deep at entrance - narrower & with more wave surge than CI 11. Oldham (2006) references Darling (1939) as mentioning "two sea caves" which may refer to CI 11 and CI 12. Coordinates are those of site C 10 derived from ordnance survey map. Our waypoint coordinates were (59.125786 N; 5.824367 W) and were those of a photo viewpoint.	59.12546	-5.82403
CI 17	Geodha Leis	Assessed from inflatable boat 18th Aug 2015. Snorkled. Cave is indicated on ordnance survey map (site C 9).	Narrow <1 m at entrance with ~ 5 m water depth. Further in it widens to ~ 3 m - boulder floor meets waterline ~30 m beyond roof closure with back wall of rock seen about 10 m beyond this point.	59.124925	-5.8252
CI 16	Geodha Blatha Beag	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Large arched entrance, rock at rear within 30 m of roof closure - possibly narrow cleft continuing but wave surged & spray seen so not entered.	59.125493	-5.827667
CI 15	Geodha Blatha Mor N	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Large fractured entrance. Rock appears to meet waterline within ~ 20 m of roof closure (it is possible it continues but narrow & too much surge to enter).	59.125277	-5.829199
CI 14	Geodha Blatha Mor	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 8).	High (~30 m) arched entrance. Rear wall of giant boulders within ~30 m of roof closure. Oldham (2006) references Darling (1939) as mentioning "a sea cave at Geodha Blatha Mor" which probably refers to this site. Coordinates are those of site C8 derived from ordnance survey map. Our waypoint coordinates were (59.124956 N; 5.830146 W) and were those of a photo viewpoint.	59.12437	-5.82849
CI 13	Geodha nan Gall	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 7).	~1.5 m wide fissure - not investigated. Coordinates are those of site C7 derived from ordnance survey map. Our waypoint coordinates were (59.123144 N; 5.835698 W) and were those of a photo viewpoint.	59.12294	-5.83411
C 6	S Geodha nan Gall	Cave is indicated on ordnance survey map	Not approached in 2015. Site identified from ordnance survey map.	59.12142	-5.83602
C 5	Sceapull	Cave is indicated on ordnance survey map	Not approached in 2015. Site identified from ordnance survey map.	59.11743	-5.83763
A 1	Hacaclaid	Cave is indicated on ordnance survey map	Not approached in 2015. Site identified from ordnance survey map. Arch ~10 m (uncertain length).	59.11785	-5.83542

Site Code	Name	Source of record	Notes	Lat	Long
CI 9	Heallair E	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Series of 4 narrow fissures. All are <1 m wide, some are only ~0.3 m wide. Appear to become intertidal after a short distance. Left hand fissure leads to a boulder slope with light seen entering through a slot above. None appear likely to lead to any significant marine cave. Oldham (2006) cites Atkinson (1949) as saying "a narrow cleft called Stoc a Phriosaion leads to an adjacent ravine called Poll Heallir".	59.11939	-5.82706
CI 8	Poll Thothatom W	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Intertidal and short. Waterline meets sloping rock slab within ~3 m of roof closure.	59.119451	-5.822016
CI 7	Poll Thothatom E	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Narrow ~0.3 m fissure - not examined closely.	59.119408	-5.82092
CI 6	Cleit an t-Sionnaich W2	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	2 very narrow ~0.3 m fissures - probably not caves.	59.118374	-5.818769
CI 5	Cleit an t-Sionnaich W	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 4).	Shallow & wave surged - ~2.5 m wide - white water - appears to be about 5 m to back wall (may be wider & continuing underwater).	59.118317	-5.818505
CI 4	Cleit an t-Sionnaich M	Assessed from inflatable boat 18th Aug 2015. Cave not entered. Cave is indicated on ordnance survey map (site C 3).	Waterline meets boulders within <3 m of roof closure - spray from back & white water.	59.118588	-5.817148
CI 3	Cleit an t-Sionnaich E 1	Dive survey 18th Aug 2015. Cave is indicated on ordnance survey map (site C 2).	See detail in Annex 7 for **NR15 CV01**. Narrow surge gulley leading to a short cave at the rear.	59.118613	-5.815656
CI 2	Cleit an t-Sionnaich E 2	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	Way in obstructed by very large boulder at waterline - beyond is a narrow ~0.3 m surged fissure at <5 m in from roof closure - depth at entrance (seaward of boulder) is ~15 m.	59.118627	-5.814424
CI 1	Cleit an t-Sionnaich E 3	Assessed from inflatable boat 18th Aug 2015. Cave not entered.	~ 1 m wide at waterline below roof closure - ~13 m deep at entrance (may be wider & continuing underwater).	59.118864	-5.813768

Annex 6B – Location map

Outline map of North Rona showing location of cave sites based on historical records and direct observation.



Annex 6C – Notes and images

Site CI 23
(tidal rise 1.0 m)

Geodha Mairi W
Rock at waterline within 10 m of roof closure - boulder slope at rear.

Site CI 22
(tidal rise 1.0 m)

S Geodh' a' Stoth
No obvious cave present - overhanging cliff with a slope of giant boulders down to intertidal zone.

Site CI 21
(tidal rise 0.9 m)

S Geodh' a' Stoth N
Gulley - possible cave but becomes intertidal before roof closure.

Site CI 20
(tidal rise 0.8 m)

Geodh an Tuill
Small rock arch. Uncertain length, estimated as ~13 m from ordnance survey map. Outline of arch highlighted in red.

Site CI 19
(tidal rise 0.7 m)

Pal a' Chleirich 1
Gulley like entrance - too much surge to investigate.

Site CI 18
(tidal rise 0.7 m)

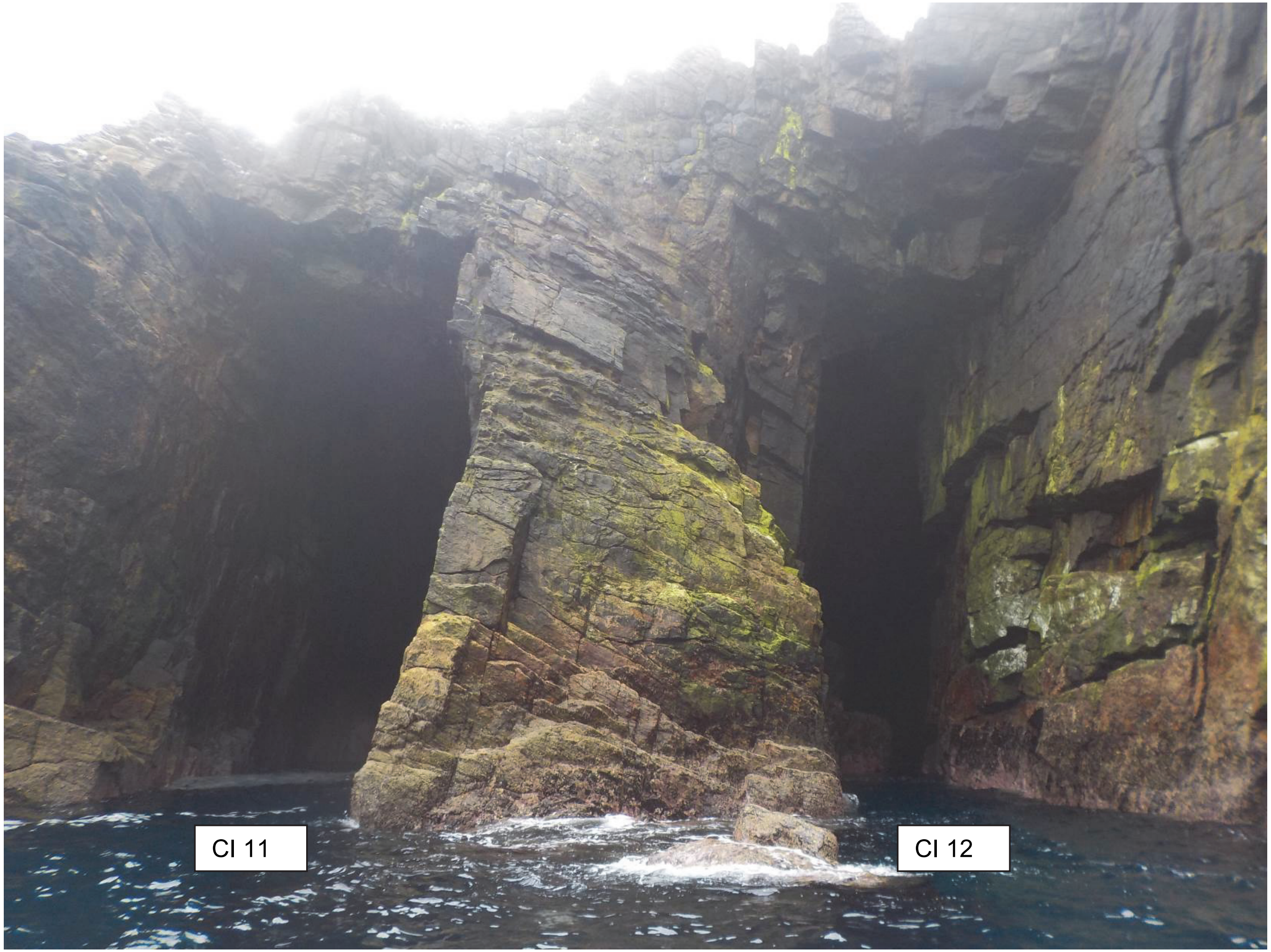
Pal a' Chleirich 2
Long narrow gully - strong surge - white water & spray at back - possibly a cave at end of gulley - could not enter.

Site CI 10
(tidal rise 1.9 m)

Sgeildige E
Cave appears to becomes intertidal within ~30 m of roof closure. ~5 m depth at entrance. Known as 'Tunnel cave & apparently links to a 'gloup' (blowhole) some 30 m inland from the cliff edge.

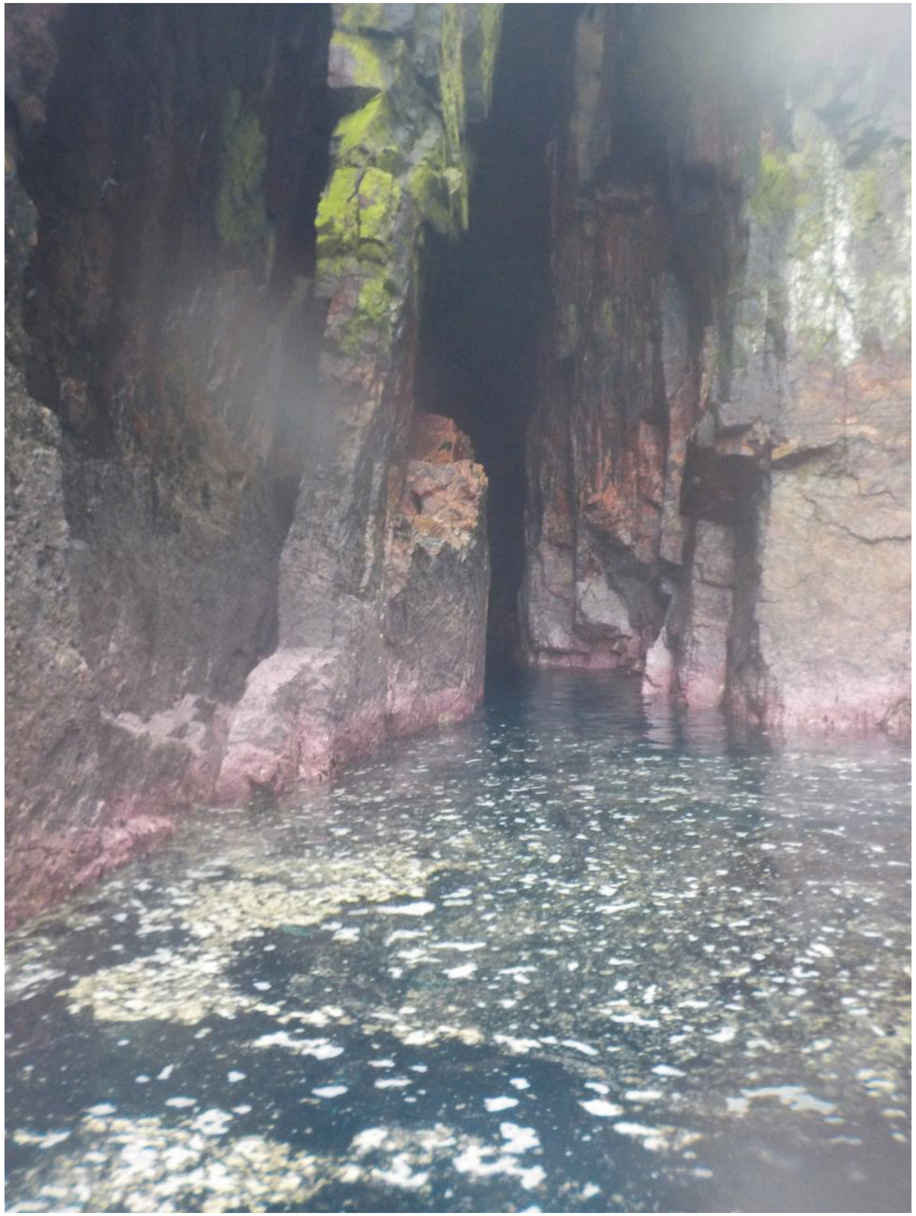
Site CI 11 & CI 12
(tidal rise 1.7 m)

Sgeildige M & W
Two adjacent caves. For **CI 11** see detail for NR15 CV02. Large cave passage - goes in ~60 m. 10 m deep at entrance ~ 5 m deep at rear.
CI 12 is ~10 m deep at entrance - narrower & with more wave surge than CI 11.
Oldham 2006 references Darling 1939 as mentioning "two sea caves" which may refer to CI 11 and CI 12.

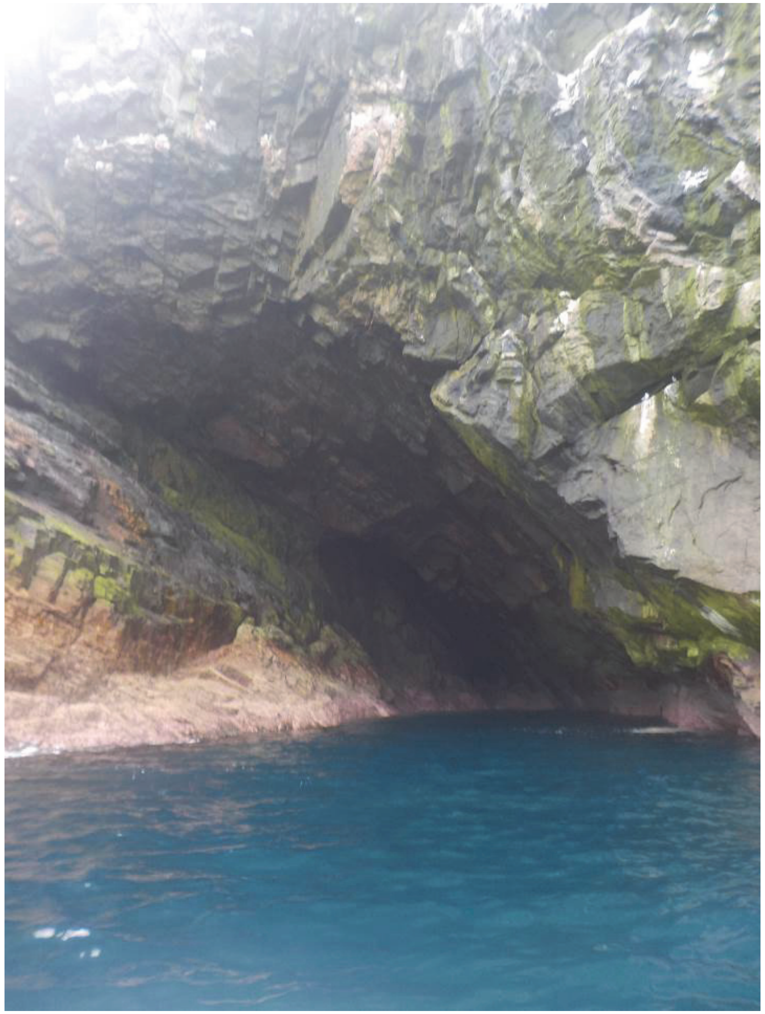


Site CI 17
(tidal rise 0.6 m)

Geodha Leis
Narrow <1 m at entrance with ~ 5 m water depth. Further in it widens to ~ 3 m - boulder floor meets waterline ~30 m beyond roof closure with back wall of rock seen about 10 m beyond this point.



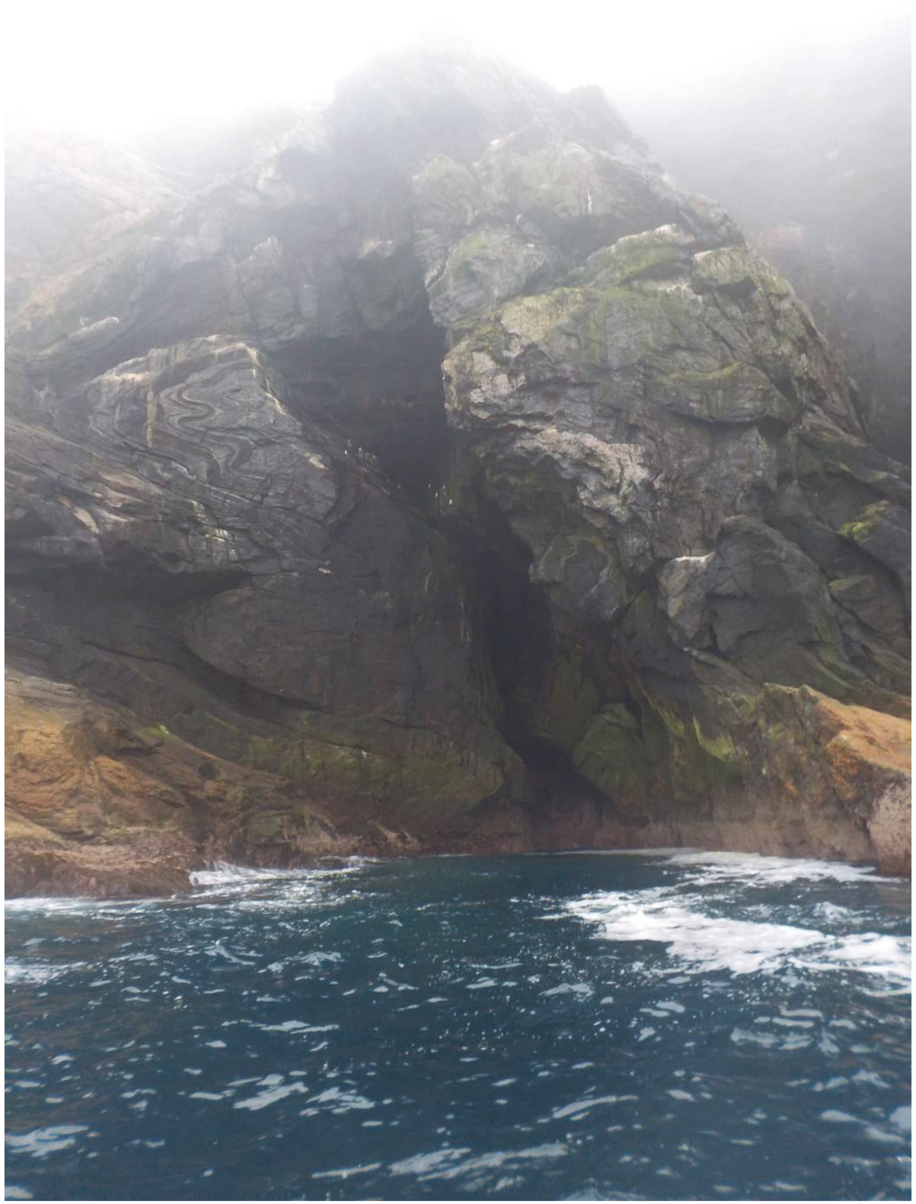
Site CI 16
(tidal rise 1.4 m)



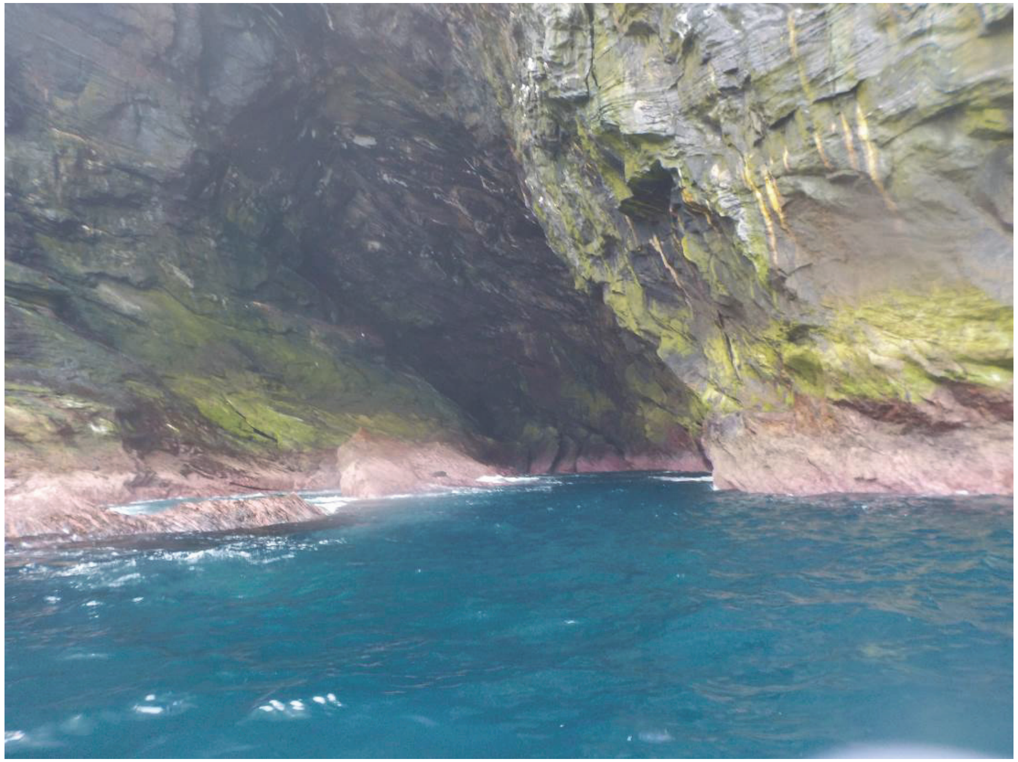
Geodha Blatha Beag
Large arched entrance, rock at rear within 30 m of roof closure - possibly narrow cleft continuing but wave surged & spray seen so not entered.

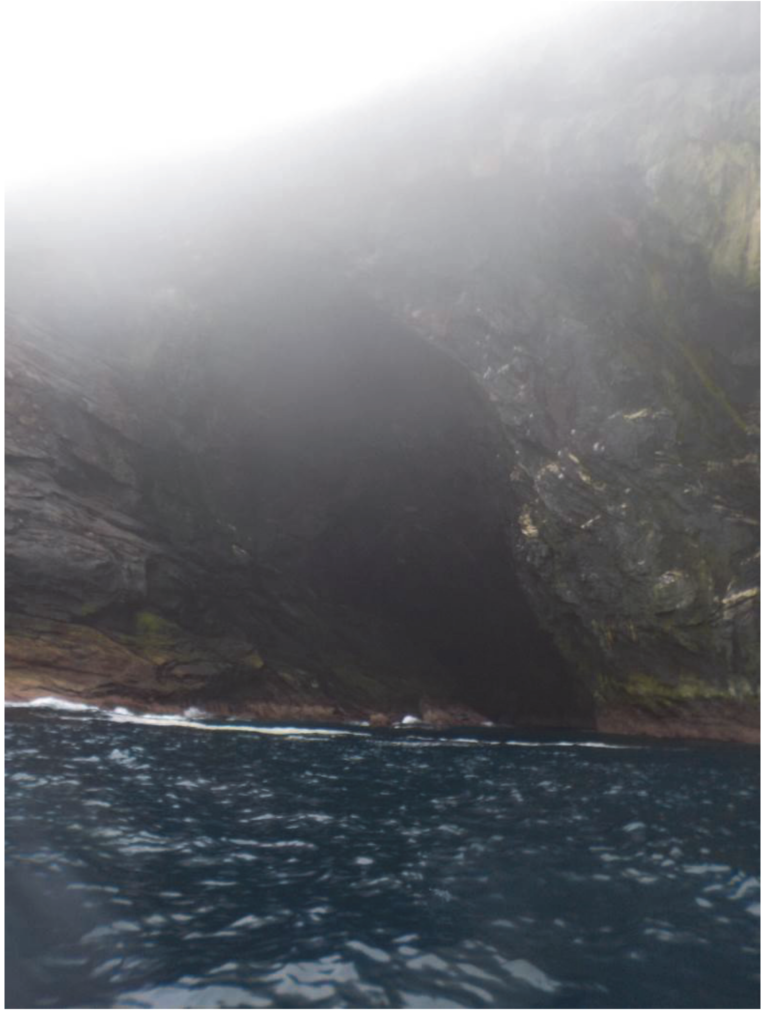
Site CI 15
(tidal rise 1.5 m)

Geodha Blatha Mor N
Large fractured entrance. Rock appears to meet waterline within ~ 20 m of roof closure (it is possible it continues but narrow & too much surge to enter).



Site Cl 14
(tidal rise 1.5 m)

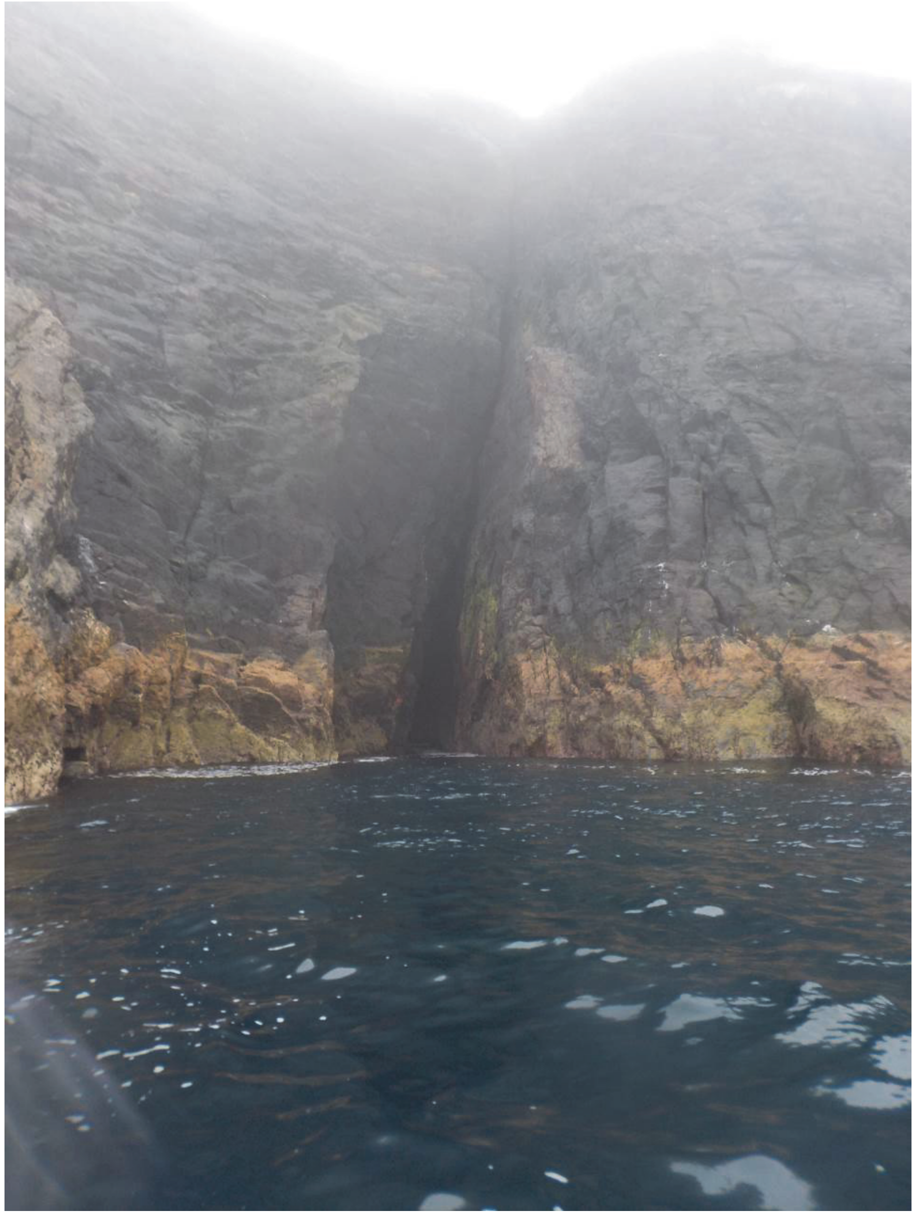




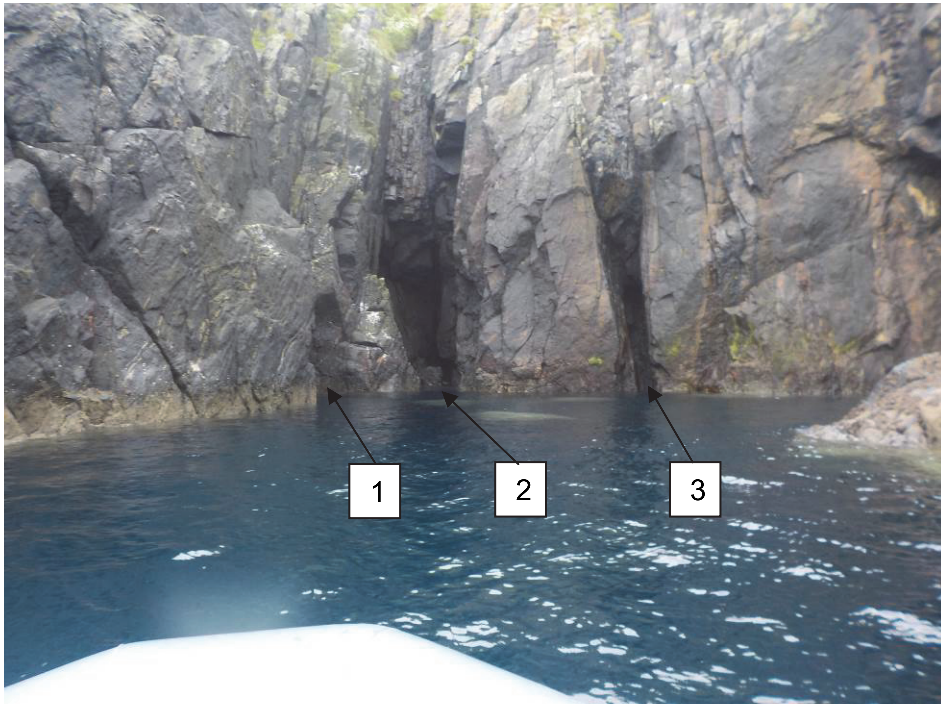
Geodha Blatha Mor
High (~30 m) arched entrance. Rear wall of giant boulders within ~30 m of roof closure.   Oldham 2006 references Darling 1939 as mentioning "a sea cave at Geodha Blatha Mor" which probably refers to this site

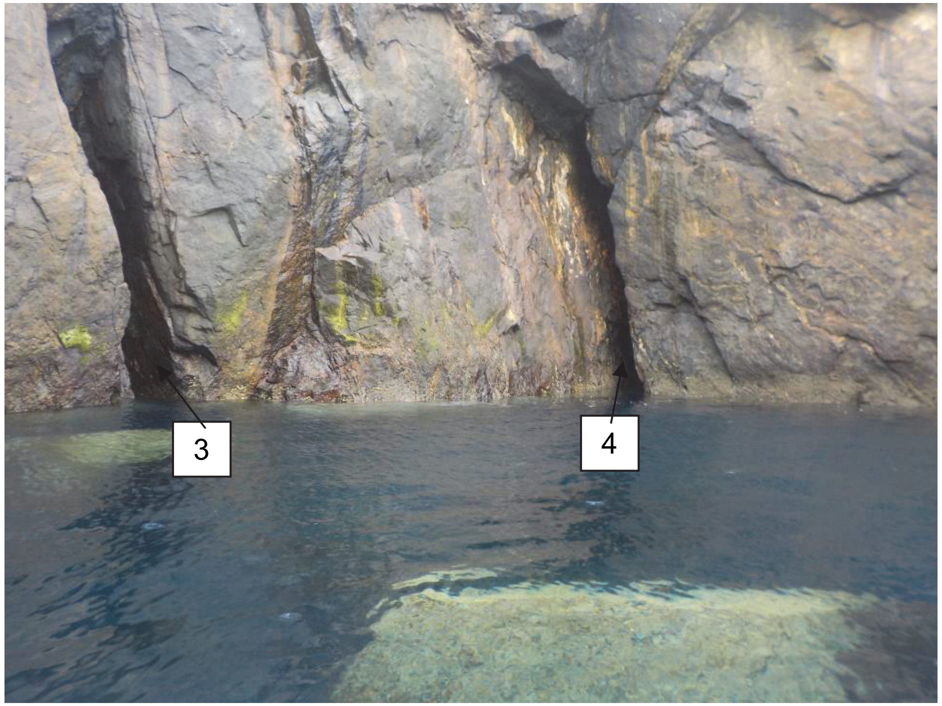
Site CI 13
(tidal rise 1.6 m)

Geodha nan Gall
~1.5 m wide fissure - not investigated.



Site CI 9
(tidal rise 2.4 m)





Heallair E
Series of 4 narrow fissures. All are <1 m wide, some are only ~0.3 m wide. Appear to become intertidal after a short distance. Left hand fissure leads to a boulder slope with light seen entering through a slot above. None appear likely to lead to any significant marine cave. Oldham (2006) cites Atkinson (1949) as saying "a narrow cleft called Stoc a Phriosaion leads to an adjacent ravine called Poll Heallir".

Site CI 9
(tidal rise 2.4 m)

Heallair E
See above.

Site CI 8
(tidal rise 2.4 m)

Poll Thothatom W
Intertidal and short. Waterline meets sloping rock slab within ~3 m of roof closure.

Site CI 7
(tidal rise 2.4 m)

Poll Thothatom E
Narrow ~0.3 m fissure - not examined closely.

Site Cl 6
(tidal rise 2.4 m)

Cleit an t-Sionnaich W2
2 very narrow ~0.3 m fissures - probably not caves.

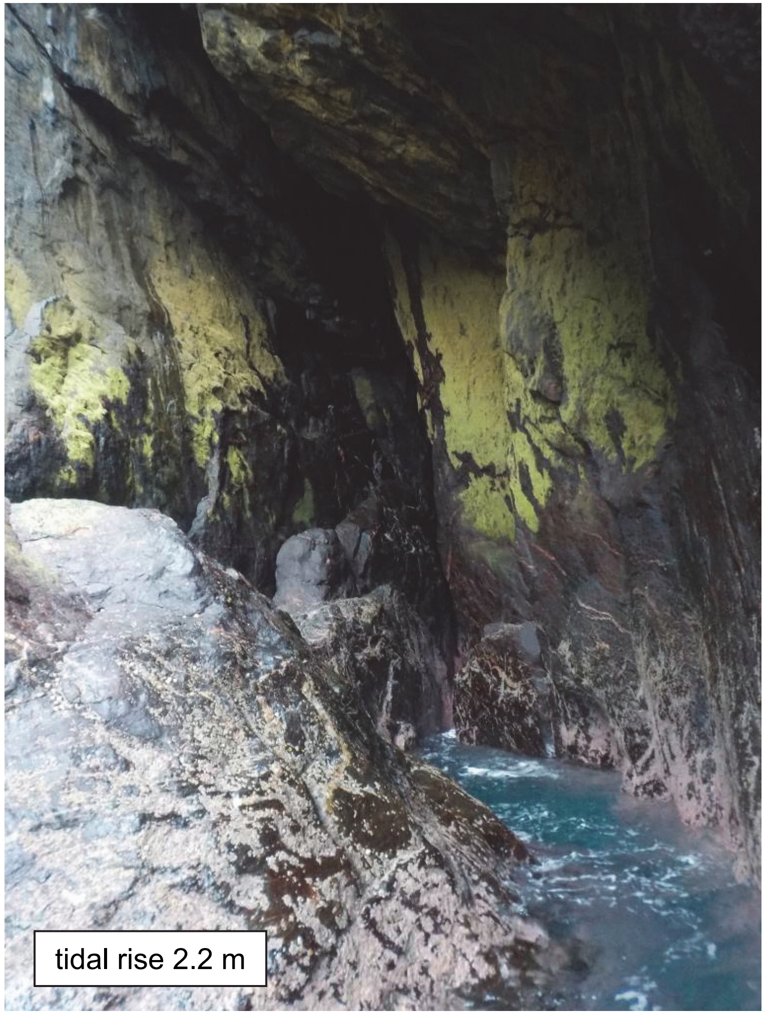
Site CI 5
(tidal rise 2.4 m)

Cleit an t-Sionnaich W
Shallow & wave surged - ~2.5 m wide - white water - appears to be about 5 m to back wall (may be wider & continuing underwater).

Site CI 4

Cleit an t-Sionnaich M
Waterline meets boulders within <3 m of roof closure - spray from back & white water.

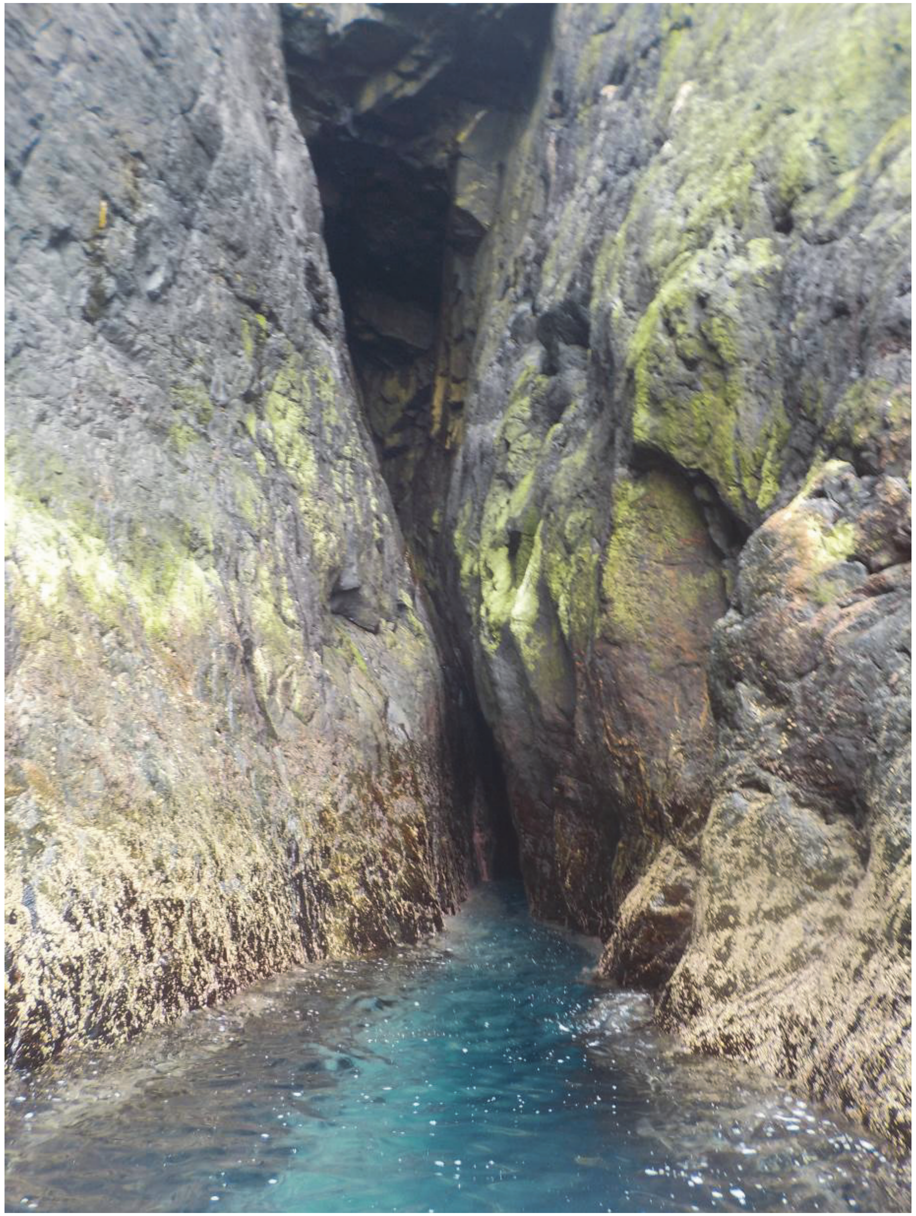
Site Cl 2



Cleit an t-Sionnaich E 2
Way in obstructed by very large boulder at waterline - beyond is a narrow ~0.3 m surged fissure at <5 m in from roof closure - depth at entrance (seaward of boulder) is ~15 m.

Site Cl 1
(tidal rise 2.2 m)

Cleit an t-Sionnaich
E3
~ 1 m wide at waterline below roof closure - ~13 m deep at entrance (may be wider & continuing underwater).

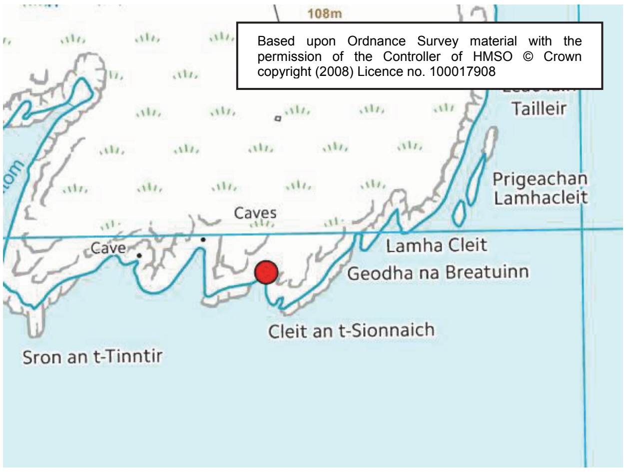


ANNEX 7: NORTH RONA CAVE SITE RELOCATION DETAILS WITH PHYSICAL AND BIOLOGICAL DATA

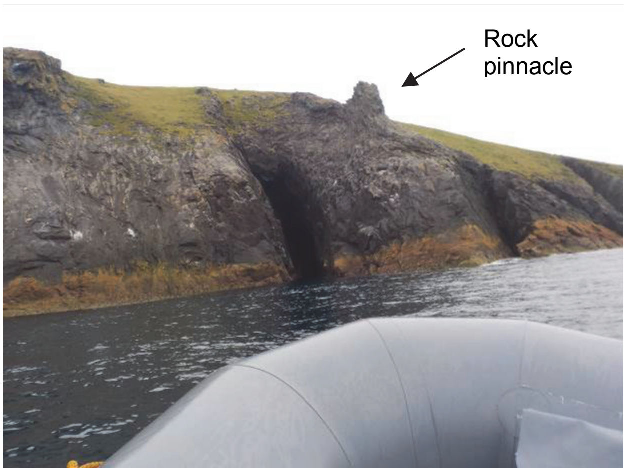
Annex 7A – NR15 CV01 – Cleit an t-Sionnaich E1

Cave relocation sheet

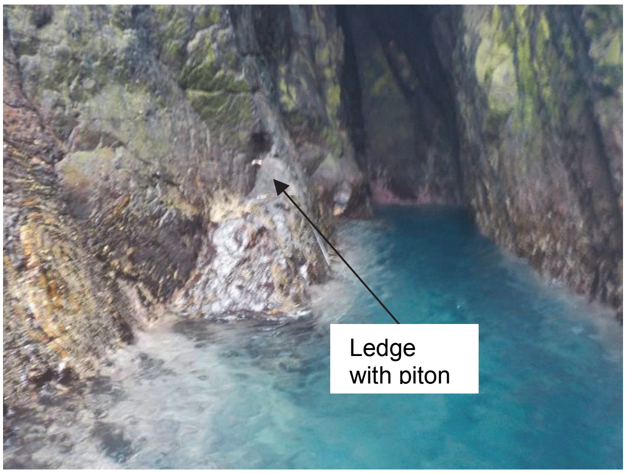
Cave name	Cleit an t-Sionnaich E1 ('C2')
Site code	NR15 CV01 ('Cl 3')
Position of entrance	59.118613° N 5.815656° W
How start point is marked	The piton is placed in the upper surface of a prominent ledge on left hand wall of the entrance gulley just below the point at which the roof closes over. The height of the ledge is ~3.7 m ACD.
Notes on relocation	Use coordinates provided to locate large obvious rift entrance in base of cliff. The entrance is narrow and high and is tilted slightly to the left. There is an obvious rock pinnacle on the upper cliff just to the right of the entrance. Enter the gulley and look for the obvious ledge on the left near where the roof closes. Use photographs to aid orientation in relation to features on the rock face.
Access	by boat



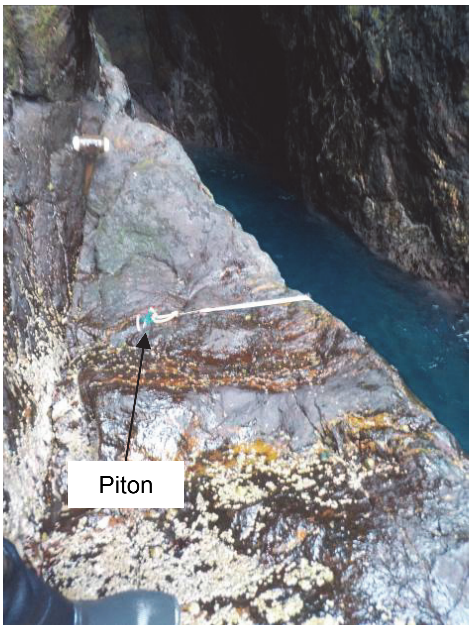
Cave location



View of entrance looking ~NNE from 59.117528° N 5.816368° W. Tidal rise ~2.6 m ACD



View of relocation piton looking ~NNE from 59.118522° N 5.815841° W. Tidal rise ~2.7 m ACD

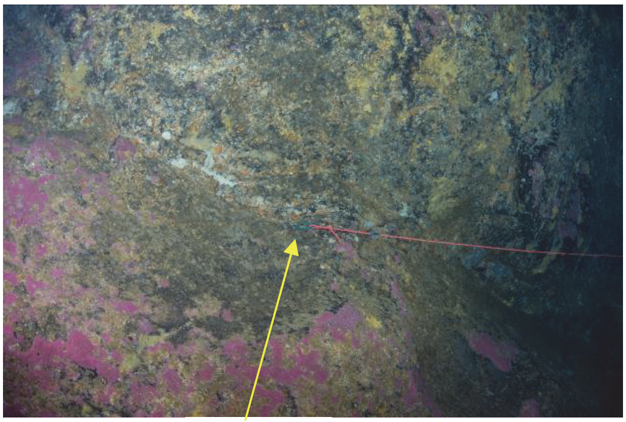


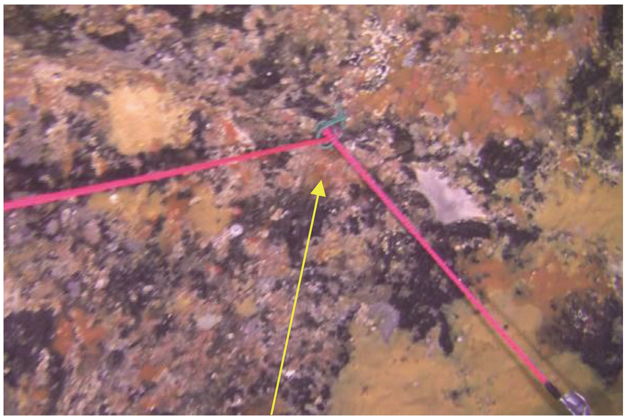
View of relocation piton at 59.118613° N 5.815656° W. Tidal rise ~2.7 m

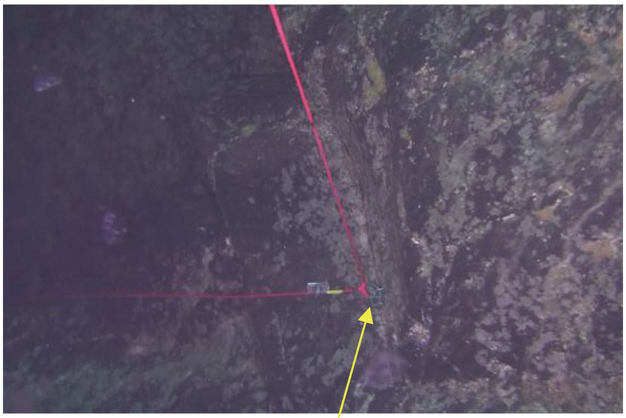
Cave datum line relocation information

Cave name	Cleit an t-Sionnaich E1 ('C2')
Site code	NR15 CV01 ('CI 3')
Position of piton 1	To relocate descend the left hand wall vertically from the relocation piton to locate piton 4 at a depth of 15.2 m BCD and a distance of ~19 m from the relocation piton. Piton 4 is placed in a vertical crevice on the left hand wall. Piton 1 is ~20 m further into the cave and is placed in a crevice on the right hand wall near the back of the cave at a depth of 4.8 m BCD.

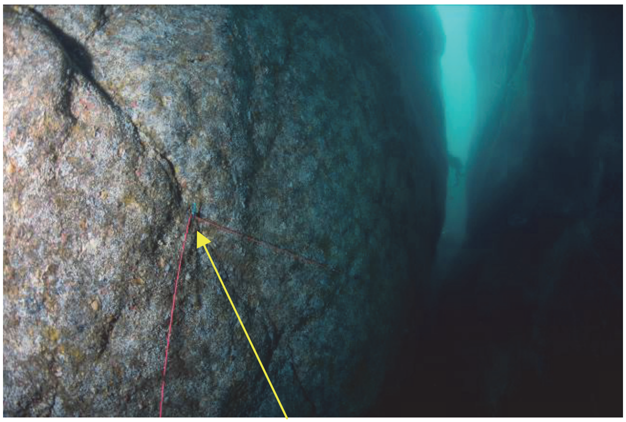
Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1	4.8	10	0	200
Piton 2	6.2	5	10	down
Piton 3	10.1	4	15	160/down
Piton 4	12.4	14	19	?
Piton 5	15.9	29	33	200
Piton 6	15.1	n/a	62	n/a


Piton 1


Piton 2


Piton 3

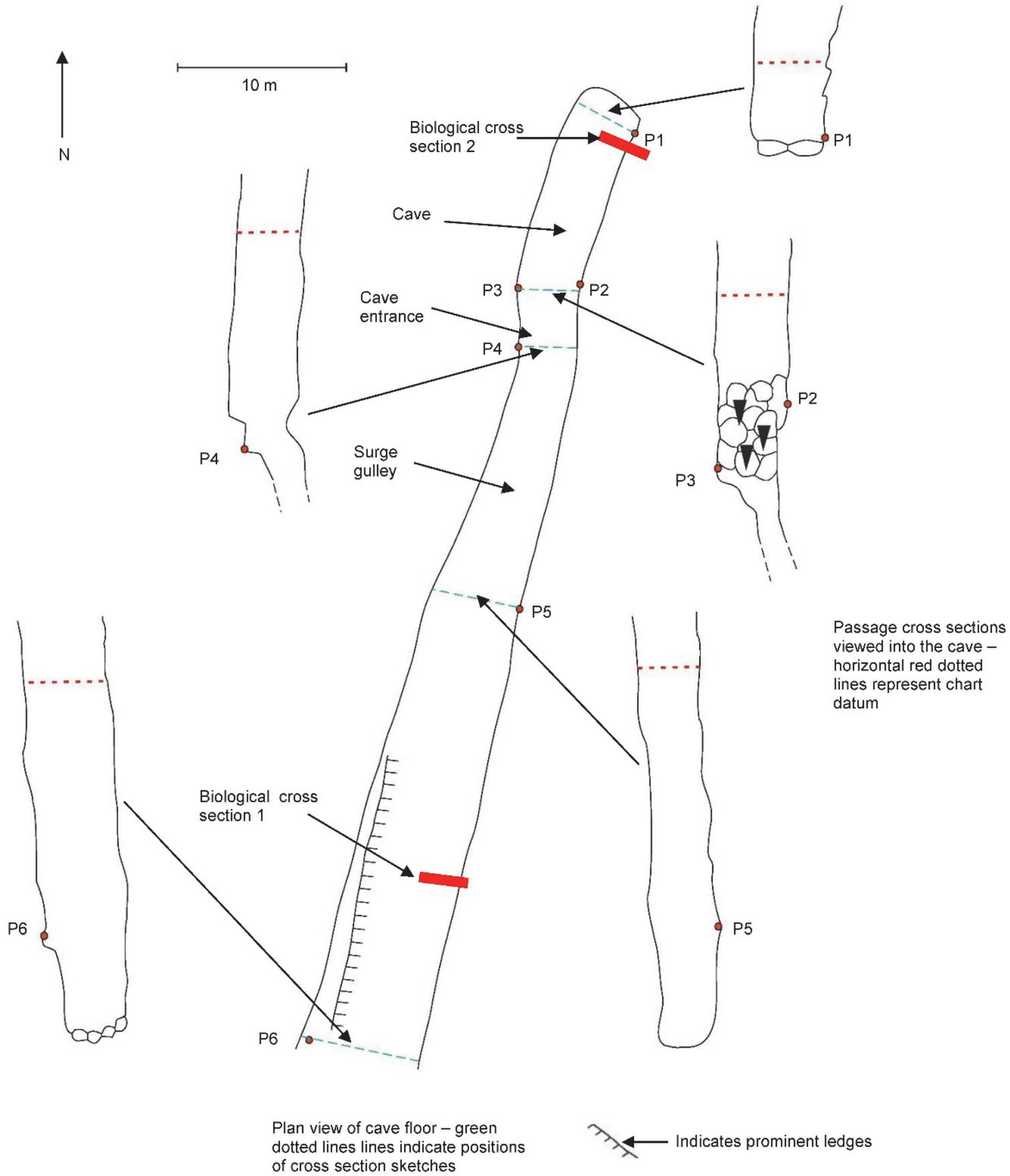

Piton 4



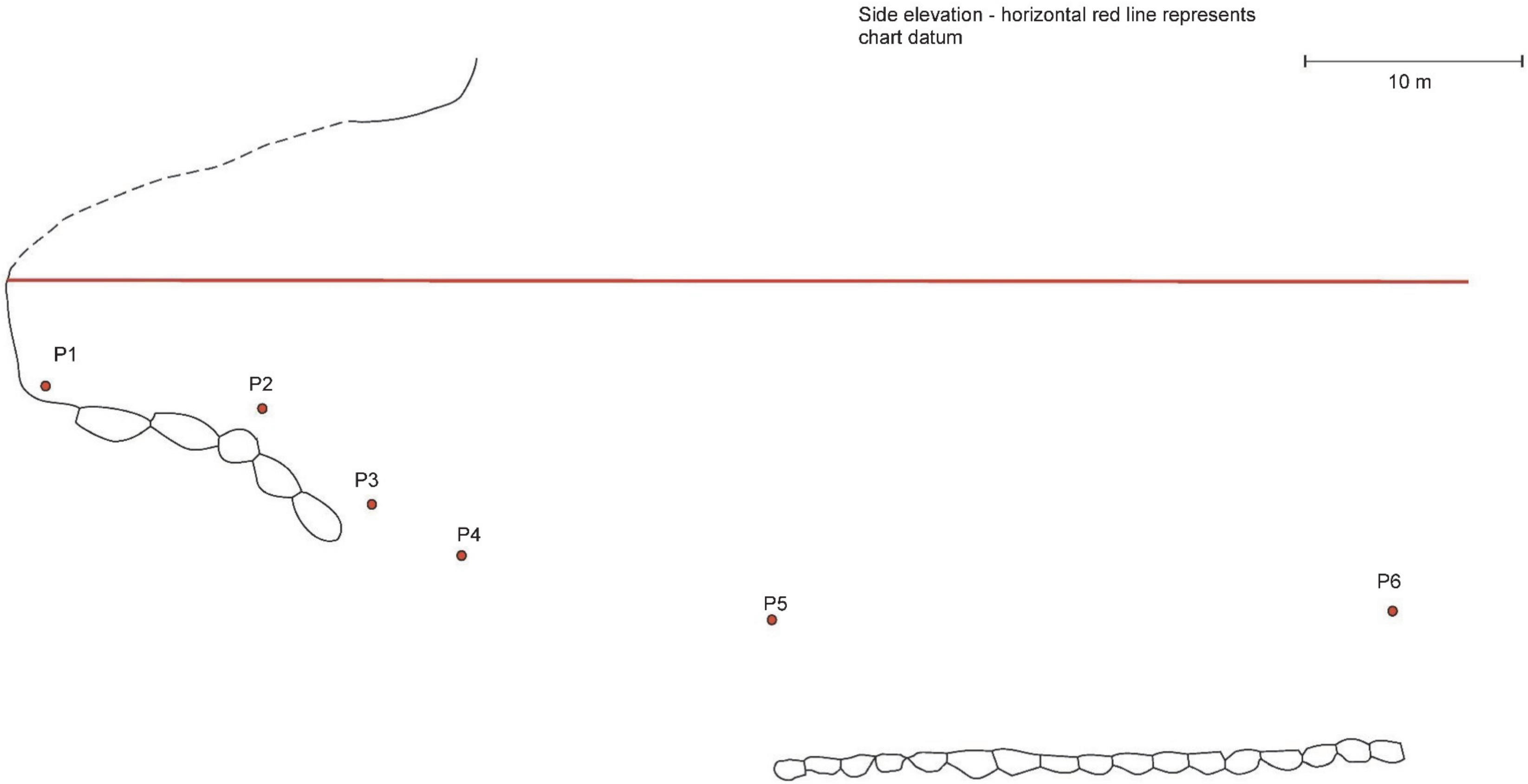
Piton 5

Piton 6

NR15 CV01 – Cleit an t-Sionnaich E1 (‘C2’; ‘CI3’) – Physical survey



NR15 CV01 – Cleit an t-Sionnaich E1 (‘C2’; ‘Cl3’) – Physical survey (cont’d)



NR15 CV01 – Cleit an t-Sionnaich E1 ('C2'; 'Cl3') – Biological summary – cross section 1 (right wall, ~30 m <u>outside of entrance</u> in surge gulley, 50 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Predominantly vertical rock wall in intertidal.	+2.9	+0.7	Abundant *Semibalanus balanoides* with common *Patella* sp. and tufts of *Porphyra* sp.	**LR.HLR.MusB.Sem**
2	Predominantly vertical rock wall in sublittoral fringe.	+0.7	-1	Superabundant coralline algal crusts and *Alaria esculenta*. Frequent *Corallina officinalis*, *Halichondria (Halichondria) panicea*, *Metridium dianthus*, *Patella* sp. and *Semibalanus balanoides*.	**IR.HIR.KFaR.Ala**
3	Sublittoral rock wall. Predominantly vertical.	-1	-4.8	Abundant coralline algal crusts and foliose red algae. Some limited areas of frequent to common sponge crusts.	**IR.FIR.SG.FoSwCC**
4	Sublittoral rock wall. Predominantly vertical.	-4.8	-9.7	Sponge dominated community with anemones & colonial ascidians. Sponge crusts were common overall and included frequent *Halichondria (Halichondria) panicea* and *Amphilectus fucorum*. Anemones included *Metridium dianthus*, *Corynactis viridis* and *Sagartia elegans* each of which were frequent overall but common in some areas. A range of colonial ascidians were present with frequent *Didemnum maculosum* being particularly prominent. Coralline algal crusts and foliose red algae were common in some patches within the zone.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
5	Sublittoral rock wall. Predominantly vertical.	-9.7	-19.7	Complex mosaic of colonial ascidians and sponge crusts in the lower (>13 m BCD) part of the zone. Increased dominance of sponges and increased anemones in the upper (<13 m BCD) part of the zone. A range of colonial ascidians were present including *Didemnum maculosum* which were locally common. Sponge crusts were common and locally abundant in the upper zone with *Halichondria (Halichondria) panicea* and *Amphilectus fucorum* being particularly prominent. Anemones included *Metridium dianthus* and *Corynactis viridis* (locally common in the upper part of the zone) and *Sagartia elegans* (locally frequent in the upper part of the zone).	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**

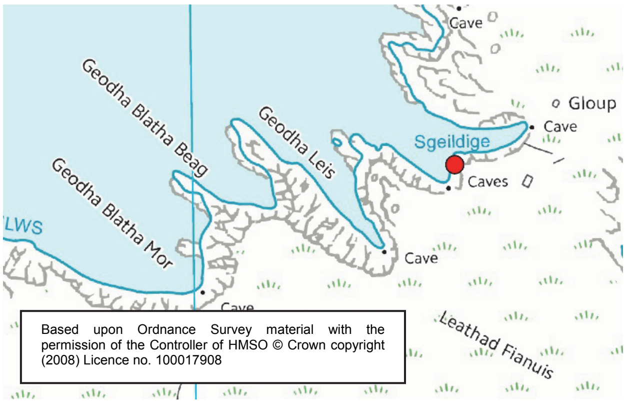
NR15 CV01 – Cleit an t-Sionnaich E1 (‘C2’; ‘CI3’) – Biological summary – cross section 2 (right wall, ~20 m from entrance, 0 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Floor of large, rounded, jammed boulders. Near vertical rock wall with some irregular sloping rock slabs in shallows forming small ledges.	~-1.5	~-5.5	The boulders of the cave floor were densely coated by superabundant coralline algal crusts with occasional patches (locally common) of thin yellow sponge crusts (*Halichondria (Halichondria) panicea*). Other biota were sparse with the exception of frequent scattered spirorbins. The base of the walls supported a richer community with abundant spirorbins, common *Jassa falcata* tube turf and locally frequent barnacles. Anemones and a range of colonial ascidians were also present in low abundance. About 2 m above the base of the wall the abundance of these taxa were reduced and the community became dominated by abundant coralline algal crusts with frequent patches of thin yellow sponge crusts (*Halichondria (Halichondria) panicea*).	**IR.FIR.SG.CrSp**

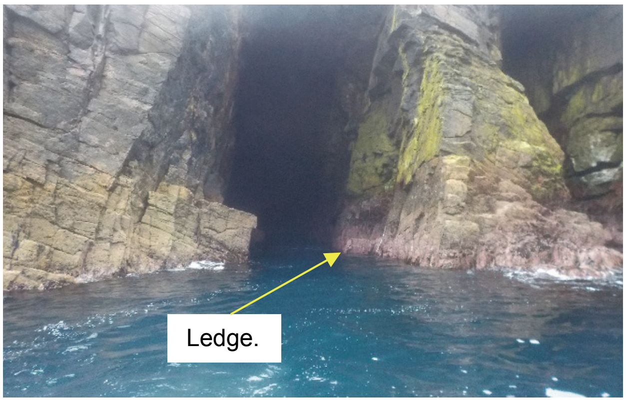
Annex 7B – NR15 CV02 – Sgeildige M

Cave relocation sheet

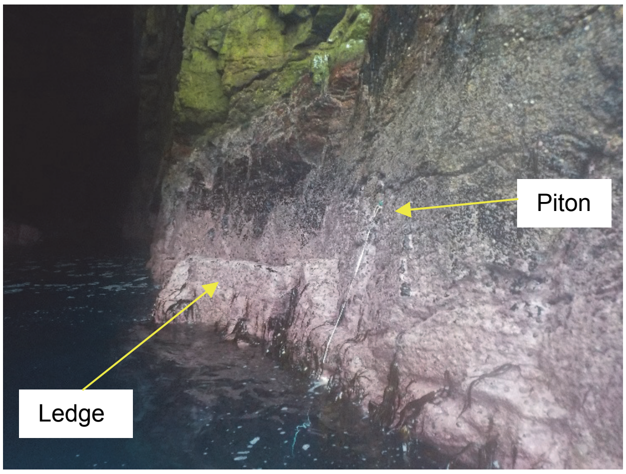
Cave name	Sgeildige M ('C11')
Site code	NR15 CV02 ('CI 11')
Position of entrance	59.125695° N 5.823964° W
How start point is marked	The piton is placed in a vertical crevice in the right hand wall of the cave just below the point at which the roof closes over. The piton placement is 1-2 m further out of the cave from a large obvious ledge on the cave wall. The piton is at the upper margin of the coralline algae zone at a height of ~2.4 m ACD.
Notes on relocation	Use coordinates provided to locate two large obvious adjacent cave entrances in base of cliff. The site is within the larger left hand entrance. Look on right hand wall below the point of roof closure for a large obvious intertidal ledge. From the ledge, search on adjacent rock surface for the piton placement. Use photographs to aid orientation in relation to features on the rock face.
Access	by boat



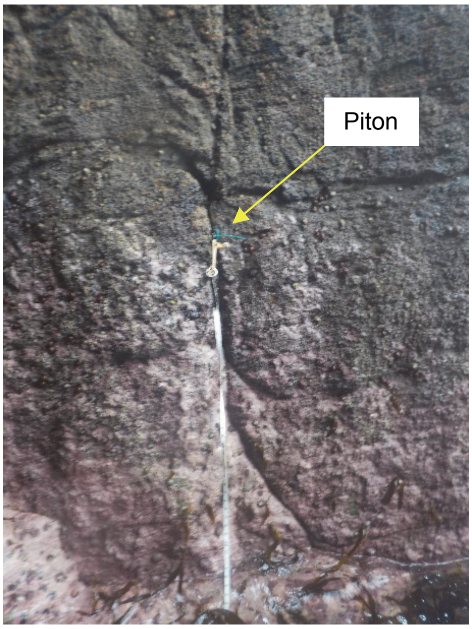
Cave location



View of entrance & piton looking ~SE from 59.125817° N 5.824093° W. Tidal rise ~0.7 m BCD.



View of relocation piton at 59.125695° N 5.823964° W. Tidal rise ~0.7 m BCD.

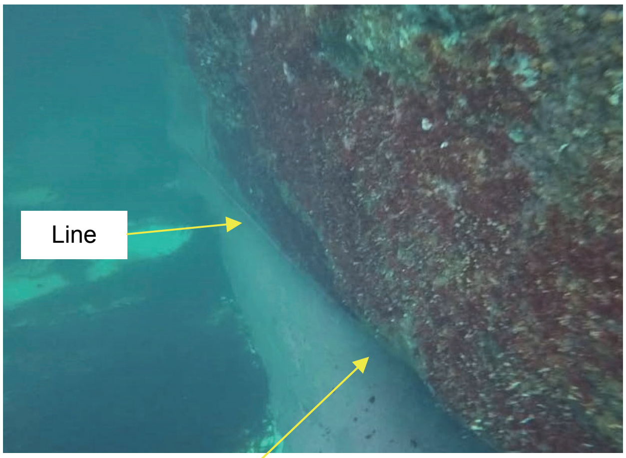


View of relocation piton at 59.125695° N 5.823964° W. Tidal rise ~0.7 m BCD.

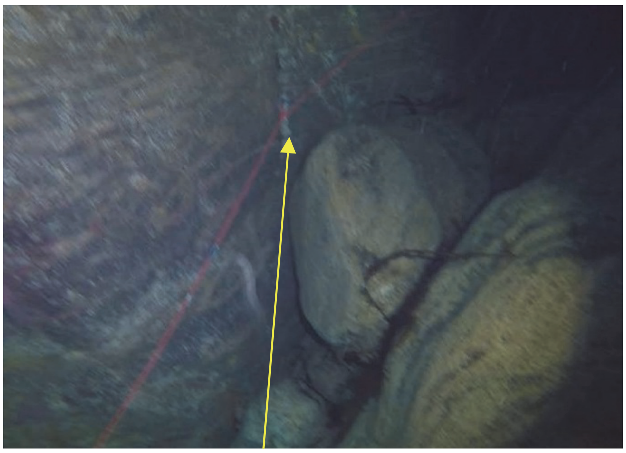
Cave datum line relocation information

Cave name	Sgeildige M ('C11')
Site code	NR15 CV02 ('CI 11')
Position of piton 1	Piton is placed in a prominent horizontal indentation which runs along the cave wall just above the highly scoured zone with coralline algal crusts. It is almost directly below the relocation piton. Distance from relocation piton is ~10.1 m at a depth of 7.2 m BCD.

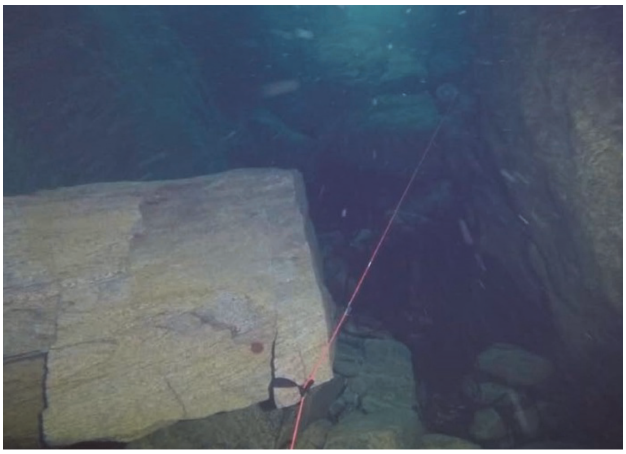
Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1	7.2	25	0	120
Piton 2	6.9	5	25	150
Piton 3 (snoopy on boulder)	6.5	25	30	130
Piton 4 (snoopy on boulder)	3.1	10	55	?
Piton 5 (reel on boulder)	2.2	n/a	65	n/a



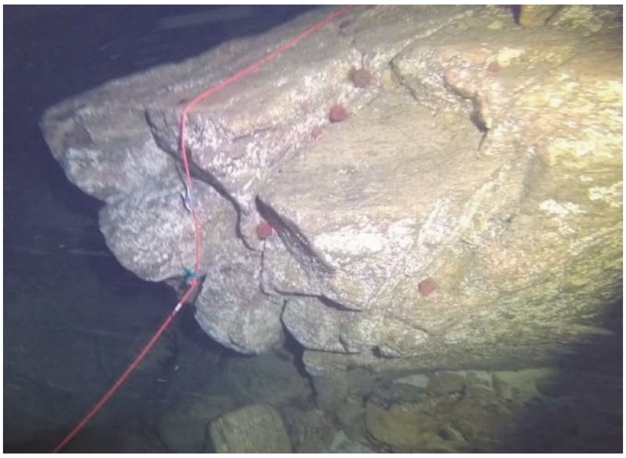
Piton 1 (hidden in horizontal indentation)



Piton 2



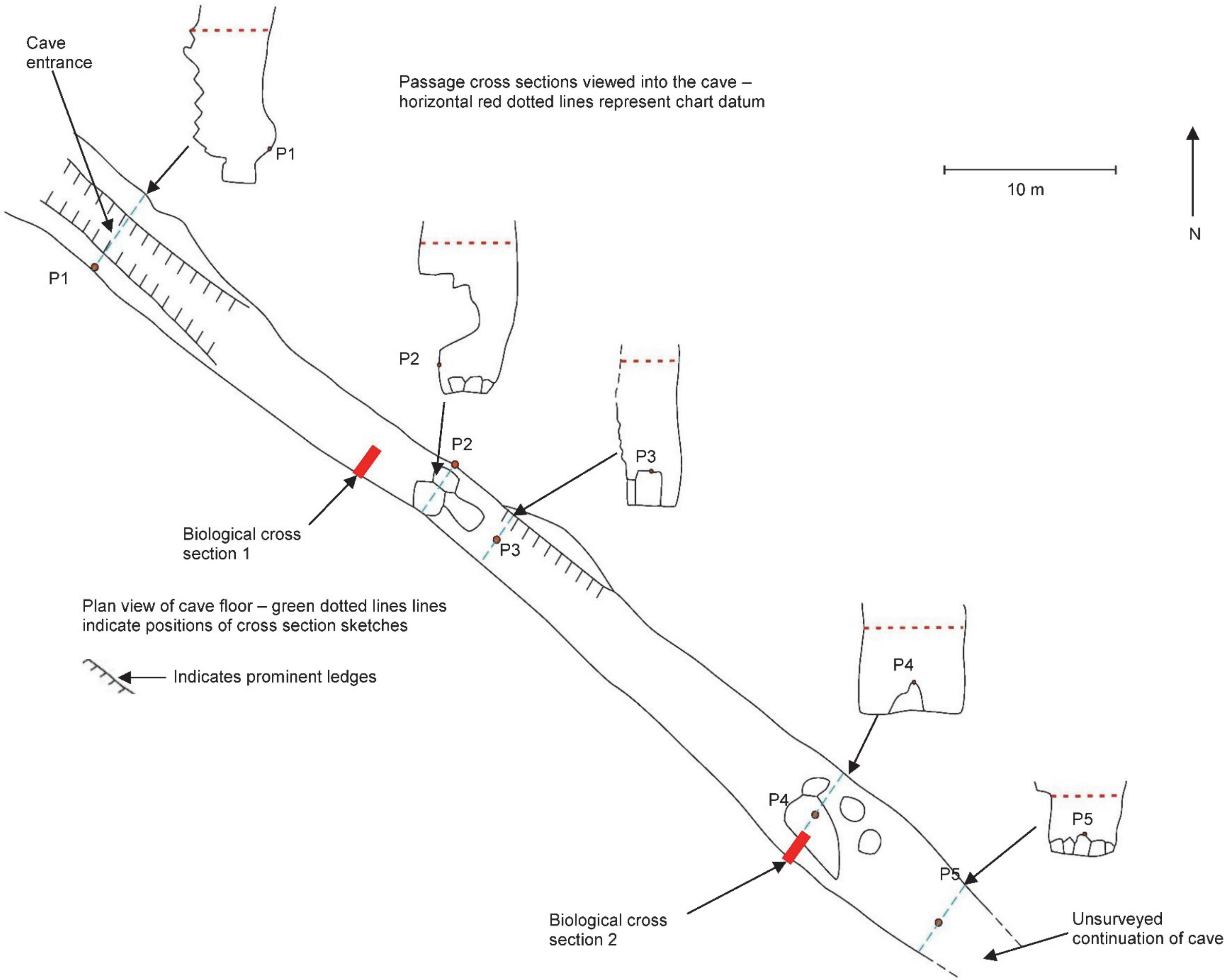
Piton 3 (snoopy-loop round boulder)



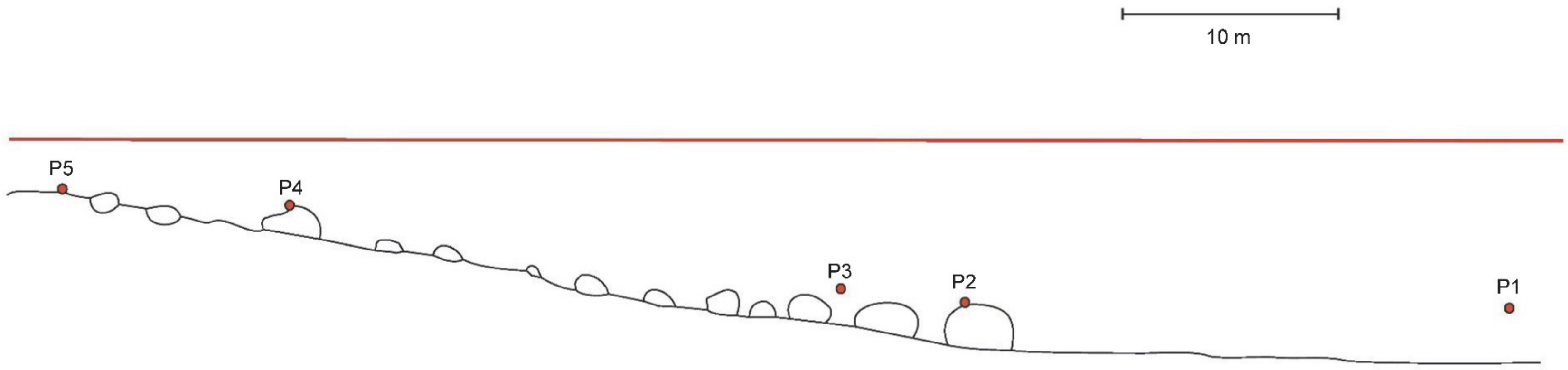
Piton 4

Piton 5 (line reel on boulder)

NR15 CV02 – Sgeildige M (‘C11’; ‘CI11’) – Physical survey



NR15 CV02 – Sgeildige M (‘C11’; ‘CI11’) – Physical survey (cont’d)



Side elevation - horizontal red line represents chart datum

NR15 CV02 – Sgeildige M ('C11'; 'CI11') – Biological summary – cross section 1 (right wall, ~20 m from entrance, 20 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral rock wall. Predominantly vertical.	+0.7	-4.3	Cave walls with tube turf, *Spirorbis (Spirorbis) tridentatus*, sponges, anemones & colonial ascidians. The tube turf was abundant but patchy. It appeared to be mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* were also present. *Spirorbis (Spirorbis) tridentatus* were frequent (locally common) and in most areas they were widely spaced rather than forming a continuous crust. A range of sponges were present. Frequent taxa included *Leuconia johnstoni* (locally abundant), *Grantia compressa* (locally common), *Halichondria (Halichondria) panicea* and *Myxilla (Myxilla) incrustans*. Among the anemones *Corynactis viridis* were frequent and occured in a few dense patches. *Metridium dianthus* were also frequent but tended to increase in density (becoming locally common) towards the top of the zone . A range of colonial ascidians were present and they were frequent overall. In the upper part of the zone there was also occasional foliose red algae and a locally frequent *Tubularia indivisa*.	**IR.FIR.SG** (not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
2	Sublittoral rock wall. Predominantly vertical.	-4.3	-7.8	Cave wall with common *Spirorbis (Spirorbis) tridentatus* which were widely spaced rather than forming a continuous crust. Tube turf was common but patchy. It appeared to be mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* were also present. Thin sponge crusts (*Halichondria (Halichondria) panicea*) were frequent but other biota were sparse.	**IR.FIR.SG.CC.BalPom**
3	Sandy floor of cave and base of walls to ~1.5 m above floor.	-7.8	-9.3	Cave floor with 100% cover of drift algae (mostly *Alaria esculenta*) to a thickness of ~30 cm. This drift algae was mobile in the wave surge and not obviously causing anoxia. Rock surfaces with with common *Spirorbis (Spirorbis) tridentatus* which were widely spaced rather than forming a continuous crust. Very little other obvious biota.	**IR.FIR.SG.CC.Mo**

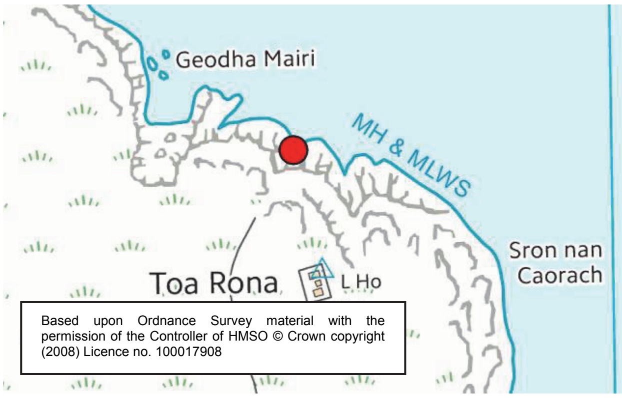
NR15 CV02 – Sgeildige M ('C11'; 'CI11') – Biological summary – cross section 1 (right wall, ~55 m from entrance, 55 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Sublittoral rock wall. Predominantly vertical.	0	-3.5	*Spirorbis (Spirorbis) tridentatus* were common (and locally abundant) but widely spaced at all levels of the wall. Tube turf was a major component with abundances ranging from common in lower parts of the zone to superabundant in upper areas. It appeared to be mainly formed by *Amphicorina* sp. but *Fabricia stellaris* and *Jassa falcata* were also present. Other biota tended to be concentrated in crevices and major representatives included generally frequent anemones (*Sagartia elegans*, *Actinia equina*, *Phellia gausapata* & *Corynactis viridis*) and generally occasional sponges (*Halichondria (Halichondria) panicea*, *Leuconia johnstoni* & *Grantia compressa*). In upper parts of the wall there were increased numbers of *Metridium dianthus* (locally common) and a few small patches of *Tubularia indivisa* (rare).	**IR.FIR.SG.CC.BalPom** (locally becoming **IR.FIR.SG.CrSpAsAn)**
2	Cave floor of cobbles & unstable boulders as well as large boulders / bedrock outcrops. Also including cave walls to ~1 m above floor.	-3.5	-4.5	Unstable boulders & cobbles were virtually barren. Larger boulders and bases of walls with common but widely spaced *Spirorbis (Spirorbis) tridentatus*. Other biota generally sparse and restricted to crevices & protected gaps between boulders. Numerous small groups of *Actinia equina* (frequent) and occasional small patches of sponge.	**IR.FIR.SG.CC.Mo**

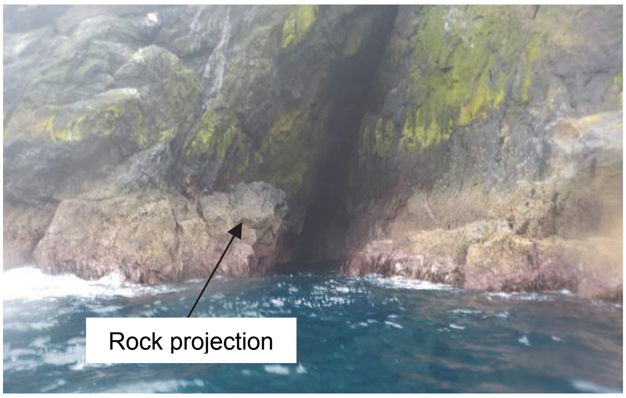
Annex 7C – NR15 CV03 – Geodha Mairi E

Cave relocation sheet

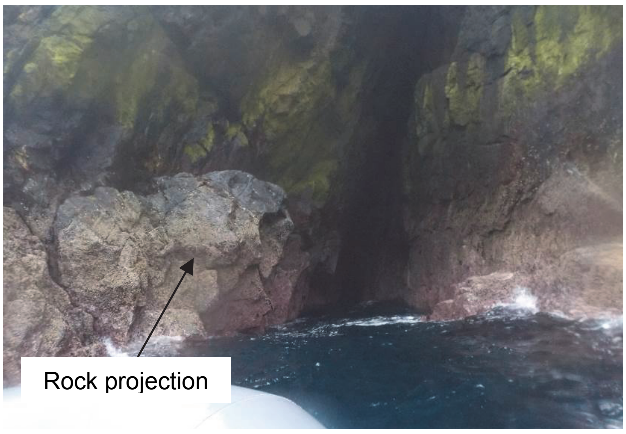
Cave name	Geodha Mairi E ('Jo's Cave')
Site code	NR15 CV03 ('CI 24')
Position of entrance	59.12237° N 5.815317° W
How start point is marked	Excessive wave surge & time constraints prevented the placement of an intertidal relocation piton. The start point is located directly below the outer margin of a prominent rock projection on the left hand wall.
Notes on relocation	Use coordinates provided to locate large obvious cave entrance in base of cliff. Look on left hand (E) wall just within entrance for the obvious rock projection. Start point is directly below this point.
Access	by boat



Cave location



Entrance looking ~south from 59.12253° N 5.815316° W.
Tidal rise ~1.0 m BCD.



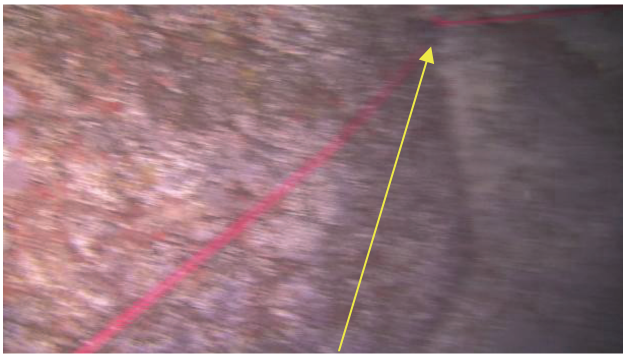
Entrance at 59.12237° N 5.815317° W.
Tidal rise ~1.2 m BCD.

Cave datum line relocation information

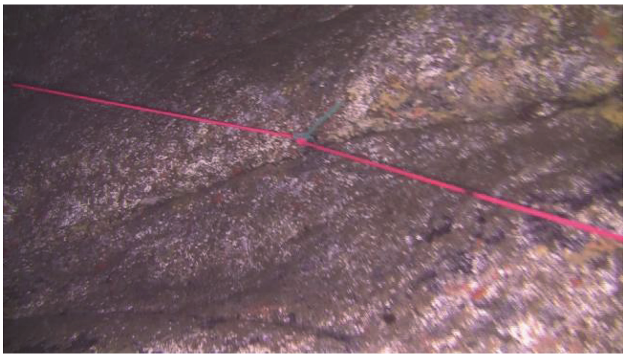
Cave name	Geodha Mairi E ('Jo's Cave')
Site code	NR15 CV03 ('CI 24')
Position of piton 1	Piton 1 is in a vertical rock crevice in the left wall of the cave some 2 m above the cave floor at a depth of 15.5 m BCD.

Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1	15.5	10	0	195
Piton 2	13.1	6	10	220
Piton 3	12.8	17	16	170
Piton 4	11.1	5	33	180
Piton 5	9.3	8	38	190
Piton 6	7.4	18	46	160
Piton 7	9.0	n/a	64	n/a

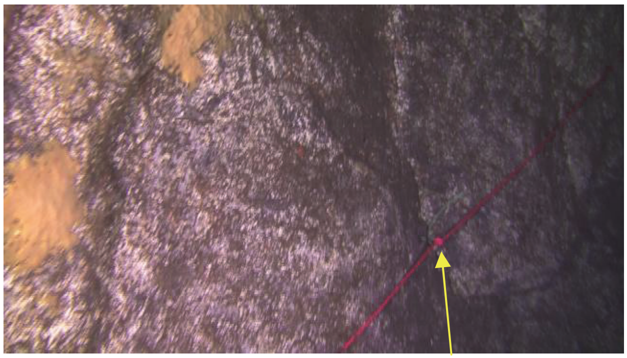
Piton 1



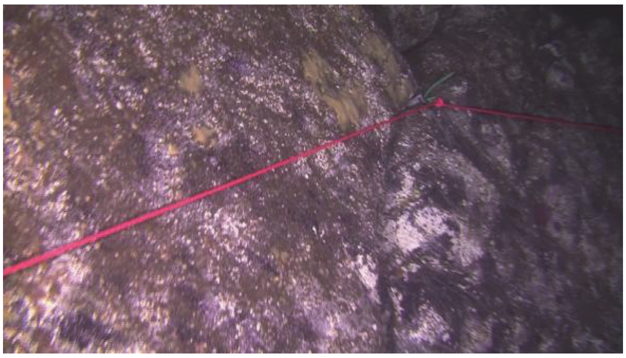
Piton 2



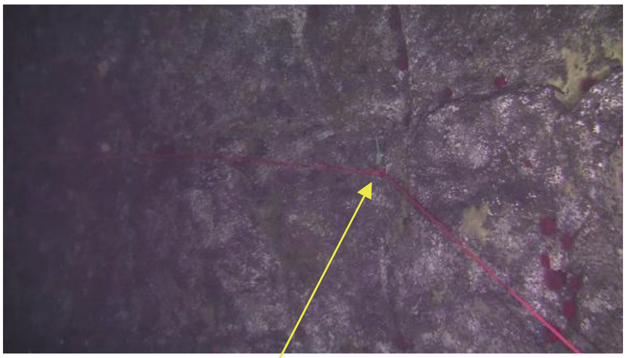
Piton 3



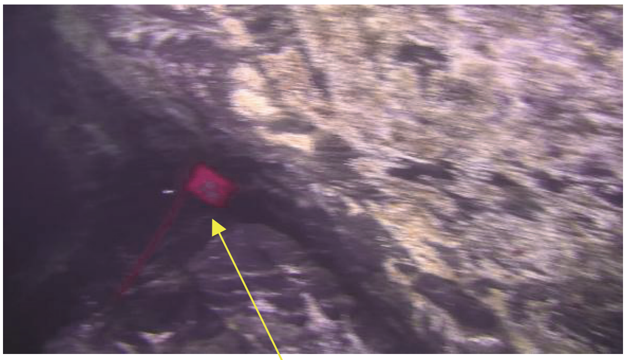
Piton 4



Piton 5

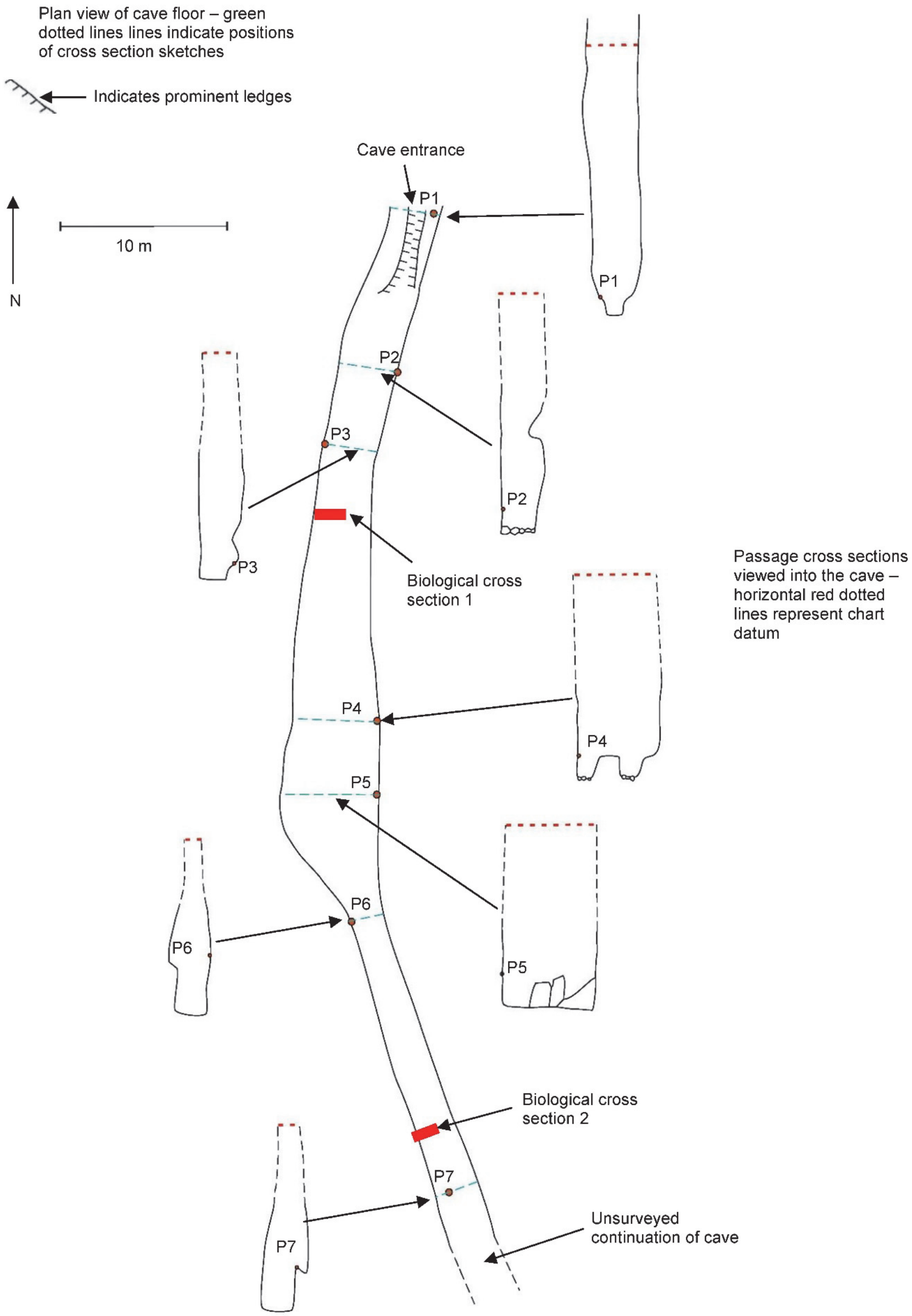


Piton 6

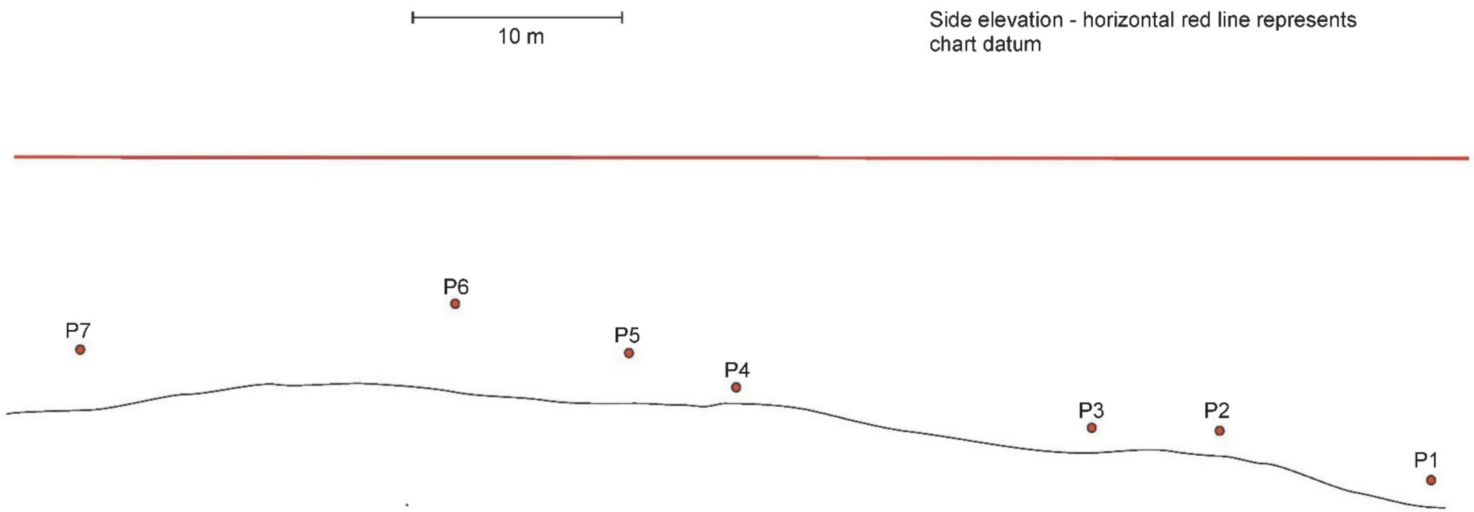


Piton 7

NR15 CV03 – Geodha Mairi E ('Jo's Cave'; 'CI24') – Physical survey



NR15 CV03 – Geodha Mairi E (‘Jo’s Cave’; ‘CI24’) – Physical survey (cont’d)



NR15 CV03 – Geodha Mairi E ('Jo's Cave'; 'CI24') – Biological summary – cross section 1 (right wall, ~20 m from entrance, 20 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Cave wall. Predominantly vertical.	-1	-14	Overall, the cave wall was a complex mosaic of sponges & colonial ascidians with a trend of increasing diversity and abundance with increasing height on the wall. The lower ~2 m of the zone had a relatively sparse biota with *Spirorbis (Spirorbis) tridentatus* common (as they were over most parts of the zone), bryozoan crusts more abundant (frequent) than in the upper parts of the zone and other taxa (tube turf of *Amphicorina* sp & *Jassa falcata* (occasional), various sponge crusts (occasional overall) and dideminids (rare)) less abundant than they were in the upper parts of the zone. Above ~12 m BCD the biota became distinctly more diverse and profuse. Sponge crusts became frequent rising to abundant further up the wall with *Halichondria (Halichondria) panicea* predominating. Other taxa increasing in abundance included *Didemnum maculosum* (locally frequent), tube turf of *Amphicorina* sp & *Jassa falcata* (locally abundant), *Grantia compressa* (locally common) and *Sagartia elegans* (locally common). Sparse *Metridium dianthus* (occasional) and *Tubularia indivisa* (rare) also appeared in the shallower part of the zone.	**IR.FIR.SG (**not a clear match to any biotope, closest to **IR.FIR.SG.CrSpAsAn)**
2	Floor with drift algae and rounded boulders. Zone also covering cave walls to ~1 m above floor.	-14	-15	Rock surfaces virtually barren. Sparse *Spirorbis (Spirorbis) tridentatus* (frequent) were present on the lower wall as well as groups of *Actinia equina* (frequent) .	**IR.FIR.SG.CC.Mo**

NR15 CV03 – Geodha Mairi E (‘Jo’s Cave’; ‘CI24’) – Biological summary – cross section 2(right wall, ~60 m from entrance, 60 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Cave wall. Predominantly vertical.	-5	-9	In the lower part of the zone (below ~7.5 m BCD) there were patches of dense *Spirorbis (Spirorbis) tridentatus* (common, locally superabundant) covering 20-30% of the rock surface, numerous *Actinia equina* (frequent, locally common) concentrated in protected crevices and a sparse cover (occasional) of tube turf of *Amphicorina* sp & *Jassa falcata*. In the upper part of the zone (above ~7.5 m BCD) the *Spirorbis (Spirorbis) tridentatus* cover became more continuous (abundant, locally superabundant), there were fewer *Actinia equina* (occasional) and slightly more tube turf (frequent). Other biota was generally sparse and the community appeared impoverished.	**IR.FIR.SG.CC.BalPom**
2	Floor with sand patches and rounded boulders. Zone also covering cave walls to ~1 m above floor.	-9	-11	Rock surfaces virtually barren. Sparse *Spirorbis (Spirorbis) tridentatus* (frequent) were present on the lower wall and groups of *Actinia equina* (frequent) occured in protected crevices.	**IR.FIR.SG.CC.Mo**

ANNEX 8: NORTH RONA CAVE SPECIES ABUNDANCE DATA (SACFOR)

Annex 8A – NR15 CV01

Taxa	CV01.1.1	CV01.1.2	CV01.1.3	CV01.1.4	CV01.1.5	CV01.2.1
Cryptopleura ramosa			O	C		
Delesseria sanguinea				R		
Hypoglossum hypoglossoides				F		
Polysiphonia sp.			F			
Corallina officinalis		F	F			
Plocamium cartilagineum		R				
Lomentaria clavellosa			F			
Porphyra sp.	C					
Algae (foliose reds)			A			
Corallinales (crusts)		S	A	C		A (loc S)
Algae (red crusts)			C			
Dictyota dichotoma		R	R	P		
Alaria esculenta		S				
Laminaria digitata		O				
Leuconia johnstoni				F	O	
Clathrina coriacea		R	F	F	F	R
Grantia compressa						R
Leucosolenia complicata		R	F	F	F	O
Aplysilla sulfurea			R			
Amphilectus fucorum		R	O	O	F (loc A upr)	R
Phorbas fictitius					R	
Antho (Acarnia) coriacea					O	
Mycale (Aegogropila) rotalis				O		
Myxilla (Myxilla) incrustans				F	F	
Halichondria (Halichondria) bowerbanki				O		
Halichondria (Halichondria) panicea		F	F	F	F (loc A upr)	O (loc C)
Pachymatisma johnstonia					O	R
Oscarella lobularis					R	
Mycale (carmia) macilenta					P	
Urticina felina						P
Metridium dianthus		F	F (loc C)	F (loc C)	loc C (upr)	
Actinothoe sphyrodeta						R
Phellia gausapata					F	R
Sagartia elegans			O	F (loc C)	loc F (upr)	O
Corynactis viridis			F (loc C)	F (loc C)	loc C (upr)	
cf Eudendrium sp.				R	O	
Tubularia indivisa			O			
Plumularia setacea			F	O	F	R
Abietinaria filicula		R	F			
Sertularella ?rugosa/tenella		R				
Lineus longissimus		P				
Filograna implexa		R			R	
Spirobranchus triqueter			O	F	F	F
Serpula vermicularis				P		
Spirorbinae indet.				F	F	A
Mytilus edulis	R	R				
Anomiidae				P	P	
Aplysia punctata				P		

Taxa	**CV01.1.1**	**CV01.1.2**	**CV01.1.3**	**CV01.1.4**	**CV01.1.5**	**CV01.2.1**
Trivia monacha				R		
Doris pseudoargus				R	R	
Limacia clavigera				P		
Calliostoma zizyphinum			O	O	O	
Tectura sp.						R
Patella sp.	C	F	O		loc O (upr)	Loc O (upr)
Acanthochitona sp.		R				
Caprella linearis			C			
Jassa falcata (tubes)			F	F	P	C
Cancer pagurus			F			R
Galathea strigosa				R	O	
Endeis spinosa					P	
Sessilia indet.					R	
Semibalanus balanoides	A	F				loc A (upr)
Balanus crenatus		O	F	O		O (loc F)
Verruca stroemia				R		O (loc F)
Schizomavella (Schizomavella) linearis			F	O	F	
Celleporina sp.			R	R		
Celleporidae				R		
Parasmittina trispinosa				R		
Oshurkovia littoralis		R	R	R		
Crisia cf eburnea			F	F		
Crisidia cornuta				F	O	
Plagioecia patina					O	
Bryozoa (white crusts)						O
Bryozoa (pink crusts)						R
Asterias rubens			O	O	O	O
Marthasterias glacialis					R	
Henricia oculata				R	R	R
Amphipholis squamata			F	O	O	
Ophiopholis aculeata						R
Didemnum maculosum		R	O	F	F (loc C)	R?
Diplosoma listerianum		R	R	R	O	
Lissoclinum perforatum		R	R	R	O	R
Aplidium nordmanni				R		
Polyclinum aurantium		R	R	R	R	R
Aplidium elegans?					R	
Botrylloides leachii		R	R	O	R	R
Botryllus schlosseri				R		
Dendrodoa grossularia				R	R	
Taurulus bubalis				O	F	
Chirolophis ascanii						R

Annex 8B – NR15 CV02

Taxa	CV02.1.1	CV02.1.2	CV02.1.3	CV02.2.1	CV02.2.2
Corallina officinalis	loc O (upr)				
Phyllophora crispa	loc O (upr)				
Corallinales (crusts)	O	R			
Leuconia johnstoni	F (loc A)	R		O	
Clathrina coriacea	O	R		R	
Grantia compressa	F (loc C)	O		O (loc C - crev)	O
Leucosolenia complicata	R			R	R
Hymedesmia (Stylopus) coriacea				R	
Myxilla (Myxilla) incrustans	F	R		R (loc C - upr)	
Halichondria (Halichondria) panicea	F	F		F	R
Hymeniacidon perlevis	F				
Pachymatisma johnstonia	R				
Antho (Acarnia) coriacea	R				
Actinia equina	R	R	P	F (loc A crev)	F (loc C crev)
Urticina felina				R	
Metridium dianthus	F (loc C upr)			loc C (upr)	
Actinothoe sphyrodeta	R?	R?			
Phellia gausapata	O			O (loc C upr)	
Sagartia elegans	O			F (loc C upr wall & A crev)	
Corynactis viridis	loc F			R (loc C crev)	
Tubularia indivisa	R (loc F upr)			loc R (upr)	
Diphasia cf fallax	F				
Plumularia setacea	P			P	
Lineus longissimus	P				
Amphicorina sp.	A	C		A	
Fabricia stellaris	P	P		P	
Spirobranchus triqueter		F			
Spirorbis (Spirorbis) tridentatus	F (loc C)	C	C	C (loc A)	F (loc C - walls, crev & lrg bldrs)
Aplysia punctata				R	
Trivia monacha	R				
Doris pseudoargus	R			R?	
Steromphala cineraria				R	
Cancer pagurus	O	P		O	
Galathea strigosa				O	
Necora puber				R	
Verruca stroemia	P	R		P	
Jassa falcata	C			C	
Celleporina sp.				O	
Cribrilina sp.				O	
Asterias rubens	P			R	
Amphipholis squamata	O				
Ophiopholis aculeata	R				
Didemnum maculosum	O	R		R	
Trididemnum sp.	R			R	
Lissoclinum perforatum	R	R		R	
Aplidium punctum	R			R	
Polyclinum aurantium	O	R			
Botrylloides leachii	O	R		R	R

Taxa	CV02.1.1	CV02.1.2	CV02.1.3	CV02.2.1	CV02.2.2
Botryllus schlosseri	R				
Dendrodoa grossularia	R				
Taurulus bubalis	O			O	

Annex 8C – NR15 CV03

Taxa	CV03.1.1	CV03.1.2	CV03.2.1	CV03.2.2
Corallinales (crusts)	R			
Leuconia johnstoni	O	R	R	
Clathrina coriacea	O			
Grantia compressa	loc C (upr)			
Leucosolenia complicata	R		R	
Amphilectus fucorum	F			
Hymedesmia (Stylopus) coriacea		R		
Myxilla (Myxilla) incrustans	O		R	
Halichondria (Halichondria) panicea	F (loc A upr)		R (loc F upr)	
Hymeniacidon perlevis	F			
Pachymatisma johnstonia	R			
Hymeniacidon kitchingi?	R			
Actinia equina	O	R	O (loc C crev)	F (loc C crev)
Urticina felina	R	F	R (crev)	
Metridium dianthus	O (upr)			
Actinothoe sphyrodeta	O			
Phellia gausapata	O			
Sagartia elegans	O (loc C upr)	R		
Corynactis viridis	O			
Tubularia indivisa	loc R (upr)			
Plumularia setacea	F			
Candelabrum cf cocksii	P			
Spirorbis (Spirorbis) tridentatus	C	F	C (loc S)	F
Amphicorina sp.	F (loc A upr)		O (loc F upr)	
Fabricia stellaris	P		P	
Anomiidae		R		
Trivia monacha	R			
Facelina auriculata	R	R		
Calliostoma zizyphinum	O			
Jassa falcata (tubes)	F (loc A upr)		O (loc F upr)	
Cancer pagurus	O	O	R	
Galathea sp.	R			
Necora puber	R	R		
Semibalanus balanoides	P			
Balanus balanus	R			
Balanus crenatus		R		
Verruca stroemia	P			
Schizomavella (Schizomavella) linearis	O (loc F lwr)			
Calloporidae indet.	R			
Celleporina sp.	O	O		
Crisiidae (turf)	R			
Bryozoa (white crusts)		O		
Asterias rubens	O			
Echinus esculentus	R			
Amphipholis squamata	F (crev)			
Ophiopholis aculeata	O (crev)			
Ophiothrix fragilis	R			
Didemnum maculosum	O (loc F)	O		
Diplosoma spongiforme	R		R	
Lissoclinum perforatum	R			
Polyclinum aurantium	O			
Aplidium turbinatum	R			
Botrylloides leachii	O			
Gadidae (juv)	O			
Taurulus bubalis	O	R		

ANNEX 9: LOCH ERIBOLL CAVE INVENTORY

This annex provides summary information on all known Loch Eriboll caves. Summary information is tabulated in Annex 9A. Cave locations are shown in the maps presented in Annex 9B. Details of caves visited in 2015 but not subject to full survey are shown in Annex 9C. Two caves were subject to detailed survey in 2015 and detailed information on these is provided in Annex 10.

Annex 9A – Tabulated records

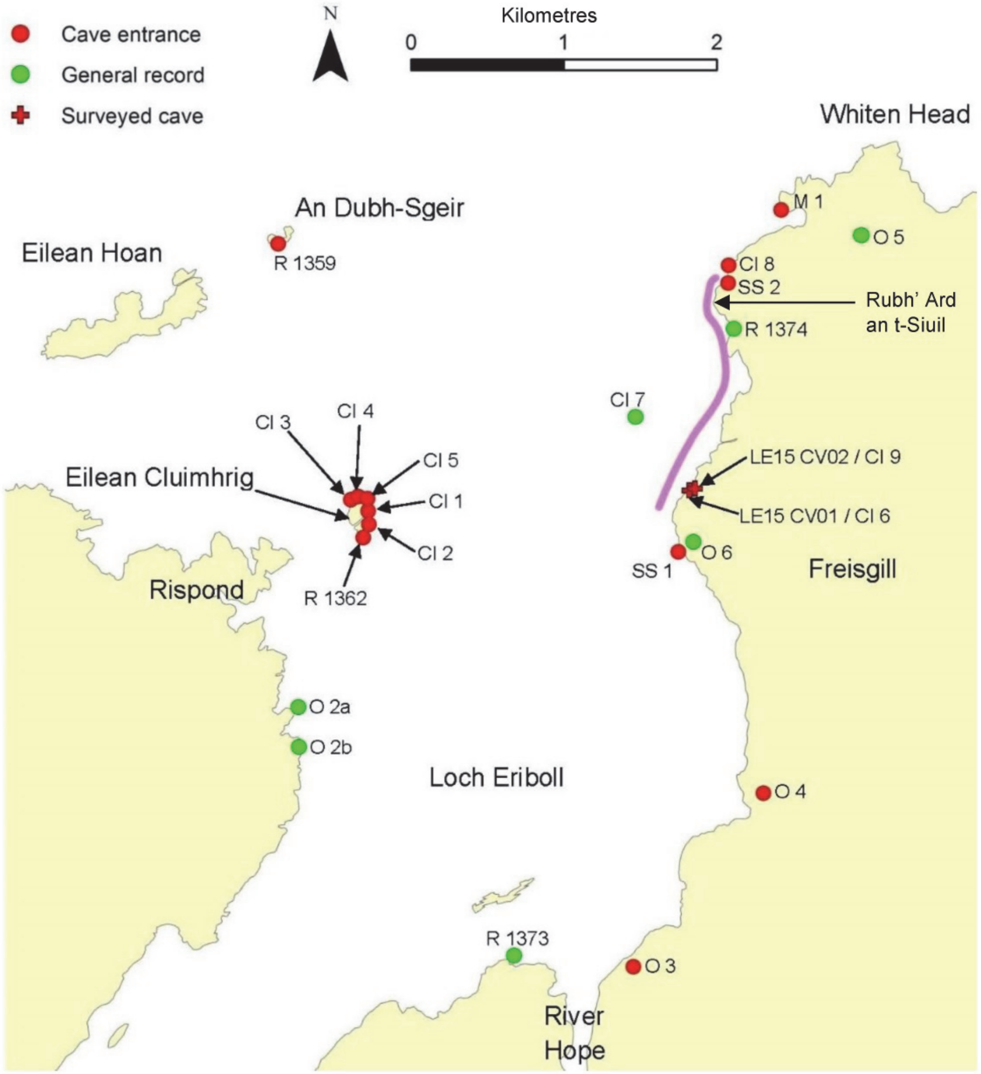
Site codes relate to the source of information as follows: 'CI XX' – visited in 2015; 'O X' - Oldham (2006); 'R X' – Ridley (1998); 'M X' – Moss (1986); 'SS X' – Seasearch 2011.

Site Code	Name	Source of record	Notes	Lat	Long
O 2a	S of Bagh Uamh Dhadhaidh 1	Oldham (2006)	Northern boundary of a series of 9 sea caves.	58.5411286	-4.6526030
O 2b	S of Bagh Uamh Dhadhaidh 2	Oldham (2006)	Southern boundary of a series of 9 sea caves.	58.5384372	-4.6523997
O 3	Geodha Meiril	Oldham (2006)	Length 30 m. Sea cave in cliffs near Geodha Meiril, about 70 feet. Not explored due to high seas.	58.5240644	-4.60837
O 4	Allt an t-Strathain Waterfall Cave	Oldham (2006)	Allt an t-Strathain Waterfall Cave. Semi-circular entrance of height 12-15 m. Floor of shingle & pebbles (cave assumed to be intertidal).	58.5360756	-4.5920794
O 5	Whiten Head	Oldham (2006)	Whiten Head - a splendid perpendicular cliff, on the NE side of which is a fine series of sea caves	58.5740342	-4.581125
O 6	Uamh Freisgill	Oldham (2006)	Mentions a series of 6 sea caves below the summit of Cnoc nan Gathar (NB I'm unable to find this place name). Number 3 is called Uamh Freisgill. Uamh Freisgill - "Length 120 m. A 20 m square passage for most of its length." Historical accounts are noted. (NB some accounts appear exaggerated in terms of passage dimensions – it is possible that these accounts actually refer to caves near Whiten Head).	58.5529483	-4.6019219
R 1359	An Dubh-Sgeir, SE side	Ridley (1998)	"The cave penetrates perhaps 100 m, with mussel covered walls and no sediment. Then it comes to a dead end."	58.5724931	-4.6566966
R 1362	Eilean Cluimhrig, S end.	Ridley (1998)	"bedrock with overhangs & caves at depths of about 25 m"	58.5527	-4.64473
R 1373	Rubh' a' Mhuilt.	Ridley (1998)	"an area with lots of interesting-looking clefts and sea caves. Unexplored"	58.5246469	-4.6238733
R 1374	Geodh' a' Bhrideoin, Whiten Head.	Ridley (1998)	"An area of ragged caves and natural arches which can be explored by a small boat. The main system has 3 entrances and is 20 m deep."	58.56749	-4.59732
CI 1	Eilean Cluimhrig. Site 1.	Assessed from inflatable boat 3rd Aug 2015. Cave not entered.	Prominent rock bridge / arch beyond which is a potential cave entrance (not entered due to wave surge). Water depth outside entrance ~7 - 8 m BCD shallowing to ~3-6 m BCD near the arch. Likely to consist of wave surged communities.	58.554506	-4.644174

Site Code	Name	Source of record	Notes	Lat	Long
CI 2	Eilean Cluimhrig. Site 2.	Assessed from inflatable boat 3rd Aug 2015. Cave not entered.	Low, square-cut cave entrance (not entered due to wave surge) a few metres south of a large open rock arch that passes through the island. Water depth outside entrance ~3 - 4 m BCD. Additional potential entrances present to the north of the rock arch appear very shallow and were wave surged at the time of survey. Likely to consist of wave surged communities.	58.553597	-4.64405
CI 3	Eilean Cluimhrig. Site 3.	Assessed from inflatable boat 3rd Aug 2015. Cave not entered.	Entrance to narrow surge gully with potential for cave at rear (not entered due to wave surge). Water depth outside entrance ~0 m BCD. Likely to consist of wave surged communities.	58.555245	-4.646443
CI 4	Eilean Cluimhrig. Site 4.	Assessed from inflatable boat 3rd Aug 2015. Cave not entered.	Entrance to narrow surge gully with potential for cave at rear (not entered due to wave surge). Likely to consist of wave surged communities.	58.555474	-4.645518
CI 5	Eilean Cluimhrig. Site 5.	Assessed from inflatable boat 3rd Aug 2015. Cave not entered.	Entrance to narrow surge gully with potential for cave at rear (not entered due to wave surge). Water depth outside entrance ~9 - 10 m BCD. Likely to consist of wave surged communities.	58.555355	-4.644294
LE15 CV01 / CI 6	Uamh Freasgill 1	Surveyed by dive team on 4th Aug 2015	See Annex 10 for detailed description for **LE15 CV01**. Large cave >140 m in length.	58.556426	-4.602586
CI 7	NE shores of Loch Eriboll	Shore viewed from inflatable boat on 4th Aug 2015	Waypoint is the viewpoint position of a series of photographs covering a ~1.5 km stretch of the NE shoreline of Loch Eriboll extending from the position of LE15 CV01 in the south to the position of cave inventory site 8 in the north. Images show numerous apparent cave entrances along this stretch of shore.	58.561337	-4.609806
CI 8	Caves north of Geodh' a' Bhrideoin	Assessed from inflatable boat 4th Aug 2015. Cave entered by snorkeler.	Series of large open caves and tunnels on the south side of a large, dramatic rock arch. Entered by snorkeler.	58.570575	-4.598192
LE15 CV02 / CI 9	Uamh Freasgill 2	Surveyed by dive team on 5th Aug 2015	See Annex 10 for detailed description for **LE15 CV02**. Large cave >65 m in length.	58.556552	-4.601861
M 1	Mol Mhor (Loch Eriboll)	Moss 1986	"A sea cave with entrance about 5 m above sea level with one small rockmill in sea bed and one larger rockmill in the entrance. Cave narrowed rapidly to water level in a gully about 6 - 7 m long. Many small red and large brown (*Alaria*) algae. Walls dominated by encrusting sponges and colonial ascidians. (IR.FIR.SG.CrSpAsDenB)"	58.5756211	-4.5915634
SS 1	Freisgill Head	Seasearch survey 2011	"Faunal turf on vertical bedrock rock wall in mouth of large cave/gully (cave arch above water, so lots of light). Short animal turf consisting of various sponges, hydroids and sea squirts. (CR.HCR.XFa.SpAnVt)"	58.5522365	-4.603846
SS 2	Rubh Ard An Tsiuil	Seasearch survey 2011	"Kelp and faunal turf on rock reef. Bedrock outcrops and gullies from 10m to 21m with cobbles, pebbles and boulders in the bottom of gullies. Sea caves present but not surveyed."	58.5717862	-4.5981945

Annex 9B – Location map

Outline map of Loch Eriboll showing location of cave sites based on historical records and direct observation. Purple line shows coastal panorama viewed from location CI 7 and depicted in Annex 9c.

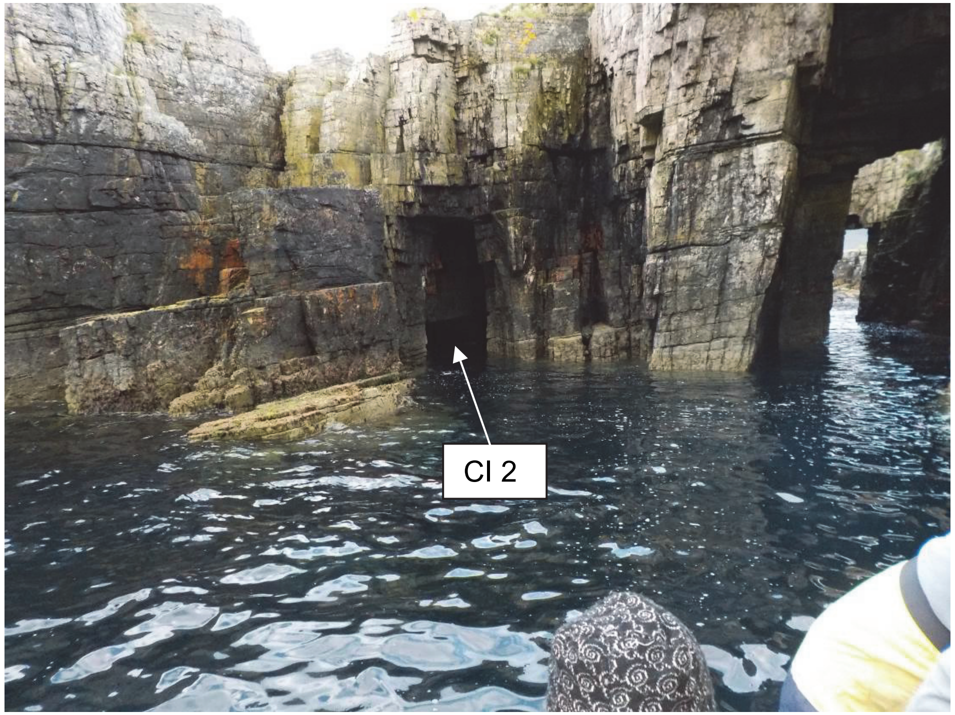


Annex 9C – Notes and images

Site Cl 1
(tidal rise 2.8 m)

Eilean Cluimhrig.
Site 1.
Prominent rock bridge / arch beyond which is a potential cave entrance (not entered due to wave surge). Water depth outside entrance ~7 - 8 m BCD shallowing to ~3 - 6 m BCD near the arch. Likely to consist of wave surged communities.

Site CI 2
(tidal rise 3.0 m)



Eilean Cluimhrig. Site 2.
Low, square-cut cave entrance (not entered due to wave surge) a few metres south of a large open rock arch that passes through the island. Water depth outside entrance ~3 - 4 m BCD. Additional potential entrances present to the north of the rock arch appear very shallow and were wave surged at the time of survey. Likely to consist of wave surged communities.

Site CI 3
(tidal rise 3.3 m)

Eilean Cluimhrig.
Site 3.
Entrance to narrow surge gully with potential for cave at rear (not entered due to wave surge). Water depth outside entrance ~0 m BCD. Likely to consist of wave surged communities.

Site Cl 4
(tidal rise 3.4 m)

Eilean Cluimhrig.
Site 4.
Entrance to narrow surge gully with potential for cave at rear (not entered due to wave surge). Likely to consist of wave surged communities.

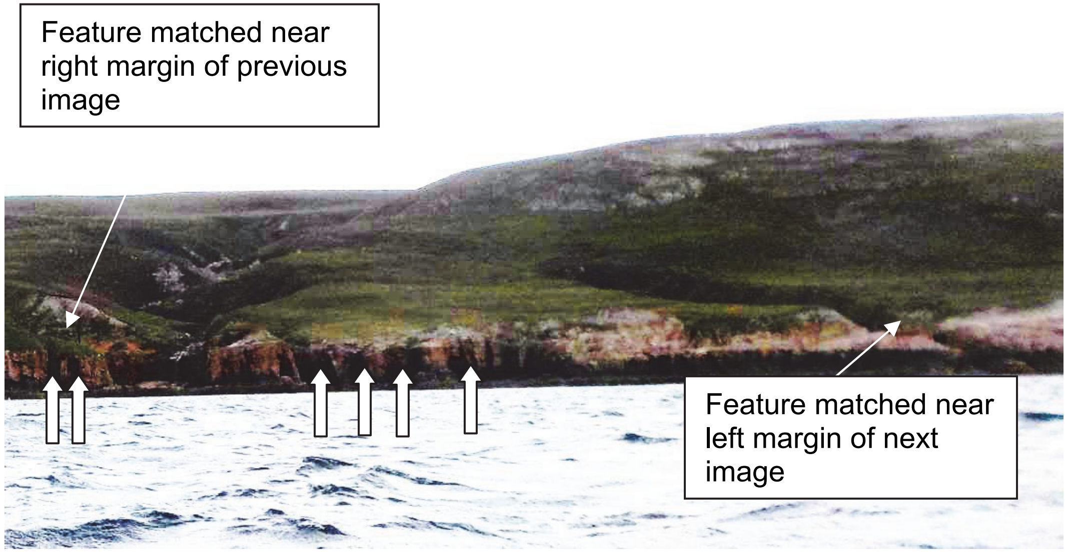
Site Cl 5
(tidal rise 3.4 m)

Eilean Cluimhrig.
Site 5.
Entrance to narrow surge gully with potential for cave at rear (not entered due to wave surge). Water depth outside entrance ~9 - 10 m BCD. Likely to consist of wave surged communities.

Site CI 7 (1 of 3)
(tidal rise 1.3m)

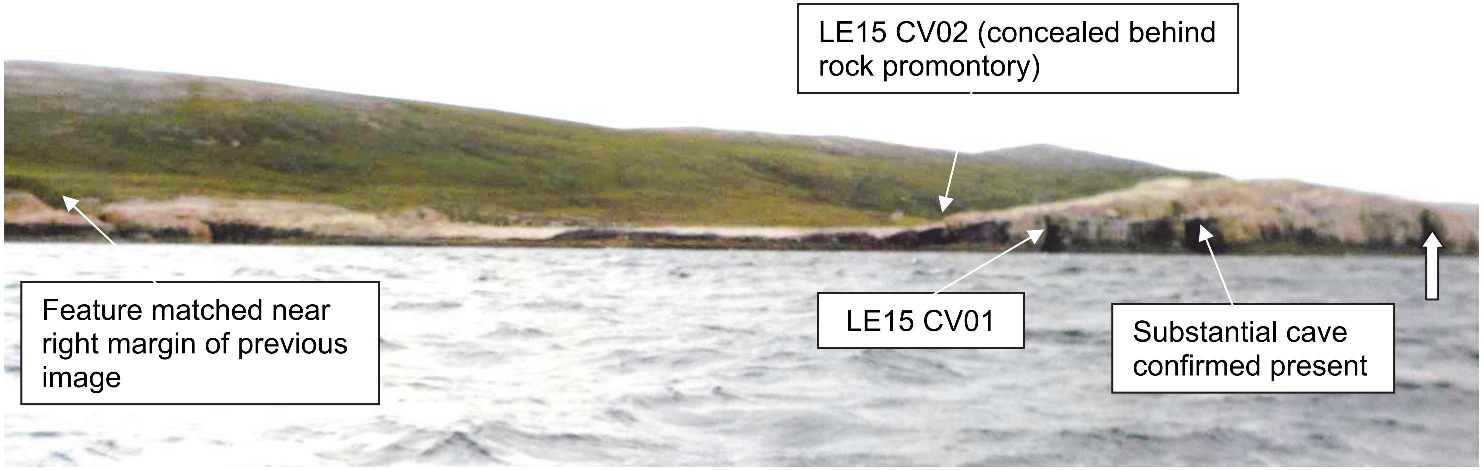
NE shores of Loch Eriboll
First of three photographs covering a ~1.5 km stretch of the NE shoreline of Loch Eriboll extending from the position of LE15 CV01 to the position of CI 8. Images show numerous apparent cave entrances along this stretch of shore. Unlabelled arrows indicate possible cave entrances.

Site CI 7 (2 of 3)
(tidal rise 1.3m)



NE shores of Loch Eriboll
Second of three photographs covering a ~1.5 km stretch of the NE shoreline of Loch Eriboll extending from the position of LE15 CV01 to the position of CI 8. Images show numerous apparent cave entrances along this stretch of shore. Unlabelled arrows indicate possible cave entrances.

Site CI 7 (3 of 3)
(tidal rise 1.3m)



NE shores of Loch Eriboll
Third of three photographs covering a ~1.5 km stretch of the NE shoreline of Loch Eriboll extending from the position of LE15 CV01 to the position of CI 8. Images show numerous apparent cave entrances along this stretch of shore. Unlabelled arrows indicate possible cave entrances.

Site CI 8 (1 of 3)
(tidal rise 1.2 m)

Caves north of Geodh' a' Bhrideoin
Series of large open caves and tunnels on the south side of a large, dramatic rock arch. Entered by snorkeler.

Site CI 8 (2 of 3)
(tidal rise 1.2 m)

Caves north of Geodh' a' Bhrideoin
Series of large open caves and tunnels on the south side of a large, dramatic rock arch. Entered by snorkeler.

Site CI 8 (3 of 3)
(tidal rise 1.2 m)

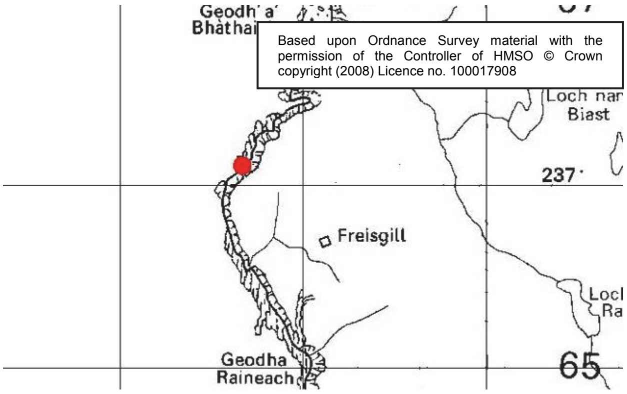
Caves north of Geodh' a' Bhrideoin
Series of large open caves and tunnels on the south side of a large, dramatic rock arch. Entered by snorkeler.

ANNEX 10: LOCH ERIBOLL CAVE SITE RELOCATION DETAILS WITH PHYSICAL AND BIOLOGICAL DATA

Annex 10A – LE15 CV01 – Uamh Freasgill 1

Cave relocation sheet

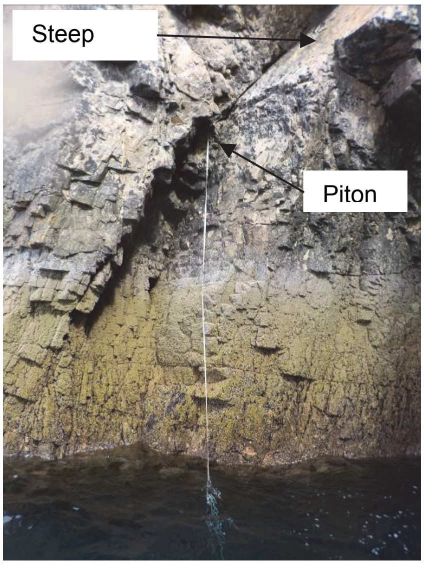
Cave name	Uamh Freasgill 1 ('Loch Eriboll Cave 1')
Site code	LE15 CV01 ('CI 6')
Position of entrance	58.556426° N 4.602586° W
How start point is marked	Galvanised relocation piton in prominent near-vertical crevice in northern (left) wall at about 6.3 m ACD just before the point at which the cave roof closes over.
Notes on relocation	Look for the corner between the cliff face and the left wall of the cave. On the corner is a steep slab below a rock overhang. The crevice runs down the left hand boundary of the slab (see photos).
Access	by boat



Cave location

View of entrance from 58.556668° N 4.603049° W, 140° M. Tidal rise ~4.8 m ACD

View of er om 58.55652° N 4.602722° W, 120° M. ~4.8 m ACD

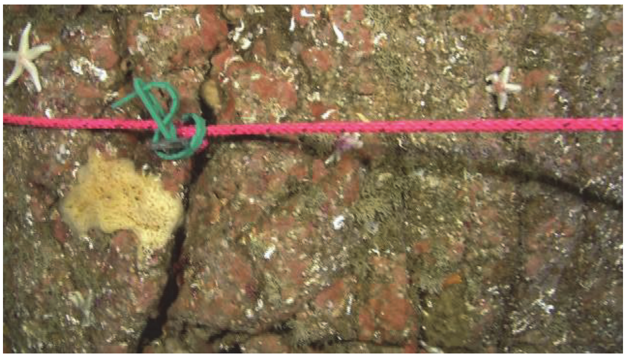


View of relocation piton.
Tidal rise ~2.2 m ACD

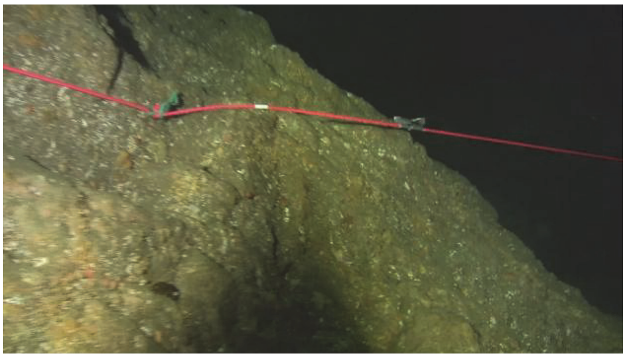
Cave datum line relocation information

Cave name	Uamh Freasgill 1 (‘Loch Eriboll Cave 1’)
Site code	LE15 CV01 (‘CI 6’)
Position of piton 1	Directly below relocation piton search at 9.2 m BCD.

Piton number	Depth of piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1	9.2	8	0	145
Piton 2	9.8	27	8	130
Piton 3	8.2	17	35	135
Piton 4 (floor cobble)	5.7	32	52	145
Piton 5 (floor cobble)	3.8	16	84	130
Piton 6 (floor cobble)	3.0	N/A	100	N/A



Piton 2



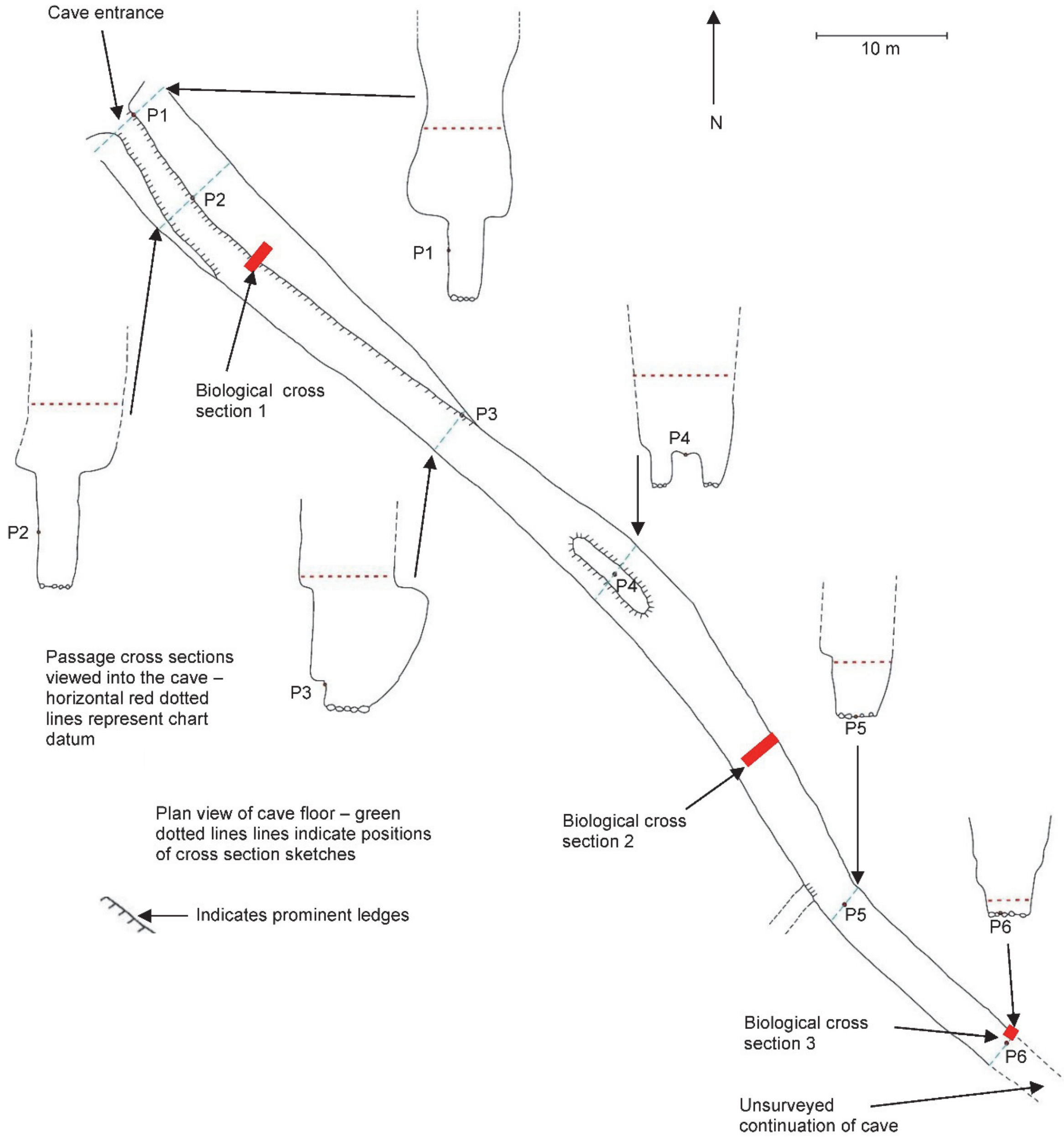
Piton 3

Piton 4

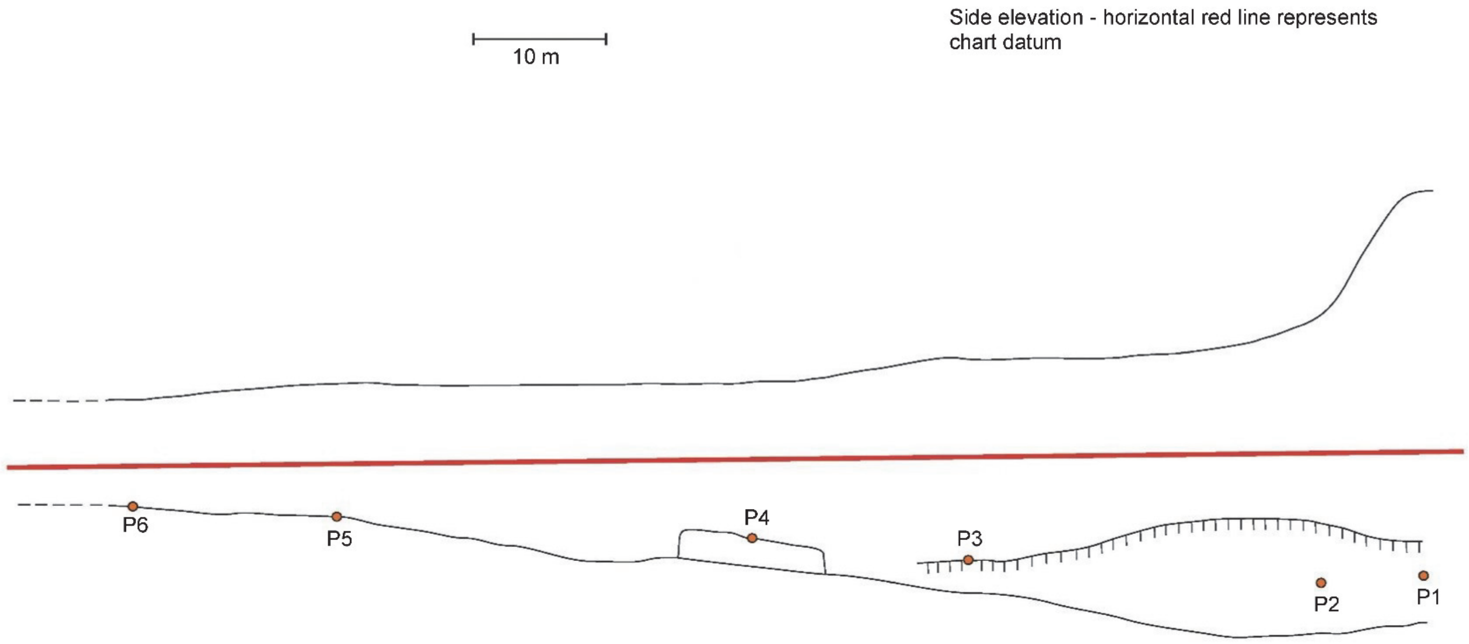
Piton 5

Piton 6

LE15 CV01 - Uamh Freasgill 1 ('Eriboll Cave 1'; 'CI6') – Physical survey



LE15 CV01 - Uamh Freasgill 1 (‘Eriboll Cave 1’; ‘Cl6’) – Physical survey (cont’d)



LE15 CV01 – Uamh Freasgill 1 (‘Eriboll Cave 1’; ‘CI6’) – Biological summary – cross section 1 (left wall, ~15 m from entrance, 15 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Supralittoral walls & ceiling. Steep & overhanging bedrock	~+9.5	+4.5	Common or abundant crusts of *Hildenbrandia* sp. & *Verrucaria* sp.	**LR.FLR.CvOv.VmucHil** Barren Rock
2	Supralittoral wall. Predominantly vertical.	+4.5	+4.2	Abundant *Verrucaria* sp., common *Hildenbrandia* sp. and occasional *Semibalanus balanoides*.	**LR.FLR.CvOv.VmucHil**
3	Eulittoral wall. Predominantly vertical.	+4.2	+1.5	Abundant *Semibalanus balanoides*, frequent *Patella vulgata* and occasional juvenile *Mytilus edulis*.	**LR.HLR.MusB.Sem.Sem**
4	Upper sublittoral wall. Predominantly vertical.	+1.5	-11.7	Mixed faunal crusts dominated by frequent colonial ascidians and a variety of sponges which were most abundant in the upper part of the zone. *Halichondria (Halichondria) panicea* in particular was locally common on the upper wall. Clumps of foliose red algae were frequent in shallow areas.	**IR.FIR.SG.CrSpAsDenB**
5	Lower sublittoral wall & floor. Scoured rock & cobbles.	-11.7	-13.8	Scoured rock surfaces. Sessile epibiota very sparse. Rare mobile epibiota included *Cancer pagurus* and *Asterias rubens*.	**IR.FIR.SG.CC.Mo**

LE15 CV01 – Uamh Freasgill 1 (‘Eriboll Cave 1’; ‘CI6’) – Biological summary – cross section 2 (left wall, ~70 m from entrance, 70 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Eulittoral wall. Predominantly vertical.	+4.2	+1.2	Superabundant *Semibalanus balanoides*.	**LR.HLR.MusB.Sem.Sem**
2	Upper sublittoral wall. Predominantly vertical.	+1.2	-4.3	Abundant *Dendrodoa grossularia* with common *Clathrina coriacea* dominated most areas. Occasional colonial ascidians, sponges and *Spirorbis (Spirorbis) tridentatus*.	**IR.FIR.SG.DenCcor**
3	Lower sublittoral wall & floor. Scoured rock & cobbles.	-4.3	-5.8	Scoured rock surfaces. Sessile epibiota very sparse.	**IR.FIR.SG.CC.Mo**

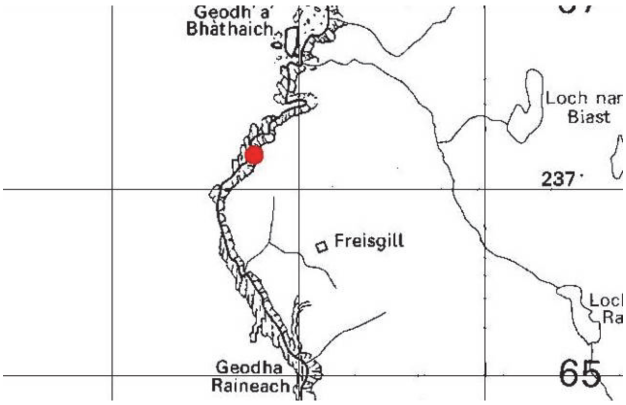
LE15 CV01 – Uamh Freasgill 1 (‘Eriboll Cave 1’; ‘CI6’) – Biological summary – cross section 3 (left wall, ~100 m from entrance, 100 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Eulittoral wall. Predominantly vertical.	+3.9	+2.4	Occasional *Semibalanus balanoides* and frequent *Actinia equina*.	**LR.HLR.MusB.Sem.Sem**
2	Upper sublittoral wall. Predominantly vertical.	+2.4	-3.1	Common *Spirorbis (Spirorbis) tridentatus* tubes and abundant tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*) dominated most surfaces. Occasional sponge crusts and colonial ascidians.	**IR.FIR.SG.CC.BalPom**
3	Lower sublittoral wall & floor. Scoured rock & cobbles.	-3.1	-3.6	Scoured rock surfaces. Sessile epibiota very sparse.	**IR.FIR.SG.CC.Mo**

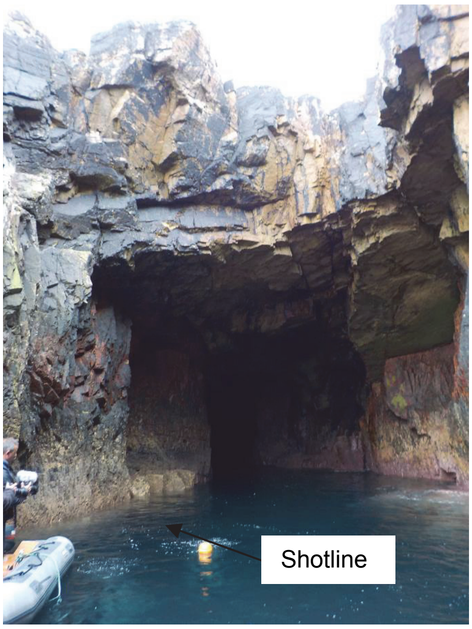
Annex 10B – LE15 CV02 – Uamh Freasgill 2

Cave relocation sheet

Cave name	Uamh Freasgill 2 (‘Eriboll Cave 2’)
Site code	LE15 CV02 (‘CI 9’)
Position of entrance	58.556552° N 4.601861° W
How start point is marked	No fixed marked was placed. Start point was a shotline deployed in the centre of the cave entrance directly below the roof closure.
Notes on relocation	Entrance is concealed behind a small rocky promontory when approaching from the west. Go round the north of the promontory into a small rocky embayment. An obvious wide gully runs southward behind the promontory and leads directly to the cave entrance.
Access	by boat



Cave location

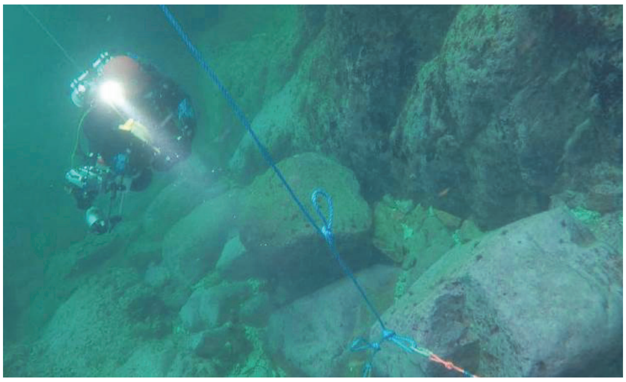


Entrance showing position of the shotline that marks the survey start point. Taken near position of entrance coordinates. Tidal rise ~2.4 m BCD.

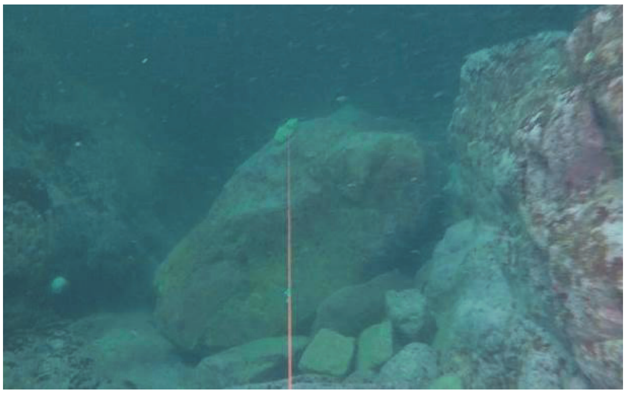
Cave datum line relocation information

Cave name	Uamh Freasgill 2 ('Eriboll Cave 2')
Site code	LE15 CV02 ('CI 9')
Position of piton 1	Position of shotline at the centre of the entrance directly below where the cave roof begins.

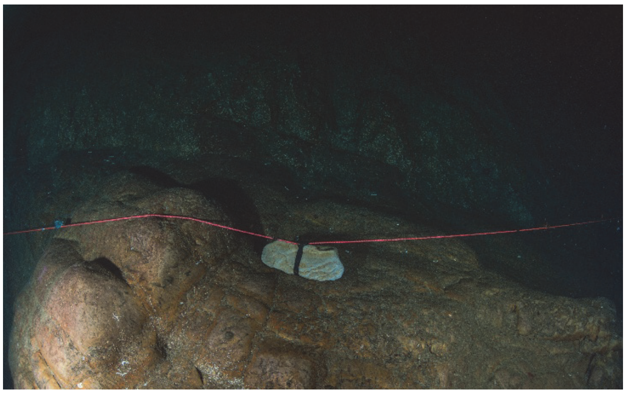
Piton number	Depth of Piton (metres below chart datum)	Distance (m) to next piton	Distance (m) on tape	Bearing (degrees magnetic) to next piton
Piton 1 (shot weight)	5.9	8	0	170
Piton 2 (snoopy on boulder)	3.2	13	8	140
Piton 3 (snoopy on boulder)	2.7	14	21	140
Piton 4 (snoopy on boulder)	1.4	31	35	150
Piton 5 (reel on boulder)	1.0	N/A	66	N/A



Piton 1 (Line attached to shot weight)

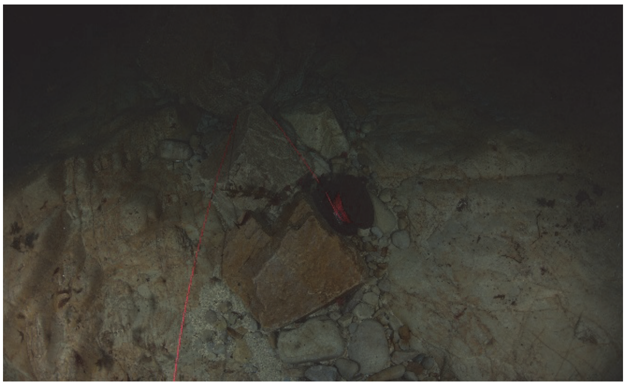


Piton 2 (snoopy on boulder)



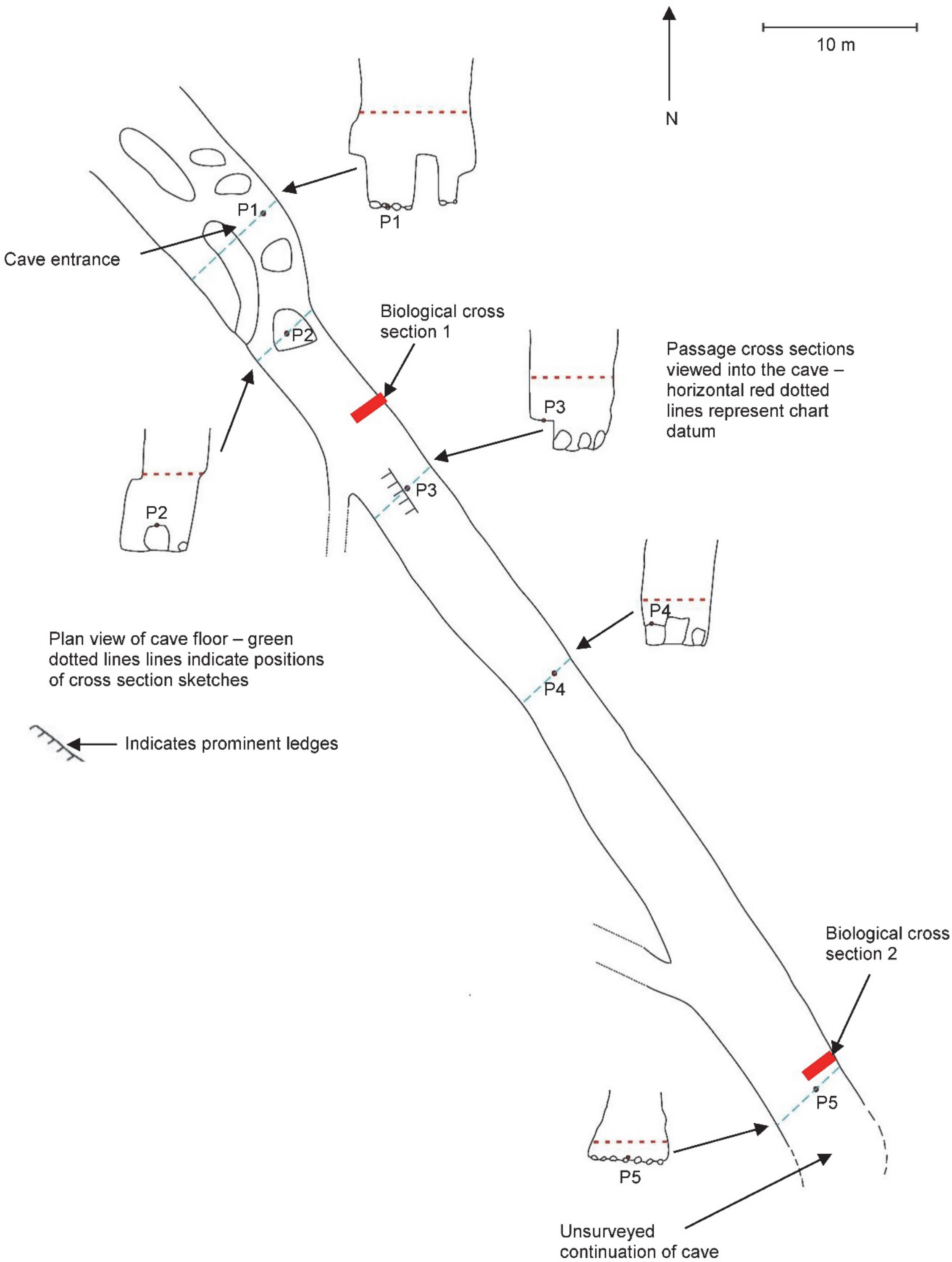
Piton 3 (snoopy on cobble on ledge)

Piton 4 (snoopy on boulder)

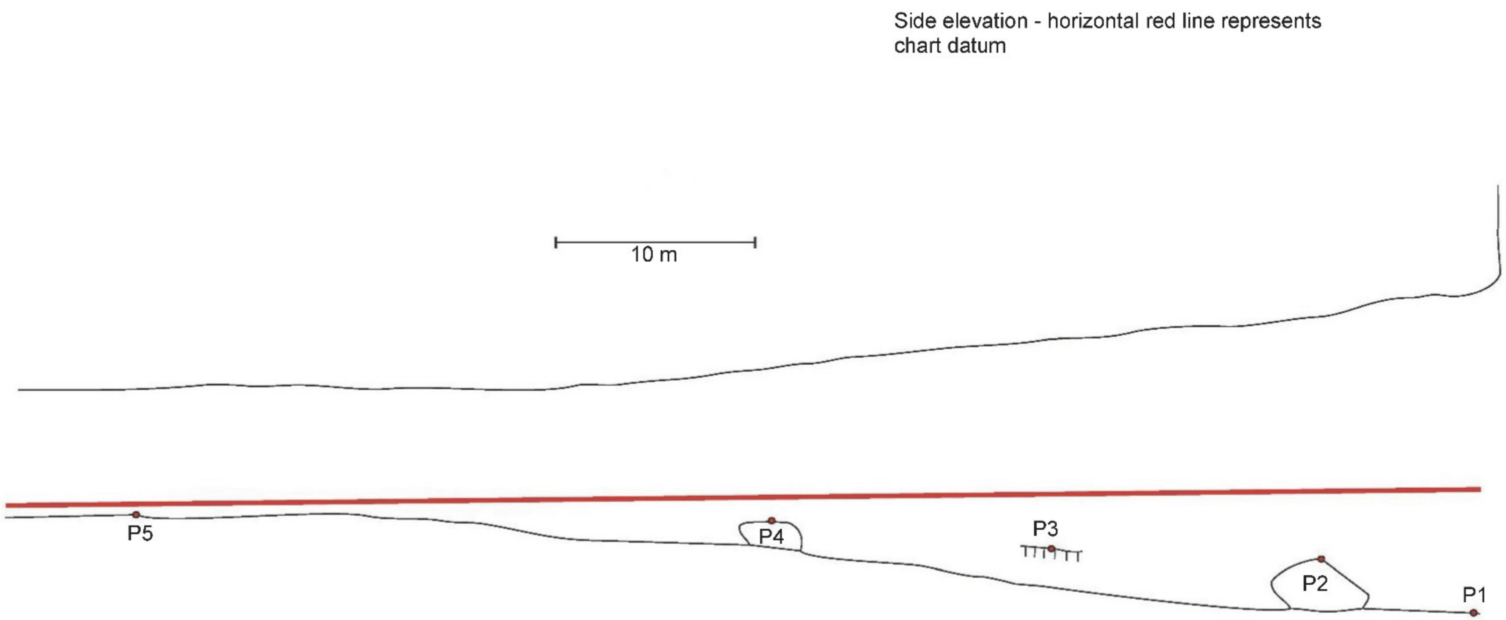


Piton 5 (line reel on boulder)

LE15 CV02 – Uamh Freasgill 2 (‘Eriboll Cave 2’; ‘CI9’) – Physical survey



LE15 CV02 – Uamh Freasgill 2 ('Eriboll Cave 2'; 'Cl9') – Physical survey (cont'd)



LE15 CV02 – Uamh Freasgill 2 ('Eriboll Cave 2'; 'CI9') – Biological summary – cross section 1 (left wall, ~15 m from entrance, 15 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Supralittoral walls & ceiling. Steep & overhanging bedrock	~+8.0	+4.3	Superabundant crusts of *Hildenbrandia* sp. and frequent *Verrucaria* sp.	**LR.FLR.CvOv.VmucHil** Barren Rock
2	Supralittoral wall. Predominantly vertical.	+4.3	+3.8	Sparse biota. Rare *Verrucaria* sp., *Semibalanus balanoides* and *Patella* sp.	**LR.FLR.CvOv.VmucHil**
3	Eulittoral wall. Predominantly vertical.	+3.8	+1.8	Abundant *Semibalanus balanoides* and coralline algal crusts with common *Patella* sp.	**LR.HLR.MusB.Sem.Sem**
4	Upper sublittoral wall. Predominantly vertical.	+1.8	0	Superabundant *Dendrodoa grossularia* with common *Grantia compressa* and frequent patches of *Halichondria (Halichondria) panicea*.	**LR.FLR.CvOv.SpR.Den**
5	Mid sublittoral wall. Predominantly vertical.	0	-3.1	Dominated by common coralline algal crusts and abundant tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*). Foliose algae locally common. A variety of sponges present with *Halichondria (Halichondria) panicea* common.	**IR.FIR.SG.CC.BalPom**
6	Lower sublittoral wall & floor. Scoured rock & cobbles.	-3.1	-4.3	Scoured rock surfaces. Sessile epibiota sparse. Dominated by abundant coralline algal crusts and common tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*).	**IR.FIR.SG.CC.Mo**

LE15 CV02 – Uamh Freasgill 2 ('Eriboll Cave 2'; 'CI9') – Biological summary – cross section 2 (left wall, ~65 m from entrance, 65 m on tape)

Zone	Physical notes	Upper limit (m CD)	Lower limit (m CD)	Biological notes	Biotope
1	Eulittoral wall. Predominantly vertical.	+3.8	+1.7	Frequent *Spirorbis (Spirorbis) tridentatus* with occasional *Dendrodoa grossularia* and *Halichondria (Halichondria) panicea*.	**LR.FLR.CvOv.SpR.Den** (impoverished)
2	Upper sublittoral wall. Predominantly vertical.	+1.7	-0.2	Abundant *Dendrodoa grossularia* with common *Grantia compressa* and *Halichondria (Halichondria) panicea*. Common *Spirorbis (Spirorbis) tridentatus* with frequent tube turf (mainly *Fabricia stellaris* with some *Jassa falcata*).	**LR.FLR.CvOv.SpR.Den**
3	Lower sublittoral wall & floor. Scoured rock & cobbles.	-0.2	-0.8	Scoured rock surfaces. Sessile epibiota very sparse. Patches of anemones with common *Urticina felina* and frequent *Actinia equina*.	**IR.FIR.SG.CC.Mo**

ANNEX 11: LOCH ERIBOLL CAVE SPECIES ABUNDANCE DATA (SACFOR)

Annex 11A – LE15 CV01

Taxa	CV01.1.2	CV01.1.3	CV01.1.4	CV01.1.5	CV01.2.1	CV01.2.2	CV01.2.3	CV01.3.1	CV01.3.2	CV01.3.3
Verrucaria mucosa	A									
Hildenbrandia rubra	C									
Corallinales (crusts)			O							
Plocamium cartilagineum			F (loc upr)							
Erythroglossum laciniatum			O							
Alaria esculenta			O (loc upr)							
cf Peyssonnelia sp.		R								
Clathrina coriacea		O	F (loc upr)			F (loc C upr)	R		O	
Leucosolenia complicata		P	F (loc upr)			O				
Grantia compressa			C			P (loc upr)			R	
Sycon ciliatum			R							
cf Antho (Acarnia) coriacea			P (loc upr)						R	
Pachymatisma johnstonia			O			O				
Halichondria (Halichondria) panicea		O	C						R	
Myxilla (Myxilla) incrustans			O			O				
Haliclona (Rhizoniera) viscosa									O	
Halisarca dujardinii									O	
Tubularia indivisa			R			P (loc upr)				
Diphasia cf fallax		F	S (loc)							
Alcyonium digitatum			O (loc upr)							
Actinia equina								F	O	R
Urticina felina			R (loc upr)			O			O	R
Sagartia elegans			R							
Phellia gausapata		R								
Caryophyllia (Caryophyllia) smithii			O							
Spirobranchus triqueter			O	R					R	
Filograna implexa			O (loc upr)			R	R			
Spirorbis (Spirorbis) tridentatus						O			C	
Fabricia stellaris			O						A	
Jassa falcata			P						P	

Taxa	CV01.1.2	CV01.1.3	CV01.1.4	CV01.1.5	CV01.2.1	CV01.2.2	CV01.2.3	CV01.3.1	CV01.3.2	CV01.3.3
Semibalanus balanoides	O	A			S			O		
Balanus balanus			R						R	
Balanus crenatus			F			R	R			
Galathea strigosa			O			R				
Galatheidae indet				P		P				
Hyas coarctatus			F							
Hyas araneus			O							
Inachus sp.										R
Cancer pagurus			F	P		O			R	R
Necora puber			O							
Homarus gammarus			R							
Nymphon sp.									R	
Steromphala cineraria			R							
Calliostoma zizyphinum			R							
Patella vulgata		F								
Trivia monacha			P							
Nucella lapillus		P								
Mytilus edulis		O								
Anomiidae			R			R				
Cadlina laevis									R	
Doridoidea indet			P							
Bicellariella ciliata			P							
Parasmittina trispinosa			P							
Cellepora pumicosa			F	R		R				
Alcyonidium diaphanum			P							
Disporella hispida			P							
Escharoides coccinea						R				
Oshurkovia littoralis		F								
Plagioecia patina			P							
Schizomavella (Schizomavella) linearis			O							
Henricia sanguinolenta			O			R			R	
Asterias rubens			O	P		R			P	
Ophiopholis aculeata						P				
Echinus esculentus			P (loc upr)							
Psammechinus miliaris			R							
Antedon bifida			O (loc upr)							

Taxa	CV01.1.2	CV01.1.3	CV01.1.4	CV01.1.5	CV01.2.1	CV01.2.2	CV01.2.3	CV01.3.1	CV01.3.2	CV01.3.3
Leptasterias (Leptasterias) muelleri			F							
Ophiopsila aranea ?			O			R			O	
Polyclinum aurantium			F			R				
Lissoclinum perforatum			O	R		P				
Dendrodoa grossularia		F	R (loc S)			A				
Botryllus schlosseri			O							
Botrylloides leachii			O			O			O	
Didemnum maculosum ?			R							
Diplosoma listerianum?			O							
Aplidium turbinatum			O			R				
Ascidiella sp.			R							
Aplidium nordmanni			O			O				
Taurulus bubalis			F			P				
Pholis gunnellus			R							
Chirolophis ascanii									R	

Annex 11B – LE15 CV02

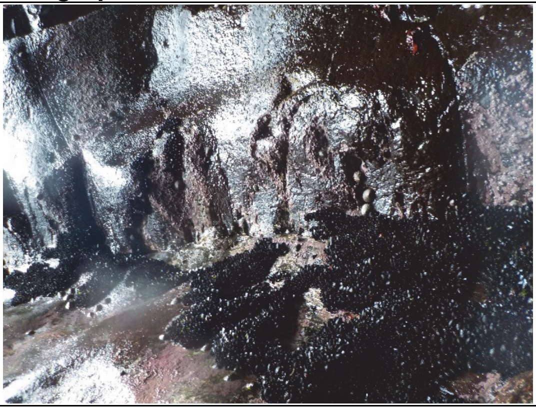
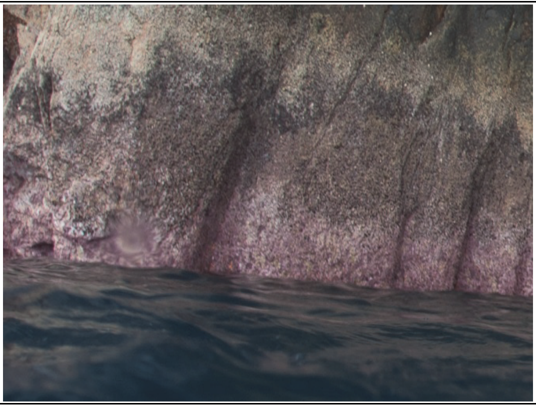
Taxa	CV02.1.1	CV02.1.2	CV02.1.3	CV02.1.4	CV02.1.5	CV02.1.6	CV02.2.1	CV02.2.2	CV02.2.3
Verrucaria mucosa	F	R	R						
Hildenbrandia rubra	S								
Corallinales (crusts)			A	O	C	A			
Plocamium cartilagineum				O	C				
Dictyota dichotoma					R				
Ptilota gunneri					R				
Phyllophora crispa				R	R				
Algae (red crusts)			F						
Clathrina coriacea				R	O				
Leucosolenia complicata				R	O				
Grantia compressa				C	F	R		C	
Leuconia johnstoni								O	
Sycon ciliatum					O				
Oscarella lobularis					P			F	
Halichondria (Halichondria) panicea			F	F	C	P	O	C	
Amphilectus fucorum					O			O	
Myxilla (Myxilla) incrustans				R	O			O	
Dysidea fragilis					R				
Halisarca dujardinii					R	R		R	
Actinia equina			C	F	R	R			F
Urticina felina					O	F		O	C
Sagartia elegans				R	R	R			
Phellia gausapata					R				
Candelabrum cf cocksii						P			
Spirobranchus triqueter				R	R	R		O	
Spirorbis (Spirorbis) tridentatus					O	P	F	C	R
Fabricia stellaris					A	C		F	
Jassa falcata					P	P		P	
Semibalanus balanoides ?		R	A						
Balanus crenatus			O	R					
Cancer pagurus			R	O	O			F	P
Verruca stroemia				P	R				
Nymphon sp.								P	
Steromphala cineraria			R			R			

Taxa	CV02.1.1	CV02.1.2	CV02.1.3	CV02.1.4	CV02.1.5	CV02.1.6	CV02.2.1	CV02.2.2	CV02.2.3
Calliostoma zizyphinum					R				
Margarites sp.									P
Tectura sp.			F		R	R			
Patella vulgata		R	C			R			
Polycera quadrilineata				R					
Doris pseudoargus					R				
Mytilus edulis			R		P				
Patella pellucida					R				
Boreochiton ruber					P				
Cadlina laevis					R				
Anomiidae					P				
Parasmittina trispinosa					R				
Cellepora pumicosa					R	R			
Alcyonidium hirsutum					O				
Electra pilosa					C (on algae)				
Haplopoma impressum					R				
Celleporina caliciformis					P				
Henricia sanguinolenta				R	R	R		R	
Asterias rubens					R	O			P
Crossaster						R			
Marthasterias glacialis					R				
Leptasterias (Leptasterias) muelleri				R	R				
Polyclinum aurantium				O	O	R			
Didemnum maculosum?					P				
Diplosoma listerianum			O	P	P	R			
Trididemnum sp.?						P			
Lissoclinum perforatum				R	O	R		R	
Dendrodoa grossularia			O	S	O	R	O	A	
Botryllus schlosseri				R	R				
Botrylloides leachii			O		O	R			
Ascidiacea indet								R	
Aplidium nordmanni					R				
Taurulus bubalis				R	R				
Lipophrys pholis			P						

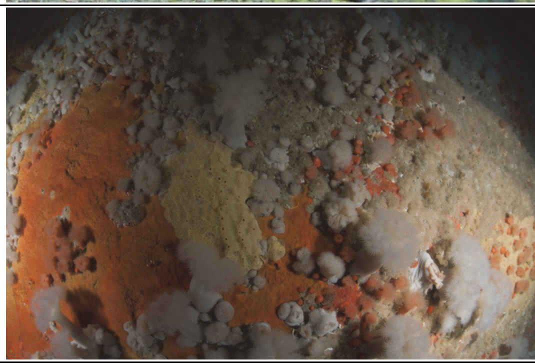
ANNEX 12: BIOTOPE INVENTORY

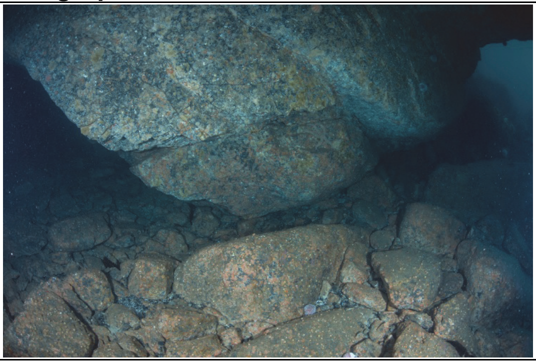
Biotopes recorded during the surveys SAC with illustrative photograph or video frame grab. Bold italicised stations indicate provenance of image.

Annex 12A – St Kilda caves

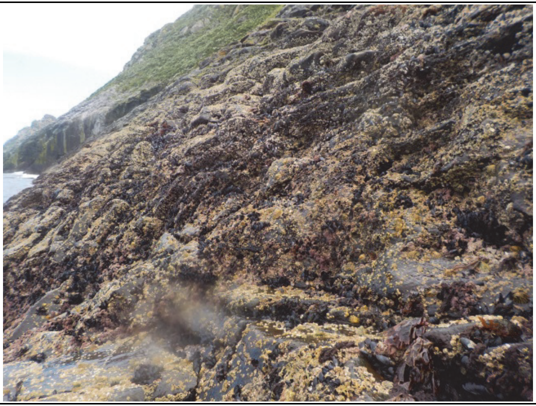
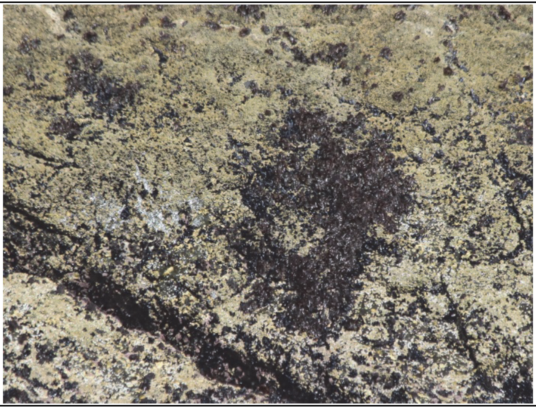
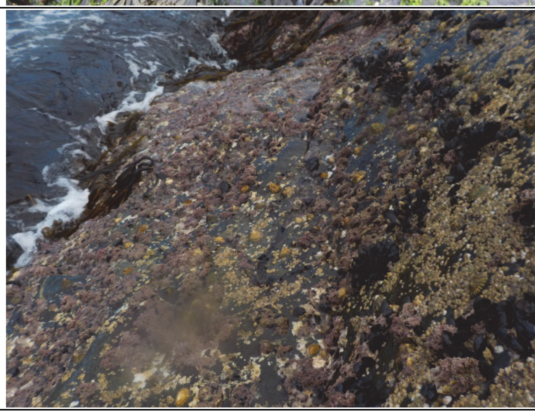
Biotope	Sites	Photograph
LR.HLR.MusB.Cht *Chthamalus spp.* on exposed upper eulittoral rock	***CV04.1.4***	
LR.HLR.MusB.Sem.Sem *Semibalanus balanoides*, *Patella vulgata* and *Littorina* spp. on exposed to moderately exposed or vertical sheltered eulittoral rock	***CV01.1.2***	
LR.HLR.FR.Coff *Corallina officinalis* on exposed to moderately exposed lower eulittoral rock	***CV01.1.3***	
LR.FLR.Lic.YG Yellow and grey lichens on supralittoral rock	***CV04.2.1***	

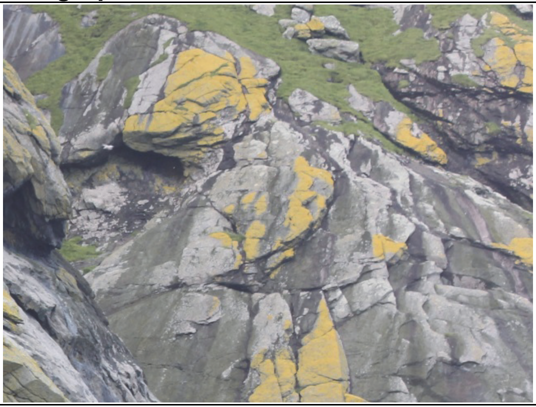
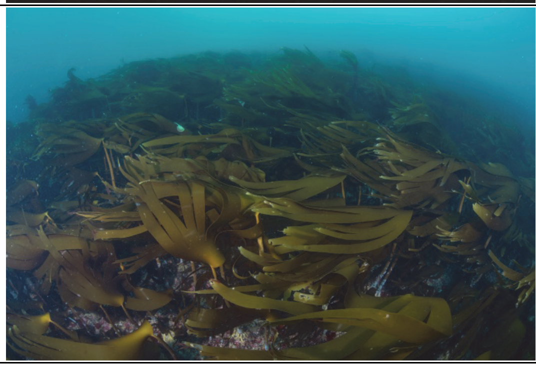
Biotope	Sites	Photograph
LR.FLR.Lic.Ver *Verrucaria maura* on littoral fringe rock	CV04.1.1 ***CV04.2.2***	
LR.FLR.CvOv.AudCla *Audouinella purpurea* and *Cladophora rupestris* on upper to mid-shore cave walls	*CV04.1.2* *CV04.2.1* *CV04.2.2* ***CV04.2.3***	
LR.FLR.CvOv.VmucHil *Verrucaria mucosa* and/or *Hildenbrandia rubra* on upper to mid shore cave walls	***CV01.1.1***	
LR.FLR.CvOv.ScrFa Sparse fauna (barnacles and spirorbids) on sand/pebble-scoured rock in upper littoral to lower shore caves	***CV04.1.5*** CV04.2.4	

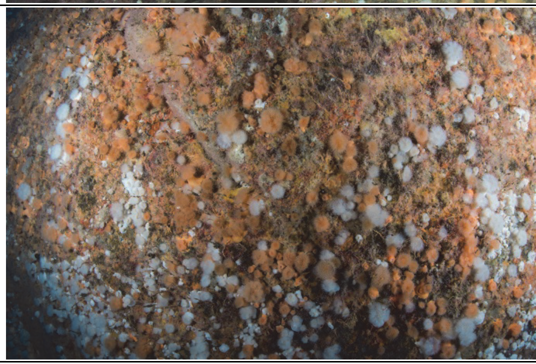
Biotope	Sites	Photograph
LR.FLR.CvOv.BarCv Barren and/or boulder-scoured littoral cave walls and floors	***CV04.2.5***	
LR.FLR.Eph.Ent *Enteromorpha* spp. on freshwater-influenced and/or unstable upper eulittoral rock	***CV04.1.2***	
IR.FIR.SG.CrSpAsAn? Anemones, including *Corynactis viridis*, crustose sponges and colonial ascidians on very exposed or wave surged vertical infralittoral rock	CV01.1.4 CV01.1.5 CV01.2.1 ***CV02.1.1*** CV02.2.1 CV03.2.1	
IR.FIR.SG.CC.Mo Coralline crusts and crustaceans on mobile boulders or cobbles in surge gullies	***CV01.1.6*** CV01.2.2 CV02.1.2	

Biotope	Sites	Photograph
IR.FIR.SG.CC.BalPom *Balanus crenatus* and/or *Pomatoceros triqueter* with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock	***CV03.1.1***	

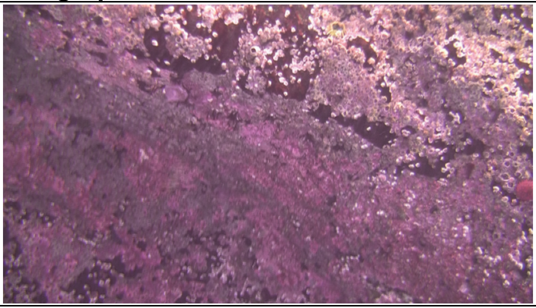
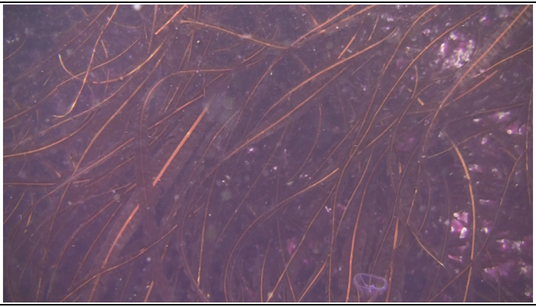
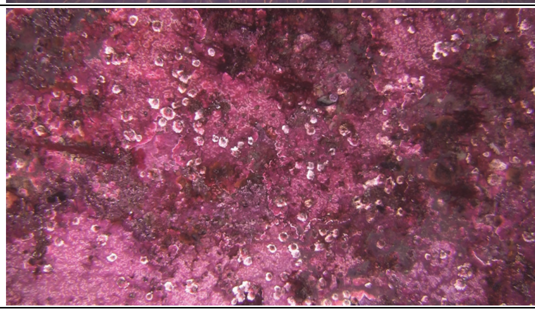
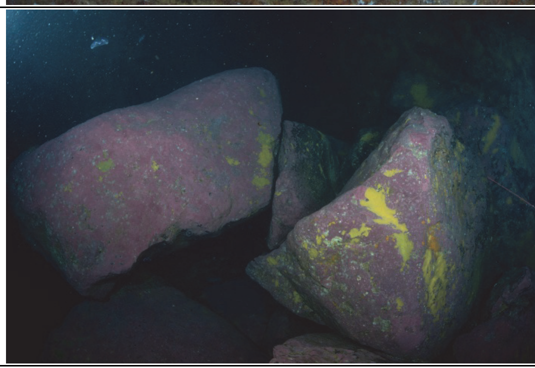
Annex 12B – St Kilda reefs

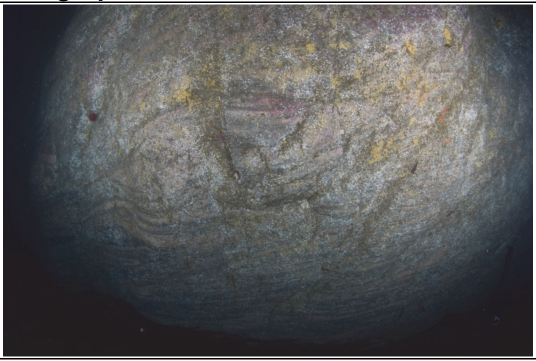
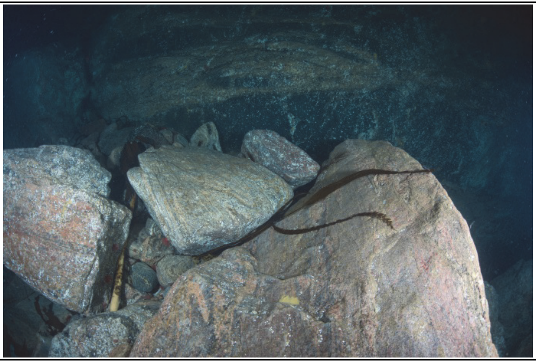
Biotope	Sites	Photograph
LR.HLR.MusB.MytB *Mytilus edulis* and barnacles on very exposed eulittoral rock	IR01.5	No image available
LR.HLR.MusB.Cht *Chthamalus* spp. on exposed upper eulittoral rock	IR01.3 IR01.4 ***IR02.4***	
LR.HLR.MusB.Sem *Semibalanus balanoides* on exposed to moderately exposed or vertical sheltered eulittoral rock	***IR01.4***	
LR.HLR.FR.Fdis *Fucus distichus* and *Fucus spiralis f. nana* on extremely exposed upper shore rock	***IR02.3***	
LR.HLR.FR.Coff *Corallina officinalis* on exposed to moderately exposed lower eulittoral rock	***IR02.5***	

Biotope	Sites	Photograph
LR.FLR.Lic.YG Yellow and grey lichens on supralittoral rock	***IR01.1*** IR02.1	
LR.FLR.Lic.Ver *Verrucaria maura* on littoral fringe rock	IR01.2 ***IR02.2***	
IR.HIR.KFaR.Ala *Alaria esculenta* on exposed sublittoral fringe bedrock	IR01.6 ***SR02.1*** SR03.1	
IR.HIR.KFaR.LhypFa *Laminaria hyperborea* forest with a faunal cushion (sponges and polyclinids) and foliose red seaweeds on very exposed upper infralittoral rock	***SR01.1***	

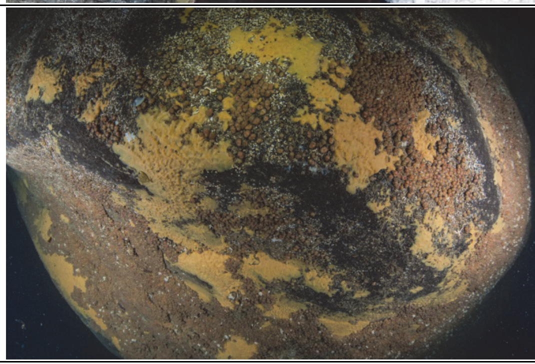
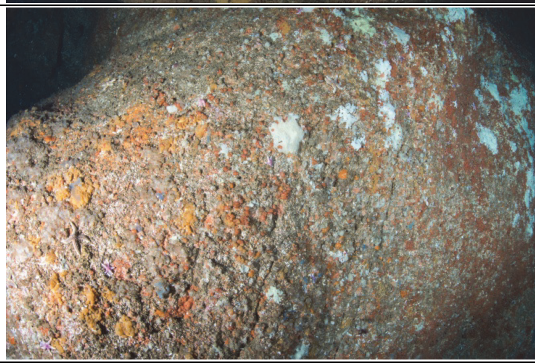
Biotope	Sites	Photograph
IR.HIR.KFaR.LhypR.Ft *Laminaria hyperborea* forest with dense foliose red seaweeds on exposed upper infralittoral rock	***SR02.2***	
IR.HIR.KSed.XKScrR Mixed kelps with scour-tolerant and opportunistic foliose red seaweeds on scoured or sand-covered infralittoral rock	***SR01.4***	
IR.FIR.SG.CrSpAsAn Anemones, including *Corynactis viridis*, crustose sponges and colonial ascidians on very exposed or wave surged vertical infralittoral rock	SR03.2 ***SR03.3*** SR03.4	
CR.HCR.XFa.CvirCri *Corynactis viridis* and a mixed turf of crisiids, *Bugula*, *Scrupocellaria*, and *Cellaria* on moderately tide-swept exposed circalittoral rock	SR01.2 ***SR01.3***	

Annex 12C – North Rona caves

Biotope	Sites	Photograph
LR.HLR.MusB.Sem *Semibalanus balanoides* on exposed to moderately exposed or vertical sheltered eulittoral rock	***CV01.1.1***	
IR.HIR.KFaR.Ala *Alaria esculenta* on exposed sublittoral fringe bedrock	***CV01.1.2***	
IR.FIR.SG.FoSwCC Foliose seaweeds and coralline crusts in surge gully entrances	***CV01.1.3***	
IR.FIR.SG.CrSpAsAn Anemones, including *Corynactis viridis*, crustose sponges and colonial ascidians on very exposed or wave surged vertical infralittoral rock	***CV01.1.4*** CV01.1.5 CV02.1.1 CV02.2.1 CV03.1.1	
IR.FIR.SG.CrSp Sponge crusts on extremely wave-surged infralittoral cave or gully walls	***CV01.2.1***	

Biotope	Sites	Photograph
IR.FIR.SG.CC.BalPom *Balanus crenatus* and/or *Pomatoceros triqueter* with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock	***CV02.1.2*** CV02.2.1 CV03.2.1	
IR.FIR.SG.CC.Mo Coralline crusts and crustaceans on mobile boulders or cobbles in surge gullies	CV02.1.3 ***CV02.2.2*** CV03.1.2 CV03.2.2	

Annex 12D – Loch Eriboll caves

Biotope	Sites	Photograph
LR.HLR.MusB.Sem *Semibalanus balanoides* on exposed to moderately exposed or vertical sheltered eulittoral rock	***CV01.1.3*** CV01.2.1 CV01.3.1 CV02.1.3	
LR.FLR.CvOv.VmucHil *Verrucaria mucosa* and/or *Hildenbrandia rubra* on upper to mid shore cave walls	***CV01.1.1*** CV01.1.2 CV02.1.1 CV02.1.2	
LR.FLR.CvOv.SpR.Den Sponges, shade-tolerant red seaweeds and *Dendrodoa grossularia* on wave-surged overhanging lower eulittoral bedrock and caves	CV02.1.4 CV02.2.1 ***CV02.2.2***	
IR.FIR.SG.CrSpAsDenB Crustose sponges and colonial ascidians with *Dendrodoa grossularia* or barnacles on wave-surged infralittoral rock	***CV01.1,4***	

Biotope	Sites	Photograph
IR.FIR.SG.DenCcor *Dendrodoa grossularia* and *Clathrina coriacea* on wavesurged vertical infralittoral rock	***CV01.2.2***	
IR.FIR.SG.CC.BalPom *Balanus crenatus* and/or *Pomatoceros triqueter* with spirorbid worms and coralline crusts on severely scoured vertical infralittoral rock	***CV01.3.2*** CV02.1.5	
IR.FIR.SG.CC.Mo Coralline crusts and crustaceans on mobile boulders or cobbles in surge gullies	CV01.1.5 ***CV01.2.3*** CV01.3.3 CV02.1.6 CV02.2.3	

ANNEX 13: MARINE RECORDER RECORDS FROM ST KILDA

Annex 13A – Summary of survey records from St Kilda deposited in Marine Recorder

MR survey code	Survey	Reference	Notes
JNCCMNCR60000108	1984 BSAC/MCS St Kilda sublittoral survey, Scotland	Howson and Picton, 1985	No sample data entered
JNCCMNCR10000684	1997 MNCR/SNH St Kilda sublittoral survey	Posford Duvivier Environment 1997	MNCR phase 2 diver records
JNCCMNCR30000694	1997 SNH BSM survey of St Kilda	Posford Duvivier Environment 1997	ROV records
MRSNH00100000031	2000 SNH ROV survey at St Kilda	Foster-Smith, 2001	Only physical data entered
MRMCS0020000002A	2005 Seasearch Scotland St Kilda		Samples classified into Seasearch seabed types rather than biotopes
MRMCS00200000054	2007 Seasearch Scotland St Kilda		
MRMCS0070000008D	2009 Seasearch Scotland Kilda and Skye		Samples classified into Seasearch seabed types rather than biotopes
MRMCS007000000A6	2010 Seasearch Scotland St. Kilda	Seasearch, 2010	Some samples ascribed to biotopes
MRMCS007000000C2	2011 Seasearch Scotland St. Kilda Survey		

Annex 13B – Positional, depth and other non-biological data

Data as downloaded from Marine Recorder. Text is uneditted and may include formatting artefacts.

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
1	063.001.001	JNCCMNCR10000063	St. Kilda (Outer Hebrides & outliers)	01/01/1970	Gordon Ridley	57.83299	-8.60082				
2	684.017.004	JNCCMNCR10000684	Seilg Geo, Dun (St Kilda)	30/06/1997	Kate Northen David Connor Sue Scott	57.79897	-8.56404	-30	-20	-28	-18
3	684.017.005	JNCCMNCR10000684	Seilg Geo, Dun (St Kilda)	30/06/1997	Rohan Holt Tim Hill	57.79897	-8.56404	-26	-23	-24	-21
4	684.020.001	JNCCMNCR10000684	Geodha Glann Neil, Hirta (St Kilda)	30/06/1997	David Connor Sue Scott Kate Northen	57.80886	-8.55572	-10	-5	-7	-2
5	684.020.002	JNCCMNCR10000684	Geodha Glann Neil, Hirta (St Kilda)	30/06/1997	David Connor Sue Scott Kate Northen	57.80886	-8.55572	-15	-10	-12	-7
6	684.020.003	JNCCMNCR10000684	Geodha Glann Neil, Hirta (St Kilda)	30/06/1997	Rohan Holt Tim Hill	57.80886	-8.55572	-22	-15	-19	-12
7	684.020.004	JNCCMNCR10000684	Geodha Glann Neil, Hirta (St Kilda)	30/06/1997	Rohan Holt Tim Hill	57.80886	-8.55572	-30	-22	-27	-19
8	684.010.001	JNCCMNCR10000684	E A'Chlaisir, Dun (St Kilda)	01/07/1997	Rohan Holt Frank Fortune	57.79836	-8.56713	-18	-6	-17	-5
9	684.010.002	JNCCMNCR10000684	E A'Chlaisir, Dun (St Kilda)	01/07/1997	Rohan Holt Frank Fortune	57.79836	-8.56713	-18	-12		
10	684.017.001	JNCCMNCR10000684	Seilg Geo, Dun (St Kilda)	30/06/1997	Tim Hill	57.79895	-8.56393	-6	0	-4	2
11	684.017.002	JNCCMNCR10000684	Seilg Geo, Dun (St Kilda)	30/06/1997	Kate Northen David Connor Sue Scott	57.79897	-8.56404	-20	-6	-18	-4
12	684.017.003	JNCCMNCR10000684	Seilg Geo, Dun (St Kilda)	30/06/1997	Rohan Holt Tim Hill	57.79897	-8.56404	-23	-11	-20.9	-8.9
13	684.010.003	JNCCMNCR10000684	E A'Chlaisir, Dun (St Kilda)	01/07/1997	Tim Hill Kate Northen Sue Scott	57.79836	-8.56713	-15	-7	-14	-6
14	684.011.001	JNCCMNCR10000684	Dun Bay, Dun (St Kilda)	01/07/1997	David Connor Alistair Davison	57.79431	-8.55492	-28	-18		
15	684.003.002	JNCCMNCR10000684	E side Gob nah-Aride, Soay (St Kilda)	02/07/1997	Rohan Holt Kate Northen	57.82551	-8.64216	-15	-9	-12	-6

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
16	684.003.004	JNCCMNCR10000684	E side Gob nah-Aride, Soay (St Kilda)	02/07/1997	Rohan Holt Kate Northen	57.82551	-8.64216	-30	-29	-27	-26
17	684.005.001	JNCCMNCR10000684	N of Gob Phursan, Soay (St Kilda)	02/07/1997	Sue Scott Tim Hill Alistair Davison	57.82461	-8.63909	-9	0	-6	3
18	684.005.002	JNCCMNCR10000684	N of Gob Phursan, Soay (St Kilda)	02/07/1997	Sue Scott Tim Hill Alistair Davison	57.82468	-8.63914	-17	-9	-14	-6
19	684.005.003	JNCCMNCR10000684	N of Gob Phursan, Soay (St Kilda)	02/07/1997	Sue Scott Tim Hill Alistair Davison	57.82468	-8.63914	-27	-17	-24	-14
20	684.004.001	JNCCMNCR10000684	Geo Phursan, Soay (St Kilda)	02/07/1997	David Connor Frank Fortune	57.82552	-8.64031	-12	-5	-9	-2
21	684.004.002	JNCCMNCR10000684	Geo Phursan, Soay (St Kilda)	02/07/1997	David Connor Frank Fortune	57.82552	-8.64031	-12.5	-5	-9	-2
22	684.034.001	JNCCMNCR10000684	Scarbh Stack, Boreray (St Kilda)	03/07/1997	Rohan Holt Kate Northen Tim Hill David Connor	57.86379	-8.49155	-15	-1	-14.5	-0.5
23	684.034.002	JNCCMNCR10000684	Scarbh Stack, Boreray (St Kilda)	03/07/1997	Sue Scott Rohan Holt Kate Northen Tim Hill David Connor	57.86379	-8.49155	-40	-25	-39.5	-24.5
24	684.034.003	JNCCMNCR10000684	Scarbh Stack, Boreray (St Kilda)	03/07/1997	Sue Scott Kate Northen David Connor	57.86379	-8.49155	-30	-25	-29.5	-24.5
25	684.021.001	JNCCMNCR10000684	NW of Sgeir Nan Sgarbh, Hirta (St Kilda)	05/07/1997	Tim Hill Kate Northen Sue Scott	57.81566	-8.55308	-11	-4		
26	684.021.002	JNCCMNCR10000684	NW of Sgeir Nan Sgarbh, Hirta (St Kilda)	05/07/1997	Tim Hill Kate Northen Sue Scott	57.81566	-8.55308	-27	-11		
27	684.018.001	JNCCMNCR10000684	off Oiseval Cliffs, Hirta (St Kilda)	05/07/1997	Rohan Holt Alistair Davison	57.81847	-8.55629	-43	-38		
28	684.019.001	JNCCMNCR10000684	Entrance to Village Bay, Hirta (St Kilda)	06/07/1997	Tim Hill Kate Northen	57.80532	-8.56317	-23	-23		
29	684.016.001	JNCCMNCR10000684	The Saw Cut, Dun (St Kilda)	06/07/1997	Sue Scott David Connor	57.79514	-8.55271	-13	-9	-12	-8
30	684.016.002	JNCCMNCR10000684	The Saw Cut, Dun (St	06/07/1997	Sue Scott	57.79514	-8.55271	-25	-11	-24	-10

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
			Kilda)		David Connor						
31	684.016.003	JNCCMNCR10000684	The Saw Cut, Dun (St Kilda)	06/07/1997	Rohan Holt Frank Fortune	57.79514	-8.55271	-34	-13	-33	-15
32	684.012.001	JNCCMNCR10000684	Poplar Reef, near Levenish (St Kilda)	07/07/1997	Rohan Holt Alistair Davison David Connor Kate Northen Frank Fortune Sue Scott Tim Hill	57.79196	-8.52548	-24	-8		
33	684.012.002	JNCCMNCR10000684	Poplar Reef, near Levenish (St Kilda)	07/07/1997	Rohan Holt Alistair Davison David Connor Kate Northen Frank Fortune Sue Scott Tim Hill	57.79196	-8.52548	-45	-24	-43	-22
34	684.006.001	JNCCMNCR10000684	Gob Chathaill, Hirta (St Kilda)	02/07/1997	Tim Hill Sue Scott	57.80796	-8.60585	-4	-1		
35	684.006.002	JNCCMNCR10000684	Gob Chathaill, Hirta (St Kilda)	02/07/1997	Tim Hill Sue Scott	57.80796	-8.60585	-18	-4		
36	684.006.003	JNCCMNCR10000684	Gob Chathaill, Hirta (St Kilda)	02/07/1997	Tim Hill Sue Scott	57.80796	-8.60585	-27	-18	-26	-17
37	684.008.001	JNCCMNCR10000684	W of Claigeann Mor, Hirta (St Kilda)	02/07/1997	David Connor Frank Fortune	57.80661	-8.59716	-15	-11	-14	-10
38	684.008.002	JNCCMNCR10000684	W of Claigeann Mor, Hirta (St Kilda)	02/07/1997	David Connor Frank Fortune	57.80661	-8.59716	-14.3	-11	-13	-10
39	684.003.001	JNCCMNCR10000684	E side Gob nah-Aride, Soay (St Kilda)	02/07/1997	Rohan Holt Kate Northen	57.82551	-8.64216	-9	-3	-6	0
40	684.007.001	JNCCMNCR10000684	Off Geo na B…glaise, Hirta (St Kilda)	02/07/1997	Rohan Holt Kate Northen	57.80584	-8.59634		-21		
41	684.007.002	JNCCMNCR10000684	Off Geo na B…glaise, Hirta (St Kilda)	02/07/1997	Rohan Holt Kate Northen	57.80584	-8.59634	-24	-22	-23	-21
42	684.007.003	JNCCMNCR10000684	Off Geo na B…glaise, Hirta (St Kilda)	02/07/1997	Rohan Holt Kate Northen	57.80584	-8.59634	-26	-24	-25	-23
43	684.039.001	JNCCMNCR10000684	W side of Stac an Armin, Boreray (St Kilda)	04/07/1997	David Connor Frank Fortune	57.87978	-8.49795	-12	0	-11	1
44	684.039.002	JNCCMNCR10000684	W side of Stac an Armin, Boreray (St Kilda)	04/07/1997	David Connor Frank Fortune	57.87978	-8.49795	-20	-12	-19	-11

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
45	684.037.001	JNCCMNCR10000684	Gearrgeo, Boreray (St Kilda)	04/07/1997	Rohan Holt Alistair Davison	57.8768	-8.489	-27	-16		
46	684.037.002	JNCCMNCR10000684	Gearrgeo, Boreray (St Kilda)	04/07/1997	Rohan Holt Alistair Davison	57.8768	-8.489	-20	-18		
47	684.036.001	JNCCMNCR10000684	Coinneag Caves, Boreray (St Kilda)	04/07/1997	Frank Fortune David Connor	57.86451	-8.48441	-15	-4	-13	-2
48	684.036.002	JNCCMNCR10000684	Coinneag Caves, Boreray (St Kilda)	04/07/1997	Rohan Holt Alistair Davison Frank Fortune David Connor	57.86451	-8.48441	-20	-5	-18	-3
49	684.034.004	JNCCMNCR10000684	Scarbh Stack, Boreray (St Kilda)	03/07/1997	Sue Scott Kate Northen David Connor	57.86379	-8.49155	-26.5	-25	-25	-24.5
50	684.034.005	JNCCMNCR10000684	Scarbh Stack, Boreray (St Kilda)	03/07/1997	Rohan Holt Tim Hill	57.86379	-8.49155	-47	-30	-46.5	-29.5
51	684.033.001	JNCCMNCR10000684	S Stack Lee, Boreray (St Kilda)	03/07/1997	Rohan Holt Tim Hill	57.8655	-8.5091	-22	-8	-19	-5
52	684.033.002	JNCCMNCR10000684	S Stack Lee, Boreray (St Kilda)	03/07/1997	Rohan Holt Tim Hill	57.8655	-8.5091	-18	-11	-15	-8
53	684.033.003	JNCCMNCR10000684	S Stack Lee, Boreray (St Kilda)	03/07/1997	David Connor Kate Northen Sue Scott Alistair Davison	57.8655	-8.5091	-18	-15	-15	-12
54	684.033.004	JNCCMNCR10000684	S Stack Lee, Boreray (St Kilda)	03/07/1997	Rohan Holt Tim Hill David Connor Kate Northen	57.8655	-8.5091	-31	-20	-28	-17
55	684.009.001	JNCCMNCR10000684	Laimh Rig Nam Gall, Hirta (St Kilda)	01/07/1997	Kate Northen Alistair Davison Tim Hill	57.80562	-8.59226	-14	-7	-11	-4
56	684.009.002	JNCCMNCR10000684	Laimh Rig Nam Gall, Hirta (St Kilda)	01/07/1997	Kate Northen Alistair Davison Tim Hill	57.8057	-8.59227	-18	-17	-15	-11
57	684.009.003	JNCCMNCR10000684	Laimh Rig Nam Gall, Hirta (St Kilda)	01/07/1997	David Connor	57.80562	-8.59226	-3	0	0	3
58	684.009.004	JNCCMNCR10000684	Laimh Rig Nam Gall, Hirta (St Kilda)	01/07/1997	Rohan Holt Sue Scott David Connor Frank Fortune	57.8057	-8.59227	-10	-3	-7	0
59	684.009.005	JNCCMNCR10000684	Laimh Rig Nam Gall,	01/07/1997	Rohan Holt	57.8057	-8.59227	-15	-6.3	-12	-3

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
			Hirta (St Kilda)		Sue Scott David Connor Frank Fortune						
60	684.024.004	JNCCMNCR10000684	NE Mina Stac, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.82596	-8.56458	-29	-25		
61	684.002.001	JNCCMNCR10000684	Am Plastair, Soay (St Kilda)	08/07/1997	Kate Northen Tim Hill	57.83298	-8.64405	-28	-10		
62	684.029.001	JNCCMNCR10000684	E side Loch Ghlinne, Hirta (St Kilda)	09/07/1997	Rohan Holt Tim Hill	57.82682	-8.59833	-48	-38	-45.2	-35.2
63	684.030.001	JNCCMNCR10000684	E of Geo nat Samh, Hirta (St Kilda)	09/07/1997	David Connor Sue Scott Kate Northen	57.82623	-8.58539	-47	-31		
64	684.032.002	JNCCMNCR10000684	NE of the Cambir, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.83797	-8.61068	-18	-6	-16.4	-4.4
65	684.032.003	JNCCMNCR10000684	NE of the Cambir, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.83797	-8.61068	-27	-18	-25.4	-16.4
66	684.035.002	JNCCMNCR10000684	Rubha Bhrengadal, Boreray (St Kilda)	04/07/1997	Tim Hill Kate Northen Sue Scott	57.86333	-8.48471	-24	-20	-22	-18
67	684.039.003	JNCCMNCR10000684	W side of Stac an Armin, Boreray (St Kilda)	04/07/1997	David Connor Frank Fortune	57.87978	-8.49795	-32	-20	-31	-19
68	684.039.004	JNCCMNCR10000684	W side of Stac an Armin, Boreray (St Kilda)	04/07/1997	David Connor Frank Fortune	57.87985	-8.49801	-45	-30	-44	-31
69	684.038.001	JNCCMNCR10000684	SE Stac an Armin, Boreray (St Kilda)	04/07/1997	Tim Hill Kate Northen Sue Scott	57.87914	-8.49416	-10	0		
70	684.038.002	JNCCMNCR10000684	SE Stac an Armin, Boreray (St Kilda)	04/07/1997	Tim Hill Kate Northen Sue Scott	57.87914	-8.49416	-18	-10		
71	684.038.003	JNCCMNCR10000684	SE Stac an Armin, Boreray (St Kilda)	04/07/1997	Tim Hill Kate Northen Sue Scott	57.87914	-8.49416	-25	-13		
72	684.036.003	JNCCMNCR10000684	Coinneag Caves, Boreray (St Kilda)	04/07/1997	Rohan Holt Alistair Davison Frank Fortune David Connor	57.86451	-8.48441	-25	-20	-23	-18
73	684.035.001	JNCCMNCR10000684	Rubha Bhrengadal,	04/07/1997	Tim Hill	57.86333	-8.48471	-20	-9	-18	-7

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
			Boreray (St Kilda)		Kate Northen Sue Scott						
74	684.012.003	JNCCMNCR10000684	Poplar Reef, near Levenish (St Kilda)	07/07/1997	David Connor Kate Northen Frank Fortune Sue Scott Tim Hill	57.79196	-8.52548	-47	-45	-45	-43
75	684.014.001	JNCCMNCR10000684	S of Levenish (St Kilda)	07/07/1997	David Connor Frank Fortune	57.7913	-8.51204	-25	-16	-24	-15
76	684.014.002	JNCCMNCR10000684	S of Levenish (St Kilda)	07/07/1997	David Connor Frank Fortune	57.7913	-8.51204	-31	-25	-30	-24
77	684.015.001	JNCCMNCR10000684	W Levenish (St Kilda)	07/07/1997	Rohan Holt Alistair Davison	57.79131	-8.51187	-32	-25	-30.5	-23.5
78	684.025.001	JNCCMNCR10000684	Cave W of Mina Stac, Hirta (St Kilda)	08/07/1997	Tim Hill Kate Northen	57.82466	-8.57244	-5	-2	-3	0
79	684.025.002	JNCCMNCR10000684	Cave W of Mina Stac, Hirta (St Kilda)	08/07/1997	Tim Hill Kate Northen	57.82466	-8.57244	-10	-4	-8	-2
80	684.023.001	JNCCMNCR10000684	Mina Stac Gully, Hirta (St Kilda)	08/07/1997	David Connor Frank Fortune	57.82599	-8.58315	-25	-16		
81	684.023.001	JNCCMNCR10000684	Mina Stac Gully, Hirta (St Kilda)	08/07/1997	David Connor Frank Fortune	57.82599	-8.58315	-25	-16		
82	684.023.002	JNCCMNCR10000684	Mina Stac Gully, Hirta (St Kilda)	08/07/1997	David Connor Frank Fortune	57.82599	-8.58315	-25	-25		
83	684.024.001	JNCCMNCR10000684	NE Mina Stac, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.82595	-8.5646	-3	-2		
84	684.024.002	JNCCMNCR10000684	NE Mina Stac, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.82596	-8.56458	-18	-4		
85	684.024.003	JNCCMNCR10000684	NE Mina Stac, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.82595	-8.5646	-28	-15		
86	684.001.003	JNCCMNCR10000684	Geo Ruadh Skerries, Soay (St Kilda)	09/07/1997	Frank Fortune Alistair Davison	57.835	-8.62787	-31	-22	-29.5	-20.5
87	684.001.001	JNCCMNCR10000684	Geo Ruadh Skerries, Soay (St Kilda)	09/07/1997	Frank Fortune Alistair Davison	57.835	-8.62787	-8	0		
88	684.001.002	JNCCMNCR10000684	Geo Ruadh Skerries, Soay (St Kilda)	09/07/1997	Frank Fortune Alistair Davison	57.835	-8.62787	-20	-8	-18.5	-6.5
89	684.022.001	JNCCMNCR10000684	Oiseval Cave Hirta (Cave	05/07/1997	David Connor	57.81429	-8.55181	-20	-10	-18.5	-8.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
			N of Sgeir Nan Sgarbh) (St Kilda)		Frank Fortune						
90	684.022.002	JNCCMNCR10000684	Oiseval Cave Hirta (Cave N of Sgeir Nan Sgarbh) (St Kilda)	05/07/1997	David Connor Frank Fortune	57.81429	-8.55181	-20	-18	-18.5	-16.5
91	684.026.001	JNCCMNCR10000684	E Brada Stac, Hirta (St Kilda)	09/07/1997	Alistair Davison Frank Fortune	57.82464	-8.5797	-27	-4	-25.8	-2.8
92	684.026.002	JNCCMNCR10000684	E Brada Stac, Hirta (St Kilda)	09/07/1997	Alistair Davison Frank Fortune	57.82464	-8.5797	-27	-25	-25.8	-23.8
93	684.027.001	JNCCMNCR10000684	SE of Brada Stac, Hirta (St Kilda)	09/07/1997	David Connor Kate Northen	57.82433	-8.58049	-10	-5	-9	-4
94	684.027.002	JNCCMNCR10000684	SE of Brada Stac, Hirta (St Kilda)	09/07/1997	David Connor Kate Northen	57.82433	-8.58049	-12	-7	-11	-6
95	684.013.001	JNCCMNCR10000684	SE Levenish (St Kilda)	07/07/1997	Tim Hill Kate Northen Sue Scott	57.79136	-8.59251	-15	-10	-14	-9
96	684.013.002	JNCCMNCR10000684	SE Levenish (St Kilda)	07/07/1997	Tim Hill Kate Northen Sue Scott	57.79136	-8.59251	-26	-14	-25	-13
97	684.013.003	JNCCMNCR10000684	SE Levenish (St Kilda)	07/07/1997	Tim Hill Kate Northen Sue Scott	57.79136	-8.59251	-30	-26	-29	-25
98	684.013.003	JNCCMNCR10000684	SE Levenish (St Kilda)	07/07/1997	Tim Hill Kate Northen Sue Scott	57.79136	-8.59251	-30	-26	-29	-25
99	684.028.001	JNCCMNCR10000684	SW Loch Ghlinne, Hirta (St Kilda)	09/07/1997	Tim Hill Sue Scott Rohan Holt	57.84129	-8.60403	-22	-4		
100	684.028.002	JNCCMNCR10000684	SW Loch Ghlinne, Hirta (St Kilda)	09/07/1997	Tim Hill Sue Scott Rohan Holt	57.84129	-8.60403	-30	-22		
101	684.031.001	JNCCMNCR10000684	Cave NE of Cambir, Hirta (St Kilda)	08/07/1997	David Connor Frank Fortune	57.83797	-8.61068	-20	-12		
102	684.031.002	JNCCMNCR10000684	Cave NE of Cambir, Hirta (St Kilda)	08/07/1997	David Connor Frank Fortune	57.83797	-8.61068	-20	-20		
103	684.032.001	JNCCMNCR10000684	NE of the Cambir, Hirta (St Kilda)	08/07/1997	Rohan Holt Sue Scott Alistair Davison	57.83797	-8.61068	-11	-6	-9.4	-4.4
104	MRMCS00200000194.01	MRMCS0020000002A	Antor	23/05/2005	Adrian Collier	57.80829	-8.56499	-40	0	-38.63	1.37

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
105	MRMCS00200000194.01	MRMCS0020000002A	Antor	23/05/2005	Adrian Collier	57.80829	-8.56499	-40	0	-38.63	1.37
106	MRMCS00200000194.01	MRMCS0020000002A	Antor	23/05/2005	Adrian Collier	57.80829	-8.56499	-40	0	-38.63	1.37
107	MRMCS00200000195.01	MRMCS0020000002A	Gob Chathaill, South Hirta	23/05/2005	Don MacNeish	57.80446	-8.60349	-40	-4	-38.84	-2.84
108	MRMCS00200000195.01	MRMCS0020000002A	Gob Chathaill, South Hirta	23/05/2005	Don MacNeish	57.80446	-8.60349	-40	-4	-38.84	-2.84
109	MRMCS00200000195.01	MRMCS0020000002A	Gob Chathaill, South Hirta	23/05/2005	Don MacNeish	57.80446	-8.60349	-40	-4	-38.84	-2.84
110	MRMCS00200000195.01	MRMCS0020000002A	Gob Chathaill, South Hirta	23/05/2005	Don MacNeish	57.80446	-8.60349	-40	-4	-38.84	-2.84
111	MRMCS00200000196.01	MRMCS0020000002A	Rubha Mhuirich Pinnacle	23/05/2005	Adrian Collier	57.80329	-8.58499	-35	-15	-33.63	-13.63
112	MRMCS00200000196.01	MRMCS0020000002A	Rubha Mhuirich Pinnacle	23/05/2005	Adrian Collier	57.80329	-8.58499	-35	-15	-33.63	-13.63
113	MRMCS00200000196.01	MRMCS0020000002A	Rubha Mhuirich Pinnacle	23/05/2005	Adrian Collier	57.80329	-8.58499	-35	-15	-33.63	-13.63
114	MRMCS00200000196.01	MRMCS0020000002A	Rubha Mhuirich Pinnacle	23/05/2005	Adrian Collier	57.80329	-8.58499	-35	-15	-33.63	-13.63
115	MRMCS00200000197.01	MRMCS0020000002A	An Torc	23/05/2005	Howard Wood	57.79312	-8.58432	-40	0	-37.66	2.34
116	MRMCS00200000197.01	MRMCS0020000002A	An Torc	23/05/2005	Howard Wood	57.79312	-8.58432	-40	0	-37.66	2.34
117	MRMCS00200000197.01	MRMCS0020000002A	An Torc	23/05/2005	Howard Wood	57.79312	-8.58432	-40	0	-37.66	2.34
118	MRMCS00200000197.01	MRMCS0020000002A	An Torc	23/05/2005	Howard Wood	57.79312	-8.58432	-40	0	-37.66	2.34
119	MRMCS00200000197.01	MRMCS0020000002A	An Torc	23/05/2005	Howard Wood	57.79312	-8.58432	-40	0	-37.66	2.34
120	MRMCS00200000197.01	MRMCS0020000002A	An Torc	23/05/2005	Howard Wood	57.79312	-8.58432	-40	0	-37.66	2.34
121	MRMCS00200000198.01	MRMCS0020000002A	Sgarbh Stack	24/05/2005	Adrian Collier	57.86381	-8.49136	-50	0	-47.98	2.02
122	MRMCS00200000198.01	MRMCS0020000002A	Sgarbh Stack	24/05/2005	Adrian Collier	57.86381	-8.49136	-50	0	-47.98	2.02
123	MRMCS00200000198.01	MRMCS0020000002A	Sgarbh Stack	24/05/2005	Adrian Collier	57.86381	-8.49136	-50	0	-47.98	2.02
124	MRMCS00200000198.01	MRMCS0020000002A	Sgarbh Stack	24/05/2005	Adrian Collier	57.86381	-8.49136	-50	0	-47.98	2.02
125	MRMCS00200000199.01	MRMCS0020000002A	Scarbh stac	24/05/2005	Don MacNeish	57.86341	-8.49142	-50	0	-48.61	1.39
126	MRMCS00200000199.01	MRMCS0020000002A	Scarbh stac	24/05/2005	Don MacNeish	57.86341	-8.49142	-50	0	-48.61	1.39
127	MRMCS00200000199.01	MRMCS0020000002A	Scarbh stac	24/05/2005	Don MacNeish	57.86341	-8.49142	-50	0	-48.61	1.39
128	MRMCS00200000199.01	MRMCS0020000002A	Scarbh stac	24/05/2005	Don MacNeish	57.86341	-8.49142	-50	0	-48.61	1.39
129	MRMCS00200000199.01	MRMCS0020000002A	Scarbh stac	24/05/2005	Don MacNeish	57.86341	-8.49142	-50	0	-48.61	1.39
130	MRMCS0020000019A.01	MRMCS0020000002A	Scarbhstac, Submarine Arch	24/05/2005	Angela Erskine	57.86354	-8.49117	-43	-15	-42.31	-14.31

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
131	MRMCS0020000019A.01	MRMCS0020000002A	Scarbhstac, Submarine Arch	24/05/2005	Angela Erskine	57.86354	-8.49117	-43	-15	-42.31	-14.31
132	MRMCS0020000019A.01	MRMCS0020000002A	Scarbhstac, Submarine Arch	24/05/2005	Angela Erskine	57.86354	-8.49117	-43	-15	-42.31	-14.31
133	MRMCS0020000019A.01	MRMCS0020000002A	Scarbhstac, Submarine Arch	24/05/2005	Angela Erskine	57.86354	-8.49117	-43	-15	-42.31	-14.31
134	MRMCS0020000019A.01	MRMCS0020000002A	Scarbhstac, Submarine Arch	24/05/2005	Angela Erskine	57.86354	-8.49117	-43	-15	-42.31	-14.31
135	MRMCS0020000019B.01	MRMCS0020000002A	Saw Cut, Dunn	24/05/2005	Howard Wood	57.79497	-8.55214	-28	0	-26.7	1.3
136	MRMCS0020000019B.01	MRMCS0020000002A	Saw Cut, Dunn	24/05/2005	Howard Wood	57.79497	-8.55214	-28	0	-26.7	1.3
137	MRMCS0020000019B.01	MRMCS0020000002A	Saw Cut, Dunn	24/05/2005	Howard Wood	57.79497	-8.55214	-28	0	-26.7	1.3
138	MRMCS0020000019B.01	MRMCS0020000002A	Saw Cut, Dunn	24/05/2005	Howard Wood	57.79497	-8.55214	-28	0	-26.7	1.3
139	MRMCS0020000019B.01	MRMCS0020000002A	Saw Cut, Dunn	24/05/2005	Howard Wood	57.79497	-8.55214	-28	0	-26.7	1.3
140	MRMCS0020000019C.01	MRMCS0020000002A	West Hirta (? W Dun ?)	24/05/2005	Angela Erskine	57.80846	-8.60582	-25	0	-22.6	2.4
141	MRMCS0020000019C.01	MRMCS0020000002A	West Hirta (? W Dun ?)	24/05/2005	Angela Erskine	57.80846	-8.60582	-25	0	-22.6	2.4
142	MRMCS0020000019C.01	MRMCS0020000002A	West Hirta (? W Dun ?)	24/05/2005	Angela Erskine	57.80846	-8.60582	-25	0	-22.6	2.4
143	MRMCS0020000019C.01	MRMCS0020000002A	West Hirta (? W Dun ?)	24/05/2005	Angela Erskine	57.80846	-8.60582	-25	0	-22.6	2.4
144	MRMCS00200000309.01	MRMCS00200000054	Sgarbhstac	08/08/2007	Vicki Billings	57.86387	-8.49036	-17	-6	-15.63	-4.63
145	MRMCS00200000309.02	MRMCS00200000054	Sgarbhstac	08/08/2007	Vicki Billings	57.86387	-8.49036	-30	-17	-28.63	-15.63
146	MRMCS00200000309.03	MRMCS00200000054	Sgarbhstac	08/08/2007	Vicki Billings	57.86387	-8.49036	-36	-30	-34.63	-28.63
147	MRMCS0020000030A.01	MRMCS00200000054	Stac Lee East Face	08/08/2007	Fiona Ravenscroft	57.86625	-8.50788	-28	-10	-25.4	-7.4
148	MRMCS0020000030A.01	MRMCS00200000054	Stac Lee East Face	08/08/2007	Fiona Ravenscroft	57.86625	-8.50788	-28	-10	-25.4	-7.4
149	MRMCS007000004C2.01	MRMCS0070000008D	Sgarbstac	15/04/2009	Justin Owen	57.86307	-8.49216	-37		-34.43	
150	MRMCS007000004C2.01	MRMCS0070000008D	Sgarbstac	15/04/2009	Justin Owen	57.86307	-8.49216	-37		-34.43	
151	MRMCS007000004C2.01	MRMCS0070000008D	Sgarbstac	15/04/2009	Justin Owen	57.86307	-8.49216	-37		-34.43	
152	MRMCS007000004C2.01	MRMCS0070000008D	Sgarbstac	15/04/2009	Justin Owen	57.86307	-8.49216	-37		-34.43	
153	MRMCS007000004C2.01	MRMCS0070000008D	Sgarbstac	15/04/2009	Justin Owen	57.86307	-8.49216	-37		-34.43	
154	MRMCS007000004C3.01	MRMCS0070000008D	an Tarc	16/04/2009	Justin Owen	57.802	-8.584	-35	-12	-32.61	-9.61
155	MRMCS007000004C3.01	MRMCS0070000008D	an Tarc	16/04/2009	Justin Owen	57.802	-8.584	-35	-12	-32.61	-9.61

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
156	MRMCS007000004C3.01	MRMCS0070000008D	an Tarc	16/04/2009	Justin Owen	57.802	-8.584	-35	-12	-32.61	-9.61
157	MRMCS007000004C3.01	MRMCS0070000008D	an Tarc	16/04/2009	Justin Owen	57.802	-8.584	-35	-12	-32.61	-9.61
158	MRMCS007000004C3.01	MRMCS0070000008D	an Tarc	16/04/2009	Justin Owen	57.802	-8.584	-35	-12	-32.61	-9.61
159	MRMCS007000005CD.01	MRMCS007000000A6	Village Bay, Dunn	01/06/2010	Lizzie Heaver Emma Harris	57.79891	-8.56354	-28	-10	-27.09	-9.09
160	MRMCS007000005CD.01	MRMCS007000000A6	Village Bay, Dunn	01/06/2010	Lizzie Heaver Emma Harris	57.79891	-8.56354	-28	-10	-27.09	-9.09
161	MRMCS007000005CD.01	MRMCS007000000A6	Village Bay, Dunn	01/06/2010	Lizzie Heaver Emma Harris	57.79891	-8.56354	-28	-10	-27.09	-9.09
162	MRMCS007000005CD.01	MRMCS007000000A6	Village Bay, Dunn	01/06/2010	Lizzie Heaver Emma Harris	57.79891	-8.56354	-28	-10	-27.09	-9.09
163	MRMCS007000005CD.01	MRMCS007000000A6	Village Bay, Dunn	01/06/2010	Lizzie Heaver Emma Harris	57.79891	-8.56354	-28	-10	-27.09	-9.09
164	MRMCS007000005CD.01	MRMCS007000000A6	Village Bay, Dunn	01/06/2010	Lizzie Heaver Emma Harris	57.79891	-8.56354	-28	-10	-27.09	-9.09
165	MRMCS007000005CE.01	MRMCS007000000A6	Village Bay, Dunn (west side)	01/06/2010	Paul Fiander Mark Carter	57.79817	-8.56167	-28	-8	-27.09	-7.09
166	MRMCS007000005CE.01	MRMCS007000000A6	Village Bay, Dunn (west side)	01/06/2010	Paul Fiander Mark Carter	57.79817	-8.56167	-28	-8	-27.09	-7.09
167	MRMCS007000005CE.01	MRMCS007000000A6	Village Bay, Dunn (west side)	01/06/2010	Paul Fiander Mark Carter	57.79817	-8.56167	-28	-8	-27.09	-7.09
168	MRMCS007000005CE.01	MRMCS007000000A6	Village Bay, Dunn (west side)	01/06/2010	Paul Fiander Mark Carter	57.79817	-8.56167	-28	-8	-27.09	-7.09
169	MRMCS007000005CE.01	MRMCS007000000A6	Village Bay, Dunn (west side)	01/06/2010	Paul Fiander Mark Carter	57.79817	-8.56167	-28	-8	-27.09	-7.09
170	MRMCS007000005CF.01	MRMCS007000000A6	Dunn (north side - caves and wall)	01/06/2010	Colin Matthews	57.79817	-8.56167	-27	-7	-26.08	-6.08
171	MRMCS007000005CF.01	MRMCS007000000A6	Dunn (north side - caves and wall)	01/06/2010	Colin Matthews	57.79817	-8.56167	-27	-7	-26.08	-6.08
172	MRMCS007000005CF.01	MRMCS007000000A6	Dunn (north side - caves and wall)	01/06/2010	Colin Matthews	57.79817	-8.56167	-27	-7	-26.08	-6.08
173	MRMCS007000005CF.01	MRMCS007000000A6	Dunn (north side - caves and wall)	01/06/2010	Colin Matthews	57.79817	-8.56167	-27	-7	-26.08	-6.08
174	MRMCS007000005D0.01	MRMCS007000000A6	Cave at Dunn	01/06/2010	Gareth Corfield Philip Payne	57.79817	-8.56167	-28	-5	-27.08	-4.08
175	MRMCS007000005D0.01	MRMCS007000000A6	Cave at Dunn	01/06/2010	Gareth Corfield Philip Payne	57.79817	-8.56167	-28	-5	-27.08	-4.08

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
176	MRMCS007000005D0.01	MRMCS007000000A6	Cave at Dunn	01/06/2010	Gareth Corfield Philip Payne	57.79817	-8.56167	-28	-5	-27.08	-4.08
177	MRMCS007000005D0.01	MRMCS007000000A6	Cave at Dunn	01/06/2010	Gareth Corfield Philip Payne	57.79817	-8.56167	-28	-5	-27.08	-4.08
178	MRMCS007000005D0.01	MRMCS007000000A6	Cave at Dunn	01/06/2010	Gareth Corfield Philip Payne	57.79817	-8.56167	-28	-5	-27.08	-4.08
179	MRMCS007000005D1.01	MRMCS007000000A6	Dunn caves	02/06/2010	Lizzie Heaver Vivienne Jones	57.79891	-8.56354	-30	-10	-27.52	-7.52
180	MRMCS007000005D1.01	MRMCS007000000A6	Dunn caves	02/06/2010	Lizzie Heaver Vivienne Jones	57.79891	-8.56354	-30	-10	-27.52	-7.52
181	MRMCS007000005D1.01	MRMCS007000000A6	Dunn caves	02/06/2010	Lizzie Heaver Vivienne Jones	57.79891	-8.56354	-30	-10	-27.52	-7.52
182	MRMCS007000005D2.01	MRMCS007000000A6	Caves on Dunn	02/06/2010	Sue Mitchell	57.79891	-8.56354	-28	-18	-25.55	-15.55
183	MRMCS007000005D2.01	MRMCS007000000A6	Caves on Dunn	02/06/2010	Sue Mitchell	57.79891	-8.56354	-28	-18	-25.55	-15.55
184	MRMCS007000005D2.01	MRMCS007000000A6	Caves on Dunn	02/06/2010	Sue Mitchell	57.79891	-8.56354	-28	-18	-25.55	-15.55
185	MRMCS007000005D2.01	MRMCS007000000A6	Caves on Dunn	02/06/2010	Sue Mitchell	57.79891	-8.56354	-28	-18	-25.55	-15.55
186	MRMCS007000005D3.01	MRMCS007000000A6	Village Bay, Dunn	02/06/2010	Emma Harris	57.79891	-8.56354	-28	-10	-24.54	-7.54
187	MRMCS007000005D3.01	MRMCS007000000A6	Village Bay, Dunn	02/06/2010	Emma Harris	57.79891	-8.56354	-28	-10	-24.54	-7.54
188	MRMCS007000005D3.01	MRMCS007000000A6	Village Bay, Dunn	02/06/2010	Emma Harris	57.79891	-8.56354	-28	-10	-24.54	-7.54
189	MRMCS007000005D3.01	MRMCS007000000A6	Village Bay, Dunn	02/06/2010	Emma Harris	57.79891	-8.56354	-28	-10	-24.54	-7.54
190	MRMCS007000005D3.01	MRMCS007000000A6	Village Bay, Dunn	02/06/2010	Emma Harris	57.79891	-8.56354	-28	-10	-24.54	-7.54
191	MRMCS007000005D3.01	MRMCS007000000A6	Village Bay, Dunn	02/06/2010	Emma Harris	57.79891	-8.56354	-28	-10	-24.54	-7.54
192	MRMCS007000005D4.01	MRMCS007000000A6	Dunn Isle	02/06/2010	Philip Payne	57.79891	-8.56354	-30	-10	-27.53	-7.53
193	MRMCS007000005D4.01	MRMCS007000000A6	Dunn Isle	02/06/2010	Philip Payne	57.79891	-8.56354	-30	-10	-27.53	-7.53
194	MRMCS007000005D4.01	MRMCS007000000A6	Dunn Isle	02/06/2010	Philip Payne	57.79891	-8.56354	-30	-10	-27.53	-7.53
195	MRMCS007000005D4.01	MRMCS007000000A6	Dunn Isle	02/06/2010	Philip Payne	57.79891	-8.56354	-30	-10	-27.53	-7.53
196	MRMCS007000005D4.01	MRMCS007000000A6	Dunn Isle	02/06/2010	Philip Payne	57.79891	-8.56354	-30	-10	-27.53	-7.53
197	MRMCS007000005D5.01	MRMCS007000000A6	Clesgor, West Boreray	07/05/2010	Liz Morris	57.86632	-8.49911	-37	-25	-35.7	-23.7
198	MRMCS007000005D5.02	MRMCS007000000A6	Clesgor, West Boreray	07/05/2010	Liz Morris	57.86632	-8.49911	-37	-28	-35.7	-26.7
199	MRMCS007000005D6.01	MRMCS007000000A6	The Sawcut Dun	04/05/2010	Steven Barnard	57.79549	-8.55222	-24	-9	-22.58	-7.58
200	MRMCS007000005D6.02	MRMCS007000000A6	The Sawcut Dun	04/05/2010	Steven Barnard	57.79549	-8.55222	-28	-20	-23.58	-18.58

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
201	MRMCS007000005D6.02	MRMCS007000000A6	The Sawcut Dun	04/05/2010	Steven Barnard	57.79549	-8.55222	-28	-20	-23.58	-18.58
202	MRMCS007000005D6.03	MRMCS007000000A6	The Sawcut Dun	04/05/2010	Steven Barnard	57.79549	-8.55222	-30	-25	-28.58	-23.58
203	MRMCS007000005D7.01	MRMCS007000000A6	South West Dun	06/05/2010	Steven Barnard	57.7945	-8.564	-31	-22	-28.94	-19.94
204	MRMCS007000005D7.02	MRMCS007000000A6	South West Dun	06/05/2010	Steven Barnard	57.7945	-8.564	-26	-22	-23.94	-19.94
205	MRMCS007000005D7.03	MRMCS007000000A6	South West Dun	06/05/2010	Steven Barnard	57.7945	-8.564	-31	-22	-28.94	-19.94
206	MRMCS007000005D7.04	MRMCS007000000A6	South West Dun	06/05/2010	Steven Barnard	57.7945	-8.564	-31	-31	-28.94	-28.94
207	MRMCS007000005D8.01	MRMCS007000000A6	Glumachsgor, Dun	06/05/2010	Liz Morris	57.79332	-8.55775	-35	-21	-33	-19.03
208	MRMCS007000005D8.02	MRMCS007000000A6	Glumachsgor, Dun	06/05/2010	Liz Morris	57.79332	-8.55775	-37	-22	-35	-20
209	MRMCS007000005D8.03	MRMCS007000000A6	Glumachsgor, Dun	06/05/2010	Liz Morris	57.79332	-8.55775	-37	-33	-35	-31
210	MRMCS007000005D8.04	MRMCS007000000A6	Glumachsgor, Dun	06/05/2010	Liz Morris	57.79332	-8.55775	-37	-35	-35	-33
211	MRMCS007000005D9.02	MRMCS007000000A6	Sgeir nan Sgarbh	05/05/2010	Steven Barnard	57.81369	-8.55071	-26	-20	-24.3	-18.3
212	MRMCS007000005D9.03	MRMCS007000000A6	Sgeir nan Sgarbh	05/05/2010	Steven Barnard	57.81369	-8.55071	-26	-26	-24.3	-24.3
213	MRMCS007000005D9.01	MRMCS007000000A6	Sgeir nan Sgarbh	05/05/2010	Steven Barnard	57.81369	-8.55071	-20	-20	-18.3	-18.3
214	MRMCS007000005DA.01	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-23	-10	-20.8	-7.8
215	MRMCS007000005DA.02	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-40	-20	-37.8	-17.8
216	MRMCS007000005DA.03	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-40	-26	-37.8	-23.8
217	MRMCS007000005DA.03	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-40	-26	-37.8	-23.8
218	MRMCS007000005DA.03	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-40	-26	-37.8	-23.8
219	MRMCS007000005DA.04	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-40	-26	-37.8	-23.8
220	MRMCS007000005DA.04	MRMCS007000000A6	Rubha Bhrengadal	05/05/2010	Liz Morris	57.86356	-8.48483	-40	-26	-37.8	-23.8
221	694.013.001	JNCCMNCR30000694	Inner Loch Ghlinne, Hirta (St Kilda)	06/07/1997	David Donnan Frank Fortune John Baxter	57.82445	-8.5991	-41	-41	-38.5	-38.5
222	694.014.001	JNCCMNCR30000694	E outer Loch Ghlinne, Hirta (St Kilda)	06/07/1997	David Donnan John Baxter Frank Fortune	57.82677	-8.59934	-48	-48	-46	-46
223	694.014.001	JNCCMNCR30000694	E outer Loch Ghlinne, Hirta (St Kilda)	06/07/1997	David Donnan, John Baxter, Frank Fortune	57.82677	-8.59934	-48	-48	-46	-46
224	694.015.001	JNCCMNCR30000694	Gob Na H-Airde, Hirta (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.82695	-8.59414	-10	-10	-8.5	-8.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
225	694.017.001	JNCCMNCR30000694	Geo An T-Samh, Hirta (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.82621	-8.58927	-25	-15	-23.5	-13.5
226	694.018.001	JNCCMNCR30000694	E of Geo an t-Samh 1, Hirta (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.82631	-8.58558	-22	-19	-19.5	-16.5
227	694.018.002	JNCCMNCR30000694	E of Geo an t-Samh 1, Hirta (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.82631	-8.58558	-35	-22	-32.5	-19.5
228	694.018.003	JNCCMNCR30000694	E of Geo an t-Samh 1, Hirta (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.82631	-8.58558	-45	-22	-42.5	-19.5
229	694.019.001	JNCCMNCR30000694	East of Geo An T-samh 2, Hirta (St Kilda)	09/07/1997	David Donnan John Baxter Frank Fortune	57.82623	-8.58539	-25	-18	-23	-16
230	694.019.002	JNCCMNCR30000694	East of Geo An T-samh 2, Hirta (St Kilda)	09/07/1997	David Donnan John Baxter Frank Fortune	57.82623	-8.58539	-30	-25	-28	-23
231	694.019.003	JNCCMNCR30000694	East of Geo An T-samh 2, Hirta (St Kilda)	09/07/1997	David Donnan John Baxter Frank Fortune	57.82623	-8.58539	-42.5	-30	-40.5	-28
232	694.003.001	JNCCMNCR30000694	Geo Ruadh, NE Soay (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.83441	-8.6254	-35	-33	-34	-32
233	694.003.002	JNCCMNCR30000694	Geo Ruadh, NE Soay (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.83441	-8.6254	-43	-34	-42	-33
234	694.005.001	JNCCMNCR30000694	Geo Nan R•n, South Soay (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.82504	-8.62891	-15	-12	-12	-9
235	694.005.002	JNCCMNCR30000694	Geo Nan R•n, South Soay (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.82504	-8.62891	-15	-12	-12	-9
236	694.006.001	JNCCMNCR30000694	NE of Sgeir Mac Righ Lochlain, S Soay (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.82222	-8.6397	-14	-12	-11	-9
237	694.006.002	JNCCMNCR30000694	NE of Sgeir Mac Righ Lochlain, S Soay (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.82222	-8.6397	-25	-14	-22	-11
238	694.006.003	JNCCMNCR30000694	NE of Sgeir Mac Righ Lochlain, S Soay (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.82222	-8.6397	-38	-25	-35	-22

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
239	694.006.004	JNCCMNCR30000694	NE of Sgeir Mac Righ Lochlain, S Soay (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.82222	-8.6397	-38	-38	-35	-35
240	694.007.001	JNCCMNCR30000694	N of the Cambir, Hirta (St Kilda)	08/07/1997	David Donnan John Baxter Frank Fortune	57.82801	-8.61172	-25	-21	-23	-19
241	694.008.001	JNCCMNCR30000694	NE of the Cambir, Hirta (St Kilda)	08/07/1997	David Donnan Frank Fortune John Baxter	57.82874	-8.60983	-46	-44	-44	-42
242	694.009.001	JNCCMNCR30000694	W outer Loch Ghlinne, Hirta (St Kilda)	06/07/1997	David Donnan Frank Fortune John Baxter	57.82749	-8.60622	-47	-47	-45	-45
243	694.011.001	JNCCMNCR30000694	E of the Cambir, Loch Ghlinne, Hirta (St Kilda)	06/07/1997	David Donnan Frank Fortune John Baxter	57.82622	-8.60278	-44	-44	-42	-42
244	694.012.001	JNCCMNCR30000694	Inner Loch Ghlinne, Hirta (St Kilda)	08/07/1997	David Donnan Frank Fortune John Baxter	57.82552	-8.6008	-44	-44	-42.5	-42.5
245	694.020.001	JNCCMNCR30000694	W of Mhina Stac, Hirta (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.82665	-8.56875	-36	-33	-34	-31
246	694.021.001	JNCCMNCR30000694	E of Mhina Stac, Hirta (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.82654	-8.56569	-40	-30	-37.5	-27.5
247	694.022.001	JNCCMNCR30000694	Leac Mhina Stac, Hirta (St Kilda)	06/07/1997	David Donnan John Baxter Frank Fortune	57.82495	-8.56243	-36	-34	-35	-33
248	694.022.002	JNCCMNCR30000694	Leac Mhina Stac, Hirta (St Kilda)	06/07/1997	David Donnan John Baxter Frank Fortune	57.82495	-8.56243	-38	-36	-37	-35
249	694.023.001	JNCCMNCR30000694	SE Leac Mhina Stac 2, Hirta (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.82362	-8.5641	-14	-11	-12.5	-9.5
250	694.024.001	JNCCMNCR30000694	SE of Mhina Stac 1, Hirta (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.82388	-8.55086	-32	-32		
251	694.025.001	JNCCMNCR30000694	NE of Sgeir Nan Sgarbh, Hirta (St Kilda)	07/07/1997	David Donnan John Baxter	57.81725	-8.54509	-52	-52	-51	-51
252	694.026.001	JNCCMNCR30000694	N of Sgeir nan Sgarbh, Hirta (St Kilda)	07/07/1997	David Donnan John Baxter	57.81491	-8.55193	-25	-22	-24	-21

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
					Frank Fortune						
253	694.027.001	JNCCMNCR30000694	E of Rubha an Uisge, Hirta (St Kilda)	06/07/1997	David Donnan John Baxter Frank Fortune	57.81206	-8.54617	-47	-45	-46	-44
254	694.027.002	JNCCMNCR30000694	E of Rubha an Uisge, Hirta (St Kilda)	06/07/1997	David Donnan John Baxter Frank Fortune	57.81206	-8.54617	-47	-47	-46	-46
255	694.028.001	JNCCMNCR30000694	Village Bay, S of Rubha an Usige, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80995	-8.55203	-20	-12.5	-19.5	-12
256	694.028.002	JNCCMNCR30000694	Village Bay, S of Rubha an Usige, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80995	-8.55203	-28	-20	-27.5	-19.5
257	694.028.003	JNCCMNCR30000694	Village Bay, S of Rubha an Usige, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80995	-8.55203	-35	-28	-34.5	-27.5
258	694.028.004	JNCCMNCR30000694	Village Bay, S of Rubha an Usige, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80995	-8.55203		-35		-34.5
259	694.029.001	JNCCMNCR30000694	S of Rubha Challa, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80764	-8.56005	-24	-6	-23	-5
260	694.029.002	JNCCMNCR30000694	S of Rubha Challa, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80764	-8.56005	-24	-21	-23	-20
261	694.029.003	JNCCMNCR30000694	S of Rubha Challa, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80764	-8.56005	-24	-24	-23	-23
262	694.030.001	JNCCMNCR30000694	Mooring site, Village Bay (St Kilda)	02/07/1997	David Donnan John Baxter	57.80865	-8.5685	-9	-9		
263	694.031.001	JNCCMNCR30000694	Centre of Village Bay, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80615	-8.56282	-22.5	-22.5	-20	-20
264	694.032.001	JNCCMNCR30000694	Village Bay, NE Ruaival, Hirta (St Kilda)	05/07/1997	David Donnan John Baxter	57.80144	-8.56668	-17	-17	-14.5	-14.5
265	694.033.001	JNCCMNCR30000694	N side of Dun (offshore) (St Kilda)	05/07/1997	David Donnan John Baxter	57.79795	-8.5606	-33	-27	-30	-24
266	694.033.002	JNCCMNCR30000694	N side of Dun (offshore) (St Kilda)	05/07/1997	David Donnan John Baxter	57.79797	-8.56065	-33	-27	-30	-24
267	694.034.001	JNCCMNCR30000694	N side of Dun (inshore) (St Kilda)	05/07/1997	David Donnan, John Baxter	57.79762	-8.5611	-24.5	-2	-21.5	1
268	694.035.001	JNCCMNCR30000694	E of Bioda Mor, Dun (St Kilda)	05/07/1997	David Donnan John Baxter Alistair Davison	57.79646	-8.55515	-40	-38	-37	-35
269	694.035.002	JNCCMNCR30000694	E of Bioda Mor, Dun (St Kilda)	05/07/1997	David Donnan John Baxter	57.79646	-8.55515	-40	-40	-37	-37

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
					Alistair Davison						
270	694.036.001	JNCCMNCR30000694	NE of Goban Duin, Dun (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.79827	-8.53405	-55	-55	-54	-54
271	694.037.001	JNCCMNCR30000694	Poplar Reefm Nr Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.79212	-8.52416	-26	-8	-24	-6
272	694.037.002	JNCCMNCR30000694	Poplar Reefm Nr Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.79212	-8.52416	-38	-26	-36	-24
273	694.037.003	JNCCMNCR30000694	Poplar Reefm Nr Levenish (St Kilda)	07/07/1997	David Donnan John Baxter	57.79212	-8.52416	-42	-38	-40	-36
274	694.038.001	JNCCMNCR30000694	Poplar reef 3, Nr Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.79148	-8.52776	-26	-23	-24.5	-21.5
275	694.038.002	JNCCMNCR30000694	Poplar reef 3, Nr Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.79148	-8.52776	-26	-23	-24.5	-21.8
276	694.038.003	JNCCMNCR30000694	Poplar reef 3, Nr Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.79148	-8.52776	-43	-40	-41.5	-38.5
277	694.039.001	JNCCMNCR30000694	S side of Poplar Reef, nr. Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.7909	-8.5285	-50	-30	-48	-28
278	694.039.002	JNCCMNCR30000694	S side of Poplar Reef, nr. Levenish (St Kilda)	07/07/1997	David Donnan John Baxter Frank Fortune	57.7909	-8.5285	-70	-50	-68	-48
279	694.040.001	JNCCMNCR30000694	W of Bioda Mor, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79488	-8.56819	-23	-9	-20	-6
280	694.040.002	JNCCMNCR30000694	W of Bioda Mor, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79488	-8.56819	-37	-23	-34	-20
281	694.040.003	JNCCMNCR30000694	W of Bioda Mor, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79488	-8.56819	-54	-37	-51	-34
282	694.040.004	JNCCMNCR30000694	W of Bioda Mor, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79488	-8.56819	-54	-50	-51	-47
283	694.041.001	JNCCMNCR30000694	NE of An Fhaing, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79662	-8.56693	-2	-1	1	2
284	694.041.002	JNCCMNCR30000694	NE of An Fhaing, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79662	-8.56693	-19	-2	-16	1

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
285	694.041.003	JNCCMNCR30000694	NE of An Fhaing, Dun (St Kilda)	02/07/1997	David Donnan John Baxter	57.79662	-8.56693	-19	-2	-16	1
286	694.042.001	JNCCMNCR30000694	E of Rubha Mhuirich, Hirta (St Kilda)	02/07/1997	David Donnan John Baxter	57.80495	-8.5866	-9	-2	-6.5	0.5
287	694.042.002	JNCCMNCR30000694	E of Rubha Mhuirich, Hirta (St Kilda)	02/07/1997	David Donnan John Baxter	57.80495	-8.5866	-25.5	-9	-23.5	-6.5
288	694.042.003	JNCCMNCR30000694	E of Rubha Mhuirich, Hirta (St Kilda)	02/07/1997	David Donnan John Baxter	57.80491	-8.58655	-25.5	-20	-23.5	-17.5
289	694.043.001	JNCCMNCR30000694	SE of Geo na Capuill, west Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80512	-8.61009	-8	-2	-5	1
290	694.043.002	JNCCMNCR30000694	SE of Geo na Capuill, west Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80513	-8.61005	-10	-8	-7	-5
291	694.044.001	JNCCMNCR30000694	NW of Sgeir Mh¢r, Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80719	-8.61026	-42.5	-36		
292	694.045.002	JNCCMNCR30000694	W of Mullach Bi, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80615	-8.61277	-56	-52		
293	694.045.001	JNCCMNCR30000694	W of Mullach Bi, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80615	-8.61277	-52	-51		
294	694.046.001	JNCCMNCR30000694	Offshore W of Mullach Bi, west Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80331	-8.61022	-81	-80		
295	694.046.002	JNCCMNCR30000694	Offshore W of Mullach Bi, west Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80331	-8.61022	-81	-81		
296	694.047.001	JNCCMNCR30000694	NW of Geo Na Lashulaich, West Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.81304	-8.61724	-50	-38		
297	694.047.002	JNCCMNCR30000694	NW of Geo Na Lashulaich, West Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.81304	-8.61724	-50	-50		
298	694.048.001	JNCCMNCR30000694	SW of Geo na Stacan, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80917	-8.61704	-52	-42	-50.5	-40.5
299	694.048.002	JNCCMNCR30000694	SW of Geo na Stacan, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80917	-8.61704	-60	-52	-58.5	-50.5
300	694.048.003	JNCCMNCR30000694	SW of Geo na Stacan, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.80917	-8.61704	-68	-60	-66.5	-58.5
301	694.049.001	JNCCMNCR30000694	S of Poll a Choire, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.81766	-8.61489	-20	-8	-18	-6
302	694.049.002	JNCCMNCR30000694	S of Poll a Choire, W Hirta (St Kilda)	03/07/1997	David Donnan Frank Fortune	57.81766	-8.61489	-20	-17	-18	-15

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
303	694.050.001	JNCCMNCR30000694	Stac An Armin (St Kilda)	04/07/1997	David Donnan John Baxter	57.88098	-8.49534	-20	-5	-18	-3
304	694.050.002	JNCCMNCR30000694	Stac An Armin (St Kilda)	04/07/1997	David Donnan John Baxter	57.88098	-8.49534	-30	-20	-28	-18
305	694.050.003	JNCCMNCR30000694	Stac An Armin (St Kilda)	04/07/1997	David Donnan John Baxter	57.88098	-8.49534	-44	-30	-42	-28
306	694.051.001	JNCCMNCR30000694	Boreray NE (St Kilda)	04/07/1997	David Donnan John Baxter	57.87527	-8.48551	-26	-24	-24.5	-22.5
307	694.051.002	JNCCMNCR30000694	Boreray NE (St Kilda)	04/07/1997	David Donnan John Baxter	57.87527	-8.48551	-44	-32	-42.5	-30.5
308	694.052.001	JNCCMNCR30000694	Boreray E 2 (St Kilda)	04/07/1997	David Donnan John Baxter	57.87119	-8.4841	-20	-14	-18.5	-12.5
309	694.052.002	JNCCMNCR30000694	Boreray E 2 (St Kilda)	04/07/1997	David Donnan John Baxter	57.87119	-8.4841	-23	-20	-21.5	-18.5
310	694.052.003	JNCCMNCR30000694	Boreray E 2 (St Kilda)	04/07/1997	David Donnan John Baxter	57.87119	-8.4841	-31	-23	-29.5	-21.5
311	694.053.001	JNCCMNCR30000694	Boreray E 1 (St Kilda)	04/07/1997	David Donnan Frank Fortune	57.87042	-8.48345	-45	-43		
312	694.054.001	JNCCMNCR30000694	SE Boreray 1 (St Kilda)	04/07/1997	David Donnan John Baxter	57.86689	-8.47842	-54	-54	-51	-51
313	694.055.001	JNCCMNCR30000694	SE Boreray 2 (St Kilda)	04/07/1997	David Donnan John Baxter	57.86684	-8.47773	-68	-66	-65	-63
314	MRMCS00700000711.01	MRMCS007000000C2	Wall: Dunn Southend	18/08/2011	Nicola Faulks	57.7942	-8.55656	-19	-3	-17	-2
315	MRMCS00700000711.02	MRMCS007000000C2	Wall: Dunn Southend	18/08/2011	Nicola Faulks	57.7942	-8.55656	-30	-10	-28	-8
316	MRMCS00700000711.02	MRMCS007000000C2	Wall: Dunn Southend	18/08/2011	Nicola Faulks	57.7942	-8.55656	-30	-10	-28	-8
317	MRMCS00700000712.01	MRMCS007000000C2	Pinnacle Oh Rubha Mnuirich	18/08/2011	Nicola Faulks	57.804	-8.5864	-19	-15	-16.5	-12.5
318	MRMCS00700000712.02	MRMCS007000000C2	Pinnacle Oh Rubha Mnuirich	18/08/2011	Nicola Faulks	57.804	-8.5864	-25	-19	-22.5	-16.5
319	MRMCS00700000712.03	MRMCS007000000C2	Pinnacle Oh Rubha Mnuirich	18/08/2011	Nicola Faulks	57.804	-8.5864	-30	-22	-27.5	-19.5
320	MRMCS00700000713.01	MRMCS007000000C2	Wall North East side of Dun	16/08/2011	Nicola Faulks	57.79703	-8.55881	-16	-2	-15.5	-1.5
321	MRMCS00700000713.01	MRMCS007000000C2	Wall North East side of Dun	16/08/2011	Nicola Faulks	57.79703	-8.55881	-16	-2	-15.5	-1.5
322	MRMCS00700000713.02	MRMCS007000000C2	Wall North East side of Dun	16/08/2011	Nicola Faulks	57.79703	-8.55881	-25	-16	-24.5	-15.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
323	MRMCS00700000713.03	MRMCS007000000C2	Wall North East side of Dun	16/08/2011	Nicola Faulks	57.79703	-8.55881	-26	-24	-25.5	-23.5
324	MRMCS00700000714.01	MRMCS007000000C2	Saw Cut	16/08/2011	Nicola Faulks	57.7952	-8.55259	-16	-6	-13.5	-3.5
325	MRMCS00700000714.01	MRMCS007000000C2	Saw Cut	16/08/2011	Nicola Faulks	57.7952	-8.55259	-16	-6	-13.5	-3.5
326	MRMCS00700000714.02	MRMCS007000000C2	Saw Cut	16/08/2011	Nicola Faulks	57.7952	-8.55259	-22	-15	-19.5	-12.5
327	MRMCS00700000714.03	MRMCS007000000C2	Saw Cut	16/08/2011	Nicola Faulks	57.7952	-8.55259	-22	-15	-19.5	-12.5
328	MRMCS00700000715.01	MRMCS007000000C2	Stac Lee	17/08/2011	Nicola Faulks	57.86619	-8.50797	-18	-2	-15	1
329	MRMCS00700000715.01	MRMCS007000000C2	Stac Lee	17/08/2011	Nicola Faulks	57.86619	-8.50797	-18	-2	-15	1
330	MRMCS00700000715.02	MRMCS007000000C2	Stac Lee	17/08/2011	Nicola Faulks	57.86619	-8.50797	-30	-18	-27	-15
331	MRMCS00700000715.03	MRMCS007000000C2	Stac Lee	17/08/2011	Nicola Faulks	57.86619	-8.50797	-35	-30	-32	-27
332	MRMCS00700000716.01	MRMCS007000000C2	Sgeir nan Sgarth	17/08/2011	Nicola Faulks	57.81414	-8.55035	-11	0	-10	1
333	MRMCS00700000716.02	MRMCS007000000C2	Sgeir nan Sgarth	17/08/2011	Nicola Faulks	57.81414	-8.55035	-16	-11	-15	-10
334	MRMCS00700000716.03	MRMCS007000000C2	Sgeir nan Sgarth	17/08/2011	Nicola Faulks	57.81414	-8.55035	-23	-16	-22	-15

Annex 13C – Habitat and biological data

Data as downloaded from Marine Recorder. Text is uneditted and may include formatting artefacts. Species names have not been italicised and nomenclature has not been updated.

Code	Habitat	Description	Biotope
1	Sublittoral rock and boulders	STEEP AND VERTICAL ROCK. The majority of steep rock surfaces in the circalittoral zone appear to be covered by encrusting species of sponges, bryozoans and algae. The most common mixtures to appear in the photographs are as follows: i) A bryozoan turf with a variety of other species including red algae at shallower depths, and Sagartia elegans. ii) Corynactis viridis often with encrusting sponges, lithothamnion or Alcyonium. iii) Tubularia indivisa with bryozoans and encrusting sponges. iv) Overhangs with thick growths of Tubularia, encrusting sponges and anemones. HORIZONTAL AND MODERATELY SLOPING ROCK. Extensive areas of smooth sloping bedrock are present as well as horizontal rock ridges of varying sizes. Again, encrusting and low growing species predominate: i) Large areas dominated by Tubularia indivisa and a yellow encrusting sponge - possible Tubularia/Halichondria panicea community?? ii) Extensive sloping 'walls' dominated by Metridium senile and a yellow encrusting sponge that may be Myxilla incrustans. iii) Thick clean bryozoan turf with other species such as Alcyonium; algae (shallow depths); Sagartia elegans and Corynactis viridis. iv) Extensive mosaics of Alcyonium digitatum (predominant), encrusting sponges, hydroids and scattered algae. v) 'Barer' areas of lithothamnion, encrusting bryozoans, Clavellina lepadiformis and scattered larger species such as Alcyonium. vi) Horizontal ledges of Alcyonium digitatum, Haliclona sp. and hydroids. vii) Kelp park with an undergrowth of red algae, lithothamnion and Alcyonium. BOULDERS. Boulders were either rather 'bare' with a cover of encrusting bryozoans, lithothamnion and Pomatoceros triqueter (especially on the sides); or were covered by Alcyonium digitatum and encrusting sponges. The latter are probably less mobile than the former. ANIMAL MOSAICS. Many of the photographs showed small areas of rock covered by a variety of species, but were on too large a scale to show the extent of each species or the slope of the rock: i) Lithothamnion and a low silty turf of either amphipod tubes or bryozoans with a variety of other species especially Caryophyllia smithi, Sagartia elegans, Clavellina and Actinothoe. ii) Tubularia indivisa and Sagartia elegans varieties. iii) Corynactis viridis. iv) Alcyonium digitatum, Metridium senile and Tubularia indivisa. v) Orange encrusting sponge and Sagartia elegans. vi) Corynactis viridis and clean bryozoan turf. vii) Encrusting sponges, encrusting bryozoans, erect bryozoans and anemones.	CR
2	Dense kelp `park' (L. hyperborea/L. saccharina) on bedrock with boulders.	Mixture of large tall rock outcrops and areas of fairly rounded but reasonably stable boulders on seabed floor between. Fairly dense park, mainly L. hyperborea but with frequent L. saccharina mixed in, on the tops of rocks. Rock beneath fairly well grazed and mostly covered by Aglaozonia with less coralline crusts and only sparse red algae, particulary the reptant form of Cryptopleura. Vertical faces covered either by dense Corynactis or dense Antedon, both mixed with Scrupocellaria and Caryophyllia.	IR.HIR.KFaR.LhypR.Pk
3	Seasonally unstable cobbles and pebbles with Laminaria saccharina.	On the floor of a large gully, seasonally unstable boulders, cobbles and pebbles were dominated by dense Laminaria saccharina beneath which were sparse foliose red algae and encrusting coralline algae and bryozoans.	IR.HIR.KSed.LsacSac
4	Wave surged shallow open cave.	Wide open cave extending above surface and subject to much wave surge - inner zone more or less lacked seaweeds and was covered by a dense turf of Corynactis and sponge crusts with large patches of red crust (?Cruoria pellita) and intermixed with some short bryozoan turf (Scrupocellaria, Bugula) and colonial ascidians.	IR.FIR.SG.CrSpAsAn
5	Laminaria hyperborea forest with dense Corynactis.	Forest of dense but fairly short Laminaria hyperborea on bedrock with a dense turf of Corynactis and various other animals (sponges, bryozoan short turf). Red seaweeds fairly sparse, with kelp stipes bare.	IR.HIR.KFaR.LhypFa
6	Upper infralittoral bedrock with Laminaria hyperborea at 12-19m BCD.	Heavily grazed upper infralittoral bedrock with Laminaria hyperborea forest, dense Echinus esculentus and encrusting coralline algae.	IR.HIR.KFaR.LhypR.Ft
7	Lower infralittoral Laminaria	Massive and very large boulders in the lower infralittoral with grazed Laminaria hyperborea park, with coralline algal	IR.MIR.KR.Lhyp.GzPk

Code	Habitat	Description	Biotope
	hyperborea park at 20-27m BCD.	crusts, Caryophyllia smithii and sparse folise red algae. Most kelp stipes were also heavily grazed.	
8	Shaded infralittoral bedrock with dense Corynactis, sponge crusts, Tubularia indivisa and Saga	Shaded infralittoral bedrock in a large gulley/cave system. Strata tilted to produce an overhanging/vertical cliff which ran the whole length of one side of a long cave (100m+). Main species included Corynactis viridis over most surfaces, large patches of encrusting sponge - some Halichondria panicea, Metridium senile, Sagartia elegans, Caryophyllia smithii and patches of dense Tubularia indivisa on the tops of the boulders. Underlying crusts of bryozoans and coralline algae.	IR.FIR.SG.CrSpAsAn
9	Scoured/grazed boulders and bedrock with coralline and bryozoan crusts.	Scoured/grazed boulders and bedrock on the floor of a long cave/gulley with little other than coralline and bryozoan crusts. Patches of sparse Caryophyllia, Corynactis and large Urticina felina.	IR.FIR.SG.CC.Mo
10	Sublittoral fringe bedrock with Alaria esculenta.	Wide sublittoral fringe bedrock slope with Alaria esculenta, encrusting sponges, dense foliose red algae. Incompletely recorded.	IR.HIR.KFaR.Ala.Myt
11	Laminaria hyperborea forest on bedrock from 4-18m.	Dense forest of Laminaria hyperborea with mixture of red algae and a cushion fauna of sponges, bryozoans and Corynactis.	IR.HIR.KFaR.LhypFa
12	Shaded vertical infralittoral bedrock with dense Corynactis, bryozoan turf and Metridium senile	Shaded vertical and overhanging rock face with dense Corynactis viridis and large patches of Sagartia elegans and Metridium senile. Also patches of Scrupocellaria and Crisia turf interspersed with sponges and Botrylloides.	IR.HIR.KFaR.LhypRVt
13	Upper infralittoral Laminaria hyperborea forest with Corynactis viridis.	Exposed bedrock with dense Laminaria hyperborea forest with Corynactis viridis and coralline crusts. Turf of Scrupocellaria sp. and Crisiidae. Kelp of various sizes - many small plants.	IR.HIR.KFaR.LhypFa
14	Grazed Laminaria hyperborea park on massive boulders.	Gently sloping plain of massive boulders. Tops of boulders with fairly dense Laminaria hyperborea park with rock below heavily grazed and dominated by Aglaozonia and coralline crusts. Red algae very sparse but Dictyota relatively common. Sides of boulders with Corynactis, Scrupocellaria and some Pomatoceros. Some large overhanging faces with bryozoan crusts (Parasmittina) and spirorbids (not very diverse). All fairly species poor. At shallowest part of habitat there were large vertical faces with sponges and Alcyonium (not surveyed).	IR.MIR.KR.Lhyp.GzPk
15	Bedrock with Laminaria hyperborea forest and foliose red algae.	Extremely exposed bedrock with Laminaria hyperborea forest and foliose red algae. Understory of colonial ascidians, sheets of sponge and sparse Corynactis viridis and Sagartia elegans.	IR.HIR.KFaR.LhypR.Ft
16	Lower infralittoral boulders and cobbles with bryozoan crusts and filamentous red algae.	Lower infralittoral rounded cobbles and boulders at 27 m with bryozoan crusts, sparse red and brown algae and a variety of grazing gastropods and echinoderms.	IR.MIR.KR.Lhyp.GzPk
17	Very steep sublittoral fringe bedrock with Alaria esculenta.	Steep and vertical bedrock in the sublittoral fringe with dense Alaria esculenta and coralline algae and very large patches of Halichondria panicea. Scattered red algae, particularly Lomentaria clavellosa and Polysiphona stricta.	IR.HIR.KFaR.Ala.Myt
18	Vertical bedrock with kelp forest.	Vertical bedrock with kelp forest. Plants of mixed sizes and many small ones. Varied undergrowth depending on depth and inclination. In deeper water rock surfaces had a patchwork of ascidians and bryozoa turf and a variety of other sessile and mobile animals and scattered algae. In shallower water, rocks beneath the kelp were covered with dense foliose algae.	IR.HIR.KFaR.LhypRVt
19	Lower infralittoral Laminaria hyperborea park with Corynactis viridis, sponges and ascidians	Lower infralittoral vertical cliff base and horizontal bedrock with sparse Laminaria hyperborea, Corynactis viridis with encrusting sponges, ascidians and a short bryozoan turf. Small fissures and crevices contained Urticina sp. and Sagartia.	IR.HIR.KFaR.LhypRVt
20	Cave side walls with sponges.	Extensive vertical walls inside cave with dense cover of sponge crusts mixed with patches of Corynactis viridis, a few colonial ascidians (Polyclinum sp., Botrylloides sp.), tufts of crisiids and bryozoan crust. Crevices with Ophiopholis aculeata and a single sipunculid (Phasolosoma ?). Small Alcyonium sp. scattered about but more frequent colonies of Parerythropodium sp.	IR.FIR.SG.CrSpAsAn

Code	Habitat	Description	Biotope
21	Scoured boulders at cave bottom with barnacles.	Scoured boulders in bottom of cave. Very stable at time of survey but must move in bad weather. Boulders supported Balanus crenatus with some Clavelina lepadiformis, Cancer oagurus and Asterias rubens.	IR.FIR.SG.CC.Mo
22	Laminaria hyperborea with cushion fauna, and red seaweeds.	Near vertical rock wall with Laminaria hyperboea - fairly dense at top but thinning below 7 m and stopping at about 15 m. Stipes densely covered in red seaweeds. Reds not very dense on rock, but fauna very rich with Corynactis sp. Metridium sp., sponges, Scrupocellaria and polyclinids.	IR.HIR.KFaR.LhypRVt
23	Circalittoral rock wall with Corynactis sp. and Antedon sp.	Extensive near vertical rock wall with dense Corynactis sp. on a covering of coralline crusts. Small Antedon sp. abundant. Rock surface also with a dense turf of Scrupocellaria reptans and fequent patches of sponge. Quite diverse (and not fully surveyed).	IR.FIR.SG.CrSpAsAn
24	Archway at 25-30 m with dense Tubularia sp.	Ceiling and upper section of tunnel dominted by Tubularia spp., and Metridium senile. Very richly colonised with dense mixture of dideminids and polychinids with anemones and sponges all covered by numerous giant caprellids.	CR.HCR.FaT.CTub.CuSp
25	Wave surge vertical rock with Laminaria hyperborea, faunal turf and foliose red algae.	Vertical rock with kelp forest of mixed sized plants and many small plants. Stipes of larger plants were covered with dense red algae. Kelp undergrowth was animal dominated in the lower part of the zone, with Metridium senile, Sagartia elegans and sponges. In the shallower parts there were also patches of dense foliose red algae, with Lomentaria clavellosa a characteristic component.	IR.HIR.KFaR.LhypRVt
26	Vertical rock with anemones, ascidians and sponges.	Vertical rock extending from 27 m bsl with sand and boulders at the base, extending to dense kelp forest at 11 m bsl. Completely encrusted with a dense faunal turf over encrusting coralline algae. The deeper part supported Caryophyllia smithii, Corynactis virids and sponge crusts, Alcyonium digitatum and Sagartia elegans. Shallower rock with dense covering of large bryozoan, Dictyota dichotoma and Metridium senile.	IR.HIR.KFaR.LhypRVt
27	Upper circalittoral boulders and cobbles with sand with Ophiocomina nigra bed.	Upper circalittoral boulders and cobbles with coarse sand between then. Brittle stars Ophiocomina nigra most abundant fauna on bryozoan and corralline crusts. Sparse hydroids; Nemertesia antennia and Nemertesia ramosa, Abietinaria abietina and Halecium halecinum and tufts of Flustra foliacea throughout and sparse red algae - Kallymenia reniformis on boulder tops. Diazona violacea and Porella compressa occasional.	CR.MCR.EcCr
28	Exposed, coarse sand with Arctica islandica.	Level plain of coarse sand with no conspiquous epifauna other than Dab Limanda limanda and one Astropecten sp. The only obvious infauna was Arctica islandica.	SS.SSa.IMuSa.FfabMag
29	Outer upper zone of large deep cut with sponges, anemones and algae.	Outer upper zone at entrance to very large deep cut, colonised by a think turf of sponges, Corynactis sp. and polyclinids with small patches of Scrupocellaria sp. and small red algae, (Erythroglossum laciniatum, Hypoglossum hypoglossoides) and small scattered kelp plants, scattered over the more upward facing outer rock faces.	IR.HIR.KFaR.LhypRVt
30	Inner/deep zone of large gulley with bryozoan turf, sponges and polyclinids.	Extensive vertical walls of a huge deep gully with a dense turf of crissiid bryozoans mixed with a wide variety of sponge crusts/ calcareous sponges and polyclinid ascidians, especially Polyclinium sp., Sagartia sp. and, Ophiopholis sp. in crevices with Galathea mexa.	IR.FIR.SG.CrSpAsAn
31	Lower infralittoral boulders and bedrock with dense Corynactis sp., sparse Laminaria hyperborea	Lower infralittoral bedrock and very large boulders with sparse kelp park, dense Corynactis viridis and patches of Sagartia sp., Scrupocelleria sp., Myxilla incrustans and, Flustra foliacea.	IR.HIR.KFaR.LhypFa
32	Steep and vertical bedrock with Laminaria hyperborea, anemones and sponges.	The flat top of the reef and the vertical sides down to 24 m BSL characterised by dense Laminaria hyperborea with heavily epiphytised stipes (mainly Phycodrys sp., Palmaria sp. Ptilota sp. and Membranoptoa sp.) with dense Coryne sp. Below the kelp, the rock surface was completely covered with Metridium senile (dwarf), Actinothoe sphyrodeta and Myxilla incrustans with foliose red algae. Sarsia tubulosa has been added to this habitat; although it was identified by NMS, there was no habitat assigned to the specimen, only S684.12	IR.HIR.KFaR.LhypRVt
33	Lower infralittoral Laminaria hyperborea park with dense Corynactis sp.	Extensive zone of Laminaria hyperborea on very steep rock drop off with many vertical faces. Beneath the kelp were a sparse red algal flora and a thick cushion of Corynactis sp. with large colonies of Myxilla incrustans and Haliclona viscosa. Smaller patches of bryozoan turf and polyclinids. Kelp fairly dense short \`park\` down to about 35 m with only isolated small kelp plants down to 43 m bcd. Extensive coralline algal crusts at deepest depths, with Schottera	IR.HIR.KFaR.LhypRVt

Code	Habitat	Description	Biotope
		nicaeensis the deepest foliose red alga at 40 m bcd.	
34	Vertical bedrock with Alaria esculenta and encrusting coralline algae.	Vertical bedrock in the sublittoral fringe with dense Alaria esculenta over encrusting coralline algae. A few scattered red algae, small Tectura sp. and anemones, but survey incomplete because of swell.	IR.HIR.KFaR.Ala.Myt
35	Vertical bedrock cliff with Laminaria hyperborea forest.	Very steep and vertical bedrock with kelp forest; many small plants. Undergrowth of dense bryozoan turf in deeper parts, and sponges and red algae. In shallower water the rock surface beneath the kelp was covered with dense foliose red and brown algae.	IR.HIR.KFaR.LhypRVt
36	Vertical and horizontal infralittoral bedrock with Laminaria hyperborea park.	Lower infralittoral bedrock cliff and its horizontal base was characterised by Laminaria hyperborea park with encrusting coralline algae, a crisiid turf, anemones and foliose red algae.	IR.HIR.KFaR.LhypRVt
37	Saccorhiza polyschides forest on bedrock.	Large patches (5-10 m across) of dense Saccarhiza polyschides forest mixed with some Alaria esculenta and both Desmarestia ligulata and Desmarestia aculeata and a little Laminaria saccharina. Underneath was a very dense turf of Polysiphonia stricta and Bonnemaisonia asparagoides. A few other red algae, but few other species.	IR.HIR.KSed.Sac
38	Slightly over hanging bedrock with faunal turf of sponges and ascidians, 10 m bcd.	Slightly over hanging bedrock, scoured at base by boulders in gully. Wall supported a faunal turf with sponges, anemones and ascidians.	IR.FIR.SG.CrSpAsAn
39	Surged bedrock with dense Alaria esculenta.	Surged sublittoral fringe bedrock with dense Alaria escultenta overlying coralline algae encrusted bedrock. Patches of Botrylloides leachi and Polyclium aurantium.	IR.HIR.KFaR.Ala.Myt
40	Mixed Laminaria hyperborea and Laminaria saccharina forest.	Laminaria hyperborea forest and park with understory of foliose and filamentous red algae. Some Alaria sp. (occasional) and Desmarestia ligulata.	IR.HIR.KSed.LsacSac
41	Very exposed vertical rock with Corynactis viridis and Scrupocellaria sp.	Vertical sides of massive boulders (3-4 m high) dominated by faunal turf of Corynactis viridis and a bryozoan turf (Scrupocellaria sp.). Ascidians occurred (Aplidium punctum and Polyclinids) and fine foliose red algae.	IR.FIR.SG.CrSpAsAn
42	Unstable boulders and cobbles with bryozoan crusts and coralline crusts.	Unstable cobbles and boulders between massive boulders, extremely mobile scoured by wave action and mobility of substrate. Squat lobsters (Galathe sp.) and brittle stars between the cobbles. Sparsely scattered bryozoan crusts on cobbles.	IR.HIR.KSed.LsacSac
43	Rock wall with Alaria sp. and Desmarestia ligulata at +1 to 11 m.	Very wide sublittoral fringe with a mixture of Alaria sp. and Desmarestia spp., especially Desmarestia ligulata and dense red seaweeds below. Not fully surveyed.	IR.HIR.KFaR.Ala.Myt
44	Laminaria hyperborea forest on rock wall at 11-19 m.	Dense forest of short Laminaria hyperborea on a near vertical rock wall. Dense red algae on stipes and a mixture of dense red algae and sponges/anemones on rock surface beneath. Not fully surveyed.	IR.HIR.KFaR.LhypRVt
45	Infralittoral vertical bedrock and very large boulders with kelp park and anthozoan turf.	Bedrock wall with very large boulders at its base with sparse kelp park and a turf of Corynactis sp. , Haliclona viscosa, bryozoan crusts and Sagartia elegans. Patches of Flustra foliacea and small clusters of Sertularella gayi.	IR.HIR.KFaR.LhypRVt
46	Surge cave with sponge crusts and calcareous tube worms.	Narrow, tall cave open to strong surge action with loose coarse gravel on the floor. Rock surface close to the floor were scoured clean with no attached fauna. Higher up the cave walls (1 m and above) the rock was covered in Clathrina coriacea, orange sponge crusts, Filograna implexa and Pomatoceros triqueter.	IR.FIR.SG.CC.BalPom
47	Cave entrance with Metridium sp. and Tubularia sp.	The entrance walls to the cave, sloping bedrock with Metridium senile and Tubularia larynx and Tubulaira indivisa.	IR.FIR.SG.CrSpAsAn
48	Inner cave walls with sponges and bryozoan turf.	Extensive cave wall, mostly just over the vertical, with a crissiid Scrupocellaria/Leucosoleria sp. turf, frequent clumps of Tubularia larynx and a variety of other sponges, particularly large sponge crusts, and patches of anemones including Phellia sp.	IR.FIR.SG.CrSpAsAn

Code	Habitat	Description	Biotope
49	Cave at top of tunnel with Parazoanthus anguicomus and Carypohyllia sp.	A small cave in the top of the tunnel forming a cave (apporx. 6 m deep. 2-3 m wide and 1.5 m high). The ceiling was covered with dense Parazoanthus anguicomus. The base with sheets of yellow sponge and tall columnar Caryophylli sp., barnacle, Pomatoceros and bryozoan crusts covered the base of the cave.	CR.FCR.Cv
50	Shaded circulittoral rock with sparse Antedon sp., bryozoan and coralline crusts.	Very steep walled high tunnel/arch with Antedon bifida, bryozoan and coralline crusts, sponges and Bugula sp. at the lower of a large underwater arch.	CR.MCR.EcCr.AdigVt
51	Wave exposed infralittoral rock with Laminaria hyperborea, anemones and sponges.	Very steep and vertical bedrock steps with Laminaria hyperborea forest to about -17 m BCD with a narrow patch beneath to the lower most limit of kelp at -21 m BCD. Beneath the kelp was a very dense turf of Metridium senile, Corynactis viridis and Sagartia elegans with patches of sponge crust (mainly Halichondria panicea and Myxilla incrustans). Dense patches of Crisidia cornuta and Scrupocellaria retans overgrew holdfasts and sponges. Foliose red algae were also fairly dense, especially in the shallower water.	IR.HIR.KFaR.LhypFa
52	Cave and tunnel in the infralittoral with bryozoan crusts and Corynactis sp.	Small cave (3 m wide, 1.5 m tall, 8 m deep) in the infralittoral with encrusting bryozoans and orange encrusting sponge over most surfaces and dense Corynactis viridis on the ceiling with a few Phellia gausapata amongst them. A small side passage (1.5 m dia) branched off from the side of the cave leading to a chimney, lined with Tubularia spp. sponges and Phellia sp. which lead up to the kelp forest at around 8 m.	IR.FIR.SG.CrSpAsAn
53	Cave at 12-15 m.	Cave, about 6-8 m wide at entrance and 10 m deep, lying between 12-15 m bcd. Rock dominated by a bryozoan crust which formed frequent nodules with very dense Caryophyllia smithii over all surfaces. Calcareous tubeworms (Serpula sp., Pomatoceros and (?) Hydroids) plentiful, most protuding perpendicularly from the rock. Galathea strigosa.	CR.FCR.Cv
54	Steep and vertical extremely exposed circalittoral bedrock with dense cover of anemones and sponges.	Steep and vertical, extremely exposed circalittoral bedrock with dense cover of Metridium senile, Sagatia elegans, Corynactis viridis and large patches of Myxilla incrustans, Scrupocellaria reptans and thick bryozoan crusts.	IR.FIR.SG.CrSpAsAn
55	Upper infralittoral wave surged kelp forest with sponges and ascidians.	Upper infralittoral steep wave surged bedrock with small Laminaria hyperborea with an understory of foliose red algae (mainly Cryptopleura ramosa and Hypoglossum hypglossoides), encrusting sponges and ascidians. Crevices in the rock were colonised by Sagartia elegans and Urticina felina. Above this zone was a wide Alaria sp. zone (not surveyed).	IR.HIR.KFaR.LhypFa
56	Entrance to large, very exposed cave with encrusting sponge and anemones.	Entrance to cave dominated by encrusting (sheets of) yellow sponge, Halichondria panicea, sparse Tubularia indivisa, Diplosoma spongiforme and anemones, (Sagartia sp. and small Metridium senile). This graded to a scoured base of bedrock (barren) with massive boulders beneath.	IR.FIR.SG.CrSp
57	Sublittoral fringe barnacle / spirbid zone.	Band of dense Balanus crenatus and spirorbids at the top (shallow) part of the cave. Small Metridium sp. quite common and large amphipods common (Iphimedia sp.).	IR.FIR.SG.CC.BalPom
58	Middle to inner zone of long cave.	Extensive vertical wall of a long cave, from about 10 m depth to 3 m bcd, covered by a mosaic of sponge crusts and anemones. Inner zone a mixture of Corynactis sp., Sagartia sp., and Phellia sp. with Leuconia nivea, Clathrina coriacea, Dercitus sp. and occasional Pachymatisma. Isolated clumps of Tubularia indivisa and Tubularia larynx in shallower zone.	IR.FIR.SG.CrSpAsAn
59	Boulders with barnacles and sparse sponges.	The bottom of the cave with boulders and barnacles. The rock had sparse sponges, small Sagartia elegans and Actinia equina. The boulders appear to be seasonally scoured (by each other) however at time of survey were stable. Long very rounded boulders mostly bare with few anemones. Actinia sp. - unusual colours pale greens/pale blue and ordinary red.	IR.FIR.SG.CC.Mo
60	Lower infralittoral cobbles and boulders with Laminaria saccharina and red algal turf.	Mixed large and small boulders and cobbles in the lower infralittoral and upper ciralittoral with foliose and filamentous red algae and Laminaria saccharina, the latter becoming abundant at the upper levels. Smaller boulders and cobbles barer with encrusting bryozoans and only a few algal sporelings. Schmitzia hiscockiana characteristic on boulders, current-swept.	IR.HIR.KSed.LsacSac

Code	Habitat	Description	Biotope
61	Very steep bedrock with Laminaria hyperborea, Corynactis viridis and red algae.	Very steep, exposed and wave surged bedrock characterised by Laminaria hyperborea with dense Corynactis viridis and a turf of Scrupocellaria reptans and a dense red algae. Kelp stipes had a dense algal turf comprising mainly Phycodrys sp., Membranipora sp. and, Ptilota sp. The upper part of this biotope was dominated by a dense Coralline officinalist turf.	IR.HIR.KFaR.LhypFa
62	Lower circalittoral boulders, cobbles and sand with Pentapora foliacea, Porella compressa and	Lower circalittoral boulders, cobbles and patches of sand with Pentapora foliacea and Diazona violacea growing on the larger stones also with Porella compressa covered in Salmacina dysteri. Coralline algae common, brittlestars Ophiocomina nigra common and Ophiopholis aculeata frequent. Not surveyed in detail.	CR.MCR.EcCr
63	Upper circalittoral bedrock and boulders with Flustra foliacea, Securiflustra securifrons and	Gentle slope of bedrock and boulders some very large, with a relatively sparse turf of Flusta foliacea and Securiflustra securifrons mixed with similar patches of crisiids and Bugula sp. Clavelina lepadiformis particularly common, especially on vertical faces. Rock with frequent patches of Parasmittina trispinosa and silty algal encrusted rock. Pentapora sp. and Porella compressavquite common in deeper part of zone. Red algae at bottom but more frequent in shallower water.	CR.HCR.XFa
64	Narrow, infralittoral gully with bryozoan (Corynactis sp.) and sponge turf.	Narrow infralittoral gully with dense turf of Scrupocellaria reptans, Clathrina coriacea and patches of Tubularia indivisa. Gully approximately 1 to 1.5 m wide, 15 m deep and spans approx 18 m to the surface.	IR.FIR.SG.CrSpAsAn
65	Lower infralittoral boulders with kelp park, red algae and faunal turfs.	Very large, medium and small boulders with kelp park and red algal turfs on their upper surfaces and Clavelina sp. Polyclinum aurantium, Corynactis sp. and bryozoan crusts on the steep and vertical surfaces. Also patches of sponge including Polymastia mamillaris and Myxilla incrustans and large Sarcodictyon roseum. Red algae included Drachiella spectabilis and a variety of other foliose and filamentous species.	IR.HIR.KFaR.LhypR.Pk
66	Narrow scoured base of gully with encrusting bryozoans and Filograna implexa.	Scoured base of surge gully (cut) at 20 -24 m Bcd with boulders in the base covered by encrusting bryozoans, Antedon bifida, dwarf Metridium senile and Calliostoma zizphinum. Much of the lower wall was covered with Filograna implexa.	IR.FIR.SG.CC.BalPom
67	Vertical bedrock with sponges, anemones and ascidians at 19-31 m.	Bedrock cliff with some fissures supporting Pachymatisma johnstonia, Myxilla incrustans and Halichondria panicea, with Sagartia elegans and Metridium senile. The hydroid Tubularia indivisa was present in some places as were the ascidians Botryllus sp. and Clavelina sp.	IR.HIR.KFaR.LhypRVt
68	Upper circalittoral rock wall with Flustra / Securiflustra turf from 31-44 m.	Extensive lower zone on rock wall with a dense covering of short Flusta spp., mixed with patches of Securiflustra, crissiid / Scrupocellaria sp. turf, fairly small Pentapora sp. Urticina sp. and a variety of polycinids. Caryophyllia sp. common but Corynactis sp. very sparse. A few tufts of red algae down to 40+ m.	CR.MCR.EcCr.AdigVt
69	Wave surges bedrock with Alaria esculenta, Saccorhiza polyschides, Desmarestia ligulata.	Extremely surged horizontal and steep bedrock with a dense mixture of Alaria esculenta, Saccorhiza polyschides and Desmarestia ligulata. Beneath the kelps was incompletely surveyed, but, Polysiphonia sticta was common, overgrowing coralline algal crust. Saccorhiza sp. was clearly this years growth (summer opportunist) and no older plants were found.	IR.HIR.KFaR.Ala.Myt
70	Steep bedrock with Laminaria hyperborea, Corynactis viridis and sponge crusts.	Very steep and upward facing wave surged Laminaria hyperborea forest with dense Corynactis viridis, sponge crusts and Plocamium cartilagineum. A dense bryozoan turf of crisiid and Scrupocellaria sp. also occurred over the rocks.	IR.HIR.KFaR.LhypFa
71	Caves at 25 m and 14 m.	Magnificent caves with hole in roof allowing wave surge to pass through. Dense faunal cover of anemones (Sagartia elegans, Corynactis viridis) and bryozoans, particularily Scrupocellaria sp. and dense clusters of Bugula sp. Also scatterings of Caryophyllia smithii and Parerythropodium nearer the back of the cave. Large growths of Polymastia sp. and Alcyonium digitatum and Sagartia elegans around the entrance. The lower cave was 23-25 m bsl approx. 7 m deep by 4 m wide, the shallower cave at 14 m of similar size. The fauna of both was comparable, so have been combined.	IR.FIR.SG.CrSpAsAn
72	Gravel scoured entrance to wave surge caves with Caryophyllia sp., bryozoan crusts and calcarous	Gravel scoured entrances to two wave surge caves in the infralittoral. Rock surfaces covered by thin patches of bryozoan crust, Pomatoceros triqueter, Caryophyllia smithii, abundant Spirorbis sp. and patches of Filograna implesa and thin orange sponge crusts. Some brown and coralline algal crusts in partial shade. Large Urticina felina adjacent	IR.FIR.SG.CC.BalPom

Code	Habitat	Description	Biotope
		to patches of coarse gravel and pebbles and one Halcampa chrysomthellum in the gravel.	
73	Vertical surged gully with Corynactis viridis, Metridium senile and Alcyonium digitatum.	Above a scoured zone, a wide band of mixed Corynactis viridis, Metridium senile and Alcyonium digitatum was interspersed with encrusting sponges (Myxilla incrustans and Halichondria panicea) and Tubularia indivisa and Tubularia complexa on protruding edges. All over the walls was a dense bryozoan turf (mainly Scrupocellaria sp. and Crisia sp.).	IR.FIR.SG.CrSpAsAn
74	Upper circalittoral rock with Flustra foliacea/Securiflustra securifrons below 43 m.	Upper circalittoral zone on uneven scenic rock including some huge boulders. Only very shallowest bit of zone surveyed (briefly). Patches of Flustra sp and Securiflustra securifroms on a pink encrusted rock with scattered Corynactis. Occasional Suberites carnosus and Nemertesia spp. and Caryophyllia smithii.	CR.MCR.EcCr.FaAlCr.Flu
75	Laminaria hyperborea forest with anemones, sponges and red algae.	Fairly dense Laminaria hyperborea on very gently sloping bedrock with some short vertical faces. Kelp stipes densely covered with Phycodrys sp. Membranoptera sp., Cryptopleora ramosa and Electra, but more sparse on horizontal surfaces where there was a lush mixture of anemones and sponge crusts with smaller patches of bryozoan turf and colonial ascidians. Short vertical faces with essentially similar fauna and lacking the algae.	IR.HIR.KFaR.LhypFa
76	Vertical rock faces in open gulley at 24-30 m.	Long shallow sloping open gully with large vertical face to one side covered by Alcyonium (with Simnia sp. and Tritonia sp.) very dense Metridium senile and Corynactis viridis with smaller patches of Salmicina dysteri. Lower more upward face of gully was dominated by Corynactis viridis.	IR.FIR.SG.CrSpAsAn
77	Lower infralittoral bedrock and boulders with Laminaria hyperborea, Corynactis sp. and corallin	Lower infralittoral bedrock and large boulders with Laminaria hyperborea park. Rock surfaces covered in Corynactis viridis on coralline algae and brown crusts. Patches of Sagartia elegans and large Alcyonium digitatum on some of the vertical faces. Simnia patula on the Alcyonium digitatum. Also patches of Haliclona viscosa and Myxilla incrustans.	IR.HIR.KFaR.LhypFa
78	End of cave with dense Verruca stroemia.	End of cave with massive rock mills at the back. The overhanging rock was dominated by dense barnacles (Verruca stroemia), sponge crusts, spirorbids and crissidae. Occasional Tubularia indivisa and Metridium senile towards the top.	IR.FIR.SG.CC.BalPom
79	Sponge crusts, anemones and bryozoans on cave walls.	Walls of a gully leading into a cave were surveyed and characterised by dense sponge crusts with Corynactis viridisand a dense short bryozoan turf (crisids and Scrupocellaria sp.). Crevices and fissures provided a sheltered refuge for Sagartia elegans, Polydinum aurantium and Cancer pagurus. Below this zone, the cave floor was boulder scoured and base.	IR.FIR.SG.CrSpAsAn
80	Lower walls of channel with ascidians and bryozoan turf.	Extensive vertical walls of channel and some very large boulders blocking base of channel. Richly colonised by ascidians, especially Aplidium punctum and Polyclinum sp. and a turf of Bugula turbinata and Scrupocellaria reptans mixed with smaller areas of mixed calcareous sponges, extensive areas of Salmacina. Areas on most tide (large boulders in centre) has more extensive areas of Halichondria sp. and Myxilla sp. Upward facing rock with a dense short turf of red algae Erythroglossum sp., Cryptopleura sp. and, Trailliella sp. and a few kelp plants in shallower areas including sporelings.	IR.FIR.SG.CrSpAsAn
81	Lower walls of channel with ascidians and bryozoan turf.	Extensive vertical walls of channel and some very large boulders blocking base of channel. Richly colonised by ascidians, especially Aplidium punctum and Polyclinum sp. and a turf of Bugula turbinata and Scrupocellaria reptans mixed with smaller areas of mixed calcareous sponges, extensive areas of Salmacina. Areas on most tide (large boulders in centre) has more extensive areas of Halichondria sp. and Myxilla sp. Upward facing rock with a dense short turf of red algae Erythroglossum sp., Cryptopleura sp. and, Trailliella sp. and a few kelp plants in shallower areas including sporelings.	IR.HIR.KFaR.LhypR.Pk
82	Mobile boulders at base of gully.	Bottom of gully with deep layer of rounded mobile and large cobbles. Rocks too mobile to support much life other than bryozoan crusts and occasional Pomatoceros triqueter but quite a few gastropods present.	IR.FIR.SG.CC.Mo
83	Alaria esculenta on upward facing, sublittoral fringe bedrock.	Dense Alaria esculenta on coralline encrusted bedrock in the sublittoral fringe. Understory of patchy Scrupocellaria reptans, Botrylloides leachi, Corallina officinalis and Halichondria panicea. Bryozoan crusts frequent.	IR.HIR.KFaR.Ala.Myt

Code	Habitat	Description	Biotope
84	Upper infralittoral Laminaria hyperborea forest with rich faunal turf.	Broken bedrock slopes (from to m bcd) with dense Laminaria hyperborea forest and a variety of stipe epifauna particularily in shallow water. Beneath the kelp rock surfaces were covered with faunal turfs of erect bryozoans, ascidians and Corynactis sp. with scattered foliose red and brown algae, and coralline crusts. Huge shoal of herring a few metres above kelp and seals in the shallow water.	IR.HIR.KFaR.LhypFa
85	Infralittoral vertical bedrock face with dense Alcyonimum digitatum.	Infralittoral vertical bedrock face with dense Alcyonium digitatum coralline crusts, Sagartia elegans, Filograna implexa and Halicona viscosa.	IR.FIR.SG.CrSpAsAn
86	Lower infralittoral bedrock with kelp and faunal turf, 20.5 to 29.5 m bcd.	Lower infralittoral bedrock with Laminaria hyperborea park and a faunal turf of bryozoans, hydroids, ascidians and sponges with abundant Corynactis sp., from 20.5 to 29.5 m bcd.	IR.HIR.KFaR.LhypR.Pk
87	Alaria sp. on bedrock at +1.5 to 6.5 m bcd.	Alaria sp. on bedrock with coralline crusts and foliose red algae. +1.5 to 6.5 m bcd.	IR.HIR.KFaR.Ala.Myt
88	Bedrock with kelp forest with faunal turf and foliose red algae, 6.5 to 18.5 m bcd.	Upper infralittoral bedrock with dense Laminaria hyperborea forest. Under canopy spaces characterised by Corynactis viridis and foliose red algae - mainly Delesseria sp. and Phycodrys rubens. Urticina felina was noted in crevices under the kelp canopy.	IR.HIR.KFaR.LhypFa
89	Cave walls with bryozoan turf, colonial ascidians and sponges.	Eudendrium has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Extensive vertical walls of large cave covered by a low turf of dense bryozoans (crissiids Scrupocellaria sp., Bugula turbinata) and polycinid ascidians (Polyclinum sp., Aplidium punctum) with lesser cover of sponge crusts (including some large patches). Polycarpa scuba and pin head squirt mixed amongst the turf and Eudendrium sp. forming a dense low turf in some areas.	IR.FIR.SG.CrSpAsAn
90	Scoured boulders at base of cave.	Large area of large very round boulders at base of cave and lower parts of cave walls. Despite the obvious mobility of the boulders they were colonised by a wide variety of species (many probably fast growing). Bryozoan crusts, Pomatoceros sp. and Caryophyllia sp. were prominant, plus a variety of small ascidians. Hinia incrassata and nudibranchs notably common.	IR.FIR.SG.CC
91	Vertical bedrock with bryozoans, sponges and ascidians, 2.8-25.8 m bcd.	Vertical bedrock wall with bryozoans, sponges and ascidians forming a dense faunal crust with dense Corynactis sp. 2.8-25.8 m bcd.	IR.FIR.SG.CrSpAsAn
92	Bedrock and boulders with kelp, coralline algae and bryozoans. 23.8-25.8 m bcd.	Bedrock and boulders supporting a kelp park with bryozoans, ascidians, sponges and foliose red algae. Lots of Corynactis sp. on rock surfaces. 23.8-25.8 m bcd.	IR.HIR.KFaR.LhypR.Pk
93	Vertical rock with crisids and ascidians.	Crisia has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Vertical bedrock covered with dense faunal turf of bryozoans and ascidians. Mostly Crisia sp, Bicellariella ciliata and Bugula sp. with ascidians (pinhead ascidians, Polyclinum aurantium and Polycarpa scuba). Sponges included dense patches of Halichondria panicea, Esperiopsis fucorum, Leuconia nivea and Leucosolenia sp.	IR.FIR.SG.CrSpAsAn
94	Ephemeral algal community (Alaria sp./red algae) on shallow rock.	Relatively complex topography in shallow water subject to surgy conditions behind a skerry. The more low lying rocks and sides of gullys were dominated by an ephemeral algal community (with highly mobile boulders present at base of rocky outcrops). Higher rock surfaces had more mature Laminaria hyperborea forest community. Alaria esculenta sp. with Desmarestia spp. dominated most rock faces whilst others had a dense turf of red algae (Kallymenia reniformis, Cryptopleura ramosa and others). Some surfaces with complete cover of a red encrusting alga with more patchy coralline crusts. Very poor fauna but Diplosoma spongiforme common.	IR.HIR.KFaR.Ala.Myt
95	Upper infralittoral Saccorhiza polyschides and Desmarestia ligulata.	Upper infralittoral dense Saccorhiza polyschides and Desmarestia ligulata forest between the Alaria sp. and the Laminaria hyperborea zones (kelps removed in winter storms?). Beneath the kelp was a dense turf of Polysiphonia stricta with Lomentaria clavellosa. Small verticals had turf of robust hydroids and bryozoans with Sagartia elegans and Corynactis viridis and abundant nudibranchs.	IR.HIR.KSed.Sac

Code	Habitat	Description	Biotope
96	Laminaria hyperborea forest with dense faunal turf and foliose algae.	Dense Laminaria hyperborea forest on sloping bedrock with a dense understory of Corynactis viridis and a crisiid and Scrupocellaria sp. turf and foliose red and brown algae. Stipes had a dense flora of Phycodrys sp. and Ptilota sp. with Dictyota dichotoma on the rock surface.	IR.HIR.KFaR.LhypFa
97	Massive boulders and bedrock with bryozoan crusts, Caryophyllia smithii	Massive boulders and bedrock. The upper facing surface supported bryozoan crusts, brown crusts and Caryophillia smithii. Vertical rock was covered with a dense faunal turf of Scrupocellaria sp. and Alcyonium digitatum, Corynactis viridis and Metridium senile. Upper facing surfaces had sparse kelp with a few foliose red algae.	IR.HIR.KFaR.LhypFa
98	Massive boulders and bedrock with bryozoan crusts, Caryophyllia smithii	Massive boulders and bedrock. The upper facing surface supported bryozoan crusts, brown crusts and Caryophillia smithii. Vertical rock was covered with a dense faunal turf of Scrupocellaria sp. and Alcyonium digitatum, Corynactis viridis and Metridium senile. Upper facing surfaces had sparse kelp with a few foliose red algae.	IR.HIR.KFaR.LhypRVt
99	Upper infralittoral Laminaria hyperborea forest with red algae and bryozoans.	Laminaria hyperborea forest (tall plants) on bedrock and very large boulders with foliose red algae and a short bryozoan turf (mainly Scrupocellaria sp.). Echinus sp. grazed the bedrock and some stipes, though most were heavily epiphyised by Phycodrys sp, Membranoptera sp and Plocamium sp. Verticals had bryozoan crusts Caryophyllia smithii and short bryozoan turf.	IR.HIR.KFaR.LhypR.Ft
100	Lower infralittoral large boulders with Laminaria hyperborea park.	Massive boulders with boulders and cobbles between characterised by a Laminaria hyperborea park with a dense turf of bryozoans and foliose red algae. Verticals and overhangs of the boulders had dense Carophyllia smithii, Pomatoceros triqueter and bryozoan crusts. Smaller sand - scoured boulders with Schmitzia sp. and Halarachion ligulatum.	IR.HIR.KFaR.LhypR.Pk
101	Infralittoral vertical rock in cave entrance with ascidian/bryozoan/sponge turf.	Extensive vertical faces on side walls of entrace to open cave with huge boulders blocking part of entrance. Rock very richly colonised with a mosaic of colonial ascidians (especially Aplidium punctum and Polyclinum sp.) and bryozoan turf (Bugula turbinata, Scrupocellaria sp. and crissiids) mixed with various calcareous and encrusting sponges. Pinhead squirt and Aplidium pallidum notably common.	IR.FIR.SG.CrSpAsAn
102	Boulders and bedrock with coralline crusts, foliose reds.	Boulders and bedrock at bottom of gully with most boulders supporting crustose and foliose red algae and some (close to entrance of cave) supporting Flustra foliacea.	IR.HIR.KFaR.FoR
103	Upper infralittoral bedrock with kelp forest, red algae and sponge turf.	Steep bedrock slope with narrow ledges and short vertical faces with Laminaria hyperborea forest. Vertical faces with Halichondria panicea and dense Coryne muscoides, understory of kelp forest with filamentous and foliose red algae.	IR.HIR.KFaR.LhypR.Ft
104	rocky pinnacle	Seasearch observation survey on a narrow pinnacle that rises above the sea level from a seabed at about 40m bls (38.6m bcd). Sides are near vertical or vertical with steps and uneven ledges, and possibly vertical grooves or gullies (?) with a lobster. Some kelp on the ledges and vertical wall to about 20m is covered with anemeones. Two crawfish seen, one at 25m bsl and one at 35m bsl. Pollock in the shallower water column.seabed types - rocky reef, boulders, cobbles and pebbles.litter seen.sea pen recorded in species list, not specified how tall and which species.	KP
105	rocky pinnacle	Seasearch observation survey on a narrow pinnacle that rises above the sea level from a seabed at about 40m bls (38.6m bcd). Sides are near vertical or vertical with steps and uneven ledges, and possibly vertical grooves or gullies (?) with a lobster. Some kelp on the ledges and vertical wall to about 20m is covered with anemeones. Two crawfish seen, one at 25m bsl and one at 35m bsl. Pollock in the shallower water column.seabed types - rocky reef, boulders, cobbles and pebbles.litter seen.sea pen recorded in species list, not specified how tall and which species.	MS
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107	rocky reef slope and pinnacles	Seasearch observation level survey covering about 150m on a rocky reef with a steep slope from about 4m bls to a gully/platform at about 20m bsl and several near vertical sided pinnacles rising to about 5m bsl, followed by a steep slope surveyed to about 40m bsl. top of the shallow slope and pinnacles had kelp forest and park.base of the	SAT

Code	Habitat	Description	Biotope
		pinnacles and the top of the deeper slope between about 15m -25m bsl were covered with jewel anemones.seabed types - rocky reef dominant. also boulders- nothing recorded- Every colour of jewel anemone, yellow/black sea cucumber.	
108	rocky reef slope and pinnacles	Seasearch observation level survey covering about 150m on a rocky reef with a steep slope from about 4m bls to a gully/platform at about 20m bsl and several near vertical sided pinnacles rising to about 5m bsl, followed by a steep slope surveyed to about 40m bsl. top of the shallow slope and pinnacles had kelp forest and park.base of the pinnacles and the top of the deeper slope between about 15m -25m bsl were covered with jewel anemones.seabed types - rocky reef dominant. also boulders- nothing recorded- Every colour of jewel anemone, yellow/black sea cucumber.	KF
109	rocky reef slope and pinnacles	Seasearch observation level survey covering about 150m on a rocky reef with a steep slope from about 4m bls to a gully/platform at about 20m bsl and several near vertical sided pinnacles rising to about 5m bsl, followed by a steep slope surveyed to about 40m bsl. top of the shallow slope and pinnacles had kelp forest and park.base of the pinnacles and the top of the deeper slope between about 15m -25m bsl were covered with jewel anemones.seabed types - rocky reef dominant. also boulders- nothing recorded- Every colour of jewel anemone, yellow/black sea cucumber.	KP
110	rocky reef slope and pinnacles	Seasearch observation level survey covering about 150m on a rocky reef with a steep slope from about 4m bls to a gully/platform at about 20m bsl and several near vertical sided pinnacles rising to about 5m bsl, followed by a steep slope surveyed to about 40m bsl. top of the shallow slope and pinnacles had kelp forest and park.base of the pinnacles and the top of the deeper slope between about 15m -25m bsl were covered with jewel anemones.seabed types - rocky reef dominant. also boulders- nothing recorded- Every colour of jewel anemone, yellow/black sea cucumber.	EPA
111	rocky pinnacle	Seasearch observation survey on a wide pinnacle about 75m wide at the base at about 35-40m bsl and 25m wide at the top at about 15m bsl, with stepped sides of steep and near vertical slopes and variable sized ledges. Crawfish in ledge/crevice and walls covered with anemones. Kelp on top of pinnacle and on ledges down to about 35m bsl. Yellow and grey sponges seen. Pollock in shallow sea beside pinnacle. Angular boulders present at the base of the pinnacle. types - dominant rocky reef, also boulders, cobbles and pebbles.litter seen,noteworthy reported.	KP
112	rocky pinnacle	Seasearch observation survey on a wide pinnacle about 75m wide at the base at about 35-40m bsl and 25m wide at the top at about 15m bsl, with stepped sides of steep and near vertical slopes and variable sized ledges. Crawfish in ledge/crevice and walls covered with anemones. Kelp on top of pinnacle and on ledges down to about 35m bsl. Yellow and grey sponges seen. Pollock in shallow sea beside pinnacle. Angular boulders present at the base of the pinnacle. types - dominant rocky reef, also boulders, cobbles and pebbles.litter seen,noteworthy reported.	MS
113	rocky pinnacle	Seasearch observation survey on a wide pinnacle about 75m wide at the base at about 35-40m bsl and 25m wide at the top at about 15m bsl, with stepped sides of steep and near vertical slopes and variable sized ledges. Crawfish in ledge/crevice and walls covered with anemones. Kelp on top of pinnacle and on ledges down to about 35m bsl. Yellow and grey sponges seen. Pollock in shallow sea beside pinnacle. Angular boulders present at the base of the pinnacle. types - dominant rocky reef, also boulders, cobbles and pebbles.litter seen,noteworthy reported.	SAT
114	rocky pinnacle	Seasearch observation survey on a wide pinnacle about 75m wide at the base at about 35-40m bsl and 25m wide at the top at about 15m bsl, with stepped sides of steep and near vertical slopes and variable sized ledges. Crawfish in ledge/crevice and walls covered with anemones. Kelp on top of pinnacle and on ledges down to about 35m bsl. Yellow and grey sponges seen. Pollock in shallow sea beside pinnacle. Angular boulders present at the base of the pinnacle. types - dominant rocky reef, also boulders, cobbles and pebbles.litter seen,noteworthy reported.	TAT
115	rocky pinnacles	Seasearch observation survey on a rocky pinnacle rising above sealevel with a smaller pinnacle rising to about 20m bsl from a gully at about 30m bsl. The sides of the pinnacles had variable slopes, tending to be near vertical on one side and steeply sloping on the opposite side. The bedrock flattened out at about 35m below the steep slope sides of	TAT

Code	Habitat	Description	Biotope
		the pinnacles, but continued to shelve unevenly below the near vertical slopes, and was surveyed to about 40m bsl. Kelp forest and park grew on the main pinnacle from sea level to about 10-15m bsl. Dahlia and sagartia anemones were on the deeper pinnacle, and many jewel anemones on the main pinnacle from about 20m to 30m bsl.seabed type - rocky reef.noteworthy or litter recorded.	
116	rocky pinnacles	Seasearch observation survey on a rocky pinnacle rising above sealevel with a smaller pinnacle rising to about 20m bsl from a gully at about 30m bsl. The sides of the pinnacles had variable slopes, tending to be near vertical on one side and steeply sloping on the opposite side. The bedrock flattened out at about 35m below the steep slope sides of the pinnacles, but continued to shelve unevenly below the near vertical slopes, and was surveyed to about 40m bsl. Kelp forest and park grew on the main pinnacle from sea level to about 10-15m bsl. Dahlia and sagartia anemones were on the deeper pinnacle, and many jewel anemones on the main pinnacle from about 20m to 30m bsl.seabed type - rocky reef.noteworthy or litter recorded.	SAT
117	rocky pinnacles	Seasearch observation survey on a rocky pinnacle rising above sealevel with a smaller pinnacle rising to about 20m bsl from a gully at about 30m bsl. The sides of the pinnacles had variable slopes, tending to be near vertical on one side and steeply sloping on the opposite side. The bedrock flattened out at about 35m below the steep slope sides of the pinnacles, but continued to shelve unevenly below the near vertical slopes, and was surveyed to about 40m bsl. Kelp forest and park grew on the main pinnacle from sea level to about 10-15m bsl. Dahlia and sagartia anemones were on the deeper pinnacle, and many jewel anemones on the main pinnacle from about 20m to 30m bsl.seabed type - rocky reef.noteworthy or litter recorded.	EPA
118	rocky pinnacles	Seasearch observation survey on a rocky pinnacle rising above sealevel with a smaller pinnacle rising to about 20m bsl from a gully at about 30m bsl. The sides of the pinnacles had variable slopes, tending to be near vertical on one side and steeply sloping on the opposite side. The bedrock flattened out at about 35m below the steep slope sides of the pinnacles, but continued to shelve unevenly below the near vertical slopes, and was surveyed to about 40m bsl. Kelp forest and park grew on the main pinnacle from sea level to about 10-15m bsl. Dahlia and sagartia anemones were on the deeper pinnacle, and many jewel anemones on the main pinnacle from about 20m to 30m bsl.seabed type - rocky reef.noteworthy or litter recorded.	MS
119	rocky pinnacles	Seasearch observation survey on a rocky pinnacle rising above sealevel with a smaller pinnacle rising to about 20m bsl from a gully at about 30m bsl. The sides of the pinnacles had variable slopes, tending to be near vertical on one side and steeply sloping on the opposite side. The bedrock flattened out at about 35m below the steep slope sides of the pinnacles, but continued to shelve unevenly below the near vertical slopes, and was surveyed to about 40m bsl. Kelp forest and park grew on the main pinnacle from sea level to about 10-15m bsl. Dahlia and sagartia anemones were on the deeper pinnacle, and many jewel anemones on the main pinnacle from about 20m to 30m bsl.seabed type - rocky reef.noteworthy or litter recorded.	KP
120	rocky pinnacles	Seasearch observation survey on a rocky pinnacle rising above sealevel with a smaller pinnacle rising to about 20m bsl from a gully at about 30m bsl. The sides of the pinnacles had variable slopes, tending to be near vertical on one side and steeply sloping on the opposite side. The bedrock flattened out at about 35m below the steep slope sides of the pinnacles, but continued to shelve unevenly below the near vertical slopes, and was surveyed to about 40m bsl. Kelp forest and park grew on the main pinnacle from sea level to about 10-15m bsl. Dahlia and sagartia anemones were on the deeper pinnacle, and many jewel anemones on the main pinnacle from about 20m to 30m bsl.seabed type - rocky reef.noteworthy or litter recorded.	KF
121	rock stack with arch and cave	Seasearch observation survey on a stack/pinnacle rising above sealevel with near vertical sides. An arch at the base rises about 20m from a fairly level seabed at about 50m bsl to about 30m bsl with a cave entrance near the top of the arch. Boulders, cobbles and pebbles on the surrounding seabed and through the arch. park on the shallower part of the walls to about 15m -20m bsl and Dabberlocks, at about 20m bsl. Sea anemones on the deeper walls and an octopus seen at about 30-40m bsl. seabed types = dominant rocky reef, also boulders, cobbles and pebbles. litter	TAT

Code	Habitat	Description	Biotope
		seen.noteworthy recorded.	
122	rock stack with arch and cave	Seasearch observation survey on a stack/pinnacle rising above sealevel with near vertical sides. An arch at the base rises about 20m from a fairly level seabed at about 50m bsl to about 30m bsl with a cave entrance near the top of the arch. Boulders, cobbles and pebbles on the surrounding seabed and through the arch. park on the shallower part of the walls to about 15m -20m bsl and Dabberlocks, at about 20m bsl. Sea anemones on the deeper walls and an octopus seen at about 30-40m bsl. seabed types = dominant rocky reef, also boulders, cobbles and pebbles. litter seen.noteworthy recorded.	SAT
123	rock stack with arch and cave	Seasearch observation survey on a stack/pinnacle rising above sealevel with near vertical sides. An arch at the base rises about 20m from a fairly level seabed at about 50m bsl to about 30m bsl with a cave entrance near the top of the arch. Boulders, cobbles and pebbles on the surrounding seabed and through the arch. park on the shallower part of the walls to about 15m -20m bsl and Dabberlocks, at about 20m bsl. Sea anemones on the deeper walls and an octopus seen at about 30-40m bsl. seabed types = dominant rocky reef, also boulders, cobbles and pebbles. litter seen.noteworthy recorded.	MS
124	rock stack with arch and cave	Seasearch observation survey on a stack/pinnacle rising above sealevel with near vertical sides. An arch at the base rises about 20m from a fairly level seabed at about 50m bsl to about 30m bsl with a cave entrance near the top of the arch. Boulders, cobbles and pebbles on the surrounding seabed and through the arch. park on the shallower part of the walls to about 15m -20m bsl and Dabberlocks, at about 20m bsl. Sea anemones on the deeper walls and an octopus seen at about 30-40m bsl. seabed types = dominant rocky reef, also boulders, cobbles and pebbles. litter seen.noteworthy recorded.	KP
125	rock stack with arch and cave	Seasearch observation survey with photographs on a stack off Boraray (south side according to position).100m wide stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls.seabed types - dominant rocky reef, also boulders.noteworthy recordedlitter.	KP
126	rock stack with arch and cave	Seasearch observation survey with photographs on a stack off Boraray (south side according to position).100m wide stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls.seabed types - dominant rocky reef, also boulders.noteworthy recordedlitter.	KF
127	rock stack with arch and cave	Seasearch observation survey with photographs on a stack off Boraray (south side according to position).100m wide stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls.seabed types - dominant rocky reef, also boulders.noteworthy recordedlitter.	EPA
128	rock stack with arch and cave	Seasearch observation survey with photographs on a stack off Boraray (south side according to position).100m wide stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls.seabed types - dominant rocky reef, also boulders.noteworthy recordedlitter.	SAT
129	rock stack with arch and cave	Seasearch observation survey with photographs on a stack off Boraray (south side according to position).100m wide stack with near vertical walls down to about 45-50m bsl and an arch about 30m at the base, rising about 20m off the seabed to 25-30m bsl with a cave entrance near the top of the arch.on the seabed at the base of the walls and in the arch way. forest on the shallow walls.seabed types - dominant rocky reef, also boulders.noteworthy recordedlitter.	TAT
130	rocky reef	Seasearch observation level survey to 43m bsl (42.3m bcd) on a submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl.events 5 & 6 for further details.is extremely clear, with no pollution.litter observed.	KF
131	rocky reef	Seasearch observation level survey to 43m bsl (42.3m bcd) on a submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl.events 5 & 6 for further details.is extremely clear, with no pollution.litter observed.	KP

Code	Habitat	Description	Biotope
132	rocky reef	Seasearch observation level survey to 43m bsl (42.3m bcd) on a submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl.events 5 & 6 for further details.is extremely clear, with no pollution.litter observed.	EPA
133	rocky reef	Seasearch observation level survey to 43m bsl (42.3m bcd) on a submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl.events 5 & 6 for further details.is extremely clear, with no pollution.litter observed.	SAT
134	rocky reef	Seasearch observation level survey to 43m bsl (42.3m bcd) on a submarine arch in a rocky pinnacle rising above a boulder seabed at about 50m bsl.events 5 & 6 for further details.is extremely clear, with no pollution.litter observed.	TAT
135	Rocky reef, wall and boulder slope	Survey about 100-120m in length from shore on a gently sloping rocky reef with kelp to about 10m bsl followed by a steep, near vertical wall to about 20m, followed by a gentle slope of large and small boulders on bedrock to about 28m bsl (26.7m bcd). The site was noteworthy for having a lot of marine life, boulders were covered with jewel anemones and there were lobsters in crevices. Fish swam above the boulders.litter seen.	KF
136	Rocky reef, wall and boulder slope	Survey about 100-120m in length from shore on a gently sloping rocky reef with kelp to about 10m bsl followed by a steep, near vertical wall to about 20m, followed by a gentle slope of large and small boulders on bedrock to about 28m bsl (26.7m bcd). The site was noteworthy for having a lot of marine life, boulders were covered with jewel anemones and there were lobsters in crevices. Fish swam above the boulders.litter seen.	KP
137	Rocky reef, wall and boulder slope	Survey about 100-120m in length from shore on a gently sloping rocky reef with kelp to about 10m bsl followed by a steep, near vertical wall to about 20m, followed by a gentle slope of large and small boulders on bedrock to about 28m bsl (26.7m bcd). The site was noteworthy for having a lot of marine life, boulders were covered with jewel anemones and there were lobsters in crevices. Fish swam above the boulders.litter seen.	EPA
138	Rocky reef, wall and boulder slope	Survey about 100-120m in length from shore on a gently sloping rocky reef with kelp to about 10m bsl followed by a steep, near vertical wall to about 20m, followed by a gentle slope of large and small boulders on bedrock to about 28m bsl (26.7m bcd). The site was noteworthy for having a lot of marine life, boulders were covered with jewel anemones and there were lobsters in crevices. Fish swam above the boulders.litter seen.	SAT
139	Rocky reef, wall and boulder slope	Survey about 100-120m in length from shore on a gently sloping rocky reef with kelp to about 10m bsl followed by a steep, near vertical wall to about 20m, followed by a gentle slope of large and small boulders on bedrock to about 28m bsl (26.7m bcd). The site was noteworthy for having a lot of marine life, boulders were covered with jewel anemones and there were lobsters in crevices. Fish swam above the boulders.litter seen.	TAT
140	boulder slope?	NOTE: The site name given indicates this site is West Dun, however the co-ordinates given are for W. Hirta. Overall, the record appears to have dubious quality. The seabed description looks more like a dive profile than seabed profile. Interpretation by data enterer: steep slope from ? surface to 25m, gradual rise again for 15m to 10m then maintained level depth for some time before ascent for 10m to surface. (???) - possibly along a boulder slope?type - only boulders noted, but this recorder always omits to record bedrock as rocky reef.huge boulders, fantastic geology, grey granite.litter.depths in habitat details on next page as queries.	KF
141	boulder slope?	NOTE: The site name given indicates this site is West Dun, however the co-ordinates given are for W. Hirta. Overall, the record appears to have dubious quality. The seabed description looks more like a dive profile than seabed profile. Interpretation by data enterer: steep slope from ? surface to 25m, gradual rise again for 15m to 10m then maintained level depth for some time before ascent for 10m to surface. (???) - possibly along a boulder slope?type - only boulders noted, but this recorder always omits to record bedrock as rocky reef.huge boulders, fantastic geology, grey granite.litter.depths in habitat details on next page as queries.	KP
142	boulder slope?	NOTE: The site name given indicates this site is West Dun, however the co-ordinates given are for W. Hirta. Overall, the record appears to have dubious quality. The seabed description looks more like a dive profile than seabed profile. Interpretation by data enterer: steep slope from ? surface to 25m, gradual rise again for 15m to 10m then maintained level depth for some time before ascent for 10m to surface. (???) - possibly along a boulder slope?type - only boulders noted, but this recorder always omits to record bedrock as rocky reef.huge boulders, fantastic geology, grey	EPA

Code	Habitat	Description	Biotope
		granite.litter.depths in habitat details on next page as queries.	
143	boulder slope?	NOTE: The site name given indicates this site is West Dun, however the co-ordinates given are for W. Hirta. Overall, the record appears to have dubious quality. The seabed description looks more like a dive profile than seabed profile. Interpretation by data enterer: steep slope from ? surface to 25m, gradual rise again for 15m to 10m then maintained level depth for some time before ascent for 10m to surface. (???) - possibly along a boulder slope?type - only boulders noted, but this recorder always omits to record bedrock as rocky reef.huge boulders, fantastic geology, grey granite.litter.depths in habitat details on next page as queries.	SAT
144	kelp forest	Kelp forest on rock slope above archway.	IR.HIR.KFaR.LhypR.Ft
145	rock wall	rock wall, vertical, outside archway, below kelp from about 17m bsl. some caves in wall above the archway.- pink, black- orange siphon.	CR.HCR.XFa.SpAnVt
146	archway	Walls and ceiling of archway through rock, subject to strong currents.	CR.HCR.FaT.CTub.Adig
147	vertical rock	Steep vertical rock face densely covered in jewel anemones and plumose anemones, mixed together, and sagartia. one cave opening with lobsters. Wall vertical from 10m - about 18m bsl, then small ledge and uneven near vertical rock below until small step at nearly 30m bsl.between 10-28m bsl (7.4-25.4m bcd).not surveyed from surface to 10m on vertical wall.	IR.HIR.KFaR.LhypRVt
148	vertical rock	Steep vertical rock face densely covered in jewel anemones and plumose anemones, mixed together, and sagartia. one cave opening with lobsters. Wall vertical from 10m - about 18m bsl, then small ledge and uneven near vertical rock below until small step at nearly 30m bsl.between 10-28m bsl (7.4-25.4m bcd).not surveyed from surface to 10m on vertical wall.	CR.HCR.XFa.SpAnVt
149	rocky reef	Survey to mas depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower.noteworthy - as above.litter - nothing reported.	TAT
150	rocky reef	Survey to mas depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower.noteworthy - as above.litter - nothing reported.	SAT
151	rocky reef	Survey to mas depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower.noteworthy - as above.litter - nothing reported.	EPA
152	rocky reef	Survey to mas depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower.noteworthy - as above.litter - nothing reported.	MS
153	rocky reef	Survey to mas depth of 37m bsl (34.5m bcd) on seabed of predominantly rocky reef and also boulders. Viz 20m +.near vertical rocky stack with an arch/tunnel near the base between 50-30m bsl 27.5 -47.5m bcd). North side: jewel anemones abundant and short turf. DCC. South side: Kelp park and mixed seaweeds from 21m and shallower.noteworthy - as above.litter - nothing reported.	KP
154	rocky reef	Survey between 12- 35.1m bsl (9.61-32.71m bcd) on seabed of predominantly rocky reef and also boulders and cobbles/pebbles. underwater pinnacle with steep sides on W, E and N with large groups of jewel anemones and hydroid and mixed red seaweeds. South side slopes with kelp park/bordeline forest, containing crawfish, crabs,	KP

Code	Habitat	Description	Biotope
		anemones, etc.noteworthy - as above.litter - nothing reported.	
155	rocky reef	Survey between 12- 35.1m bsl (9.61-32.71m bcd) on seabed of predominantly rocky reef and also boulders and cobbles/pebbles. underwater pinnacle with steep sides on W, E and N with large groups of jewel anemones and hydroid and mixed red seaweeds. South side slopes with kelp park/bordeline forest, containing crawfish, crabs, anemones, etc.noteworthy - as above.litter - nothing reported.	MS
156	rocky reef	Survey between 12- 35.1m bsl (9.61-32.71m bcd) on seabed of predominantly rocky reef and also boulders and cobbles/pebbles. underwater pinnacle with steep sides on W, E and N with large groups of jewel anemones and hydroid and mixed red seaweeds. South side slopes with kelp park/bordeline forest, containing crawfish, crabs, anemones, etc.noteworthy - as above.litter - nothing reported.	EPA
157	rocky reef	Survey between 12- 35.1m bsl (9.61-32.71m bcd) on seabed of predominantly rocky reef and also boulders and cobbles/pebbles. underwater pinnacle with steep sides on W, E and N with large groups of jewel anemones and hydroid and mixed red seaweeds. South side slopes with kelp park/bordeline forest, containing crawfish, crabs, anemones, etc.noteworthy - as above.litter - nothing reported.	SAT
158	rocky reef	Survey between 12- 35.1m bsl (9.61-32.71m bcd) on seabed of predominantly rocky reef and also boulders and cobbles/pebbles. underwater pinnacle with steep sides on W, E and N with large groups of jewel anemones and hydroid and mixed red seaweeds. South side slopes with kelp park/bordeline forest, containing crawfish, crabs, anemones, etc.noteworthy - as above.litter - nothing reported.	TAT
159	Kelp on rock reef	Kelp forest on horizontal bedrock at 10 metres, phasing into kelp park on sloping bedrock from 10-28m with large boulders at the base. Mixed seaweeds and faunal turf beneath the kelp. Cave and various crevices in the rock face.	KF
160	Kelp on rock reef	Kelp forest on horizontal bedrock at 10 metres, phasing into kelp park on sloping bedrock from 10-28m with large boulders at the base. Mixed seaweeds and faunal turf beneath the kelp. Cave and various crevices in the rock face.	KP
161	Kelp on rock reef	Kelp forest on horizontal bedrock at 10 metres, phasing into kelp park on sloping bedrock from 10-28m with large boulders at the base. Mixed seaweeds and faunal turf beneath the kelp. Cave and various crevices in the rock face.	MS
162	Kelp on rock reef	Kelp forest on horizontal bedrock at 10 metres, phasing into kelp park on sloping bedrock from 10-28m with large boulders at the base. Mixed seaweeds and faunal turf beneath the kelp. Cave and various crevices in the rock face.	EPA
163	Kelp on rock reef	Kelp forest on horizontal bedrock at 10 metres, phasing into kelp park on sloping bedrock from 10-28m with large boulders at the base. Mixed seaweeds and faunal turf beneath the kelp. Cave and various crevices in the rock face.	SAT
164	Kelp on rock reef	Kelp forest on horizontal bedrock at 10 metres, phasing into kelp park on sloping bedrock from 10-28m with large boulders at the base. Mixed seaweeds and faunal turf beneath the kelp. Cave and various crevices in the rock face.	TAT
165	Kelp on bedrock	Kelp forest on bedrock at 8m phasing into kelp park from 17 to 28m, the bedrock giving way to a seabed of boulders, cobbles and pebbles at 28m. Large cave in the bedrock. Lots of sea squirts covering the rock. One large iron grid seen but no other man made objects.	KF
166	Kelp on bedrock	Kelp forest on bedrock at 8m phasing into kelp park from 17 to 28m, the bedrock giving way to a seabed of boulders, cobbles and pebbles at 28m. Large cave in the bedrock. Lots of sea squirts covering the rock. One large iron grid seen but no other man made objects.	KP
167	Kelp on bedrock	Kelp forest on bedrock at 8m phasing into kelp park from 17 to 28m, the bedrock giving way to a seabed of boulders, cobbles and pebbles at 28m. Large cave in the bedrock. Lots of sea squirts covering the rock. One large iron grid seen but no other man made objects.	MS
168	Kelp on bedrock	Kelp forest on bedrock at 8m phasing into kelp park from 17 to 28m, the bedrock giving way to a seabed of boulders, cobbles and pebbles at 28m. Large cave in the bedrock. Lots of sea squirts covering the rock. One large iron grid seen but no other man made objects.	EPA

Code	Habitat	Description	Biotope
169	Kelp on bedrock	Kelp forest on bedrock at 8m phasing into kelp park from 17 to 28m, the bedrock giving way to a seabed of boulders, cobbles and pebbles at 28m. Large cave in the bedrock. Lots of sea squirts covering the rock. One large iron grid seen but no other man made objects.	SAT
170	Kelp and faunal turf on rock wall	Bedrock slope from 7m to 27m. Kelp forest phasing into kelp park with a diverse faunal turf beneath the kelp. Small cave with crevices and overhanging areas, the walls mainly covered in jewel anemones. No human activities or impacts recorded.	SAT
171	Kelp and faunal turf on rock wall	Bedrock slope from 7m to 27m. Kelp forest phasing into kelp park with a diverse faunal turf beneath the kelp. Small cave with crevices and overhanging areas, the walls mainly covered in jewel anemones. No human activities or impacts recorded.	KF
172	Kelp and faunal turf on rock wall	Bedrock slope from 7m to 27m. Kelp forest phasing into kelp park with a diverse faunal turf beneath the kelp. Small cave with crevices and overhanging areas, the walls mainly covered in jewel anemones. No human activities or impacts recorded.	KP
173	Kelp and faunal turf on rock wall	Bedrock slope from 7m to 27m. Kelp forest phasing into kelp park with a diverse faunal turf beneath the kelp. Small cave with crevices and overhanging areas, the walls mainly covered in jewel anemones. No human activities or impacts recorded.	EPA
174	Kelp and faunal turf on rock reef with cave	Sloping bedrock reef from 5m to 28m with kelp forest in the shallows phasing into kelp park with a rich understorey of sponges and anemones. Seabed of boulders, cobbles and pebbles at 28m. Metal grating seen, but no other man made objects recorded. Cave in bedrock.	KF
175	Kelp and faunal turf on rock reef with cave	Sloping bedrock reef from 5m to 28m with kelp forest in the shallows phasing into kelp park with a rich understorey of sponges and anemones. Seabed of boulders, cobbles and pebbles at 28m. Metal grating seen, but no other man made objects recorded. Cave in bedrock.	KP
176	Kelp and faunal turf on rock reef with cave	Sloping bedrock reef from 5m to 28m with kelp forest in the shallows phasing into kelp park with a rich understorey of sponges and anemones. Seabed of boulders, cobbles and pebbles at 28m. Metal grating seen, but no other man made objects recorded. Cave in bedrock.	MS
177	Kelp and faunal turf on rock reef with cave	Sloping bedrock reef from 5m to 28m with kelp forest in the shallows phasing into kelp park with a rich understorey of sponges and anemones. Seabed of boulders, cobbles and pebbles at 28m. Metal grating seen, but no other man made objects recorded. Cave in bedrock.	EPA
178	Kelp and faunal turf on rock reef with cave	Sloping bedrock reef from 5m to 28m with kelp forest in the shallows phasing into kelp park with a rich understorey of sponges and anemones. Seabed of boulders, cobbles and pebbles at 28m. Metal grating seen, but no other man made objects recorded. Cave in bedrock.	SAT
179	Rock wall and cave covered in faunal turf	Kelp park on bedrock at 10m, sheer wall from 10m to 22m covered in anemones, with many crevices home to crabs and squat lobsters. Cave at the base of the wall from 22m-23m with plumose anemones covering the ceiling at the entrance and boulders in the bottom. Sea bed of boulders, cobbles and pebbles sloping down to 30m. Octopus seen under one boulder. No litter or man made objects seen.	KP
180	Rock wall and cave covered in faunal turf	Kelp park on bedrock at 10m, sheer wall from 10m to 22m covered in anemones, with many crevices home to crabs and squat lobsters. Cave at the base of the wall from 22m-23m with plumose anemones covering the ceiling at the entrance and boulders in the bottom. Sea bed of boulders, cobbles and pebbles sloping down to 30m. Octopus seen under one boulder. No litter or man made objects seen.	EPA
181	Rock wall and cave covered in faunal turf	Kelp park on bedrock at 10m, sheer wall from 10m to 22m covered in anemones, with many crevices home to crabs and squat lobsters. Cave at the base of the wall from 22m-23m with plumose anemones covering the ceiling at the entrance and boulders in the bottom. Sea bed of boulders, cobbles and pebbles sloping down to 30m. Octopus seen under one boulder. No litter or man made objects seen.	SAT

Code	Habitat	Description	Biotope
182	Kelp and faunal turf on bedrock	Bedrock wall from 18m to 28m with kelp forest phasing into kelp park and giving way to faunal turf at around 25m. Cave at around 26m with plumose anemones covering the ceiling at the entrance. Boulder sea bed below 28m. No litter or man made objects apparent.	KF
183	Kelp and faunal turf on bedrock	Bedrock wall from 18m to 28m with kelp forest phasing into kelp park and giving way to faunal turf at around 25m. Cave at around 26m with plumose anemones covering the ceiling at the entrance. Boulder sea bed below 28m. No litter or man made objects apparent.	KP
184	Kelp and faunal turf on bedrock	Bedrock wall from 18m to 28m with kelp forest phasing into kelp park and giving way to faunal turf at around 25m. Cave at around 26m with plumose anemones covering the ceiling at the entrance. Boulder sea bed below 28m. No litter or man made objects apparent.	EPA
185	Kelp and faunal turf on bedrock	Bedrock wall from 18m to 28m with kelp forest phasing into kelp park and giving way to faunal turf at around 25m. Cave at around 26m with plumose anemones covering the ceiling at the entrance. Boulder sea bed below 28m. No litter or man made objects apparent.	SAT
186	Kelp and faunal turf on bedrock and boulders	Kelp forest on bedrock at 10m, wall from 10-27m encrusted with anemones, kelp park on boulders at 27m. No litter or man made objects seen.	KF
187	Kelp and faunal turf on bedrock and boulders	Kelp forest on bedrock at 10m, wall from 10-27m encrusted with anemones, kelp park on boulders at 27m. No litter or man made objects seen.	KP
188	Kelp and faunal turf on bedrock and boulders	Kelp forest on bedrock at 10m, wall from 10-27m encrusted with anemones, kelp park on boulders at 27m. No litter or man made objects seen.	MS
189	Kelp and faunal turf on bedrock and boulders	Kelp forest on bedrock at 10m, wall from 10-27m encrusted with anemones, kelp park on boulders at 27m. No litter or man made objects seen.	EPA
190	Kelp and faunal turf on bedrock and boulders	Kelp forest on bedrock at 10m, wall from 10-27m encrusted with anemones, kelp park on boulders at 27m. No litter or man made objects seen.	SAT
191	Kelp and faunal turf on bedrock and boulders	Kelp forest on bedrock at 10m, wall from 10-27m encrusted with anemones, kelp park on boulders at 27m. No litter or man made objects seen.	TAT
192	Kelp and faunal turf on bedrock	Kelp forest on horizontal bedrock at 10m (octopus seen here), phasing into kelp park on steep wall with crevices leading down to a cave at around 25m with cup corals, jewel anemones and dead mens fingers on the walls. Poor cod seen amongst boulders in cave. Seabed of boulders, cobbles and pebbles at 30m.	KF
193	Kelp and faunal turf on bedrock	Kelp forest on horizontal bedrock at 10m (octopus seen here), phasing into kelp park on steep wall with crevices leading down to a cave at around 25m with cup corals, jewel anemones and dead mens fingers on the walls. Poor cod seen amongst boulders in cave. Seabed of boulders, cobbles and pebbles at 30m.	KP
194	Kelp and faunal turf on bedrock	Kelp forest on horizontal bedrock at 10m (octopus seen here), phasing into kelp park on steep wall with crevices leading down to a cave at around 25m with cup corals, jewel anemones and dead mens fingers on the walls. Poor cod seen amongst boulders in cave. Seabed of boulders, cobbles and pebbles at 30m.	EPA
195	Kelp and faunal turf on bedrock	Kelp forest on horizontal bedrock at 10m (octopus seen here), phasing into kelp park on steep wall with crevices leading down to a cave at around 25m with cup corals, jewel anemones and dead mens fingers on the walls. Poor cod seen amongst boulders in cave. Seabed of boulders, cobbles and pebbles at 30m.	SAT
196	Kelp and faunal turf on bedrock	Kelp forest on horizontal bedrock at 10m (octopus seen here), phasing into kelp park on steep wall with crevices leading down to a cave at around 25m with cup corals, jewel anemones and dead mens fingers on the walls. Poor cod seen amongst boulders in cave. Seabed of boulders, cobbles and pebbles at 30m.	ABM
197	Kelp park on boulders	Bedrock slope and boulder tops with scattered Laminaria hyperborea, encrusting pink algae, bryozoan turf, hydroids and Actinothoe sphyrodeta. 25-37m bsl. Mostly surveyed boulder reef away from the main wall.	IR.MIR.KR.LhypT.Pk

Code	Habitat	Description	Biotope
198	Faunal and algal turf on boulder walls	Very large boulder reef walls (sides and overhangs). Steep angular boulders dominated by pink encrusting algae, frequent Actinothoe sphyrodeta and occasional patches of Corynactis viridis and in other places patches of Alcyonium digitatum. One patch of Parazoanthus axinellae photographed.	CR.HCR.XFa.SpAnVt
199	Kelp and faunal turf on rock wall	Wall face. Exposed wall made entirely of rock, open to the Atlantic. High occurrences of Alcyonium digitatum and also of Halichondria panicea and Corynactis viridis. Horizontal and gradual slopes dominated by kelp forest, with Alaria esculenta common (not surveyed in detail).	IR.HIR.KFaR.AlaAnCrSp
200	Kelp park on bedrock and boulders	Top of boulders almost exclusively covered in algae with vast forests of Laminaria digitata and L. hyperborea with bryozoan mats evident on many fronds. Large numbers of small Cancer pagurus hiding amongst the stipes and holdfasts. L. hyperborea stipes encrusted with epiphytic organisms. Echinus present in large numbers amongst kelp park with understorey of pink encrusting algae.	IR.HIR.KFaR.LhypR.Ft
201	Kelp park on bedrock and boulders	Top of boulders almost exclusively covered in algae with vast forests of Laminaria digitata and L. hyperborea with bryozoan mats evident on many fronds. Large numbers of small Cancer pagurus hiding amongst the stipes and holdfasts. L. hyperborea stipes encrusted with epiphytic organisms. Echinus present in large numbers amongst kelp park with understorey of pink encrusting algae.	IR.HIR.KFaR.LhypR.Pk
202	Faunal turf on boulder walls	Bottom of wall and sides and bottoms of boulders. Good light penetration to the bottom and around the boulders that were often house-sized. Encrusted with sponges and Corynactis viridis. Lots of Pachymatisma johnstonii. Tritonia hombergi feeding on clusters of Alcyonium.	IR.FIR.SG.CrSpAsAn
203	Kelp forest on rock wall	Vertical wall from 22m to 31m bsl. Bedrock wall running from surface to the seabed covered in Laminaria digitata, Laminaria hyperborea and Sagartia elegans. Echinus esculentus and Asterias rubens are plentiful also. Epiphytes on most Laminaria hyperborea stipes.	IR.HIR.KFaR.LhypRVt
204	Kelp park on boulders	Tops of large boulders 22m-26m bsl. Large presence of laminoids including juvenile plants. Tritonia hombergi around Alcyonium digitatum, often with visible scars. Pink encrusting algae and bryozoans on tops of the boulders. Aplidium punctum on most of the Laminaria holdfasts.	IR.HIR.KFaR.LhypR.Pk
205	Faunal turf on boulder sides	Sides of boulders from 22m to 31m bsl. Covered in Corynactis viridis and orange encrusting bryozoans, unidentifiable from photos. Common Antedon bifida spread evenly with regular occurrence of Echinus esculentus.	IR.FIR.SG.CrSpAsAn
206	Mobile fauna on horizontal bedrock and sediment	Level seabed at 31m of bedrock, boulders, shell fragments and sand.	CR.HCR
207	Faunal turf on vertical wall	Vertical bedrock wall (not surveyed much) and sides of large boulders, surveyed from 21m to 35m bsl. The wall extended steeply to the surface but was not surveyed, and large boulders were present deeper. Dominated by Corynactis viridis and encrusting pink algae, Alcyonium digitatum present in places.	IR.FIR.SG.CrSpAsAn
208	Kelp park on boulders	Tops of large boulders with kelp to 33m bsl. The boulder surface is covered with encrusting pink algae and Jassa-like amphipod tubes, with occasional mixed red and non-calcareous algae.	IR.HIR.KFaR.LhypR.Pk
209	Faunal turf in overhangs and tunnels	Overhangs and large crevices/tunnels between very large boulders covered in jewel anemones and urchins.	CR.FCR.Cv
210	Faunal crusts on mobile boulders	Large and medium boulders at base of very large boulders covered in encrusting sponges and orange bryozoan crusts almost exclusively, possibly due to movement of mobile boulders. (35-37m bsl)	CR.MCR.EcCr.FaAlCr
211	Faunal turf on boulder sides	Sides of boulders covered in Corynactis viridis and pink encrusting algae. Haliclona occasional as well as small Alcyonium digitatum. Echinus esculentus and Delesseria sanguinea common. 20-26m bsl.	IR.FIR.SG.CrSpAsAn
212	Sugar kelp on mixed substrate	Sand, gravel and pebble sea bed. Echinus esculentus abundant. Many echinoderms present on small stones and at bases of boulders. Marthasterias glacialis seen frequently.	SS.SMp.KSwSS
213	Kelp forest on large boulders	Tops of large boulders covered in pink encrusting algae and Alaria esculenta and Laminaria digitata, hyperborea and saccharina with associated epiphytes. Helcion pellucidum common on some fronds.	IR.HIR.KFaR.LhypR.Ft

Code	Habitat	Description	Biotope
214	Kelp park on vertical bedrock	Kelp dominated vertical bedrock to around 23m bsl. Not surveyed in detail as too much surge. Understorey of pink encrusting algae and red foliose seaweeds home to Aplysia punctata. Lots of small and juvenile Laminaria spp, not very dense or particularly long.	IR.HIR.KFaR.LhypRVt
215	Faunal turf on vertical bedrock	Vertical bedrock wall encrusted with short faunal turf and pink encrusting algae and particularly colourful patches of jewel anemones, elegant anemones, sponges (Haliclona viscosa and Myxilla incrustans) and occasional patches of Metridium senile. Habitat also includes vertical walls of large boulders. Some foliose red algae present. 20-40m bsl. Most of this habitat was on a layer of pink encrusting algae with faunal turf sparsely clustered on it.	CR.HCR.XFa.SpAnVt
216	Faunal turf in caves and overhangs	Vertical walls and ceilings of caves and overhangs dominated by encrusting sponges but not as well covered as habitat 2. 26-40m bsl.	CR.HCR.XFa
217	Faunal turf in caves and overhangs	Vertical walls and ceilings of caves and overhangs dominated by encrusting sponges but not as well covered as habitat 2. 26-40m bsl.	CR.HCR.XFa
218	Faunal turf in caves and overhangs	Vertical walls and ceilings of caves and overhangs dominated by encrusting sponges but not as well covered as habitat 2. 26-40m bsl.	CR.FCR.Cv
219	Cup corals on cave and overhang floors	Cave and overhang floors of bedrock, boulders and cobbles dominated by Caryophyllia smithii.	CR.MCR.EcCr.CarSp
220	Cup corals on cave and overhang floors	Cave and overhang floors of bedrock, boulders and cobbles dominated by Caryophyllia smithii.	CR.FCR.Cv
221	Cobbles, pebbles and boulders with bryozoans, 38.5 m bcd.	Cobbles, pebbles and small boulders with various bryozoans and corallinaceae 38.5 m bcd.	SS.SCS.CCS.PomB
222	Cobbles, pebbles and sand with bryozoans at 48 m bcd.	Cobbles and pebbles with Alcyonium diaphanum, Pentapora foliacea and bryozoan crusts 48 m bcd.	SS.SCS.CCS.PomB
223	Cobbles, pebbles and sand with bryozoans at 48 m bcd.	Cobbles and pebbles with Alcyonium diaphanum, Pentapora foliacea and bryozoan crusts 48 m bcd.	SS.SMx.CMx
224	Bedrock with kelp forest, 8,5 m Bcd.	ROV was not able to penetrate dense kelp forest. Substratum assumed to be bedrock, supporting Laminaria hyperborea forest. Surveyed at 8.5 m bcd.	IR.HIR
225	Bedrock and boulders with kelp forest 13.5 to 23.5 m bcd.	Bedrock and some large boulders supporting abundant Laminaria hyperborea. The rock surfaces were encrusted by corallinaceae, with vertical surfaces supporting a turf of sponges, bryozoans and algae. Surveyed from 13.5-23.5 m bcd.	CR
226	Boulders with kelp forest, 16.5-19.5 m bcd.	Boulders with super abundant Laminaria hyperborea and faunal turf including the anemone Actinothoe sphyrocleta on vertical surfaces. Surveyed from 16.5 to 19.5 m bcd.	IR.HIR
227	Boulders with kelp park, 19.5 to 32.5 m bcd.	Boulders with Laminaria hyperborea park and encrusted with corallinaceae. Surveyed from 19.5 to 32.5 m bcd.	IR.HIR
228	Boulders with corallinaceae, 19.5 to 42.4 m bcd.	Boulders with corallinaceae, bryozoan crusts and ascidians. Surveyed from 19.5 to 42.5 m bcd. Dogfish eggs (mermaids purses) were observed on one rock.	CR.HCR
229	Boulders and bedrock with kelp forest 16-23 m bcd.	Boulders and some bedrock with Laminaria hyperborea forest and an understory of foliose red algae. Surveyed from 16-23 m bcd.	IR.HIR
230	Boulders and bedrock with red and brown algae, 23-28 m bcd.	Boulders and bedrock with foliose red and brown algae, Laminaria hyperborea park, corallinaceae and faunal turf, 23 to 28 m bcd.	IR.HIR
231	Bedrock and boulders with corallinaceae and faunal turf, 28-40.5	Stepped bedrock and some boulders with encrusting corallinaceae and a faunal turf including crisiidae, Flustra foliaceae and porifera species. Surveyed from 28-40.5 m bcd.	CR.HCR

Code	Habitat	Description	Biotope
	m bcd.		
232	Bedrock outcrop with Alcyonium digitatum, 32-34 m bcd.	Bedrock outcrop with Alcyonium digitatum and corallinaceae as well as some Ophithrix fragilis among the dead men's fingers. 32 to 34 m bcd.	CR.HCR
233	Boulders and cobbles with Flustra foliacea, 33 to 42 m bcd.	Boulders and cobbles with Flustra foliacea, crustose bryozoans, corallinaceae and brittle stars. Surveyed from 33 to 42 m bcd.	CR.HCR
234	Bedrock and boulders with kelp forest 12-15 m bcd.	Bedrock and boulders upper surfaces with Laminaria hyperborea forest 12 to 15 m bcd.	IR.HIR
235	Faunal turf on vertical surfaces of massive boulders.	Vertical surfaces on massive boulders with rich faunal turf of sponge and colonial ascidians.	IR.FIR.SG.CrSpAsAn
236	Bedrock with Saccorhiza polyscides 12 m bcd to 14 m bcd.	Area of sloping bedrock with dense Saccorhiza polyschides, Desmarestia ligulata and Alaria esculentus. Surveyed 12 to 14 m bcd.	IR.HIR
237	Bedrock with kelp forest and faunal turf 14 to 25 m bcd.	Sloping bedrock with Laminaria hyperborea forest and faunal turf and encrusting bryozoans and algae on rock below. Surveyed from 14 to 25 m bcd.	IR.HIR
238	Kelp park on bedrock with faunal turf 25 to 38 m bcd.	Sloping bedrock with kelp park and faunal turf.	IR.HIR
239	Boulders and cobbles with corallinaceae and keel worms, 38 m bcd.	Boulders and cobbles encrusted with coralline red algae and Pomatoceros triqueter. 38 m bcd.	CR.HCR
240	Bedrock and boulders with kelp forest, 19-23 m bcd.	Bedrock (sloping) and some large boulders with kelp forest and corallinaceae. Surveyed from 19 to 23 m bcd.	IR.HIR
241	Bedrock with brittlestars, 42 to 44 m bcd.	Gently sloping bedrock outcrop, encrusted by corallinaceae and bryozoans and supporting large numbers of the brittlestar Ophiocomina nigra. Surveyed from 42-44 mbcd.	CR.HCR
242	Sand with diatom film, 47 m bcd.	Sand with a patchy diatom film and some hermit crabs, 47 m bcd.	SS.SSa.CFiSa
243	Sand with little biota 44 m bcd.	Rippled and mounded sand with loose drift algae moving in the swell. Rare Alcyonium digitatum, Callionymus lyra and Pleuronectidae sp. were recorded. 44 m bcd.	SS.SSa.CFiSa
244	Sand with rare small boulders, 42.5 m bcd.	Coarse, apparently barren sand with rare small boulders and bryozoan crusts, erect bryozoans and keel worms, 42.5 mbcd.	SS.SCS.ICS
245	Boulders with bryozoans, porifera and corallinaceae crusts, 31-34 m bcd.	Boulders and some very large boulders, with crusts of porifera, bryozoa and corallinaceae. Surveyed from 31-34 m bcd.	CR.HCR
246	Boulders with bryozoans and corallinaceae 27.5 to 37.5 m bcd.	Boulders with some very large boulders supporting crustose and erect bryozoans, and corallinaceae. Surveyed from 27.5 m to 37.5 m bcd.	CR.HCR
247	Boulders with bryozoans and corallinaceae, 33 to 35 m bcd.	Boulders with Flustra folicea, Pentapora foliacea, bryozoan crusts and corallinaceae. Surveyed form 33 to 35 m bcd.	CR.HCR
248	Cobbles and brittlestars and bryozoans 35 to 37 m bcd.	Cobbles with Ophicomina nigra, Pentapora foliacea, Flustra foliacea and bryozoan crusts, surveyed from 35 to 37 m bcd.	SS.SMx.CMx.OphMx
249	Kelp forest on bedrock.	Kelp forest Laminaria hyperborea on bedrock occasional large boulders. Surveyed from 9.5 to 12.5 m bcd.	IR.HIR
250	Boulders and cobbles with kelp park, 32 m bcd.	Boulders and cobbles with kelp park, the brittle star Ophicomina nigra and both foliose and crustose red algae. Depth was 32 m bcd.	CR.HCR

Code	Habitat	Description	Biotope
251	Coarse sand with flatfish 52 m bcd.	Coarse, heavily rippled sand with no obvious biota other than a flatfish. Some heart urchin tests were observed indicating an infaunal presence 52 m bcd.	SS.SCS.CCS
252	Boulders with kelp park, 22 m bcd to 25 m bcd.	Boulders with Laminaria hyperborea park and Alcyonium digitatum and Actinothoe sphyrodeta on some vertical surfaces, 22 to 25 m bcd.	IR.HIR
253	Stepped bedrock with corallinaceae and bryozoans 47 to 45 m bcd.	Stepped bedrock outcrops with corallinaceae, Flustra folicea bryozoan crusts and brittlestars. Surveyed from 47 to 45 m bcd.	CR.HCR
254	Coarse sand with brittlestars 47 m bcd.	Coarse sand in mega ripples, supporting the brittlstar Ophicomina nigra. Surveyed at 47 m bcd.	SS.SMx.CMx.OphMx
255	Bedrock and boulders with kelp forest 12.5 to 20 m bcd.	Bedrock and boulders with kelp forest. Vertical surfaces supported anemones, sponges anf bryozoans with foliose red and brown algae forming an understory below the kelp. Surveyed from 12.5 to 20 m bcd.	IR.HIR
256	Kelp park on boulder and bedrock from 20 to 28 m bcd.	Kelp park on urchin grazed boulders with some bedrock. Upward faces on larger boulders with rich turf of foliose algae including Dictyota dichotoma and Delesseria sanguinea.	IR.HIR
257	Urchin grazed boulder and bedrock from 28 to 35 m bcd.	Large boulders and some bedrock with Echinus esculentus and Corallinaceae (crusts). Subject to grazing and some scour where this biotope meets sand at 35 m bcd.	IR.HIR
258	Rippled medium sand, barren at 35 m bcd.	Rippled medium sand, visually barren with no crabs or siphons visible. Occasional unidentified flatfish.	SS.SSa.IFiSa.IMoSa
259	Bedrock with kelp forest 6 to 24 m bcd.	Bedrock and some boulders encrusted by bryozoa, porifera and corallinaceae, with kelp Laminaria hyperborea forest, from 6 to 24 m bcd.	IR.HIR
260	Boulders with kelp park, 21 to 24 m bcd.	Boulders supporting coralline algal crusts, bryozoan crusts and supporting Laminaria hyperborea park, 21 to 24 m bcd.	IR.HIR
261	Sand with diatom film, 24 m bcd.	Sand with a surface film of diatoms at 24 m bcd.	SS.SSa.CFiSa
262	Sand with some burrows/holes, 9 m bcd.	Rippled and mounded, firm sand with some holes/burrows and some drift algae, at 9 m bcd.	SS.SSa.IFiSa
263	Sand with diatom film 20 m bcd.	Sand with a patchy covering of diatoms. The sand surface was indented by burrows indicating infaunal biota 20 m bcd.	SS.SSa.CFiSa
264	Sand with diatom film 14 m bcd.	Apparently barren sand with patchy diatom film. The surface of the sand was indented with holes, indicating the presence of burrows below the surface 14 m bcd.	SS.SSa.IFiSa
265	Upper boulder surfaces with kelp park 33 to 27 m bcd.	Upper surfaces of boulders, encrusted with corallinaceae, supporting an understory of Dictyota dichotoma below kelp park. 33 to 27 m bcd.	IR.HIR
266	Vertical rock with faunal turf 27 to 33 m bcd.	Vertical surfaces of boulders with faunal turf including Parazoanthus axinellae, porifera, and bryozoan turf, 27 to 33 m bcd.	CR.MCR.EcCr.AdigVt
267	Bedrock and boulders with kelp forest 24.5 to 2 mcd.	Bedrock slope with boulders near base supporting kelp forest from 2 to 24.5 m bcd.	IR.HIR
268	Boulders with Corynactis sp. and bryozoans 35 to 37 m bcd.	Boulders and some bedrock outcrops with Corynactis viridis, various sponges and hydroids. Surveyed from 38 to 40 m bcd. Frequent colonies of Polymastia boletiformis were encountered.	CR.HCR
269	Sand with some Luidia ciliaris 37 m bcd.	Coarse sand with occasional Luidia ciliaris.	SS.SCS.ICS
270	Boulders and cobbles with crusts and brittlestars 54 m bcd.	Boulders and cobbles with algal and bryozoan crusts and brittlestars, Ophicomina nigra and Ophiothrix fragilis. Depth was 54 m bcd.	CR.HCR
271	Bedrock with kelp forest 6 to 24 m bcd.	Upper surfaces on bedrock pinnacle. Supporting kelp Laminaria hyperborea forest 6 to 24 m bcd.	IR.HIR

Code	Habitat	Description	Biotope
272	Vertical bedrock with faunal turf, 24 to 36 m bcd.	Vertical bedrock side of rocky pinnacle with dense anemones, sponges and coralline red algae. 24 to 36 m bcd.	IR.HIR.KFaR.LhypRVt
273	Bedrock with Corynactis viridis, 36 to 40 m bcd.	Bedrock and some large boulders, at the base of a bedrock pillar and supporting Corynactis viridis and corallinaceae. Surveyed from 36 to 40 m bcd. A ling and a greater spotted dogfish were encountered.	CR.HCR
274	Bedrock with kelp forest 23 to 26 m bcd.	Upper surfaces of bedrock steps with Laminaria hyperborea forest. Surveyed from 23 to 26 m bcd.	IR.HIR
275	Bedrock with faunal turf, 23 to 26 m bcd.	Vertical bedrock surfaces with a faunal turf dominated by the anemone Actinothoe sphyrodeta and sponges. Surveyed from 23 to 26 m bcd.	IR.HIR.KFaR.LhypRVt
276	Bedrock with Corynactis sp. and corallinaceae, 40 to 43 m bcd.	Bedrock steps encrusted with corallinaceae and supporting a dense covering of the jewel anemone Corynactis viridis. Surveyed from 40 to 43 m bcd.	CR.HCR
277	Bedrock with corallinaceae and Corynactis viridis 30-50 m bcd.	Sloping bedrock, encrusted with corallinaceae and supporting dense Corynactis viridis 30 to 50 m bcd.	CR.HCR
278	Bedrock and boulders with bryozoans and sponges 50 to 70 m bcd.	Bedrock and boulder slope with some Swiftia pallida, bryozoans, both erect and crustose and sponges. 50 to 70 m bcd.	CR.HCR
279	Bedrock with kelp forest 9 to 23 m bcd.	Sloping bedrock supporting dense Laminaria hyperborea forest with the bedrock encrusted by coralline red algae and supporting foliose red algae. Surveyed from 9 to 23 m bcd.	IR.HIR
280	Bedrock with kelp park 23 to 37 m bcd.	Bedrock slope supporting kelp (Laminaria hyperborea) park. The bedrock was encrusted by coralline red algae and also supported Echinus esculentus. Surveyed from 23 to 37 m bcd.	IR.HIR
281	Ciracalittoral bedrock with sponges and crustose red algae 37 to 54 m bcd.	Circalittoral bedrock with encrusting and erect sponges, crustose coralline algae and Echinus esculentus. Surveyed from 37 to 54 m bcd.	CR.HCR
282	Boulders with coralline algae and keel worms 50 to 54 m bcd.	Circalittoral boulders, encrusted by coralline red algae, sponges and keel worms. Surveyed from 50 to 54 m bcd.	CR.HCR
283	Bedrock with Alaria esculenta 1 to 2 m bcd.	Bedrock, vertical and sloping, with encrusting red coralline algae and Alaria esculenta 1 to 2 m bcd.	IR.HIR.KFaR.Ala
284	Bedrock with kelp from 2 to 19 m bcd.	Sloping bedrock with Laminaria hyperborea foliose red algae and faunal turf below from 2 to 19 m bcd.	IR.HIR
285	Bedrock with faunal turf, 2 to 19 m bcd.	Vertical and overhanging bedrock supporting a faunal turf containing anemones, sponges, hydroids and bryozoans.	IR.FIR.SG.CrSpAsAn
286	Bedrock with Alaria sp. 7 to 9 m bcd.	Vertical bedrock with Alaria esculenta barnacles and encrusted with coralline red algae. Surveyed from 7 to 9 m bcd.	IR.HIR.KFaR.Ala.Myt
287	Bedrock and boulders with kelp 9 to 25.5 m bcd.	Upper and steep faces of bedrock and boulders. Supporting Laminaria hyperborea and foliose red and brown algae.	IR.HIR
288	Vertical bedrock and boulders with faunal turf, 20 to 25.5 m bcd.	Vertical surfaces on bedrock cliff and boulders below supporting a faunal turf with the jewel anemone, Corynactis viridis, various sponges and coralline crustose red algae. Surveyed between 20 and 25.5 m bcd.	IR.FIR.SG.CrSpAsAn
289	Bedrock with faunal turf 2 to 8 m bcd.	Bedrock cave walls covered in a faunal turf with sponges, jewel anemones and crustose and erect bryozoans 2 to 8 mbcd.	IR.FIR.SG.CrSpAsAn
290	Boulders and bedrock with coralline algal and bryozoan crusts 8 to 10 m bcd.	Boulders and the bedrock cave walls at 8 to 10 m bcd. These substrata supported scoured crusts of coralline red algae and bryozoa with some sponges.	IR.HIR
291	Bedrock and boulders with algal and bryozoan crusts 36 to 42.5 m bcd.	Bedrock outcrops and boulders encrusted by coralline algae and bryozoans with jewel anemones, hydroids and some red foliose algae. Surveyed from 36 to 42.5 m bcd	CR.HCR

Code	Habitat	Description	Biotope
292	Boulders and cobbles with coralline algae and bryozoan crusts, 52 to 56 m bcd.	Boulders with cobbles in between. The habitat was not fully surveyed but supported bryozoans and coralline algal crusts, between 52 to 56 m bcd.	CR.HCR
293	Bedrock with bryozoans and coralline algal crusts, 51 to 52 m bcd.	Stepped bedrock with coralline crustose red algae, crustose and erect bryozoans and porifera species. Surveyed from 51 to 52 m bcd.	CR.HCR
294	Bedrock with bryozoans 80 to 81 m bcd.	Bedrock outcrop with bryozoan crusts, Porella compressa keel worms, featherstars and brittlestars 80 to 81 m bcd.	CR.HCR
295	Cobbles and pebbles with keel worms 81 m bcd.	Cobbles and pebbles in waves (wavelength 1-2 m) with keel worms and some bryozoans and brittlestars. 81 m bcd.	SS.SCS.CCS.PomB
296	Bedrock with crustose algae and bryozoans with Corynactis sp, 38 to 50 m bcd.	Sloping bedrock encrusted by coralline algae and bryozoans with a covering of Corynactis viridis and Pomatoceros triqueter. Surveyed from 38 to 50 m bcd.	CR.HCR
297	Cobbles with encrusting plants and animals with brittlestars 50 m bcd.	Cobbles encrusted by coralline red algae and bryozoans with keel worms and brittlestars between. Surveyed at 50 m bcd.	SS.SMx.CMx.OphMx
298	Bedrock with corallinaceae and Corynactis viridis, 42 to 52 m bcd.	Sloping bedrock with encrusting red algae, jewel anemones and clumps of the bryozoan Flustra foliacea.	CR.HCR
299	Bedrock with bryozoan and algal crusts and brittlestars 52 to 60 m bcd.	Sloping bedrock and some red algal and bryozoan crusts. The rock also supported brittlestars and sponges. Surveyed from 52 to 60 m bcd.	CR.HCR
300	Bedrock with Caryophyllia smithii and keel worms, 60 to 68 m bcd.	Sloping silty bedrock with large numbers of the cup coral Caryophyllia smithii, Pomatoceros triqueter and Echinus esculentus. Surveyed from 60 to 68 m bcd.	CR.HCR
301	Kelp forest on boulders and bedrock, infralittoral, 8 to 20 m bsl.	Kelp forest of Laminaria hyperborea with Saccorhiza polyschides on bedrock and massive boulders. Stipes with rich epiphytic growth.	IR.HIR
302	Vertical rock with faunal turf 17 to 20 m bcd.	Vertical faces on boulders supporting a faunal turf with coralline algae and some red and brown foliose algae also. Depth surveyed 17 to 20 m bcd.	IR.HIR.KFaR.LhypRVt
303	Kelp forest (Laminaria hyperborea) on steep/vertical bedrock.	Laminaria hyperborea forest on bedrock with very rich epibiota on stipes and rock surfaces.	IR.HIR
304	Bedrock with kelp park and Corynactis viridis 20 to 30 m bsl.	Sloping bedrock with encrusting Corynactis viridis and kelp park Laminaria hyperborea, with some Laminaria saccharina. Surveyed from 20 to 30 m bsl.	IR.HIR
305	Bedrock and boulders with corallinaceae and Echinus esculentus 30 to 44 m bcd.	Bedrock and boulders with corallinaceae, Echinus esculentus and some Flustra folicea. Surveyed from 30 to 44 m bcd.	CR.HCR
306	Bedrock with kelp forest 24 to 26 m bcd.	Bedrock with Laminaria hyperborea forest, Corynactis viridis and Echinus esculentus. Surveyed from 24 to 26 m bcd.	IR.HIR
307	Bedrock with brittlestars and Flustra folicea 32 to 44 m bcd.	Bedrock with some cobbles and gravel in gullies. The substrata supported coralline crustose algae, Flustra folicea, and brittlestars, surveyed from 32 to 44 m bcd.	CR.MCR.EcCr
308	Kelp forest on bedrock and large boulders 14 to 20 m bcd.	Bedrock and very large boulders with Laminaria hyperborea forest, from 14 to 20 m bcd.	IR.HIR
309	Boulders with sugar kelp forest from 20 to 23 m bcd.	Boulders and some bedrock with Laminaria saccharina forest, from 20 to 23 m bcd.	IR.HIR
310	Boulders with crustose algae and	Boulders with corallinaceae, foliose brown algae and bryozoan crusts. Surveyed from 23 to 31 m bcd.	IR.HIR

Code	Habitat	Description	Biotope
	bryozoa, 23 to 31 m bcd.		
311	Boulders and bedrock with brittlestars, 43 to 45 m bcd.	Boulders and some bedrock outcrops with encrusting coralline red algae, bryozoans and keel worms. The substrata also supported large numbers of brittlestars. Surveyed 43 to 45 m bcd.	CR.HCR
312	Sand with plaice 54 m bcd.	Coarse sand with the plaice Pleuronectes platessa at 54 m bcd.	SS.SSa.CFiSa
313	Boulders with bryozoans and hydroids 63 to 65 m bcd.	Boulders supporting crustose and erect bryozoans, hydroids and corallinaceae. Surveyed from 63 to 65 m bcd.	CR.HCR
314	Kelp park on vertical bedrock	Kelp park on steep walls down to 18m with hyperborea dominant. Lots of encrusting species on rock underneath. Large number of urchins too.	IR.MIR.KR.LhypVt
315	Short faunal turf on vertical/steep bedrock	Short animal turf. Present on all vertical/steep faces where kelp cannot grow, also includes boulders at 28m - 30m bsl.	CR.HCR.XFa
316	Short faunal turf on vertical/steep bedrock	Short animal turf. Present on all vertical/steep faces where kelp cannot grow, also includes boulders at 28m - 30m bsl.	CR.HCR.XFa.CvirCri
317	Kelp forest on bedrock	Dense kelp forest, plants with long stipes up to 2m and blades. Many nudibranchs feeding and mating on the bryozoan mat. Lots of sponges and other encrusting animals on the bases and holdfasts.	IR.HIR.KFaR.LhypFa
318	Kelp park on bedrock	Kelp thinning out and interspersed with red seaweeds. Lots of encrusting algae and sponges but also jewel anemones and Sagartia.	IR.HIR.KFaR.LhypR.Pk
319	Anemones and bryozoans on vertical bedrock	Walls - this type of habitat present in small patches above 22m but dominant below this on the steeper parts of the pinnacle. Areas dominated by anemones. The odd strand of kelp and red seaweed still present at 30m!	CR.HCR.XFa.CvirCri
320	Alaria kelp park on bedrock	Kelp park with dabberlocks dominant. Other kelps present. Loads of anemones and brittle stars also present between the holdfasts.	IR.HIR.KFaR.Ala.Ldig
321	Alaria kelp park on bedrock	Kelp park with dabberlocks dominant. Other kelps present. Loads of anemones and brittle stars also present between the holdfasts.	IR.HIR.KFaR.LhypR.Pk
322	Anemones and bryozoans on vertical bedrock	Short animal turf on vertical walls. In areas, dense cover of jewel anemones. Lots of Sagartia - white form too.	CR.HCR.XFa.CvirCri
323	Red algae and faunal turf on boulders	Boulders - mix of seaweeds and animal turf. Algae present include kelp and divided net weed, red rags, fan weed and sea beech.	CR.HCR.XFa
324	Alaria kelp park on bedrock	Kelp park from around 16m upwards, dense kelp and dabberlocks. Lots of Membranipora bryozoan being grazed by nudibranchs.	IR.HIR.KFaR.Ala.Ldig
325	Alaria kelp park on bedrock	Kelp park from around 16m upwards, dense kelp and dabberlocks. Lots of Membranipora bryozoan being grazed by nudibranchs.	IR.HIR.KFaR.LhypR.Pk
326	Anemones on vertical bedrock	Walls outside cave. Community characterised by anemone growth and sparse cover of kelp. Number of red seaweeds also present.	CR.HCR.XFa.SpAnVt
327	Faunal turf on cave walls	Cave walls. Inside the Saw Gap, both walls plastered with marine life. Obviously an area prone to surge. Sponges and bryozoans were numerous.	CR.FCR.Cv
328	Alaria kelp park on bedrock	Kelp park to 15 metres. Clear water, daylight penetrating deep down. Dabberlocks dominant but other kelps and red seaweed present.	IR.HIR.KFaR.Ala.Ldig
329	Alaria kelp park on bedrock	Kelp park to 15 metres. Clear water, daylight penetrating deep down. Dabberlocks dominant but other kelps and red seaweed present.	IR.HIR.KFaR.LhypR.Pk
330	Faunal turf on vertical bedrock	Wall plastered with life: anemones, sponges and bryozoans, obviously very strong tidal streams.	CR.HCR.XFa.SpAnVt

Code	Habitat	Description	Biotope
331	Patchy faunal turf on boulders and in gullies	Boulders and gullies in bedrock. Patchy animal turf, mainly on the upper surfaces and mainly the same species as on the bedrock wall of the stack but with fewer anemones.	CR.HCR.XFa
332	Kelp forest on vertical bedrock	Kelp forest, quite dense with lots of bryozoan growth on blades, so lots of nudibranchs present. Solid bedrock, quite steep.	IR.MIR.KR.LhypVt
333	Kelp park on bedrock	Kelp park with red seaweeds present. Thinning out, but lots of encrusting fauna - sponges etc - present on bedrock also.	IR.HIR.KFaR.LhypR.Pk
334	Faunal turf on boulders	Short animal turf on boulders - red seaweeds present too, but sparse. Lots of anemones and sponges present, crabs too.	CR.HCR.XFa

ANNEX 14: MARINE RECORDER RECORDS FROM NORTH RONA

Annex 14A – Positional, depth and other non-biological data

Data as downloaded from Marine Recorder. Text is uneditted and may include formatting artefacts.

Code	Sample reference	Survey key	Event name	Date	Surveyors	Latitude	Longitude	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
1	MRMCS007000005C6.01	MRMCS007000000A5	Sron Nan Caorach	26/07/2010	Chris Wood	59.12227	-5.81202	-6.0	0.0	-5.3	0.7
2	MRMCS007000005C6.02	MRMCS007000000A5	Sron Nan Caorach	26/07/2010	Chris Wood	59.12227	-5.81202	-20.0	-6.0	-19.3	-5.3
3	MRMCS007000005C6.03	MRMCS007000000A5	Sron Nan Caorach	26/07/2010	Chris Wood	59.12227	-5.81202	-22.0	-20.0	-21.3	-19.3
4	MRMCS007000005C7.03	MRMCS007000000A5	Gealldruig Mhor	26/07/2010	Richard Shucksmith, Rachel Hope	59.11370	-5.80995	-30.0	-22.0	-28.0	-20.0
5	MRMCS007000005C1.01	MRMCS007000000A5	Ton Braighe	29/07/2010	John Fellows	59.12533	-5.83470	-22.5	-13.0	-19.9	-10.4
6	MRMCS007000005C1.01	MRMCS007000000A5	Ton Braighe	29/07/2010	John Fellows	59.12533	-5.83470	-22.5	-13.0	-19.9	-10.4
7	MRMCS007000005C1.01	MRMCS007000000A5	Ton Braighe	29/07/2010	John Fellows	59.12533	-5.83470	-22.5	-13.0	-19.9	-10.4
8	MRMCS007000005C2.01	MRMCS007000000A5	East Side Rona	27/07/2010	John Fellows	59.12416	-5.81451	-18.5	-15.0	-15.8	-12.3
9	MRMCS007000005C2.01	MRMCS007000000A5	East Side Rona	27/07/2010	John Fellows	59.12416	-5.81451	-18.5	-15.0	-15.8	-12.3
10	MRMCS007000005C2.01	MRMCS007000000A5	East Side Rona	27/07/2010	John Fellows	59.12416	-5.81451	-18.5	-15.0	-15.8	-12.3
11	MRMCS007000005C7.01	MRMCS007000000A5	Gealldruig Mhor	26/07/2010	Richard Shucksmith, Rachel Hope	59.11370	-5.80995	-22.0	-8.0	-20.0	-5.1
12	MRMCS007000005C7.02	MRMCS007000000A5	Gealldruig Mhor	26/07/2010	Richard Shucksmith, Rachel Hope	59.11370	-5.80995	-22.0	-8.0	-20.0	-5.1
13	MRMCS007000005CC.01	MRMCS007000000A5	Ton Braighe	29/07/2010	Chris Wood	59.12533	-5.83470	-22.0	-13.0	-19.4	-10.4
14	MRMCS007000005CC.02	MRMCS007000000A5	Ton Braighe	29/07/2010	Chris Wood	59.12533	-5.83470	-31.0	-22.0	-28.4	-19.4
15	MRMCS007000005CC.02	MRMCS007000000A5	Ton Braighe	29/07/2010	Chris Wood	59.12533	-5.83470	-31.0	-22.0	-28.4	-19.4

Code	Sample reference	Survey key	Event name	Date	Surveyors	Latitude	Longitude	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
16	MRSNH0160000002B.01	MRSNH01600000006	Video transect 03	03/08/2009	Julia Doran	59.13122	-5.82717				
17	MRSNH0160000002B.02	MRSNH01600000006	Video transect 03	03/08/2009	Julia Doran	59.13126	-5.82744				
18	MRSNH0160000002B.03	MRSNH01600000006	Video transect 03	03/08/2009	Julia Doran	59.13133	-5.82797				
19	MRSNH0160000002B.04	MRSNH01600000006	Video transect 03	03/08/2009	Julia Doran	59.13137	-5.82832				
20	MRSNH0160000002B.05	MRSNH01600000006	Video transect 03	03/08/2009	Julia Doran	59.13145	-5.82877				
21	MRSNH0160000002C.01	MRSNH01600000006	Video transect 04	03/08/2009	Julia Doran	59.13054	-5.83348				
22	MRSNH0160000002C.02	MRSNH01600000006	Video transect 04	03/08/2009	Julia Doran	59.13079	-5.83420				
23	MRSNH0160000002C.03	MRSNH01600000006	Video transect 04	03/08/2009	Julia Doran	59.13096	-5.83457				
24	MRSNH0160000002D.01	MRSNH01600000006	Video transect 05	10/08/2009	Julia Doran	59.12802	-5.83232				
25	MRSNH0160000002D.02	MRSNH01600000006	Video transect 05	10/08/2009	Julia Doran	59.12832	-5.83270				
26	MRSNH0160000002D.03	MRSNH01600000006	Video transect 05	10/08/2009	Julia Doran	59.12836	-5.83280				
27	MRSNH0160000002D.04	MRSNH01600000006	Video transect 05	10/08/2009	Julia Doran	59.12845	-5.83281				
28	MRSNH0160000002E.01	MRSNH01600000006	Video transect 06	03/08/2009	Julia Doran	59.12680	-5.82615				
29	MRSNH0160000002E.02	MRSNH01600000006	Video transect 06	03/08/2009	Julia Doran	59.12704	-5.82714				
30	MRSNH0160000002E.03	MRSNH01600000006	Video transect 06	03/08/2009	Julia Doran	59.12724	-5.82812				
31	MRSNH01600000030.01	MRSNH01600000006	Video transect 09	03/08/2009	Julia Doran	59.12689	-5.83394				
32	MRSNH01600000030.02	MRSNH01600000006	Video transect 09	03/08/2009	Julia Doran	59.12696	-5.83456				
33	MRSNH01600000030.03	MRSNH01600000006	Video transect 09	03/08/2009	Julia Doran	59.12703	-5.83510				
34	MRSNH01600000030.04	MRSNH01600000006	Video transect 09	03/08/2009	Julia Doran	59.12715	-5.83581				
35	MRSNH01600000030.05	MRSNH01600000006	Video transect 09	03/08/2009	Julia Doran	59.12726	-5.83652				
36	MRSNH01600000030.06	MRSNH01600000006	Video transect 09	03/08/2009	Julia Doran	59.12726	-5.83661				
37	MRSNH01600000031.01	MRSNH01600000006	Video transect 11	10/08/2009	Julia Doran	59.12756	-5.84023				
38	MRSNH01600000031.02	MRSNH01600000006	Video transect 11	10/08/2009	Julia Doran	59.12747	-5.84022				
39	MRSNH01600000031.03	MRSNH01600000006	Video transect 11	10/08/2009	Julia Doran	59.12733	-5.84011				
40	MRSNH01600000031.04	MRSNH01600000006	Video transect 11	10/08/2009	Julia Doran	59.12729	-5.84002				
41	MRSNH01600000032.01	MRSNH01600000006	Video transect 12	03/08/2009	Julia Doran	59.12481	-5.84036				
42	MRSNH01600000033.01	MRSNH01600000006	Video transect 14	10/08/2009	Julia Doran	59.12151	-5.84112				
43	MRSNH01600000033.02	MRSNH01600000006	Video transect 14	10/08/2009	Julia Doran	59.12131	-5.84154				

Code	Sample reference	Survey key	Event name	Date	Surveyors	Latitude	Longitude	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
44	MRSNH01600000033.03	MRSNH01600000006	Video transect 14	10/08/2009	Julia Doran	59.12098	-5.84211				
45	MRSNH01600000034.01	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12072	-5.84654				
46	MRSNH01600000034.02	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12067	-5.84662				
47	MRSNH01600000034.03	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12062	-5.84662				
48	MRSNH01600000034.04	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12058	-5.84670				
49	MRSNH01600000034.05	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12048	-5.84686				
50	MRSNH01600000034.06	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12039	-5.84703				
51	MRSNH01600000034.07	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12034	-5.84711				
52	MRSNH01600000034.08	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12029	-5.84728				
53	MRSNH01600000034.09	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12024	-5.84745				
54	MRSNH01600000034.10	MRSNH01600000006	Video transect 15	10/08/2009	Julia Doran	59.12019	-5.84753				
55	MRSNH01600000035.01	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11236	-5.84499				
56	MRSNH01600000035.02	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11243	-5.84561				
57	MRSNH01600000035.03	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11250	-5.84614				
58	MRSNH01600000035.04	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11254	-5.84641				
59	MRSNH01600000035.05	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11262	-5.84668				
60	MRSNH01600000035.06	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11266	-5.84677				
61	MRSNH01600000035.07	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11274	-5.84722				
62	MRSNH01600000035.08	MRSNH01600000006	Video transect 18	10/08/2009	Julia Doran	59.11294	-5.84820				
63	MRSNH01600000036.01	MRSNH01600000006	Video transect 23	10/08/2009	Julia Doran	59.11803	-5.82657				
64	MRSNH01600000036.02	MRSNH01600000006	Video transect 23	10/08/2009	Julia Doran	59.11793	-5.82673				
65	MRSNH01600000036.03	MRSNH01600000006	Video transect 23	10/08/2009	Julia Doran	59.11784	-5.82681				
66	MRSNH01600000036.04	MRSNH01600000006	Video transect 23	10/08/2009	Julia Doran	59.11760	-5.82731				
67	MRSNH01600000036.05	MRSNH01600000006	Video transect 23	10/08/2009	Julia Doran	59.11745	-5.82773				
68	MRSNH01600000038.01	MRSNH01600000006	Video transect 28	13/08/2009	Julia Doran	59.12036	-5.81005				
69	MRSNH01600000038.02	MRSNH01600000006	Video transect 28	13/08/2009	Julia Doran	59.11984	-5.80911				
70	MRSNH01600000038.03	MRSNH01600000006	Video transect 28	13/08/2009	Julia Doran	59.11963	-5.80883				
71	MRSNH01600000038.04	MRSNH01600000006	Video transect 28	13/08/2009	Julia Doran	59.11950	-5.80855				

Code	Sample reference	Survey key	Event name	Date	Surveyors	Latitude	Longitude	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
72	MRSNH01600000038.05	MRSNH01600000006	Video transect 28	13/08/2009	Julia Doran	59.11942	-5.80811				
73	MRSNH01600000039.01	MRSNH01600000006	Video transect 30	07/08/2009	Julia Doran	59.12437	-5.81731				
74	MRSNH01600000039.02	MRSNH01600000006	Video transect 30	07/08/2009	Julia Doran	59.12446	-5.81723				
75	MRSNH01600000039.03	MRSNH01600000006	Video transect 30	07/08/2009	Julia Doran	59.12450	-5.81733				
76	MRSNH01600000039.04	MRSNH01600000006	Video transect 30	07/08/2009	Julia Doran	59.12458	-5.81768				
77	MRSNH01600000039.05	MRSNH01600000006	Video transect 30	07/08/2009	Julia Doran	59.12465	-5.81830				
78	MRSNH0160000003A.01	MRSNH01600000006	Video transect 31	07/08/2009	Julia Doran	59.12642	-5.81186				
79	MRSNH0160000003B.01	MRSNH01600000006	Video transect 29	13/08/2009	Julia Doran	59.12115	-5.80594				
80	MRSNH0160000003B.02	MRSNH01600000006	Video transect 29	13/08/2009	Julia Doran	59.12090	-5.80381				
81	MRSNH0160000003C.01	MRSNH01600000006	Video transect 33	07/08/2009	Julia Doran	59.12794	-5.81054				
82	MRSNH0160000003D.01	MRSNH01600000006	Video transect 34	07/08/2009	Julia Doran	59.13093	-5.81586				
83	MRSNH0160000003D.02	MRSNH01600000006	Video transect 34	07/08/2009	Julia Doran	59.13222	-5.81626				
84	MRSNH0160000003D.03	MRSNH01600000006	Video transect 34	07/08/2009	Julia Doran	59.13266	-5.81657				
85	MRSNH0160000003D.04	MRSNH01600000006	Video transect 34	07/08/2009	Julia Doran	59.13301	-5.81687				
86	MRSNH0160000003E.03	MRSNH01600000006	Video transect 35	07/08/2009	Julia Doran	59.13254	-5.81157				
87	MRSNH0160000003E.04	MRSNH01600000006	Video transect 35	07/08/2009	Julia Doran	59.13390	-5.81269				
88	MRSNH0160000003E.05	MRSNH01600000006	Video transect 35	07/08/2009	Julia Doran	59.13460	-5.81329				
89	MRSNH0160000003E.01	MRSNH01600000006	Video transect 35	07/08/2009	Julia Doran	59.13113	-5.81037				
90	MRSNH0160000003E.02	MRSNH01600000006	Video transect 35	07/08/2009	Julia Doran	59.13179	-5.81097				
91	MRSNH0160000003F.01	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13426	-5.81553				
92	MRSNH0160000003F.02	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13483	-5.81611				
93	MRSNH0160000003F.03	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13527	-5.81660				
94	MRSNH0160000003F.04	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13561	-5.81699				
95	MRSNH0160000003F.05	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13600	-5.81747				
96	MRSNH0160000003F.06	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13627	-5.81776				
97	MRSNH0160000003F.07	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13644	-5.81796				
98	MRSNH0160000003F.08	MRSNH01600000006	Video transect 38	07/08/2009	Julia Doran	59.13688	-5.81844				
99	MRSNH01600000040.01	MRSNH01600000006	Video transect 39	07/08/2009	Julia Doran	59.13689	-5.82404				

Code	Sample reference	Survey key	Event name	Date	Surveyors	Latitude	Longitude	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
100	MRSNH01600000040.02	MRSNH01600000006	Video transect 39	07/08/2009	Julia Doran	59.13720	-5.82425				
101	MRSNH01600000041.01	MRSNH01600000006	Video transect 25	10/08/2009	Julia Doran	59.11683	-5.82303				
102	MRSNH01600000041.02	MRSNH01600000006	Video transect 25	10/08/2009	Julia Doran	59.11676	-5.82372				
103	MRSNH01600000041.03	MRSNH01600000006	Video transect 25	10/08/2009	Julia Doran	59.11676	-5.82381				

Annex 14B – Habitat and biological data

Data as downloaded from Marine Recorder. Text is uneditted and may include formatting artefacts. Species names have not been italicised and nomenclature has not been updated.

Code	Habitat	Description	Biotope
1	Alaria kelp forest on bedrock	Sloping bedrock from surface to 6m dominated by Alaria esculenta kelp forest. Not surveyed in detail due to large swell.	IR.HIR.KFaR.Ala
2	Kelp forest on bedrock and boulders	Sloping bedrock and boulders dominated by Laminaria hyperborea kelp forest, thinning out and flattening out at the bottom with increasing amounts of Laminaria latissima and Halidrys siliquosa. Beneath kelp and on occasional vertical faces there is a mixed turf of anemones, encrusting bryozoans and pink encrusting algae - grazed by urchins so not very diverse. Many nudibranchs and blue rayed limpets on kelp blades and bryozoans.	IR.HIR.KFaR.LhypR.Ft
3	Kelp and seaweed on pebbles and sand	Level seabed of clean pebbles with coarse sand between them. Small Laminaria latissima and Halidrys. This habitat was mixed with the lower range of habitat 2 (kelp forest on bedrock).	SS.SMp.KSwSS
4	Grazed kelp park on boulders	Large boulders with the tops covered in kelp and the sides covered in anemones (Sagartia elegans, Actinothoe sphyrodeta) and sponges. Urchin grazed surfaces with pink encrusting algae and encrusting bryozoans (Parasmittina).	IR.MIR.KR.Lhyp.GzPk
5	Kelp park on bedrock slope	Steeply sloping rugged bedrock reef from 13m to 22.5m bsl, with kelp park in the shallower area and mixed seaweeds and animal turf in the deeper area. No litter seen.	KP
6	Kelp park on bedrock slope	Steeply sloping rugged bedrock reef from 13m to 22.5m bsl, with kelp park in the shallower area and mixed seaweeds and animal turf in the deeper area. No litter seen.	MS
7	Kelp park on bedrock slope	Steeply sloping rugged bedrock reef from 13m to 22.5m bsl, with kelp park in the shallower area and mixed seaweeds and animal turf in the deeper area. No litter seen.	SAT
8	Kelp park and mixed seaweeds on mixed ground	Seabed of bobbles and pebbles with occasional bedrock and boulders from 15 to 18m bsl. Kelp park, mixed seaweeds and faunal turf present. No litter seen. Beadlet anemone recorded at 18.5m.	TAT
9	Kelp park and mixed seaweeds on mixed ground	Seabed of bobbles and pebbles with occasional bedrock and boulders from 15 to 18m bsl. Kelp park, mixed seaweeds and faunal turf present. No litter seen. Beadlet anemone recorded at 18.5m.	KP
10	Kelp park and mixed seaweeds on mixed ground	Seabed of bobbles and pebbles with occasional bedrock and boulders from 15 to 18m bsl. Kelp park, mixed seaweeds and faunal turf present. No litter seen. Beadlet anemone recorded at 18.5m.	MS
11	Kelp forest on bedrock	Bedrock with a slope of approximately 50 degrees covered in Alaria esculenta with animal turf underneath, consisting of edible mussels covered in sponges and plumose anemones. Seals seen in the shallows.	IR.HIR.KFaR.Ala.Myt
12	Kelp on bedrock slope	Bedrock slope covered in Laminaria hyperborea and Laminaria saccharina with animal turf underneath consisting of anemones (Actinothoe sphyrodeta) and sponges. Lower down the slope the kelp thinned out and the kelp-free patches were dominated by anemones and hydroids.	IR.HIR.KFaR.LhypFa
13	Kelp park on steep bedrock	Steeply sloping smooth very exposed bedrock with kelp park of small Laminaria hyperborea (presumably the plants do not survive more than one season). Frequent red flattened algae - small again, possibly young Dilsea. Dictyota dichotoma, globular yellow sea squirts and Sagartia elegans in the understorey. Generally very low profile turf leading to rather bare appearance - likely to be due to the extreme conditions rather than grazing, as there were very few mobile animals.	IR.HIR.KFaR.LhypR.Pk
14	Anthozoan turf on steep bedrock	Steeply sloping circalittoral bedrock dominated by faunal turf of jewel anemones and dead mens fingers with frequent devonshire cup corals. Occasional small gullies with small amount of gravel in the bottom.	CR.HCR.XFa.SpAnVt
15	Anthozoan turf on steep bedrock	Steeply sloping circalittoral bedrock dominated by faunal turf of jewel anemones and dead mens fingers with frequent devonshire cup corals. Occasional small gullies with small amount of gravel in the bottom.	CR.MCR.EcCr.CarSp
16	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 3 Bio	CR.MCR.EcCr.FaAlCr

Code	Habitat	Description	Biotope
		1SOH12:53:34181131.541033439.89CR.MCR.EcCr.FaAlCrEOH12:54:19181128.801033440.40	
17	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 3 Bio 2SOH12:54:19181128.801033440.40IR.HIR.KFaR.LhypR.PkEOH12:57:24181103.081033446.85	IR.HIR.KFaR.LhypR.Pk
18	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 3 Bio 3SOH12:57:24181103.081033446.85CR.MCR.EcCr.FaAlCrEOH13:00:52181069.741033460.33	CR.MCR.EcCr.FaAlCr
19	CR.MCR.EcCr.FaAlCr.Adig	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 3 Bio 4SOH13:00:52181069.741033460.33CR.MCR.EcCr.FaAlCr.AdigEOH13:01:28181064.491033462.58	CR.MCR.EcCr.FaAlCr.Adig
20	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 3 Bio 5SOH13:01:28181064.491033462.58CR.MCR.EcCr.FaAlCrEOH13:05:37181017.421033484.80	CR.MCR.EcCr.FaAlCr
21	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 4 Bio 1SOH11:05:001807951033365CR.MCR.EcCr.FaAlCr.BriEOH11:10:301807301033413	CR.MCR.EcCr.FaAlCr.Bri
22	SS.SMX.CMx.OphMx	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 4 Bio 2SOH11:10:301807301033413SS.SMX.CMx.OphMxEOH11:11:071807231033419	SS.SMx.CMx.OphMx
23	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 4 Bio 3SOH11:11:071807231033419CR.MCR.EcCr.FaAlCr.BriEOH11:14:081806871033446	CR.MCR.EcCr.FaAlCr.Bri
24	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 5 Bio 1SOH10:22:191808271033071CR.MCR.EcCr.FaAlCr.BriEOH10:26:261807991033126	CR.MCR.EcCr.FaAlCr.Bri
25	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 5 Bio 2SOH10:26:261807991033126CR.MCR.EcCr.FaAlCrEOH10:36:011807881033140	CR.MCR.EcCr.FaAlCr
26	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 5 Bio 3SOH10:36:011807881033140CR.MCR.EcCr.FaAlCr.BriEOH10:36:571807881033143	CR.MCR.EcCr.FaAlCr.Bri
27	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 5 Bio 4SOH10:36:571807881033143CR.MCR.EcCr.FaAlCrEOH10:39:571807901033155	CR.MCR.EcCr.FaAlCr
28	IR.HIR.KFaR.Ala	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 6 Bio 1SOH11:33:361811751032927IR.HIR.KFaR.AlaEOH11:36:441811381032956	IR.HIR.KFaR.Ala
29	IR.HIR.KFaR.LhypR.Ft	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 6 Bio 2SOH11:36:441811381032956IR.HIR.KFaR.LhypR.FtEOH11:41:411810741032987	IR.HIR.KFaR.LhypR.Ft
30	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 6 Bio 3SOH11:41:411810741032987.3, IR.HIR.KFaR.LhypR.PkEOH11:44:481810301033011	IR.HIR.KFaR.LhypR.Pk
31	SS.SCS.CCS	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 9 Bio 1SOH11:56:141807181032984SS.SCS.CCSEOH11:56:531807101032984	SS.SCS.CCS
32	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 9 Bio 2SOH11:56:531807101032984CR.MCR.EcCr.FaAlCr.BriEOH12:01:461806521032997	CR.MCR.EcCr.FaAlCr.Bri
33	SS.SCS.CCS	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 9 Bio 3SOH12:01:461806521032997SS.SCS.CCSEOH12:01:591806501032998	SS.SCS.CCS
34	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 9 Bio 4SOH12:01:591806501032998CR.MCR.EcCr.FaAlCr.BriEOH12:09:071805701033028	CR.MCR.EcCr.FaAlCr.Bri
35	SS.SMX.CMx.OphMx	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 9 Bio 5SOH12:09:071805701033028SS.SMX.CMx.OphMxEOH12:09:211805671033029	SS.SMx.CMx.OphMx
36	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 9 Bio	CR.MCR.EcCr.FaAlCr.Bri

Code	Habitat	Description	Biotope
		6SOH12:09:211805671033029CR.MCR.EcCr.FaAlCr.BriEOH12:10:031805591033032	
37	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 11 Bio 1 SOH10:59:151803601033075CR.MCR.EcCr.FaAlCr.BriEOH11:02:091803621033073	CR.MCR.EcCr.FaAlCr.Bri
38	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 11 Bio 2SOH11:02:091803621033073CR.MCR.EcCr.FaAlCrEOH11:04:051803651033055	CR.MCR.EcCr.FaAlCr
39	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 11 Bio 3SOH11:04:051803651033055CR.MCR.EcCr.FaAlCr.BriEOH11:07:321803721033043	CR.MCR.EcCr.FaAlCr.Bri
40	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 11 Bio 4 SOH11:07:321803721033043CR.MCR.EcCr.FaAlCrEOH11:09:02(EOL 11:08:41)1803691033049	CR.MCR.EcCr.FaAlCr
41	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 12SOH13:21:171804271032781CR.MCR.EcCr.FaAlCr.BriEOH13:30:001802401032759	CR.MCR.EcCr.FaAlCr.Bri
42	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 14 Bio 1SOH11:28:471802941032424CR.MCR.EcCr.FaAlCr.BriEOH11:33:281802491032391	CR.MCR.EcCr.FaAlCr.Bri
43	CR.MCR.EcCr.FaAlCr.Car	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 14 Bio 2SOH11:33:281802491032391CR.MCR.EcCr.FaAlCr.CarEOH11:34:081802351032377	CR.MCR.EcCr.FaAlCr.Car
44	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 14 Bio 3SOH11:34:081802351032377CR.MCR.EcCr.FaAlCr.BriEOH11:42:38 (EOL 11:42:21)1801821032323	CR.MCR.EcCr.FaAlCr.Bri
45	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 1SOH12:02:101799591032345CR.MCR.EcCr.FaAlCr.BriEOH12:04:451799521032333	CR.MCR.EcCr.FaAlCr.Bri
46	CR.MCR.EcCr.FaAlCr.Car	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 2SOH12:04:451799521032333CR.MCR.EcCr.FaAlCr.CarEOH12:05:521799481032327	CR.MCR.EcCr.FaAlCr.Car
47	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 3SOH12:05:521799481032327CR.MCR.EcCr.FaAlCrEOH12:06:481799471032323	CR.MCR.EcCr.FaAlCr
48	SS.SCS.CCS	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 4SOH12:06:481799471032323SS.SCS.CCSEOH12:07:571799411032316	SS.SCS.CCS
49	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 5SOH12:07:571799411032316CR.MCR.EcCr.FaAlCr.BriEOH12:11:111799271032299	CR.MCR.EcCr.FaAlCr.Bri
50	CR.MCR.EcCr.FaAlCr.Car	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 6SOH12:11:111799271032299CR.MCR.EcCr.FaAlCr.CarEOH12:11:511799251032296	CR.MCR.EcCr.FaAlCr.Car
51	CR.MCR.EcCr.FaAlCr.Flu	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 7SOH12:11:511799251032296CR.MCR.EcCr.FaAlCr.FluEOH12:14:141799151032289	CR.MCR.EcCr.FaAlCr.Flu
52	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 8SOH12:14:141799151032289CR.MCR.EcCr.FaAlCrEOH12:17:361799041032286	CR.MCR.EcCr.FaAlCr
53	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 9SOH12:17:361799041032286CR.MCR.EcCr.FaAlCr.BriEOH12:19:251798951032283	CR.MCR.EcCr.FaAlCr.Bri
54	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 15 Bio 10SOH12:19:251798951032283CR.MCR.EcCr.FaAlCrEOH12:20:43 (EOL 12:20:09)1798901032281	CR.MCR.EcCr.FaAlCr
55	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 1SOH12:42:491799981031397CR.MCR.EcCr.FaAlCr.BriEOH12:44:301799801031405	CR.MCR.EcCr.FaAlCr.Bri
56	CR.MCR.EcCr.FaAlCr.Adig	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio	CR.MCR.EcCr.FaAlCr.Adig

Code	Habitat	Description	Biotope
		2SOH12:44:301799801031405CR.MCR.EcCr.FaAlCr.AdigEOH12:49:051799321031417	
57	CR.MCR.EcCr.FaAlCr.Adig	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 3SOH12:49:051799321031417CR.MCR.EcCr.FaAlCr.AdigEOH12:49:581799181031422	CR.MCR.EcCr.FaAlCr.Adig
58	CR.MCR.EcCr.FaAlCr.Adig	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 4SOH12:49:581799181031422CR.MCR.EcCr.FaAlCr.AdigEOH12:51:131799051031429	CR.MCR.EcCr.FaAlCr.Adig
59	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 5SOH12:51:131799051031429CR.MCR.EcCr.FaAlCrEOH12:52:321798901031436	CR.MCR.EcCr.FaAlCr
60	CR.MCR.EcCr.FaAlCr.Flu	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 6SOH12:52:321798901031436CR.MCR.EcCr.FaAlCr.FluEOH12:52:521798881031437	CR.MCR.EcCr.FaAlCr.Flu
61	SS.SCS.CCS	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 7SOH12:52:521798881031437SS.SCS.CCSEOH12:57:121798401031457	SS.SCS.CCS
62	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 18 Bio 8SOH12:57:121798401031457CR.MCR.EcCr.FaAlCr.BriEOH13:04:27 (EOL 13:03:19)1797761031490	CR.MCR.EcCr.FaAlCr.Bri
63	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 23 Bio 1SOH13:32:421810871031984IR.HIR.KFaR.LhypR.PkEOH13:37:421810731031964	IR.HIR.KFaR.LhypR.Pk
64	IR.HIR.KFaR.FoR	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 23 Bio 2SOH13:37:421810731031964IR.HIR.KFaR.FoREOH13:38:511810711031957	IR.HIR.KFaR.FoR
65	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 23 Bio 3SOH13:38:511810711031957IR.HIR.KFaR.LhypR.PkEOH13:43:311810551031943	IR.HIR.KFaR.LhypR.Pk
66	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 23 Bio 4SOH13:43:311810551031943CR.MCR.EcCr.FaAlCrEOH13:53:111810131031912	CR.MCR.EcCr.FaAlCr
67	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 23 Bio 5SOH13:53:111810131031912CR.MCR.EcCr.FaAlCr.BriEOH13:54:28 (EOL 13:54:21)1810071031910	CR.MCR.EcCr.FaAlCr.Bri
68	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 28 Bio 1SOH10:23:131820051032222IR.HIR.KFaR.LhypR.PkEOH10:33:051820811032128	IR.HIR.KFaR.LhypR.Pk
69	IR.HIR.KFaR.Ala	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 28 Bio 2SOH10:33:051820811032128IR.HIR.KFaR.AlaEOH10:35:121820951032100	IR.HIR.KFaR.Ala
70	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 28 Bio 3SOH10:35:121820951032100IR.HIR.KFaR.LhypR.PkEOH10:36:461821091032081	IR.HIR.KFaR.LhypR.Pk
71	SS.SCS.CCS	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 28 Bio 4SOH10:36:461821091032081SS.SCS.CCSEOH10:37:451821271032070	SS.SCS.CCS
72	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 28 Bio 5SOH10:37:451821271032070IR.HIR.KFaR.LhypR.PkEOH10:39:34 (EOL 10:39:16)1821561032060	IR.HIR.KFaR.LhypR.Pk
73	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 30 Bio 1SOH09:09:001816451032637IR.HIR.KFaR.LhypR.PkEOH09:09:421816571032652	IR.HIR.KFaR.LhypR.Pk
74	IR.HIR.KFaR.Ala	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 30 Bio 2SOH09:09:421816571032652IR.HIR.KFaR.AlaEOH09:10:221816541032658	IR.HIR.KFaR.Ala
75	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 30 Bio 3SOH09:10:221816541032658IR.HIR.KFaR.LhypR.PkEOH09:11:041816501032660	IR.HIR.KFaR.LhypR.Pk
76	IR.HIR.KFaR.Ala	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 30 Bio	IR.HIR.KFaR.Ala

Code	Habitat	Description	Biotope
		4SOH09:11:041816501032660IR.HIR.KFaR.AlaEOH09:15:141816121032680	
77	IR.HIR.KFaR.LhypR.Ft	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 30 Bio 5SOH09:15:141816121032680IR.HIR.KFaR.LhypR.FtEOH09:18:501815801032681	IR.HIR.KFaR.LhypR.Ft
78	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 31SOH10:35:091820081032788IR.HIR.KFaR.LhypR.PkEOH10:42:361819351032925	IR.HIR.KFaR.LhypR.Pk
79	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 29 Bio 1SOH10:55:301822361032266IR.HIR.KFaR.LhypR.PkEOH11:00:021823171032230	IR.HIR.KFaR.LhypR.Pk
80	IR.HIR.KFaR.LhypR.Ft	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 29 Bio 2SOH11:00:021823171032230IR.HIR.KFaR.LhypR.FtEOH11:07:36 (EOL 11:07:17)1824781032198	IR.HIR.KFaR.LhypR.Ft
81	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 33SOH11:02:141820951032938IR.HIR.KFaR.LhypR.PkEOH11:13:031820181033103	IR.HIR.KFaR.LhypR.Pk
82	IR.HIR.KFaR.LhypR.Ft	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 34 Bio 1SOH11:52:591817831033268IR.HIR.KFaR.LhypR.FtEOH11:59:081817711033470	IR.HIR.KFaR.LhypR.Ft
83	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 34 Bio 2SOH11:59:081817711033470IR.HIR.KFaR.LhypR.PkEOH12:01:371817461033561	IR.HIR.KFaR.LhypR.Pk
84	IR.HIR.KFaR.Ala	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 34 Bio 3SOH12:01:371817461033561IR.HIR.KFaR.AlaEOH12:01:511817441033568	IR.HIR.KFaR.Ala
85	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 34 Bio 4SOH12:01:511817441033568IR.HIR.KFaR.LhypR.PkEOH12:04:101817181033639	IR.HIR.KFaR.LhypR.Pk
86	IR.HIR.KFaR.LhypR.Ft	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 35 Bio 3SOH11:26:111820621033449IR.HIR.KFaR.LhypR.FtEOH11:32:221820011033618	IR.HIR.KFaR.LhypR.Ft
87	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 35 Bio 4SOH11:32:221820011033618IR.HIR.KFaR.LhypR.PkEOH11:39:241819461033758	IR.HIR.KFaR.LhypR.Pk
88	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 35 Bio 5SOH11:39:241819461033758IR.HIR.KFaR.LhypR.PkEOH11:40:051819381033777	IR.HIR.KFaR.LhypR.Pk
89	IR.HIR.KFaR.LhypR.Ft	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 35 Bio 1SOH11:19:521821171033302IR.HIR.KFaR.LhypR.FtEOH11:26:021820631033447	IR.HIR.KFaR.LhypR.Ft
90	IR.HIR.KFaR.Ala	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 35 Bio 2SOH11:26:021820631033447IR.HIR.KFaR.AlaEOH11:26:111820621033449	IR.HIR.KFaR.Ala
91	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 1 SOH12:17:061818241033719IR.HIR.KFaR.LhypR.PkEOH12:18:221818071033759	IR.HIR.KFaR.LhypR.Pk
92	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 2 SOH12:18:221818071033759IR.HIR.KFaR.LhypR.PkEOH12:21:491817651033852	IR.HIR.KFaR.LhypR.Pk
93	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 3SOH12:21:491817651033852CR.MCR.EcCr.FaAlCrEOH12:21:581817631033856	CR.MCR.EcCr.FaAlCr
94	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 4 SOH12:21:581817631033856IR.HIR.KFaR.LhypR.PkEOH12:24:561817191033931	IR.HIR.KFaR.LhypR.Pk
95	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 5SOH12:24:561817191033931CR.MCR.EcCr.FaAlCrEOH12:25:351817111033949	CR.MCR.EcCr.FaAlCr
96	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio	CR.MCR.EcCr.FaAlCr.Bri

Code	Habitat	Description	Biotope
		6SOH12:25:351817111033949CR.MCR.EcCr.FaAlCr.BriEOH12:27:011816911033986	
97	SS.SMX.CMx.OphMx	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 7 SOH12:27:011816911033986SS.SMX.CMx.OphMxEOH12:27:181816881033993	SS.SMx.CMx.OphMx
98	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 38 Bio 8SOH12:27:181816881033993CR.MCR.EcCr.FaAlCr.BriEOH12:31:211816391034091	CR.MCR.EcCr.FaAlCr.Bri
99	IR.HIR.KFaR.LhypR.Pk	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 39 Bio 1SOH12:49:001813491034026IR.HIR.KFaR.LhypR.PkEOH12:53:281813351034090	IR.HIR.KFaR.LhypR.Pk
100	IR.HIR.KFaR.FoR	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 39 Bio 2SOH12:53:281813351034090IR.HIR.KFaR.FoREOH12:54:20 (13:00:23)1813311034102	IR.HIR.KFaR.FoR
101	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 25 Bio 1SOH14:10:371813081031826CR.MCR.EcCr.FaAlCr.BriEOH14:26:261812361031815	CR.MCR.EcCr.FaAlCr.Bri
102	CR.MCR.EcCr.FaAlCr	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 25 Bio 2SOH14:26:261812361031815CR.MCR.EcCr.FaAlCrEOH14:27:441812311031817	CR.MCR.EcCr.FaAlCr
103	CR.MCR.EcCr.FaAlCr.Bri	LineS/EOHTime (GMT)Easting (m)Northing (m)HabitatLine 25 Bio 3SOH14:27:441812311031817CR.MCR.EcCr.FaAlCr.BriEOH14:27:521812311031817	CR.MCR.EcCr.FaAlCr.Bri

ANNEX 15: MARINE RECORDER RECORDS FROM LOCH ERIBOLL

Annex 15A – Positional, depth and other non-biological data

Data as downloaded from Marine Recorder. Text is uneditted and may include formatting artefacts.

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
1	056.013.004	JNCCMNCR60000056	Sgeir a' Bhuic E (Loch Eriboll)	08/08/1986	Sue Hiscock Jack Woodward	58.5296	-4.61942				-15
2	056.014.001	JNCCMNCR60000056	Lighthouse (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt Sue Hiscock Jack Woodward	58.51637	-4.65106			-4.5	-2
3	056.014.002	JNCCMNCR60000056	Lighthouse (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt Sue Hiscock Jack Woodward Roz Kingston K Yeates	58.51637	-4.65106			-9	-4.5
4	056.014.003	JNCCMNCR60000056	Lighthouse (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt Sue Hiscock Jack Woodward Betty Green Gil Green	58.51637	-4.65106				-9
5	056.014.003	JNCCMNCR60000056	Lighthouse (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt Sue Hiscock Jack Woodward Betty Green Gil Green	58.51637	-4.65106				-9
6	056.014.004	JNCCMNCR60000056	Lighthouse (Loch Eriboll)	08/08/1986	Sue Hiscock Jack Woodward Betty Green Gil Green	58.51637	-4.65106			-25	
7	056.015.001	JNCCMNCR60000056	An Dubh-sgeir N (Loch Eriboll)	09/08/1986	Dave Moss K Yeates Roz Kingston Norma Brandt Jack Woodward Sue Hiscock	58.57469	-4.65547			-20	-5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
8	056.015.001	JNCCMNCR60000056	An Dubh-sgeir N (Loch Eriboll)	09/08/1986	Dave Moss K Yeates Roz Kingston Norma Brandt Jack Woodward Sue Hiscock	58.57469	-4.65547			-20	-5
9	056.015.002	JNCCMNCR60000056	An Dubh-sgeir N (Loch Eriboll)	09/08/1986	Dave Moss K Yeates Jack Woodward Sue Hiscock Betty Green Gil Green	58.57469	-4.65547			-19	-16
10	056.016.001	JNCCMNCR60000056	Eilean Hoan W (Loch Eriboll)	09/08/1986	Dave Moss Norma Brandt Jack Woodward Sue Hiscock	58.56411	-4.68907			-3	-2
11	056.016.002	JNCCMNCR60000056	Eilean Hoan W (Loch Eriboll)	09/08/1986	Dave Moss Norma Brandt Jack Woodward Sue Hiscock	58.56411	-4.68907			-10	-3
12	056.016.003	JNCCMNCR60000056	Eilean Hoan W (Loch Eriboll)	09/08/1986	Dave Moss Norma Brandt	58.56411	-4.68907			-15	-10
13	056.016.003	JNCCMNCR60000056	Eilean Hoan W (Loch Eriboll)	09/08/1986	Dave Moss Norma Brandt	58.56411	-4.68907			-15	-10
14	056.001.001	JNCCMNCR60000056	Grave Point (Loch Eriboll)	03/08/1986	Jack Woodward Gil Green	58.53529	-4.64906			-13	-10
15	056.001.003	JNCCMNCR60000056	Grave Point (Loch Eriboll)	03/08/1986	Dave Moss Norma Brandt	58.53529	-4.64906			-25	-24
16	056.002.001	JNCCMNCR60000056	Rubha Ruadh (Loch Eriboll)	03/08/1986	Jack Woodward Robert Smith Gil Green	58.5252	-4.6586	-11	-8	-13	-10
17	056.002.001	JNCCMNCR60000056	Rubha Ruadh (Loch Eriboll)	03/08/1986	Jack Woodward Robert Smith Gil Green	58.5252	-4.6586	-11	-8	-13	-10
18	056.002.002	JNCCMNCR60000056	Rubha Ruadh (Loch Eriboll)	03/08/1986	Dave Moss Norma Brandt	58.5252	-4.6586			-24	-16
19	056.003.001	JNCCMNCR60000056	Ard Neackie N (Loch Eriboll)	04/08/1986	Norma Brandt Jack Woodward	58.49983	-4.6687				-4
20	056.003.002	JNCCMNCR60000056	Ard Neackie N (Loch Eriboll)	04/08/1986	Norma Brandt Jack Woodward	58.49983	-4.6687			-12	

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
21	056.003.002	JNCCMNCR60000056	Ard Neackie N (Loch Eriboll)	04/08/1986	Norma Brandt Jack Woodward	58.49983	-4.6687			-12	
22	056.003.003	JNCCMNCR60000056	Ard Neackie N (Loch Eriboll)	04/08/1986	Betty Green Gil Green Dave Moss	58.49983	-4.6687	-22	-16	-19	-13
23	056.004.001	JNCCMNCR60000056	Eilean Choraidh SE (Loch Eriboll)	04/08/1986	Jack Woodward Norma Brandt	58.47744	-4.70818	-14	-2	-12	0
24	056.004.001	JNCCMNCR60000056	Eilean Choraidh SE (Loch Eriboll)	04/08/1986	Jack Woodward Norma Brandt	58.47744	-4.70818	-14	-2	-12	0
25	056.004.001	JNCCMNCR60000056	Eilean Choraidh SE (Loch Eriboll)	04/08/1986	Jack Woodward Norma Brandt	58.47744	-4.70818	-14	-2	-12	0
26	056.005.001	JNCCMNCR60000056	Eilean Choraidh NW (Loch Eriboll)	04/08/1986	Dave Moss Gil Green	58.48547	-4.71051	-18	-16	-16	-14
27	056.006.001	JNCCMNCR60000056	Eilean Cl—imhrig E (Loch Eriboll)	05/08/1986	Norma Brandt Jack Woodward	58.55431	-4.64189			-18	-16
28	056.006.002	JNCCMNCR60000056	Eilean Cl—imhrig E (Loch Eriboll)	05/08/1986	Dave Moss Gil Green	58.55431	-4.64189	-32	-21	-29	-18
29	056.007.001	JNCCMNCR60000056	An t-Aigeach (Loch Eriboll)	05/08/1986	Dave Moss Jack Woodward	58.55233	-4.65034			-10	-4
30	056.007.002	JNCCMNCR60000056	An t-Aigeach (Loch Eriboll)	05/08/1986	Dave Moss Jack Woodward	58.55233	-4.65034			-16	-10
31	056.008.001	JNCCMNCR60000056	Whiten Head (1) (Loch Eriboll)	06/08/1986	Jack Woodward Sue Hiscock Dave Moss Norma Brandt	58.58158	-4.582			-19	-11
32	056.008.002	JNCCMNCR60000056	Whiten Head (1) (Loch Eriboll)	06/08/1986	Dave Moss Norma Brandt	58.58158	-4.582			-21	-19
33	056.008.003	JNCCMNCR60000056	Whiten Head (1) (Loch Eriboll)	06/08/1986	Betty Green Gil Green	58.58158	-4.582	-24	-21	-20	-17
34	056.010.001	JNCCMNCR60000056	Torr na Bithe (Loch Eriboll)	07/08/1986	Dave Moss Norma Brandt Jack Woodward Sue Hiscock	58.50539	-4.66054			-10	0
35	056.010.001	JNCCMNCR60000056	Torr na Bithe (Loch Eriboll)	07/08/1986	Dave Moss Norma Brandt Jack Woodward Sue Hiscock	58.50539	-4.66054			-10	0

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
36	056.010.002	JNCCMNCR60000056	Torr na Bithe (Loch Eriboll)	07/08/1986	Dave Moss Norma Brandt Jack Woodward Sue Hiscock	58.50539	-4.66054			-18	-10
37	056.010.003	JNCCMNCR60000056	Torr na Bithe (Loch Eriboll)	07/08/1986	Dave Moss Norma Brandt	58.50539	-4.66054				-18
38	056.012.001	JNCCMNCR60000056	Sgeir a' Bhuic NW (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt	58.52943	-4.628			-3	-1
39	056.012.001	JNCCMNCR60000056	Sgeir a' Bhuic NW (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt	58.52943	-4.628			-3	-1
40	056.012.002	JNCCMNCR60000056	Sgeir a' Bhuic NW (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt	58.52943	-4.628			-14	-3
41	056.012.003	JNCCMNCR60000056	Sgeir a' Bhuic NW (Loch Eriboll)	08/08/1986	Dave Moss Norma Brandt	58.52943	-4.628			-16	-14
42	056.013.001	JNCCMNCR60000056	Sgeir a' Bhuic E (Loch Eriboll)	08/08/1986	Sue Hiscock Jack Woodward Gil Green Betty Green	58.5296	-4.61942			-10	-0.5
43	056.013.002	JNCCMNCR60000056	Sgeir a' Bhuic E (Loch Eriboll)	08/08/1986	Sue Hiscock Jack Woodward Gil Green Betty Green	58.5296	-4.61942			-14	-10
44	056.013.003	JNCCMNCR60000056	Sgeir a' Bhuic E (Loch Eriboll)	08/08/1986	Sue Hiscock Jack Woodward Gil Green Betty Green	58.5296	-4.61942			-15	-14
45	056.017.001	JNCCMNCR60000056	Whiten Head (2) (Loch Eriboll)	10/08/1986	Dave Moss Sue Hiscock	58.58155	-4.58372			-24	-10
46	056.017.001	JNCCMNCR60000056	Whiten Head (2) (Loch Eriboll)	10/08/1986	Dave Moss Sue Hiscock	58.58155	-4.58372			-24	-10
47	056.017.002	JNCCMNCR60000056	Whiten Head (2) (Loch Eriboll)	10/08/1986	Dave Moss Sue Hiscock	58.58155	-4.58372			-28	-24
48	056.020.001	JNCCMNCR60000056	Cnoc nan Gobhar (Loch Eriboll)	11/08/1986	Dave Moss Norma Brandt	58.53354	-4.60253			-9.5	-1.5
49	056.020.001	JNCCMNCR60000056	Cnoc nan Gobhar (Loch Eriboll)	11/08/1986	Dave Moss Norma Brandt	58.53354	-4.60253			-9.5	-1.5
50	056.020.002	JNCCMNCR60000056	Cnoc nan Gobhar (Loch Eriboll)	11/08/1986	Dave Moss Norma Brandt	58.53354	-4.60253			-10.5	-9.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
51	056.021.001	JNCCMNCR60000056	Geodha Meiril (Loch Eriboll)	11/08/1986	Gil Green Betty Green	58.52719	-4.60549	-15	-13	-13	-11
52	056.021.002	JNCCMNCR60000056	Geodha Meiril (Loch Eriboll)	11/08/1986	Gil Green Betty Green	58.52719	-4.60549	-15		-13	
53	056.022.001	JNCCMNCR60000056	E Cl—imhrig N (Loch Eriboll)	12/08/1986	Gil Green Betty Green Norma Brandt Dave Moss Sue Hiscock Roz Kingston K Yeates Jack Woodward	58.55606	-4.64375			-16	-3
54	056.022.002	JNCCMNCR60000056	E Cl—imhrig N (Loch Eriboll)	12/08/1986	Gil Green Betty Green Dave Moss K Yeates	58.55606	-4.64375			-23	-16
55	056.023.001	JNCCMNCR60000056	Rubh' Armli (Loch Eriboll)	12/08/1986	Sue Hiscock Jack Woodward	58.45783	-4.74268			-10	0
56	056.023.001	JNCCMNCR60000056	Rubh' Armli (Loch Eriboll)	12/08/1986	Sue Hiscock Jack Woodward	58.45783	-4.74268			-10	0
57	056.024.001	JNCCMNCR60000056	Rubh' Ard Bhaideanach (Loch Eriboll)	12/08/1986	Dave Moss Norma Brandt	58.46451	-4.72433			-6	-1
58	056.024.002	JNCCMNCR60000056	Rubh' Ard Bhaideanach (Loch Eriboll)	12/08/1986	Dave Moss Norma Brandt	58.46451	-4.72433			-10	-6
59	056.024.003	JNCCMNCR60000056	Rubh' Ard Bhaideanach (Loch Eriboll)	12/08/1986	Dave Moss Norma Brandt	58.46451	-4.72433			-12	-10
60	056.025.001	JNCCMNCR60000056	Buoy chain (Loch Eriboll)	12/08/1986	Dave Moss Norma Brandt	58.49204	-4.69729			-15	0
61	056.025.002	JNCCMNCR60000056	Buoy chain (Loch Eriboll)	12/08/1986	Dave Moss Norma Brandt	58.49204	-4.69729			-27	-15
62	056.025.002	JNCCMNCR60000056	Buoy chain (Loch Eriboll)	12/08/1986	Dave Moss Norma Brandt	58.49204	-4.69729			-27	-15
63	056.026.001	JNCCMNCR60000056	Rispond N (Loch Eriboll)	13/08/1986	Dave Moss K Yeates Norma Brandt Roz Kingston	58.55388	-4.6625			-14.5	-0.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
64	056.026.002	JNCCMNCR60000056	Rispond N (Loch Eriboll)	13/08/1986	Dave Moss K Yeates Norma Brandt Roz Kingston	58.55388	-4.6625			-16	-14.5
65	056.027.001	JNCCMNCR60000056	Eilean Hoan S (Loch Eriboll)	13/08/1986	Betty Green Gil Green	58.56336	-4.68213			-5	0
66	056.027.002	JNCCMNCR60000056	Eilean Hoan S (Loch Eriboll)	13/08/1986	Betty Green Gil Green	58.56336	-4.68213				-5
67	056.027.003	JNCCMNCR60000056	Eilean Hoan S (Loch Eriboll)	13/08/1986	Sue Hiscock Jack Woodward	58.56336	-4.68213			-12	0
68	056.028.001	JNCCMNCR60000056	Eilean Choraidh NE (Loch Eriboll)	13/08/1986	Dave Moss Norma Brandt	58.48752	-4.69866			-11.5	-10
69	056.028.002	JNCCMNCR60000056	Eilean Choraidh NE (Loch Eriboll)	13/08/1986	Dave Moss Norma Brandt	58.48752	-4.69866			-11.5	-7.5
70	056.029.001	JNCCMNCR60000056	W channel, Eilean Choraidh (Loch Eriboll)	13/08/1986	Sue Hiscock Jack Woodward	58.47801	-4.72366	-14	-3	-11	0
71	056.030.001	JNCCMNCR60000056	S basin anchorage (Loch Eriboll)	14/08/1986	Dave Moss Norma Brandt	58.4727	-4.71982			-30	-18
72	056.031.001	JNCCMNCR60000056	B…gh Loch Sian (Loch Eriboll)	14/08/1986	Sue Hiscock Jack Woodward	58.52506	-4.66546			-7	-1
73	056.031.002	JNCCMNCR60000056	B…gh Loch Sian (Loch Eriboll)	14/08/1986	Sue Hiscock Jack Woodward	58.52506	-4.66546			-13	-7
74	056.031.002	JNCCMNCR60000056	B…gh Loch Sian (Loch Eriboll)	14/08/1986	Sue Hiscock Jack Woodward	58.52506	-4.66546			-13	-7
75	056.032.001	JNCCMNCR60000056	Eilean Dubh (Loch Eriboll)	14/08/1986	Gil Green Betty Green Roz Kingston K Yeates	58.51864	-4.67185			-10	-1
76	056.032.001	JNCCMNCR60000056	Eilean Dubh (Loch Eriboll)	14/08/1986	Gil Green Betty Green Roz Kingston K Yeates	58.51864	-4.67185			-10	-1
77	056.032.002	JNCCMNCR60000056	Eilean Dubh (Loch Eriboll)	14/08/1986	Gil Green Betty Green Roz Kingston K Yeates	58.51864	-4.67185	-17	-12	-15	-10
78	056.032.003	JNCCMNCR60000056	Eilean Dubh (Loch Eriboll)	14/08/1986	Roz Kingston K Yeates	58.51864	-4.67185			-13	-11

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
79	056.033.001	JNCCMNCR60000056	Camas an D—in (Loch Eriboll)	14/08/1986	Dave Moss Norma Brandt	58.49097	-4.66288			-3	0
80	056.033.002	JNCCMNCR60000056	Camas an D—in (Loch Eriboll)	14/08/1986	Dave Moss Norma Brandt	58.49097	-4.66288			-15	-3
81	056.034.001	JNCCMNCR60000056	Ard Neackie S (Loch Eriboll)	14/08/1986	Sue Hiscock Jack Woodward	58.49725	-4.66335			-4	0
82	056.034.001	JNCCMNCR60000056	Ard Neackie S (Loch Eriboll)	14/08/1986	Sue Hiscock Jack Woodward	58.49725	-4.66335			-4	0
83	056.034.002	JNCCMNCR60000056	Ard Neackie S (Loch Eriboll)	14/08/1986	Sue Hiscock Jack Woodward	58.49725	-4.66335			-9	-4
84	056.11A.001	JNCCMNCR60000056	Geodh' an Sgadan (a) (Loch Eriboll)	07/08/1986	Dave Moss Norma Brandt	58.50895	-4.66252			-9	-2
85	056.11A.002	JNCCMNCR60000056	Geodh' an Sgadan (a) (Loch Eriboll)	07/08/1986	Dave Moss Norma Brandt	58.50895	-4.66252			-16	-9
86	056.11B.001	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417			-5.5	-1.5
87	056.11B.002	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417			-2	
88	056.11B.003	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417			-2	
89	056.11B.004	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417			-2	-2
90	056.11B.005	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417			-6	-2
91	056.11B.006	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417			-6	-5
92	056.11B.007	JNCCMNCR60000056	Geodh' an Sgadan (b) (Loch Eriboll)	07/08/1986	Jack Woodward Sue Hiscock	58.50801	-4.66417				-9
93	056.19A.001	JNCCMNCR60000056	Freisgill Head N (Loch Eriboll)	11/08/1986	Betty Green Gil Green Dave Moss Norma Brandt	58.55414	-4.60578			-5.5	-1
94	056.19A.002	JNCCMNCR60000056	Freisgill Head N (Loch Eriboll)	11/08/1986	Betty Green Gil Green Dave Moss Norma Brandt	58.55414	-4.60578			-6	-5.5
95	056.19B.001	JNCCMNCR60000056	Freisgill Head S (Loch Eriboll)	11/08/1986	Sue Hiscock Jack Woodward	58.55239	-4.60393			-6	0

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
96	056.19B.002	JNCCMNCR60000056	Freisgill Head S (Loch Eriboll)	11/08/1986	Sue Hiscock Jack Woodward	58.55239	-4.60393			-10	-6
97	056.9/18.001	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Jack Woodward Sue Hiscock	58.57603	-4.5902			-8	0
98	056.9/18.001	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Jack Woodward Sue Hiscock	58.57603	-4.5902			-8	0
99	056.9/18.002	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Jack Woodward Sue Hiscock	58.57603	-4.5902			-13	-8
100	056.9/18.003	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Jack Woodward Sue Hiscock	58.57603	-4.5902			-14	-13
101	056.9/18.004	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Jack Woodward Sue Hiscock Betty Green Gil Green	58.57603	-4.5902			-15	-13
102	056.9/18.005	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Roz Kingston K Yeates	58.57603	-4.5902			-15	-12
103	056.9/18.006	JNCCMNCR60000056	Mol Mhor(Loch Eriboll)	06/08/1986	Dave Moss Norma Brandt	58.57603	-4.5902			-9	0
104	089.001.001	JNCCMNCR10000089	N of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50378	-4.69476				
105	089.001.001	JNCCMNCR10000089	N of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50378	-4.69476				
106	089.002.001	JNCCMNCR10000089	S of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50188	-4.69976				
107	089.002.001	JNCCMNCR10000089	S of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50188	-4.69976				
108	089.002.001	JNCCMNCR10000089	S of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50188	-4.69976				
109	089.002.001	JNCCMNCR10000089	S of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50188	-4.69976				
110	089.002.001	JNCCMNCR10000089	S of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50188	-4.69976				
111	089.002.001	JNCCMNCR10000089	S of Portnancon (Loch Eriboll)	01/09/1974	A M Jones	58.50188	-4.69976				
112	089.003.001	JNCCMNCR10000089	Port Chamuill (Loch Eriboll)	01/09/1974	A M Jones	58.50924	-4.69174				
113	089.003.001	JNCCMNCR10000089	Port Chamuill (Loch Eriboll)	01/09/1974	A M Jones	58.50924	-4.69174				

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
114	089.003.001	JNCCMNCR10000089	Port Chamuill (Loch Eriboll)	01/09/1974	A M Jones	58.50924	-4.69174				
115	089.003.001	JNCCMNCR10000089	Port Chamuill (Loch Eriboll)	01/09/1974	A M Jones	58.50924	-4.69174				
116	089.003.001	JNCCMNCR10000089	Port Chamuill (Loch Eriboll)	01/09/1974	A M Jones	58.50924	-4.69174				
117	089.005.001	JNCCMNCR10000089	Bay near Lochan Havurn (Loch Eriboll)	01/09/1974	A M Jones	58.44785	-4.74705				
118	089.006.001	JNCCMNCR10000089	Rispond Bay (Loch Eriboll)	01/09/1974	A M Jones	58.54767	-4.65859				
119	089.006.001	JNCCMNCR10000089	Rispond Bay (Loch Eriboll)	01/09/1974	A M Jones	58.54767	-4.65859				
120	063.003.001	JNCCMNCR10000063	Whiten Head (Loch Eriboll approaches)	01/01/1970	Gordon Ridley	58.57982	-4.58015				
121	063.004.001	JNCCMNCR10000063	Sango Bay (Loch Eriboll approaches)	01/01/1970	Gordon Ridley	58.57124	-4.73435				
122	063.004.001	JNCCMNCR10000063	Sango Bay (Loch Eriboll approaches)	01/01/1970	Gordon Ridley	58.57124	-4.73435				
123	063.004.001	JNCCMNCR10000063	Sango Bay (Loch Eriboll approaches)	01/01/1970	Gordon Ridley	58.57124	-4.73435				
124	063.004.001	JNCCMNCR10000063	Sango Bay (Loch Eriboll approaches)	01/01/1970	Gordon Ridley	58.57124	-4.73435				
125	063.004.001	JNCCMNCR10000063	Sango Bay (Loch Eriboll approaches)	01/01/1970	Gordon Ridley	58.57124	-4.73435				
126	089.007.001	JNCCMNCR10000089	An t-Aigeach (Loch Eriboll approaches)	01/09/1974	A M Jones	58.5514	-4.65199				
127	089.007.001	JNCCMNCR10000089	An t-Aigeach (Loch Eriboll approaches)	01/09/1974	A M Jones	58.5514	-4.65199				
128	089.007.001	JNCCMNCR10000089	An t-Aigeach (Loch Eriboll approaches)	01/09/1974	A M Jones	58.5514	-4.65199				
129	089.008.001	JNCCMNCR10000089	An t-Sr•n (Loch Eriboll)	01/09/1974	A M Jones	58.48365	-4.66919				
130	089.008.001	JNCCMNCR10000089	An t-Sr•n (Loch Eriboll)	01/09/1974	A M Jones	58.48365	-4.66919				
131	089.009.001	JNCCMNCR10000089	S end of loch (Loch Eriboll)	01/09/1974	A M Jones	58.45181	-4.73021				
132	089.009.001	JNCCMNCR10000089	S end of loch (Loch Eriboll)	01/09/1974	A M Jones	58.45181	-4.73021				

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
133	089.009.001	JNCCMNCR10000089	S end of loch (Loch Eriboll)	01/09/1974	A M Jones	58.45181	-4.73021				
134	089.009.001	JNCCMNCR10000089	S end of loch (Loch Eriboll)	01/09/1974	A M Jones	58.45181	-4.73021				
135	089.010.001	JNCCMNCR10000089	S end of loch (Loch Eriboll)	01/09/1974	A M Jones	58.44811	-4.73507				
136	089.012.001	JNCCMNCR10000089	Ard Neackie (inner) (Loch Eriboll)	01/09/1974	A M Jones	58.49811	-4.66514				
137	089.012.001	JNCCMNCR10000089	Ard Neackie (inner) (Loch Eriboll)	01/09/1974	A M Jones	58.49811	-4.66514				
138	089.012.001	JNCCMNCR10000089	Ard Neackie (inner) (Loch Eriboll)	01/09/1974	A M Jones	58.49811	-4.66514				
139	089.013.001	JNCCMNCR10000089	Ard Neackie (outer) (Loch Eriboll)	01/09/1974	A M Jones	58.498	-4.67028				
140	089.013.001	JNCCMNCR10000089	Ard Neackie (outer) (Loch Eriboll)	01/09/1974	A M Jones	58.498	-4.67028				
141	089.013.001	JNCCMNCR10000089	Ard Neackie (outer) (Loch Eriboll)	01/09/1974	A M Jones	58.498	-4.67028				
142	089.013.001	JNCCMNCR10000089	Ard Neackie (outer) (Loch Eriboll)	01/09/1974	A M Jones	58.498	-4.67028				
143	089.014.001	JNCCMNCR10000089	Smoo gully (Loch Eriboll approaches)	01/09/1974	A M Jones	58.56712	-4.71682				
144	089.014.001	JNCCMNCR10000089	Smoo gully (Loch Eriboll approaches)	01/09/1974	A M Jones	58.56712	-4.71682				
145	089.015.001	JNCCMNCR10000089	Sango Bay (Loch Eriboll approaches)	01/09/1974	A M Jones	58.56937	-4.73764				
146	089.015.001	JNCCMNCR10000089	Sango Bay (Loch Eriboll approaches)	01/09/1974	A M Jones	58.56937	-4.73764				
147	089.015.001	JNCCMNCR10000089	Sango Bay (Loch Eriboll approaches)	01/09/1974	A M Jones	58.56937	-4.73764				
148	089.015.001	JNCCMNCR10000089	Sango Bay (Loch Eriboll approaches)	01/09/1974	A M Jones	58.56937	-4.73764				
149	474.001.001	JNCCMNCR10000474	Loch Havurn (Loch Eriboll)	09/05/1994	Roger Covey Frank Fortune	58.44875	-4.74712	-0.2	0		
150	474.001.002	JNCCMNCR10000474	Loch Havurn (Loch Eriboll)	09/05/1994	Roger Covey Frank Fortune	58.44875	-4.74712	-0.2	0		
151	474.001.003	JNCCMNCR10000474	Loch Havurn (Loch Eriboll)	09/05/1994	Roger Covey Frank Fortune	58.44875	-4.74712	-1.5	0		

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
152	MRMCS007000006BD.01	MRMCS007000000BA	Rispond (Loch Eriboll)	25/07/2010	Kat Sanders	58.54942	-4.65268	-15.1	-15.1	-10.7	-10.7
153	MRMCS007000006BD.02	MRMCS007000000BA	Rispond (Loch Eriboll)	25/07/2010	Kat Sanders	58.54942	-4.65268	-15.1	-8	-10.7	-3.6
154	MRMCS00700000717.01	MRMCS007000000C3	An Dubh-Sgeir	17/06/2011	Chris Rickard	58.57392	-4.65284	-21	-12	-16.5	-7.5
155	MRMCS00700000717.02	MRMCS007000000C3	An Dubh-Sgeir	17/06/2011	Chris Rickard	58.57392	-4.65284	-32	-21	-27.5	-16.5
156	MRMCS00700000718.01	MRMCS007000000C3	Rubh Ard An T-Siuil	18/06/2011	Chris Rickard	58.57219	-4.59683	-16	-7	-11.5	-2.5
157	MRMCS00700000718.02	MRMCS007000000C3	Rubh Ard An T-Siuil	18/06/2011	Chris Rickard	58.57219	-4.59683	-19.5	-14	-15	-9.5
158	MRMCS00700000721.01	MRMCS007000000C3	South of White Head	18/06/2011	Allison Gleadhill Michael Bramham	58.50885	-4.65676	-10	-5	-6.5	-1.5
159	MRMCS00700000721.02	MRMCS007000000C3	South of White Head	18/06/2011	Allison Gleadhill Michael Bramham	58.50885	-4.65676	-20	-10	-16.5	-6.5
160	MRMCS00700000721.03	MRMCS007000000C3	South of White Head	18/06/2011	Allison Gleadhill Michael Bramham	58.50885	-4.65676	-30	-20	-25.5	-16.5
161	MRMCS00700000722.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Chris Rickard	58.55264	-4.60248	-15	-5	-11	-1
162	MRMCS00700000722.02	MRMCS007000000C3	Freisgill Head	19/06/2011	Chris Rickard	58.55264	-4.60248	-19	-15	-15	-11
163	MRMCS00700000722.03	MRMCS007000000C3	Freisgill Head	19/06/2011	Chris Rickard	58.55264	-4.60248	-19	-15	-15	-11
164	MRMCS00700000722.03	MRMCS007000000C3	Freisgill Head	19/06/2011	Chris Rickard	58.55264	-4.60248	-19	-15	-15	-11
165	MRMCS00700000723.01	MRMCS007000000C3	Grave Point	19/06/2011	Allison Gleadhill	58.53377	-4.65145	-17	-10	-13.5	-6.5
166	MRMCS00700000723.02	MRMCS007000000C3	Grave Point	19/06/2011	Allison Gleadhill	58.53377	-4.65145	-25	-17	-21.5	-13.5
167	MRMCS00700000723.03	MRMCS007000000C3	Grave Point	19/06/2011	Allison Gleadhill	58.53377	-4.65145	-25	-17	-21.5	-15.5
168	MRMCS00700000724.01	MRMCS007000000C3	Torr na Bithe	20/06/2011	Chris Rickard	58.50643	-4.65912	-20	-7	-15.7	-2.7
169	MRMCS00700000724.02	MRMCS007000000C3	Torr na Bithe	20/06/2011	Chris Rickard	58.50643	-4.65912	-20	-13	-15.7	-8.7
170	MRMCS00700000724.03	MRMCS007000000C3	Torr na Bithe	20/06/2011	Chris Rickard	58.50643	-4.65912	-35	-20	-30.7	-15.7
171	MRMCS00700000726.01	MRMCS007000000C3	South of White Head	18/06/2011	Tracy Scott	58.50885	-4.65666	-30	-5	-26.5	-1.5
172	MRMCS00700000726.01	MRMCS007000000C3	South of White Head	18/06/2011	Tracy Scott	58.50885	-4.65666	-30	-5	-26.5	-1.5
173	MRMCS00700000726.01	MRMCS007000000C3	South of White Head	18/06/2011	Tracy Scott	58.50885	-4.65666	-30	-5	-26.5	-1.5
174	MRMCS00700000727.01	MRMCS007000000C3	Rubh Ard An Tsiuil	18/06/2011	Franca Pugnaghi	58.57219	-4.59683	-21	-10	-16.5	-5.5
175	MRMCS00700000727.01	MRMCS007000000C3	Rubh Ard An Tsiuil	18/06/2011	Franca Pugnaghi	58.57219	-4.59683	-21	-10	-16.5	-5.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
176	MRMCS00700000727.01	MRMCS007000000C3	Rubh Ard An Tsiuil	18/06/2011	Franca Pugnaghi	58.57219	-4.59683	-21	-10	-16.5	-5.5
177	MRMCS00700000727.01	MRMCS007000000C3	Rubh Ard An Tsiuil	18/06/2011	Franca Pugnaghi	58.57219	-4.59683	-21	-10	-16.5	-5.5
178	MRMCS00700000728.01	MRMCS007000000C3	Eilean Cluinhrig (north tip)	17/06/2011	Franca Pugnaghi	58.55626	-4.64318	-14.5	-10	-12.5	-8
179	MRMCS00700000728.01	MRMCS007000000C3	Eilean Cluinhrig (north tip)	17/06/2011	Franca Pugnaghi	58.55626	-4.64318	-14.5	-10	-12.5	-8
180	MRMCS00700000728.01	MRMCS007000000C3	Eilean Cluinhrig (north tip)	17/06/2011	Franca Pugnaghi	58.55626	-4.64318	-14.5	-10	-12.5	-8
181	MRMCS00700000728.01	MRMCS007000000C3	Eilean Cluinhrig (north tip)	17/06/2011	Franca Pugnaghi	58.55626	-4.64318	-14.5	-10	-12.5	-8
182	MRMCS00700000728.01	MRMCS007000000C3	Eilean Cluinhrig (north tip)	17/06/2011	Franca Pugnaghi	58.55626	-4.64318	-14.5	-10	-12.5	-8
183	MRMCS00700000729.01	MRMCS007000000C3	Eilean Cluinhrig (east)	17/06/2011	Tracy Scott	58.55491	-4.64148	-20	-15	-18	-13
184	MRMCS00700000729.01	MRMCS007000000C3	Eilean Cluinhrig (east)	17/06/2011	Tracy Scott	58.55491	-4.64148	-20	-15	-18	-13
185	MRMCS00700000729.01	MRMCS007000000C3	Eilean Cluinhrig (east)	17/06/2011	Tracy Scott	58.55491	-4.64148	-20	-15	-18	-13
186	MRMCS00700000729.01	MRMCS007000000C3	Eilean Cluinhrig (east)	17/06/2011	Tracy Scott	58.55491	-4.64148	-20	-15	-18	-13
187	MRMCS00700000729.01	MRMCS007000000C3	Eilean Cluinhrig (east)	17/06/2011	Tracy Scott	58.55491	-4.64148	-20	-15	-18	-13
188	MRMCS0070000072A.01	MRMCS007000000C3	An Dubh Sgeir (east side)	17/06/2011	Michael Bramham	58.57344	-4.65285	-21	-10	-17	-6
189	MRMCS0070000072A.01	MRMCS007000000C3	An Dubh Sgeir (east side)	17/06/2011	Michael Bramham	58.57344	-4.65285	-21	-10	-17	-6
190	MRMCS0070000072A.01	MRMCS007000000C3	An Dubh Sgeir (east side)	17/06/2011	Michael Bramham	58.57344	-4.65285	-21	-10	-17	-6
191	MRMCS0070000072A.01	MRMCS007000000C3	An Dubh Sgeir (east side)	17/06/2011	Michael Bramham	58.57344	-4.65285	-21	-10	-17	-6
192	MRMCS0070000072B.01	MRMCS007000000C3	An Dubh Sgeir	17/06/2011	Marco Bottacini	58.57301	-4.65707	-21	-12	-16.5	-7.5
193	MRMCS0070000072B.01	MRMCS007000000C3	An Dubh Sgeir	17/06/2011	Marco Bottacini	58.57301	-4.65707	-21	-12	-16.5	-7.5
194	MRMCS0070000072B.01	MRMCS007000000C3	An Dubh Sgeir	17/06/2011	Marco Bottacini	58.57301	-4.65707	-21	-12	-16.5	-7.5
195	MRMCS0070000072B.01	MRMCS007000000C3	An Dubh Sgeir	17/06/2011	Marco Bottacini	58.57301	-4.65707	-21	-12	-16.5	-7.5
196	MRMCS0070000072B.01	MRMCS007000000C3	An Dubh Sgeir	17/06/2011	Marco Bottacini	58.57301	-4.65707	-21	-12	-16.5	-7.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
197	MRMCS0070000072C.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Michael Bramham	58.47814	-4.69466	-20	-8	-17	-5
198	MRMCS0070000072C.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Michael Bramham	58.47814	-4.69466	-20	-8	-17	-5
199	MRMCS0070000072C.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Michael Bramham	58.47814	-4.69466	-20	-8	-17	-5
200	MRMCS0070000072C.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Michael Bramham	58.47814	-4.69466	-20	-8	-17	-5
201	MRMCS0070000072C.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Michael Bramham	58.47814	-4.69466	-20	-8	-17	-5
202	MRMCS0070000072D.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Tracy Scott	58.47877	-4.6932	-32	-12	-29	-9
203	MRMCS0070000072D.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Tracy Scott	58.47877	-4.6932	-32	-12	-29	-9
204	MRMCS0070000072D.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Tracy Scott	58.47877	-4.6932	-32	-12	-29	-9
205	MRMCS0070000072E.01	MRMCS007000000C3	Grave Point	19/06/2011	Tracy Scott	58.53377	-4.65145	-25	-15	-21.5	-11.5
206	MRMCS0070000072E.01	MRMCS007000000C3	Grave Point	19/06/2011	Tracy Scott	58.53377	-4.65145	-25	-15	-21.5	-11.5
207	MRMCS0070000072E.01	MRMCS007000000C3	Grave Point	19/06/2011	Tracy Scott	58.53377	-4.65145	-25	-15	-21.5	-11.5
208	MRMCS0070000072E.01	MRMCS007000000C3	Grave Point	19/06/2011	Tracy Scott	58.53377	-4.65145	-25	-15	-21.5	-11.5
209	MRMCS0070000072F.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Michael Bramham	58.55264	-4.60248	-16	-7	-12	-3
210	MRMCS0070000072F.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Michael Bramham	58.55264	-4.60248	-16	-7	-12	-3
211	MRMCS0070000072F.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Michael Bramham	58.55264	-4.60248	-16	-7	-12	-3
212	MRMCS00700000730.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Franca Pugnaghi	58.55264	-4.60248	-18.4	-5	-14.4	-1
213	MRMCS00700000730.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Franca Pugnaghi	58.55264	-4.60248	-18.4	-5	-14.4	-1
214	MRMCS00700000730.01	MRMCS007000000C3	Freisgill Head	19/06/2011	Franca Pugnaghi	58.55264	-4.60248	-18.4	-5	-14.4	-1
215	MRMCS00700000731.01	MRMCS007000000C3	South of White Head	18/06/2011	Marco Bottacini	58.50885	-4.65666	-21	-10	-17.5	-6.5
216	MRMCS00700000731.01	MRMCS007000000C3	South of White Head	18/06/2011	Marco Bottacini	58.50885	-4.65666	-21	-10	-17.5	-6.5
217	MRMCS00700000731.01	MRMCS007000000C3	South of White Head	18/06/2011	Marco Bottacini	58.50885	-4.65666	-21	-10	-17.5	-6.5
218	MRMCS00700000731.01	MRMCS007000000C3	South of White Head	18/06/2011	Marco Bottacini	58.50885	-4.65666	-21	-10	-17.5	-6.5
219	MRMCS00700000731.01	MRMCS007000000C3	South of White Head	18/06/2011	Marco Bottacini	58.50885	-4.65666	-21	-10	-17.5	-6.5
220	MRMCS007000007DA.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Marco Bottacini	58.47859	-4.69382	-17.2	-7	-13.9	-3.7

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
221	MRMCS007000007DA.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Marco Bottacini	58.47859	-4.69382	-17.2	-7	-13.9	-3.7
222	MRMCS007000007DA.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Marco Bottacini	58.47859	-4.69382	-17.2	-7	-13.9	-3.7
223	MRMCS007000007DA.01	MRMCS007000000C3	Bagh Leac Finn	20/06/2011	Marco Bottacini	58.47859	-4.69382	-17.2	-7	-13.9	-3.7
224	MRMCS007000007DB.01	MRMCS007000000C3	Torr na Bithe	20/06/2011	Franca Pugnaghi	58.5071	-4.65605	-17.6	-7	-13.3	-2.7
225	MRMCS007000007DB.01	MRMCS007000000C3	Torr na Bithe	20/06/2011	Franca Pugnaghi	58.5071	-4.65605	-17.6	-7	-13.3	-2.7
226	MRMCS007000007DB.01	MRMCS007000000C3	Torr na Bithe	20/06/2011	Franca Pugnaghi	58.5071	-4.65605	-17.6	-7	-13.3	-2.7
227	MRMCS007000007DB.01	MRMCS007000000C3	Torr na Bithe	20/06/2011	Franca Pugnaghi	58.5071	-4.65605	-17.6	-7	-13.3	-2.7
228	MRMCS007000007DB.01	MRMCS007000000C3	Torr na Bithe	20/06/2011	Franca Pugnaghi	58.5071	-4.65605	-17.6	-7	-13.3	-2.7
229	MRMCS007000007DC.01	MRMCS007000000C3	Grave Point	19/06/2011	Marco Bottacini	58.53445	-4.65305	-24	-7	-20.2	-3.2
230	MRMCS007000007DC.01	MRMCS007000000C3	Grave Point	19/06/2011	Marco Bottacini	58.53445	-4.65305	-24	-7	-20.2	-3.2
231	MRMCS007000007DC.01	MRMCS007000000C3	Grave Point	19/06/2011	Marco Bottacini	58.53445	-4.65305	-24	-7	-20.2	-3.2
232	MRMCS007000007DC.01	MRMCS007000000C3	Grave Point	19/06/2011	Marco Bottacini	58.53445	-4.65305	-24	-7	-20.2	-3.2
233	MRMCS007000007DC.01	MRMCS007000000C3	Grave Point	19/06/2011	Marco Bottacini	58.53445	-4.65305	-24	-7	-20.2	-3.2
234	MRMCS007000007DC.01	MRMCS007000000C3	Grave Point	19/06/2011	Marco Bottacini	58.53445	-4.65305	-24	-7	-20.2	-3.2
235	MRMCS017000008B1.01	MRMCS017000000EF	Torr Na Bithr, E side of Loch Eriboll	16/07/2012	Tom Kerr Hilary Kerr	58.50788	-4.65837	-8.9	-1.5	-5.98	1.42
236	MRMCS017000008B1.02	MRMCS017000000EF	Torr Na Bithr, E side of Loch Eriboll	16/07/2012	Tom Kerr Hilary Kerr	58.50788	-4.65837	-30	-8.9	-27.08	-5.98
237	MRMCS017000008B1.03	MRMCS017000000EF	Torr Na Bithr, E side of Loch Eriboll	16/07/2012	Tom Kerr Hilary Kerr	58.50788	-4.65837	-30.2	-15.3	-27.28	-12.38
238	MRMCS017000008B2.01	MRMCS017000000EF	An Dubh-Sgeir, mouth of Loch Eriboll	13/07/2012	Tom Kerr Hilary Kerr	58.57238	-4.65542	-6	0	-3.51	2.49
239	MRMCS017000008B2.02	MRMCS017000000EF	An Dubh-Sgeir, mouth of Loch Eriboll	13/07/2012	Tom Kerr Hilary Kerr	58.57238	-4.65542	-16.5	-6	-14.01	-3.51
240	MRMCS017000008B2.03	MRMCS017000000EF	An Dubh-Sgeir, mouth of Loch Eriboll	13/07/2012	Tom Kerr Hilary Kerr	58.57238	-4.65542	-16.5	-10.5	-14.01	-8.01
241	MRSNH0180000007B.01	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.46229	-4.73403			-15.2	-14.3
242	MRSNH0180000007B.02	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.46967	-4.71706			-20.2	-18.1
243	MRSNH0180000007B.03	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.47715	-4.70304			-40.9	-37

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
244	MRSNH0180000007B.03	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.47715	-4.70304			-40.9	-37
245	MRSNH0180000007B.04	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.48821	-4.69055			-42.9	-36.8
246	MRSNH0180000007B.05	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.49509	-4.68214			-46.7	-45.8
247	MRSNH0180000007B.06	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.51307	-4.66376			-57.6	-51.6
248	MRSNH0180000007B.07	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.52378	-4.65188			-53.4	-49.5
249	MRSNH0180000007B.08	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53375	-4.63595			-37.7	-37.6
250	MRSNH0180000007B.09	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.532	-4.61298			-21.5	-20.5
251	MRSNH0180000007B.10	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.532	-4.61298			-21.5	-20.5
252	MRSNH0180000007B.11	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54255	-4.62862			-34.4	-34.3
253	MRSNH0180000007B.12	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.55201	-4.62559			-41.2	-40.2
254	MRSNH0180000007B.13	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.56282	-4.62564			-48.2	-47.3
255	MRSNH0180000007B.14	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.56241	-4.65325			-43.3	-28.3
256	MRSNH0180000007B.15	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.56067	-4.67371			-20.4	-20.4
257	MRSNH0180000007B.16	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.56338	-4.60676			-33	-25.2
258	MRSNH0180000007B.16	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.56338	-4.60676			-33	-25.2
259	MRSNH0180000007B.17	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.55544	-4.60645			-27.4	-23.3
260	MRSNH0180000007B.17	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.55544	-4.60645			-27.4	-23.3
261	MRSNH0180000007B.18	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54449	-4.60091			-20.6	-18.5
262	MRSNH0180000007B.19	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54449	-4.60091			-20.6	-18.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
263	MRSNH0180000007B.20	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53863	-4.59948			-13	-11
264	MRSNH0180000007B.21	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53863	-4.59948			-13	-11
265	MRSNH0180000007B.22	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53598	-4.6042			-20.8	-15.8
266	MRSNH0180000007B.22	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53598	-4.6042			-20.8	-15.8
267	MRSNH0180000007B.22	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53598	-4.6042			-20.8	-15.8
268	MRSNH0180000007B.23	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.52442	-4.63539			-10.8	-8.8
269	MRSNH0180000007B.24	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.52154	-4.64509			-11.8	-10.8
270	MRSNH0180000007B.25	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.49887	-4.69764			-27.6	-23.6
271	MRSNH0180000007B.26	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.49157	-4.66845			-26.4	-25.5
272	MRSNH0180000007B.27	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.45714	-4.73824			-13.1	-11.8
273	MRSNH0180000007B.28	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.46806	-4.72778			-17.5	-15.2
274	MRSNH0180000007B.29	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.47424	-4.7216			-17.9	-16.6
275	MRSNH0180000007B.30	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.47238	-4.71314			-35.3	-28.2
276	MRSNH0180000007B.30	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.47238	-4.71314			-35.3	-28.2
277	MRSNH0180000007B.31	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.50556	-4.68222			-38.3	-36.2
278	MRSNH0180000007B.32	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.50702	-4.66742			-46.5	-39.4
279	MRSNH0180000007B.33	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.53652	-4.61881			-29.8	-27.9
280	MRSNH0180000007B.34	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54152	-4.61047			-31	-29
281	MRSNH0180000007B.35	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54152	-4.61047			-31	-29

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
282	MRSNH0180000007B.36	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54152	-4.61047			-31	-29
283	MRSNH0180000007B.37	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54808	-4.60887			-29.1	-26.1
284	MRSNH0180000007B.38	MRSNH0180000001A	Loch Eriboll video survey	22/09/2011	Scottish Natural Heritage	58.54808	-4.60887			-29.1	-26.1
285	MRSNH01800000089.01	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.48555	-4.6813			-36.1	-29.1
286	MRSNH01800000089.02	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.48555	-4.6813			-36.1	-29.1
287	MRSNH01800000089.03	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.48246	-4.68474			-25	-16
288	MRSNH01800000089.04	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.50326	-4.68455			-49.2	-27.2
289	MRSNH01800000089.05	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.5158	-4.66352			-63.6	-49.9
290	MRSNH01800000089.06	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.51822	-4.65364			-49.1	-39.3
291	MRSNH01800000089.07	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.5206	-4.64844			-32.4	-19.2
292	MRSNH01800000089.08	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.5206	-4.64844			-32.5	-19.2
293	MRSNH01800000089.09	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.52281	-4.65603			-53.9	-35.6
294	MRSNH01800000089.10	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.53252	-4.64668			-33.9	-32.6
295	MRSNH01800000089.11	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.53575	-4.62407			-34	-29.2
296	MRSNH01800000089.12	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.53575	-4.62407			-34	-29.2
297	MRSNH01800000089.13	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.53575	-4.62407			-34	-29.2
298	MRSNH01800000089.14	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.54334	-4.64122			-32.7	-30.7
299	MRSNH01800000089.15	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.54334	-4.64122			-32.7	-30.7
300	MRSNH01800000089.16	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.54334	-4.64122			-32.7	-30.7

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
301	MRSNH01800000089.17	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.55142	-4.63287			-44.2	-30.5
302	MRSNH01800000089.18	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.55142	-4.63287			-44.2	-30.5
303	MRSNH01800000089.19	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.55719	-4.62836			-50.2	-49.7
304	MRSNH01800000089.20	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.56035	-4.6134			-46	-31.7
305	MRSNH01800000089.21	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.56035	-4.6134			-46	-31.7
306	MRSNH01800000089.22	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.56035	-4.6134			-46	-31.7
307	MRSNH01800000089.23	MRSNH01800000026	2012 Loch Eriboll video survey	08/03/2012	Scottish Natural Heritage	58.51593	-4.66603			-64.1	-32
308	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
309	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
310	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
311	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
312	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
313	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
314	MRSS00100000002.01	MRSS00100000007	Eilean Hoan (SE 1),	03/05/2002	Keith Pritchard Neil Cowie	58.56889	-4.66232	-20	-6	-18	-4
315	MRSS00100000003.01	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-15	-2	-13	0
316	MRSS00100000003.01	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-15	-2	-13	0
317	MRSS00100000003.01	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-15	-2	-13	0

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
318	MRSS00100000003.01	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-15	-2	-13	0
319	MRSS00100000003.01	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-15	-2	-13	0
320	MRSS00100000003.01	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-15	-2	-13	0
321	MRSS00100000003.02	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-16	-15	-14	-13
322	MRSS00100000003.02	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-16	-15	-14	-13
323	MRSS00100000003.02	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-16	-15	-14	-13
324	MRSS00100000003.02	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-16	-15	-14	-13
325	MRSS00100000003.02	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-16	-15	-14	-13
326	MRSS00100000003.03	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-20	-16	-18	-14
327	MRSS00100000003.03	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-20	-16	-18	-14
328	MRSS00100000003.03	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-20	-16	-18	-14
329	MRSS00100000003.03	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-20	-16	-18	-14
330	MRSS00100000003.03	MRSS00100000007	Eilean Hoan (Mid 1)	03/05/2002	Digger Jackson Calum Duncan Sue Scott	58.56656	-4.66627	-20	-16	-18	-14

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
331	MRSS00100000007.01	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-10	-2	-7	0
332	MRSS00100000007.01	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-10	-2	-7	0
333	MRSS00100000007.01	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-10	-2	-7	0
334	MRSS00100000007.01	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-10	-2	-7	0
335	MRSS00100000007.01	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-10	-2	-7	0
336	MRSS00100000007.02	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-30	-10	-27	-7
337	MRSS00100000007.02	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-30	-10	-27	-7
338	MRSS00100000007.02	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-30	-10	-27	-7
339	MRSS00100000007.02	MRSS00100000007	Whitehead (SE1)	03/05/2002	Paul Tyler Mary Harvey	58.51622	-4.64866	-30	-10	-27	-7
340	MRSS00100000008.01	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan	58.5139	-4.65071	-2	0	-2	0
341	MRSS00100000008.02	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-8.7	-2	-5.7	0
342	MRSS00100000008.02	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-8.7	-2	-5.7	0
343	MRSS00100000008.02	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-8.7	-2	-5.7	0
344	MRSS00100000008.02	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-8.7	-2	-5.7	0
345	MRSS00100000008.02	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-8.7	-2	-5.7	0
346	MRSS00100000008.02	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-8.7	-2	-5.7	0

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
347	MRSS00100000008.03	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-32	-8.7	-29	-5.7
348	MRSS00100000008.03	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-32	-8.7	-29	-5.7
349	MRSS00100000008.03	MRSS00100000007	Whitehead (SE2)	03/05/2002	Calum Duncan Digger Jackson Sue Scott	58.5139	-4.65071	-32	-8.7	-29	-5.7
350	MRSS00100000009.01	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-10	0	-7	0
351	MRSS00100000009.01	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-10	0	-7	0
352	MRSS00100000009.01	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-10	0	-7	0
353	MRSS00100000009.01	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-10	0	-7	0
354	MRSS00100000009.01	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-10	0	-7	0
355	MRSS00100000009.02	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-16	-10	-13	-7
356	MRSS00100000009.02	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-16	-10	-13	-7
357	MRSS00100000009.02	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-16	-10	-13	-7
358	MRSS00100000009.02	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-16	-10	-13	-7
359	MRSS00100000009.03	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-25	-16	-22	-13
360	MRSS00100000009.03	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-25	-16	-22	-13
361	MRSS00100000009.03	MRSS00100000007	Tor Mor Cliff	03/05/2002	Neil Cowie Keith Pritchard	58.50038	-4.65399	-25	-16	-22	-13
362	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5
363	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5
364	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5

Code	Sample reference	Survey key	Event name	Event date	Surveyors	LatWGS84	LongWGS84	Lower height SL (m)	Upper height SL (m)	Lower height CD (m)	Upper height CD (m)
365	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5
366	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5
367	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5
368	MRSS0010000000A.01	MRSS00100000007	Whitehead (SE3)	03/05/2002	Chris Turkentine Paul Turkentine	58.51353	-4.65056	-12	-3	-9.5	-0.5

Annex 15B – Habitat and biological data

Data as downloaded from Marine Recorder. Text is uneditted and may include formatting artefacts. Species names have not been italicised and nomenclature has not been updated.

Code	Habitat	Description	Biotope
1	Extensive area of pebbles with scattered boulders.	An extensive area of pebbles with interesting flora, scattered boulders with occasional kelp. N. wiggii occasional on pebbles at 15m.	SS.SMp.KSwSS.LsacR.CbPb
2	Kelp forest on broken bedrock slope, many gullies and fissures.	Broken bedrock at 2 - 4 m BCD with many gullies and fissures, running longshore. Dense kelp, L. hyperborea (A), with grazed undergrowth.	IR.MIR.KR.Lhyp.GzFt
3	Vertical bedrock cliff.	From c. 4.5 - 9 m, a vertical cliff (intersected in one place by a steep-sided gully), the cliff and vertical faces dominated by Alcyonium. Other animal cover abundant.	IR.MIR.KR.LhypVt
4	Gentle fine sand slope at base of rock wall.	Bedrock cliff wall ends on a gentle fine sand slope, (slightly muddy close to the rock), well worked, with empty Ensis shells on the surface and numerous L. depurator just buried. Occasional rock outcrops, 1 - 2 m high, with Alcyonium, Metridium and L. hy	IR.HIR.KSed.XKScrR
5	Gentle fine sand slope at base of rock wall.	Bedrock cliff wall ends on a gentle fine sand slope, (slightly muddy close to the rock), well worked, with empty Ensis shells on the surface and numerous L. depurator just buried. Occasional rock outcrops, 1 - 2 m high, with Alcyonium, Metridium and L. hy	SS.SSa.IMuSa.EcorEns
6	Sediment slope.	Incline of slope increasing with depth to 25 m and beyond, but infaunal activity decreasing.	SS.SSa.IMuSa.EcorEns
7	Flat bedrock top then 45 degrees bedrock slope ontoûboulder/cobble slope.	Kelp forest on top of bedrock at 5 m onto 45 degrees bedrock slope with kelp thinning out via park effect. Lower limit of kelp at 18 m. L. hyperborea dominant and well covered with Obelia. Bedrock gave way to boulder, cobble slope with depth. A fairly den	CR.MCR.EcCr
8	Flat bedrock top then 45 degrees bedrock slope ontoûboulder/cobble slope.	Kelp forest on top of bedrock at 5 m onto 45 degrees bedrock slope with kelp thinning out via park effect. Lower limit of kelp at 18 m. L. hyperborea dominant and well covered with Obelia. Bedrock gave way to boulder, cobble slope with depth. A fairly den	IR.HIR.KFaR.LhypR
9	Vertical sided gully.	Haliclona has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Gullies, running approximately down-slope, one with about 3 m high vertical sides, very well fissured	CR.MCR.EcCr.AdigVt
10	A densely kelp-covered plateau.	A densely kelp-covered plateau at 2 - 3 m adjacent to the shore, cut into 'peninsulas' and approximately rectangular islands, by vertical sided/overhung gullies.	IR.HIR.KFaR.LhypR.Ft
11	Gully in bedrock.	Vertical sided/overhung gullies. The gully sides are richly encrusted by ascidians, sponges, Alcyonium, ophiuroids and bryozoans.	IR.FIR.SG.CrSpAsAn
12	Shallow boulder slope.	At the foot of the rock/gully complex at c. 11 m, a shallow boulder slope. Occasional bedrock outcrops, gradually thinning out, the size of the boulders decreasing to cobble, with increasing sandy patches to c. 16 m. Occasional L. saccharina. An O. fragil	IR.HIR.KSed.XKScrR
13	Shallow boulder slope.	At the foot of the rock/gully complex at c. 11 m, a shallow boulder slope. Occasional bedrock outcrops, gradually thinning out, the size of the boulders decreasing to cobble, with increasing sandy patches to c. 16 m. Occasional L. saccharina. An O. fragil	SS.SMx.CMx.OphMx
14	Kelp on bedrock slope.	Kelp. L. hyperborea (C), on stepped bedrock slope. Lower limit of L. hyperborea 12 - 13 m. Echinus abundant, therefore grazing probably a modifier. Occasional boulders and gullies.	IR.MIR.KR.Lhyp.GzPk

Code	Habitat	Description	Biotope
15	Plain of rippled, slightly muddy sand.	A plain of rippled, slightly muddy sand, at base of stepped bedrock slope. Ophiuroids quite frequent especially O. nigra and O. texturata. Ensis shells present.	SS.SMx.CMx.OphMx
16	Kelp forest on stepped/terraced bedrock.	From 10 BCD, there was stepped/terraced bedrock with initially thick kelp forest, L. hyperborea abundant, which thinned out and stopped at about 12 m BCD. The 'steps' continued to about 13 m BCD. Echinus was abundant, therefore grazing was a modifier at t	CR.MCR.EcCr.AdigVt
17	Kelp forest on stepped/terraced bedrock.	From 10 BCD, there was stepped/terraced bedrock with initially thick kelp forest, L. hyperborea abundant, which thinned out and stopped at about 12 m BCD. The 'steps' continued to about 13 m BCD. Echinus was abundant, therefore grazing was a modifier at t	IR.MIR.KR.Lhyp.GzFt
18	Moderate sediment slope.	Below 16 m was a moderate sediment slope, at first mostly medium sand and pebbles with beds of O. fragilis plus a few O. nigra above 18 m. Deeper the sand became muddier.	CR.LCR.BrAs.AmenCio.Bri
19	Bedrock cliff with kelp forest.	A near vertical bedrock cliff from about 4 m BCD, with thick L. hyperborea forest.	IR.MIR.KR.LhypVt
20	Gentle boulder slope.	Gentle boulder slope leading on from bedrock cliff. Kelp thinned out, L. hyperborea rare. Severe under-recording of species. Maerl common around 6 m.	IR.MIR.KR.Lhyp.Pk
21	Gentle boulder slope.	Gentle boulder slope leading on from bedrock cliff. Kelp thinned out, L. hyperborea rare. Severe under-recording of species. Maerl common around 6 m.	SS.SMp.Mrl.Pcal
22	Muddy shell sand in terraces on bedrock.	From about 12 - 13 m BCD, there was a gentle slope apparently of fine, slightly muddy sand with occasional boulders, descending at intervals by bedrock steps c. 15 - 20 m high. It seems likely that a bedrock terrace underlies the sediment; this formation	CR.MCR.EcCr
23	Small bedrock cliffs, then gentle boulder/cobble slope, thenûmuddy sand slope.	2 - 3 m high bedrock cliffs with L. hyperborea, descending to a fairly gentle boulder/cobble slope with tatty, silt-covered L. saccharina and long ropes of Chorda filum. Below 6 or 7 m, a muddy sand slope with broken shell, at first overhung by L. sacchar	IR.LIR.K.Lsac.Ft
24	Small bedrock cliffs, then gentle boulder/cobble slope, thenûmuddy sand slope.	2 - 3 m high bedrock cliffs with L. hyperborea, descending to a fairly gentle boulder/cobble slope with tatty, silt-covered L. saccharina and long ropes of Chorda filum. Below 6 or 7 m, a muddy sand slope with broken shell, at first overhung by L. sacchar	IR.MIR.KR.Lhyp.Ft
25	Small bedrock cliffs, then gentle boulder/cobble slope, thenûmuddy sand slope.	2 - 3 m high bedrock cliffs with L. hyperborea, descending to a fairly gentle boulder/cobble slope with tatty, silt-covered L. saccharina and long ropes of Chorda filum. Below 6 or 7 m, a muddy sand slope with broken shell, at first overhung by L. sacchar	SS.SMp.KSwSS.LsacR.Mu
26	Gently sloping muddy fine sand bottom.	A gently sloping muddy sand bottom, with large patches of algal detritus. At first, the sediment was loose and amorphous with little life. A region of firmer sediment with occasional small boulders was found in slightly shallower water. Hydroids thick on	SS.SMx.CMx.ClloMx.Nem
27	Gently sloping bedrock.	Very gently sloping bedrock with a few very large boulders. A few cobbles and pebbles in crevices, also some coarse shell sand in crevices. Small (0 - 5 m) L. hyperborea well spaced out (1 mwith fronds thickly covered with Obelia. Stipes and rock surfaces	IR.MIR.KR.Lhyp.GzPk
28	Steep bedrock and very large boulder slope.	A steep slope of bedrock and very large boulders, very well grazed by Echinus, with little encrusting animal life except for P. trispinosa and patches of Flustra and Securiflustra.	IR.MIR.KR.Lhyp.GzPk
29	Kelp forest on rock wall.	Luxuriant L. hyperborea with many epiphytes on the rock wall, with healthy growths also on the lower outcrops. Echinus quite common, but there was still a reasonable covering of bryozoans and other encrusting fauna on steep parts of the cliff.	IR.MIR.KR.LhypVt
30	Gentle boulder slope with rock outcrops and clean coarse sandûpatches.	A gentle slope of boulders, rock outcrops and clean coarse sand patches from c. 16 - 10 m, the proportion of bedrock and the slope both increasing until a steep, almost vertical, rock wall (with crevices and deep gullies) was encountered above c. 10 m. Th	IR.HIR.KSed

Code	Habitat	Description	Biotope
31	Bedrock with rock walls and vertical-sided gullies.	Below 11 m BCD, bedrock with rock walls (1 - 5 m high) and vertical-sided gullies. Bottom 0.5 m of rock was well scoured, and the zone immediately above, dominated by barnacles and Pomatoceros. Kelp forest 11 - 18 m, H. panicea quite common on kelp stipes	IR.HIR.KFaR.LhypRVt
32	Clean rippled sand or gravel/small pebbles.	At depths between 19 - 21 m BCD, depending on position, clean rippled sand or gravel/small pebbles encountered.	SS.SMp.KSwSS.LsacR.Sa
33	Large boulder slope, clean shelly gravel between boulders.	A slope of large boulders, with clean shelly gravel between. The boulders were well grazed by Echinus. Lithothamnion was conspicuous. Patches of Antedon were found.	CR.MCR.EcCr.FaAlCr
34	Dense kelp forest on steep bedrock.	Dense L. saccharina from 2 - 8 m BCD, taking over from L. hyperborea as dominant kelp, 0 - 2 m. Lower limit of kelp c. 10 m BCD.	IR.LIR.K.Lsac.Ft
35	Dense kelp forest on steep bedrock.	Dense L. saccharina from 2 - 8 m BCD, taking over from L. hyperborea as dominant kelp, 0 - 2 m. Lower limit of kelp c. 10 m BCD.	IR.MIR.KR.Lhyp.Ft
36	Steep and vertical/overhung bedrock slope with boulder/cobbleûpatches or sandy patches on ledges.	Foliose algae from 10 m BCD (lower limit of kelp) down to 12 - 13 m, then becoming sparse and no foliose algae below 15 m. Crustose algae continued downwards and was dominant on steep and vertical bedrock faces beneath thin silt layer.	IR.MIR.KR.LhypVt
37	Steep muddy slope.	Fairly steep muddy slope with Cerianthus below the rock face.	SS.SMx.CMx.ClloMx
38	Sloping bedrock cut by vertical-sided gullies.	Flat to moderate sloping bedrock by 1 - 2 m high by c. 2 m across, vertical-sided, gullies running parallel to the shore. Colourful animal cover on walls (Alcyonium, etc), boulders with Alaria on floor.	IR.HIR.KFaR.LhypRVt
39	Sloping bedrock cut by vertical-sided gullies.	Flat to moderate sloping bedrock by 1 - 2 m high by c. 2 m across, vertical-sided, gullies running parallel to the shore. Colourful animal cover on walls (Alcyonium, etc), boulders with Alaria on floor.	IR.HIR.KSed.DesFilR
40	Bedrock cliff, steep.	A vertical bedrock cliff, with abundant Alcyonium and bryozoans on the upper part. Lower on the cliff, grazing by Echinus was evident, but thick patches of Antedon were present. Kelp forest on upper part of cliff.	IR.MIR.KR.LhypVt
41	Cobble slope onto slightly muddy, sand slope onto sand plain.	Thirty to forty-five degree cobble slope at base of bedrock cliff, giving way onto a slightly muddy, well-worked sand slope with cobble and numerous small pebbles (with algae and hydroids) at c. 16 m bcd. As move further out still, the proportion of sand	SS.SMx.IMx
42	Thick kelp forest on broken bedrock slope.	Broken bedrock from 0.5 - 10 m BCD, with many gullies. Thick L. hyperborea forest with fairly dense stipe flora in the shallows, but increasingly grazed by Echinus below c. 2.5 m.	IR.MIR.KR.Lhyp.GzFt
43	Kelp park on smooth 'glaciated' bedrock slope.	At about 10 m BCD, the bedrock becomes smooth, with a (?) glaciated appearance, the kelp thinning out to a park. Alcyonium, occasional sponges, C. smithii and Antedon present.	IR.MIR.KR.Lhyp.GzPk
44	Cobbles and boulders with gravel patches.	Bedrock slope flattens out and becomes cobble and boulder with gravel patches. Kelp much thinner (only F - O), but denser foliose algae here.	IR.MIR.KR.Lhyp.GzPk
45	Bedrock slope with kelp forest.	Bedrock slope dominated by kelp, L. hyperborea, down to 19 m. H. panicea thickly encrusts some stipes. Kelp gives way to zone dominated by foliose algae down to 22 m. Alcyonium and colonial ascidians are above a zone dominated by Flustra, and Securiflustr	CR.MCR.EcCr.FaAlCr.Sec
46	Bedrock slope with kelp forest.	Bedrock slope dominated by kelp, L. hyperborea, down to 19 m. H. panicea thickly encrusts some stipes. Kelp gives way to zone dominated by foliose algae down to 22 m. Alcyonium and colonial ascidians are above a zone dominated by Flustra, and Securiflustr	IR.HIR.KFaR.LhypR
47	Tide-swept plain of pebbles and small cobbles.	An extensive tide-swept (1 knot on chart) plain of pebbles and small cobbles offshore. Barnacles, hydroids and some encrusting bryozoans present. At 24 m, a narrow band of much smaller pebbles lies adjacent to a bedrock slope resulting in a narrow scour z	SS.SMx.CMx

Code	Habitat	Description	Biotope
48	Bedrock terraces, with gullies and flattened cobbles at bedrockûbase.	Bedrock terraces descending from about 1.5 - 9.5 m, with a gully about 1 m deep at the base of each step. Dense L. hyperborea on upward-facing surfaces and quantities of foliose red algae on the stipes. Vertical gully walls were not very rich in fauna due	IR.HIR.KSed.XKScrR
49	Bedrock terraces, with gullies and flattened cobbles at bedrockûbase.	Bedrock terraces descending from about 1.5 - 9.5 m, with a gully about 1 m deep at the base of each step. Dense L. hyperborea on upward-facing surfaces and quantities of foliose red algae on the stipes. Vertical gully walls were not very rich in fauna due	IR.MIR.KR.Lhyp.Ft
50	Extensive rippled clean sand plain, with gravel in hollows.	An extensive rippled clean sand plain, with gravel in hollows, following on from flattened cobbles at base of bedrock.	SS.SCS.ICS.SLan
51	Kelp forest on bedrock and boulder slope.	A bedrock and boulder slope giving way to a sediment plain with cobbles at edge. D. aculeata on cobbles.	IR.MIR.KR.Lhyp.Ft
52	Clean sand plain.	Clean sand plain with Arenicola at c. 13 m BCD. Rippled sand surface, tubes and mounds also present.	SS.SSa.IMuSa.AreISa
53	Kelp forest on steep bedrock slope/cliff descending via ledges.	Kelp forest, L. hyperborea abundant, on steep bedrock slope/cliff descending via ledges onto a slope of large, jumbled boulders. Thick growths of epiphytic algae on kelp.	IR.MIR.KR.LhypVt
54	Large jumbled boulder slope.	A slope of large jumbled boulders. Occasional vertical-sided gullies, walls with Alcyonium, ascidians, bryozoans but elsewhere well grazed with little except encrusting bryozoans, especially Parasmittina and Lithothamnion. Boulders rather bare.	CR.MCR.EcCr.FaAlCr
55	Gentle sandy mud slope, occasional bedrock.	A gentle slope, sampled below c. 3 m. Sandy mud with occasional bedrock. Then an area of sandy mud, well worked by Arenicola with some Sabella. Low ridges of bedrock parallel to the shore, c. 10 - 20 m across, supporting numerous large (to 58 mm diameter)	IR.LIR.KVS.LsacPsaVS
56	Gentle sandy mud slope, occasional bedrock.	A gentle slope, sampled below c. 3 m. Sandy mud with occasional bedrock. Then an area of sandy mud, well worked by Arenicola with some Sabella. Low ridges of bedrock parallel to the shore, c. 10 - 20 m across, supporting numerous large (to 58 mm diameter)	SS.SMu.ISaMu
57	Kelp forest on cobble and pebble slope.	Cobble and pebble slope, occasional muddy sand patches, almost totally obscured by very tatty and silty L. saccharina being consumed by numerous L. littorea.	SS.SMp.KSwSS.LsacCho
58	Mud slope with many discarded/broken shells.	By 6 m, the pebbles had decreased in size and given way to a mud slope (shallow) with many discarded/broken shells. (Modiolus, Chlamys, etc.) and patches of Ceramium rubrum mat.	SS.SBR.SMus.ModHAs
59	Mud plain.	Mud slope flattening out to plain with Virgularia at densities to about 1 per squ. m.	SS.SMu.CSaMu.VirOphPmax
60	Mooring buoy and anchor chain.	Anchor chain of large naval mooring buoy. Thick L. saccharina on underside of buoy, persisting to about 10 m; sparse brown algae persisting to about 14 m. Numerous small Anomiidae at 10 - 13 m, occasional small attached A. opercularis and patches of Mytil	IR.LIR.K.Lsac.Ft
61	Lower part of mooring buoy anchor chain onto soft mud.	Fauna on chain becomes poorer as depth increases. A thin growth of hydroids, giving way to barnacles, with a number of Onchidoris bilamellata, spawning. Soft worked mud at bottom, with occasional Virgularia, some 'topped' by Eudendrium sp.	CR.FCR.FouFa
62	Lower part of mooring buoy anchor chain onto soft mud.	Fauna on chain becomes poorer as depth increases. A thin growth of hydroids, giving way to barnacles, with a number of Onchidoris bilamellata, spawning. Soft worked mud at bottom, with occasional Virgularia, some 'topped' by Eudendrium sp.	SS.SMu.CFiMu
63	Steep bedrock slope/cliff with thick kelp forest near surface.	A steep bedrock slope/cliff descending onto sand plain with a scour zone at base of slope immediately above sediment, fringed above by Pomatoceros. L. hyperborea on upward facing surfaces, thick near surface. Alcyonium common on some verticals, also hydro	IR.MIR.KR.LhypVt

Code	Habitat	Description	Biotope
64	Sand plain.	At edge of sand, a fringe of kelp debris. Sand rather bare except for Arenicola casts; worn kelp stipes scattered on the sand. About 100 m from rock face, a zone of foliose algal debris.	SS.SSa.IMuSa.EcorEns
65	Thick kelp forest on broken bedrock slope.	Broken bedrock slope to about 5 m with thick L. hyperborea and L. saccharina.	IR.HIR.KSed.LsacSac
66	Rippled coarse sand slope with occasional small rocky outcrops.	Rippled coarse sand slope with occasional small rocky outcrops, Arenicola present in patches.	SS.SMx.CMx.ClloMx
67	Boulders and bedrock, some sand, then boulders and cobble.	A fairly gentle slope of boulders and bedrock outcrops interspersed with sand to c. 9 m with L. hyperborea, L. saccharina and S. polyschides. Slope continuing to 12 m, with boulders and cobble (with L. saccharina and L. hyperborea becoming scarcer).	IR.HIR.KSed.XKScrR
68	Gentle slope of soft, silty mud.	At 10 m BCD, a gentle slope of soft, silty mud (slightly sandy in places) with many small brown and red algae, mostly unattached but a few attached to shells and very small pebbles. A scattering of dead maerl present, together with a few live pieces, and	SS.SMp.KSwSS.LsacR.Mu
69	Large limestone outcrop on sediment slope.	At c. 11.5 m, a large limestone outcrop, 3 - 4 m high, was found. The bottom of the sides of the outcrop were vertical/overhung to 1 - 1.5 m, with a shallow cave. The rock was well bored and creviced with O. fragilis, Ciona, A. mentula, Antedon, etc. Quit	IR.LIR.K.LhypCape
70	Gentle slope (muddy sand, cobble, maerl) in channel.	Gentle slope in the channel between island and mainland. Muddy sand with cobble and L. saccharina to c. 4 m. C. filum, patches of live and dead maerl, Arenicola, Cerianthus, Turritella and eventually Pecten at about 11 m. Gelidium pusillum present as epip	SS.SMp.Mrl.Pcal.R
71	Fine mud, occasional small boulders.	At c. 18 m BCD, soft mud, with patches of Virgularia, some again surmounted by Eudendrium sp., at densities to c. 1 mMetridium on occasional small boulders. At 28+ m a few Nephrops. [A doubtful record of the hydroid Perigonimus miniatus was obtained for t	SS.SMu.CFiMu.SpnMeg
72	Cobble/boulder slope with kelp forest.	Cobble/boulder slope with kelp forest - L. saccharina and L. hyperborea.	IR.LIR.K.LhypLsac.Gz
73	Gentle muddy sand slope, coarse sand patches and occasional rockûoutcrop.	Gentle slope, muddy sand with coarse sand and pebble patches, and at 10 m, a rock outcrop with L. hyperborea. The sediment was well worked by bivalves and dense Arenicola.	IR.MIR.KR.Lhyp
74	Gentle muddy sand slope, coarse sand patches and occasional rockûoutcrop.	Gentle slope, muddy sand with coarse sand and pebble patches, and at 10 m, a rock outcrop with L. hyperborea. The sediment was well worked by bivalves and dense Arenicola.	SS.SMx.IMx
75	Vertical rock face below L. hyperborea forest.	Kelp, (L. hyperborea abundant) forest on bedrock to c. 6 m, then vertical rock face with crevices to c. 10 m. Thick Alcyonium and hydroid/bryozoan turf present, many Antedon.	IR.MIR.KR.Lhyp.Ft
76	Vertical rock face below L. hyperborea forest.	Kelp, (L. hyperborea abundant) forest on bedrock to c. 6 m, then vertical rock face with crevices to c. 10 m. Thick Alcyonium and hydroid/bryozoan turf present, many Antedon.	IR.MIR.KR.LhypVt
77	Extensive, gentle, muddy sand slope, well worked.	Extensive, gentle, muddy sand slope to 15 m, well worked by bivalves, Arenicola and Myxicola. Occasional L. saccharina on small boulders and foliaceous red algae on buried shell fragments. Hermit crabs common on the sediment.	SS.SSa.IMuSa.AreISa
78	Short boulder slope with kelp/shelly gravel band at base ofûcliff.	In places there is a short boulder slope with kelp or shelly gravel band at the base of the cliff.	IR.MIR.KR.Lhyp.Ft
79	Kelp forest on cobble/boulder slope.	A narrow band of cobble gives way to a boulder slope 0 - 3 m, with a dense covering of L. saccharina.	IR.LIR.K.Lsac.Ft

Code	Habitat	Description	Biotope
80	Sediment slope with occasional small boulders.	At 3 - 10 m, the sediment is a firm muddy sand, very well worked especially by Arenicola; Pecten present. Occasional small boulders with L. saccharina. At 10 - 15 m, bottom of soft mud, with pebbles and shell debris partially covered by small algae with a	SS.SMx.CMx.ClloMx.Nem
81	Kelp forest on small boulder/cobble slope.	A steep slope of small boulders and cobble from 0 - 4 m, supporting kelp forest - L. digitata, L. hyperborea (cape form) and L. saccharina abundant.	IR.LIR.K.LhypLsac.Ft
82	Kelp forest on small boulder/cobble slope.	A steep slope of small boulders and cobble from 0 - 4 m, supporting kelp forest - L. digitata, L. hyperborea (cape form) and L. saccharina abundant.	IR.LIR.K.Lsac.Ldig
83	Gentle muddy, well worked, sand slope.	Gentle muddy sand slope 4 - 9 m (extends deeper), well worked by bivalves and Arenicola. An area of closely packed Arenicola mounds close to bare boulder/cobble slope. An area of thick algal debris was encountered.	SS.SSa.IMuSa.AreISa
84	Boulder slope.	A continuous boulder slope to c. 4 m BCD, the boulders then thinning out to c. 7 - 9 m. Small algae from 4 m down.	IR
85	Muddy sand slope.	A slope of muddy sand with small rectangular pebbles, 9 - 16 m bcd, levelling out at c. 16 m bcd. Hydroids on small stones on sediment; mats of Desmarestia aculeata and some Desmarestia ligulata.	SS.SSa.IMuSa
86	Loose-lying algae on pebbles and sand.	A north-facing bay with pebbles and sand predominant and with loose-lying algae from 1.5 - 5.5 m BCD.	LR.FLR.Eph
87	Pebbles and fine sand.	Pebbles and fine sand predominant, the sediment becoming finer with increasing depth. Frequent Lithothamnion glaciale, hermit crabs and occasional A. marina. Evidence of sediment being worked in places.	SS.SMp.KSwSS.LsacCho
88	Kelp on boulders.	A few boulders in shallow water with 'broad fronded' L. hyperborea and L. saccharina.	IR.LIR.K.LhypLsac.Ft
89	Dense patches of P. maximus.	Patches of dense P. maximus in places, at 2 m BCD, on a coarse sand/pebble substrate.	SS.SMx.IMx
90	L. saccharina on cobbles/fine sand substrate.	L. saccharina on cobbles/fine sand substrate. Lithothamnion abundant in this area.	SS.SMp.KSwSS.LsacR.Sa
91	Trailliella covering pebbles.	Trailliella predominant on pebbles at 5 - 6 m BCD.	SS.SMp.KSwSS.Tra
92	Dense beds of L. saccharina on coarse sand/pebble/gravel.	Dense beds of L. saccharina on coarse sand/pebble/gravel substrate below 9 m BCD. Shallow slope.	SS.SMp.KSwSS
93	Bedrock slope, kelp forest, with occasional boulders.	Bedrock slope with occasional boulders to c. 5.5 m. Kelp forest on bedrock, L. hyperborea, L. saccharina and occasional sponges.	IR.MIR.KR
94	Sediment plain with bedrock outcrops and ridges.	Bedrock slope flattens out to form a sediment plain 5.5 - 6 m BCD. Sand (Halidrys) with bedrock outcrops and ridges bearing L. hyperborea.	IR.HIR.KSed.XKHal
95	Steeply sloping rock pinnacle with thick kelp.	A fairly steeply sloping rock pinnacle (drying at LW) with thick kelp, Laminaria, flattening out somewhat at about 6 m BCD.	IR.MIR.KR
96	Gentle slope of boulders, bedrock outcrops, coarse sand patches.	A gentle slope of boulders, bedrock outcrops and patches of coarse sand at base of rock pinnacle. Kelp on rock. D. sanguinea common on bedrock and boulders beneath kelp.	IR.HIR.KSed
97	Steep and vertical bedrock, dominated by kelp and foliose algae.	A steeply sloping/vertical bedrock cliff, dominated by kelp and foliose algae from 0 - 8 m BCD.	IR.HIR.KFaR.Ala.Myt
98	Steep and vertical bedrock, dominated by kelp and foliose algae.	A steeply sloping/vertical bedrock cliff, dominated by kelp and foliose algae from 0 - 8 m BCD.	IR.HIR.KFaR.LhypR.Ft

Code	Habitat	Description	Biotope
99	Steep and vertical bedrock, dominated by Alcyonium andûencrusting animals.	A steeply sloping/vertical bedrock cliff, dominated by Alcyonium and encrusting animals from 8 - 13 m BCD, following on from kelp forest.	CR.MCR.EcCr.AdigVt
100	Overhanging cave.	Overhanging 'cave' at 13 - 14 m BCD.	CR.FCR.Cv
101	Jumble of rock and large boulders.	Jumble of rock and large boulders at base of steep bedrock cliff. Lithothamnion abundant.	IR.HIR.KFaR.LhypR.Pk
102	Rocky bottom, large and small boulders, large irregular rockmill.	Rocky bottom with large and small boulders. Large and irregular rockmill found some 30 m from base of steep bedrock cliff. Kelp forest present with other smaller vegetation.	IR.HIR.KFaR.LhypR.Ft
103	Sea level cave with two rockmills in gully at cave entrance.	A sea cave with entrance about 5 m above water at time of dive with one small rockmill in sea bed and one larger rockmill in the entrance. Cave narrowed rapidly to water level in a gully about 6 - 7 m long. Many small red and large brown (Alaria) algae at	IR.FIR.SG.CrSpAsDenB
104	Bedrock area, but including boulders near low water mark.	Bedrock area with boulders near low water mark providing substrate for localised communities. Some gravel/shingle between boulders. Lichen belt includes an extensive belt of Verracuria maura. Balanus balanoides abundant with associated fauna Patella vulga	LR.FLR.Lic
105	Bedrock area, but including boulders near low water mark.	Bedrock area with boulders near low water mark providing substrate for localised communities. Some gravel/shingle between boulders. Lichen belt includes an extensive belt of Verracuria maura. Balanus balanoides abundant with associated fauna Patella vulga	LR.MLR.BF
106	Boulder and gravel beach.	Boulder and gravel beach. Lichens present although no Verrucaria maura belt. Upper beach dominated by Littorina saxtilis, Gammarus spp., Talitrus saltator and Orchestia gammarella. Overall support vast littorinid populations. Algae found in quantity on th	IR.LIR.K.Lsac.Ldig
107	Boulder and gravel beach.	Boulder and gravel beach. Lichens present although no Verrucaria maura belt. Upper beach dominated by Littorina saxtilis, Gammarus spp., Talitrus saltator and Orchestia gammarella. Overall support vast littorinid populations. Algae found in quantity on th	LR.FLR.Lic
108	Boulder and gravel beach.	Boulder and gravel beach. Lichens present although no Verrucaria maura belt. Upper beach dominated by Littorina saxtilis, Gammarus spp., Talitrus saltator and Orchestia gammarella. Overall support vast littorinid populations. Algae found in quantity on th	LR.HLR.MusB.Sem
109	Boulder and gravel beach.	Boulder and gravel beach. Lichens present although no Verrucaria maura belt. Upper beach dominated by Littorina saxtilis, Gammarus spp., Talitrus saltator and Orchestia gammarella. Overall support vast littorinid populations. Algae found in quantity on th	LR.LLR.F
110	Boulder and gravel beach.	Boulder and gravel beach. Lichens present although no Verrucaria maura belt. Upper beach dominated by Littorina saxtilis, Gammarus spp., Talitrus saltator and Orchestia gammarella. Overall support vast littorinid populations. Algae found in quantity on th	LS.LSa.St.Tal
111	Boulder and gravel beach.	Boulder and gravel beach. Lichens present although no Verrucaria maura belt. Upper beach dominated by Littorina saxtilis, Gammarus spp., Talitrus saltator and Orchestia gammarella. Overall support vast littorinid populations. Algae found in quantity on th	SS.SSa.IMuSa.EcorEns
112	Boulder beach and gravel areas with freshwater stream acrossûshore.	Boulder and gravel beach with lichen zone - Verrucaria maura and others abundant. Zones of Pelvetia canaliculata, and Ascophyllum nodosum/Fucus serratus. Abundant well developed Rhodophycea community with Hildenbranchia spp. and Polysiphonia lanosa domina	IR.LIR.K.Lsac.Ldig

Code	Habitat	Description	Biotope
113	Boulder beach and gravel areas with freshwater stream acrossûshore.	Boulder and gravel beach with lichen zone - Verrucaria maura and others abundant. Zones of Pelvetia canaliculata, and Ascophyllum nodosum/Fucus serratus. Abundant well developed Rhodophycea community with Hildenbranchia spp. and Polysiphonia lanosa domina	LR.FLR.Lic
114	Boulder beach and gravel areas with freshwater stream acrossûshore.	Boulder and gravel beach with lichen zone - Verrucaria maura and others abundant. Zones of Pelvetia canaliculata, and Ascophyllum nodosum/Fucus serratus. Abundant well developed Rhodophycea community with Hildenbranchia spp. and Polysiphonia lanosa domina	LR.LLR.F.Fserr
115	Boulder beach and gravel areas with freshwater stream acrossûshore.	Boulder and gravel beach with lichen zone - Verrucaria maura and others abundant. Zones of Pelvetia canaliculata, and Ascophyllum nodosum/Fucus serratus. Abundant well developed Rhodophycea community with Hildenbranchia spp. and Polysiphonia lanosa domina	LR.LLR.F.Pel
116	Boulder beach and gravel areas with freshwater stream acrossûshore.	Boulder and gravel beach with lichen zone - Verrucaria maura and others abundant. Zones of Pelvetia canaliculata, and Ascophyllum nodosum/Fucus serratus. Abundant well developed Rhodophycea community with Hildenbranchia spp. and Polysiphonia lanosa domina	LR.LLR.FVS.Fcer
117	Bay near saline lagoon with bedrock substrate.	Abundance scale from Crapp (1973) Bedrock substrate with lichen zone . Pelvetia canaliculata, Fucus spiralis, Ascophyllum nodosum, Fucus serratus and Fucus vesiculosis all abundant. Also a mixed Rhodophyceae community with Hildenbrandia spp. and Polysipho	LR.LLR.F
118	Bedrock and sediments in small inlet at head of Loch Eriboll.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Well developed lichen community dominated by Verrucaria maura. Pelvetia canaliculata dominant algae w	IR.MIR.KR.Ldig
119	Bedrock and sediments in small inlet at head of Loch Eriboll.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Well developed lichen community dominated by Verrucaria maura. Pelvetia canaliculata dominant algae w	LR.LLR.F
120	Bedrock	Bedrock appears to be dominated by a low silty turf of amphipod tubes and small bryozoa and Caryophyllia smithi is present. The occurrence of Parazoanthus anguicomus at this site is of interest.	CR.MCR
121	Bedrock - steep, horizontal; coarse shell sand and pebbles.	STEEP AND VERTICAL BEDROCK. The main cover appears to be a rich sponge/tunicate turf with patches of different species and mixtures of species. Dendrodoa/Clathrina community: There appears to be a typical Dendrodoa grossularia/Clathrina coriacea community	CR.HCR.XFa
122	Bedrock - steep, horizontal; coarse shell sand and pebbles.	STEEP AND VERTICAL BEDROCK. The main cover appears to be a rich sponge/tunicate turf with patches of different species and mixtures of species. Dendrodoa/Clathrina community: There appears to be a typical Dendrodoa grossularia/Clathrina coriacea community	IR.FIR.SG.CrSpAsAn
123	Bedrock - steep, horizontal; coarse shell sand and pebbles.	STEEP AND VERTICAL BEDROCK. The main cover appears to be a rich sponge/tunicate turf with patches of different species and mixtures of species. Dendrodoa/Clathrina community: There appears to be a typical Dendrodoa grossularia/Clathrina coriacea community	IR.FIR.SG.DenCcor
124	Bedrock - steep, horizontal; coarse shell sand and pebbles.	STEEP AND VERTICAL BEDROCK. The main cover appears to be a rich sponge/tunicate turf with patches of different species and mixtures of species. Dendrodoa/Clathrina community: There appears to be a typical Dendrodoa grossularia/Clathrina coriacea community	IR.HIR.KSed
125	Bedrock - steep, horizontal; coarse shell sand and pebbles.	STEEP AND VERTICAL BEDROCK. The main cover appears to be a rich sponge/tunicate turf with patches of different species and mixtures of species. Dendrodoa/Clathrina community: There appears to be a typical Dendrodoa grossularia/Clathrina coriacea community	SS.SCS.CCS.Nmix
126	Bedrock on exposed head near mouth of loch.	Bedrock substrate dominated by Verrucaria maura and barnacle community. Mix of lichens other than Verrucaria maura present, only Xanthoria parietina and Lecanora spp. abundant. Littorinids present but not abundant. Balanus balanoides dominant with associa	IR.MIR.KR.Ldig

Code	Habitat	Description	Biotope
127	Bedrock on exposed head near mouth of loch.	Bedrock substrate dominated by Verrucaria maura and barnacle community. Mix of lichens other than Verrucaria maura present, only Xanthoria parietina and Lecanora spp. abundant. Littorinids present but not abundant. Balanus balanoides dominant with associa	LR.FLR.Lic
128	Bedrock on exposed head near mouth of loch.	Bedrock substrate dominated by Verrucaria maura and barnacle community. Mix of lichens other than Verrucaria maura present, only Xanthoria parietina and Lecanora spp. abundant. Littorinids present but not abundant. Balanus balanoides dominant with associa	LR.HLR.MusB
129	Exposed bedrock with predominately algal communities.	Fucaceae, Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Lichen zone present but not dominant. Littornids abundant. Algae dominated bedrock substrat	LR.FLR.Lic
130	Exposed bedrock with predominately algal communities.	Fucaceae, Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Lichen zone present but not dominant. Littornids abundant. Algae dominated bedrock substrat	LR.LLR.F
131	Boulder/shingle/gravel beach near southern end of loch.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Boulder/shingle/gravel beach with large boulders situated near M.L.W. level. Upper beach stable grave	IR.LIR.K.Lsac.Ldig
132	Boulder/shingle/gravel beach near southern end of loch.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Boulder/shingle/gravel beach with large boulders situated near M.L.W. level. Upper beach stable grave	LR.FLR.Lic
133	Boulder/shingle/gravel beach near southern end of loch.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Boulder/shingle/gravel beach with large boulders situated near M.L.W. level. Upper beach stable grave	LR.LLR.F
134	Boulder/shingle/gravel beach near southern end of loch.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Boulder/shingle/gravel beach with large boulders situated near M.L.W. level. Upper beach stable grave	LS.LSa.St.Tal
135	Shingle/gravel beach at southern end of Loch Eriboll.	Species poor shingle/gravel beach. Some lichens present at low abundances. Only algae present Hildenbrandia spp. at low abundance. Some crustaceans present, again low abundances -Ligia oceanica, Gammerus spp., Echinogammerus spp. Littorina saxatilis only	LS.LCS.Sh
136	Protected, inner bedrock faces of Ard Neackie head.	Reduced Verrucaria maura zone although other lichens present. Shore dominated by Pelvetia canaliculata and Ascophyllum nodosum. Fucus spiralis, Fucus serratus & Fucus vesiculosis also abundant. Well developed Rhodophyceae community. Some barnacles, mussel	IR.MIR.KR.Ldig
137	Protected, inner bedrock faces of Ard Neackie head.	Reduced Verrucaria maura zone although other lichens present. Shore dominated by Pelvetia canaliculata and Ascophyllum nodosum. Fucus spiralis, Fucus serratus & Fucus vesiculosis also abundant. Well developed Rhodophyceae community. Some barnacles, mussel	LR.FLR.Lic
138	Protected, inner bedrock faces of Ard Neackie head.	Reduced Verrucaria maura zone although other lichens present. Shore dominated by Pelvetia canaliculata and Ascophyllum nodosum. Fucus spiralis, Fucus serratus & Fucus vesiculosis also abundant. Well developed Rhodophyceae community. Some barnacles, mussel	LR.LLR.F
139	Pitted bedrock face with high-level rockpools.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Verrucaria maura dominant in lichen zone. Other lichens abundant. Pelvetia canaliculata and Fucus ser	IR.MIR.KR.Ldig
140	Pitted bedrock face with high-level rockpools.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Verrucaria maura dominant in lichen zone. Other lichens abundant. Pelvetia canaliculata and Fucus ser	LR.FLR.Lic

Code	Habitat	Description	Biotope
141	Pitted bedrock face with high-level rockpools.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Verrucaria maura dominant in lichen zone. Other lichens abundant. Pelvetia canaliculata and Fucus ser	LR.FLR.Rkp
142	Pitted bedrock face with high-level rockpools.	Laminaria has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Verrucaria maura dominant in lichen zone. Other lichens abundant. Pelvetia canaliculata and Fucus ser	LR.MLR.BF
143	Bedrock and gravel in sheltered gully with freshwater influence.	Few lichens. Very sheltered gully with fucoid algae abundant. Particularly dominant Pelvetia canaliculata, Fucus spiralis, Ascophyllum nodosum. Also beds of large Mytilus edulis. Numerous molluscs and encrusting organisms are found in the crevices of the	LR.LLR.F
144	Bedrock and gravel in sheltered gully with freshwater influence.	Few lichens. Very sheltered gully with fucoid algae abundant. Particularly dominant Pelvetia canaliculata, Fucus spiralis, Ascophyllum nodosum. Also beds of large Mytilus edulis. Numerous molluscs and encrusting organisms are found in the crevices of the	LS.LBR.LMus.Myt
145	Bedrock and coarse sands of open coast bay.	Ascophyllum nodosum has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Bedrock and coarse sand bay. Coarse sand devoid of macrofauna. Verrucaria maura zone with other lichens abundant. Pelvetia canali	IR.HIR.KFaR.Ala
146	Bedrock and coarse sands of open coast bay.	Ascophyllum nodosum has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Bedrock and coarse sand bay. Coarse sand devoid of macrofauna. Verrucaria maura zone with other lichens abundant. Pelvetia canali	LR.FLR.Lic
147	Bedrock and coarse sands of open coast bay.	Ascophyllum nodosum has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Bedrock and coarse sand bay. Coarse sand devoid of macrofauna. Verrucaria maura zone with other lichens abundant. Pelvetia canali	LR.HLR.MusB
148	Bedrock and coarse sands of open coast bay.	Ascophyllum nodosum has been given a nominal abundance value of Present for this record as in Arev it had no abundance value. Bedrock and coarse sand bay. Coarse sand devoid of macrofauna. Verrucaria maura zone with other lichens abundant. Pelvetia canali	LS.LSa.MoSa.BarSa
149	Soft peaty mud in a brackish ob.	Corophium volutator has been removed from the species list for this record as more specific related taxa were also present, these are now marked as characterising. Very soft peaty mud at the head of an ob, separated from adjacent water by a cobble bar at	SS.SMp.SSgr.Rup
150	Sandy cobbles and pebbles of a percolation bar.	Mixture of sand, cobbles, gravel and pebbles on the inside of the percolation bar at the mouth of the ob. Species present were typically more marine than those of habitat 1, due to the influx of saline water through the percolation bar at high water. Larg	IR.LIR.Lag.FChoG
151	Sublittoral fringe cobbles and sediment with Halidrysûsiliquosa.	Around the edge of the outer pool cobbles and muddy gravel were dominated columns of Halidrys siliquosa, with Laminaria saccharina laying over the sediment. Upon rocks and larger algae there were large examples of Metridium senile. Amongst the kelp there	SS.SMp.KSwSS.LsacCho
152	Gravel with mobile fauna	Very gently sloping gravel bottom with high shell content making it pale/white in colour. Numerous juvenile flatfish and hermit crabs present with occasional anemones.	SS.SCS
153	Kelp park on bedrock	Sloping rocky reef where gravel bottom meets the cliffs of mainland. Kelp park all over the reef with scoured patches underneath showing pink encrusting algae, urchins and red seaweeds.	IR.MIR.KR.Lhyp.GzPk
154	Kelp park on steep bedrock	Kelp park on rock wall with a 60 degree slope. Laminaria hyperborea park with urchins and short animal turf. Pitted limestone rock with thousands of brittle stars inside pits with arms out feeding. Pink encrusting algae on patches with no animal turf.	IR.HIR.KFaR.LhypR.Pk
155	Faunal turf on vertical bedrock	Rock wall 45 degrees. Short animal turf with dead mens fingers, boring sponge and various hydroids and bryozoans. Similar to the kelp park habitat above it, but with more sponges and no kelp.	CR.HCR.XFa.SpAnVt

Code	Habitat	Description	Biotope
156	Faunal turf on vertical bedrock	Vertical limestone bedrock covered in short animal turf, mostly encrusting ascidians and bryozoans.	CR.HCR.XFa.SpAnVt
157	Mobile scoured boulders, cobbles and pebbles	Boulders, cobbles and pebbles of white limestone, very clean of life. The odd anemone and some pink encrusting algae.	CR.HCR
158	Kelp forest on bedrock	Dense kelp forest, not possible to see the rock beneath the kelp to record the features. Lots of bryozoans and hydroids growing on the kelp.	IR.MIR.KR.Lhyp.Ft
159	Coarse sediment on bedrock with mobile fauna	Bedrock shelf covered in gravel and Cerianthus lloydi. Some large boulders present, providing shelter for squat lobsters and fish to hide under.	SS.SCS.CCS
160	Faunal turf on vertical bedrock	Very steep to vertical wall with lots of Devonshire cup corals, anemones and sea squirts and some dead mens fingers.	CR.HCR.XFa.SpAnVt
161	Faunal turf on vertical bedrock	Vertical rock wall in mouth of large cave/gully (cave arch above water, so lots of light). Short animal turf consisting of various sponges, hydroids and sea squirts.	CR.HCR.XFa.SpAnVt
162	Sugar kelp on cobbles and pebbles	Gently sloping sand/shell sediment seabed with pebbles and cobbles covered in red algae and sugar kelp from 15m to 19m.	SS.SMp.KSwSS.LsacR
163	Faunal and algal crusts on very large boulders	Very large limestone boulders (car to truck sized) with pink encrusting algae on the sides and devonshire cup corals and kelp and sugar kelp on top.	CR.MCR.EcCr.FaAlCr.Car
164	Faunal and algal crusts on very large boulders	Very large limestone boulders (car to truck sized) with pink encrusting algae on the sides and devonshire cup corals and kelp and sugar kelp on top.	IR.LIR.K.LhypLsac
165	Kelp park on bedrock	Mixture of kelps on sloping reef of limestone bedrock and large boulders.	IR.MIR.KR
166	Faunal turf on vertical bedrock	Vertical faces of limestone bedrock and boulders covered in short animal turf and pink encrusting algae.	CR.MCR.EcCr
167	Coarse sediment with mobile fauna	Gently sloping seabed of coarse sand with shell fragments. One bit of broken pipe seen.	SS.SCS.CCS
168	Faunal turf on vertical bedrock	Vertical rock wall with short animal turf	CR.LCR
169	Faunal turf on boulders and cobbles	Broken boulders and cobbles and pebbles with small patches of mud. Pink encrusting algae dominant on rock surfaces.	CR.LCR
170	Mud mixed with cobbles and pebbles	Mud with occasional areas of gravel, cobbles and pebbles providing habitat for some short animal turf.	SS.SMu.CFiMu
171	Faunal turf on vertical bedrock	Steep to vertical bedrock reef with short and tall animal turf and pink encrusting algae. Sea bed of sand and gravel at 25-30m. Two lots of squid eggs seen, and 3 catshark eggs containing embryo.	EPA
172	Faunal turf on vertical bedrock	Steep to vertical bedrock reef with short and tall animal turf and pink encrusting algae. Sea bed of sand and gravel at 25-30m. Two lots of squid eggs seen, and 3 catshark eggs containing embryo.	SAT
173	Faunal turf on vertical bedrock	Steep to vertical bedrock reef with short and tall animal turf and pink encrusting algae. Sea bed of sand and gravel at 25-30m. Two lots of squid eggs seen, and 3 catshark eggs containing embryo.	TAT
174	Kelp and faunal turf on rock reef	Bedrock outcrops and gullies from 10m to 21m with cobbles, pebbles and boulders in the bottom of gullies. Sea caves present but not surveyed. One dead catshark seen with no head.	EPA
175	Kelp and faunal turf on rock reef	Bedrock outcrops and gullies from 10m to 21m with cobbles, pebbles and boulders in the bottom of gullies. Sea caves present but not surveyed. One dead catshark seen with no head.	KP
176	Kelp and faunal turf on rock reef	Bedrock outcrops and gullies from 10m to 21m with cobbles, pebbles and boulders in the bottom of gullies. Sea caves present but not surveyed. One dead catshark seen with no head.	SAT

Code	Habitat	Description	Biotope
177	Kelp and faunal turf on rock reef	Bedrock outcrops and gullies from 10m to 21m with cobbles, pebbles and boulders in the bottom of gullies. Sea caves present but not surveyed. One dead catshark seen with no head.	TAT
178	Kelp park and faunal turf on rock reef	Reef of bedrock and boulders from 10m to 14.5m. Kelp park present in the shallows. Faunal turf, particularly dead mens fingers, on the vertical faces of bedrock and boulders. No litter or man made objects seen.	EPA
179	Kelp park and faunal turf on rock reef	Reef of bedrock and boulders from 10m to 14.5m. Kelp park present in the shallows. Faunal turf, particularly dead mens fingers, on the vertical faces of bedrock and boulders. No litter or man made objects seen.	KP
180	Kelp park and faunal turf on rock reef	Reef of bedrock and boulders from 10m to 14.5m. Kelp park present in the shallows. Faunal turf, particularly dead mens fingers, on the vertical faces of bedrock and boulders. No litter or man made objects seen.	MS
181	Kelp park and faunal turf on rock reef	Reef of bedrock and boulders from 10m to 14.5m. Kelp park present in the shallows. Faunal turf, particularly dead mens fingers, on the vertical faces of bedrock and boulders. No litter or man made objects seen.	SAT
182	Kelp park and faunal turf on rock reef	Reef of bedrock and boulders from 10m to 14.5m. Kelp park present in the shallows. Faunal turf, particularly dead mens fingers, on the vertical faces of bedrock and boulders. No litter or man made objects seen.	TAT
183	Kelp and fanal turf on rock reef	Reef of bedrock and boulders covered in short and tall animal turf, with kelp forest above 15m. Stagshorn bryozoan recorded. No sponges recorded above 15m. No litter or man made objects seen.	EPA
184	Kelp and fanal turf on rock reef	Reef of bedrock and boulders covered in short and tall animal turf, with kelp forest above 15m. Stagshorn bryozoan recorded. No sponges recorded above 15m. No litter or man made objects seen.	KF
185	Kelp and fanal turf on rock reef	Reef of bedrock and boulders covered in short and tall animal turf, with kelp forest above 15m. Stagshorn bryozoan recorded. No sponges recorded above 15m. No litter or man made objects seen.	MS
186	Kelp and fanal turf on rock reef	Reef of bedrock and boulders covered in short and tall animal turf, with kelp forest above 15m. Stagshorn bryozoan recorded. No sponges recorded above 15m. No litter or man made objects seen.	SAT
187	Kelp and fanal turf on rock reef	Reef of bedrock and boulders covered in short and tall animal turf, with kelp forest above 15m. Stagshorn bryozoan recorded. No sponges recorded above 15m. No litter or man made objects seen.	TAT
188	Kelp and animal turf on bedrock and boulders	Reef of bedrock and boulders from 10m to 21m, consisting of heavily pitted limestone. Kelp forest at 10m, animal turf of dead mens fingers and sponges on vertical rock faces. Gullies about 2m high and very narrow running from west to east. Rock faces a	EPA
189	Kelp and animal turf on bedrock and boulders	Reef of bedrock and boulders from 10m to 21m, consisting of heavily pitted limestone. Kelp forest at 10m, animal turf of dead mens fingers and sponges on vertical rock faces. Gullies about 2m high and very narrow running from west to east. Rock faces a	KF
190	Kelp and animal turf on bedrock and boulders	Reef of bedrock and boulders from 10m to 21m, consisting of heavily pitted limestone. Kelp forest at 10m, animal turf of dead mens fingers and sponges on vertical rock faces. Gullies about 2m high and very narrow running from west to east. Rock faces a	MS
191	Kelp and animal turf on bedrock and boulders	Reef of bedrock and boulders from 10m to 21m, consisting of heavily pitted limestone. Kelp forest at 10m, animal turf of dead mens fingers and sponges on vertical rock faces. Gullies about 2m high and very narrow running from west to east. Rock faces a	SAT
192	Kelp and animal turf on bedrock with gully	Gully between two bedrock walls from 12m to 21m. Pebbles, cobbles, gravel and boulders in the base of the gully. Kelp park on the horizontal surfaces of the rock either side of the gully. Lots of squid eggs seen. No litter or man made objects.	EPA
193	Kelp and animal turf on bedrock with gully	Gully between two bedrock walls from 12m to 21m. Pebbles, cobbles, gravel and boulders in the base of the gully. Kelp park on the horizontal surfaces of the rock either side of the gully. Lots of squid eggs seen. No litter or man made objects.	KF
194	Kelp and animal turf on bedrock with gully	Gully between two bedrock walls from 12m to 21m. Pebbles, cobbles, gravel and boulders in the base of the gully. Kelp park on the horizontal surfaces of the rock either side of the gully. Lots of squid eggs seen. No litter or man made objects.	KP

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195	Kelp and animal turf on bedrock with gully	Gully between two bedrock walls from 12m to 21m. Pebbles, cobbles, gravel and boulders in the base of the gully. Kelp park on the horizontal surfaces of the rock either side of the gully. Lots of squid eggs seen. No litter or man made objects.	MS
196	Kelp and animal turf on bedrock with gully	Gully between two bedrock walls from 12m to 21m. Pebbles, cobbles, gravel and boulders in the base of the gully. Kelp park on the horizontal surfaces of the rock either side of the gully. Lots of squid eggs seen. No litter or man made objects.	SAT
197	Kelp and faunal turf on bedrock and mixed ground	Heavily pitted and undercut limestone wall from the surface to 8m, encrusted with devonshire cup corals and orange bryozoans. From the base of the wall the seabed slopes gently to the west, with a boulder field immediately at the base of the wall, kelp f	EPA
198	Kelp and faunal turf on bedrock and mixed ground	Heavily pitted and undercut limestone wall from the surface to 8m, encrusted with devonshire cup corals and orange bryozoans. From the base of the wall the seabed slopes gently to the west, with a boulder field immediately at the base of the wall, kelp f	KF
199	Kelp and faunal turf on bedrock and mixed ground	Heavily pitted and undercut limestone wall from the surface to 8m, encrusted with devonshire cup corals and orange bryozoans. From the base of the wall the seabed slopes gently to the west, with a boulder field immediately at the base of the wall, kelp f	MS
200	Kelp and faunal turf on bedrock and mixed ground	Heavily pitted and undercut limestone wall from the surface to 8m, encrusted with devonshire cup corals and orange bryozoans. From the base of the wall the seabed slopes gently to the west, with a boulder field immediately at the base of the wall, kelp f	SAT
201	Kelp and faunal turf on bedrock and mixed ground	Heavily pitted and undercut limestone wall from the surface to 8m, encrusted with devonshire cup corals and orange bryozoans. From the base of the wall the seabed slopes gently to the west, with a boulder field immediately at the base of the wall, kelp f	SLA
202	Mud with burrowing and mobile fauna	Seabed of mud with occasional bedrock, boulders, sand and gravel from 12m to 32m depth. Kelp present in shallower water but not surveyed. Horse mussels, scallops and Norwegian lobsters present.	SAT
203	Mud with burrowing and mobile fauna	Seabed of mud with occasional bedrock, boulders, sand and gravel from 12m to 32m depth. Kelp present in shallower water but not surveyed. Horse mussels, scallops and Norwegian lobsters present.	SLA
204	Mud with burrowing and mobile fauna	Seabed of mud with occasional bedrock, boulders, sand and gravel from 12m to 32m depth. Kelp present in shallower water but not surveyed. Horse mussels, scallops and Norwegian lobsters present.	TAT
205	Rock reef grading into sediment seabed	Seabed of bedrock sloping to the SE with kelp above 15m and faunal turf below. Boulder reef at around 18-20m. Seabed levelling out at around 25m, grading into sediment with burrowing fauna including sea mouse and angular crabs. Lots of dragonets seen.	KF
206	Rock reef grading into sediment seabed	Seabed of bedrock sloping to the SE with kelp above 15m and faunal turf below. Boulder reef at around 18-20m. Seabed levelling out at around 25m, grading into sediment with burrowing fauna including sea mouse and angular crabs. Lots of dragonets seen.	SAT
207	Rock reef grading into sediment seabed	Seabed of bedrock sloping to the SE with kelp above 15m and faunal turf below. Boulder reef at around 18-20m. Seabed levelling out at around 25m, grading into sediment with burrowing fauna including sea mouse and angular crabs. Lots of dragonets seen.	SLA
208	Rock reef grading into sediment seabed	Seabed of bedrock sloping to the SE with kelp above 15m and faunal turf below. Boulder reef at around 18-20m. Seabed levelling out at around 25m, grading into sediment with burrowing fauna including sea mouse and angular crabs. Lots of dragonets seen.	TAT
209	Kelp forest on bedrock	Bedrock with kelp forest from 7m to 16m. Faunal turf on vertical faces. Patches of sand and shell gravel. Pollack numerous in the shallows. Seals evident on the surface although none seen underwater. No litter seen.	EPA
210	Kelp forest on bedrock	Bedrock with kelp forest from 7m to 16m. Faunal turf on vertical faces. Patches of sand and shell gravel. Pollack numerous in the shallows. Seals evident on the surface although none seen underwater. No litter seen.	KF

Code	Habitat	Description	Biotope
211	Kelp forest on bedrock	Bedrock with kelp forest from 7m to 16m. Faunal turf on vertical faces. Patches of sand and shell gravel. Pollack numerous in the shallows. Seals evident on the surface although none seen underwater. No litter seen.	SAT
212	Bedrock with kelp and faunal turf	Bedrock ridges and gullies with kelp on the upper surfaces and faunal turf on the vertical surfaces. Cobbles and pebbles in the bottom of the gullies. Barnacles grazed off the rock surfaces.	EPA
213	Bedrock with kelp and faunal turf	Bedrock ridges and gullies with kelp on the upper surfaces and faunal turf on the vertical surfaces. Cobbles and pebbles in the bottom of the gullies. Barnacles grazed off the rock surfaces.	KP
214	Bedrock with kelp and faunal turf	Bedrock ridges and gullies with kelp on the upper surfaces and faunal turf on the vertical surfaces. Cobbles and pebbles in the bottom of the gullies. Barnacles grazed off the rock surfaces.	MS
215	Kelp park on boulders	Seabed of boulders, sand and gravel sloping in a northerly direction from 10m to 21m. Kelp on the boulders. No litter seen.	EPA
216	Kelp park on boulders	Seabed of boulders, sand and gravel sloping in a northerly direction from 10m to 21m. Kelp on the boulders. No litter seen.	KP
217	Kelp park on boulders	Seabed of boulders, sand and gravel sloping in a northerly direction from 10m to 21m. Kelp on the boulders. No litter seen.	SAT
218	Kelp park on boulders	Seabed of boulders, sand and gravel sloping in a northerly direction from 10m to 21m. Kelp on the boulders. No litter seen.	SLA
219	Kelp park on boulders	Seabed of boulders, sand and gravel sloping in a northerly direction from 10m to 21m. Kelp on the boulders. No litter seen.	TAT
220	Seaweeds on mixed ground and boulders	Seabed of mixed ground, largely sand, with occasional boulders, sloping downwards towards the NW. Kelp park with mixed seaweeds present. No litter seen.	KP
221	Seaweeds on mixed ground and boulders	Seabed of mixed ground, largely sand, with occasional boulders, sloping downwards towards the NW. Kelp park with mixed seaweeds present. No litter seen.	MS
222	Seaweeds on mixed ground and boulders	Seabed of mixed ground, largely sand, with occasional boulders, sloping downwards towards the NW. Kelp park with mixed seaweeds present. No litter seen.	SAT
223	Seaweeds on mixed ground and boulders	Seabed of mixed ground, largely sand, with occasional boulders, sloping downwards towards the NW. Kelp park with mixed seaweeds present. No litter seen.	SLA
224	Kelp park on boulder reef	Boulder reef with patches of sand and mixed ground, kelp park with mixed seaweeds and pink encrusting algae at around 7m. No litter seen.	EPA
225	Kelp park on boulder reef	Boulder reef with patches of sand and mixed ground, kelp park with mixed seaweeds and pink encrusting algae at around 7m. No litter seen.	KP
226	Kelp park on boulder reef	Boulder reef with patches of sand and mixed ground, kelp park with mixed seaweeds and pink encrusting algae at around 7m. No litter seen.	MS
227	Kelp park on boulder reef	Boulder reef with patches of sand and mixed ground, kelp park with mixed seaweeds and pink encrusting algae at around 7m. No litter seen.	SAT
228	Kelp park on boulder reef	Boulder reef with patches of sand and mixed ground, kelp park with mixed seaweeds and pink encrusting algae at around 7m. No litter seen.	SLA
229	Kelp on boulder reef, stepped bedrock with sand	Kelp forest, then kelp park, on boulder reef from 7m to 16m. Stepped bedrock with a layer of sand from 16m to 24m. No litter seen.	EPA
230	Kelp on boulder reef, stepped bedrock with sand	Kelp forest, then kelp park, on boulder reef from 7m to 16m. Stepped bedrock with a layer of sand from 16m to 24m. No litter seen.	KF

Code	Habitat	Description	Biotope
231	Kelp on boulder reef, stepped bedrock with sand	Kelp forest, then kelp park, on boulder reef from 7m to 16m. Stepped bedrock with a layer of sand from 16m to 24m. No litter seen.	KP
232	Kelp on boulder reef, stepped bedrock with sand	Kelp forest, then kelp park, on boulder reef from 7m to 16m. Stepped bedrock with a layer of sand from 16m to 24m. No litter seen.	MS
233	Kelp on boulder reef, stepped bedrock with sand	Kelp forest, then kelp park, on boulder reef from 7m to 16m. Stepped bedrock with a layer of sand from 16m to 24m. No litter seen.	SAT
234	Kelp on boulder reef, stepped bedrock with sand	Kelp forest, then kelp park, on boulder reef from 7m to 16m. Stepped bedrock with a layer of sand from 16m to 24m. No litter seen.	SLA
235	reef wall with kelp	Lam hyp forest on rocky reef and boulders. Encrusting pink, Alc dig and Ech esc.	IR.LIR.K.LhypCape
236	boulder slope	Steep, stepped boulder slope. Sediment on upper faces, deeply pitted limestone.Mixed animal turf with Car smi dominant. Some kelp and algae near top.	IR.LIR.K.LhypLsac.Gz
237	coarse sediment slope	Coarse sand and broken shells steeply sloping away. Pec max and cer llo	SS.SCS.CCS
238	kelp forest on reef top	Lam hyp forest with pink encrusting and some red algae.	IR.MIR.KR.Lhyp.Ft
239	reef and gulley walls	Steep pitted limestone walls descending to seabed, or ending in stepped gullies. Mixed animal turf, kelp and algae	IR.MIR.KR.Lhyp.GzPk
240	boulders, cobbles and sediment	Gently sloping poorly sorted boulders, cobbles, pebbles, gravel and broken shell.	SS.SMp.KSwSS.LsacR.Gv
241	infralittoral plain of soft mud	SUBSTRATE: flat plain of soft mud with numerous faunal tracks. BIOTA: sediment covered by a brown diatomaceous film (A) and supporting frequent Virgularia mirabilis and Sagartiogeton laceratus. Some of the tracks have been created by pagurids (O). Aste	SS.SMu.IFiMu.PhiVir
242	circalittoral muddy sand with scattered gravel,pebbles, cobbles and shells	SUBSTRATE: muddy sand with scattered gravel,pebbles, cobbles and shells. BIOTA: fairly sparse visible life including Asterias rubens (O), Marthasterias glacialis (P), Crossaster papposus (P), Aequipecten opercularis (R), Pecten maximus (P), Myxicola infu	SS.SMx.CMx
243	circalittoral burrowed soft mud interrupted by stoney bands	SUBSTRATE: burrowed soft mud interrupted by patches of pebbles and cobbles on muddy sediment. BIOTA: the soft mud is fairly flat but contains small burrows (C, c. 1 - 3 cm in diameter); no seapens are visible. Asterias rubens (O), Turritella communis sh	SS.SMx.CMx
244	circalittoral burrowed soft mud interrupted by stoney bands	SUBSTRATE: burrowed soft mud interrupted by patches of pebbles and cobbles on muddy sediment. BIOTA: the soft mud is fairly flat but contains small burrows (C, c. 1 - 3 cm in diameter); no seapens are visible. Asterias rubens (O), Turritella communis sh	SS.SMu.CFiMu.SpnMeg
245	circalittoral burrowed soft mud	SUBSTRATE: densely burrowed soft mud. BIOTA: dense small (< 3cm diameter) burrows, some at least containing small Nephrops norvegicus (P).	SS.SMu.CFiMu.SpnMeg
246	circalittoral burrowed soft mud	SUBSTRATE: densely burrowed soft mud. BIOTA: dense small (mostly < 3cm diameter) burrows; small Nephrops norvegicus (P). Pleuronectiformes sp. (P), Liocarcinus sp. (R), small teleosts (P).	SS.SMu.CFiMu.SpnMeg
247	circalittoral burrowed soft mud	SUBSTRATE: densely burrowed soft mud. BIOTA: dense, mostly < 3cm diameter, burrows but Nephrops norvegicus burrows present. Small teleosts (O), Brachyura spp. (O), Munida sarsi (R), Aequipecten opercularis (R), small patch of Metridium senile (locally C	SS.SMu.CFiMu.SpnMeg
248	circalittoral burrowed soft mud	SUBSTRATE: sparsely burrowed soft mud. BIOTA: sparse burrows include those of Nephrops norvegicus; N. norvegicus (P). Asterias rubens (O), small teleosts (O), Brachyura spp. (O), Liocarcinus sp. (P), Aequipecten opercularis (R), Pleuronectidae sp. (P),	SS.SMu.CFiMu.SpnMeg

Code	Habitat	Description	Biotope
249	circalittoral muddy sand	SUBSTRATE: muddy sand. BIOTA: much algal drift material and very sparse burrows. Some areas with superabundant Amphiura sp. Asterias rubens (O), Brachyura spp. (O), Astropecten irregularis? (R), Arenicola-like casts (P), Pleuronectiformes sp. (P).	SS.SMu.CSaMu
250	infralittoral stones with algal turf	SUBSTRATE: mixed substrate of gravel, pebbles, cobbles and, mostly small, boulders. BIOTA: larger stones encrusted with serpulid worms (C), pink coralline algae (O) and Parasmittina trispinosa (R) and colonised by patchy turf of red algae (C) and sparse	SS.SMp.KSwSS.LsacR.CbPb
251	circalittoral rippled clean fine sand	SUBSTRATE: rippled clean fine sand. BIOTA: little life visible. Asterias rubens (O), Asteroidea spp. indet (O), Ophiura sp. (P), Liocarcinus sp. (R).	SS.SSa.CFiSa
252	circalittoral rippled fine sand	SUBSTRATE: rippled fine sand. BIOTA: little life visible. Asterias rubens (O), small Asteroidea sp. (P), Ophiura ophiura (P), Liocarcinus depurator (R), polychaete casts (P).	SS.SSa.CFiSa
253	circalittoral rippled fine sand	SUBSTRATE: rippled fine sand. BIOTA: little life visible. Asterias rubens (O), small Asteroidea sp. (P), Ophiura ophiura (P), Liocarcinus depurator (R), polychaete casts (P), Cerianthus lloydii (R).	SS.SSa.CFiSa
254	circalittoral rippled slightly silty fine sand with scattered shell	SUBSTRATE: rippled slightly silty fine sand with scattered shell. BIOTA: little life visible. Asterias rubens (R), Asteroidea sp. (R), Cancer pagurus (P), Liocarcinus sp. (R), Callionymus lyra (O), infaunal tubes (P).	SS.SSa.CFiSa
255	circalittoral slightly silty rippled fine sand	SUBSTRATE: slightly silty rippled fine sand. BIOTA: little life visible. Small Asteroidea sp. (O), Liocarcinus sp. (O), Pecten maximus (R), Ammodytes sp.? (O).	SS.SSa.CFiSa
256	circalittoral slightly rippled fine sand	SUBSTRATE: slightly rippled fine sand. BIOTA: little life visible. Small Asteroidea sp. (R), Teleostei sp. (R), Necora puber? (R).	SS.SSa.CFiSa
257	circalittoral bedrock, boulders and cobbles, with patches of coarse sand	SUBSTRATE: bedrock outcrops and dense boulders and cobbles with gravelly sand infill, with patches of coarse sand and gravel in waves. BIOTA: rock encrusted with Spirobranchus spp. (C, locally A), Balanus spp. (P), Parasmittina trispinosa (O), red bryozo	CR.MCR.EcCr.FaAlCr.Pom
258	circalittoral bedrock, boulders and cobbles, with patches of coarse sand	SUBSTRATE: bedrock outcrops and dense boulders and cobbles with gravelly sand infill, with patches of coarse sand and gravel in waves. BIOTA: rock encrusted with Spirobranchus spp. (C, locally A), Balanus spp. (P), Parasmittina trispinosa (O), red bryozo	SS.SCS.CCS
259	circalittoral bedrock and stones on medium-coarse sand, with small coarse sand pockets	SUBSTRATE: initially cobbles, pebbles and small boulders on medium-coarse sand, with small coarse sand pockets, becoming dense boulders and cobbles and bedrock outcrops. BIOTA: rock encrusted with Spirobranchus spp. (F, locally C), Parasmittina trispinos	SS.SCS.CCS
260	circalittoral bedrock and stones on medium-coarse sand, with small coarse sand pockets	SUBSTRATE: initially cobbles, pebbles and small boulders on medium-coarse sand, with small coarse sand pockets, becoming dense boulders and cobbles and bedrock outcrops. BIOTA: rock encrusted with Spirobranchus spp. (F, locally C), Parasmittina trispinos	CR.MCR.EcCr.FaAlCr
261	circalittoral boulders and cobbles on sand	SUBSTRATE: dense boulders and cobbles on sand. BIOTA: rock sparsely encrusted with serpulids (F), barnacles (F), pink coralline algae (O) and Parasmittina trispinosa (R) and supporting sparse patches of foliose red algae (O) and Dictyota dichotoma? (R).	CR.MCR.EcCr.FaAlCr
262	circalittoral rippled fine sand	SUBSTRATE: rippled fine sand. BIOTA: very sparse visible life. Ophiura ophiura (P), Asteroidea sp. indet. (P), Echinus esculentus (P).	SS.SSa.CFiSa
263	kelp park on boulders on sand	SUBSTRATE: boulders on sand. BIOTA: laminaria hyperborea park (overall C but decreasing in density throughout the run). Saccharina latissima is present on the sand surface. Rock is encrusted with pink coralline (F), red and brown algae, as well as with	IR.MIR.KR.Lhyp.Pk
264	circalittoral boulders and cobbles on sand	SUBSTRATE: boulders and cobbles on sand. BIOTA: rock encrusted with pink coralline algae (F) and sparse Spirobranchus spp. (F), Balanus spp. (R) and Parasmittina trispinosa (R). Asterias rubens (F), scattered clumps of red algae (R).	CR.MCR.EcCr.FaAlCr

Code	Habitat	Description	Biotope
265	circalittoral boulders and cobbles on medium-coarse sand with sand waves	SUBSTRATE: mostly boulders and cobbles on medium-coarse sand with patches of sand waves. BIOTA: rock encrusted with pink coralline algae (F) and sparse Spirobranchus spp. (F), Balanus spp. (O), brown algae and Parasmittina trispinosa (R). Asterias ruben	SS.SCS.CCS
266	circalittoral boulders and cobbles on medium-coarse sand with sand waves	SUBSTRATE: mostly boulders and cobbles on medium-coarse sand with patches of sand waves. BIOTA: rock encrusted with pink coralline algae (F) and sparse Spirobranchus spp. (F), Balanus spp. (O), brown algae and Parasmittina trispinosa (R). Asterias ruben	CR.MCR.EcCr.FaAlCr
267	circalittoral boulders and cobbles on medium-coarse sand with sand waves	SUBSTRATE: mostly boulders and cobbles on medium-coarse sand with patches of sand waves. BIOTA: rock encrusted with pink coralline algae (F) and sparse Spirobranchus spp. (F), Balanus spp. (O), brown algae and Parasmittina trispinosa (R). Asterias ruben	IR.MIR.KR.XFoR
268	circalittoral rippled silty fine sand	SUBSTRATE: rippled silty fine sand. BIOTA: sediment coated with an extensive brown diatomaceous film (A) and supporting an abundant but patchy population of Ophiura ophiura. Small asteroids (F), Liocarcinus sp. (R), Brachyura sp. (R).	SS.SSa.IMuSa
269	circalittoral rippled silty fine sand	SUBSTRATE: rippled silty fine sand. BIOTA: sediment largely with a fairly sparse brown diatomaceous film (F) and with very sparsely scattered shells of Ensis spp. Small asteroids (O), Asterias rubens (P), Liocarcinus depurator (O).	SS.SSa.IMuSa
270	circalittoral burrowed soft mud	SUBSTRATE: densely burrowed soft mud. BIOTA: dense small (mostly <3 cm diameter) burrows with occasional larger Nephrops-like burrows. Many small fish darting into burrows. Pleuronectiformes sp. (P), Brachyura sp. (R), Aequipecten opercularis (R), Pagu	SS.SMu.CFiMu.SpnMeg
271	circalittoral burrowed soft mud	SUBSTRATE: burrowed soft mud. BIOTA: moderately dense, small (mostly < 5 cm diameter) burrows with occasional larger Nephrops-like burrows. High population density of Asterias rubens for sediment type (F, locally C), possibly resulting from vicinity of	SS.SMu.CFiMu.SpnMeg
272	circalittoral burrowed soft mud	SUBSTRATE: burrowed soft mud. BIOTA: lightly burrowed mud with dense Virgularia mirabilis (C) for most of run, with occasional Asterias rubens, brachyurans (possibly Carcinus maenas) and small teleosts. Aequipecten opercularis (R), pagurids (R). At the	SS.SMu.CFiMu.SpnMeg
273	circalittoral flat plain of mud	SUBSTRATE: flat plain of mud with scattered stones in places. BIOTA: very sparse burrows and Virgularia mirabilis (R). Thin brown diatomaceous film (F), Asterias rubens (O), small teleosts (O), Aequipecten opercularis (O), pagurids (R), Brachyura spp. (	SS.SMu
274	circalittoral flat plain of mud	SUBSTRATE: flat plain of mud with some sand content. BIOTA: very sparse burrows and Virgularia mirabilis (R). Thin brown diatomaceous film (F), Turritella communis (F), Asterias rubens (O), small teleosts (O), Aequipecten opercularis (R), Liocarcinus de	SS.SMu
275	circalittoral sandy mud and burrowed softer mud	SUBSTRATE: initially sandy mud with scattered cobbles and shells becoming burrowed softer mud. BIOTA: burrows increase from zero to moderate densities in second half of run, with Nephrops norvegicus present. Asterias rubens is frequent overall but becom	SS.SMu.CSaMu
276	circalittoral sandy mud and burrowed softer mud	SUBSTRATE: initially sandy mud with scattered cobbles and shells becoming burrowed softer mud. BIOTA: burrows increase from zero to moderate densities in second half of run, with Nephrops norvegicus present. Asterias rubens is frequent overall but becom	SS.SMu.CFiMu.SpnMeg
277	circalittoral burrowed soft mud	SUBSTRATE: densely burrowed soft mud. BIOTA: burrows include some large Nephrops-like burrows. Little life visible. Brachyura spp. (R).	SS.SMu.CFiMu.SpnMeg
278	circalittoral burrowed soft mud	SUBSTRATE: densely burrowed soft mud. BIOTA: burrows include those of Nephrops. Several N. norvegicus seen. Small teleosts (O).	SS.SMu.CFiMu.SpnMeg
279	circalittoral rippled slightly silty fine sand	SUBSTRATE: rippled slightly silty fine sand. BIOTA: asterias rubens (O), Myxicola infundibulum (P), Asteroidea spp. indet (P). Very sparsely scattered Ensis/Solen shells.	SS.SSa.CFiSa

Code	Habitat	Description	Biotope
280	circalittoral large ripples of medium sand	SUBSTRATE: large ripples (or waves) of medium sand with dense shell material, including Ensis, in troughs. BIOTA: little life visible. Asterias rubens (P), Liocarcinus sp. (P), Astropecten irregularis? (P), small teleosts (P).	SS.SSa
281	circalittoral fine sand interrupted by narrow bands of medium sand	SUBSTRATE: sharp transition at start of biotope from medium sand to rippled slightly silty fine sand. Fine sand interrupted by narrow bands of medium sand in two places. BIOTA: asterias rubens (F), Asteroidea sp. indet. (R), Cerianthus lloydii? (P).	SS.SSa.CFiSa
282	circalittoral silty fine sand densely covered with pebbles and gravel	SUBSTRATE: silty fine sand densely covered with pebbles and gravel, with some bare patches. BIOTA: pebbles encrusted with serpulid worms (C). Liocarcinus sp. (R), Asteroidea sp. indet. (R).	SS.SMx.CMx
283	circalittoral rippled fine sand	SUBSTRATE: rippled fine sand. BIOTA: sparse visible fauna. Asterias rubens (R), Asteroidea sp. indet. (R), Pecten maximus (R), Urticina sp. (R adjacent to isolated boulder), terebellid worms (P).	SS.SSa.CFiSa
284	circalittoral pebbles on fine sand with increasing addition of cobbles and small boulders	SUBSTRATE: dense pebbles on fine sand with increasing addition of cobbles and small boulders through run. BIOTA: stones encrusted with serpulid worms (C), pink coralline algae (O) and Parasmittina trispinosa (R). Asterias rubens (F), Liocarcinus sp. (P)	SS.SMx.CMx
285	Circalittoral soft mud	SUBSTRATE: Soft mud. BIOTA: Mud fairly densely burrowed by Nephrops norvegicus (C), although mostly small; 1 N. norvegicus seen. Sagartiogeton laceratus (R) present towards end of run. Teleostei spp. (P).	SS.SMu.CFiMu.SpnMeg
286	Circalittoral sandy mud	SUBSTRATE: Sandy mud with some shell gravel and sparsely scattered cobbles. BIOTA: Scattered small Nephrops norvegicus burrows. Turritella communis (C), Sagartiogeton laceratus (F), Carcinus maenas (P).	SS.SMu.CSaMu
287	Circalittoral sandy mud	SUBSTRATE: Sandy mud with some shell gravel, and scattered pebbles towards end. BIOTA: Sparsely scattered small Nephrops norvegicus burrows. Turritella communis (P), Sagartiogeton laceratus (F), Cerianthus lloydii (locally C), Aequipecten opercularis (O	SS.SMu.CSaMu
288	Circalittoral soft mud	SUBSTRATE: Soft mud. BIOTA: Mud fairly densely burrowed by Nephrops norvegicus (C), although mostly small. Asterias rubens (P), Teleostei (P).	SS.SMu.CFiMu.SpnMeg
289	Circalittoral mud	SUBSTRATE: Mud. BIOTA: Nephrops norvegicus burrows (C). Turritella communis (P), Echinus esculentus (R).	SS.SMu.CFiMu.SpnMeg
290	Circalittoral mud, posssibly slightly sandy	SUBSTRATE: Mud, posssibly slightly sandy. BIOTA: Nephrops norvegicus burrows (C), smaller burrows (P), small mounds and polychaete tubes (P). Turritella communis (C), Asterias rubens (O but locally A), Cerianthus lloydii (R), Metridium senile (R), Echin	SS.SMu.CFiMu.SpnMeg
291	Infralittoral slightly silty fine sand with scattered shells	SUBSTRATE: Very slightly silty rippled fine sand with scattered shells, especially Ensis, occasional small patches of scattered pebbles and cobbles and a dense surface cover of Ensis in deeper water. BIOTA: Little life visible. Asterias rubens (O), Ophi	SS.SSa.IMuSa
292	Circalittoral flat muddy sand or possibly sandy mud	SUBSTRATE: Flat muddy sand or possibly sandy mud. BIOTA: Very sparse burrows, including Nephrops norvegicus. Asterias rubens (O) .	SS.SMu.CSaMu
293	Circalittoral mud	SUBSTRATE: Mud, posssibly slightly sandy. BIOTA: Nephrops norvegicus burrows (O, locally F), Asterias rubens (O), Teleostei spp. (O), Callionymus lyra (R), Brachyura sp. (R), Crossaster papposus (P), Echinus esculentus (O).	SS.SMu.CFiMu.SpnMeg
294	Circalittoral rippled fine sand with scatter of stones	SUBSTRATE: Rippled fine sand with scatter of pebbles, cobbles and small boulders in places. BIOTA: Little surface life visible. Asterias rubens (R), Pecten maximus (R). Stones support sparse hydroids (R), serpulid worms (R) and pink coralline algae (R)	SS.SSa.CFiSa
295	Circalittoral rippled slightly silty fine sand	SUBSTRATE: Rippled slightly silty fine sand. BIOTA: Little visible evidence of life. Asterias rubens (R).	SS.SSa.CFiSa
296	Circalittoral waves of slightly silty coarse sand	SUBSTRATE: Waves of slightly silty coarse sand with shell material in troughs. BIOTA: No life visible.	SS.SCS.CCS

Code	Habitat	Description	Biotope
297	Circalittoral rippled slightly silty fine sand	SUBSTRATE: Rippled slightly silty fine sand. BIOTA: Little visible evidence of life. Asterias rubens (R).	SS.SSa.CFiSa
298	Circalittoral rippled fine sand	SUBSTRATE: Rippled fine sand. BIOTA: Little visible evidence of life. Asterias rubens (R), Solaster endeca (P).	SS.SSa.CFiSa
299	Circalittoral bedrock outcrops and boulders and cobbles on sand	SUBSTRATE: Extensive bedrock outcrops and boulders and cobbles on sand. BIOTA: Rock encrusted with pink coralline algae (F) and Parasmittina trispinosa (R). Luidia ciliaris (F), Echinus esculentus (F).	CR.MCR.EcCr.FaAlCr
300	Circalittoral rippled fine sand	SUBSTRATE: Rippled fine sand. BIOTA: Little visible evidence of life. Asterias rubens/Astropecten irregularis (R), Teleostei spp. (R).	SS.SSa.CFiSa
301	Circalittoral rippled fine sand	SUBSTRATE: Rippled fine sand. BIOTA: No life visible.	SS.SSa.CFiSa
302	Circalittoral bedrock outcrops and boulders and cobbles on sand	SUBSTRATE: Bedrock outcrops and boulders and cobbles on sand. BIOTA: Rock encrusted with pink coralline algae (O), Parasmittina trispinosa (O) and serpulid worms (F) and supporting Caryophyllia smithii (C). Echinus esculentus (C), Porella compressa? (R)	CR.MCR.EcCr.FaAlCr.Car
303	Circalittoral rippled silty fine sand	SUBSTRATE: Rippled silty fine sand. BIOTA: No life visible.	SS.SSa.CFiSa
304	Circalittoral cobbles and boulders with gravelly coarse sand	SUBSTRATE: Mostly dense cobbles and boulders with patches of gravelly coarse sand. BIOTA: Rock encrusted with pink coralline algae (F), Parasmittina trispinosa (O), red bryozoans (R) and Spirobranchus spp. (A). Echinus esculentus (C), Asterias rubens (R	CR.MCR.EcCr.FaAlCr.Pom
305	Circalittoral waves of coarse sand	SUBSTRATE: Waves of coarse sand with gravel and pebbles concentrated in troughs. BIOTA: No visible fauna apart from sparse serpulid worms on pebbles (R).	SS.SCS.CCS
306	Circalittoral rippled slightly silty fine sand	SUBSTRATE: Rippled slightly silty fine sand. BIOTA: No life visible apart from sparse worm tubes (P).	SS.SSa.CFiSa
307	Circalittoral soft mud	SUBSTRATE: Soft mud. BIOTA: Mud fairly densely burrowed by Nephrops norvegicus (C), although mostly small; 2 N. norvegicus seen. Patches of Asterias rubens (O overall), Munida rugosa (P), Teleostei (R).	SS.SMu.CFiMu.SpnMeg
308	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	ABB
309	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	EPA
310	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	KF
311	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	KP
312	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	MS
313	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	SAT
314	Rocky reef and boulders between 6-20m bsl	Steep limestone rock face with overhangs and natural arches from sea level to 15m bcd. More gentle slope with cobbles and sand patches between 15 and 17m bcd. Blind gullies. Kelp attached to vertical rock faces and atop pinnacles.	TAT
315	Rock wall	80 degree wall of rock from 15-10m, above 10m slope at 50degrees. Rock pitted but also larger crevices and irregularities, some quite deep. Lower reaches covered with animals especially brittle and feather stars and encrusting brown and corraline algae. A	ABB

Code	Habitat	Description	Biotope
316	Rock wall	80 degree wall of rock from 15-10m, above 10m slope at 50degrees. Rock pitted but also larger crevices and irregularities, some quite deep. Lower reaches covered with animals especially brittle and feather stars and encrusting brown and corraline algae. A	EPA
317	Rock wall	80 degree wall of rock from 15-10m, above 10m slope at 50degrees. Rock pitted but also larger crevices and irregularities, some quite deep. Lower reaches covered with animals especially brittle and feather stars and encrusting brown and corraline algae. A	KF
318	Rock wall	80 degree wall of rock from 15-10m, above 10m slope at 50degrees. Rock pitted but also larger crevices and irregularities, some quite deep. Lower reaches covered with animals especially brittle and feather stars and encrusting brown and corraline algae. A	MS
319	Rock wall	80 degree wall of rock from 15-10m, above 10m slope at 50degrees. Rock pitted but also larger crevices and irregularities, some quite deep. Lower reaches covered with animals especially brittle and feather stars and encrusting brown and corraline algae. A	SAT
320	Rock wall	80 degree wall of rock from 15-10m, above 10m slope at 50degrees. Rock pitted but also larger crevices and irregularities, some quite deep. Lower reaches covered with animals especially brittle and feather stars and encrusting brown and corraline algae. A	TAT
321	bedrock outcrop	Pitted limestone, bedrock with irregular surface covered in encrusting brown and red corraline algae. Areas of rich growth of red algae, and sparse small kelp (laminaria hyperborea)	ABB
322	bedrock outcrop	Pitted limestone, bedrock with irregular surface covered in encrusting brown and red corraline algae. Areas of rich growth of red algae, and sparse small kelp (laminaria hyperborea)	EPA
323	bedrock outcrop	Pitted limestone, bedrock with irregular surface covered in encrusting brown and red corraline algae. Areas of rich growth of red algae, and sparse small kelp (laminaria hyperborea)	KP
324	bedrock outcrop	Pitted limestone, bedrock with irregular surface covered in encrusting brown and red corraline algae. Areas of rich growth of red algae, and sparse small kelp (laminaria hyperborea)	MS
325	bedrock outcrop	Pitted limestone, bedrock with irregular surface covered in encrusting brown and red corraline algae. Areas of rich growth of red algae, and sparse small kelp (laminaria hyperborea)	SAT
326	Gravelly sand with sparse boulders and rocks	Slight slope. Mixed sand and shell gravel and pebbles. Scattered boulders with sparse kelp and encrusting brown and corraline pink algae. Scoured by gravel. Rocks mostly embedded, some loose with hidey-holes below.	EPA
327	Gravelly sand with sparse boulders and rocks	Slight slope. Mixed sand and shell gravel and pebbles. Scattered boulders with sparse kelp and encrusting brown and corraline pink algae. Scoured by gravel. Rocks mostly embedded, some loose with hidey-holes below.	KP
328	Gravelly sand with sparse boulders and rocks	Slight slope. Mixed sand and shell gravel and pebbles. Scattered boulders with sparse kelp and encrusting brown and corraline pink algae. Scoured by gravel. Rocks mostly embedded, some loose with hidey-holes below.	MS
329	Gravelly sand with sparse boulders and rocks	Slight slope. Mixed sand and shell gravel and pebbles. Scattered boulders with sparse kelp and encrusting brown and corraline pink algae. Scoured by gravel. Rocks mostly embedded, some loose with hidey-holes below.	SAT
330	Gravelly sand with sparse boulders and rocks	Slight slope. Mixed sand and shell gravel and pebbles. Scattered boulders with sparse kelp and encrusting brown and corraline pink algae. Scoured by gravel. Rocks mostly embedded, some loose with hidey-holes below.	SLA
331	Limestone bedrock	Vertical limestone rockface. common species Alcyonium digitatum and L. hyperborea.	EPA
332	Limestone bedrock	Vertical limestone rockface. common species Alcyonium digitatum and L. hyperborea.	KF
333	Limestone bedrock	Vertical limestone rockface. common species Alcyonium digitatum and L. hyperborea.	MS
334	Limestone bedrock	Vertical limestone rockface. common species Alcyonium digitatum and L. hyperborea.	SAT

Code	Habitat	Description	Biotope
335	Limestone bedrock	Vertical limestone rockface. common species Alcyonium digitatum and L. hyperborea.	TAT
336	Sandy Mud	Steep muddy sand slope with lots of broken ensis shells. (evidence of dredging?). occasional rock outcrops.common species Ceriathus lloydii and Ensis.	MS
337	Sandy Mud	Steep muddy sand slope with lots of broken ensis shells. (evidence of dredging?). occasional rock outcrops.common species Ceriathus lloydii and Ensis.	SAT
338	Sandy Mud	Steep muddy sand slope with lots of broken ensis shells. (evidence of dredging?). occasional rock outcrops.common species Ceriathus lloydii and Ensis.	SLA
339	Sandy Mud	Steep muddy sand slope with lots of broken ensis shells. (evidence of dredging?). occasional rock outcrops.common species Ceriathus lloydii and Ensis.	TAT
340	Vertical rock wall	vertical bedrock wall encrusted with edible mussels and barnacles.	ABM
341	vertical rock wall	Vertical rock wall crowned with L.digitata. A. digitatum among the holdfasts. Rock encrusted with pink algae and keelworms.	EPA
342	vertical rock wall	Vertical rock wall crowned with L.digitata. A. digitatum among the holdfasts. Rock encrusted with pink algae and keelworms.	KF
343	vertical rock wall	Vertical rock wall crowned with L.digitata. A. digitatum among the holdfasts. Rock encrusted with pink algae and keelworms.	MS
344	vertical rock wall	Vertical rock wall crowned with L.digitata. A. digitatum among the holdfasts. Rock encrusted with pink algae and keelworms.	SAT
345	vertical rock wall	Vertical rock wall crowned with L.digitata. A. digitatum among the holdfasts. Rock encrusted with pink algae and keelworms.	SLA
346	vertical rock wall	Vertical rock wall crowned with L.digitata. A. digitatum among the holdfasts. Rock encrusted with pink algae and keelworms.	TAT
347	20 degree mud slope with abundant life	Compact mud with layer of silt	KP
348	20 degree mud slope with abundant life	Compact mud with layer of silt	MS
349	20 degree mud slope with abundant life	Compact mud with layer of silt	SLA
350	Cliff	Vertical columns of angular bedrock with overhanging sections covered in Alcyonium digitatum. Kelp on horizontal ledges, dense in top 6m	EPA
351	Cliff	Vertical columns of angular bedrock with overhanging sections covered in Alcyonium digitatum. Kelp on horizontal ledges, dense in top 6m	KF
352	Cliff	Vertical columns of angular bedrock with overhanging sections covered in Alcyonium digitatum. Kelp on horizontal ledges, dense in top 6m	MS
353	Cliff	Vertical columns of angular bedrock with overhanging sections covered in Alcyonium digitatum. Kelp on horizontal ledges, dense in top 6m	SAT
354	Cliff	Vertical columns of angular bedrock with overhanging sections covered in Alcyonium digitatum. Kelp on horizontal ledges, dense in top 6m	TAT

Code	Habitat	Description	Biotope
355	Bedrock and boulder slope	Bedrock and boulder slope, very angular some rocks as large as cars. Relatively barren, except for high cover of encrusting pink corraline algae. Kelp very sparse at steeper end but increasing in shallower, particularly on top of boulders. One or two of t	EPA
356	Bedrock and boulder slope	Bedrock and boulder slope, very angular some rocks as large as cars. Relatively barren, except for high cover of encrusting pink corraline algae. Kelp very sparse at steeper end but increasing in shallower, particularly on top of boulders. One or two of t	KP
357	Bedrock and boulder slope	Bedrock and boulder slope, very angular some rocks as large as cars. Relatively barren, except for high cover of encrusting pink corraline algae. Kelp very sparse at steeper end but increasing in shallower, particularly on top of boulders. One or two of t	MS
358	Bedrock and boulder slope	Bedrock and boulder slope, very angular some rocks as large as cars. Relatively barren, except for high cover of encrusting pink corraline algae. Kelp very sparse at steeper end but increasing in shallower, particularly on top of boulders. One or two of t	SAT
359	mud	Mud mainly from beyond 25m to approx 16m. Area near boulders more shell sand. Not much life in mud. All species found were rare or occassional. Foraminiferan masses frequent.	ABS
360	mud	Mud mainly from beyond 25m to approx 16m. Area near boulders more shell sand. Not much life in mud. All species found were rare or occassional. Foraminiferan masses frequent.	BS
361	mud	Mud mainly from beyond 25m to approx 16m. Area near boulders more shell sand. Not much life in mud. All species found were rare or occassional. Foraminiferan masses frequent.	SLA
362	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	ABB
363	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	ABM
364	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	ABS
365	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	EPA
366	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	KP
367	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	MS
368	Rocky reef, cliff	Rocky reef consisting of a pitted vertical wall, with kelp park then dead mens fingers, brittlestars, fissures and cracks to 9.5m bcd. Boulders at foot. Sand with crushed shells.	SAT

ANNEX 16: ST KILDA SAC CAVE SITE ATTRIBUTE TABLE

Attribute	Target	Prescription
1.1.1 Extent of cave(s)	1.1.1 No change in dimensions of a cave, allowing for natural changes that are part of a wider coastal geomorphological management regime.	At 6-yearly intervals (in addition to individual case assessments) review activities that have had the potential to reduce the extent of the cave feature (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals visit all four phyically surveyed caves and make visual assessment of extent in comparison to pre-existing topographic cave survey. Cave extent and the implications of activities should be assessed against Harries *et al.* (2018).
1.1.2 Number of caves in site	1.1.2 No reduction in the number of caves within a site allowing for natural change.	At 6-yearly intervals (in addition to individual case assessments) review activities that have had the potential to reduce the number of caves (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals visit all four phyically surveyed caves and confirm cave presence. Number of caves and the implications of activities should be assessed against Harries *et al.* (2018).
1.1.3 Biotope composition of a cave	1.1.3 Maintain the variety of biotopes identified for the cave, allowing for natural succession or known cyclical change. The following biotopes (or equivalents) must be found on the relocatable sections of SK15CV01 & SK15CV02: **IR.FIR.SG.CrSpAsAn** **IR.FIR.SG.CC.Mo**	At 6-yearly intervals (in addition to individual case assessments) review changes to human activities and any pollution incidents with potential to modify cave biota. (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals conduct a repeat biological survey of SK15CV01 & SK15CV02 employing comparable methodology to Harries *et al.,* 2018. Assess the biotope composition against the baseline established in the first SCM event (Harries *et al*., 2018).

Attribute	Target	Prescription
1.1.4 Presence of representative/ notable biotopes	1.1.4 Maintain the presence of the specified biotope, allowing for natural succession/known cyclical change. The following biotope is representative of the site and should be found in SK15CV01 & SK15CV02: **IR.FIR.SG.CrSpAsAn** The following biotope is notable for deeper sites and should be found in SK15CV03: **IR.FIR.SG.CC.BalPom**	At 6-yearly intervals (in addition to individual case assessments) review changes to human activities and any pollution incidents with potential to modify cave biota. (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals conduct repeat biological surveys of SK15CV01, SK15CV02 & SK15CV03 employing comparable methodology to Harries *et al*., 2018. Assess the biotope composition against the baseline established in the first SCM event (Harries *et al*., 2018).
1.1.5 Species composition of representative or notable biotopes	1.1.5 No decline in biotope quality due to change in species composition or loss of notable species, allowing for natural succession/ known cyclical change. The biotope **IR.FIR.SG.CrSpAsAn** within SK15CV01 & SK15CV02 should show comparable species composition and diversity to the baseline data from 2015 (particular attention should be paid to crisid bryozoan turfs, sponge crusts, *Metridium dianthus*, *Sagartia elegans* & *Tubularia indivisa*).	At 6-yearly intervals (in addition to individual case assessments) review changes to human activities and any pollution incidents with potential to modify cave biota. (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals conduct a repeat biological survey of SK15CV01 & SK15CV02 employing comparable methodology to Harries *et al*., 2018. Assess the biotope composition against the baseline established in the first SCM event (Harries *et al.,* 2018).
1.1.6 Presence and/or abundance of specified species	1.1.6 Maintain presence and/or abundance of the specified desirable species. Absence of the specified undesirable species (such as an invasive non-native species)	This attribute will not be used for assessment

Note – Changes in human use of the site and reported pollution incidents should be reviewed every 6 years. If this review raises concerns that the biota or physical structure of the caves have been impacted then consideration should be given to initiating a biological monitoring survey to assess the consequences.

ANNEX 17: NORTH RONA SAC CAVE SITE ATTRIBUTE TABLE

Attribute	Target	Prescription
1.1.1 Extent of cave(s)	1.1.1 No change in dimensions of a cave, allowing for natural changes that are part of a wider coastal geomorphological management regime.	At 6-yearly intervals (in addition to individual case assessments) review activities that have had the potential to reduce the extent of the cave feature (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals visit all three phyically surveyed caves and make visual assessment of extent in comparison to pre-existing topographic cave survey. Cave extent and the implications of activities should be assessed against Harries *et al.* (2018).
1.1.2 Number of caves in site	1.1.2 No reduction in the number of caves within a site allowing for natural change.	At 6-yearly intervals (in addition to individual case assessments) review activities that have had the potential to reduce the number of caves (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals visit all three phyically surveyed caves and confirm cave presence. Number of caves and the implications of activities should be assessed against Harries *et al.* (2018).
1.1.3 Biotope composition of a cave	1.1.3 Maintain the variety of biotopes identified for the cave, allowing for natural succession or known cyclical change. The following biotopes (or equivalents) must be found on the relocatable sections of NR15CV02 & NR15CV03: **IR.FIR.SG.CrSpAsAn** **IR.FIR.SG.CC.Mo**	At 6-yearly intervals (in addition to individual case assessments) review changes to human activities and any pollution incidents with potential to modify cave biota. (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals conduct a repeat biological survey of NR15CV02 & NR15CV03 employing comparable methodology to Harries *et al*., 2018. Assess the biotope composition against the baseline established in the first SCM event (Harries *et al.,* 2018).

Attribute	Target	Prescription
1.1.4 Presence of representative/ notable biotopes	1.1.4 Maintain the presence of the specified biotope, allowing for natural succession/known cyclical change. The following biotope is representative of the site and should be found in NR15CV02 & NR15CV03: **IR.FIR.SG.CrSpAsAn**	At 6-yearly intervals (in addition to individual case assessments) review changes to human activities and any pollution incidents with potential to modify cave biota. (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals conduct repeat biological surveys of NR15CV02 & NR15CV03 employing comparable methodology to Harries et al., 2018 Assess the biotope composition against the baseline established in the first SCM event (Harries *et al.,* 2018).
1.1.5 Species composition of representative or notable biotopes	1.1.5 No decline in biotope quality due to change in species composition or loss of notable species, allowing for natural succession/ known cyclical change. The biotope **IR.FIR.SG.CrSpAsAn** within NR15CV02 & NR15CV03 should show comparable species composition and diversity to the baseline data from 2015 (particular attention should be paid to colonial ascidians, sponge crusts, turfs of amphipod and sabellid tubes and patches of anemones including *Metridium dianthus*, *Sagartia elegans* & *Corynactis viridis*).	At 6-yearly intervals (in addition to individual case assessments) review changes to human activities and any pollution incidents with potential to modify cave biota. (in consultation with SNH Area Office, relevant authorities and site management groups where applicable). At 12-yearly intervals conduct a repeat biological survey of NR15CV02 & NR15CV03 employing comparable methodology to Harries *et al*., 2018 Assess the biotope composition against the baseline established in the first SCM event (Harries *et al.,* 2018).
1.1.6 Presence and/or abundance of specified species	1.1.6 Maintain presence and/or abundance of the specified desirable species. Absence of the specified undesirable species (such as an invasive non-native species)	This attribute will not be used for assessment

Note – Changes in human use of the site and reported pollution incidents should be reviewed every 6 years. If this review raises concerns that the biota or physical structure of the caves have been impacted then consideration should be given to initiating a biological monitoring survey to assess the consequences.

ANNEX 18: SURVEY LOG

Outline of activities during the survey.

Period	Activity
1st August 2015	Mobilisation. Travel to Stromness. Load vessel.
2nd August 2015	Familiarisation dives & inflatable launching practice in Scapa Flow while awaiting improved weather forecast.
3rd August 2015	Transit Stromness - Loch Eriboll. Cave & shore recce.
4th August 2015	Survey LE15 CV01 & practice shore survey methodology.
5th August 2015	Survey LE15 CV02. Transit Loch Eriboll - Loch Laxford.
6th to 9th August 2015	SCM survey within Loch Laxford.
10th & 11th August 2015	Attempt transit to St Kilda. Divert to Skye for engine repairs.
12th August 2015	Transit to Loch na Madadh
13th August 2015	SCM survey within Loch na Madadh
14th August 2015	SCM survey within Loch na Madadh & transit to St Kilda
15th August 2015	St Kilda. Cave recce. Surveys of SK15 IR01, SK15 SR01, SK15 IR02, SK15 SR02
16th August 2015	St Kilda. Surveys of SK15 CV01, SK15 CV02 & SK15 CV03.
17th August 2015	St Kilda. Surveys of SK15 CV03 & SK15 SR03. Depart for North Rona.
18th August 2015	Arrive at North Rona. Cave recce. Surveys of NR15 CV01, NR15 CV02 & NR15 CV03. Depart for Stromness.
19th August 2015	Arrive in Stromness. Unloading vessel. Data checks etc.
20th August 2015	Demobilisation. Return to base.

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