SCOTTISH NATURAL HERITAGE

Loch nam Madadh Special Area of Conservation

Advice under Regulation 33(2)

of The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended)

30 March 2006

About this Package:

Section 1 of this document provides a general introduction and Sections 2 and 3 fulfil Scottish Natural Heritage's duties under Regulation 33(2) of The Conservation (Natural Habitats, &c.) Regulations 1994 (Habitats Regulations) (as amended by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004). This requires that SNH advises other relevant authorities as to the conservation objectives of the site (see Section 2) and any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species, in so far as such disturbance could be significant, for which the site has been designated (see Section 3).

Annexes A and B provide supplementary, non-statutory information. Annex A gives information on the sensitivity and vulnerability of the qualifying interests: 'Coastal lagoons'; 'Large shallow inlets and bays'; 'Mudflats and sandflats not covered by sea water all the time'; 'Reefs'; 'Sandbanks which are slightly covered by sea water all the time'; and 'Otter *Lutra lutra*'. Annex B gives some indication as to the extent, distribution, structure, function and processes that affect the qualifying interests. It should be noted that this is indicative and not definitive, and as more site information is gathered these sections may be updated.

Loch nam Madadh was designated by Scottish Ministers as a Special Area of Conservation (SAC) on 17th March 2005. This site is also referred to as a 'European site' (Regulation 10(1)). A 'European marine site' is a 'European site' which is wholly or in part marine (Regulation 2(1)) and is hereafter referred to as a marine SAC.

Although the following statutory information is for the benefit of relevant authorities (see below for explanation of their role), it can also be used by other competent authorities when assessing plans or projects.

1 Introduction

1.1 Background

The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004), commonly referred to as the Habitats Regulations, transpose the EC Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora (Habitats Directive) into domestic legislation. Regulation 33(2) gives Scottish Natural Heritage a statutory responsibility to advise other relevant authorities as to the conservation objectives for marine SACs in Scotland, and any operations which may cause deterioration of natural habitats or the habitats of species, or disturbance of species for which the site has been designated.

This document presents the Regulation 33 advice, plus supporting information, for the Loch nam Madadh SAC to assist relevant and competent authorities, local interest groups and individuals in considering management (including the management scheme) of the site. This advice, plus supporting information, will also help to determine the scope and nature of any "appropriate assessment", which the Habitats Directive requires to be undertaken for proposed plans and projects that are not connected to the conservation management of the site and are considered likely to have a significant effect. Where necessary Scottish Natural Heritage will also provide more detailed advice to relevant, and other competent, authorities to inform assessment of the implications of any such plans or projects.

1.2 Relevant and competent authorities

Within the context of a marine SAC, a relevant authority is a body or authority that has a function in relation to land or waters within or adjacent to the site (Regulation 5) and include: a nature conservation body; a local authority; water undertakers; a navigation authority; a harbour authority; a lighthouse authority; a river purification board (SEPA); a district salmon fishery board; and a local fisheries committee. All *relevant authorities* are *competent authorities*.

A competent authority is defined in Regulation 6 as "any Minister, government department, public or statutory undertaker, public body of any description or person holding a public office". In the context of a plan or project, the *competent authority* is the authority with the power or duty to determine whether or not the proposal can proceed.

1.3 The role of relevant authorities

The Habitats Regulations require relevant authorities to exercise their functions so as to secure compliance with the Habitats Directive. A management scheme may be drawn up for each marine SAC by the relevant authorities as described under Regulation 34. For marine SACs with overlapping interests, a single management scheme may be developed.

Where a management scheme is in place the relevant authorities must ensure that all plans for the area integrate with it. Such plans may include shoreline

management plans, Sites of Special Scientific Interest (SSSI) management plans, local Biodiversity Action Plans (BAPs) and sustainable development strategies for estuaries. This must occur to ensure that only a single management scheme is produced through which all relevant authorities exercise their duties under the Habitats Regulations.

1.4 Responsibilities under other conservation designations

Other designations within or adjacent to the Loch nam Madadh marine SAC are: Loch an Duin Ramsar site; Loch an Duin, Loch nam Madadh and Mointeach Scadabhaigh SSSI; Mointeach Scadabhaigh SAC; Mointeach Scadabhaigh Special Protection Area (SPA). The obligations of relevant, and other competent authorities and organisations under such designations and legislation are not affected by the advice contained in this document.

1.5 Conservation objectives

Section 2 of this document contains the conservation objectives for the Loch nam Madadh marine SAC, a site which consists of marine qualifying interests and otters. The conservation objectives have been developed to ensure that the obligations of the Habitats Directive are met.

1.6 Advice as to operations

The operations, set out in Section 3, are those which SNH advise may cause deterioration of natural habitats for which the site has been designated. This does not necessarily mean that the operations are *presently* ongoing or, if they are, that they are at levels incompatible with the conservation objectives.

1.7 Plans and projects

The Habitats Regulations require that, where an authority concludes that a development proposal is unconnected with the nature conservation management of a Natura site and is likely to have a significant effect on that site, it must undertake an appropriate assessment of the implications for the qualifying interest for which the area has been designated.

1.8 Review of Consents

Competent authorities are required by the Habitats Regulations to undertake a review of all consents and permissions for activities affecting the site as soon as reasonably practicable after it becomes a European site. This will have implications for discharge and other consents, which will need to be reviewed in the light of the conservation objectives.

2 Statutory advice given by SNH under Regulation 33(2) Conservation Objectives

2.1 Introduction

This section provides conservation objectives, which have been developed by SNH in agreement with the Scottish Executive and are to be provided to the relevant authorities in fulfilment of the requirements under Regulation 33(2) of The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004).

The conservation objectives ensure that the obligations of the Habitats Directive are met; that is, there should not be deterioration or significant disturbance of the qualifying interest. This will also ensure that the integrity of the site is maintained and that it makes a full contribution to achieving favourable conservation status for its qualifying interests.

The Loch nam Madadh marine SAC has been designated for the habitats 'Coastal lagoons', 'Large shallow inlets and bays', 'Mudflats and sandflats not covered by sea water at low tide', 'Reefs' and 'Sandbanks which are slightly covered by sea water all the time', which are listed on Annex I of the Habitats Directive. It has also been designated for the Annex II species 'Otter *Lutra lutra'*. It should be noted that although otters within the SAC partly feed in the marine environment they are also dependent on terrestrial habitats.

The conservation objectives for the Loch nam Madadh marine SAC are as follows:

To avoid deterioration of the qualifying habitats (**Coastal lagoons**, **Large shallow inlets and bays, Mudflats and sandflats not covered by sea water at low tide, Reefs and Sandbanks which are slightly covered by seawater all the time**) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying interests.
To ensure for the qualifying habitats that the following are maintained in the long term:
• Extent of the habitat on site
• Distribution of the habitat within site
• Structure and function of the habitat
• Processes supporting the habitat
• Distribution of typical species of the habitat
• Viability of typical species as components of the habitat
• No significant disturbance of typical species of the habitat

To avoid deterioration of the habitats of qualifying species (**Otter *Lutra lutra***) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for the qualifying interests.
To ensure for the qualifying species that the following are maintained in the long term:
• Population of the species as a viable component of the site
• Distribution of the species within site
• Distribution and extent of habitats supporting the species
• Structure, function and supporting processes of habitats supporting the species
• No significant disturbance of the species

3 Statutory advice given by SNH under Regulation 33(2) Operations

The following advice as to operations to be considered by relevant authorities is provided by SNH with respect to the Loch nam Madadh marine SAC in fulfilment of the requirements under Regulation 33(2)(b) of The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004). The advice identifies those operations, either on or affecting the SAC, which may cause deterioration of the marine natural habitats or the habitats of species, or disturbance of species, for which the site has been designated. These include operations that may not be currently affecting the Loch nam Madadh marine SAC.

Operations (in alphabetical order)

Aquaculture
Finfish farming
Shellfish farming

Coastal Development
Agriculture
Civil engineering
Forestry operations

Discharges / Waste Disposal
Discharge of commercial effluent
Discharge of sewage

Fishing
Hydraulic fishing
Mobile gear: Dredging
Mobile gear: Trawling
Static gear: Creel / Pot fishing

Gathering / Harvesting
Diver collection of shellfish
Harvesting of seaweed subtidally
Intertidal collection of shellfish
Intertidal gathering of cast seaweed

Marine Development
Extraction of beach material
Maintenance dredging
Mineral extraction

Marine Traffic
Boat maintenance and antifoulant use
Commercial vessels

Recreational Activities
Boat anchorages
Boat moorings
Charter / recreational vessels
Scuba diving

Scientific Research
Scientific research

Annex A

Non-statutory advice given by SNH
Sensitivity and Vulnerability of the Loch nam Madadh SAC 'Coastal lagoons'; 'Large shallow inlets and bays'; 'Mudflats and sandflats not covered by sea water all the time'; 'Reefs'; 'Sandbanks which are slightly covered by sea water all the time'; and 'Otter *Lutra lutra*' to activities listed in Section 3

The comments below are general and should not be considered to be definitive. They are made without prejudice to any comments SNH may provide or any assessment that may be required for specific proposals to be considered by a relevant authority. The level of any impact will depend on the location and intensity of the relevant activity. This advice is provided to assist and focus the relevant authorities in their consideration of the management of these operations.

NB. References to deterioration in the comments section below should be taken to mean *deterioration of all the qualifying interests*. If specific qualifying interests are particularly at risk they may be referred to individually where relevant.

Operations	Comments
Aquaculture	
Finfish farming	**Habitats:** Finfish farming has the potential to cause deterioration of qualifying habitats and communities through changes in water quality, smothering from waste material and physical disturbance from mooring systems. There is potential for accidental introduction of new non-native species and increasing the spread of existing non-native plants and animals (e.g. *Caprella mutica* Japanese skeleton shrimp), which are already widely distributed in the UK. Invasive species have the potential to cause deterioration of the qualifying interests by altering community structure and quality. The associated environmental effects mentioned above are usually localised but the reduced water exchange within Loch nam Madadh may exacerbate these effects and cumulative impacts should be considered.
	Otters: The development of finfish farming sites has the potential to cause disturbance to resident otter individuals or populations in the vicinity of such farms, mainly as a result of human activities such as noise and boat usage. The construction, use and maintenance of shore bases built to support finfish farms have the potential to disturb otters and cause deterioration of their habitats through destruction and physical damage to shoreline holts.

Aquaculture contd.		
Shellfish farming		**Habitats:** This activity has the potential to cause deterioration of the qualifying habitats and communities through physical damage (e.g. installation of mooring blocks and continued scouring by riser chains) and changes in community structure caused by smothering from pseudo-faeces (undigested waste products) and debris (including dead shells) falling from the farm. There is also potential for accidental introduction of new non-native species and increasing the spread within the UK of existing non-native plants and animals (e.g. *Sargassum muticum* Wireweed), through importation or translocation of shellfish stocks. Invasive species have the potential to cause deterioration of the qualifying interests by altering community structure and quality. The associated environmental effects mentioned above are usually localised but the reduced water exchange within Loch nam Madadh may exacerbate these effects and cumulative impacts should be considered.
		Otters: The development of shellfish farming sites has the potential to cause disturbance to resident otter individuals or populations in the vicinity of such farms, mainly through human activities such as noise and boat usage. The construction, use and maintenance of shore bases built to support shellfish farms have the potential to disturb otters and cause deterioration of their habitats through destruction and physical damage to shoreline holts.
Coastal Development		
Agriculture		**Habitats:** Diffuse run-off from agricultural practices and drainage from land improvement have the potential to cause deterioration of qualifying habitats and communities through the smothering of qualifying interests, and / or altering water quality through discharge of organic and inorganic pollutants.
Civil engineering		**Habitats:** The construction and maintenance of structures, both within and adjacent to the sea have the potential to cause direct loss of qualifying habitat and deterioration of adjacent habitats and communities as tidal currents and therefore coastal processes are affected. For example coastal structures such as linear coastal defences or erosion control measures (e.g. gabions) can affect local sediment suspension and deposition patterns and therefore have the potential to cause deterioration of qualifying habitats, particularly reefs, through smothering. Installation, replacement and maintenance of undersea cables have the potential to cause direct loss of qualifying habitats as well as local deterioration of qualifying habitats and communities.
		Otters: Civil engineering has the potential to disturb otters and cause deterioration of their habitats through intense and prolonged human presence, and destruction or physical damage to shoreline holts.
Forestry operations		**Habitats:** Increased concentrations of dissolved nutrients from fertiliser run-off has the potential to cause deterioration of qualifying habitats and communities. Large-scale run-off of terrestrial sediment, from forestry operations, has the potential to cause deterioration of qualifying habitats, particularly reefs, through smothering. The associated environmental effects mentioned above are usually localised but the reduced water exchange within Loch nam Madadh may exacerbate these effects and cumulative impacts should be considered.

Discharges / Waste Disposal		
Discharge of commercial effluent		**Habitats:** Commercial effluent has the potential to cause deterioration of qualifying habitats and communities. This would be through the effects of pollution and / or nutrient enrichment, which may cause subsequent changes in community structure.
Discharge of sewage		**Habitats:** Sewage effluent (whether treated or untreated) has the potential to cause deterioration of qualifying habitats and communities. This would be through the effects of pollution and / or nutrient enrichment, which may cause subsequent changes in community structure.
Fishing		
Hydraulic fishing		**Habitats:** Hydraulic fishing has the potential to cause deterioration of the qualifying habitats and communities through the large volumes of sediment disturbed by this method smothering the qualifying interests and causing subsequent changes in community structure.
Mobile gear: Dredging		**Habitats:** Benthic dredging has the potential to cause deterioration of qualifying habitats and communities through direct contact with dredge gear, and sedimentation when dredging occurs close to the qualifying interest, particularly reefs.
Mobile gear: Trawling		**Habitats:** Benthic trawling has the potential to cause deterioration of qualifying habitats and communities through direct contact with trawling gear, and sedimentation when trawling occurs close to the qualifying interest, particularly reefs.
Static gear: Creel / Pot fishing		**Habitats:** The use of creels and / or pots in a localised area has the potential to cause deterioration of qualifying habitats and communities such as reefs through direct contact, particularly during their deployment and / or recovery.
		Otters: The use of creels and / or pots in water shallower than 10m has the potential to cause disturbance to otters if they get caught in creels when attracted to bait, as this will usually result in drowning.
Gathering / Harvesting		
Diver collection of shellfish		**Habitats:** Collection of shellfish by diving has the potential to cause deterioration of the qualifying habitats and communities where the target species is a key component of that community, or where the collection method involves the use of invasive techniques (e.g. hydraulic equipment). Diving amongst reefs could cause deterioration and physical damage, in particular to erect and fragile species.
Harvesting of seaweed subtidally		**Habitats:** Harvesting of seaweed subtidally has the potential to cause deterioration of qualifying habitats and communities (particularly reefs) by physical damage or through the loss of target species, which can cause imbalances in community and ecosystem structures.
		Otters: Harvesting of seaweed subtidally has the potential to cause disturbance to otters in the vicinity of the harvesting area, mainly caused by intense and prolonged human presence.
Intertidal collection of shellfish		**Habitats:** Collection of shellfish from intertidal areas has the potential to cause deterioration of qualifying habitat and communities through physical damage and disturbance (trampling and turning stones), and removal of the target species, which can cause an imbalance of communities and ecosystems.
		Otters: Collection of shellfish from intertidal areas has the potential to cause disturbance to otters in the vicinity of the collection area, mainly caused by intense and prolonged human presence.
Intertidal gathering of cast seaweed		**Habitats:** The gathering of cast seaweed has the potential to cause deterioration of intertidal habitats and communities through physical damage and disturbance (trampling). Removal of the target species can cause an imbalance of communities and ecosystems within the intertidal area, which may affect qualifying interests, particularly reefs.

Gathering / Harvesting contd.		
Intertidal gathering of cast seaweed contd.		**Otters:** The gathering of cast seaweed from intertidal areas has the potential to cause disturbance to otters in the vicinity of the collection area, mainly caused by intense and prolonged human presence.
Marine Development		
Extraction of beach material		**Habitats:** Extraction of beach material for agricultural and construction use has the potential to cause deterioration of qualifying interests through direct loss of habitat and associated species, and impact within the extraction site. Such operations could result in the redistribution and deposition of fine particulate sediment, smothering by re-suspended sediments, and changes in water circulation and sediment transport. Gaining mechanical access to sand and gravel has the potential to cause deterioration to qualifying interests through direct loss of intertidal habitats, or sedimentation and local deterioration of any of the qualifying habitats and communities.
		Otters: Extraction of beach material for agricultural and construction use has the potential to cause deterioration of habitats associated with otters, or disturbance to otters that rest and forage in the vicinity of the operation through physical damage to shoreline holts and habitat destruction.
Maintenance dredging		**Habitats:** Maintenance of shipping channels has the potential to cause deterioration of qualifying habitats and communities through direct contact with extraction gear, and sedimentation, particularly when this activity occurs close to reef qualifying interest.
		Otters: Maintenance dredging has the potential to cause deterioration of habitats associated with otters, or disturbance to otters that rest and forage in the vicinity of the operation through physical damage to shoreline holts and habitat destruction.
Mineral extraction		**Habitats:** Extraction of subtidal sand and gravel has the potential to cause deterioration of the qualifying habitats and communities through direct loss and impact within the extraction site. Such operations could result in the redistribution and deposition of fine particulate sediment, which could alter the sediment characteristics of adjacent areas and their associated plant and animal communities.
		Otters: Mineral extraction has the potential to cause disturbance or deterioration to otters that rest and forage in the vicinity of the operation through physical damage to shoreline holts and habitat destruction.
Marine Traffic		
Boat maintenance and antifoulant use		**Habitats:** Most antifoulant products are designed to kill or discourage naturally occurring organisms and, as such, cause damage to the water environment if used carelessly. Under such circumstances use of antifoulant has the potential to cause deterioration of qualifying habitats and communities within this site.
Commercial vessels		**Habitats:** The pumping of bilges, discharge of ballast, accidental grounding, or accidental oil (or other chemical) spillage from commercial vessels could occur within or close to this SAC. Such incidents have the potential to cause deterioration of qualifying habitats and communities through direct and / or indirect impacts. Local authority emergency plans and oil spill contingency plans should take into account specific qualifying interests and recognise the importance of marine SACs should such incidents occur.
		Otters: The pumping of bilges, discharge of ballast or accidental oil (or other chemical) spillage from commercial vessels could occur within or close to this SAC. Such incidents have the potential to cause disturbance to otters or deterioration to their habitats. Local authority emergency plans and oil spill contingency plans should take into account specific qualifying interests and recognise the importance of marine SACs should such incidents occur.

Recreational Activities		
Boat anchorages		**Habitats:** Anchors and continual scouring by riser chains have the potential to cause deterioration of qualifying habitats and communities through direct contact with the qualifying interests.
Boat moorings		**Habitats:** Moorings and continual scouring by riser chains have the potential to cause deterioration of qualifying habitats and communities through direct contact with the qualifying interests.
Charter / recreational vessels		**Habitats:** Boats have the potential to cause deterioration of qualifying habitats and communities through repeated launching and recovery in specific areas, accidental grounding, and accidental fuel spillages.
		Otters: Charter / recreational vessels have the potential to cause disturbance to foraging or resting otters. Such disturbance may cause temporary displacement of otters from their territory.
Scuba diving		**Habitats:** Recreational diving in specific areas has the potential to cause deterioration of qualifying habitats and communities, in particular to erect and fragile reef species.
Scientific Research		
Scientific Research		**Habitats:** Research activities have the potential to cause deterioration of qualifying habitats and communities through direct alteration, removal or manipulation of this qualifying interests and its associated species.
		Otters: Otters are a European Protected Species and some research will require a licence. Advice should be sought from SNH if there is any doubt as to whether a licence is required.

Annex B

Non-statutory Advice given by SNH
Site account

Site description

Loch nam Madadh is a large and complex fjardic system located in the north east of North Uist in the Outer Hebrides. It has a highly irregular coastline and contains a large number of inlets, islands and channels including two major tidal rapids at Leireabhagh and Spònais. Although there is little charted information available for the loch, at least 22 sills and basins can be discerned in the fully marine part of the system. The greater part of the loch is a maze of rocks, channels and basins and a substantial proportion of its area is intertidal. The maximum depth within Loch nam Madadh SAC is 38 m although the loch is predominantly shallow, with deep water only at the entrance.

Environmental conditions within the main body of the loch range from moderately-exposed fully marine conditions at the entrance to extremely sheltered brackish basins in the inner loch, which connect to freshwater lochans inland via the most extensive and diverse system of saline lagoons in the UK and EU. Loch nam Madadh is connected by culverts with two major brackish-water loch systems, Loch an Dùin and Loch an Struth Mhòir. Loch nam Madadh is characterised by a very diverse assemblage of marine habitats of outstanding quality. Many of the associated species-rich communities are poorly represented elsewhere in the EU.

Qualifying marine interests
Annex I Habitats:
Coastal lagoons

Loch nam Madadh has fine examples of isolate lagoons, silled lagoons, sluiced lagoons, and lagoonal inlets within this complex site. The communities within the lagoons include intertidal rock and boulder waterfalls which support dense mats of wrack seaweed and sponges, plus subtidal rock, boulder and coarse sediment rapids which support kelp, sea-oak, sponges, anemones, sea squirts, fan worms, brittle stars and mussels. Inner basins are often micro-tidal (<1m range) and have soft sediments supporting burrowing fauna, for example amphipods and lugworms. Haloclines are present in most lagoons where fresh water run-off from the surrounding land floats on top of the salt water of the lagoons. This allows fresh water species to exist in close proximity to marine species, above and below the halocline, such as communities of mixed seagrasses and rare charophytes in low salinity basins. Plant species of high conservation value include seagrasses, tasselweed and stonewort plants such as the foxtail stonewort, and their associated brackish water communities are found within the lagoons of Loch nam Madadh cSAC.

Large shallow inlets and bays

Loch nam Madadh is a complex habitat linking the terrestrial and aquatic environments. It is a habitat of large coastal indentations and has limited influence of freshwater. It is generally sheltered from wave action, relatively shallow and contains a great diversity of sediments and substrates with a well

developed zonation of benthic communities. Loch nam Madadh is a fjard, that is a series of shallow basins connected to the sea via shallow and often intertidal sills. The loch has a highly irregular outline and no main channel. It lies amidst low-lying ground and has been subject to glacial roughening. This feature is made up of components that, individually, are recognised as Annex I habitat qualifying features in their own right ('Coastal lagoons', 'Sandbanks which are slightly covered by seawater all the time', 'Mudflats and sandflats not covered by seawater at low tide' and 'Reefs'). Other features within this qualifying habitat include sheltered intertidal boulder or bedrock reefs, dominated by dense mats of knotted wrack and under-boulder communities of sponges, sea squirts, anemones and mussels. Also, within the basins there are deep soft sediment habitats with sea pen communities as well as soft sediments with communities of sea cucumbers.

Mudflats and sandflats not covered by sea water at low tide

There are a number of intertidal habitats consisting of sands and muds. They tend to be devoid of vascular plants and, in the muddier areas, are usually coated by blue algae and diatoms. The sediment flats within Loch nam Maddadh range from soft mud to clean coarse sands. Within the loch's muddy sands, typical and representative communities of lugworm and bivalves are found. They are of particular importance as feeding grounds for wildfowl and waders

Sandbanks which are slightly covered by sea water all the time

Within Loch nam Madadh this feature includes extensive areas of subtidal coarse sediment consisting of a combination of cobbles, pebbles and coarse sand. These areas may support the sea-oak brown algae with large epiphytic communities living in association with them. Within the tidal rapids there are pockets of maerl and associated rich communities. There are also areas of subtidal coarse sediments with rock and boulders within the rapids, supporting kelps, sea oak, sponges, anemones and sea squirts. Fan worms inhabit the coarse sediment while mussels and green algae are evident on the hard rock substrates.

Reefs

Loch nam Madadh reef habitats and associated communities vary from the exposed outer margins and deep water reefs to the sheltered inner basins, narrow shallow channels, tidal rapids and reefs that extend into the intertidal areas.

In the outer part of the loch, the subtidal reefs support dense kelp forests. Kelp parks extend to 12 m, grading to exposed rock in deeper waters. The deep water silty reefs at the entrance, in the channels between islands and in the enclosed sheltered conditions of the loch support rich communities of erect sponges, sea fans, feather stars, anemones, sea squirts, hydroids, barnacles, pink and red algae, starfish, urchins, worms and crabs.

The central part of Loch nam Madadh is characterised by strong tidal streams through narrow, shallow channels and the reefs are colonised by many

species characteristic of exposed open coast conditions. Most of the channels comprise mixed boulders, stones and coarse sediments on bedrock, supporting dense kelp forests below which there is a rich red algal turf. The fauna includes frequent cup corals *Caryophillia smithii*, worms, decapod crustaceans, brittlestars, sea squirts, starfish and sea urchins.

Although inner Loch nam Madadh is sheltered from the prevailing weather, tidal movements result in strong tidal streams through narrow entrances to lagoons. These tidal rapids are particularly rich in fauna and flora, supporting communities of oarweed *Laminaria digitata*, sea-oak *Halidrys siliquosa*, thongweed *Himanthalia elongata* and red and green algae. The fauna associated with the seaweed includes sponges, sea squirts, cup coral *C. smithii*, dead man's fingers *Alcyonium digitata* and bryozoans.

Annex II Species: Otter *Lutra lutra*

The Loch nam Madadh fjardic sealoch system has a wide range of high quality marine habitats, including saline lagoons, intertidal areas, shallow marine waters, and tidal rapids and channels. These habitats provide excellent feeding grounds for otters, which forage in the channels and the extensive inter- and subtidal beds of the seaweeds *Ascophylum* and *Laminaria*, for fish and crustaceans. The myriad of islands and the highly irregular coastline of the loch are dotted with breeding holts and resting places, whilst a number of small freshwater lochans and streams provide bathing sites. The Western Isles is one of the strongholds of otter within the UK and the Loch nam Madadh system holds a very high density of the species.