

The table to the right shows how many species were recorded in each group and some of the most widely distributed species.

Sponges

Sponges were a conspicuous component of the fauna with the calcareous *Clathrina coriacea* on the shallow walls and the Boring sponge and Elephant's ear sponge deeper. *Suberites carnosus* was found on the very sheltered sites. There was a possible record of the rare *Thymosia guernii* from the entrance to Loch Carloway.

Anemones, Corals, Hydroids & Jellyfish

Phellia gausapata CH



This was a diverse group of animals with 17 different species found. The most common hydroids were *Tubularia indivisa* which was found on the shallow exposed cliffs and the sea beard *Nemertesia* spp. Anemones were common, especially jewel anemones, plumose anemones and the daisy anemone *Sagartia elegans* which were all abundant on the exposed rock faces. The burrowing anemone *Cerianthus lloydii* was recorded from the mud in the sheltered inner loch. Dead men's fingers *Alcyonium digitatum* were common at most sites, particularly on vertical faces. Among the more unusual finds was the small anemone *Phellia gausapata*, a northern species which lives in areas with strong surge.



Pachymatisma johnstonia CH

Shells, Sea slugs and Octopus

This was one of the most diverse groups recorded with 27 species found. Grey and Painted top shells were common in the kelp forests with cowries found in the faunal turf. King and Queen scallops were present on the sediment sites, with Queenies restricted to the sheltered inner loch whilst King scallops were also found on more exposed sediments. There were 7 species of sea slug recorded, with the scarce *Trapania pallida* reported from the entrance to Loch Carloway. The Octopus *Eledone cirrhosa* was found at Pabay.

Phylum	Common Name	Number of Species	Common Species
Porifera	Sponges	13	Elephant's ear sponge Boring sponge <i>Pachymatisma johnstonia</i> <i>Cliona celata</i>
Cnidaria	Anemones, Corals, Hydroids, Jellyfish	17	Dead men's fingers Dahlia anemone Plumose anemone Jewel anemone Devonshire cup coral <i>Alcyonium digitatum</i> <i>Urticina felina</i> <i>Metridium senile</i> <i>Sagartia elegans</i> <i>Corynactis viridis</i> <i>Caryophyllia smithii</i>
Nemertea	Ribbon worms	2	
Annelida	Segmented worms	7	
Crustacea	Barnacles, crabs, lobsters	19	Squat lobster Spider crab Edible crab Velvet swimming crab <i>Galathea strigosa</i> <i>Hyas araneus</i> <i>Cancer pagurus</i> <i>Necora puber</i>
Mollusca	Shells, sea slugs, octopus	27	Painted top shell Cowrie King scallop <i>Calliostoma zizyphinum</i> <i>Trivia monacha</i> <i>Pecten maximus</i>
Bryozoa	Sea mats	2	
Echinodermata	Starfish, sea urchins	17	Feather star Sunstar Purple sunstar Bloody Henry Common starfish Spiny starfish Common sea urchin <i>Antedon bifida</i> <i>Solaster endeca</i> <i>Crossaster papposus</i> <i>Henricia</i> sp. <i>Asterias rubens</i> <i>Marthasterias glacialis</i> <i>Echinus esculentus</i>
Tunicata	Sea squirts	11	Light-bulb ascidian <i>Clavelina lepadiformis</i>
Pisces	Fish	7	Sea scorpion <i>Taurulus bubalis</i>
Algae	Seaweeds	21	Enc. coralline algae Sea beech Dabberlocks Kelp or Cuvie Corallinaceae <i>Delesseria sanguinea</i> <i>Alaria esculenta</i> <i>Laminaria hyperborea</i>

Starfish, Sea urchins and Sea cucumbers

The echinoderms were an important group, with several starfish species reported from most sites. The spiny and common starfish were common throughout the area and the red cushion star, a northern species in the UK, was found at several of the exposed sites. The black brittlestar *Ophiocoma nigra* was found amongst sea oak at Gallan Head. Among the more unusual finds were the cotton spinner sea cucumber *Holothuria forskali* which is at its northern limit of distribution in this area and *Stichastrella rosea*, a starfish with a northern and western distribution.

Sea squirts

Sea squirts were an important component of the fauna with colonial ascidians such as *Polyclinum aurantium* common on the shallow walls. The large solitary *Ascidella aspersa* and *Ascidia mentula* were recorded from the sheltered inner loch.



Stichastrella rosea CH

Crabs and lobsters

Lobsters were only recorded once, at Gallan Head, but crabs, particularly the velvet swimming crab and the edible crab, were found at many sites. Several species of spider crab and squat lobster were recorded and there was one record of *Xantho pilipes*, a more unusual crab species, from the entrance to the loch.

Fish

Very few fish were seen with the scorpion fish *Taurulus bubalis* recorded most often. A conger eel was seen near Pabay and gobies were frequent on the sand.



Taurulus bubalis CH

Nationally Rare and Scarce species

Species	Designation	Where found
Sponge	scarce	Bearasay, Rare
Thymosia guernei		
Sea slug	scarce	Entrance to Loch Carloway, Rare
Trapania pallida		

Surveyors taking part were K. Brown, S. Castro, C. Duncan, J. Gold, J. Hall-Spencer, K. Ingles, S. Ingles, A. McIlwaine, F. Mathers, K. Nicholson, B. Panter, M. Perutz, J. Phillips, G. Saunders, P. Tyler. We would like to thank Ken Brown and Alan McIlwaine for their boats and Ken Ingles and the Lewis and Harris Sub-Aqua Club for providing air and invaluable local knowledge of dive sites. This report was prepared by C. Howson. Photographs are by Christine Howson and Calum Duncan.

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Seasearch is a volunteer underwater survey project for recreational divers to contribute to the conservation of the marine environment. Financial support for the project during 2003 and for the production of this summary report has been given by:



Nudibranch, *Facelina auriculata* CH



Sea beech, *Delesseria sanguinea* CH

Loch Roag Survey March/April 2002 Summary Report



Black brittlestar CH



Red cushion star CH



Squat lobster, *Galathea strigosa* CH



Fauna on rock walls CH

Loch Roag

The Isle of Lewis contains a spectacular variety of unspoilt marine communities. From rocky coasts exposed to the full might of the Atlantic swell to the sheltered lagoon complexes of Loch Roag, Lewis offers excellent examples of a range of marine habitats. A number of surveys of both the shores and subtidal zones have been carried out in Loch Roag since the late 1970's but none of these managed to survey many of the more exposed outer parts of the loch. When Edinburgh University Sub-Aqua Club wanted to mount a Seasearch expedition to a remote region of Scotland in 2002, the outer parts of Loch Roag provided an ideal location.

Loch Roag lies on the west coast of Lewis and is the largest loch system in the Western Isles. It is broadly composed of five subsidiary lochs with several lagoons and a large number of islands. The lagoons range from fully saline to brackish basins and their conservation importance has led to the system being proposed as a marine Special Area of Conservation (SAC). The loch complex includes shores with every grade of wave exposure from fully exposed sandy beaches and steep cliffs outside the loch, to fully sheltered mud and rock in the inner reaches, where there is local brackish influence. There are many tidal channels of varying current strengths which add considerably to the interest.



Loch Roag CD

Kelp forests

The shallow rock was dominated by kelp forest, with the dominant kelp species at each site dependent on the degree of wave exposure. Kelp reached a maximum depth of 22m at the most exposed sites dived but only reached 4m in the very sheltered inner loch. In many cases, steep bedrock limited the maximum depth of the forest although there was frequently kelp park on boulders at the base of cliffs.

The dominant kelp species changed from *Laminaria hyperborea* at the more exposed sites to *Laminaria saccharina* in the more sheltered survey areas, often with a mixture of species in between. In general the more exposed forests had a rich associated fauna and flora whilst grazed forests were found at more sheltered sites. Conspicuous species included the elephant's ear sponge *Pachymatisma johnstonia*, the painted top shell *Calliostoma zizyphinum* and the cowry *Trivia monacha*. In the richer forests, there was a red algal turf with colonial ascidians, bryozoans, the boring sponge *Cliona celata*, jewel anemones *Corynactis viridis* and dead men's fingers *Alcyonium digitatum*. In grazed forests sea urchins *Echinus esculentus*, coralline algal crusts and cup corals *Caryophyllia smithii* were common.



Kelp forest CH



Hermit crab CD

The sheltered *L. saccharina* forests consisted of cape-form plants, with large, umbrella-like fronds. Conspicuous species beneath the kelp included the ascidian *Asciidiella sanguinea*, the sponge *Suberites carnosus*, sea beech and common starfish. This group of species is very characteristic of the silty rock found in such sheltered conditions in sealochs.

Sediment

Sediment types recorded ranged from waves of coarse shell gravel with few species outside the loch to rich sandy mud in the sheltered inner loch. At the sheltered sites within Loch Roag, sandy mud supported a rich community with large numbers of the turret shell *Turritella communis*, the burrowing anemone *Cerianthus lloydii*,

the brittle star *Ophiura albida*, clumps of ascidians *Asciidiella aspersa* and the sponge *Suberites carnosus*. There were some lug worms *Arenicola marina* present and patches of the filamentous red alga *Trailliella imbricata*. Mobile species present included the hermit crab *Pagurus bernhardus*, the shore crab *Carcinus maenas* and the spider crabs *Inachus* sp. and *Macropodia* sp.

Exposed animal-dominated rock

Circalittoral rock was mostly confined to the exposed outer loch, with the rock-sediment boundary ranging from at least 27 m at Tiumpán on the open coast to 4 to 8 m at Glas Eilean in the inner loch. At many of the most exposed sites there was steep or vertical rock, often cut by gullies with cobble floors. These walls were subject to considerable swell and were covered by sheets of the jewel anemone *Corynactis viridis* with dwarf plumose anemones *Metridium senile*. These species formed a major part of a rich animal turf which completely covered the rock surface, with other conspicuous species including dead

men's fingers *Alcyonium digitatum*, the anemone *Sagartia elegans*, the sponges *Pachymatisma johnstonia* and *Cliona celata*, feather stars *Antedon bifida* and hydroids such as *Tubularia indivisa* and *Sertularia argentea*. Mobile species included the sunstar *Crossaster papposus* and the spiny starfish *Marthasterias glacialis*, the cushion star *Porania pulvillus* and crabs such as *Necora puber* and *Cancer pagurus*. Crevices contained dahlia anemones *Urticina felina* and the sea cucumber *Pawsonia saxicola*.

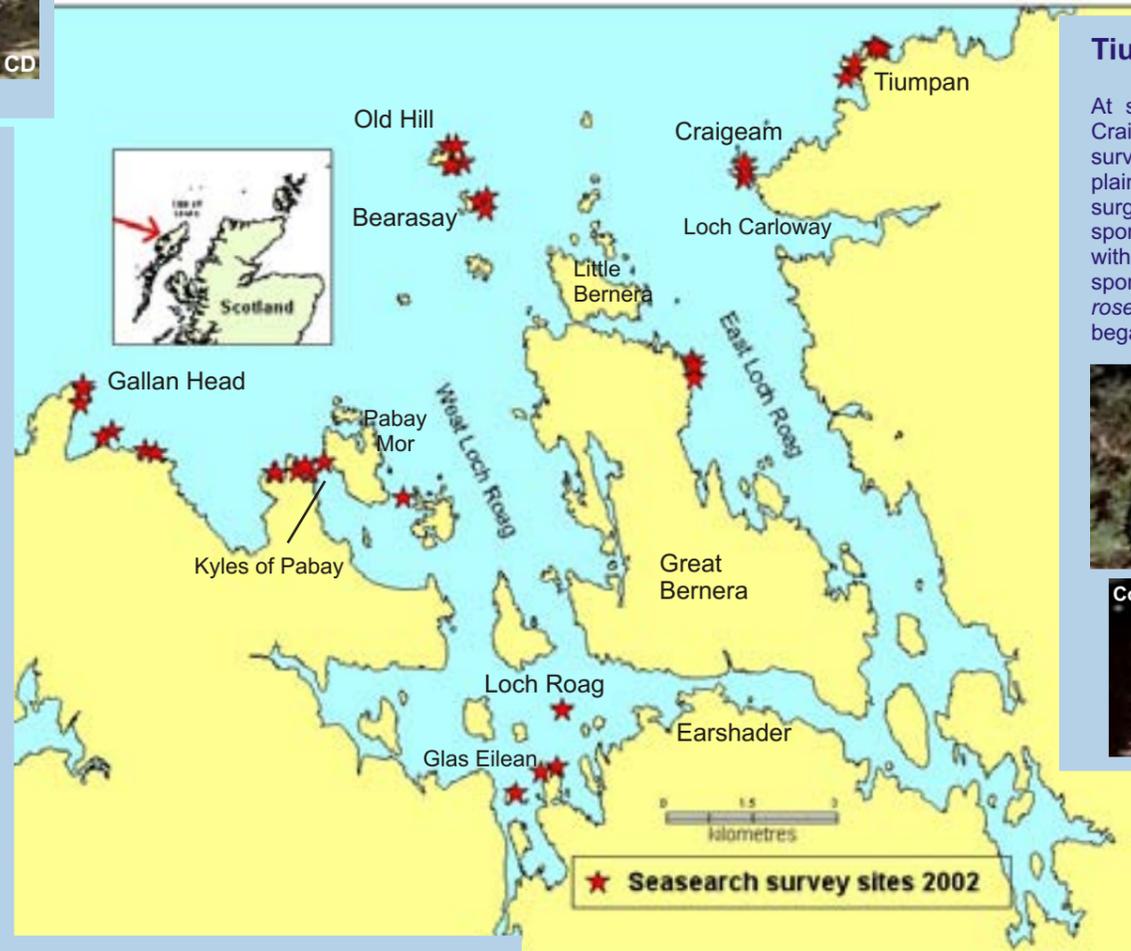
Boulders or a more gradual rock slope at the base of steep or vertical rock supported species such as the cup coral

Sunstar *Solaster endeca* CD



Caryophyllia smithii, coralline algal and bryozoan crusts, patches of jewel anemones, sponges such as *Cliona celata* and *?Haliclona simulans* and occasionally brittlestars and feather stars. These regions were relatively bare compared to the turf-covered shallower rock.

Mobile, clean cobbles were a feature of many sites particularly where there were surge gullies in the cliff faces. There were few species recorded on these cobbles although brittlestars and dahlia anemones were present in places.



Gallan Head

At this exposed headland at the entrance to Loch Roag, the sea oak *Halidrys siliquosa* was recorded mixed with sparse *Laminaria hyperborea* at the base of the rock slope where large boulders and sand began. This is a community characteristic of sand scour and there were large numbers of the brittlestar *Ophiocoma nigra* on the rock amongst the *Halidrys*, with horn wrack *Flustra foliacea* on the sides of boulders and dahlia anemones *Urticina felina* at the rock-sediment boundary. The rock above this zone was vertical in places with ridges and gullies and was covered with a rich turf of surge-tolerant species typical of the exposed sites in this area. The cotton spinner *Holothuria forskali* and the red cushion star *Porania pulvillus* were both found here. The clean coarse sand beyond the rock was formed into mega ripples with little obvious life.

Kyles of Pabay

In the Kyles of Pabay, steep rock walls and gullies fell to a floor of scoured cobbles and boulders at about 20 m. The rock walls were covered with a colourful turf of jewel anemones, plumose anemones, *Sagartia elegans*, feather stars, the elephant's ear sponge and colonial ascidians such as *Sidnyum turbinatum* and *Morchellium argus*. Mobile species included spiny starfish, squat lobsters and octopus. The cobbles, which were fairly barren, were covered with encrusting algae and dahlia anemones.

Tiumpán

At sites on the headlands of Tiumpán and Craigeam, perhaps the most exposed area surveyed, vertical bedrock dropped to a sand plain at 30 m. These walls were dominated by a surge-tolerant short turf of branching seamats, sponges, small ascidians and jewel anemones with sea cucumbers in crevices and the boring sponge *Cliona celata*. The starfish *Stichastrella rosea* was found in this area. A sand plain began at about 30 m.



Jewel anemones CH



Cotton spinner CH



Coralline seaweed CH

Old Hill and Bearasay

The seabed around Old Hill and Bearasay was very rugged and swept by strong tides. There were cliffs, deep gullies, bedrock steps and very large boulders covered with a diverse fauna and flora, and clean cobbles on the gully floors. Vertical faces were covered by sheets of jewel anemones, ascidians and sponges whilst upward-facing rock supported dense kelp to a depth of 20 m. There was a band of dabberlocks *Alaria esculenta* in very shallow water.

Glas Eilean, inner Loch Roag

This very sheltered group of sites had a forest of cape-form sugar kelp to 3 or 4 m with animal-dominated rock continuing beyond the kelp to a boulder and mud slope at about 6 m. Clumps of the ascidian *Asciidiella aspersa* were recorded on the rock and boulders with the sponges *Polymastia mamillaris* and *Suberites carnosus*, large plumose anemones and scattered hydroids. The muddy sediment had brittlestars *Ophiura ophiura*, tower shells, queen scallops and *Inachus* spider crabs. This site was typical of the sheltered parts of sealochs.



Velvet swimming crab CD