

Marine Research Report

Seaweed survey of the Outer Hebrides 2012



**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 furoids 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* ('*Trailliella*' 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 fjords 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 2.1. 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 scallochs 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