



**SEAWEED SURVEY OF THE OUTER HEBRIDES
30 JULY-7 AUGUST 2012**



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1.0 EXECUTIVE SUMMARY

A shore survey of the red (Rhodophyta), brown (Phaeophyceae) and green (Chlorophyta) seaweeds undertaken between the 30th July and 7th August 2012 at 19 sites in North and South Uist, Harris and Lewis in the Outer Hebrides, yielded 525 records and c. 128 species - approximately 20% of the UK seaweed flora. A literature search of seaweed research in the Outer Hebrides from 1844 to the present revealed 389 taxon names - over 60% of the UK flora. Four hundred and ninety specimens were collected and preserved for incorporation into the algal herbarium at the Natural History Museum. The number of species recorded for saltmarshes and other sheltered sites dominated by large brown fucoids ranged from 4 to 12, and for open coasts between 41 and 65. The most commonly recorded species were the reds *Chondrus crispus* and *Vertebrata lanosa* (the latter epiphytic on *Ascophyllum nodosum*), the browns *Fucus spiralis*, *F. vesiculosus* and *Pelvetia canaliculata*, and the green *Cladophora rupestris*. Five non-native species were recorded: reds *Asparagopsis armata* ('*Falkenbergia*' sporophyte phase), *Bonnemaisonia hamifera* ('*Trailiella*' sporophyte phase), *Pyropia leucosticta*, brown *Colpomenia peregrina* and green *Codium fragile* subsp. *fragile*. The highly invasive brown species *Sargassum muticum* was not encountered at the sites studied but it has been reported in 2012 from Benbecula. A comparison of the species composition for sites Geodh'an Faraidh and Port Geiraha, previously studied in 1971, indicated that although the overall number was similar only c. 20% were the same species. The following genera of seaweed were highlighted as taxonomically in need of study for the area: the reds *Osmundea*, *Ceramium* and *Polysiphonia*, browns *Sphacelaria* and *Fucus* (notably hybrids) and the greens *Cladophora*, and *Ulva*. This survey provides a new baseline for the Outer Hebrides and it confirms the importance of the area for its seaweed diversity and resource. Recommendations include: i) monitoring should be undertaken in parallel with any increased harvesting in order to monitor impact on seaweed diversity; ii) detailed seaweed surveys should be undertaken at fixed sites at regular intervals to study long term change; iii) several genera of seaweed require taxonomic studies and iv) collections should be made during survey work and deposited in national herbaria as a verifiable source of data for future reference.

2.0 INTRODUCTION

The Outer Hebrides are an important area for seaweeds in the UK due to a large range of habitats: an exposed west and south coast and sheltered east coast, sea lochs with exposed entrances and sheltered tide-swept shallow channels, plus fjards which occur in areas of low lying land that have undergone extensive scour by glacier ice and have intensely interrupted shorelines.

The conservation importance of the species and habitats in the Outer Hebrides is recognized through several designations. Several sites designated as Special Areas of Conservation (SACs) feature seaweeds, including Loch Maddy (Loch nam Madadh), Loch Roag Lagoons, North Uist Machair, Loch Eport (Obain Loch Euphoirt), South Uist Machair, St Kilda (http://jncc.defra.gov.uk/ProtectedSites/SACselection/SAC_list.asp). The Sound of Barra is a proposed SAC (pSAC). The UK Biodiversity Action Plan (BAP) *Ascophyllum nodosum* ecad *mackayi* and maerl beds also occur in the Outer Hebrides. The Important Plant Areas (IPAs) report (Brodie et al. 2007a) nominates three sites in the Outer Hebrides for marine algae (Barra/Eriskay Sound, Loch Maddy complex and Sound of Harris), although all these are somewhat lacking in survey data.

Seaweeds have been closely integrated into the lives and economy of the people in the Outer Hebrides for many centuries. The seaweeds have been used as organic fertilizer for the soils, as a source of soda, potash and iodine in the kelp industry and as a source of alginates. Although the industry went into decline in the 1980s and 1990s, there is currently considerable interest and activity from industrial companies for commercial seaweed harvesting (for e.g. bioenergy, alginates). For example, the Hebridean Seaweed Company (<http://www.hebrideanseaweed.co.uk/>), which was set up in 2006, manufactures seaweed products for use in the animal feed supplement, soil enhancement, alginate and nutraceutical sectors. There has been a study on the intertidal seaweed resource of the Outer Hebrides (Burrows et al. 2010), but the impact of industrial scale collecting is unknown on overall seaweed biodiversity.

A summary of the main seaweed studies which contain floristic information for the Outer Hebrides is given in Table 1. Much of the work involved in recording the seaweeds has often been localized in focus, concentrating on particular habitats, island or islands or a set of species, particularly in relation to the kelp harvesting and resource. The first studies of the seaweed flora were undertaken in the 19th C as part of a general account of the plants of the Outer Hebrides (Balfour & Babbington 1844 a, b) but it was almost a hundred years before further work was published. Between the 1940s and 1960s considerable work was undertaken by the Institute of Seaweed Research in Scotland owing to the great extent of the fucoids and kelps on the Scottish coasts (see Norton & Powell 1979), with the Outer Hebrides supporting 70% of the littoral seaweed of the region (Walker 1947). However, there have only been a small number of surveys of note that have dealt with the marine algae in detail. Campbell (1945) listed the species for Uig, Lewis. Powell (1953) and Watling et al. (1970) recorded the seaweeds of St Kilda. Norton (1972) produced an annotated list of the marine algae for Lewis (nine sites) and Harris (three sites) based on a visit by the British Phycological Society in 1971 as part of the society's aim to record seaweeds around Britain (Norton 1972; Appendix 2). This study is noteworthy because identification was undertaken by specialists in the different algal groups and in addition to intertidal collections, subtidal collections were made by Tyge Christensen who snorkeled to c. 4 m depth (Martin Wilkinson, pers. comm.). An extensive study of sealochs by Howson et al. (1994) resulted in the survey of the flora and fauna of 19 of these in the Outer Hebrides. Reviews of the macroalgal flora have been undertaken by Norton & Powell (1979) and Maggs (1986). A database of the lists that have been published can be found in Appendix 1.

The Natural History Museum (NHM) marine algal collections in the algal herbarium (BM) represent over 250 years of UK data and as such are integral to the study of seaweed biodiversity. These collections have enabled us to develop up to date identification guides (e.g. Brodie et al. 2007b, Bunker et al. 2010) and identify seaweed Important Plant Areas (Brodie et al., 2007a), work which has contributed to the consideration of potential Marine Protected Areas (MPAs) but also highlighted the deficiency of the seaweed data for many sites. We have recently identified several major gaps in the NHM UK seaweed collections, notably the Outer Hebrides, where few

collections have been made (c. 100 specimens, mostly from the 1971 BPS expedition). The Outer Hebrides are particularly pertinent as they have been noted as of potential conservation interest for seaweeds.

2.1 Aim of study

The aim of this study is to document the biodiversity of the intertidal seaweeds of the Outer Hebrides, an area of interest for these organisms and which has been identified as a major gap both in the Natural History Museum seaweed collections and our knowledge. By undertaking this survey work now, we capture current baseline data on seaweed diversity which will highlight sites of particular conservation importance and enable comparative work to be undertaken in the future to demonstrate any changes to the flora.

Table 2.1 Summary of literature covering seaweeds for the Outer Hebrides.

Reference	Summary
Balfour & Babbington (1844a)	An account of the excursion and plants of the Outer Hebrides. Some of the more common seaweeds recorded from the Shiant Islands are listed.
Balfour & Babbington (1844b)	Includes a list of algae, including two species of <i>Chara</i> (<i>C. vulgaris</i> and <i>C. aspera</i>), 11 brown, 8 red and 2 green. List databased (Appendix 1).
Nicol (1936)	An account of the brackish-water lochs of North Uist. Conditions of the lochs (salinity, pH, temperature etc) and ecology are described, including mention of some seaweed species.
Sinclair (1936)	A list of 78 species of green, brown and red marine algae in an account of the natural history of Barra based on the results of a scientific expedition 1-4 July 1935.
Sinclair (1938)	An annotated list of Barra marine algae based on the visit in 1935 (Sinclair 1936) and 1936. List databased (Appendix 1).
Dunn (1937)	A comparison of species found in two Orkney lochs and some lochs on North Uist. It is noted that the lochs in North Uist are much more varied in depth and salinity than the Orkney lochs. Salinities range from 1.2 to 34 per cent [sic].
Campbell (1945)	Chapter VII Algae. Determined by L. Lyle and A. Gepp. pp. 59-60. List of Myxophyceae, Chlorophyceae, Phaeophyceae and Rhodophyceae and two species of Charophyta (<i>Nitella translucens</i> Ag. and <i>Chara delicatula</i> Ag.) from Grassavig, Miavaig, Uig sands, Beri sands and a small islet (un-named on the 6" map) in Loch Roag between July 20th and 26th 1949. List databased (Appendix 1).
Clow & Clow (1947)	History of kelp. Hebrides: kelp-burning was begun by Macleod of Uist c. 1730. There is reference to Rory Macdonald who was invited to North Uist from Ireland in about 1735 to carry out experiments for Hugh Macdonald of Ballishar. 1764 Hebridean kelp: £3 per ton.

	Smegmatologia: the art of making potashes. Kelping was carried out in practically every littoral parish in Scotland in the 1790s. Basic raw material: <i>Fucus vesiculosus</i> : common sea wrack; sometimes known as Sea Oak and in Orkney as Black Tang; <i>Fucus nodosus</i> [now <i>Ascophyllum nodosum</i>]: the knotted wrack, bell wrack, or in the Orkneys, Yellow Tang; <i>Fucus serratus</i> : serrated wrack or Ware; <i>Fucus digitatus</i> [now <i>Laminaria digitata</i>]: the Tangle. At this time, kelping: was a principle occupation; hundreds of tons exported annually to Leith and Liverpool. Gives details of amounts, composition etc.
Walker (1947)	Survey of the seaweed resources of Scotland; major undertaking of the Scottish Seaweed Research Association. It gives the length of the Scottish Mainland and Islands, excluding Shetland and minor islets and inlets as 4630 miles (excludes Barra and other islands). It divides the coast into areas. General surveys where the density of weed growth was 50-100 tons per mile. Detailed surveys where over 100 tons per mile. Measured length and width of each zone etc. <i>Pelvetia canaliculata</i> was not included. Results: Outer Hebrides supported 70% of the littoral seaweed of Scotland with the highest weed density. The weed densities of Lewis & Harris are similar to the Mainland but North Uist, Benbecula and South Uist, the weed is at its best. Loch Maddy (N. Uist) supports the largest quantity – equal to the whole of Orkney – with the highest weed density of all places in Scotland- four times that of Orkney. Over half the littoral weed in Scotland is in the extensive sea lochs on the east coast of the OH. Weed growth fed directly by the Atlantic but sheltered from its violence. Cut monthly to look at seasonal variation.
Blackler (1948)	Short letter recording the finding of <i>Colpomenia sinuosa</i> (Mert.) Derb. Et Sol., near Stornoway. Growing in shallow pools on <i>Corallina officinalis</i> at Aiginish, on the Broad Bay side of the Eye Peninsula in July 1947. Blackler notes that the first record of this species was from St. Andrews, summer of 1938 (Dunn, M.D 1939 <i>Trans and Proc. Bot. Soc. Edin.</i> 32: iv.).
Gauld et al. (1953)	Survey of St Kilda July and August 1952. Description of the zonation. Annotated algal list of Chlorophyceae, Phaeophyceae and Rhodophyceae compiled by H. T. Powell. List databased (Appendix 1).
Walker & Richardson (1955)	A study of the seasonal changes in the sublittoral algal crop in different localities around Scotland. Use lb./sq.yd for weights. Survey July 1950, May 1952 and Oct-Nov 1952. Includes data for <i>Laminaria digitata</i> , <i>L. hyperborea</i> , <i>Saccharina latissima</i> and <i>Saccorhiza polyschides</i> .
Powell (1957)	The case for using the name ‘ <i>distichus</i> ’, description and distribution of subspecies. At the time, Powell considered that only <i>F. distichus</i> subsp. <i>anceps</i> was recorded for the British Isles. Outer Hebrides: Island of Lewis and St Kilda islands.
Lewis (1957)	A general account of the rocky shore populations of North Uist. Description of the different shore habitats useful for comparison. Notes that the Scottish Seaweed Research Association (Walker 1947) reports a

	high proportion of the harvestable fucoids of the Scottish coasts occur in the Outer Hebrides, notably the extensive sheltered sea lochs which open from the east coasts of the islands. Estimated length of shore line of Loch Maddy: 200-300 miles. Lewis notes that although he expected to see <i>Fucus distichus</i> at Griminish, he did not. Species from general descriptions (not lists) databased (Appendix 1).
Stewart (1960)	List of the marine blue-green algae from Barra. Collections were made in September 1959 mainly from 7 sites (listed) on Barra.
Stewart (1962)	Reports on <i>Cystoseira tamariscifolia</i> from the Isles of Barra whilst undertaking an intertidal survey of the algae in 1961. The species was abundant near Cliad on the west of the island in deep pools at c. mean low water springs and associated with <i>Codium fragile</i> subspecies <i>atlanticum</i> and <i>Halidrys siliquosa</i> . Large quantities of <i>C. tamariscifolia</i> were found in the drift after a storm, suggesting abundant growth at sublittoral levels.
Gunning et al. (1966)	Small scale survey of distribution patterns for intertidal algae in Loch Obe, Isle of Barra. Covers topography, hydrography and distribution of the following algal species: <i>Pelvetia canaliculata</i> , <i>Fucus spiralis</i> , <i>Fucus vesiculosus</i> , <i>Ascophyllum nodosum</i> , <i>Fucus serratus</i> , <i>Himanthalia elongata</i> , <i>Mastocarpus stellatus</i> and <i>Laminaria digitata</i> . Conclusion: not one single environmental factor can account for changes in distribution of individual species.
Watling et al. (1970)	Review of literature and collections of the marine algae of St Kilda and collation of information. List of 70 species, 18 of which were new records for St Kilda. They describe the characters of the coast, exposure, tides, zonation and buoys. List databased (Appendix 1).
Norton (1972)	The marine algae of Lewis and Harris based on a visit of the British Phycological Society fieldtrip to the Western Isles of Scotland from 7 to 14 August 1971. They reported c. 189 species, including 31 new records for the county of Inverness and 131 new records for Wester Ross. Red, brown and green algae databased (Appendix 1).
Adey & Adey (1973)	Part of a biosystematic-ecological study of the crustose corallines of the North Atlantic begun in 1960. Presents new data for the British Isles and explores the relationship of the British coralline flora to the whole North Atlantic. It includes one transect station from the Outer Hebrides: north of Loch Eport, North Uist.
Kain (1977)	Populations of <i>Laminaria hyperborea</i> were sampled from the subtidal from a number of sites in the UK, including from South Uist (McKenzie Rock, Muldoanich and Griean Head) to study growth and production. Gives data on production, e.g. shallow water off Muldoanich 1.1 kg dry matter m ⁻² y ⁻¹ (= 0.4 kg C m ⁻² year ⁻¹). Water movement enhancing nutrient supply was an important factor limiting production. Most populations were 12 years old but at c. 20 m off Muldoanich longevity was very low.
Price & Tittley (1978)	Annotated checklist of the marine algae (excluding diatoms) of Mull based on collections made between 1966 and 1970; annotation includes comparison with Scotland (including occasional reference to the Outer

	Hebrides) and the NE Atlantic.
Norton & Powell (1979)	A review of the literature on the ecology of rocky shores focussing on the seaweeds. It includes a full list of seaweeds recorded in the islands. They list 264 species (c. 38% of the British total). They note that the sublittoral of the southern and western coasts is dominated by beds of <i>Laminaria hyperborea</i> and that the eastern coasts are dominated by <i>Ascophyllum nodosum</i> . A brief history of the use of the large brown seaweeds is also given.
Spence et al. (1979a)	Survey of macrophyte vegetation in and around 30 lochs centred on Loch Druidibeg. Includes measurements of alkalinity and conductivity. Includes list of red, green and brown seaweeds from various lochs. List databased (Appendix 1).
Spence et al. (1979b)	Limnological and macrophyte survey of Loch Obisary, a narrow sea inlet, 45 m deep and stratified in summer and winter. Lists red, green, brown seaweeds and blue-green algae in relation to distance from the sea inlet. List databased (Appendix 1).
Dipper (1983)	Report of a diving survey of Loch Roag, Lewis. Algal diversity was lower than anticipated due to grazing pressures from large <i>Echinus esculentus</i> populations. This was probably the first study of the sublittoral seaweeds of Lewis or Harris. It includes descriptions of plant and animal communities. Algal species list databased (Appendix 1).
Maggs (1986)	A distributional checklist, biogeographical analysis and literature abstract of Scottish marine macroalgae. Principle published studies and surveys for the Outer Hebrides listed. List of species for Scotland, including from the Outer Hebrides compiled from the following sources: Adey & Adey (1973), Dipper (1983, 1985), Dipper & Mitchell (1980), Howson & Picton (1985), Norton (1972), Norton & Powell (1979), Powell (1957), Price & Tittley (1978), Prud'homme van Reine (1982), Spence et al. (1979a, b). List databased (Appendix 1).
Howson et al. (1994)	Results of field surveys of flora and fauna of Scottish sealochs undertaken between 1988 and 1991. Includes lists of red, brown and green seaweeds recorded from 19 lochs in the Outer Hebrides: West Loch Tarbert, Braigh Mor, Loch Resort, Loch Tealasavay, Loch Tamanavay, Loch Grimshader, Loch Leurpost, Loch Erisort, Loch Mharabhig, Loch Bhrollum, Loch Claidh, Loch Seaforth, East Loch Tarbert, Loch Stockinish, Loch Maddy, Loch Eport, Loch Uiskevagh, Loch Skipport, Loch Boisdale. Note: the fjards were covered in <i>Ascophyllum nodosum</i> ; loch entrances were exposed with barnacles and fucoids; sheltered, tide-swept sites of shallow channels in fjards were particularly rich. Combined species list databased (Appendix 1).
James et al. (1999)	Report of a habitat survey within the Sound of Eriskay in May 1999 for Babtie Group PLC as a precursor to planned causeway from South Uist to the Isle of Eriskay. Key results: <ul style="list-style-type: none"> - several nationally common biotope complexes - some of the most diverse communities were found in tide-swept surge channels on bedrock overhangs mid to lower shore - rock pools supported interesting algal species normally

	<p>associated with more southerly distribution found in Haun Harbour</p> <ul style="list-style-type: none"> - presence of <i>Cystoseira tamariscifolia</i> at or near northern limits for British Isles - live mearl <i>Phymatolithon calcareum</i> in proposed route of causeway - southern feel to flora: <i>Dudresnaya verticillata</i>, <i>Grateloupia filicina</i> and <i>Gelidiella calcicola</i> generally uncommon or rare in Scottish waters.
James et al. (2000)	<p>Report of a habitat survey undertaken within the Sound of Barra in September 1999 for Babtie Group PLC as a precursor to planned construction of ferry terminal on west coast of Eriskay. Key results:</p> <ul style="list-style-type: none"> - rocky intertidal had nationally common biotope complexes - some of the most species rich were mid to lower eulittoral rock pools - interesting algal species normally associated with more southern distributions. <p>List of algae from Site 1 databased (Appendix 1).</p>
SEPA Water Framework Directive (2008)	<p>Macroalgal lists were recorded from several sites in 2008 in relation to monitoring for the Water Framework Directive. These included Loch Erisort, Loch Roag and North Uist North.</p>
Burrows et al. (2010)	<p>An assessment of the intertidal seaweed resources of the Outer Hebrides undertaken by the Scottish Association for Marine Science (SAMS) and the Hebridean Seaweed Company (HBS) for the Scottish Enterprise and Highlands and Islands Enterprise in March 2010. The report focuses on <i>Ascophyllum nodosum</i>. Shore surveys using methods agreed with key stakeholders undertaken between April and October 2010 along with habitat modeling were used to estimate the biomass of rockweed. The final estimate (170500t) was close to the 1947 estimate (123000t) made by the Scottish Seaweed Research Association. The report also concluded that the present harvesting industry can access 36% of the total tonnage of <i>A. nodosum</i> and that for a sustainable harvest four years need to be left between cutting. The report also provides information on <i>A. nodosum</i> biology and ecology.</p>

3.0 METHODS

3.1 Survey work

A shore survey of the red (Rhodophyta), brown (Phaeophyceae) and green (Chlorophyta) macroalgae (seaweeds) was undertaken at sites in North Uist, South Uist, Harris and Lewis in the Outer Hebrides between the 30th July and 7th August 2012 (Table 3.1).

Table 3.1 Details of dates, sites and georeferences for seaweed survey sites.

Date	Island	Site	Latitude	Longitude
30.vii.2012	North Uist	Hoglan Bay	N 57 36 43.2	W 7 30 56.8
30.vii.2012	North Uist	Traig Stir bay	N 57 37 41.1	W 7 30 6.8
30.vii.2012	North Uist	Sheilings	N 57 33 5.9	W 7 11 46.5
31.vii.2012	North Uist	Sponish Pier	N 57 36 43.5	W 7 9 20.9
31.vii.2012	North Uist	Eilean na Roe	N 57 35 58.4	W 7 32 35.8
01.viii.2012	South Uist	Ceann a Gharaidh	N 57 6 42.4	W 7 23 32.2
01.viii.2012	South Uist	West Kilbride	N 57 6 11.3	W 7 21 1
02.viii.2012	South Uist	Rubha Ardvule	N 57 14 17.5	W 7 27 0.8
02.viii.2012	South Uist	Road to South Locheynort	N 57 14 2.6	W 7 21 35.5
03.viii.2012	Harris	Bagh Steinigie	N 57 50 4.1	W 7 1 33.8
03.viii.2012	Harris	Rubha Reamhar	N 57 52 3	W 6 55 39.8
03.viii.2012	Harris	To Luskentyre	N 57 52 32.5	W 6 55 24.4
04.viii.2012	Harris	Flodabay	N 57 47 43.8	W 6 52 58.7
04.viii.2012	Harris	Loch na h-Uamha	N 57 49 43.2	W 6 45 37
05.viii.2012	Lewis	Geodh'an Fharaidh ¹	N 58 6 25	W 7 6 35.7
06.viii.2012	Lewis	Port Geiraha ² north side of bay	N 58 21 58.9	W 6 12 49.4
		south side of bay	N 58 22 13.8	W 6 12 52.8
07.viii.2012	Lewis	Loch Leurbost	N 58 8 26.8	W 6 29 3.4
07.viii.2012	Lewis	Loch Erisort	N 58 4 58.7	W 6 37 56.7
07.viii.2012	Harris	Scalpay North Harbour	N 57 52 21	W 6 42 1.5

¹ Site 1, British Phycological Society 1971 (Norton 1972)

² Site 4, British Phycological Society 1971 (Norton 1972)

The choice of sites was made in order to represent a range of shore types and exposure on the east and west coasts of the islands in relation to the tides and time available. At each site, collections were made between the uppermost point that seaweeds were found (splash zone) and the lowest point it was possible to reach at low water (lower shore/sublittoral fringe). The tidal times and heights for low water for the sampling period are given in Figures 2-20. Samples were collected from as wide a range of habitats and exposure on each shore as possible. Details of the nature of each shore were recorded and an indication of the abundance of each species noted as far as possible.

3.2 Identification of species

Following each day's fieldwork, where possible, samples were identified to species and then either pressed and dried as herbarium sheets or, in the case of crusts on pebbles/rock, air dried. Specimens that could not be identified during the trip were also pressed or air dried for examination on return to the Natural History Museum. Identifications based on morphology were made by eye, stereo and/or compound microscope. Species were identified using Brodie & Irvine (2003), Brodie et al. (2007b), Bunker et al. (2010), Dixon & Irvine (1977), Fletcher (1981), Irvine (1983), Irvine & Chamberlain (1994), Kornmann & Sahling (1977) and Maggs & Hommersand (1993). The identification of species of *Ceramium*, *Osmundea* and *Polysiphonia* were confirmed by Prof. Christine Maggs. Samples of *Corallina* specimens are the subject of an ongoing molecular study.

3.3 Data

A specimen database was created (Appendix 3) from which a list of species at each site was generated (Appendix 4). These data were also incorporated into the database of species listed in the literature (Appendix 1). A comparison of the species recorded in 1971 (Norton 1972) was made for two sites revisited in 2012: Geodh'an Fharaidh and Port Geiraha.

4.0 RESULTS

4.1 Sites and records for 2012

Nineteen sites were visited (Fig. 1). Descriptions and illustrations of features and species are given in Figs 2-20. Seaweed collections were made from all sites with the exception of West Kilbride (Fig. 8), Road to South Locheynort (Fig. 10), North Harbour, Scalpay (Fig. 16) and Loch Erisort (Fig. 20). Lists were recorded from these sites with the exception of Road to South Locheynort. Five hundred and twenty five records were listed (Appendix 3) of which 490 specimens were pressed and dried as herbarium sheets or, in the case of crusts on stones, air dried. These are held in the algal herbarium (BM) at the Natural History Museum.

Figure 1. Map of the Outer Hebrides with location of sites.



4.2 Number of species recorded in 2012

One hundred and forty three taxa were recorded (Appendix 4): 73 red, 44 brown and 26 green. Of these, the identification of c. 15 was uncertain which makes the approximate number of species recorded as 128. Some species included one or both life history phases: the '*Falkenbergia*' phase (filamentous sporophyte) of *Asparagopsis armata*, the '*Trailliella*' phase (filamentous sporophyte) of *Bonnemaisonia hamifera*, both the crustose *Petrocelis* phase and upright phase of *Mastocarpus stellatus* and the blade phase of *Cutleria multifida* (as opposed to '*Aglaozonia*' phase).

4.3 Species recorded per site in 2012

A summary of the nature of each site is given in Table 4.1. The number of species recorded at each site (Table 4.1) ranged from 1 where we were passing by or looking for a particular species, through 4-12 for saltmarshes and other sheltered sites dominated by large brown fucoids, to 41-65 species at sites which were predominantly open coasts on the west coasts. No one species was recorded at all sites (Appendix 4). Of the reds, *Chondrus crispus* and *Vertebrata lanosa* (epiphyte on *Ascophyllum nodosum*) were found most frequently (10 sites) followed by *Corallina officinalis*, *Lomentaria articulata* and *Osmundea pinnatifida* (8 sites). For the browns species, *Pelvetia canaliculata* (14 sites), *Fucus spiralis* (12 sites), *Ascophyllum nodosum* (12 sites) and *F. vesiculosus* (11 sites) were the most frequently recorded. Of the greens, *Cladophora rupestris* was the most frequent (11 sites), all the rest only recorded at 6 or less sites. Overall, 44 species (c. 34% of the total) were only recorded from one site. Species not recorded in previous studies included four reds, one brown (putative hybrid) and two green, including an undescribed *Ulvaria* (Table 4.2).

4.4 Non-native species

Five species of non-native species were recorded, three red, one brown and one green (Table 4.3). Only the sporophyte phases were found of *Asparagopsis armata* and *Bonnemaisonia hamifera*. The approximate length of time that it has taken for the non-natives recorded to arrive in the Outer Hebrides since they were first recorded in the UK ranges from 42 to 166 years.

Table 4.1 Summary of the nature of the site and number of species.

Site	Nature of site	No. of species
Hoglan Bay	West coast; open coast	48
Traig Stir bay	West coast; open coast	9
Sheilings	East coast; extremely sheltered shore	9
Sponish Pier	East coast; extremely sheltered shore	11
Eilean na Roe	West coast; open coast	44
Ceann a Gharaidh	West coast; open coast	45
West Kilbride	South coast; open; sheltered by offshore islands	8
Rubha Ardvule	West coast; saltmarsh	58
Road to South Locheynort	Saltmarsh	0 ¹
Bàgh Steinigie	West coast; open coast	49
Rubha Reamhar	Saltmarsh	4
Just before Luskentyre	West coast; extremely sheltered inlet	1
Flodabay	West coast; extremely sheltered loch	12
Loch na h-Uamha	West coast; sheltered sealoch	65
Geodh'an Fharaidh	West coast; exposed open coast	56
Port Geiraha	East coast; exposed open coast	41
Loch Leurbost	East coast; very sheltered head of sealoch	10
Loch Erisort	East coast; very sheltered	4
Scalpay North Harbour	East coast; very sheltered	1

¹No samples collected.

Table 4.2 Species not recorded in previous studies.

Species		
Red	Brown	Green
<i>Ceramium diaphanum</i> sensu Harvey	<i>Fucus vesiculosus</i> x <i>spiralis</i>	<i>Ulva pseudocurvata</i>
<i>Helminthocladia calvadosii</i>		¹ <i>Ulvaria</i> sp.
<i>Osmundea oederi</i>		
<i>O. osmunda</i>		

¹This is an undescribed species identified by molecular data (C.A. Maggs, pers. comm.).

Table 4.3 Non-native species recorded from the Outer Hebrides.

Species	First record in the Outer Hebrides	First record for the UK ¹
<i>Asparagopsis armata</i> 'Falkenbergia' phase	1988-1991 (Howson 1994)	1936(?)
<i>Bonnemaisonia hamifera</i> 'Trailliella' phase	1935-1936 (Sinclair 1938)	1893
<i>Pyropia leucosticta</i>	1971 (Norton 1972)	1880
<i>Colpomenia peregrina</i>	1971 (Norton 1972)	1907
<i>Codium fragile</i> subsp. <i>fragile</i>	1999 (James et al. 2000)	1853

¹Dates based on herbarium specimens at the Natural History Museum.

4.5 Comparison of 2012 data with 1971 records

At Geodh'an Faraidh, 106 species were recorded in 1971 (Norton 1972) in comparison to 56 in 2012 (Appendix 4). Of the total combined list of 131 species for both surveys, only 31 of the same species were recorded on both occasions. At Port Geiraha, 97 species were recorded in 1971 and 41 in 2012. Of the total combined list of 112 species for both surveys, only 25 of the same species were recorded on both occasions. The combined number of species for these two sites for each survey was 179 in 1971 and 152 in 2012. A comparison of the proportion of red, brown and green algae (Table 4.4) showed that at Geodh 'an Faraidh there were proportionally more green species in 2012 than in 1971 but the actual numbers were similar. At Port Geiraha there were proportionally more red species in 2012 than in 1971. There was also a marked difference in species composition between the two surveys.

Table 4.4 Comparison of sites surveyed in 1971 with 2012: numbers of red, brown and green algae. Numbers in brackets = percentages.

Site	Number of seaweed group at each site			
	Geodh 'an Faraidh		Port Geiraha	
	1971	2012	1971	2012
Date surveyed	1971	2012	1971	2012
Red	58 (55)	30 (54)	45 (46)	27 (66)
Brown	38 (36)	17 (30)	33 (34)	8 (19)
Green	10 (9)	9 (16)	19 (20)	6 (15)
Total	106	56	97	41

4.6 Species recorded in the literature

Species listed in the literature that was reviewed consisted of 389 taxon entries, of which 209 were red, 113 brown and 67 green (Appendix 1). Of the red species, *Mastocarpus stellatus* was listed most often, with 14 out of 19 site/area entries. For the brown species, *Alaria esculenta*, *Ascophyllum nodosum*, *Fucus vesiculosus* and *Himanthalia elongata* were listed most often, with 14 out of 19 site/area entries. *Cladophora rupestris* was the most listed green, also with 14 out of 19 site/area entries.

Figure 2. Hoglan Bay, North Uist

Date: 30.viii.2012

Grid ref: N 57 36 43.2 W 7 30 56.8

Low water: 11.38 BST, 1.4 m (arrived on shore 09:45, surveying lower shore from 11:00 to 12:30).

Weather: Relatively calm and dry, making conditions good for collecting.

Shore: A sandy bay with large rock outcrops and a shallow slope. Patches of sand with pebbles support *Ulva* species and there are rock pools in the mid-shore.

General notes: Birds included oyster catchers, ducks (unidentified) and some little waders.



a) General view of shore



b) Close up of shore with rock pools



c) *Fucus spiralis* conceptacles



e) *Ralfsia verrucosa* on limpets



f) *Hildenbrandia rubra*



g) *Halidrys siliquosa* with epiphyte *Sphacelaria cirrosa*



h) Bleached *Corallina officinalis*



i) Crustose corallines under fucoids

Figure 3. Traig Stir, North Uist

Date: 30.viii.2012

Grid ref: N 57 37 41.1 W 7 30 6.8

Low water: 11.38 BST, 1.4 m (arrived on shore 13:00).

Weather: Relatively calm, sunny.

Shore: A sandy bay backed by sand dunes with very flowery machair vegetation above. At the north end of the beach a bedrock outcrop forms a reef into sea; more sheltered areas with boulders covered in *Ulva* spp.

General notes: The tide was coming up so this was only a brief survey of the shore and it was not possible to get to the exposed side of the reef. There was considerable drift weed accumulated on the beach. Notable drift species lower on the shore included *Alaria esculenta*, *Laminaria digitata*, *Odonthalia elongata* and *Eudesme virescens*.



b) View of lower shore with incoming tide



a) General view of shore



c) *Ulva* sp.



d) *Porphyra dioica* growing over *Ulva* sp.



e) *Ascophyllum nodosum*

Figure 4. Sheilings, North Uist

Date: 30.viii.2012

Grid ref: N 57 33 5.9 W 7 11 46.5

Low water: 11.38 BST, 1.4 m (arrived on shore 15:30).

Weather: Calm and sunny; very pleasant.

Shore: By Drim Sidinish, opposite Bay Sponish. Very sheltered shore dominated by large brown fucoids with saltmarsh vegetation with *Blidingia* and *Fucus cottonii* amongst *Armeria maritima*, *Glaux maritima* and *Puccinellia maritima*.

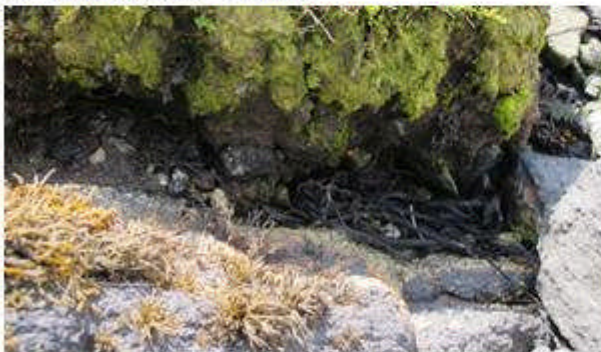
General notes: The tide was approx. mid-way. There was a small amount of drift. Birds included lapwing, oyster catcher, ring plover, duck (unidentified), buzzard, whooper swan, greylag geese, stonechat, linnnet, wren, grey wagtail.



a) General view of inlet



b) Brown algal zonation



c) *Blidingia marginata* (top) and *Pelvetia canaliculata* (lower left)



e) *Fucus cottonii* amongst saltmarsh plants



d) Reproductive tips of *Pelvetia canaliculata*



f) *Fucus cottonii*

Figure 5. Spanish Pier, North Uist

Date: 31.viii.2012

Grid Ref: N 57 36 43.5 W 7 9 20.9

Low water: 12.35 BST, 1.1 m (arrived on shore 09:45).

Weather: Calm, sunny, very good conditions for collecting.

Shore: Extremely sheltered bay; bedrock on either side, dominated by *Ascophyllum nodosum* until pebbly lower shore.

General notes: Quite a lot of drift.

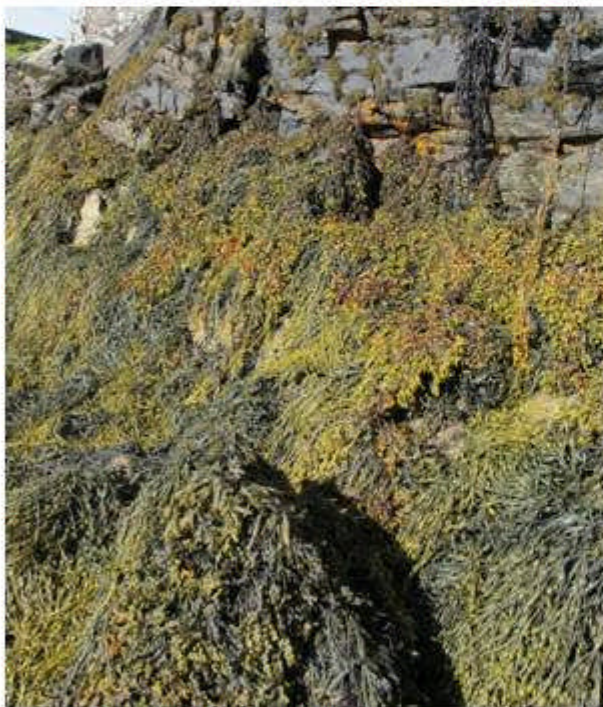
Pelvetia canaliculata 0.5 m in vertical extent; *Fucus spiralis* with very small reproductive structures; *F. vesiculosus*, very bladdered, forming a narrow zone. Possible hybrids between the two fucoid species. *Ascophyllum* c. 2-4 m in length of zone; individuals with 7-10 bladders (c. 11-14 years old). *Hildenbrandia* on pebbles and bedrock. *Chondrus crispus* growing on pebbles on lower shore, olive green in colour.



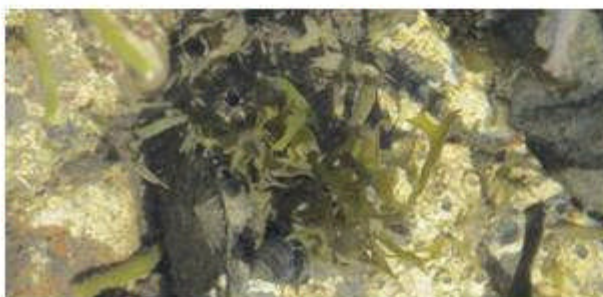
a) View of inlet



b) Inlet at c. mid-tide



c) Brown algal zonation



d) *Chondrus crispus*, lower shore



e) *Pelvetia canaliculata* (top), *Fucus spiralis* (mid) and *F. vesiculosus* (bottom)

Figure 6. Eilean na Roe, North Uist

Date: 31.viii.2012

Grid ref: N 57 35 58.4 W 7 32 35.8

Low water: 12.35 BST, 1.1 m (arrived on shore 11.45).

Weather: Calm and sunny; very good conditions for collecting.

Shore: Sandy bay with outcrops of bedrock; semi-exposed shore with rock pools.

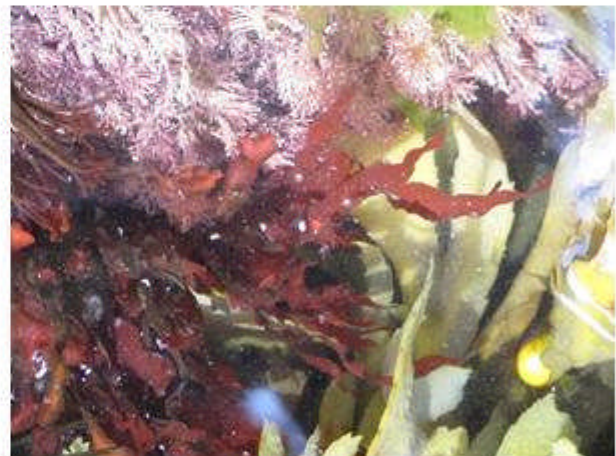
General notes: *Fucus serratus* very abundant. Limpets and barnacles on rocks. *Lithothamnion* lining pools. *Chondrus crispus* very variable in form with both narrow and broader forms.



b) Lower shore with rock pools



a) General view of the shore



c) *Phyllophora crispus*



d) *Asperococcus fistulosus* epiphytic on *Fucus*



e) Rock pool with coralline algae

Figure 7. Ceann a Garaidh, west of Smerclate, South Uist

Date: 01.viii.2012

Grid ref: N 57 6 42.4 W 7 23 32.2

Low water: 13.24, BST, 0.9 m (arrived on shore 11:00)

Weather: Rain clearing, windy; reasonable for collecting

Shore: Sandy bay with fairly extensive, seaweed-dominated flat rock interspersed with boulders, pebbly areas and water-filled channels.

General notes: Many large individuals: *Codium fragile* subsp. *fragile*, very long *Chorda filum*, large, flat *Fucus vesiculosus*. Channel communities with *Halidrys siliquosa* reminiscent of a northern version of Isles of Scilly.



a) View of bay



b) View of shore



c) Sand, gravel and pebble community



d) Fertile *Ulva*

Figure 7 contd.



e) Example of sandy channel with *Chorda filum*



f) *Halidrys siliquosa* with *Sphacelaria cirrosa*



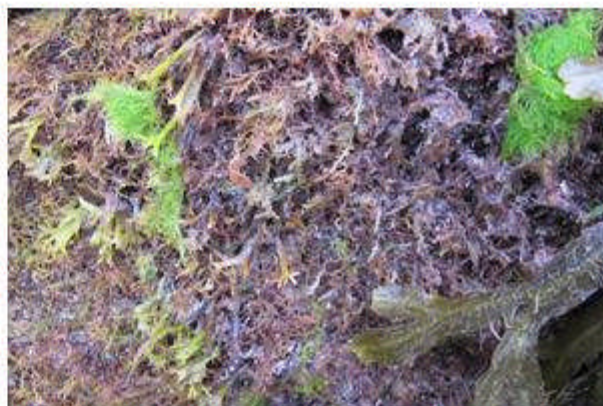
g) Channel with *Halidrys siliquosa* and *Codium fragile* subsp. *fragile*



h) *Codium fragile* subsp. *fragile*



i) *Rhodochorton floridulum*



j) Overhang, including *Osmundea pinnatifida*, *Chondrus crispus*, *Lomentaria articulata*

Figure 8. West Kilbride, South Uist

Date: 01.viii.2012

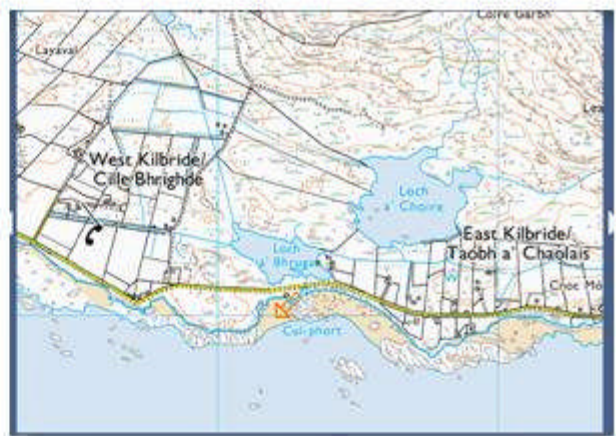
Grid ref: N 57 6 11.3 W 7 21 1

Low water: 13.24, BST, 0.9 m (arrived on shore 13:30).

Weather: Deteriorating and downpour.

Shore: Sandy beach with sand-scoured rocks.

General notes: Very low diversity of seaweeds; large limpets with *Ralfsia*; large *Mytilus edulis*. Short time spent on shore.



a) View of bay



b) *Ascophyllum nodosum*



c) *Ulva linza* at base of rock



d) Fucoids on bedrock outcrops



e) *Ralfsia verrucosa* on limpet shell



f) *Cladophora rupestris* under fucoids



g) Drift *Zostera*

Figure 9. Rubha Ardvule, South Uist

Date: 02.viii.2012

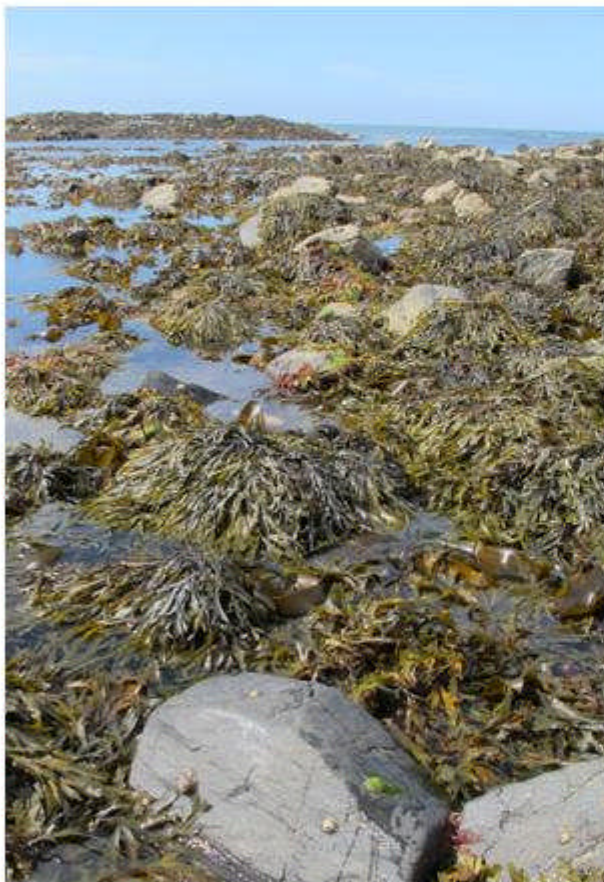
Grid ref: N 57 14 17.5 W 7 27 0.8

Low water: 14.07, BST, 0.7 m (arrived on shore 11:00).

Weather: Good.

Shore: Extensive rocky shore with rock pools and runnels and extensive kelp beds at bottom of shore.

General notes: Upper shore protected by rocks. Seals in shallow bay and hauled out on island opposite bottom of shore. Birds included oyster catchers, herring gulls, greater black-backed gull, cormorant, heron, redshank, curlew, wheatear, raven, gannet and flock of little waders.



a) View of lower shore



b) View of upper shore



c) Kelps and fucoids on lower shore

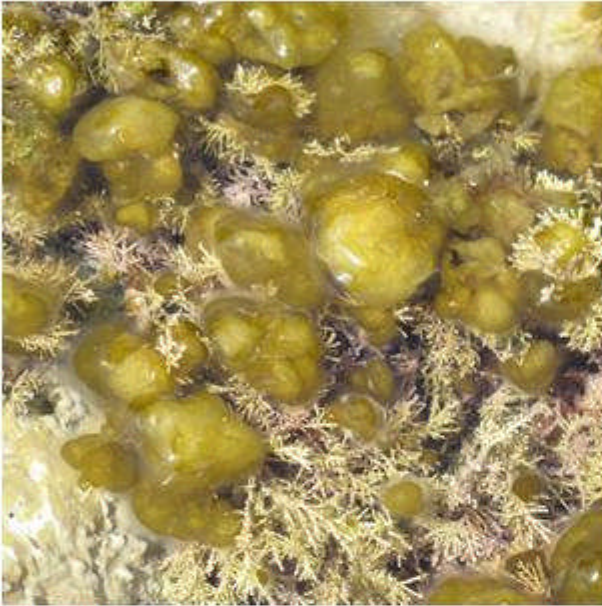


d) Kelps, sublittoral fringe

Figure 9 contd.



e) Mid shore rock pool



f) *Leathesia difformis* on *Corallina*



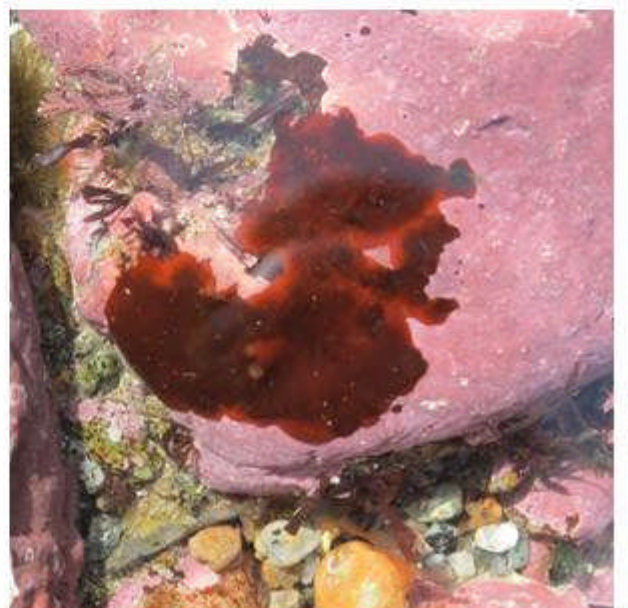
g) Lower shore and Common seals



h) Coralline algae



i) Crustose corallines



j) *Cruoria pellita*

Figure 10. Road to South Locheynort, South Uist

Date: 02.viii.2012

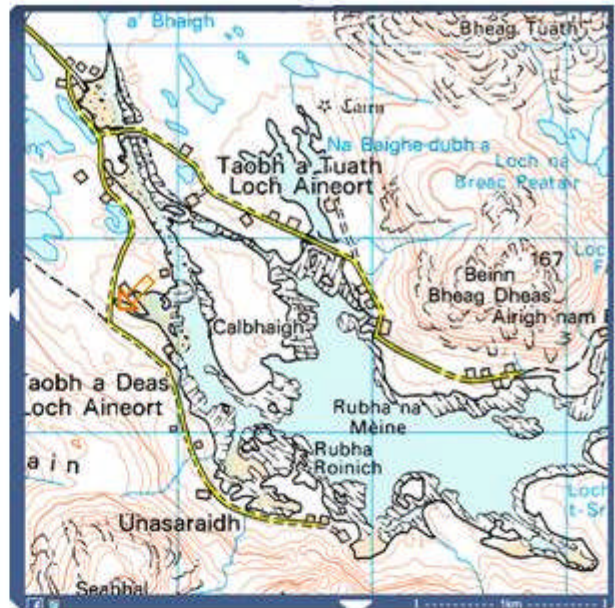
Grid ref: N 57 14 2.6 W 7 21 35.5

Low water: 14.07, BST, 0.7 m (visited c. 15:00).

Weather: Good.

Shore: Saltmarsh. Very sheltered.

General notes: Very short vegetation with *Armeria maritima*, *Glaux maritima*, *Puccinellia maritima*. No sign of *Bostrychia*. No collections made.



a) View of saltmarsh



b) Saltmarsh vegetation



c) Fucoids along shore



e) *Fucus cottonii* with *Armeria maritima*



f) View of inlet

Figure 11. Bàgh Steinigie, Harris

Date: 03.viii.2012

Grid ref: N 57 50 4.1 W 7 1 33.8

Low water: 14.46, BST, 0.7 m (arrived on shore 12:30).

Weather: Very calm and sunny.

Shore: Sandy beach with boulders, bedrock, rockpools; freshwater streams running onto beach. Lower shore: boulders and bedrock with gravelly sand.

General notes: Upper shore: *Lithophyllum incrustans* lining pools and *Halidrys siliquosa* in crevices. Lots of *Chordaria flagelliformis* on lower shore. *Corallina officinalis* very bleached. Also some bleaching of crustose corallines and *Osmundea pinnatifida*.



b) Kelps and fucoids on lower shore



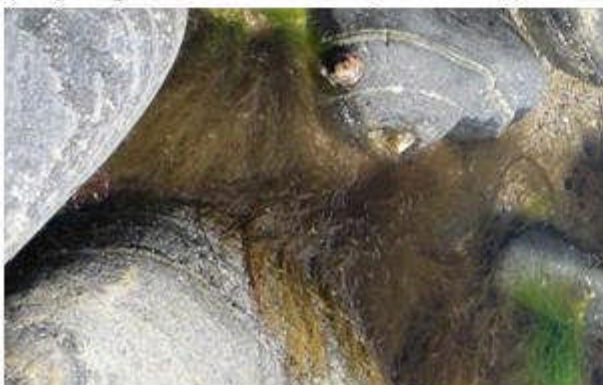
a) View of shore looking west



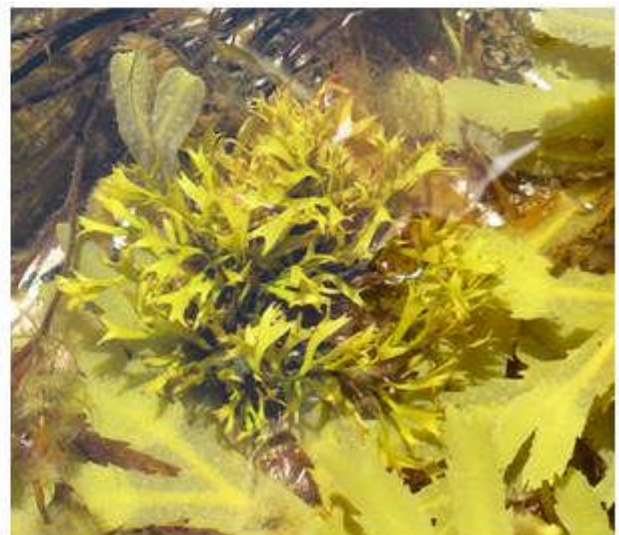
c) *Scytosiphon lomentaria* d) *Elachista fucicola*



f) *Corallina officinalis* in rock pool



e) *Chordaria flagelliformis*



g) *Chondrus crispus* with loss of red pigment

Figure 12. Rubha Reamhar, Harris

Date: 03.viii.2012

Grid ref: N 57 52 3 W 6 55 39.8

Low water: 14.46, BST, 0.7 m (visited c. 16:00).

Weather: Very calm and sunny.

Shore: Saltmarsh.

General notes: Very shore vegetation.
No sign of *Bostrychia scorpioides*.



a) View of the bay



c) Green algae and saltmarsh vegetation



b) *Spartina* on sand



d) Green algae loose on substratum

Figure 13. Road to Luskentyre, Harris

Date: 03.viii.2012

Grid ref: N 57 52 32.5 W 6 55 24.4

Low water: 14.46, BST, 0.7 m (visited c. 16:30).

Weather: Very calm and sunny.

Shore: Very sheltered shore.

General notes: Small patches of saltmarsh vegetation above fucoid middle shore running into sandy inlet. Lots of *Catenella repens*.



a) View of shore



b) Dense cover of fucoids on shore



c) *Fucus* with pseudobladders



d) *Catenella repens*



e) View of inlet

Figure 14. Flodabay, Harris

Date: 04.viii.2012

Grid ref: N 57 47 43.8 W 6 52 58.7

Low water: 15.24, BST, 0.7 m (arrived on shore 12:00).

Weather: Very calm and sunny.

Shore: Extremely sheltered loch.

General notes: Quay running out along shore. Freshwater entering. Probably about mid-tide. Lots of variable looking fucoids. No obvious sign of *Fucus ceranoides*.



a) Flodabay quay



b) Stony shore with jetty and bedrock



c) Fucoids on bedrock outcrops



d) Fucoids on upper shore



e) Zonation of *Fucus vesiculosus* (above) and *Ascophyllum* with *Vertebrata lanosa*



f) *Fucus vesiculosus* x *spiralis*?

Figure 15 contd.



e) *Laminaria digitata*, lower shore



f) *Himanthalia elongata*



g) *Osmundea osmunda* (centre) with *Mastocarpus stellatus* (left)



h) *Palmaria palmata*



i) *Odonthalia dentata*, infralittoral



j) *Petrocelis phase* (crust) of *Mastocarpus stellatus* with *Himanthalia elongata* 'buttons'

Figure 16. Scalpay, North Harbour, Harris

Date: 07.viii.2012

Grid ref: N 57 52 21 W 6 42 1.5

Low water: 17.15, BST, 1.3 m (arrived on shore 16:30).

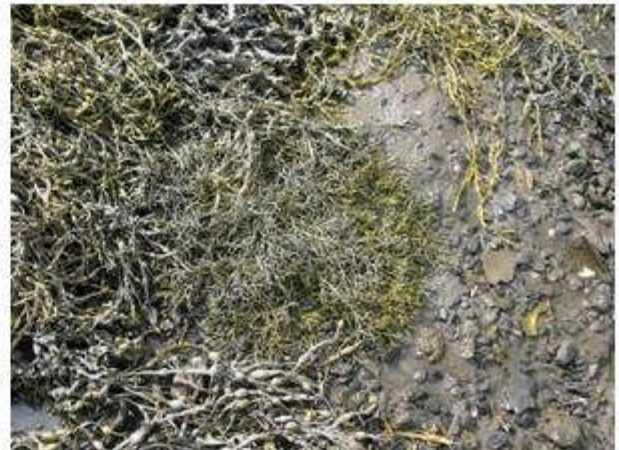
Weather: Good.

Shore: Extremely sheltered, flat, pebbly, muddy inlet.

General notes: Some patches of *Ascophyllum nodosum* ecad *mackayi*.



a) North Harbour, Scalpay



c) *Ascophyllum nodosum* ecad *mackayi*



b) Narrow form of *Ascophyllum nodosum*



d) Close up, *Ascophyllum nodosum* ecad *mackayi*

Figure 17. Geodh'an Fharaidh, Harris

Date: 05.viii.2012

Grid ref: N 58 6 25 W 7 6 35.7

Low water: 16.01, BST, 0.8 m (arrived on shore 14:30).

Weather: Calm, good.

Shore: Exposed bay with boulders high on shore running onto sand and boulders.

General notes: Barnacle zone looks very scoured. Rock pools and sandy pools and channels/runnels. Lower shore sandy.



a) View of the bay



b) Bedrock covered in *Porphyra dioica*



c) *Ulva* species and sandy pools



d) Mid shore



e) Lower shore with *Alaria esculenta* and *Mastocarpus stellatus*



f) Lower part of middle shore

Figure 17 contd.



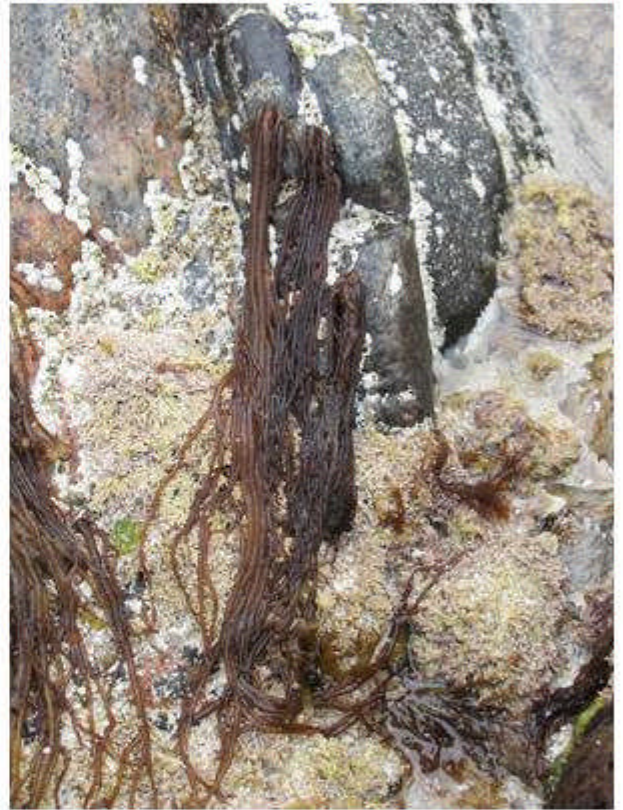
g) *Lithophyllum incrustans*



j) *Helminthocladia calvadosii*



h) *Corallina* sp.



k) *Nematium helmonthoides*



i) *Mastocarpus stellatus*



l) *Osmundea* sp.

Figure 18. Port Geiraha, Lewis

Date: 06.viii.2012

Grid ref: N 58 22 13.8 W 6 12 52.8

Low water: 16.37, BST, 1.0 m, (arrived on shore 15:00).

Weather: Sunny, good.

Shore: Sandy bay with seastacks and bedrock

General notes: Well-developed classic-looking zonation of exposed shore communities.



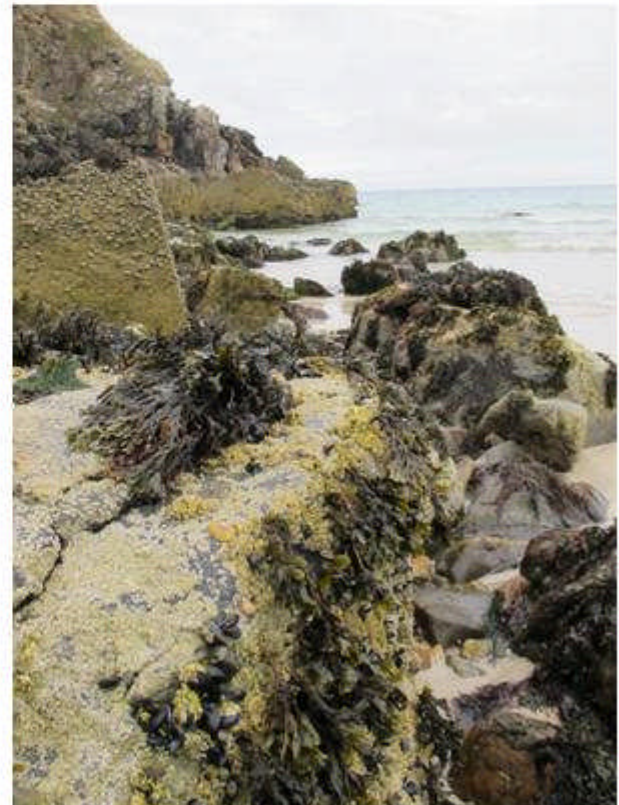
a) Shore looking north



b) Shore looking south



c) Stack showing zonation at base



d) Bedrock north side with fucoids amongst barnacle-dominated rocks

Figure 18 contd.



e) *Chondrus crispus* and *Corallina officinalis*
lower shore pool



f) *Ceranium shuttleworthianum*



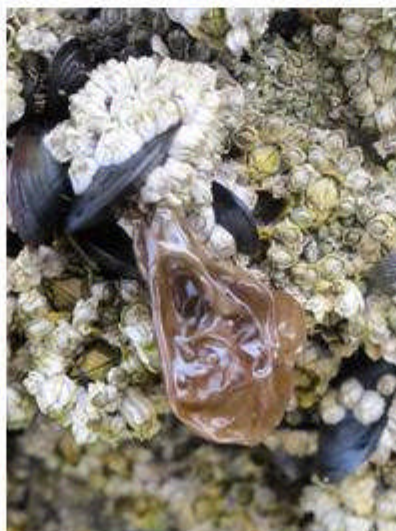
g) *Aglaothamnion sepositum*



h) *Palmaria palmata*



i) Seaweed zonation



j) *Porphyra umbilicalis*



k) *Pyropia leucosticta*
epiphytic on *Fucus*

Figure 19. Leurbost, Lewis

Date: 07.viii.2012

Grid ref: N 58 8 26.8 W 6 29 3.4

Low water: 17.15, BST, 1.3 m (arrived on shore 13:00).

Weather: Overcast, calm.

Shore: Very sheltered head of loch.

General notes: Pebbly and small boulders. Scattered patches of saltmarsh development. Patchy *Ascophyllum nodosum* ead. *mackayi* amongst *A. nodosum*.



a) View of the loch



b) *Ascophyllum nodosum* and *Fucus* species



c) *Ascophyllum nodosum* ead. *mackayi*



d) *Ascophyllum nodosum* ead. *mackayi* with *Vertebrata lanosa*



e) *Fucus cottonii* on edge of saltmarsh



f) *Catenella repens* on pebble

Figure 20. Loch Erisort, Lewis

Date: 07.viii.2012

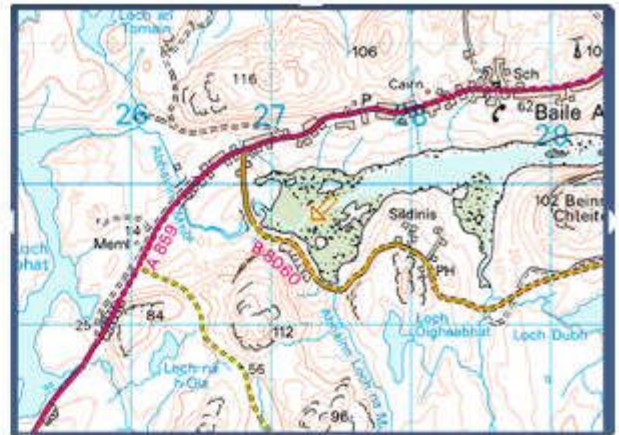
Grid ref: N 58 4 58.7 W 6 37 56.7

Low water: 17.15, BST, 1.3 m (arrived on shore 14:30).

Weather: Overcast, calm.

Shore: Very sheltered shore.

General notes: Furoid covered pebbles and boulders. Appears less sheltered and shore steeper than at Leurbost. No sign of *Ascophyllum nodosum* ecad *mackayi*.



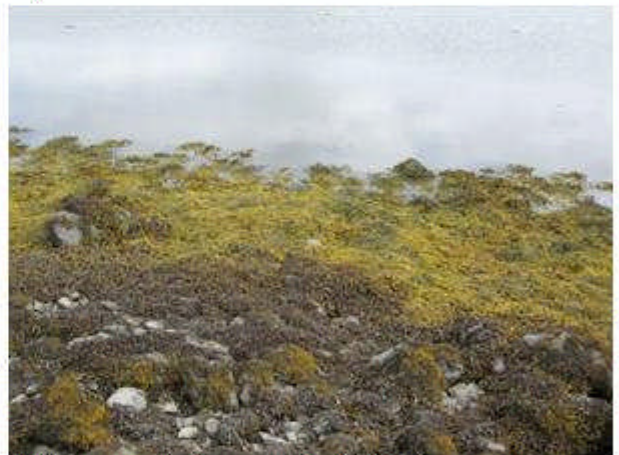
a) Loch from the road



b) Inlets of the loch



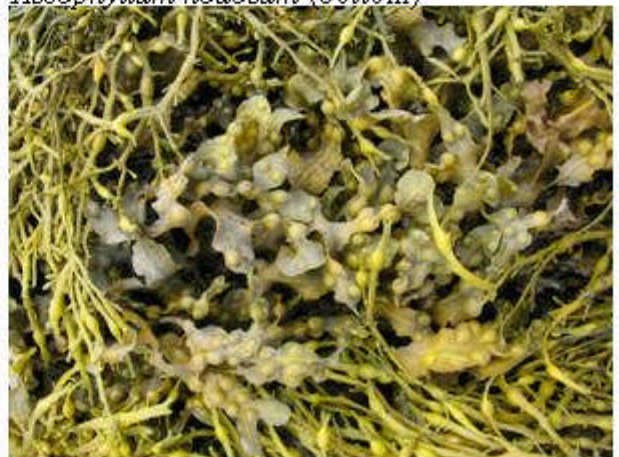
c) Brown algal cover on shore of loch



d) Brown algal zonation: *Pelvetia canaliculata* (top), *Fucus spiralis* (mid) and *Ascophyllum nodosum* (bottom)



e) *Ascophyllum nodosum*



f) *Fucus vesiculosus*

5.0 DISCUSSION

During the 2012 survey, approximately 128 species were recorded which represents c. 20% of the UK seaweed flora. The literature survey with 389 taxon names represents over 60% of the UK seaweed flora. This makes the Outer Hebrides an extremely valuable area for seaweed diversity in the UK. To put this into a broader context, the seashores and shallow seas around the UK are a hot spot for seaweed biodiversity, supporting c. 7% of the world's seaweed flora. Of the taxa recorded for the Outer Hebrides, it is not realistic to give an exact number of species. Much has been done in recent years on the taxonomy of the UK seaweeds and tools are being developed to assist with identification (e.g. Bunker et al. 2010) but many species are extremely hard or impossible to distinguish on the basis of morphology alone. It is clear that some groups require further specialist taxonomic studies, including the application of molecular techniques. Such groups that we have identified based on the results of this survey include: i) species of the red algal genera *Ceramium*, *Polysiphonia* and *Osmundea*, ii) the brown morphologically intermediate fucoids, ectocarpoid and crustose species, and iii) species of the green algal genera *Cladophora* and *Ulva*, where although excellent work has been undertaken on these genera by Leliaert & Boedeker (2007) and Maggs et al. (2007), there is uncertainty on species identification in the Outer Hebrides.

Over the course of this study, 143 species names were recorded, each associated with one or more specimens. The value of having such specimens associated with these names means that they can be revisited and if necessary re-identified. It is also of note how different the species composition can be at a site at different times and although there are certain species which are characteristic (notably kelps and fucoids), there is a great deal of variation between the species that have been recorded in the various lists, which highlights the stochastic nature of what seaweeds might be present at different times. These observations point to the need for fixed sites which can be studied in detail over long periods of time in order to be able to monitor change. A few sites have been sampled in the Outer Hebrides by the Scottish Environment Protection Agency (SEPA) as part of the Water Framework Directive but they are no longer sampling at Loch Erisort, North Uist (Clare Scanlan, personal communication, 2012).

The presence/impact of non-native seaweeds appears to be relatively light. This is in comparison to other UK coasts, notably southern England, where c. 40 seaweed species have been considered to be non-natives (Brodie et al. 2012). *Codium fragile* subsp. *fragile* (Fig. 7g, h) is highly conspicuous in pools and channels on some shores in the Outer Hebrides. The impact is unknown but it would be useful to know if it is competing with e.g. *Halidrys siliquosa*. The ‘*Trailliella*’ phase of *Bonnemaisonia hamifera* and the ‘*Falkenbergia*’ phase of *Asparagopsis armata* have been known in the UK flora for a considerable period of time (Table 4.4). *Pyropia leucosticta* is a common epiphyte of *Fucus* but was only confirmed as a non-native species from the results of a global phylogeny of the Bangiales based on molecular data (Sutherland et al. 2012). We did not find *Sargassum muticum* during our 2012 seaweed survey but one specimen, 1 m long, was found attached to rocks on a predominantly sandy beach to the southwest of Benbecula (Luib Bhan - NF 77777 84951; Laura Bush, personal communication 2012).

There are a number of constraints to this type of survey, notably the need for spring tides to be able to study the lower parts of the lower shore. The number of sites visited and the number of samples processed during the survey were at the limit of what was physically possible for two people. The survey of the marine algae of Lewis and Harris in 1971 included a team of nine phycologists who specialized in particular algal groups (Norton 1972).

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

This survey provides a new baseline for seaweed diversity for the Outer Hebrides, a region well known for its seaweeds and where there is great interest in them both for their biodiversity and as a valuable resource. Considerable quantities of fucoids are currently harvested, but these are collected from low seaweed diversity areas and the impact of harvesting on the seaweed diversity appears to be quite low. If the scale of harvesting increases, then it will be necessary to monitor the impact on diversity. An increase in the scale of harvesting has the potential to alter the dynamics of the ecosystem, including the

removal of the damping effect of the sea by these large brown species and potential change in the structure of the habitat/substratum. The latter may make conditions more favourable for non-natives such as the highly invasive *Sargassum muticum*. Our results indicate that there is scope for future intertidal and subtidal studies. It would be valuable to return to sites that have been surveyed and also to study them at different times of the year. Based on the sites that were studied in 2012, we have also identified gaps that would be valuable to fill, including Barra, Benbecula, the mid-Uists and the north-west coast of Lewis. The problems of the taxonomy of certain seaweed groups have been highlighted from the data and further studies would be useful for the area, the results of which would also be valuable to related areas and elsewhere in the UK. Collections associated with surveys are an invaluable source of data for such work as well as providing a verifiable record of the species in space and time.

6.2 Recommendations

- Further monitoring should be undertaken in parallel with any increased harvesting in order to monitor impact on seaweed diversity.
- Detailed seaweed surveys should be undertaken at fixed sites at regular intervals to study long term change.
- Taxonomic studies of certain groups should be undertaken, notably species of *Osmundea*, *Ceramium*, *Polysiphonia*, *Sphacelaria*, *Fucus* hybrids, *Cladophora*, and *Ulva*.
- Collections should be made during survey work and deposited in national or regional herbaria as a verifiable source of data for future reference.

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9.0 APPENDICES

<i>Audouinella membranea</i>									1	1									2
<i>Audouinella</i> sp.															1				1
<i>Bangia fuscopurpurea</i>			1					1	1	1									4
<i>Boergeseniella fruticulosa</i>									1						1		1		3
<i>Bonnemaisonia asparagoides</i>		1								1				1	1				4
<i>Bonnemaisonia hamifera</i> 'Trailliella' phase						1		1	1			1		1		1	1		7
<i>Bostrychia scorpioides</i>					1	1				1									3
<i>Brongniartella byssoides</i>		1							1	1				1	1				5
<i>Calliblepharis ciliata</i>															1	1			2
<i>Callithamnion arbuscula</i>								1	1	1									3
<i>Callithamnion corymbosum</i>			1	1						1					1				4
<i>Callithamnion granulatum</i>		1							1	1									3
<i>Callithamnion tetragonum</i>		1			1	1			1	1	1				1				7
<i>Callithamnion</i> sp.															1	1			2
<i>Callithamnion</i> spp. (spongy)															1				1
<i>Calocolax neglectus</i>									1	1							1		3
<i>Callophyllis cristata</i>															1		1		2
<i>Callophyllis laciniata</i>		1			1				1	1	1			1		1		1	8
<i>Catenella repens</i>			1				1	1			1	1		1				1	8
<i>Ceramium ciliatum</i>			1		1				1	1	1					1			7
<i>Ceramium cimbricum</i>																	1		1
<i>Ceramium circinatum</i>											1								1
<i>Ceramium desclongchampii</i>																1			1
<i>Ceramium diaphanum</i>			1							1	1					1			4
<i>Ceramium diaphanum</i> sensu Harvey																		1	1
<i>Ceramium echinotum</i>											1							1	2
<i>Ceramium gaditanum</i>										1	1								2
<i>Ceramium pallidum</i>																1		1	2
<i>Ceramium 'rubrum'</i>			1	1	1					1	1	1	1	1	1		1		10
<i>Ceramium secundatum</i>																1		1	2
<i>Ceramium secundatum?</i>																		1	1
<i>Ceramium shuttleworthianum</i>			1	1	1					1	1	1				1		1	10
<i>Ceramium strictum</i>			1								1	1				1			4
<i>Ceramium virgatum</i>																	1	1	2
<i>Ceramium virgatum?</i>																		1	1
<i>Ceramium</i> sp.													1		1				2
<i>Ceramium</i>					1				1										2
Ceramiales indet.															1				1

<i>Chondria dasyphylla</i>																	1			1	
<i>Chondrus crispus</i>	1	1						1	1	1	1					1		1	1	10	
<i>Choreocolax polysiphoniae</i>										1	1									2	
<i>Chylocladia verticillata</i>		1								1	1							1	1	5	
<i>Colaconema daviesii</i>											1									1	
<i>Compsothamnion thuyoides</i>																	1			1	
<i>Conchocelis rosea</i> (life history phase of <i>Porphyra</i>)				1					1		1									3	
<i>Corallina elongata</i>											1	1							1	3	
<i>Corallina officinalis</i>		1		1	1				1	1	1				1		1	1	1	11	
<i>Corallina</i> sp.																			1	1	
<i>Corallina</i>						1	1													2	
Corallinaceae indet.																	1			1	
Corallinaceae indet. (enc)																		1		1	
<i>Cordylecladia erecta</i>																	1			1	
<i>Cruoria pellita</i>				1					1	1	1						1		1	5	
<i>Cruoria</i> sp.																1				1	
<i>Cryptopleura ramosa</i>				1					1	1	1				1		1	1	1	9	
<i>Cystoclonium purpureum</i>		1	1		1				1		1	1		1			1		1	10	
<i>Dasya hutchinsiae</i>																	1			1	
<i>Delesseria sanguinea</i>	1	1							1		1	1		1		1	1	1	1	10	
<i>Dilsea carnosa</i>									1		1	1		1		1	1	1	1	8	
<i>Dudresnaya verticillata</i>																	1			1	
<i>Dumontia contorta</i>		1	1								1	1					1	R	1	1	8
Encrusting ' <i>Lithothamnia</i> '					1															1	
<i>Erythrodermins traillii</i>																			1	1	
<i>Erythroglossum laciniatum</i>																	1			1	
<i>Erythrotrichia carnea</i>										1	1	1								3	
<i>Furcellaria fastigiata</i>		1							1		1	1		1	1		1	1	1	10	
<i>Gastroclonium ovatum</i>		1									1	1						1	1	6	
<i>Gastroclonium reflexum?</i>																		1		1	
<i>Gelidium attenuatum</i>		1									1									2	
<i>Gelidium corneum</i>											1									1	
<i>Gelidium crinale</i>				1	1					1	1								1	5	
<i>Gelidium latifolium</i>												1							1	3	
<i>Gelidium pulchellum</i>										1										1	
<i>Gelidium pusillum</i>		1										1					1	1	1	6	
<i>Gelidium</i> sp.																					
<i>Gelidium</i>									1								1			2	

<i>Osmundea oerderi</i> ?																			1	1
<i>Osmundea osmunda</i>																			1	1
<i>Osmudea osmunda</i> ?																			1	1
<i>Osmundea pinnatifida</i>		1	1			1			1	1				1	1	1	1	1	1	9
<i>Osmundea</i>						1	1													2
<i>Palmaria palmata</i>	1	1	1	1			1	1	1	1			1		1	1	1	1	1	13
<i>Peyssonelia dubyi</i>									1	1					1					3
<i>Peyssonelia</i> sp.															1					1
<i>Phycodrys rubens</i>		1						1	1	1			1		1	1	1	1	1	9
<i>Phyllophora crispa</i>									1	1		1	1		1	1	1	1	1	8
<i>Phyllophora pseudoceranoides</i>									1	1		1			1	1	1	1	1	7
<i>Phyllophora traillii</i>									1	1					1	1				4
<i>Phyllophora truncata</i>									1	1		1			1					4
<i>Phyllophora</i> sp.													1							1
<i>Phymatolithon calcareum</i>		1							1	1					1					4
<i>Phymatolithon lamii</i>										1										1
<i>Phymatolithon lenormandii</i>									1	1							1	1	1	4
<i>Phymatolithon purpureum</i>										1							1	1	1	3
<i>Plenosporium borneri</i>									1	1										2
<i>Plocarium cartilagineum</i>		1	1				1	1	1	1			1		1	1	1	1	1	11
<i>Plumaria plumosa</i>		1	1						1	1					1	1	1	1	1	8
<i>Pneophyllum caulerpae</i>										1										1
<i>Polyides rotundus</i>	1	1							1	1			1		1			1	1	7
<i>Polysiphonia atlantica</i>									1									1		2
<i>Polysiphonia atlantica</i> ?																1				1
<i>Polysiphonia brodiei</i>		1	1			1			1	1							1	1	1	7
<i>Polysiphonia brodiei</i> ?																			1	1
<i>Polysiphonia ceramiaeformis</i>																	1			1
<i>Polysiphonia elongata</i>															1	1				2
<i>Polysiphonia fibrata</i>									1	1					1		1			4
<i>Polysiphonia fibrilosa</i>																1				1
<i>Polysiphonia fibrillosa</i> ?																		1	1	1
<i>Polysiphonia fucoides</i>			1						1	1					1		1	1	1	6
<i>Polysiphonia furcellata</i>															1		1			2
<i>Polysiphonia nigra</i>									1	1		1			1			1	1	5
<i>Polysiphonia stricta</i>		1		1				1	1	1		1			1		1	1	1	9
<i>Polysiphonia</i> sp.													1		1	1				3
<i>Polysiphonia</i>					1			1												2

<i>Polyneura bonnemaisonii</i>																	1			1	
<i>Porphyra amplissima</i>				1					1		1						1			4	
<i>Porphyra dioica</i>				1															1	2	
<i>Porphyra linearis</i>									1		1									2	
<i>Porphyra purpurea</i>									1	1	1									3	
<i>Porphyra umbilicalis</i>			1	1	1	1			1	1	1						1		1	10	
<i>Porphyra</i> sp.	1															1	1			2	
<i>Porphyra</i>								1												1	
<i>Porphyropsis coccinea</i>																	1			1	
<i>Porphyrostromium ciliare</i>											1	1								2	
<i>Pterosiphonia parasitica</i>				1					1	1	1						1		1	6	
<i>Pterothamnion plumula</i>				1					1		1					1	1			5	
<i>Ptilota gunneri</i>																		1	1	2	
<i>Ptilota plumosa</i>			1		1				1	1	1	1					1			1	8
<i>Ptilothamnion pluma</i>												1	1								2
<i>Pyropia leucosticta</i>										1	1	1								1	4
<i>Rhodochorton purpureum</i>												1	1								2
<i>Rhodomela confervoides</i>													1	1			1	1	1		5
<i>Rhodomela lycopodioides</i>														1	1						4
<i>Rhodophyllis divaricata</i>															1		1				2
<i>Rhodophyllis irvineorum</i>																	1				1
<i>Rhodophyllis</i> sp.																	1				1
<i>Rhodophysema elegans</i>												1	1						1		3
<i>Rhodothamniella floridula</i>			1						1	1	1	1				1			1	1	9
<i>Rhodymenia ardissoni</i>																	1				1
<i>Rhodymenia holmesii</i>																	1				1
<i>Rhodymenia pseudopalmata</i>																1					1
<i>Schmitzia hiscockiana</i>																	1				1
<i>Schottera nicaeensis</i>																	1	1			2
<i>Schizymenia dubyi</i>										1		1									2
<i>Scinaia furcellata</i>										1		1									2
<i>Scinaia turgida</i>																	1				1
<i>Seirospora seirosperma</i>																	1				1
<i>Spermothamnion repens</i>													1				1				2
<i>Spongoclonium caribaeum</i>																	1				1
<i>Titanoderma corallinae</i>													1								1
<i>Titanoderma hapaliododes</i>																					1
<i>Titanoderma pustulatum</i>			1																1	1	4

<i>Vertebrata lanosa</i>		1	1							1	1	1	1			1	1	1	1	10
Filamentous red algae indet.																1				1
Foliose red algae indet.																1				1
Rhodophyta indet. (enc)																	1			1
Rhodophyta indet. (non-calc. crusts)																1				1
PHAEOPHYCEAE																				
<i>Acinetospora crinita</i>											1									1
<i>Acrothrix gracilis</i>																1				1
<i>Alaria esculenta</i>	1	1	1	1	1	1			1	1	1			1		1	1	1	1	14
<i>Arthrocladia villosa</i>																1				1
<i>Ascophyllum nodosum</i>	1	1		drift only		1	1	1	1	1	1	1	1			1	1		1	14
<i>Ascophyllum nodosum</i> ecad. <i>mackayii</i>	1									1						1			1	4
<i>Asperococcus bullosus</i>										1										1
<i>Asperococcus compressus</i>											1					1			1	3
<i>Asperococcus fistulosus</i>		1	1							1	1					1		1	1	7
<i>Asperococcus turneri</i>											1					1				2
<i>Asperococcus</i> sp.																1				1
<i>Carpomitra costata</i>																1		1		2
<i>Chaetopteris plumosa</i>																1				1
<i>Chilionema ocellatum</i>											1	1								2
<i>Chorda filum</i>	1	1						1		1	1			1		1	1	1	1	10
<i>Chordaria flagelliformis</i>		1	1								1	1				1		1	1	7
<i>Cladosiphon zosterae</i>		1										1								2
<i>Cladostephus spongiosus</i>		1				1			1	1	1			1		1	1	1	1	10
<i>Colpomenia peregrina</i>											1	1						1	1	4
<i>Cutleria mutifida</i>																1			1	2
<i>Cutleria mutifida</i> 'Aglaozonia' phase											1					1				2
<i>Cystoseira tamariscifolia</i>			1								1									1
<i>Desmarestia aculeata</i>	1	1									1	1		1		1	1	1		8
<i>Desmarestia ligulata</i>		1		1					1	1	1					1		1		7
<i>Desmarestia viridis</i>		1									1	1				1		1		5
<i>Dictyosiphon foeniculaceus</i>		1	1								1	1						1	1	6
<i>Dictyosiphon</i> sp.																1	1			2
<i>Dictyota dichotoma</i>		1		1				1	1	1	1			1		1	1	1	1	11
Ectocarpaceae indet.																1				1
<i>Ectocarpus fasciculatus</i>		1		1					1	1	1							1	1	7
<i>Ectocarpus siliculosus</i>		1									1	1	1						1	5
<i>Ectocarpus siliculosus</i> ?																			1	1

<i>Elachista flaccida</i>									1	1						1		3	
<i>Elachista fucicola</i>		1	1	1					1	1	1				1		1	1	9
<i>Elachista scutulata</i>		1		1					1	1	1								5
<i>Elachista</i> sp.														1	1				2
<i>Eudesme virescens</i>		1								1	1				1		1		5
<i>Fucus ceranoides</i>		1	1				1			1	1	1	1						7
<i>Fucus cottonii</i>															1			1	2
<i>Fucus distichus</i>				1							1						1		3
<i>Fucus distichus</i> subsp. <i>anceps</i>									1										1
<i>Fucus serratus</i>	1	1	1			1	1	1		1	1		1		1	1	1	1	13
<i>Fucus spiralis</i>		1		1		1	1	1	1	1	1				1	1	1	1	12
<i>Fucus spiralis</i> ?																		1	1
<i>Fucus spiralis</i> f. <i>nana</i>					1	1													2
<i>Fucus vesiculosus</i>	1	1	1	1		1	1	1		1	1	1	1		1	1		1	14
<i>Fucus vesiculosus</i> var. <i>evesiculosus</i>					1	1												1	3
<i>Fucus vesiculosus</i> var. <i>vadorum</i>																			
<i>Fucus vesiculosus</i> x <i>spiralis</i> hybrid?																		1	1
<i>Fucus</i> sp.															1				1
<i>Halidrys siliquosa</i>	1	1						1		1	1	1		1		1	1	1	11
<i>Halopteris filicina</i>															1				1
<i>Halopteris scoparia</i>															1				1
<i>Halothris lumbricalis</i>															1				1
<i>Hecatonema foecundum</i>											1								1
<i>Hecatonema maculans</i>											1								1
<i>Hecatonema velutinum</i>											1	1							2
<i>Himanthalia elongata</i>	1	1	1	1		1		1	1	1	1		1		1	1	1	1	14
<i>Hincksia granulosa</i>											1	1			1		1		4
<i>Hincksia hincksiae</i>										1	1	1			1				4
<i>Hincksia secunda</i>				1						1		1							3
<i>Hincksia</i> sp.																			
<i>Laminaria digitata</i>	1					1	1	1		1	1		1		1	1	1	1	11
<i>Laminaria digitata</i> ?																		1	1
<i>Laminaria hyperborea</i>		1	1	1				1	1	1	1		1		1	1	1	1	12
<i>Laminaria</i> sp.															1				1
<i>Leathesia difformis</i>		1		1				1	1	1	1		1		1	1	1	1	11
<i>Leptonematella fasciculata</i>											1	1							2
<i>Litosiphon laminariae</i>		1									1	1					1	1	5
<i>Mesogloia vermiculata</i>		1									1	1			1		1	1	6

<i>Mesogloia</i>								1												1
<i>Microsponsum globosum</i>										1	1									2
<i>Myriactula areschougii</i>		1									1									2
<i>Myriactula haydenii</i>										1	1									2
<i>Myrionema strangulans</i>		1								1	1		1						1	5
<i>Myriotrichia clavaeformis</i>										1	1									2
<i>Myriotrichia filiformis</i>		1								1	1									3
<i>Pelvetia canaliculata</i>	1	1	1			1	1	1	1	1	1				1	1	1	1	1	13
<i>Petalonia fascia</i>		1		1						1	1	1				1			1	7
<i>Petalonia sp.</i>															1					1
<i>Petroderma maculiforme</i>										1	1								1	3
<i>Petrospongium berkeleyi</i>		1									1									1
<i>Phaeophila lanosa</i>														1						1
<i>Protectocarpus speciosus</i>										1	1									2
<i>Pseudolithoderma extensum</i>															1					1
<i>Punctaria latifolia</i>										1	1					1				3
<i>Ounctaria tenuissima</i>															1					1
<i>Pylaiella littoralis</i>			1				1		1	1		1					1	1		7
<i>Pylaiella sp.</i>															1					1
<i>Ralfsia clavata</i>										1	1									2
<i>Ralfsia verrucosa</i>		1								1	1					1	1	1		6
<i>Ralfsia sp.</i>															1					1
<i>Saccharina latissima</i>	1	1					1		1	1			1		1		1	1		9
<i>Saccorhiza polyschides</i>		1	1	1					1		1		1		1	1		1		9
<i>Scytosiphon lomentaria</i>		1	1	1	1				1	1	1				1	1	1	1	1	11
<i>Spermatochnus paradoxus</i>											1				1					1
<i>Sphacelaria bipinnata</i>										1	1									2
<i>Sphacelaria cirrosa</i>		1								1	1						1	1		5
<i>Sphacelaria fusca</i>										1	1						1			3
<i>Sphacelaria plumula</i>				1				1		1	1									3
<i>Sphacelaria radicans</i>										1	1		1				1			4
<i>Sphacelaria</i>								1												1
<i>Sphacelaria sp.</i>															1	1			1	3
<i>Spongonema tomentosum</i>		1		1					1	1	1				1		1	1		8
<i>Sporochnus pedunculatus</i>															1					1
<i>Stictyosiphon griffithsianus</i>			1							1	1									3
<i>Stictyosiphon tortilis</i>															1					1
<i>Stilophora tenella</i>																				

<i>Stilopsis lejolisi</i>								1											1	
<i>Striaria attenuata</i>																		1	1	
Filamentous brown algae indet.																		1	1	
Phaeophyceae indet. (crusts)																		1	1	
Phaeophyceae indet.																	1		1	
CHLOROPHYTA																				
<i>Acrosiphonia arcta</i>				1				1	1	1	1							1	1	6
<i>Blidingia marginata</i>		1									1	1							1	4
<i>Blidingia minima</i>											1	1						1	1	4
<i>Bryopsis hypnoides</i>											1	1					1	1		4
<i>Bryopsis plumosa</i>		1									1			1			1	1	1	6
<i>Chaetomorpha aerea</i>				1																1
<i>Chaetomorpha ligustica</i>		1									1	1						1		5
<i>Chaetomorpha linum</i>									1	1	1	1	1					1	1	7
<i>Chaetomorpha melagonium</i>		1							1	1	1						1	1	1	8
<i>Chaetomorpha</i> sp.																	1			1
<i>Chlorochytrium cohnii</i>											1	1								2
<i>Chlorochytrium willei</i>											1	1								2
<i>Cladophora albida</i>		1									1	1							1	4
<i>Cladophora albida</i> ?																			1	1
<i>Cladophora fracta</i>				1								1								2
<i>Cladophora hutchinsiae</i>												1	1							1
<i>Cladophora lehmanniana</i>												1								1
<i>Cladophora liniformis</i> ?																			1	1
<i>Cladophora pellucida</i>																			1	1
<i>Cladophora pygmaea</i>																			1	1
<i>Cladophora rupestris</i>		1	1				1	1	1	1	1	1	1					1	1	14
<i>Cladophora sericea</i>											1	1							1	4
<i>Cladophora sericea</i> ?																			1	1
<i>Cladophora</i> sp.								1									1		1	5
<i>Cladophora traillii</i>				1	tain species															2
<i>Cladophora vagabunda</i>																			1	1
<i>Codiolum petrocelidis</i>											1									1
<i>Codiolum phases</i>											1	1								2
<i>Codium fragile</i> subsp. <i>atlanticum</i>											1	1					1	1	1	5
<i>Codium fragile</i> subsp. <i>fragile</i>																	1	1	1	3
<i>Codium tomentosum</i>		1									1	1					1			4
<i>Codium</i> sp.																	1			1

Appendix 2. Sites and species list taken from Norton (1971); Isle of Lewis and Isle of Harris												
	Geodh'an Fharaidh, Lewis	Bosta, Great Bemera, Lewis	Earshader, Loch Barraglan, Lewis	Port Geiraha, Lewis	Traigh Ghris, Gress sands, Lewis	The mouths of the rivers Amhuinn a' Ghlinne Dhuibh and Laxdale, Lewis	Aignish, Lewis	Portnaguiran, Lewis	Stornoway Harbour, Lewis	Loch Maarraig, Harris	Loch na h-Uamha	Loch Flodabay
	1	2	3	4	5	6	7	8	9	10	11	12
RHODOPHYTA												
<i>Acrochaetium secundatum</i>	1											
<i>Acrochaetium virgatulum</i>	1	1										
<i>Acrosorium uncinatum</i>	1	1		1							1	
<i>Aglaothamnion hookeri</i>		1		1			1	1				
<i>Aglaothamnion sepositum</i>												
<i>Ahnfeltia plicata</i>	1	1		1			1	1			1	
<i>Apoglossum ruscifolium</i>	1	1										
<i>Asparagopsis armata</i> 'Falkenbergia' phase												
<i>Audouinella membranacea</i>				1								
<i>Bangia fuscopurpurea</i>	1											
<i>Bonnemaisonia hamifera</i> 'Trailliella' phase		1		1				1			1	
<i>Boergesenella fruticulosa</i>	1							1				
<i>Brongniartella byssoides</i>	1											
<i>Callithamnion arbuscula</i>	1	1		1								
<i>Callithamnion granulatum</i>				1				1				
<i>Callithamnion tetragonum</i>	1	1										
<i>Callocolax neglectus</i>											1	
<i>Callophyllis laciniata</i>	1	1									1	
<i>Catenella repens</i>				1					1			
<i>Ceramium ciliatum</i>	1							1				
<i>Ceramium diaphanum</i> sensu lato											1	
<i>Ceramium flabelligerum</i>	1											
<i>Ceramium rubrum</i>	1	1		1				1			1	
<i>Ceramium shuttleworthianum</i>	1	1		1				1	1		1	
<i>Ceramium strictum</i>		1		1								

<i>Chondrus crispus</i>	1	1		1				1			1	
<i>Choreocolax polysiphoniae</i>		1						1			1	
<i>Chylocladia verticillata</i>							1					
<i>Corallina elongata</i>	1										1	
<i>Corallina officinalis</i>	1	1		1			1	1	1		1	
<i>Cruoria pellita</i>		1									1	
<i>Cryptopleura ramosa</i>	1	1		1				1			1	
<i>Cystoclonium purpureum</i>				1			1	1				
<i>Delesseria sanguinea</i>	1	1		1			1	1			1	
<i>Dilsea carnosa</i>	1	1					1				1	
<i>Dumontia contorta</i>	1	1		1				1	1		1	
<i>Erythrotrichia carnea</i>		1										
<i>Furcellaria fastigiata</i>	1	1					1	1			1	
<i>Gastroclonium ovatum</i>	1	1						1				
<i>Gelidium attenuatum</i>	1							1			1	
<i>Gelidium corneum</i>								1				
<i>Gelidium crinale</i>	1	1					1				1	
<i>Gelidium latifolium</i>												
<i>Gelidium stellata</i>	1	1		1			1	1			1	
<i>Gonimophyllum buffhamii</i>											1	
<i>Gracilaria gracilis</i>		1										
<i>Halurus flosculosus</i>	1	1		1			1				1	
<i>Heterosiphonia plumosa</i>	1											
<i>Hildenbrandia crouanii</i>								1			1	
<i>Hildenbrandia rubrum</i>								1			1	
<i>Hypoglossum hypoglossoides</i>		1						1				
<i>Kallymenia reniformis</i>											1	
<i>Lithophyllum incrustans</i>	1	1		1				1			1	
<i>Lithothamnion glaciale</i>	1	1									1	
<i>Lithothamnion polymorphum</i>								1				
<i>Lomentaria articulata</i>	1	1		1				1	1		1	
<i>Lomentaria clavellosa</i>	1	1										
<i>Lomentaria orcadensis</i>				1								
<i>Mastocarpus stellatus</i>	1	1		1			1	1			1	
<i>Mastocarpus stellatus 'Petrocelis' phase</i>	1							1			1	
<i>Melobesia membranacea</i>												
<i>Membranoptera alata</i>	1	1		1				1			1	
<i>Mesophyllum lichenoides</i>	1											
<i>Nemalion helminthoides</i>	1	1						1				
<i>Nitophyllum punctatum</i>	1	1									1	
<i>Odonthalia dentata</i>	1	1		1				1			1	

<i>Osmundea hybrida</i>		1		1							1	
<i>Osmundea osmunda</i>												
<i>Osmundea pinnatifida</i>	1	1		1			1	1			1	
<i>Palmaria palmata</i>	1	1		1				1	1		1	
<i>Peyssonelia dubyi</i>		1						1			1	
<i>Phycodrys rubens</i>	1	1					1	1			1	
<i>Phyllophora crispa</i>	1	1		1				1			1	
<i>Phyllophora pseudoceranooides</i>	1	1						1			1	
<i>Phyllophora traillii</i>		1		1							1	
<i>Phyllophora truncata</i>		1		1				1				
<i>Phymatolithon lenormandii</i>	1	1		1				1			1	
<i>Plenosporium borneri</i>	1										1	
<i>Plocamium cartilagineum</i>	1	1		1			1	1			1	
<i>Plumaria plumosa</i>	1	1		1				1	1		1	
<i>Polyides rotundus</i>		1		1							1	
<i>Polysiphonia atlantica</i>							1	1				
<i>Polysiphonia brodiei</i>	1	1		1				1				
<i>Polysiphonia fibrata</i>	1	1							1			
<i>Polysiphonia fucooides</i>	1	1							1		1	
<i>Polysiphonia nigra</i>				1				1				
<i>Polysiphonia stricta</i>	1	1		1				1			1	
<i>Porphyra dioica</i>												
<i>Porphyra purpurea</i>		1										
<i>Porphyra umbilicalis</i>	1			1				1	1		1	
<i>Porphyrostromium ciliare</i>		1										
<i>Pterosiphonia parasitica</i>	1	1						1			1	
<i>Ptilota plumosa</i>	1	1		1			1	1			1	
<i>Ptilothamnion pluma</i>											1	
<i>Pyropia leucosticta</i>		1									1	
<i>Rhodochoton purpureum</i>		1		1							1	
<i>Rhodomela confervoides</i>	1	1		1				1			1	
<i>Rhodomela lycopodioides</i>		1										
<i>Rhodophysema elegans</i>	1											
<i>Rhodothamniella floridula</i>	1	1		1			1	1			1	
<i>Spermothamnion repens</i>				1				1			1	
<i>Titanoderma pustulatum</i>												
<i>Vertebrata lanosa</i>		1		1			1	1			1	
PHAEOPHYCEAE												
<i>Alaria esculenta</i>	1	1		1				1	1			
<i>Ascophyllum nodosum</i>		1		1			1	1	1	1	1	1
<i>Ascophyllum nodosum</i> ecad. <i>mackayi</i>												

<i>Asperococcus fistulosus</i>	1	1		1			1	1			1	
<i>Chileonema ocellatum</i>								1				
<i>Chorda filum</i>		1					1		1			
<i>Chordaria flagelliformis</i>	1	1		1			1	1	1			
<i>Cladostephus spongiosus</i>	1	1		1			1	1			1	
<i>Colpomenia peregrina</i>									1			
<i>Cutleria multifida</i> 'Aglaozonia' phase				1								
<i>Desmarestia aculeata</i>	1			1				1				
<i>Desmarestia ligulata</i>	1 drift			1								
<i>Desmarestia viridis</i>	1			1				1				
<i>Dictyosiphon foeniculaceus</i>	1			1			1	1				
<i>Dictyota dichotoma</i>	1	1		1			1	1	1		1	
<i>Ectocarpus fasciculatus</i>	1	1		1				1	1		1	
<i>Ectocarpus siliculosus</i>	1	1		1				1				
<i>Elachista flaccida</i>	1	1										
<i>Elachista fucicola</i>	1	1		1			1	1	1		1	
<i>Elachista scutellata</i>	1	1										
<i>Eudesme virescens</i>	1	1						1				
<i>Fucus ceranoides</i>											1	1
<i>Fucus serratus</i>	1	1		1			1			1	1	
<i>Fucus spiralis</i>	1	1		1			1	1	1	1	1	
<i>Fucus vesiculosus</i>	1	1		1			1	1	1	1	1	1
<i>Hincksia granulosa</i>									1			
<i>Hincksia hinksiae</i>	1											
<i>Halidrys siliquosa</i>	1	1		1			1	1	1		1	
<i>Hecatonema foecundum</i>											1	
<i>Hecatonema maculans</i>		1		1							1	
<i>Herponema velutinum</i>		1										
<i>Himanthalia elongata</i>	1	1		1			1		1		1	
<i>Laminaria digitata</i>	1	1		1			1	1	1		1	
<i>Laminaria hyperborea</i>	1	1		1			1	1			1	
<i>Leathesia difformis</i>	1	1					1	1	1		1	
<i>Leptonematella fasciculata</i>		1										
<i>Litosiphon laminariae</i>	1			1								
<i>Mesogloia vermiculata</i>		1						1			1	
<i>Microspongium globosum</i>											1	
<i>Myricatula haydenii</i>	1											
<i>Myrionema strangulans</i>		1										
<i>Myriotrichia clavaeformis</i>	1											
<i>Myriotrichia filiformis</i>		1		1				1				
<i>Pelvetia canaliculata</i>	1	1		1			1	1	1	1	1	1

<i>Petalonia fascia</i>			1									
<i>Petroderma maculiforme</i>	1						1					
<i>Protectocarpus speciosus</i>	1		1									
<i>Punctaria latifolia</i>							1				1	
<i>Pylaiella littoralis</i>	1	1	1				1	1	1		1	
<i>Ralfsia clavata</i>								1				
<i>Ralfsia verrucosa</i>	1	1						1			1	
<i>Saccharina latissima</i>	1	1	1				1	1			1	
<i>Saccorhiza polyschides</i>	1						1 drift	1			1	
<i>Scytosiphon lomentaria</i>	1	1	1				1	1	1		1	
<i>Sphacelaria bipinnata</i>		1						1			1	
<i>Sphacelaria cirrosa</i>	1	1	1				1	1			1	
<i>Sphacelaria fusca</i>	1						1	1				
<i>Sphacelaria radicans</i>			1				1					
<i>Spongonema tomentosum</i>	1	1	1					1			1	
<i>Stictyosiphon griffithsianus</i>											1	
CHLOROPHYTA												
<i>Acrosiphonia arcta</i>			1									
<i>Blidingia marginata</i>									1			
<i>Blidingia minima</i>			1									
<i>Bryopsis hypnoides</i>	1	1	1				1				1	
<i>Chaetomorpha ligustica</i>	1	1	1				1		1		1	
<i>Chaetomorpha linum</i>	1	1	1					1				
<i>Chaetomorpha melagonium</i>		1	1					1			1	
<i>Chlorochytrium cohnii</i>											1	
<i>Chlorochytrium willei</i>			1									
<i>Cladophora albida</i>	1						1				1	
<i>Cladophora hutchinsiae?</i>			1 drift									
<i>Cladophora rupestris</i>	1	1	1				1	1	1		1	
<i>Cladophora sericea</i>			1								1	
<i>Codiolum petrocelidis</i>											1	
<i>Codiolum</i> -phases	1	1	1					1			1	
<i>Codium fragile</i> subsp. <i>atlanticum</i>	1	1	1				1	1			1	
<i>Entocladia perforans</i>	1	1	1					1			1	
<i>Epicladia flustrae</i>		1										
<i>Eugomontia sacculata</i>		1 drift						1				
<i>Ostreobium queketii</i>			1								1	
<i>Prasiola stipitata</i>			1				1					
<i>Pseudendoclonium marinum</i>	1		1								1	
<i>Rhizoclonium implexum</i>			1									
<i>Rhizoclonium riparium</i>			1				1		1	1		

<i>Spongomorpha aeruginosa</i>				1							1	
<i>Tellamia intricata</i>	1			1				1			1	
<i>Ulothrix flacca</i>							1					
<i>Ulva flexuosa</i>											1	
<i>Ulva intestinalis</i>							1		1		1	
<i>Ulva lactuca</i>		1					1	1				
<i>Ulva rigida</i>											1	
<i>Ulva torta</i>			1			1			1			
<i>Ulva</i> sp.											1	
<i>Urospora penicilliformis</i>											1	

Appendix 3. Natural History Museum survey data: Outer Hebrides 30 July - 7 August 2012, specimen dataset					
* All records are verified by voucher specimens housed at NHM, except for the records marked by an asterix					
DATE	SITE	RGB	SPECIES	HABITAT	ABUNDANCE
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Pelvetia canaliculata</i>	Upper shore, bedrock	C
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Halidrys siliquosa</i>	In larger pools, mid-shore and in runnel where flowing water	F in pools
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Fucus vesiculosus</i>	On bedrock	F-C
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Fucus spiralis</i>	On bedrock	C-A
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Fucus serratus</i>	On bedrock	A
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Ascophyllum nodosum</i>	On bedrock	A
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Chordaria flagelliformis</i>	On pebble, lower shore	R
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Chordaria flagelliformis</i>	On bedrock in a rockpool	R
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Chordaria flagelliformis</i>		F
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Leathesia difformis</i>	Epiphytic on <i>Furcellaria fastigiata</i> , mid-shore pools	
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Laminaria hyperborea</i>	In runnel, lower shore	R
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Fucus serratus</i>	In upper shore pool	R
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Cladostephus spongiosus</i>	Bedrock	F
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Asperococcus fistulosus</i>	Epiphytic on <i>Leathesia difformis</i> particularly; in pools	F
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Dictyosiphon foeniculaceus</i>	In pools	F
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Ectocarpus siliculosus</i>	Epiphytic on <i>Fucus</i>	C
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus serratus</i>	O
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Sphacelaria cirrosa</i>	Epiphytic on <i>Halidrys siliquosa</i>	F
30 July 2012	Hoglan Bay, North Uist	Brown	<i>Scytosiphon lomentaria</i>	On bedrock of pool	R
30 July 2012	Hoglan Bay, North Uist	Brown	* <i>Ralfsia verrucosa</i>	On back of limpets	F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Ahnfeltia plicata</i>	In rock pools	F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Membranoptera alata</i>	Under fucoids, overhang	R
30 July 2012	Hoglan Bay, North Uist	Red	<i>Osmundea pinnatifida</i>	Upper part lower shore	O-F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Gelidium pusillum</i>	Under fucoids, overhangs	F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Gelidium latifolium</i>		
30 July 2012	Hoglan Bay, North Uist	Red	<i>Lomentaria articulata</i>	Under fucoids, overhangs	O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Chondrus crispus</i>	Overhangs, pools	F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Chylocladia verticillata</i>	In rock pool	R
30 July 2012	Hoglan Bay, North Uist	Red	<i>Ceramium pallidum</i>	Epiphyte on <i>Halidrys siliquosa</i>	R
30 July 2012	Hoglan Bay, North Uist	Red	<i>Polysiphonia fucoides</i>		R
30 July 2012	Hoglan Bay, North Uist	Red	<i>Ceramium virgatum</i>	Epiphytic on <i>Ahnfeltia plicata</i>	O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Asparagopsis armata</i> 'Falkenbergia' phase	Drift	F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Ceramium virgatum?</i>	Epiphytic	O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Hildenbrandia rubra</i>	On pebbles	C
30 July 2012	Hoglan Bay, North Uist	Red	<i>Rhodothamniella floridula</i>	Over sand in small rock crevice	R
30 July 2012	Hoglan Bay, North Uist	Red	<i>Catenella caespitosa</i>	On top of rock in crevices	O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Vertebrata lanosa</i>	Epiphytic on <i>Ascophyllum nodosum</i>	C-A
30 July 2012	Hoglan Bay, North Uist	Red	<i>Cryptopleura ramosa</i>		O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Osmundea pinnatifida</i>		O

30 July 2012	Hoglan Bay, North Uist	Red	<i>Furcellaria fastigiata</i>		O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Dumontia contorta</i>		O
30 July 2012	Hoglan Bay, North Uist	Red	<i>Chondrus crispus</i>		F
30 July 2012	Hoglan Bay, North Uist	Red	* <i>Phymatolithon lenormandii</i>	On rock under <i>Fucus serratus</i> lower shore	C
30 July 2012	Hoglan Bay, North Uist	Red	* <i>Phymatolithon purpureum</i>	On rock under <i>Fucus serratus</i> lower shore	A
30 July 2012	Hoglan Bay, North Uist	Red	<i>Corallina officinalis</i>	In large pool	
30 July 2012	Hoglan Bay, North Uist	Red	* <i>Lithophyllum incrustans</i>	Upper shore rock pools	F
30 July 2012	Hoglan Bay, North Uist	Red	<i>Lithothamnion glaciale</i>	On pebble, lower shore	?
30 July 2012	Hoglan Bay, North Uist	Green	<i>Cladophora rupestris</i>	On rock and in pools	C
30 July 2012	Hoglan Bay, North Uist	Green	<i>Ulva prolifera</i>	Upper shore	C
30 July 2012	Hoglan Bay, North Uist	Green	<i>Cladophora albida</i> ?	Pools	F
30 July 2012	Hoglan Bay, North Uist	Green	<i>Ulva pseudocurvata</i>	Epiphytic, around edges of pools in shady areas	R
30 July 2012	Hoglan Bay, North Uist	Green	<i>Codium fragile</i> subsp. <i>fragile</i>	On rock in pools	O
30 July 2012	Hoglan Bay, North Uist	Green	* <i>Ulva intestinalis</i>	In rock pools	F
30 July 2012	Hoglan Bay, North Uist	Green	<i>Ulva flexuosa</i>		F
30 July 2012	Traigh Stir, North Uist	Brown	<i>Fucus vesiculosus</i>	Pebbles, boulders and bedrock	C
30 July 2012	Traigh Stir, North Uist	Brown	<i>Scytosiphon lomentaria</i>	On pebble in sandy/pebbly area	
30 July 2012	Traigh Stir, North Uist	Brown	<i>Alaria esculenta</i>		
30 July 2012	Traigh Stir, North Uist	Brown	* <i>Mesogloia vermiculata</i>	On pebble, lower shore	
30 July 2012	Traigh Stir, North Uist	Brown	<i>Myrionema strangulans</i>	On <i>Porphyra dioica</i>	F
30 July 2012	Traigh Stir, North Uist	Brown	<i>Myrionema strangulans</i>	On <i>Ulva</i> sp.	
30 July 2012	Traigh Stir, North Uist	Red	<i>Porphyra dioica</i>	On pebbles and boulders in sand	C
30 July 2012	Traigh Stir, North Uist	Red	<i>Chondrus crispus</i>		
30 July 2012	Traigh Stir, North Uist	Green	<i>Ulva intestinalis</i>	On pebbles and boulders	C
30 July 2012	Traigh Stir, North Uist	Green	<i>Ulva flexuosa</i>	On pebbles and boulders	C
30 July 2012	Sheilings, North Uist	Brown	<i>Ascophyllum nodosum</i>		C
30 July 2012	Sheilings, North Uist	Brown	<i>Fucus spiralis</i>		C
30 July 2012	Sheilings, North Uist	Brown	<i>Pelvetia canaliculata</i>	On rock, upper shore	C
30 July 2012	Sheilings, North Uist	Brown	<i>Fucus cottonii</i>	In consolidated mud	R
30 July 2012	Sheilings, North Uist	Brown	<i>Fucus cottonii</i>	In consolidated mud	
30 July 2012	Sheilings, North Uist	Brown	<i>Fucus vesiculosus</i>	On stones in channel	C
30 July 2012	Sheilings, North Uist	Red	<i>Catenella caespitosa</i>	On high shore rocks in crevice	O
30 July 2012	Sheilings, North Uist	Red	<i>Hildenbrandia rubra</i>	On pebbles	F
30 July 2012	Sheilings, North Uist	Green	<i>Blidingia marginata</i>	On edge of consolidated mud	F
30 July 2012	Sheilings, North Uist	Green	<i>Blidingia minima</i>	On edge of consolidated mud	
31 July 2012	Sponish Pier, North Uist	Brown	<i>Ascophyllum nodosum</i>	On bedrock and boulders/pebbles	A
31 July 2012	Sponish Pier, North Uist	Brown	<i>Pelvetia canaliculata</i>	On bedrock upper shore	A
31 July 2012	Sponish Pier, North Uist	Brown	<i>Fucus spiralis</i>	On bedrock below <i>Pelvetia canaliculata</i>	A
31 July 2012	Sponish Pier, North Uist	Brown	<i>Fucus vesiculosus</i>	On bedrock, below <i>F. spiralis</i>	F
31 July 2012	Sponish Pier, North Uist	Brown	<i>Fucus vesiculosus</i>	On small boulders and pebbles, lower shore	F
31 July 2012	Sponish Pier, North Uist	Red	<i>Chondrus crispus</i>	Under <i>Ascophyllum nodosum</i>	O
31 July 2012	Sponish Pier, North Uist	Red	<i>Gelidium pusillum</i>	Under <i>Ascophyllum nodosum</i>	F
31 July 2012	Sponish Pier, North Uist	Red	* <i>Phymatolithon lenormandii</i>	Under <i>Ascophyllum nodosum</i>	F
31 July 2012	Sponish Pier, North Uist	Red	* <i>Hildenbrandia</i> sp.	Under <i>Ascophyllum nodosum</i>	O-F?

31 July 2012	Sponish Pier, North Uist	Red	<i>Catenella caespitosa</i>	In crevices, upper shore	
31 July 2012	Sponish Pier, North Uist	Green	<i>Ulva prolifera</i>	Tending to be unattached and tangled amongst fucoids	F
31 July 2012	Sponish Pier, North Uist	Green	<i>Cladophora rupestris</i>	Under <i>Ascophyllum nodosum</i>	O
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Pelvetia canaliculata</i>	Upper shore, bedrock	F
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Laminaria digitata</i> ?	In a crevice in flowing water	R
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Laminaria hyberborea</i>	In a rock pool	O
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Ascophyllum nodosum</i>	On bedrock	F-C
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Fucus serratus</i>	On bedrock, lower shore	A
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Fucus vesiculosus</i>	On bedrock, middle shore	C
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Halidrys siliquosa</i>	On rock in pools	F
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Fucus spiralis</i>	On bedrock below <i>Pelvetia canaliculata</i>	F-C
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Saccharina latissima</i>	In crevice with <i>Laminaria</i>	R
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Chorda filum</i>	Bottom of large pool, lower shore	R
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Cladostephus spongiosus</i>	Under overhangs, crevices, bedrock	F
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Leathesia difformis</i>	Epiphytic on e.g. <i>Corallina</i>	O
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Chordaria flagellifomis</i>	Rock pools lower shore	O
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus vesiculosus</i>	F
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Scytosiphon lomentaria</i>		
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Asperococcus fistulosus</i>	Epiphytic on <i>Fucus</i> in pools	O
31 July 2012	Eilean na Roe, North Uist	Brown	<i>Sphacelaria</i> sp.		R
31 July 2012	Eilean na Roe, North Uist	Brown	* <i>Ralfsia verrucosa</i>	On backs of limpets	
31 July 2012	Eilean na Roe, North Uist	Red	<i>Phyllophora crispa</i>	In narrow rock pool, lower shore, very shady	O
31 July 2012	Eilean na Roe, North Uist	Red	<i>Corallina officinalis</i>	Pools and crevices	F-C
31 July 2012	Eilean na Roe, North Uist	Red	<i>Ahnfeltia plicata</i>	Pools	O
31 July 2012	Eilean na Roe, North Uist	Red	<i>Mastocarpus stellatus</i>	Pools, lower shore	O
31 July 2012	Eilean na Roe, North Uist	Red	<i>Chondrus crispus</i>	Under fucoids on rock and in pools	F
31 July 2012	Eilean na Roe, North Uist	Red	<i>Osmundea pinnatifida</i>	On rock, c. top of lower shore	F
31 July 2012	Eilean na Roe, North Uist	Red	<i>Vertebrata lanosa</i>	Epiphytic on <i>Ascophyllum</i>	
31 July 2012	Eilean na Roe, North Uist	Red	<i>Membranoptera alata</i>	In narrow rock pool, lower shore, very shady	R
31 July 2012	Eilean na Roe, North Uist	Red	<i>Plocamium cartilagineum</i>	In narrow rock pool, lower shore, very shady	R
31 July 2012	Eilean na Roe, North Uist	Red	<i>Furcellaria fastigiata</i>	In rock pools, lower shore	F
31 July 2012	Eilean na Roe, North Uist	Red	<i>Lomentaria articulata</i>	On rock in crevices and overhangs	O
31 July 2012	Eilean na Roe, North Uist	Red	<i>Ceramium virgatum</i>	Epiphytic on <i>Polysiphonia fucoides</i>	F
31 July 2012	Eilean na Roe, North Uist	Red	<i>Polysiphonia fucoides</i>	In pool	?
31 July 2012	Eilean na Roe, North Uist	Red	<i>Cystoclonium purpureum</i>	Pools, lower shore	?
31 July 2012	Eilean na Roe, North Uist	Red	<i>Hypoglossum hypoglossoides</i>	Base of <i>Polysiphonia fucoides</i>	?
31 July 2012	Eilean na Roe, North Uist	Red	<i>Polysiphonia nigra</i>	Pool	
31 July 2012	Eilean na Roe, North Uist	Red	<i>Gelidium latifolium</i>	Pools	O
31 July 2012	Eilean na Roe, North Uist	Red	<i>Asparagopsis armata</i> 'Falkenbergia' phase	Tangled in other seaweeds	
31 July 2012	Eilean na Roe, North Uist	Red	<i>Phymatolithon purpureum</i>	Lining pool under <i>Fucus serratus</i>	
31 July 2012	Eilean na Roe, North Uist	Green	<i>Cladophora rupestris</i>	Pools, mid-lower shore pools	F
31 July 2012	Eilean na Roe, North Uist	Green	<i>Ulva pseudocurvata</i>	Epiphytic on e.g. <i>Corallina</i>	O
31 July 2012	Eilean na Roe, North Uist	Green	<i>Chaetomorpha ligustica</i>		
31 July 2012	Eilean na Roe, North Uist	Green	<i>Chaetomorpha melagonium</i>	Pool, mid shore	R

31 July 2012	Eilean na Roe, North Uist	Green	<i>Ulva intestinalis</i>	In pools	F
31 July 2012	Eilean na Roe, North Uist	Green	<i>Cladophora albida</i>		
31 July 2012	Eilean na Roe, North Uist	Green	<i>Cladophora albida?</i>	In pools, various levels	F
31 July 2012	Eilean na Roe, North Uist	Green	<i>Cladophora sericea?</i>		
31 July 2012	Eilean na Roe, North Uist	Green	<i>Codium fragile</i> subsp. <i>fragile</i>	In pools	O
31 July 2012	Eilean na Roe, North Uist	Green	<i>Ulva intestinalis</i>	Rocks and pools	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Saccharina latissima</i>	On boulder in shallow sand and pebble channel between bedrock	R
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Halidrys siliquosa</i>	In channels between rocks	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Fucus serratus</i>	On rock lower shore and pools higher on shore	A
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Fucus vesiculosus</i>	On rock	A
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Fucus spiralis</i>	On rock upper shore	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Ascophyllum nodosum</i>	On rocks middle shore	SA
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Pelvetia canaliculata</i>	On rock, upper shore	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Chorda filum</i>	On pebbles in channels	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Chordaria flagelliformis</i>	On pebbles in channels	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Sphacelaria cirrosa</i>	Epiphytic on <i>Halidrys siliquosa</i>	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Dictyosiphon foeniculaceus</i>	In channel	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Cladostephus spongiosus</i>	On vertical rocks under fucoids	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Asperococcus ensiformis</i>	Epiphytic on <i>Fucus vesiculosus</i> and <i>F. serratus</i> on pebbles in channels	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Ralfsia verrucosa</i>	On backs of limpets and pebbles	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Ectocarpus siliculosus?</i>	Epiphytic on <i>Fucus</i>	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus</i>	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Litosiphon laminariae</i>	Epiphytic on <i>Chorda filum</i>	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Mesogloia vermiculata</i>	Drift in channel	?
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	<i>Myrionema strangulans</i>	Epiphytic on <i>Ulva lactuca</i>	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Brown	* <i>Saccorhiza polyschides</i>	Drift	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Vertebrata lanosa</i>	Epiphytic on <i>Ascophyllum nodosum</i>	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Polyides rotundus</i>	In channel	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Ahnfeltia plicata</i>	Epiphytic at base of <i>Codium fragile</i> subsp. <i>fragile</i>	?
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Chondrus crispus</i>	On rock in shady places	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Rhodothamniella floridula</i>	On vertical rock, shaded by fucoids	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Ceramium virgatum</i>	Epiphytic on algae	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Ceramium virgatum?</i>	Epiphytic in channel	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Asparagopsis armata</i> 'Falkenbergia' phase	Floating in the channels	A
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Osmundea pinnatifida</i>	In turf on vertical rock under fucoids	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Corallina officinalis</i>	Minute piece in turf with <i>Gelidium pusillum</i> and <i>Osmundea pinnatifida</i>	R
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Gelidium pusillum</i>	In turf on vertical rock under fucoids	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Phymatolithon lenormandii</i>	On pebbles	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	* <i>Phymatolithon purpureum</i>	On large pebbles/small boulders in deeper part of channel	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Membranoptera alata</i>	Under fucoids	

01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Ceramium virgatum</i>	Epiphytic on <i>Fucus</i>	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Ceramium virgatum</i>		F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Hildenbrandia rubra</i>	Epiphytic on pebbles	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Hildenbrandia</i> sp.	Epiphytic on pebbles	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Red	<i>Lomentaria articulata</i>	Amongst <i>Chondrus crispus</i>	
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Codium fragile</i> subsp. <i>fragile</i>	In channels, typically deeper parts	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Cladophora rupestris</i>	On rock and pebbles etc	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Ulva lactuca</i>	Epiphytic on algae in channels	O
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Chaetomorpha linum</i>	On pebble in channel	?
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Chaetomorpha linum</i>	In upper shore pool	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Ulva linza</i> ?	In pools, especially upper shore	C
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Ulva flexuosa</i>	On pebbles	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Cladophora sericea</i>	In upper shore pool	F
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Cladophora sericea</i> ?		
01 August 2012	Ceann a Garaidh, west of Smerclate, South Uist	Green	<i>Ulvaria</i> sp.	Epiphytic on <i>Chordaria flagelliformis</i>	R
01 August 2012	West Kilbride, South Uist	Brown	* <i>Pelvetia canaliculata</i>	Upper shore rock and boulders, sheltered side	C
01 August 2012	West Kilbride, South Uist	Brown	* <i>Ascophyllum nodosum</i>	Bedrock and boulders	A
01 August 2012	West Kilbride, South Uist	Brown	* <i>Fucus spiralis</i>	Below <i>Pelvetia canaliculata</i>	C
01 August 2012	West Kilbride, South Uist	Brown	* <i>Fucus vesiculosus</i>	Lower rocks	C
01 August 2012	West Kilbride, South Uist	Brown	* <i>Ralfsia verrucosa</i>	On backs of limpets which were large	F
01 August 2012	West Kilbride, South Uist	Red	* <i>Vertebrata lanosa</i>	Very occasional on <i>Ascophyllum nodosum</i>	O
01 August 2012	West Kilbride, South Uist	Green	* <i>Cladophora rupestris</i>	Lower down shore in crevices where wet	C
01 August 2012	West Kilbride, South Uist	Green	* <i>Ulva linza</i>	Base of rocks	F
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Pelvetia canaliculata</i>	On bedrock upper shore, more sheltered areas	C
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Fucus spiralis</i>	On bedrock below <i>Pelvetia canaliculata</i>	C
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Laminaria hyperborea</i>	In pool lower shore	C-A
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Saccharina latissima</i>	In shallow pool lower shore	R
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Halidrys siliquosa</i>	In pools, mid-infralittoral fringe	C
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Fucus vesiculosus</i>	Mid shore mainly	C-A
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Fucus serratus</i>	Lower shore	C-A
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Ascophyllum nodosum</i>	Mid shore, sheltered areas of shore	F
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Alaria esculenta</i>	Lower shore pools and infralittoral fringe	O
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Laminaria digitata</i>	Lower shore pools and infralittoral fringe	C
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Chordaria flagelliformis</i>	Mid shore pools to lower shore	C
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Scytosiphon lomentaria</i>	Mid shore pool	?
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Cladostephus spongiosus</i>	Lower shore on overhang	R
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Asperococcus fistulosus</i>	Epiphytic on e.g. <i>Cladophora</i> mid shore pools	F
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus serratus</i>	F
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Myrionema strangulans</i>	Epiphytic on <i>Palmaria palmata</i>	
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Sphacelaria</i> sp.		
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Leathesia difformis</i>	Epiphytic on <i>Corallina</i>	
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Ralfsia verrucosa</i>	On limpets	
02 August 2012	Rubha Ardvule, South Uist	Brown	<i>Ectocarpus fasciculatus</i>	Epiphytic on <i>Chordaria flagelliformis</i>	
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Ahnfeltia plicata</i>		

02 August 2012	Rubha Ardvule, South Uist	Red	<i>Cryptopleura ramosa</i>		
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Vertebrata lanosa</i>	On <i>Ascophyllum nodosum</i> in sheltered areas	C
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Palmaria palmata</i>	Epiphytic on stipes of <i>Fucus serratus</i> and <i>Laminaria hyperborea</i> etc	C
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Furcellaria fastigiata</i>	One large plant lower shore	R?
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Chondrus crispus</i>	Mid shore pools to sublittoral fringe	C
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Mastocarpus stellatus</i>	Bottom of lower shore under fucoids	F
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Melobesia membranacea</i>	Epiphytic on <i>Mastocarpus stellatus</i>	O?
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Dilsea carnosa</i>	Lower shore pools	O
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Plumaria plumosa</i>	Crevice in vertical rock	O
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Lomentaria articulata</i>	On vertical rock or shaded under fucoids	F
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Osmundea pinnatifida</i>	On bedrock	O-F
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Osmundea osmunda</i>	On bedrock slope beneath fucoids, <i>Ascophyllum nodosum</i> etc	O
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Odonthalia dentata</i>	On pebble in lower shore shallow pool	R?
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Halurus flosculosus</i>	In lower shore pool	?
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Gastroclonium ovatum</i>	In lower shore pool	
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Corallina officinalis</i>	Mid and lower shore, pools	C
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Ceramium virgatum</i>	Epiphytic on e.g. <i>Corallina</i> and other algae	F
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Ceramium virgatum</i>	Epiphytic on other algae	F
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Osmundea osmunda</i>		
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Osmunda oederi</i>		
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Gelidium pusillum</i>	Lower shore	
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Gelidium latifolium</i>		
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Asparagopsis armata</i> 'Falkenbergia' phase		
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Ceramium echinotum</i>	Lower shore pool	
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Lithophyllum incrustans</i>	Mid shore and runnels	
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Phymatolithon lenormandii</i>		
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Phymatolithon purpureum</i>	Lining base of lower shore pools and covering rocks lower down	C
02 August 2012	Rubha Ardvule, South Uist	Red	<i>Cruoria pellita</i>	On rock	R
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Codium fragile</i> subsp. <i>fragile</i>	In pools, mid-lower shore	O
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Cladophora rupestris</i>	On rock in damp places and pools	F
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva lactuca</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva pseudocurvata</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Chaetomorpha ligustica</i>	Tangled in <i>Ceramium echinotum</i> , lower shore pool	
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Chaetomorpha linum</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Cladophora albida</i> ?		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Cladophora albida</i> ?		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Cladophora sericea</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva prolifera</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva flexuosa</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva flexuosa</i>		
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva intestinalis</i> ?	Upper shore pool	

02 August 2012	Rubha Ardvule, South Uist	Green	<i>Ulva linza</i>	Upper shore pool	
02 August 2012	Rubha Ardvule, South Uist	Green	<i>Blidingia marginata</i>		
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Laminaria digitata</i>	Bottom of lower shore and sublittoral fringe	C
03 August 2012	Bàgh Steinigie, Harris	Brown	* <i>Laminaria hyperborea</i>	Sublittoral fringe and shallow subtidal	C
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Fucus serratus</i>	Bedrock, lower shore	A
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Fucus serratus</i>	Upper shore rock pools	
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Fucus spiralis</i>	Bedrock, below <i>Pelvetia</i> , in more sheltered areas	C
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Fucus vesiculosus</i>	Bedrock, mid-low shore	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Pelvetia canaliculatus</i>	Bedrock, upper shore	F
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Ascophyllum nodosum</i>	Boulders, mid and lower shore	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Halidrys siliquosa</i>	Rock pools upper-lower shore, sublittoral fringe	F
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Spongonema tomentosum</i>	Epiphytic on old <i>Fucus</i> stipes	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Sphacelaria</i> sp.	On sides of rock pools in <i>Corallina</i> turf	F
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Chorda filum</i>	On pebble, lower shore	R
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Asperococcus fistulosus</i>	Epiphytic on other algae	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Asperococcus ensiformis</i>	On rock, lower shore	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Asperococcus ensiformis</i>		
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Scytosiphon lomentaria</i>	In rock pools	R
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Chordaria flagelliformis</i>	Epiphytic on other algae and on rock, rock pools and lower shore	C
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Chordaria flagelliformis</i>		
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Chordaria flagelliformis</i>		
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Mesogloia vermiculata</i>	Epiphytic on <i>Osmundea pinnatifida</i> and <i>Mastocarpus stellatus</i>	R
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Cladostephus spongiosus</i>	In rock pools	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Leathesia difformis</i>	Epiphytic on <i>Corallina officinalis</i> and <i>Polyides rotundus</i>	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus serratus</i>	F
03 August 2012	Bàgh Steinigie, Harris	Brown	* <i>Ralfsia verrucosa</i>	Backs of limpets	F
03 August 2012	Bàgh Steinigie, Harris	Brown	* <i>Petroderma maculiforme</i> ?	Boulders lower shore	O
03 August 2012	Bàgh Steinigie, Harris	Brown	<i>Myrionema strangulans</i>	On <i>Ulva flexuosa</i>	
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Osmundea pinnatifida</i>		F
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Lomentaria articulata</i>		F
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Vertebrata lanosa</i>	Epiphytic on <i>Ascophyllum nodosum</i>	O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Mastocarpus stellatus</i>	In rock pools upper shore, rock lower shore	F
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Ahnfeltia plicata</i>	In rock pools upper to lower shore	O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Polyides rotundus</i>	Rock pools and in gravelly sand, lower shore	O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Melobesia membranacea</i>	Epiphytic on <i>Polyides rotundus</i>	F
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Osmundea osmunda</i> ?	On rock, lower shore under fucoids	O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Membranoptera alata</i>	Large bright red form epiphytic at base of <i>Fucus serratus</i> and darker, bushier form	O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Membranoptera alata</i>		O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Chondrus crispus</i>	On rocks in more sheltered areas	F
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Plumaria plumosa</i>	Bottom of lower shore on rock	O

03 August 2012	Bàgh Steinigie, Harris	Red	<i>Corallina officinalis</i>	Rock pools upper-lower shore, sublittoral fringe; base of boulders	C
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Petrocelis</i> phase of <i>Mastocarpus stellatus</i>	Lower shore on boulder	R
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Rhodothamniella floridula</i>	Base of vertical boulder under fucoids; sandy crevice	R
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Polysiphonia stricta</i>	Bottom of lower shore on rock	F
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Polysiphonia brodiei?</i>		
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Ceramium virgatum?</i>	Pools upper-lower, epiphytic on algae	C
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Ceramium diaphanum</i> sensu Harvey	Epiphytic on <i>Fucus serratus</i> upper pools	O
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Acrochaetium secundatum?</i>	Epiphytic on <i>Corallina</i>	R
03 August 2012	Bàgh Steinigie, Harris	Red	<i>Dumontia contorta</i>		
03 August 2012	Bàgh Steinigie, Harris	Red	* <i>Hildenbrandia</i> sp.	On rock in stream	
03 August 2012	Bàgh Steinigie, Harris	Red	* <i>Lithophyllum incrustans</i>	Upper shore pools	F
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Cladophora rupestris</i>	Bottom of boulders under fucoids, upper to lower shore	F
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Codium fragile</i> subsp. <i>fragile</i>	Mid shore pool growing out of crevice, side of pool	R
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Ulva flexuosa</i>	Pools; lower shore	O
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Ulva flexuosa</i>		O
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Cladophora</i> sp.	Pools	O
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Cladophora albida?</i>	Epiphytic on <i>Corallina</i>	O
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Acrosiphonia arcta</i>		
03 August 2012	Bàgh Steinigie, Harris	Green	<i>Spongomorpha aeruginosa</i>		
03 August 2012	Rubha Reamhar, Harris	Green	<i>Ulva intestinalis</i>	Saltmarsh	F
03 August 2012	Rubha Reamhar, Harris	Green	<i>Blidingia marginata</i>	Saltmarsh	
03 August 2012	Rubha Reamhar, Harris	Green	<i>Blidingia marginata</i>	Saltmarsh	
03 August 2012	Rubha Reamhar, Harris	Green	<i>Ulva prolifera</i>	Saltmarsh	
03 August 2012	Rubha Reamhar, Harris	Green	<i>Cladophora liniformis?</i>	Saltmarsh	
03 August 2012	Just before Luskentyre, Harris	Red	<i>Catenella caespitosa</i>	Base of fucoids	A
04 August 2012	Flodabay, Harris	Brown	<i>Ascophyllum nodosum</i>		A
04 August 2012	Flodabay, Harris	Brown	<i>Fucus vesiculosus</i> x <i>spiralis</i> hybrid?	Mid-upper shore	F
04 August 2012	Flodabay, Harris	Brown	<i>Fucus spiralis?</i>	Mid-upper shore	F?
04 August 2012	Flodabay, Harris	Brown	<i>Fucus vesiculosus</i>	Mid?	C
04 August 2012	Flodabay, Harris	Brown	<i>Fucus spiralis</i>	Bedrock upper shore	C-A
04 August 2012	Flodabay, Harris	Brown	<i>Pelvetia canaliculata</i>	Bedrock above <i>Fucus spiralis</i>	C-A
04 August 2012	Flodabay, Harris	Red	<i>Vertebrata lanosa</i>	Epiphytic on <i>Ascophyllum nodosum</i>	F
04 August 2012	Flodabay, Harris	Red	<i>Chondrus crispus</i>	Under fucoids; mid shore	F
04 August 2012	Flodabay, Harris	Red	<i>Hildenbrandia rubra</i>	On pebbles	F
04 August 2012	Flodabay, Harris	Green	<i>Ulva lactuca</i>	On rock under fucoids	R
04 August 2012	Flodabay, Harris	Green	<i>Ulva intestinalis</i>	On pebbles	F
04 August 2012	Flodabay, Harris	Green	<i>Cladophora rupestris</i>	In crevices below <i>Fucus vesiculosus</i>	
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Cladostephus spongiosus</i>	Bottom of lower shore on vertical rock face	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Cutleria multifida</i>	In channel, on side of rock	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Dictyota dichotoma</i>	In channel	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Ralfsia verrucosa</i>	On backs of limpets	C

04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Laminaria digitata</i>	Lower shore	A
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Laminaria hyperborea</i>	Shallow subtidal	A
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Laminaria</i> sp. (juveniles)	Bottom of lower shore	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Saccharina latissima</i>	In the channel	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Leathesia difformis</i>	Epiphytic on <i>Mastocarpus stellatus</i>	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Chordaria flagelliformis</i>	Mid shore pools	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Mesogloia vermiculata</i>	Mid shore pool; epiphytic on <i>Chordaria flagelliformis</i>	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Mesogloia vermiculata</i>	Mid shore pool; epiphytic on <i>Chordaria flagelliformis</i>	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Asperococcus fistulosus</i>	Epiphytic on other algae	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Scytosiphon lomentaria</i>	Mid shore pools	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus serratus</i>	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Sphacelaria</i> sp.	Epiphytic on <i>Corallina</i>	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	* <i>Colpomenia peregrina</i>	Epiphytic	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Pelvetia canaliculata</i>	Upper shore rocks	C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Fucus spiralis</i>	Below <i>Pelvetia canaliculata</i>	C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Fucus vesiculosus</i>		C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Fucus serratus</i>		A
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Halidrys siliquosa</i>	In deep rock pool mid shore	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Himantalia elongata</i>		C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Ascophyllum nodosum</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Ectocarpus siliculosus</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Brown	<i>Ectocarpus siliculosus?</i>	Epiphytic on <i>Mastocarpus stellatus</i>	
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Phymatolithon purpureum</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Hildenbrandia crouanii</i>	On pebbles	
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Hildenbrandia rubra</i>	On pebbles	
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Phymatolithon lenormandii</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Vertebrata lanosa</i>	On <i>Ascophyllum nodosum</i>	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Chondrus crispus</i>	On rocks	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Dilsea carnosa</i>	Pools and shallow subtidal	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Odonthalia dentata</i>	Shallow subtidal	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Cryptopleura ramosa</i>	Lower shore and shallow subtidal, under fucoids and kelps often on vertical rock faces	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Cryptopleura ramosa</i>	Lower shore and shallow subtidal, under fucoids and kelps often on vertical rock faces	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Delesseria sanguinea</i>	Deep channel on shore	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Phycodryis rubens</i>	In channel and on rock amongst kelp on lower shore	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Osmundea osmunda</i>	In pools, channel and bottom of lower shore	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Osmundea pinnatifida</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Gelidium latifolium</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Lomentaria articulata</i>	In pools on rock, overhangs, epiphytic at base of <i>Fucus serratus</i> (fucoids) on lower shore	C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Phyllophora crispa</i>	In channel, on side	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Membranoptera alata</i>	In channel, on lower shore and shallow subtidal, on vertical rock face under algae and base of kelps	

04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Palmaria palmata</i>	On rocks on lower shore and on kelp stipes	F-C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Plumaria plumosa</i>	On rocks under fucoids, on vertical faces etc	C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Ptilota gunneri</i>	Mainly on <i>Laminaria hyperborea</i> stipes	C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Polysiphonia stricta</i>	On rocks under fucoids, on vertical faces etc	F-C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Polysiphonia fucoides</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Polysiphonia fibrillosa</i> ?		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Polysiphonia fibrillosa</i> ?		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Plocamium cartilagineum</i>	On rocks, under fucoids, base of fucoids and shallow subtidal	C
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Corallina</i> sp.	On vertical rock bottom of lower shore	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Hypoglossum hypoglossoides</i>	Amongst the other reds; somewhat bleached specimen	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Osmundea osmunda</i>	On rocks, lower shore	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Titanoderma pustulatum</i>	Epiphytic on <i>Mastocarpus</i>	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Mastocarpus stellatus</i>	Bottom of lower shore	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Titanoderma pustulatum</i>	Pink crust on <i>Laminaria hyperborea</i> , shallow subtidal	?
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Phyllophora pseudoceranoides</i>	In the channel; on side of rock	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Corallina officinalis</i>	Rock pools and bottom of lower shore	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Ceramium pallidum</i>	Epiphytic on other algae	F
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Ceramium secundatum</i>	Lower shore	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Ceramium virgatum</i>	Lower shore	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Ceramium virgatum</i>	Lower shore	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Polysiphonia fucoides</i>	Lower shore	
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Bonnemaisonia hamifera</i> 'Trailliella' phase	Mid shore pool on <i>Corallina</i>	
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Red	<i>Gelidium latifolium</i>		O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Green	<i>Chaetomorpha ligustica</i>	In pools, amongst other algae	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Green	<i>Chaetomorpha melagonium</i>	In channel	R
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Green	<i>Ulva lactuca</i>	Bottom of lower shore	O
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Green	<i>Ulva linza</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Green	<i>Ulva prolifera</i>		
04 August 2012	Loch na h-Uamha, Harris (Site 11, BPS 1971)	Green	<i>Cladophora rupestris</i>	Lower shore; under fucoids	O-F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Alaria esculenta</i>	On boulders and bedrock, lower shore	C
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Halidrys siliquosa</i>	In rock pools, mid-lower shore	F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Pelvetia canaliculata</i>	In sheltered areas, back of rocks	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Fucus vesiculosus evesiculosus</i>	Bottom of middle shore going into lower shore	F-C
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Fucus vesiculosus evesiculosus</i>	Bottom of middle shore going into lower shore	F-C
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Spongonema tomentosum</i>	Epiphytic on <i>Fucus vesiculosus evesiculosus</i>	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Fucus 'spiralis'</i>	Upper shore	F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Fucus serratus</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Laminaria digitata</i>	Rock pool, middle shore	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Saccharina latissima</i>	Sandy pools, more sheltered areas	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Scytosiphon lomentaria</i>	Pools	O-F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Leathesia difformis</i>	Epiphytic on <i>Corallina</i> , lower shore	O-F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Scytosiphon lomentaria</i>	Epiphytic on e.g. <i>Ulva</i>	F

05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Scytosiphon lomentaria</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Litosiphon laminariae</i>	Epiphytic on <i>Alaria esculanta</i>	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus serratus</i>	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus vesiculosus evesiculosus</i>	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Myrionema strangulans</i>	Epiphytic on <i>Porphyra dioica</i>	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	<i>Petalonia fascia</i>		R
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	* <i>Mesogloia vermiculata</i>	Sandy rock pool with runnels	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Brown	* <i>Asperococcus fistulosus</i>	Epiphytic on other algae; rock pools	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Gelidium pusillum</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Corallina</i> sp.		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Corallina officinalis</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Polysiphonia stricta</i>		F-A
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Polysiphonia nigra</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Phyllophora crispa</i>	On boulders on sandy part of beach, on underside of	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Polysiphonia brodiei</i>	On rock lower shore	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Dumontia contorta</i>	On side of rock in pool	R
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Pyropia leucosticta</i>	Epiphytic on <i>Fucus</i>	R
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Porphyra umbilicalis</i>	Lower shore	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Porphyra dioica</i>	Boulders and bedrock, sandy parts of bay	SA
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Dilsea carnosa</i>	In a rock pool	R
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Nemalion helminthoides</i>	On bedrock and backs of limpets, lower shore	F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Helminthocladia calvadosii</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Plocamium cartilagineum</i>	On side of boulders, lower shore	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Osmundea hybrida</i>	Pool, sandy more sheltered area	R
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Osmundea oederi</i> ?	Lower shore on rock	
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Ahnfeltia plicata</i>	Pools, especially sandy ones	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Osmundea osmunda</i>	Lower shore on rock	O-F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Osmundea pinnatifida</i>	Lower shore on rock	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Osmundea oederi</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Mastocarpus stellatus</i>	Lower shore and mid shore	A
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Mastocarpus stellatus</i> 'Petrocelis' phase	Lower shore	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Furcellaria fastigiata</i>	Lower shore, sandy areas	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Polyides rotundus</i>	Lower shore, pools and more sandy areas	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Rhodothamniella floridula</i>	Lower shore on side of rock binding sand	A
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Ceramium pallidum</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Ceramium shuttleworthianum</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Lomentaria articulata</i>		F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Callithamnion sepositum</i>		F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Red	<i>Lithophyllum incrustans</i>	On bedrock, lower shore runnels	F
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Codium fragile</i> subsp. <i>atlanticum</i>	In a rock pool, growing out of a crevice, mid shore	R
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Ulva lactuca</i>	On rock growing over weeds	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Cladophora rupestris</i>	Pools, edges of overhangs	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Cladophora albida</i> ?	Pools	O
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Chaetomorpha melagonium</i>	Bottom of sandy pools	O

05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Cladophora sericea</i> ?		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Spongomorpha aeruginosa</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Ulva flexuosa</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Ulva linza</i>		
05 August 2012	Geodh'an Fharaidh, Lewis (Site 1, BPS 1971)	Green	<i>Ulva linza</i>		
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Pelvetia canaliculata</i>	On rock	
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Fucus vesiculosus evesiculosus</i>	Mid to lower shore on barnacle covered rock	F-C
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Fucus spiralis</i>	Upper shore on boulders and rocks	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Spongonema tomentosum</i>	Epiphytic on <i>Fucus</i> bottom of boulder hanging in sandy rock pool	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Alaria esculenta</i>	In shady rock pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Laminaria hyperborea</i>	In a rock pool	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Elachista fucicola</i>	Epiphytic on <i>Fucus</i>	
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Litosiphon laminariae</i>	Epiphytic on <i>Alaria esculenta</i>	R
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	<i>Litosiphon laminariae</i>	Epiphytic on <i>Laminaria</i>	R
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Brown	* Hard crust	On bedrock	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Palmaria palmata</i>	On rock below barnacle zone	A
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Porphyra umbilicalis</i>	On boulders and bedrock, mussels and limpets, mid-lower shore	F-C
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Pophyra dioica</i>	On boulders in sand	C-A
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Pyropia leucosticta</i>	Epiphytic on <i>Fucus</i>	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Chondrus crispus</i>	In small, shady rock pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Osmundea hybrida</i>	On boulders, lower shore, N side	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Osmundea pinnatifida</i>	On boulders, lower shore	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Osmundea osmunda</i>	On boulders, lower shore	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Lomentaria clavellosa</i>	In a shady rock pool	R
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Ahnfeltia plicata</i>	In a shady rock pool	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Dumontia contorta</i>	In shady rock pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Plocamium cartilagineum</i>	In shady rock pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Mastocarpus stellatus</i>	On more exposed rock and vertical faces	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Aglaothamnion sepositum</i>	On exposed rock and on mussels	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Corallina officinalis</i>	In rock pools	O-F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Corallina</i> sp.	Tufts on exposed rock in runnels in shade	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Corallina elongata</i>	In a shady crevice	R
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Lomentaria articulata</i>	On boulders, N side	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Ceramium shuttleworthianum</i>	On mussels and barnacles on exposed rock	C
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Ceramium pallidum</i>	Epiphytic?	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Ceramium pallidum</i>		
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Ceramium secundatum</i> ?	Pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Aglaothamnion hookeri</i>	Upper shore cave	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Catenella caespitosa</i>	Upper shore cave	R
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Polysiphonia nigra</i>	Lower shore pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Plumaria plumosa</i>	Upper shore cave	
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Rhodothamniella floridula</i>		

06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Red	<i>Phymatolithon lenormandii</i>	On rock, mid-shore	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Green	<i>Cladophora rupestris</i>	Damp crevices	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Green	<i>Cladophora sericea</i> ?	Pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Green	<i>Ulva linza</i>	Pools	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Green	<i>Ulva linza</i> ?	Sandy pools	F
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Green	<i>Ulva linza</i> ?	Pools	O
06 August 2012	Port Geiraha, Lewis (Site 4, BPS 1971)	Green	* <i>Ulva lactuca</i>		O
07 August 2012	Leurbost, Lewis	Brown	<i>Ascophyllum nodosum</i> ecad. <i>mackayi</i>	On gravelly/pebbly patches amongst <i>Ascophyllum nodosum</i>	F
07 August 2012	Leurbost, Lewis	Brown	<i>Ascophyllum nodosum</i>	On pebbles, mid shore	SA
07 August 2012	Leurbost, Lewis	Brown	<i>Pelvetia canaliculata</i>	On pebbles and small boulders, top pebbly part	C
07 August 2012	Leurbost, Lewis	Brown	<i>Fucus spiralis</i> ?	On gravel and pebbles below <i>Pelvetia canaliculata</i>	C
07 August 2012	Leurbost, Lewis	Brown	<i>Fucus vesiculosus</i> x <i>spiralis</i> hybrid?	On pebbles scattered, probably more frequent slightly lower	C
07 August 2012	Leurbost, Lewis	Brown	<i>Fucus spiralis</i> ?	On vertical face of consolidated mud just below saltmarsh veg	O
07 August 2012	Leurbost, Lewis	Brown	<i>Pelvetia canaliculata</i>	Amongst saltmarsh vegetation and just below on consolidated mud, especially around the edges of tiny salt pans	O
07 August 2012	Leurbost, Lewis	Red	<i>Vertebrata lanosa</i>	<i>Ascophyllum nodosum</i> ecad. <i>mackayi</i>	O
07 August 2012	Leurbost, Lewis	Red	<i>Catenella caespitosa</i>	On small boulders, <i>Pelvetia canaliculata</i> zone	
07 August 2012	Leurbost, Lewis	Red	<i>Hildenbrandia</i> sp.	On pebbles, mid shore; under <i>Ascophyllum nodosum</i> and <i>Fucus serratus</i>	F
07 August 2012	Leurbost, Lewis	Green	<i>Ulva torta</i>	On side of consolidated mud, just below saltmarsh vegetation	F
07 August 2012	Leurbost, Lewis	Green	<i>Chaetomorpha ligustica</i>	On mud of saltmarsh vegetation	F
07 August 2012	Loch Erisort, Lewis	Brown	* <i>Pelvetia canaliculata</i>	On rock	A
07 August 2012	Loch Erisort, Lewis	Brown	* <i>Fucus spiralis</i>	On rock	A
07 August 2012	Loch Erisort, Lewis	Brown	* <i>Ascophyllum nodosum</i>	On rock	A
07 August 2012	Loch Erisort, Lewis	Red	* <i>Vertebrata lanosa</i>	Epiphytic on <i>Ascophyllum nodosum</i>	
07 August 2012	North Harbour, Scalpay, Harris	Brown	* <i>Ascophyllum nodosum</i> ecad. <i>mackayi</i>	On pebbles amongst typical <i>Ascophyllum nodosum</i>	O

Appendix 4. Natural History Museum survey data: Outer Hebrides 30 July - 7 August 2012, species and sites																		
Abundance: SA = super abundant; A = abundant; C = common; F = frequent; O = occasional; R = rare; P = present; ? = abundance uncertain																		
? = species identity uncertain																		
	Hoglan Bay North Uist	Traig Strir North Uist	Shellings North Uist	Spanish Pier North Uist	Eilean na Roe North Uist	Ceann a Garaidh South Uist	West Kilbride South Uist	Rubha Ardvue South Uist	Bàgh Steinigie Harris	Rubha Reamhar Harris	Road to Luskenlyre Harris	Fiodabay Harris	Loch na h-Uamha Harris	Geodhan Fharaidh Lewis	Port Geiraha Lewis	Leurbost Lewis	Loch Eilsort Lewis	North Harbour Scalpay, Harris
	30.7.12	30.7.12	30.7.12	31.7.12	31.7.12	01.8.12	01.8.12	02.8.12	03.8.12	03.8.12	03.8.12	04.8.12	04.8.12	05.8.12	06.8.12	07.8.12	07.8.12	07.8.12
RHODOPHYTA																		
<i>Acrochaetium secundatum</i>									R									
<i>Aglaothamnion hookeri</i>															F			
<i>Aglaothamnion sepositum</i>														F	F			
<i>Ahnfeltia plicata</i>					O	P		P	O					O	O			
<i>Asparagopsis armata</i> 'Falkenbergia' phase	F				P	A		P					P					
<i>Bonnemaisonia hamifera</i> 'Trailliella' phase													P					
<i>Catenella caespitosa</i>	O		O	P							A				R	P		
<i>Ceramium diaphanum</i> sensu Harvey									O									
<i>Ceramium echinotum</i>								P										
<i>Ceramium pallidum</i>	R												F	P	F			
<i>Ceramium secundatum</i>													O					
<i>Ceramium secundatum</i> ?															O			
<i>Ceramium shuttleworthianum</i>														P	C			
<i>Ceramium virgatum</i>	O				F	C		F					O					
<i>Ceramium virgatum</i> ?	O					C			C									
<i>Chondrus crispus</i>	F	P		O	F	F		C	F			F	O		O			
<i>Chylocladia verticillata</i>	R																	
<i>Corallina elongata</i>															R			
<i>Corallina officinalis</i>	P				F-C	R		C	C				F	P	O-F			
<i>Corallina</i> sp.													O	P	O			
<i>Cruoria pellita</i>								R										
<i>Cryptopleura ramosa</i>	O							P					F					
<i>Cystoclonium purpureum</i>					P													
<i>Delesseria sanguinea</i>													R					
<i>Dilsea carnosa</i>								O					F	R				
<i>Dumontia contorta</i>	O								P					R	O			
<i>Furcellaria fastigiata</i>	O				F			R?						O				

<i>Gastroclonium ovatum</i>								P											
<i>Gelidium latifolium</i>	P				o			P					O						
<i>Gelidium pusillum</i>	F					F		F						P					
<i>Halurus flosculosus</i>								?											
<i>Helminthocladia calvadosii</i>														R					
<i>Hildenbrandia crouanii</i>													P						
<i>Hildenbrandia rubra</i>	C		F					P					F	P					
<i>Hildenbrandia</i> sp.					O-F?			F			P							F	
<i>Hypoglossum hypoglossoides</i>						P								R					
<i>Lithophyllum incrustans</i>	F								P	F					F				
<i>Lithothamnion glaciale</i>	P																		
<i>Lomentaria articulata</i>	O				O		P		F	F				C	F	O			
<i>Lomentaria clavellosa</i>																R			
<i>Mastocarpus stellatus</i>					O				F	F				F	A	F			
<i>Mastocarpus stellatus</i> 'Petrocelis' phase										R					O				
<i>Melobesia membranacea</i>									O?	F									
<i>Membranoptera alata</i>	R				R		P			O				P					
<i>Nemalion helminthoides</i>															F				
<i>Odonthalia dentata</i>									R?					F					
<i>Osmundea hybrida</i>															R	O			
<i>Osmundea oederi</i>									p						P				
<i>Osmundea oederi</i> ?															P				
<i>Osmundea osmunda</i>									O					F	O-F	O			
<i>Osmundea osmunda</i> ?										O									
<i>Osmundea pinnatifida</i>	O-F				F		O		O-F	F				P	O	O			
<i>Palmaria palmata</i>										C				F-C		A			
<i>Phycodrys rubens</i>														O					
<i>Phyllophora crispa</i>					O									R	O				
<i>Phyllophora pseudoceranoides</i>														R					
<i>Phymatolithon lenormandii</i>	C				F				F	P				P		F			
<i>Phymatolithon purpureum</i>	C					P	P			C				P					
<i>Plocamium cartilagineum</i>						R								C	O	O			
<i>Plumaria plumosa</i>									O	O				C		P			
<i>Polyides rotundus</i>							O			O					O				
<i>Polysiphonia brodiei</i> ?										P									
<i>Polysiphonia fibrillosa</i> ?														P					
<i>Polysiphonia fucoides</i>	O					P								P					
<i>Polysiphonia nigra</i>						p									P	O			
<i>Polysiphonia stricta</i>										F				F-C	F-A				
<i>Porphyra dioica</i>		C													SA	C-A			
<i>Porphyra umbilicalis</i>															O	F-C			

Appendix 5a. Comparison of sites surveyed in 1971 and 2012					
	Geodh'an Fharaidh, Lewis			Port Geiraha, Lewis	
	August 1971	August 2012		August 1971	August 2012
RHODOPHYTA			RHODOPHYTA		
<i>Acrochaetium secundatum</i>	1		<i>Acrosorium uncinatum</i>	1	
<i>Acrochaetium virgatulatum</i>	1		<i>Aglaothamnion hookeri</i>	1	F
<i>Acrosorium uncinatum</i>	1		<i>Aglaothamnion sepositum</i>		F
<i>Aglaothamnion sepositum</i>		F	<i>Ahnfeltia plicata</i>	1	O
<i>Ahnfeltia plicata</i>	1	O	<i>Audouinella membranacea</i>	1	
<i>Apoglossum ruscifolium</i>	1		<i>Bonnemaisonia hamifera</i> 'Trailliella' phase	1	
<i>Bangia fuscopurpurea</i>	1		<i>Callithamnion arbuscula</i>	1	
<i>Boergesenella fruticulosa</i>	1		<i>Callithamnion granulatum</i>	1	
<i>Brongniartella byssoides</i>	1		<i>Catenella repens</i>	1	R
<i>Callithamnion arbuscula</i>	1		<i>Ceramium pallidum</i>		F
<i>Callithamnion tetragonum</i>	1		<i>Ceramium rubrum</i>	1	
<i>Callophyllis laciniata</i>	1		<i>Ceramium secundatum?</i>		O
<i>Ceramium ciliatum</i>	1		<i>Ceramium shuttleworthianum</i>	1	C
<i>Ceramium flabelligerum</i>	1		<i>Ceramium strictum</i>	1	
<i>Ceramium pallidum</i>		P	<i>Chondrus crispus</i>	1	O
<i>Ceramium rubrum</i>	1		<i>Corallina elongata</i>		R
<i>Ceramium shuttleworthianum</i>	1	P	<i>Corallina officinalis</i>	1	O-F
<i>Chondrus crispus</i>	1		<i>Corallina sp.</i>		O
<i>Corallina elongata</i>	1		<i>Cryptopleura ramosa</i>	1	
<i>Corallina officinalis</i>	1	P	<i>Cystoclonium purpureum</i>	1	
<i>Corallina sp.</i>		P	<i>Delesseria sanguinea</i>	1	
<i>Cryptopleura ramosa</i>	1		<i>Dumontia contorta</i>	1	O
<i>Delesseria sanguinea</i>	1		<i>Gelidium stellata</i>	1	
<i>Dilsea carnosa</i>	1	R	<i>Halurus flosculosus</i>	1	
<i>Dumontia contorta</i>	1	R	<i>Lithophyllum incrustans</i>	1	
<i>Furcellaria fastigiata</i>	1	O	<i>Lomentaria articulata</i>	1	O
<i>Gastroclonium ovatum</i>	1		<i>Lomentaria clavellosa</i>		R
<i>Gelidium attenuatum</i>	1		<i>Lomentaria orcadensis</i>	1	
<i>Gelidium crinale</i>	1		<i>Mastocarpus stellatus</i>	1	F
<i>Gelidium pusillum</i>		P	<i>Membranoptera alata</i>	1	
<i>Gelidium stellata</i>	1		<i>Odonthalia dentata</i>	1	
<i>Halurus flosculosus</i>	1		<i>Osmundea hybrida</i>	1	O
<i>Helminthocladia calvadosii</i>		R	<i>Osmundea osmunda</i>		O
<i>Heterosiphonia plumosa</i>	1		<i>Osmundea pinnatifida</i>	1	O
<i>Lithophyllum incrustans</i>	1	F	<i>Palmaria palmata</i>	1	A

<i>Lithothamnion glaciale</i>	1		<i>Phyllophora crispa</i>	1	
<i>Lomentaria articulata</i>	1	F	<i>Phyllophora traillii</i>	1	
<i>Lomentaria clavellosa</i>	1		<i>Phyllophora truncata</i>	1	
<i>Mastocarpus stellatus</i>	1	A	<i>Phymatolithon lenormandii</i>	1	F
<i>Mastocarpus stellatus</i> 'Petrocelis' phase	1	O	<i>Plocamium cartilagineum</i>	1	O
<i>Membranoptera alata</i>	1		<i>Plumaria plumosa</i>	1	P
<i>Mesophyllum lichenoides</i>	1		<i>Polyides rotundus</i>	1	
<i>Nemalion helminthoides</i>	1	F	<i>Polysiphonia brodiei</i>	1	
<i>Nitophyllum punctatum</i>	1		<i>Polysiphonia nigra</i>	1	O
<i>Odonthalia dentata</i>	1		<i>Polysiphonia stricta</i>	1	
<i>Osmundea hybrida</i>		R	<i>Porphyra dioica</i>		C-A
<i>Osmundea oederi</i>		P	<i>Porphyra umbilicalis</i>	1	F-C
<i>Osmundea oederi</i> ?		P	<i>Ptilota plumosa</i>	1	
<i>Osmundea osmunda</i>		O-F	<i>Pyropia leucosticta</i>		F-C
<i>Osmundea pinnatifida</i>	1	O	<i>Rhodochoton purpureum</i>	1	
<i>Palmaria palmata</i>	1		<i>Rhodomela confervoides</i>	1	
<i>Phycodryis rubens</i>	1		<i>Rhodothamniella floridula</i>	1	P
<i>Phyllophora crispa</i>	1	O	<i>Spermothamnion repens</i>	1	
<i>Phyllophora pseudoceranoides</i>	1		<i>Vertebrata lanosa</i>	1	
<i>Phymatolithon lenormandii</i>	1		PHAEOPHYCEAE		
<i>Plenosporium borrii</i>	1		<i>Alaria esculenta</i>	1	O
<i>Plocamium cartilagineum</i>	1	O	<i>Ascophyllum nodosum</i>	1	
<i>Plumaria plumosa</i>	1		<i>Asperococcus fistulosus</i>	1	
<i>Polyides rotundus</i>		O	<i>Chordaria flagelliformis</i>	1	
<i>Polysiphonia atlantica</i>	1		<i>Cladostephus spongiosus</i>	1	
<i>Polysiphonia brodiei</i>	1		<i>Cutleria multifida</i> 'Aglaozonia' phase	1	
<i>Polysiphonia fucooides</i>	1		<i>Desmarestia aculeata</i>	1	
<i>Polysiphonia nigra</i>	1	P	<i>Desmarestia ligulata</i>	1	
<i>Polysiphonia stricta</i>	1	F-A	<i>Desmarestia viridis</i>	1	
<i>Porphyra dioica</i>		SA	<i>Dictyosiphon foeniculaceus</i>	1	
<i>Porphyra umbilicalis</i>	1	O	<i>Dictyota dichotoma</i>	1	
<i>Pterosiphonia parasitica</i>	1		<i>Ectocarpus fasciculatus</i>	1	
<i>Pyropia leucosticta</i>		R	<i>Ectocarpus siliculosus</i>	1	
<i>Rhodomela confervoides</i>	1		<i>Elachista fucicola</i>	1	P
<i>Rhodophysema elegans</i>	1		<i>Fucus serratus</i>	1	
<i>Rhodothamniella floridula</i>		A	<i>Fucus spiralis</i>	1	F
PHAEOPHYCEAE			<i>Fucus vesiculosus</i>	1	
<i>Alaria esculenta</i>	1	C	<i>Giffordia granulosa</i>		F-C
<i>Asperococcus fistulosus</i>	1	P	<i>Halidryis siliquosa</i>	1	
<i>Chordaria flagelliformis</i>	1		<i>Hecatonema maculans</i>	1	

<i>Cladostephus spongiosus</i>	1		<i>Himanthalia elongata</i>	1	
<i>Desmarestia aculeata</i>	1		<i>Laminaria digitata</i>	1	
<i>Desmarestia ligulata</i>	1 (drift)		<i>Laminaria hyperborea</i>	1	O
<i>Desmarestia viridis</i>	1		<i>Litosiphon laminariae</i>	1	R
<i>Dictyosiphon foeniculaceus</i>	1		<i>Myriotrichia filiformis</i>	1	
<i>Dictyota dichotoma</i>	1		<i>Pelvetia canaliculata</i>	1	P
<i>Ectocarpus fasciculatus</i>	1		<i>Petalonia fascia</i>	1	
<i>Ectocarpus siliculosus</i>	1		<i>Petroderma maculiforme</i>		O
<i>Elachista flaccida</i>	1		<i>Protectocarpus speciosus</i>	1	
<i>Elachista fucicola</i>	1	P	<i>Pylaiella littoralis</i>	1	
<i>Elachista scutellata</i>	1		<i>Saccharina latissima</i>	1	
<i>Eudesme virescens</i>	1		<i>Scytosiphon lomentaria</i>	1	
<i>Fucus serratus</i>	1	F	<i>Sphacelaria cirrosa</i>	1	
<i>Fucus spiralis</i>	1		<i>Sphacelaria radicans</i>	1	
<i>Fucus spiralis?</i>		F	<i>Spongonema tomentosum</i>	1	
<i>Fucus vesiculosus</i>	1		CHLOROPHYTA		
<i>Giffordia granulosa</i>		F-C	<i>Acrosiphonia arcta</i>	1	
<i>Giffordia hinksiae</i>	1		<i>Blidingia minima</i>	1	
<i>Halidrys siliquosa</i>	1	F	<i>Bryopsis hypnoides</i>	1	
<i>Himanthalia elongata</i>	1		<i>Chaetomorpha ligustica</i>	1	
<i>Laminaria digitata</i>	1	O	<i>Chaetomorpha linum</i>	1	
<i>Laminaria hyperborea</i>	1		<i>Chaetomorpha melagonium</i>	1	
<i>Leathesia difformis</i>	1	O-F	<i>Chlorochytrium willei</i>	1	
<i>Litosiphon laminariae</i>	1	P	<i>Cladophora hutchinsiae?</i>	1 (drift)	
<i>Mesogloia vermiculata</i>		O	<i>Cladophora rupestris</i>	1	O
<i>Myricatula haydenii</i>	1		<i>Cladophora sericea</i>	1	
<i>Myrionema strangulans</i>		P	<i>Cladophora sericea?</i>		O
<i>Myriotrichia clavaeformis</i>	1		<i>Codiolum-phases</i>	1	
<i>Pelvetia canaliculata</i>	1	O	<i>Codium fragile</i> subsp. <i>atlanticum</i>	1	
<i>Petalonia fascia</i>		R	<i>Entocladia perforans</i>	1	
<i>Petroderma maculiforme</i>	1		<i>Ostreobium quekettii</i>	1	
<i>Protectocarpus speciosus</i>	1		<i>Prasiola stipitata</i>	1	
<i>Pylaiella littoralis</i>	1		<i>Pseudendoclonium marinum</i>	1	
<i>Ralfsia verrucosa</i>	1		<i>Rhizoclonium implexum</i>	1	
<i>Saccharina latissima</i>	1	O	<i>Spongomorpha aeruginosa</i>	1	O
<i>Saccorhiza polyschides</i>	1		<i>Tellamia intricata</i>	1	
<i>Scytosiphon lomentaria</i>	1	O-F	<i>Ulva lactuca</i>		O
<i>Sphacelaria cirrosa</i>	1		<i>Ulva linza</i>		F
<i>Shacelaria fusca</i>	1		<i>Ulva linza?</i>		F
<i>Spongonema tomentosum</i>	1	P	TOTAL	97	41

CHLOROPHYTA					
<i>Bryopsis hypnoides</i>	1				
<i>Chaetomorpha ligustica</i>	1				
<i>Chaetomorpha linum</i>	1				
<i>Chaetomorpha melagonium</i>			O		
<i>Cladophora albida</i>	1				
<i>Cladophora albida?</i>			O		
<i>Cladophora rupestris</i>	1		O		
<i>Cladophora sericea?</i>			O		
<i>Codiolum</i> -phases	1				
<i>Codium fragile</i> subsp. <i>atlanticum</i>	1		R		
<i>Entocladia perforans</i>	1				
<i>Pseudendoclonium marinum</i>	1				
<i>Spongomorpha aeruginosa</i>			P		
<i>Tellamia intricata</i>	1				
<i>Ulva flexuosa</i>			P		
<i>Ulva lactuca</i>			O		
<i>Ulva linza</i>			P		
TOTAL	106		56		

Appendix 5b. Summary comparison of species lists from 1971 and 2012		
	Norton 1971	NHM Survey 2012
RHODOPHYTA		
<i>Acrochaetium secundatum</i>	1	1
<i>Acrochaetium virgatum</i>	1	
<i>Acrosorium venulosum</i>	1	
<i>Aglathaomnion hookeri</i>	1	1
<i>Aglaothamnion sepositum</i>		1
<i>Ahnfeltia plicata</i>	1	1
<i>Apoglossum ruscifolium</i>	1	
<i>Asparagopsis armata</i> 'Falkenbergia' phase		1
<i>Bangia fuscopurpurea</i>	1	
<i>Boergesenella fruticulosa</i>	1	
<i>Bonnemaisonia hamifera</i> 'Trailliella' phase	1	1
<i>Brongniartella byssoides</i>	1	
<i>Callithamnion arbuscula</i>	1	
<i>Callithamnion granulatum</i>	1	
<i>Callithamnion tetragonum</i>	1	
<i>Callocolax neglectus</i>	1	
<i>Callophyllis laciniata</i>	1	
<i>Catenella repens</i>	1	1
<i>Ceramium ciliatum</i>	1	
<i>Ceramium diaphanum</i> (Lightf.) Roth	1	
<i>Ceramium diaphanum sensu</i> Harvey		1
<i>Ceramium echinotum</i>		1
<i>Ceramium gaditanum</i>	1	
<i>Ceramium pallidum</i>		1
<i>Ceramium 'rubrum'</i>	1	
<i>Ceramium secundatum</i>		1
<i>Ceramium secundatum?</i>		1
<i>Ceramium shuttleworthianum</i>	1	1
<i>Ceramium strictum</i>	1	
<i>Ceramium virgatum</i>		1
<i>Ceramium virgatum?</i>		1
<i>Chondrus crispus</i>	1	1
<i>Choreocolax polysiphoniae</i>	1	
<i>Chylocladia verticillata</i>	1	1
<i>Corallina elongata</i>	1	1
<i>Corallina officinalis</i>	1	1
<i>Corallina</i> sp.		1
<i>Cruoria pellita</i>	1	1
<i>Cryptopleura ramosa</i>	1	1
<i>Cystoclonium purpureum</i>	1	1
<i>Delesseria sanguinea</i>	1	1
<i>Dilsea carnosa</i>	1	1
<i>Dumontia contorta</i>	1	1
<i>Erythrotrichia carnea</i>	1	
<i>Furcellaria fastigiata</i>	1	1
<i>Gastroclonium ovatum</i>	1	1
<i>Gelidium attenuatum</i>	1	
<i>Gelidium corneum</i>	1	
<i>Gelidium crinale</i>	1	
<i>Gelidium latifolium</i>		1
<i>Gelidium pusillum</i>		1

<i>Gonimophyllum buffhamii</i>	1	
<i>Gracilaria gracilis</i>	1	
<i>Halurus flosculosus</i>	1	1
<i>Helmithora calvadosii</i>		1
<i>Hildenbrandia crouanii</i>	1	1
<i>Hildenbrandia rubra</i>	1	1
<i>Hildenbrandia</i> sp.		1
<i>Hypoglossum hypoglossoides</i>	1	1
<i>Kallymenia reniformis</i>	1	
<i>Lithophyllum incrustans</i>	1	1
<i>Lithothamnion glaciale</i>	1	1
<i>Lomentaria articulata</i>	1	1
<i>Lomentaria clavellosa</i>	1	1
<i>Lomentaria orcadensis</i>	1	
<i>Mastocarpus stellatus</i>	1	1
<i>Mastocarpus stellatus</i> 'Petrocelis' phase	1	1
<i>Melobesia membranacea</i>		1
<i>Membranoptera alata</i>	1	1
<i>Mesophyllum lichenooides</i>	1	
<i>Nemalion helminthoides</i>	1	1
<i>Nitophyllum punctatum</i>	1	
<i>Odonthalia dentata</i>	1	1
<i>Osmundea hybrida</i>	1	1
<i>Osmundea oederi</i>		1
<i>Osmundea oederi</i> ?		1
<i>Osmundea osmunda</i>		1
<i>Osmundea osmunda</i> ?		1
<i>Osmundea pinnatifida</i>	1	1
<i>Palmaria palmata</i>	1	1
<i>Peyssonelia dubyi</i>	1	
<i>Phycodryas rubens</i>	1	1
<i>Phyllophora crispa</i>	1	1
<i>Phyllophora pseudoceranooides</i>	1	1
<i>Phyllophora traillii</i>	1	
<i>Phyllophora truncata</i>	1	
<i>Phymatolithon calcareum</i>	1	
<i>Phymatolithon lenormandii</i>	1	1
<i>Phymatolithon purpureum</i>		1
<i>Plenosporium borneri</i>	1	
<i>Plocamium cartilagineum</i>	1	1
<i>Plumaria plumosa</i>	1	1
<i>Polyides rotundus</i>	1	1
<i>Polysiphonia atlantica</i>	1	
<i>Polysiphonia brodiei</i>	1	1
<i>Polysiphonia brodiei</i> ?		1
<i>Polysiphonia fibrata</i>	1	
<i>Polysiphonia fibrillosa</i> ?		1
<i>Polysiphonia fucoides</i>	1	1
<i>Polysiphonia nigra</i>	1	1
<i>Polysiphonia stricta</i>	1	1
<i>Porphyra dioica</i>		1
<i>Porphyra purpurea</i>	1	
<i>Porphyra umbilicalis</i>	1	1
<i>Porphyrostromium ciliare</i>	1	
<i>Pterosiphonia parasitica</i>	1	
<i>Ptilota plumosa</i>	1	1

<i>Ptilothamnion pluma</i>	1	
<i>Pyropia leucosticta</i>	1	1
<i>Rhodochorton purpureum</i>	1	
<i>Rhodomela confervoides</i>	1	
<i>Rhodomela lycopodioides</i>	1	
<i>Rhodophysema elegans</i>	1	
<i>Rhodothamniella floridula</i>	1	1
<i>Titanoderma pustulatum</i>		1
<i>Vertebrata lanosa</i>	1	1
PHAEOPHYCEAE		
<i>Alaria esculenta</i>	1	1
<i>Ascophyllum nodosum</i>	1	1
<i>Ascophyllum nodosum</i> ecad. <i>mackayii</i>		1
<i>Asperococcus ensiformis</i>		1
<i>Asperococcus fistulosus</i>	1	1
<i>Chilionema ocellatum</i>	1	
<i>Chorda filum</i>	1	1
<i>Chordaria flagelliformis</i>	1	1
<i>Cladostephus spongiosus</i>	1	1
<i>Colpomenia peregrina</i>	1	1
<i>Cutleria mutifida</i>		1
<i>Desmarestia aculeata</i>	1	
<i>Desmarestia ligulata</i>	1	
<i>Desmarestia viridis</i>	1	
<i>Dictyosiphon foeniculaceus</i>	1	1
<i>Dictyota dichotoma</i>	1	1
<i>Ectocarpus fasciculatus</i>	1	1
<i>Ectocarpus siliculosus</i>	1	1
<i>Ectocarpus siliculosus?</i>		1
<i>Elachista flaccida</i>	1	
<i>Elachista fucicola</i>	1	1
<i>Elachista scutulata</i>	1	
<i>Eudesme virescens</i>	1	
<i>Fucus ceranoides</i>	1	
<i>Fucus cottonii</i>		1
<i>Fucus serratus</i>	1	1
<i>Fucus spiralis</i>	1	1
<i>Fucus spiralis?</i>		1
<i>Fucus vesiculosus</i>	1	1
<i>Fucus vesiculosus</i> v. <i>evesiculosus</i>		1
<i>Fucus vesiculosus</i> x <i>spiralis</i> hybrid?		1
<i>Hinckesia granulosa</i>	1	
<i>Hinckesia hincksiae</i>	1	
<i>Halidrys siliquosa</i>	1	1
<i>Hecatonema velutinum</i>	1	
<i>Himanthalia elongata</i>	1	1
<i>Laminaria digitata</i>	1	1
<i>Laminaria digitata?</i>		1
<i>Laminaria hyperborea</i>	1	1
<i>Leathesia difformis</i>	1	1
<i>Leptonematella fasciculata</i>	1	
<i>Litosiphon laminariae</i>	1	1
<i>Mesogloia vermiculata</i>	1	1
<i>Microsponsum globosum</i>	1	
<i>Myriactula haydenii</i>	1	
<i>Myrionema strangulans</i>	1	1

<i>Myriotrichia clavaeformis</i>	1	
<i>Myriotrichia filiformis</i>	1	
<i>Pelvetia canaliculata</i>	1	1
<i>Petalonia fascia</i>	1	1
<i>Petroderma maculiforme</i>	1	1
<i>Protectocarpus speciosus</i>	1	
<i>Punctaria latifolia</i>	1	
<i>Pylaiella littoralis</i>	1	1
<i>Ralfsia clavata</i>	1	
<i>Ralfsia verrucosa</i>	1	1
<i>Saccharina latissima</i>	1	1
<i>Saccorhiza polyschides</i> (as <i>S. bulbosa</i>)		1
<i>Scytosiphon lomentaria</i>	1	1
<i>Sphacelaria bipinnata</i>	1	
<i>Sphacelaria cirrosa</i>	1	1
<i>Sphacelaria fusca</i>	1	
<i>Sphacelaria radicans</i>	1	
<i>Sphacelaria</i> sp.		1
<i>Spongonema tomentosum</i>	1	1
<i>Stictyosiphon griffithsianus</i> (as <i>Phloeospora brachiata</i>)	1	
CHLOROPHYTA		
<i>Acrosiphonia arcta</i> (as <i>Cladophora arcta</i>)	1	1
<i>Blidingia marginata</i>	1	1
<i>Blidingia minima</i>	1	1
<i>Bryopsis hypnoides</i>	1	
<i>Chaetomorpha ligustica</i>	1	1
<i>Chaetomorpha linum</i>	1	1
<i>Chaetomorpha melagonium</i>	1	1
<i>Chlorochytrium cohnii</i>	1	
<i>Chlorochytrium willei</i>	1	
<i>Cladophora albida</i>	1	1
<i>Cladophora albida?</i>		1
<i>Cladophora hutchinsiae</i>	1	
<i>Cladophora liniformis?</i>		1
<i>Cladophora rupestris</i>	1	1
<i>Cladophora sericea</i>	1	1
<i>Cladophora sericea?</i>		1
<i>Cladophora</i> sp.		1
<i>Codiolum petrocelidis</i>	1	
<i>Codiolum phases</i>	1	
<i>Codium fragile</i> subsp. <i>atlanticum</i>	1	1
<i>Codium fragile</i> subsp. <i>fragile</i>		1
<i>Entocladia perforans</i>	1	
<i>Epicladia flustrae</i> (as <i>Endoderma flustrae</i>)	1	
<i>Eugomontia sacculata</i>	1	
<i>Ostreobium quekettii</i>	1	
<i>Prasiola stipitata</i>	1	
<i>Pseudendozonium marinum</i>	1	
<i>Rhizoclonium riparium</i>	1	
<i>Spongomorpha aeruginosa</i>	1	1
<i>Tellamia intricata</i>	1	
<i>Ulothrix flacca</i>	1	
<i>Ulva flexuosa</i>	1	1
<i>Ulva intestinalis</i>	1	1
<i>Ulva intestinalis?</i>		1
<i>Ulva lactuca</i>	1	1

<i>Ulva linza</i>		1
<i>Ulva linza?</i>		1
<i>Ulva prolifera</i>		1
<i>Ulva pseudocurvata</i>		1
<i>Ulva rigida</i>	1	
<i>Ulva torta</i>	1	1
<i>Urospora penicilliformis</i>	1	
SPECIES TOTALS	179	152