

6 Activities and Infrastructure

Within Loch Etive, a diverse range of activities occur such as aquaculture, commercial and recreational fishing, scuba diving, kayaking, sailing, charter boat operations and tourism. All of these activities depend to some degree on the health of the coastal and marine ecosystem, whilst other activities e.g. walking, rely more on the physical characteristics of the loch or the surrounding scenery. Therefore, all activities and their interaction with other interests need to be considered in an ICZM plan.

This section provides an overview of the current status of all the major activities that take place either within or adjacent to the loch is provided. Information is presented on the following:

- Economic value of the activity;
- Potential impacts and interactions;
- Existing management measures; and
- Considerations for future development and use.

Recommendations on future management, use and development have been developed based on information gathered and discussions with stakeholders and regulators throughout the development of this plan and marine and coastal users, developers and regulators are encouraged to take account of them. Specific actions following from them are presented in an Implementation Action plan in section 8.

Area-wide policies have been developed where required to guide sustainable use and development of these activities.

6.1 Aquaculture

6.1.1 Introduction

Aquaculture is well established in Loch Etive, focussed on the culture of mussels and rainbow trout. Aquaculture production in Loch Etive began in the late 1970s and has been an important component of the local economy providing employment within the local area.

6.1.2 Existing Operators & Development

Trout farming

All rainbow trout farming in the loch is currently undertaken by Dawnfresh Farming Ltd. This Scottish owned and based seafood company is the largest supplier of trout and second largest of Scampi in Scotland, with trout farms also located in Loch Awe.

Dawnfresh has five sites in Loch Etive with up to three operating at any one time. The production cycle (grow out period) is approximately 18 months with a fallow period of 6 to 10 months for all sites. To service the marine farms, the main shore-base is located at Inverawe and a smaller facility at Ardchattan, adjacent to the pier. In 2009, Dawnfresh Farming Ltd. produced approximately 1500 tonnes of trout in Loch Etive.

Mussel farming

There are currently 14 individual mussel farm sites owned by five different companies. Muckairn Mussels and Celtic Sea own the largest number of sites, with Black Isles Seafoods, Kames and Forera owning the rest. Figure 6.1 shows the location of all existing aquaculture leases in Loch Etive.



Ardchattan fin fish Farm
Image courtesy of Argyll and Bute Council

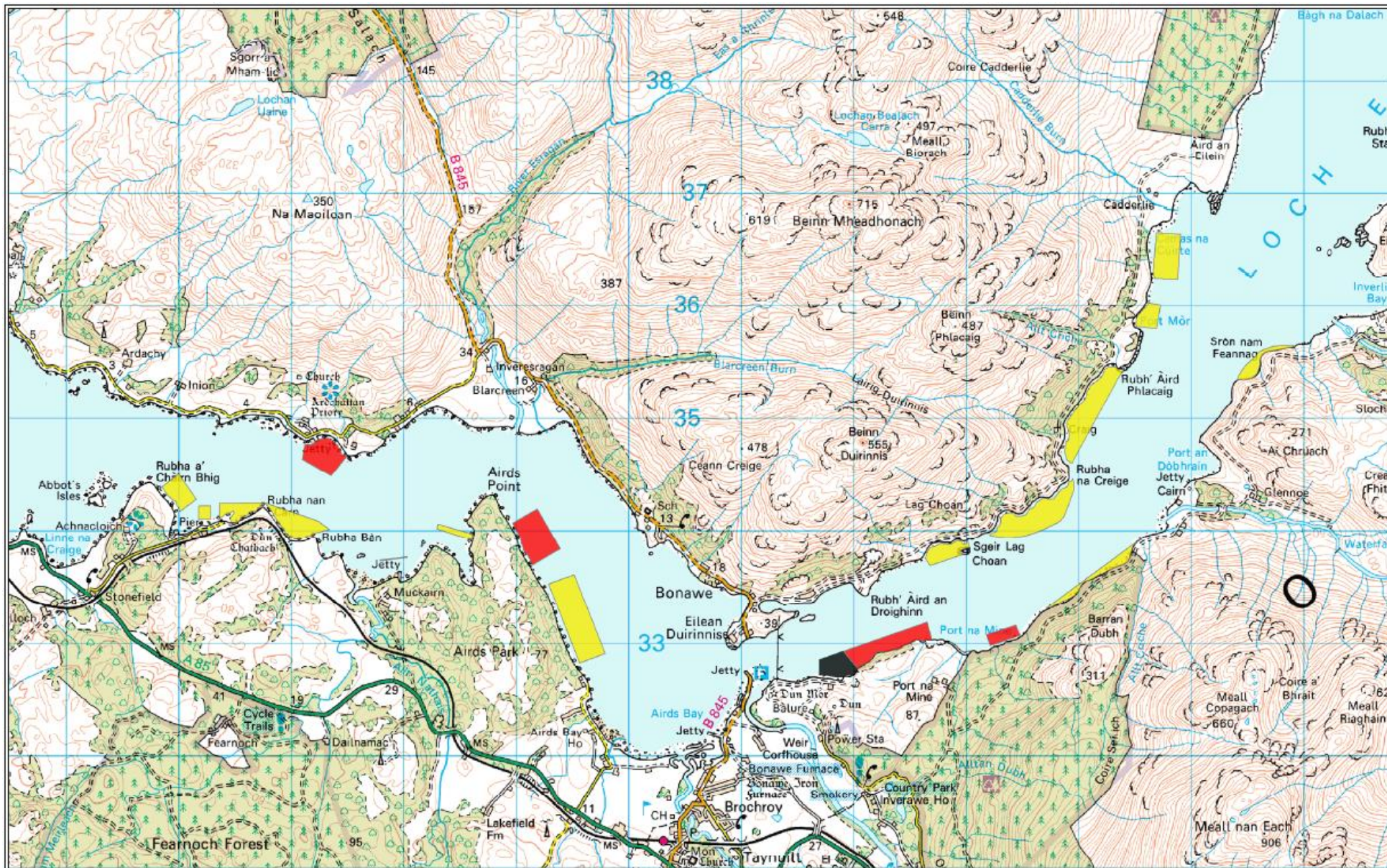


Mussel farm ropes
Image courtesy of Argyll and Bute Council

6.1.3 Economics

Aquaculture makes a significant contribution to the economy of Argyll and Bute and in particular to more remote and fragile areas. It is often the case within these areas that, although the actual numbers employed are low, the significance of them to the sustainability of these communities is very high. Aquaculture provides year round jobs which are important for coastal communities, although the increase in automation has resulted in a stabilising level of employment despite production increasing. Downstream jobs are also supported in transport, processing and support services and Scottish Government figures estimate that each aquaculture job supports a further 2.1 jobs in ancillary industries.

Loch Etive at one time produced 50% of the total Scottish production of *Mytilus edulis*, and at its peak in 2002, was producing 1000 tonnes and employing more than 30 people. By 2003-4, shells were noticeably thinner and the meat was of poor quality. A scientific study by Zbawicka *et al.* (2010) identified that these mussels were *Mytilus trossulus*, including hybrid species. The study suggests that this species may be a relic from the last ice age, although this is still questionable. Employment and production has since fallen dramatically to negligible levels.



Legend



- Mussels
- Trout
- Trout & mussels

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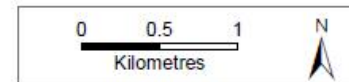


Figure 6.1 Location of existing aquaculture leases

6.1.4 Potential Impacts and interactions between Aquaculture and other interests

There is a range of potential effects on aquaculture development which are summarised in the table below.

Effects on	Finfish	Shellfish
Landscape	Potential effects on landscape character, scenic quality and visual amenity	
Water Quality	Potential effects from release of nutrients, occasional medicines and antifoulants	n/a
Benthic impacts	Accumulation of solid wastes on the seabed	Accumulation of mussel shells on seabed, particularly during grading.
Historic environment	Potential effects on the setting of known coastal historic features and direct offshore impacts on shipwrecks	
Wildfish populations	Transfer of disease and parasites and effects from escapes of interbreeding and competition (see section 5.2 for more detail).	n/a
Marine wildlife	Potential for operation of aquaculture sites to disturb marine mammals and seabirds and interaction with predators	Potential for the operation of the site to disturb wildlife and avian predators
Spread of INNS	n/a	Invasive non-native species can be introduced through importation or translocation of shellfish stocks
Navigation	Potential to create hazards to navigation	
Other users	Potential to compete for space with other sectors e.g. commercial fisheries and recreational anchoring	
Existing aquaculture sites	Potential effects on the management of disease and parasites	n/a
Noise	Potential to be a source of noise pollution due to activities associated with the construction and operation of the facility	

In many cases, the potential for conflict can be removed or significantly minimised through: siting development in appropriate locations and at an appropriate scale; appropriate mitigation measures, and the adherence to codes of good practice and management agreements.

6.1.5 Existing Management and Controls for Finfish Aquaculture

There is wide range of legislation, national policy and guidance that is relevant to the regulation and operation of aquaculture in Scotland, which has been summarised in Appendix IX. The existing management and controls that are specifically relevant to aquaculture in Loch Etive are discussed below.

Locational Guidelines for the Authorisation of Marine Fish Farms in Scottish Waters

Loch Etive as a single water body is listed under the Scottish Government's Locational Guidelines as a Category 3 area. Designated areas are based on predictive modelling of nutrient enhancement and benthic impact conducted by the Fisheries Research Services. Category 3 areas are the least sensitive and show the lowest potential for environmental impact. Therefore, they offer the best prospects for obtaining permission for aquaculture development, although each case is still considered carefully and site-specific modelling is run for each application.

The upper basin water-body of Loch Etive is not mixed as regularly as the lower basin meaning that it

may be at a higher risk from nutrient enhancement. The Scottish Association for Marine Science has been undertaking research looking at hypoxic (low oxygen) conditions in aquatic ecosystems in relation to global warming and has found that the deep water of Loch Etive is turned over every 16 months. Therefore, the upper basin may be more susceptible to enrichment than the whole loch, as currently modelled.

Marine Scotland has re-modelled both basins separately to provide a better spatial resolution and the conclusions suggest that there is still capacity in both the upper and lower loch, based on nutrient discharges and benthic impacts. Both the upper and lower loch, modelled as individual bodies of water, are still identified as Category 3. Landscape capacity will limit the maximum tonnage of finfish development in the upper and lower basins well before the level needed to change these basins to Category 1.

Code of Good Practice for Scottish Finfish Aquaculture

Dawnfresh Farming Ltd. is an active British Trout Association (BTA) Member, and operates to the Scottish Salmon Producers Organisation Code of Good Practice (CoGP) for Scottish Finfish Aquaculture. The CoGP is incorporated into the BTA Quality Trout Standard and the company are audited on both.

Aquaculture and Fisheries (Scotland) Act 2007

This Act makes provision in relation to finfish farms for sea lice control and containment of fish. It gives Marine Scotland inspectors powers to inspect fish farms, ensuring that satisfactory measures are in place for control of sea lice, containment of farmed fish, prevention of escapes and recovery of escaped fish.

Authorisation of Fish Farm Businesses

All new fish farms are required to register with Marine Scotland which ensures that the fish health status of Scottish waters can be monitored, maintained and improved.

Area Management Agreements

In Scotland, local Area Management Groups (AMGs) have been established, comprising representatives from local fish farming companies and local wild salmonid interests, with a goal to promote and maintain the good health of wild and farmed salmonids through an Area Management Agreement (AMA).

Loch Etive is now managed as part of one large management area that encompasses the Linnhe, Lorn Etive Sound of Mull & Sunart area. Dawnfresh and Argyll Fisheries Trust are members of the Area Management Group for this AMA. Due to the brackish nature of the loch, sea lice are not currently considered to be a problem on trout farms and sea lice treatments have not been used, although as a precaution, SEPA discharge consents for lice treatments are in place on the majority of farms in Loch Etive and it is the intention of Dawnfresh to apply this to all sites.

Predator Control

Top nets are used to control seabirds and mink are trapped on cages and close by on the adjacent shore. In relation to seals, heavy duty, well tensioned nets with a false bottom are used which provide greater resistance to seal attack. Acoustic deterrent devices are used if needed. Dawnfresh Seafood Ltd. is part of the Lismore Seal SAC Aquaculture and Fisheries Action Group and operates within a code of good conduct to try and exclude seals from damaging the nets and farmed fish. The last option, should all other measures fail, would be to shoot an individual persistent seal.

The Marine (Scotland) Act has repealed the Conservation of Seals Act 1970 and has brought in new arrangements for seal conservation and predator control options for fisheries and fish farmers. A licence is now required to shoot seals at any time of the year. Reporting and monitoring is a requirement of the licence. These new arrangements should improve the balance between seal conservation and seal management.

6.1.6 Existing Management and Controls for Shellfish Aquaculture

Association of Scottish Shellfish Growers (ASSG) Code of Good Practice

The majority of shellfish farmers in Loch Etive adhere to the ASSG Code of Good Practice¹ which aims to ensure that ‘activities are managed in an environmentally responsible and sustainable manner that is in harmony with the needs of other marine and shoreline users.’ It covers establishing and locating a shellfish farm, environmental impacts, monitoring, husbandry, use of equipment and materials, waste management, health and safety, training and depuration.

Predator Control

The main predators of farmed mussels in Loch Etive are Eider Ducks, Golden Eyes, crabs and starfish. Bird predators are controlled by having a presence on the water.

6.1.7 Required Consents for Finfish Development

Aquaculture developments are subject to a range of complex regulatory and consenting procedures.

Required Consents	Finfish	Shellfish	Regulator	Details
Planning Permission	✓	✓	Argyll and Bute Council/Highland Council	Applications for new or modifications to existing marine fish farms are made to the relevant planning authority.
Seabed Lease	✓	✓	The Crown Estate	Where the foreshore/seabed is owned by The Crown Estate an operator must apply for a lease for the right to occupy the site.
CAR Authorisation	✓		Scottish Environment Protection Agency (SEPA)	SEPA regulate discharges through the Water Environment (Controlled Activities) Regulations 2005 by issuing CAR authorisations and monitor authorised discharges.
Coast Protection Act 1949 - Section 34 Consent	✓	✓	Scottish Government, Ports and Harbours Division	Section 34 consent is required for the installation of any new farm or modification of an existing farm. The purpose of control under Section 34 is solely concerned with the safety of navigation.

Further information on the procedure for applying for planning permission for a new finfish farm or modification of an existing farm can be found on the Scottish Government website².

6.1.8 Future Development

Section 7 of the Plan assesses the potential for new finfish development or expansion of existing sites across different areas of Loch Etive. Due to the amount of existing sites in Loch Etive, the loch is either at or approaching landscape capacity in many places, therefore little capacity for new development has been identified. Although some farm sites are not in use or not currently utilising the maximum amount of equipment (cages, rafts & longlines) that they are consented for, when assessing landscape capacity they have to be treated as if they are developed to their full capacity.

This means that there is currently existing unused capacity in Loch Etive, especially for mussel sites and there is likely to be opportunities to maximise the production of both trout and mussels in the loch through rationalisation of existing sites.

¹ <http://www.assg.co.uk/index.htm>

² <http://www.scotland.gov.uk/Topics/marine/Fish-Shellfish/18716>

Future consolidation and swapping of sites

Future consolidation/rationalisation of existing developments may offer the greatest opportunity for maximising production of trout and mussel farming in Loch Etive. Therefore, basic guidance is being developed to help companies maximise environmental and economic benefits should they choose to rationalise their operations. This guidance will look at potential benefits in terms of landscape, wild fish interactions, interaction with commercial fishing ground and navigation to help identify win-win opportunities. As part of this work, a new landscape assessment is underway that is looking at the capacity of Loch Etive as if no aquaculture development was present. However, consolidation has to be driven by and lead to economic benefits for the companies involved, due to the cost of relocating sites. This guidance will be separate to the plan but a link to it is included in the Aquaculture policy in section 6.1.9.

Trout farming

Loch Etive is ideal for growing trout as they prefer brackish and freshwater conditions. As sea lice do not thrive in brackish water, there is a reduced risk for chemical bath treatments often associated with finfish farming in full saltwater locations. Dawnfresh are keen to better utilise their existing sites and are considering the potential for mussel farmers to utilise trout farms that are fallowed for periods of up to 2 years. They would also be happy to farm as far up the loch as possible as lower salinity is beneficial for trout farming.

Interaction with wild migratory salmonids

This Plan does not discourage new finfish operators from applying for new finfish sites in Loch Etive. However, it does actively encourage operators to discuss new development proposals in detail with the existing Area Management Group (see section 6.1.4) and wild fish interests, prior to submitting a planning application. New applications would need to demonstrate that it would be possible to operate any new site to the same standards as are currently in place and that the existing aims and objectives of the AMA can be maintained.

Escapes from trout farms in Loch Etive have been an issue in the past and Dawnfresh have been improving equipment with all sites now using circular cages. Containment is a key priority for the finfish industry, wild fish interests and other regulators and new development proposals will need to demonstrate that all reasonable steps to prevent escapes of stock will be taken.

Shellfish farming

Mussels

Mussel farming in the loch is no longer economically viable due to the presence of *Mytilus trossulus* on existing mussel lines and rafts. The existing mussel farmers are seeking a solution to this problem through a Scottish Aquaculture Research Forum (SARF) research project working with the relevant government agencies. Through this project, it is proposed to eradicate this species from artificial farming structures by stripping mussel ropes and letting natural predators consume them on the seabed.

Once existing sites have been cleared of this species, they will be kept fallow until monitoring of mussel spat indicates that the preferred mussel species (*Mytilus edulis*) will not be over-settled by *Mytilus trossulus*. During this period the existing companies have agreed not to apply for new or expansion to existing mussel sites.

Due to the current difficulties in growing mussels, existing shellfish companies may wish to change the existing use of sites to trout farming or look at developing polyculture (shellfish and algae grown together), or looking at the possibilities for algae farming trials. In addition, there is interest to look at the potential to collect and grow spat in shore-based hatcheries with associated genetic work on selection for growth, yield and immunity to algal toxins.

Currently there are no locational guidelines or standard models to assess the biological carrying capacity for shellfish development, although an ongoing SARF project is looking at the potential for such a model. A basic model used in Shetland to estimate the capacity of individual voes suggests if all shellfish sites were fully developed in Loch Etive they would be well below carrying capacity.

Other shellfish

At present, mussels are the only species of shellfish grown in the loch. Views from existing shellfish growers in the area are that there is little potential for scallop or oyster culture in Loch Etive. Other than Ardmucknish Bay, the conditions in Loch Etive itself are generally not felt to be suitable for scallops. For oysters, where suitable substrate exists the shore is either too steeply sloping or is too exposed for culture of this species. Other areas like Dunstaffnage Bay and Airds Bay are too close to built up areas with a higher risk of contamination. Camas Bruaich Ruaidhe may have suitable shoreline, but the proximity to the existing boat moorings and potential for marina development would be conflicting.

Seaweed and polyculture

Seaweed is currently being used as food source; fertiliser and animal feed in many countries, but may also have the potential to become a major source of biofuel. Growing biofuel in the sea has advantages over growing on land, as seaweed does not require soil and is already supplied with all the water it needs. In partnership with Irish researchers, the Scottish Association for Marine Science are undertaking a project (Biomara³) which aims to demonstrate the feasibility and viability of producing biofuel from seaweed and microalgae, as an alternative to *agri-fuels* production from terrestrial land plants.

Macroalgae can take up nitrogen from sea water at high rates and there is now a consensus that at least 80% of the total dissolved inorganic nitrogen from fish farming is plant-available. Removing nutrients generated by fish farming by harvesting macroalgae grown in the vicinity of cages would potentially alleviate local nutrient pollution and result in further net losses of nutrients from coastal ecosystems. By using macroalgae that are also of commercial value, as human or animal food, their cultivation will generate a secondary income for the fish farmer and an economic as well as an environmental incentive (Sanderson 2006).

There is interest from trout and shellfish companies in growing algae, either alongside existing production or as an alternative to mussel farming. At the moment the potential benefits from growing algae alongside finfish are not able to be considered by SEPA when determining the biomass of fish that can be grown in a particular location as part of the CAR licence. This removes a potential incentive for finfish farmers considering polyculture.

Undeveloped sites

There is concern nationally about the number of finfish and shellfish sites that have a Crown Estate seabed lease, but have not been developed. Undeveloped sites can inhibit future development as they have to be treated as if they were fully developed when identifying the potential for new sites.

It is noted that some sites may no longer be economically viable to operate and in some situations owners of a lease may be reluctant to give it up as it is seen as an asset. Argyll and Bute Council is supportive of unused leases either being developed or relinquished in order to give others the opportunity to use these sites where appropriate. Allowances will however be made for mussel farm companies that are currently following their sites in order to eradicate *Mytilus trossulus*. As discussed above Argyll and Bute Council encourage the consideration of options for consolidation of small uneconomical sites to fewer larger sites as a way of removing small uneconomical sites and maximising the capacity of an area.

Inactive developed or partially developed sites can fall into a state of disrepair and present a hazard to other users and the environment. Inactive or relinquished sites are encouraged to remove all surface equipment and seabed equipment where it is deemed necessary to allow safe use of the area by other interests and removal will not result in significant adverse environmental effects. Planning conditions will be added to all new aquaculture permissions in order to ensure sites are maintained and not left in a state of disrepair.

³ www.biomara.org

Other Finfish Species

Cod Farming

Although the industry is still new and much is still to be learned about the environmental impacts, the farming of cod shows potential for future expansion in Argyll. Research is currently being conducted into cod diseases and viruses, and cod do require to be vaccinated against the common disease: vibriosis. Organic cod may offer further market potential, however the cost of growing fewer fish to meet organic welfare standards is economically challenging.

Halibut Farming

Halibut, once considered as by-catch, is a premium product with fishmongers and a popular choice of restaurants and the public. However, due to low stock levels, commercial fishing for wild halibut is now considered unsustainable by the Marine Conservation Society, with farmed halibut recommended as a sustainable alternative. Halibut have been farmed in Argyll since 1999 by Kames Ltd. at Kilmelford. Currently Otter Ferry Seafish, based in Loch Fyne, is the only halibut hatchery in Scotland that produces young fish. Therefore, with this local resource, there is potential to develop the industry in Argyll.

The brackish nature of Loch Etive is not thought to be a constraint to farming these species. Through the farming of the flatfish, turbot, it has been found that this species performs better in brackish water, rather than full strength seawater.

6.1.9 Aquaculture Policy

POLICY LE AQ1 – AQUACULTURE DEVELOPMENT & MANAGEMENT

PART A – Policy Framework

There is general support for shellfish and finfish development subject to development proposals being consistent with:

- general policies (Policy LE GEN 1 & Policy LE INNS 1);
- policy guidance in the relevant policy zone (Section 7);
- relevant Argyll and Bute Development Plan policies, within the Argyll and Bute Council area of Loch Etive, in particular policy LP AQUA 1; and
- relevant Highland Development Plan policies, within the Highland Council area of Loch Etive.

PART B - Other considerations

- Proposals for finfish developments should take account of the Locational Guidelines for Loch Etive.
- Development applications for new sites or modifications to existing sites should consider SNH guidance on landscape - Siting and Design of Aquaculture (2000).
- Developers are encouraged to informally consult with the relevant Council planning service and relevant local stakeholders prior to submitting a planning application for a new or modified site.

PART C – Consolidation and reorganisation of existing sites

Future proposals to consolidate or reorganise existing development sites will be supported where proposals are consistent with PART A of this policy.

Such proposals should consider the following:

- any available spatial guidance on areas that are most suitable for development;
- potential environmental benefits, including landscape, habitats and species and wild migratory salmonids;
- potential benefits in terms of site management, including disease control and escapes;
- potential benefits to communities and commercial and recreational activities: and
- increased economic viability and socio-economic benefits

To allow proper assessment of consolidation proposals, all changes to existing sites that are part of a

single consolidation proposal should be dealt with through single planning applications for each new or amended site with all applications submitted at the same time. This will allow the consideration of 'net benefits' to be assessed as part of the proposals.

PART D – Voluntary/statutory management

Aquaculture operators are encouraged to sign up to and operate under the following voluntary management and codes of conduct during their operation

- Association of Scottish Shellfish Growers Code of Good Practice;
- British Trout Association Quality Trout Standard;
- Code of Good Practice for Scottish Finfish Aquaculture;
- Linnhe, Lorn, Etive, Sound of Mull & Sunart Area Management Agreement.

(See Appendix X for website links)

Justification

This policy covers marine shellfish and finfish development in the coastal waters and intertidal area of Loch Etive, Dunstaffnage Bay and Ardmucknish Bay. The policy has taken account of the National Framework for Scottish Aquaculture, including the Renewed Framework for Scottish Aquaculture, Scottish Planning Policy, Scottish Government Locational Guidance and other sources of guidance.

There is general support for aquaculture development as an important component of the economy, subject to proposals being consistent with relevant Argyll and Bute and Highland Development Plan policies and other policies in this Plan, including specific policy guidance for each policy zone. This will help guide future aquaculture development to appropriate areas by taking account of other activities and environmental sensitivities.

The policy sets out key guidance that should be considered when developing proposals and encourages pre-application consultation with relevant stakeholders and local authority planning officers. Consolidation and rationalisation of existing sites is supported in order to maximise the economic potential of the area and this policy encourages such proposals to consider available guidance and possible benefits for the environment and other users.

Finally, the policy identifies important voluntary management agreements and codes of conducts that aquaculture operators are encouraged to sign up to and operate within, in order to minimise effects on the environment and other users.

6.1.10 Recommendations for Aquaculture

- To support consideration of future development proposals, including consolidation options, existing or new tidal stream data should be used to assist identification of areas that are both suitable and unsuitable for shellfish and finfish farming in Loch Etive.
- The development or relinquishment of undeveloped seabed leases for aquaculture sites should be encouraged, in order to give others the opportunity to use these sites.
- Lease holders and operators who have inactive or relinquished sites should remove all surface equipment and seabed equipment where it is deemed necessary to allow safe use of the area by other interests, and where removal will not result in significant adverse environmental effects.
- After a new farm has been installed, accurate GPS positions of anchors and equipment surface area should be taken and forwarded to the local authority, The Crown Estate and Scottish Government (Ports and Harbours) so that records can be updated.
- Guidance should be provided for recreational sea anglers on fishing close to aquaculture sites including advice on preventing damage to farm equipment and safety.
- The effect of new finfish development on wild migratory salmonids, monitored through the existing Area Management Agreement and work of its members should feed into subsequent planning decisions.
- As part of the work of the local AMA, a sea lice dispersion model should be developed for Loch Etive, to provide spatial guidance for finfish development and management.

6.2 Commercial Fishing

6.2.1 Introduction

Argyll and Bute has the second highest proportion of fishermen as percentage of the total workforce in Scotland (Donnelley 2009). This region is therefore highly fishing-dependent, underlining economic and social importance of commercial fishing. The local fleet, once reliant on herring and whitefish, now targets shellfish species using a variety of fishing methods.

The fishery region of Loch Etive falls within the West of Scotland Fishery District, and the ICES fishing area VIa. The main fishing harbour for Loch Etive is Oban. The main target species is *Nephrops norvegicus* (otherwise known as prawns, langoustine or scampi), with other crab species also important in particular areas. Much of Loch Etive is *Nephrops* ground which is targeted by local creel boats. The most important area for commercial fishing is however Ardmucknish Bay which is frequently creel fished for prawns. In addition, velvet swimming crabs (*Necora puber*) are targeted on the north shore and green crab (*Carcinus maenas*) at other locations in the bay. Occasionally trawlers fish for *Nephrops* in Ardmucknish Bay and utilise the north of the bay as far as the wreck of the Breda.



In the past, trawlers have fished in Airds Bay on rare occasions but the distance required to steam this far up the loch makes this an uneconomical and therefore unattractive option compared to targeting other fishing grounds. Figure 6.2 provides a snapshot of approximate areas used for different methods of commercial fishing at the time of plan preparation.

6.2.2 Economics

Providing an accurate assessment of fishing activity and fisheries statistics in Loch Etive is difficult as it is a small area within the Oban district port and the area is fished by both local and non local vessels. The following figures, taken from Scottish Sea Fisheries Statistics for 2008 are therefore focussed on the Argyll and Bute region and Oban district⁴.

	Argyll and Bute	Oban district
Employment	513	268
Landings (weight)	-	3,500 tonnes
Landings (value)	£20.1 million	£8.5 million

99% of weight and value of landings for the Oban district were for shellfish species with *Nephrops* making up 47% of landings.

⁴ Oban district includes the ports of Coll, Fort William, Loch Buie, Loch Scridain, Luing, Oban, Tiree & Tobermory

6.2.3 Potential Impacts and interactions with other interests

Potential Impacts

Effects are dependent on the intensity and distribution of fishing, the type of fishing gear used and the sensitivity of the seabed habitats involved.

- Trawling and creeling remove both the target species and result in bycatch of other species.
- The use of benthic trawls can result disturbance to the seabed. Some seabed habitats and species are particularly sensitive to disturbance such as maerl beds, flame shell beds, the tall sea pen and fireworks anemones. While small numbers of the fireworks anemone have been recorded at the head of Loch Etive, trawling does not occur in this area.
- Historic environment – trawling has the potential to affect ship wrecks, through direct contact and potential disturbance of sediments. It is however not in the interest of fishing vessels to fish over or in close vicinity of wrecks, due to the risk of entanglement and gear damage, and none of the wrecks in Loch Etive are currently designated.

Loch Etive is an important area for spurdog, also known as spiny dogfish, and may be a pupping area for this species. Spurdog are especially susceptible to overexploitation and long lasting depletion due to their exceptionally slow growth, late maturity, and small litters. Long-lining targeting this species has occurred in the past, focusing on Loch Etive, the Sound of Mull and Loch Sunart.



Interactions

New developments such as finfish or shellfish farms, marine renewable devices, or moorings have the potential to restrict access to existing fishing grounds. Although some developments may involve relatively small areas of seabed the cumulative effect of many developments can be considerable.

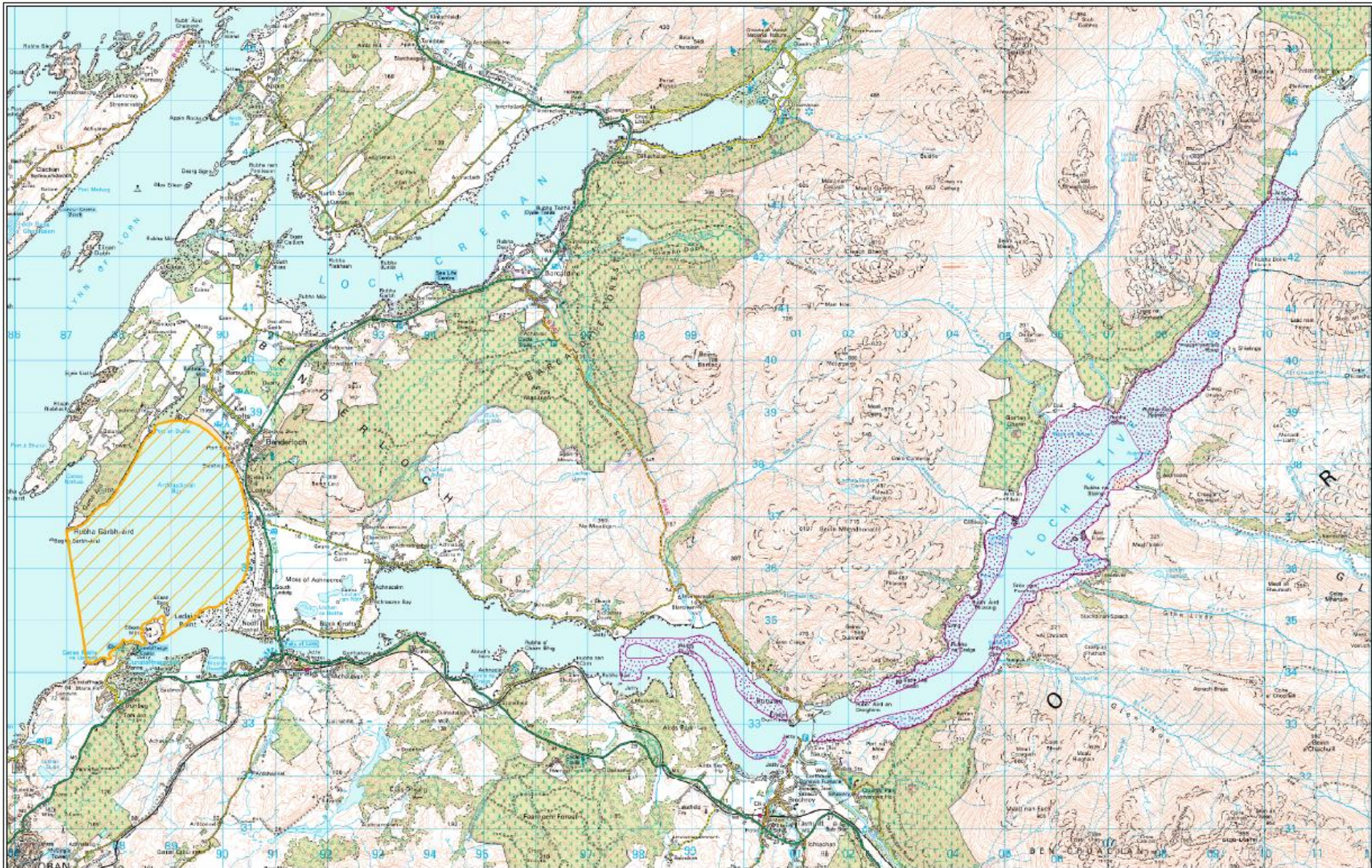
6.2.4 Existing Management and Controls

Finfish fisheries and the *Nephrops* fishery are managed through the EU Common Fisheries Policy (CFP). The CFP sets Total Allowable Catches (TAC) for these fisheries and allocates quotas to Member States based on historic fishing rights. The CFP also includes a range of technical measures including fishing gear regulations and minimum landing sizes. The Scottish Government manages quota for fish stocks and controls the activities of fishing vessels and fishing effort (days spent at sea) out to 12 nautical miles. The spurdog is one of only a few species of sharks for which the EU limits catch. ICES has recommended ending targeted fisheries for spurdog in the Northeast Atlantic through a single Total Allowable Catch (TAC) limit of zero, applicable to all areas where spurdog are caught in the Northeast Atlantic. ICES scientists also advise the establishment of measures to reduce bycatch of spurdog to the lowest level possible.

Inshore Fisheries

Within 12 nm of Scotland's coast the Scottish Government has the ability to take non-discriminatory conservation measures. Since 1984, inshore fisheries in Scotland have been regulated primarily through the Inshore Fishing (Scotland) Act 1984. This Act enables Ministers to regulate fishing in inshore waters by prohibiting combinations of the following:

- all fishing for sea fish or fishing for a specified description of sea fish
- fishing by a specified method or fishing from a specified description of fishing boat
- fishing from or by means of any vehicle, or any vehicle of a specific description
- fishing by means of a specified description of equipment



Legend



- Prawn Creeling
- Creeling + Prawn Trawling

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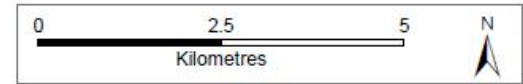


Figure 6.2 Location of fishing activity in Loch Etive

Inshore Fisheries Groups

Recent developments in fisheries management includes the setting up of Inshore Fisheries Groups⁵ (IFGs). The aim of these groups is to put fishermen at the heart of decision making, draw on expertise that already exists within fishing communities, and to strike a fair balance between competing demands in Scotland's inshore waters. Each IFG is required to develop a Management Plan for their area. Whilst plans will reflect specific and localised priorities, they also need to fit with wider strategic national goals such as sustainable stocks, a healthy marine environment and a profitable fishing sector that supports strong coastal communities.

Loch Etive falls within the South West IFG area, which is one of many areas where a management group has yet to be set up. Two IFGs have already been set up as pilots in Argyll and Bute (Mull & the Small Isles and the Clyde) and the Scottish Government will be making a decision on if and how the remaining IFGs will be established once a review of these pilots is complete.

Enforcement

Marine Scotland Compliance, formerly the Scottish Fisheries Protection Agency (SFPA), co-ordinates an enforcement programme for the monitoring, control and surveillance of sea fishing activity. Marine Scotland Compliance also undertakes investigations and prosecutions when breaches of the regulations are identified.

6.2.5 Commercial Fishing Policy

POLICY LE FISH1 – COMMERCIAL SEA FISHING

In order to encourage sustainable inshore fishing activities, the Loch Etive ICZM Plan supports:

- the establishment of the South West Inshore Fisheries Group;
- the development of new and increased uptake of existing fishing measures and practices, such as measures to reduce bycatch and capture of undersized prawns;
- the needs of local commercial fishing interests being taken into account in proposals for harbour and waterfront development and projects;
- a presumption against long-lining in Loch Etive, in order to protect the important spurdog population in the loch.

Justification

Commercial sea fishing is of cultural significance and is a key component of the rural economy of Argyll and Bute. It is important that this industry is managed sustainably for the benefit of local communities and the environment, and it is for these reasons that more local control and management of inshore fisheries is supported.

There is also a need for ongoing investment in maintaining facilities such as ports, piers and jetties and access to these facilities has been identified as important to the industry.

The spurdog population in Loch Etive is of significant biodiversity and recreational interest and is very vulnerable to targeted long-line fishing.

6.2.6 Recommendations for Commercial Fishing

- Long-lining in Loch Etive is discouraged in order to protect the important spurdog population in the loch and other vulnerable shark and ray species.
- Accreditation for sustainably fished products through schemes is encouraged.

⁵ <http://www.scotland.gov.uk/Topics/marine/Sea-Fisheries/InshoreFisheries/IFGsMap>

6.3 Recreational Activities

There are a wide range of recreational activities occurring within the loch and along its shores such as sea angling, kayaking, scuba diving, sailing and walking. A number of local businesses are orientated around these activities and they are important to the wellbeing of those living by and visiting the loch.

The location of recreational activities and infrastructure is presented in the maps for each individual policy zone in section 7 of the plan.

6.3.1 Sea Angling

Loch Etive is one of the most important and well known sea angling locations on the West coast of Scotland where angling is available year round from both boat and the shore. It is thought that around 20% of angling is from boats and 80% being conducted from the numerous fishing marks, particularly on the north shore (Radford *et al.* 2009).

The unique environment of the loch attracts a wide range of fish with a species division either side of Bonawe narrows. There are some excellent shore marks for pollack with fish around the 6lb mark fairly common. Bottom fishing from the shore will produce a wide variety of sea species but boat fishing will yield a greater number, with a total of 33 different species recorded as having been caught. Spurdog fishing in the loch is good with the Scottish shore record of 15lb 3oz was caught here in 1991.

Shore angling

The lower loch is easily accessible from the A85 and the B845. The most popular marks on the northern shore are Ardchattan Priory and Bonawe Quarry. Further marks along the forestry road north of the Quarry can be accessed by foot via a rough coastal track and coastal paths. Popular southern shore marks include Connel Bridge, the bays west of Achnacloch, Airds Bay and Taynuilt Pier.

Boat angling

Boat angling is popular and is the best way to access the upper loch. The main access points are Dunstaffnage Marina, Connel, Bonawe, Airds Bay and Taynuilt Jetty. The most important of these sites is Taynuilt, as it is easy to access the upper loch and boat launching is relatively easy.



The Scottish Sea Angling Conservation Network (SSACN) holds annual angling competition competitions and tagging events, including the Spurdog Tagathon weekend, which takes place annually in late autumn and is centered on Lochs Sunart and Etive. This event aims to tag as many fish as possible from the shore and boat; to highlight the urgent need for shark conservation in Scottish waters.

The 'Laura Dawn' operates half-day trips from Airds Bay and Firth of Lorn Charters ('M.V Creagallan') based in Oban provides general sea angling charters in Loch Etive, departing and returning via Taynuilt.

6.3.2 Sea kayaking

The Oban/Firth of Lorn area is recognised as a world class sea kayak venue with visitors from the UK and overseas coming to experience the sea lochs and tidal races. This activity has rapidly expanded in recent years and Oban now has one large, two medium and two small companies providing sea kayak coaching, guiding and rental. Many independent paddlers and club groups also come to the area for sea kayaking.

Loch Etive is an important sea kayak and open canoe venue and provides a sheltered environment for coaching beginners and intermediate paddlers and for trips for experienced paddlers when conditions make it unwise to go further out. In particular, the lower loch is sheltered in strong South East to South West winds and the upper loch reasonably sheltered in strong SE or NW winds. The scenery, wildlife and variety of conditions are all part of the kayaking experience.

The falls of Lora at the Connel narrows are considered to be of international importance as a site for challenging paddling conditions for both sea and white water paddlers⁶, where 8 knot currents and white water features on salt water are directly accessible by road. Although visited less than the lower loch, upper Loch Etive is still an important area and the whole length can be traversed end to end as a day trip, but more often as a two to three day trip.



The main access points for this activity are the car park at the Falls of Lora, Achnacloich and both Airds Bay and Taynuilt Pier. Groups visiting the Falls of Lora also park on the north side of Connel Bridge and walk down a steep slope to get to the shore. Achnacloich is a key access location for many of the local sea kayak providers as it is the most reliably sheltered.

6.3.3 Scuba Diving

Most divers from outwith the area normally focus on the Firth of Lorn and Sound of Mull as the key locations in the Oban area. While Loch Etive offers a wide range of different dive sites with generally good visibility, most diving is undertaken by divers that are local to the area or have abandoned other dive sites for Loch Etive in bad weather.

There are at least 20 identified dives sites, offering a choice of intact wrecks, pinnacles, wall and drop-offs, many of which are promoted by dive guides such as 'Dive West Scotland', dive club websites and local businesses. Some of the most spectacular diving can be found at the Falls of Lora, dived mostly at slack water but also as a drift dive, where there are abundant dahlia anemones, shell hash beds and sponges along the vertical walls. Other popular dives sites include vertical walls and cliff faces at McKinley's Cliff, which support a variety of colourful, diverse marine life, including cup corals and sea squirts, the wreck of the SS Breda in Ardmucknish Bay and an overhanging cliff face at Dunfuinary.

British Sub Aqua Club (BSAC) Dalriada Diving are based in Oban and provide guided dives for club members. Puffin Dive Centre operates out of Oban, offering instruction, tank refills and hire of their vessels for sports divers. Dive charters on the TSMV Gannet are also available, running out of Oban.

There are few places to launch dive boats along the loch, and boats are often launched from Ganavan, near Oban or Dunstaffnage Marina which offers services for divers including compressed air. Divers staying at Tralee Chalet Park or Ledaig Caravan Park can launch across the shore at these locations. The privately owned slip at Fisherman's Wharf (Camas Bruiach Ruiadhe) can also be used with permission. Taynuilt is also an important launching location as it provides the easiest access to dive sites in the upper loch. Boat access here is usually across the foreshore just before Taynuilt pier.

⁶ www.fallsloflora.info

6.3.4 Sailing, Marine Wildlife Watching and Other Water Sports

Sailing and boating

Argyll and the Islands are regarded by many as one of the finest sailing areas in the world. The plethora of islands ensures that sheltered waters are always available for a pleasant day sail, whilst for those seeking greater adventure it is also possible to undertake longer coastal and offshore passages.

While recreational boating is popular throughout Loch Etive, the loch itself is not used greatly for sailing with activity focussing around the large marina in Dunstaffnage Bay and adjacent bays west up to Connel bridge. Dunstaffnage is also the base for the charter company 'Alba Sailing' which has 14 sail boats available for charter.



Dunstaffnage Marina
Image courtesy of Argyll and Bute Council



Boat moorings at Taynuilt
Image courtesy of Argyll and Bute Council

Access to the loch is constrained by the Falls of Lora, and although there are numerous private moorings in the sheltered bays in the lower loch, once beyond the narrows at Bonawe there is no infrastructure.

There are many moorings located in the loch with association moorings at Dunstaffnage, Achnacree and Taynuilt. Private moorings are focussed at Camas Bruaich Ruidhe, Connel, near Ardchattan Priory and Bonawe. Although there are a number of anchorages in the loch, the depth of many areas adjacent to the shore, particularly in the upper loch make anchoring difficult.

Dunstaffnage Marina and other coastal infrastructure are discussed in more detail in section 6.5.1.

Marine Wildlife Watching

Etive Cruises and Coastal Connections offer day cruises/trips up Loch Etive, focussed on wildlife and scenery. In addition, many other recreational activities such as diving, kayaking, sailing, angling and coastal walking offer opportunities to view marine wildlife, which are considered as an important part of the experience. The main wildlife species of interest above the water are otters, seals, golden eagles and other coastal birds.

Other Water Sports

Jet skiing has increased in popularity over recent years and occasionally takes place in Ardmucknish Bay and Airds Bay. There has also been an increase in more powerful motor boats using the loch.

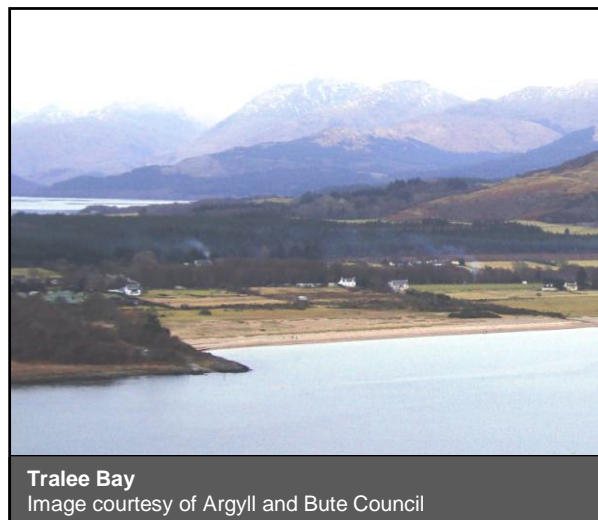


Information sign
Image courtesy of Argyll and Bute Council

6.3.5 Coastal Walks and beach recreation

There are a variety of paths around the shores of Loch Etive and in the neighbouring hills offering opportunities for walkers, cyclists, mountain bikers and horse riders. Many of these paths provide impressive views of the loch and Ben Cruachan, as well as opportunities to view local wildlife. Coastal paths are accessible on the both sides of the upper loch. However, the condition of the track/path on the east side of the loch is variable in stretches.

A number of existing coastal paths have been identified as proposed core paths by Argyll and Bute Council and Highland Council which are of importance to residents and visitors.



Tralee Bay at the north of Ardmucknish Bay is a long sandy beach, which leads to a pebble shore stretching round the coast to Ledaig Point. The beach is well used by local residents and visitors to the area and is accessible by vehicle or foot, via a rough single track road. A small car park is situated adjacent to the main road (Kiel road), opposite the track and limited parking is available at the top of the beach, above the high tide mark.

6.3.6 Economics

Sea Angling

In 2009, the Scottish Government undertook an economic assessment of recreational sea angling in Scotland⁷ and the following information is taken from this report. Argyll and Lochaber was identified as Scotland's second most important region for sea angling with Taynuilt identified as the third most important launch site. Table 5.1 compares estimated angler days, revenue and income, for Scotland, Argyll and Lochaber and Loch Etive.

Table 5.1 Annual angler days, revenue and income for sea angling in Loch Etive

	Angler days	Revenue/expenditure (£million)	Income supported (£million)
Scotland	252,600	141	69.7
Argyll and Lochaber	105,000	22.6	8.4
Loch Etive	44,300	4.1	1.5

⁷ Economic Impact of Recreational Sea Angling in Scotland (Radford et.al 2009) www.scotland.gov.uk/Publications/2009/07/31154700/0
It should be noted that the calculation of these estimates are extremely complex and figures for expenditure relate to both direct and indirect costs, including fuel, food, bait, charter costs, accommodation, boat & rod hire, clothing and books.

In addition to general angling, the annual SSACN Tagathon event and a number of different angling competitions make a significant economic contribution to the area.

Sailing

Figures of economic value for the geographical area covered by this plan are not available. Of all the water-based activity, sailing is considered to be the biggest generator of economic activity. In 2005 the British Marine Federation predicted that the UK leisure boating industry was on course to providing up to 30,000 jobs with a turnover of £2 billion, such was the growth in this sector across the UK. A study of the sailing industry in Scotland estimated that the marine leisure and tourism sector was worth £211 million (at 2001 prices) (Mackenzie Wilson Partnership Report, MWP, 2006).

Kayaking

Oban has five companies providing sea kayak coaching, guiding and rental. There are also two shops in Oban that sell sea kayaks and equipment. Table 5.2 summarises the capacity in terms of clients and employment for all companies.

In all, around 13 people are employed some of whom are seasonal. All individual companies have increased their capacity between 2009 and 2010, with a total of 4000 client days annually for all companies together.

The majority of clients undertake day trips and prefer to stay in local bed and breakfast accommodation while a minority prefer to camp on local commercial camp sites. Most clients buy evening meals and packed lunches and many of those camping will eat out in Oban rather than cooking themselves.

An economic impact case study undertaken by one of the medium sized companies estimated that 550 client days in 2010 equated to approximately 320 accommodation nights, 60 campsite nights and 340 evening meals.

Table 5.2 Capacity and employment of local sea kayak businesses

Capacity (Clients per day)		Staff employed (2010)	
2009	2010	Full time	Part time
45	62	8	5

Scuba Diving

The TSMV Gannet operates out of Oban and advertises dives around Dunstaffnage, Falls of Lora and the SS Breda wreck. Some visiting clubs base themselves at Ledaig/Tralee and visit Ardmucknish Bay and Loch Creran. The area tends to get a rush of people coming up to train at Easter, although through the summer months there are more diving trips. Although no specific economic data is available for diving in the Loch Etive area, it is not considered to have a significant economic value compared to other areas in Argyll and is felt that currently little income is generated from diving within the loch.

6.3.7 Potential Impacts and interactions

Potential impacts from recreational activities and development can include:

- Competition for space between moorings/anchorages and aquaculture development/ commercial fishing;
- Competition for berthing space between recreational vessels and commercial vessels where existing harbours or marinas are redeveloped;
- Reduced water quality – the discharge of untreated sewage from vessels concentrated in large numbers may have the potential to affect the high standard of water quality required for shellfish growing;

- Inconsiderate behaviour: participants undertaking recreational activities such as angling, diving and kayaking can affect road traffic, road safety and private property if participants park in inappropriate areas. Noise, litter, and a lack of changing and toilet facilities can also be an issue;
- Disturbance to marine and coastal wildlife;
- Disturbance of sensitive seabed habitats or historic heritage interests from anchoring and the scouring action of mooring chains; and
- Inappropriate use of jet skis and small power boats could be a safety risk or nuisance to other activities including kayakers, divers, fishing and commercial shipping vessels.

Conflicts with other interests:

- Sea anglers may catch wild salmon and sea trout which are subject to catch and release on many of the rivers in the Etive catchment. The Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003, states that it is an offence to fish for salmon and sea trout in any waters, including any part of the sea within 1.5 kilometres of mean low water springs, without the written permission of the person who owns the fishing rights to that water. Full details and legal requirements can be found at <http://www.fishpal.com/Scotland/Legal.asp?dom=Britain>.
- New marine development, such as aquaculture development, can affect safe navigation or safe entrance to designated anchorages, and
- Marine litter is seen as a threat to recreational activities and tourism and floating debris can be a hazard to leisure boats.

6.3.8 Existing Management and Controls

Many of the potential conflicts listed above can be and have been fully or partially mitigated by a range of environmental programmes and codes of conduct. Further information on these codes and programmes can be found in Appendix X. Policy LE REC1, detailed in Section 6.3.11 encourages recreational users to follow this good practice.

The Maritime and Coastguard Agency (MCA), on behalf of the UK Government, enforces the regulations to which vessels in UK territorial waters must adhere. The Merchant Shipping Regulations apply to all vessels (private and commercial) in UK waters and the International Regulations for Preventing Collisions at Sea (IRPCS or COLREGs) apply on or near the coast.

6.3.9 Required Consents for Recreational Development

Section 6.5.4 provides details of the relevant consents required for developments such as moorings, pontoons, slipways and piers.

6.3.10 Future development and activity

Loch Etive clearly has much strength as a marine leisure destination with rich scenic, cultural, historic and wildlife qualities as well as safe, largely sheltered waters. The biggest constraint to the development of marine and coastal recreation is the lack of facilities, and strategic coastal infrastructure development and/or improvements could bring significant economic development opportunities to the area.

There are however existing concerns about the current level of recreational activity in the area, in terms of parking and access, camping and litter and therefore any improvements to existing infrastructure and opportunities for new facilities will need to be considered carefully in order that recreation does not result in unacceptable impacts on the environment and local communities.

Access requirements for angling, kayaking and diving

To enable improvement of access for recreational facilities and alleviate current access issues it is necessary to take a strategic approach and assess existing access points in order to identify the need for management and opportunities for access improvements or new development. The promotion of dedicated access points could take pressure off other less suitable locations and provide economic

benefit to nearby services. Opportunities⁸ to improve marine access or coastal infrastructure for recreational activities are identified in individual policy zones in section 7.

The Land Reform Scotland Act 2003 gives recreational users the right to pursue these activities but states that exercising these access rights must be done responsibly. Users have to ensure that they park legally and do not to cause problems for local residents. Occasionally irresponsible behaviour by a minority of individuals, can lead to restrictions or removal of vehicular access to areas that may be important to other recreational users. This not only makes using an important area difficult but can have an impact on local businesses providing that activity. Alongside provision of appropriate facilities at suitable locations it is therefore also necessary to promote responsible behaviour to individual recreational user groups, and many associations have developed codes of conduct for this purpose.

Access to marine waters for activities such as diving, angling and kayaking is poor in many places, with some existing infrastructure in a state of disrepair. There is clearly a lack of parking for vehicles and boat trailers, accessible piers and slipways and toilet and changing facilities. On some single track roads, turning areas for vehicles towing trailers would be advantageous.

For some activities such as kayaking and shore angling the only infrastructure required is adequate parking. While there are many places along the north shore of Loch Etive that would be suitable launch sites for kayaking, a lack of parking means they cannot be used.

There is an opportunity to include provision for improved access to the water and facilities for recreational users as part of new development proposals, including new businesses such as cafes or restaurants, or development of new and improvement to existing coastal infrastructure. Such proposals could explore the potential for allowing boaters/kayakers, divers and anglers to access proposed infrastructure or to provide additional parking, dedicated launching points or toilet facilities.

Motorised Water-sports

It is possible that the level of power boating and jet skiing in Loch Etive may increase in the future, particularly if restrictions continue in fresh water lochs. If a significant increase in the use of Loch Etive occurs it may be appropriate to consider identifying appropriate areas for these activities in relation to other users and interests.

Sailing

There have been a number of studies that have looked at the potential to develop sailing in Argyll and the Islands⁹. These studies highlighted the growth potential of the recreational sailing/marine leisure tourism industry and the requirement for infrastructure and facility improvements in order to facilitate that growth. Improved communications and collective promotion were also identified as means of improving business.

The Argyll and Bute Development Plan identifies Camas Bruaich Rhaidhe, near Connel, as a Potential Development Area (PDA) for marina related leisure development. This location offers potential for a large number of berths and alongside berths at Dunstaffnage Marina, would greatly increase the capacity of the area.

Loch Etive is not served well by good anchorages and visitor moorings at Taynuilt might encourage more local or visiting leisure boats to go up the loch. The potential for a small pontoon at Taynuilt pier for visiting boats has also been identified as well as potential for increased dingy sailing if appropriate facilities were available.

Priorities for access improvements and interpretation

A number of opportunities for improved access and infrastructure for recreational activity and provision of interpretation are identified in the Policy Zones (section 7). These opportunities relate to specific

⁸ Engineering feasibility or detailed economic justification for these development opportunities has not been assessed.

⁹ Overview of the Marine Leisure Tourism Sector in Argyll and the Islands – Stewart Miller Associates (July 2004); Sail West Project, 2007. A Strategic Programme for the Development of Marine Leisure Activities and Infrastructure in the Republic of Ireland Border Region, Northern Ireland and the West of Scotland.

needs identified by stakeholders, and some opportunities are of greater priority than others.

Existing access points at Connel, Taynuilt and Achnacloich are well used by recreational users and improvements to infrastructure and facilities at these locations should act to secure future access and improved management of these locations. The Plan therefore prioritises improvements to existing access points over development of new ones, with the key priorities identified as:

- improved access and access management at Connel (Falls of Lora), Taynuilt Pier and Achnacloich;
- a new access point for sea kayaking at the north end of the Connel Bridge; and
- retaining public access to the pier at Glen Etive.

In relation to provision of interpretation, four opportunities are identified, with interpretation at Taynuilt for sea anglers and at An Sailean relating to management of coastal saltmarsh a priority.

6.3.11 Recreation Policy

Infrastructure required to support recreational use of Loch Etive is considered by the Coastal and Marine Infrastructure Policy (Policy LE INF1) in section 6.5.6.

POLICY LE REC1 – RECREATIONAL USE

PART A – Priorities for Recreational Activity

The Loch Etive ICZM Plan encourages recreational activity that will:

- maintain and increase the attractiveness of the area for both visitors and local residents;
- lengthen the tourist season and encourage sustainable business development;
- incorporate historic, cultural and wildlife interests of the area into tours, trails and interpretation;
- enhance or make better use of existing attractions and facilities and promote the local character of an area; and
- make better use of existing infrastructure, including the re-use of redundant buildings, piers and other facilities.

PART B - Minimising Effects on the Environment and Other Users

To minimise or prevent effects on the environment and other interests, recreational users are encouraged follow existing good practice and voluntary codes of conduct, in addition to any statutory codes or requirements:

- Scottish Outdoor Access Code;
- Scottish Marine Wildlife Watching Code;
- Wild Scotland Best Practice Guidelines;
- The Green Blue guidance for recreational boating;
- Scottish Canoe Association (SCA) guidance and codes of conduct;
- Scottish Sub-Aqua Club (SSAC) - Land Access Guidance for Divers;
- British Sub-Aqua Club (BSAC) - Respect Our Wrecks Code;
- Maritime and Coastguard Agency (MCA) codes of practice; and
- Scottish Sea Anglers Conservation Network (SSACN) - guidance on catch & release and spurdog.

(See Appendix X for further details)

Justification

Every area of Argyll and Bute has potential for tourism. In a fragile rural economy the tourism and recreation industry offers the prospect for real growth. The coastal area of Loch Etive is an important recreational resource and the potential contribution to the local economy is acknowledged.

The aim of this policy is to encourage recreational activity and maximise the local social and economic benefits, but at the same time protect residential amenity and our outstanding environment.

Recreational activities have the potential to affect the environment and other interests and significant work has been undertaken by associations representing specific activities in developing guidance and codes of conduct to minimise potential impacts. This policy recognises the importance of this guidance and encourages all recreational users to follow relevant good practice.

6.3.12 Recommendations for Recreational Activities

- The controlled use of antifouling for recreational and commercial vessels should be promoted in order to minimise the risk to the environment from spread of invasive non-native species, which is considered on balance to be greater than that from antifouling chemicals.
- New and existing marina developments should consider options for removing antifouling contamination from waste water generated by pressure washing boat hulls, including 'closed loop boat wash down systems'.
- If power boating/jet skiing increases significantly in the future it may be appropriate to consider identifying appropriate areas for these activities, in relation to other users and interests.
- Loch users are encouraged to report sightings of marine mammals to the relevant agencies/conservation groups. Details of recording schemes and contact details can be found in Appendix IV.

6.4 Commercial Shipping

6.4.1 Timber transshipment

Planning permission to upgrade the pier at the head of Loch Etive for extraction of commercial timber from the forestry plantation at Glen Etive was granted in 2008. Scottish Woodlands Ltd, are managing harvesting and timber extraction on behalf of Glen Etive Estate and initial extraction will continue over a three year period from 2010, shipping approximately 600 tonnes a week by barge.



Pier for timber transshipment, upper Loch Etive
Image courtesy of Isaac Forster



Timber transshipment vessel at Kilmaronig narrows
Image courtesy of Argyll and Bute Council

The Forestry Commission operate two areas of commercial forestry adjacent to Loch Etive: Barrs/Cadderlie and Inverawe Forest. The Forestry Commission wish to maximise the use of sea transport in association with feeder road transport and are interested in developing appropriate infrastructure or upgrading existing piers to enable timber transshipment from these forests. Future operations will probably ship timber from the old pier/jetty at Barrs using internal forest roads, as upgrading road access to the nearest public road would be prohibitive.

6.4.2 Bonawe quarry

Breedon Aggregates, previously Ennstone Thistle operate the quarry at Bonawe. The quarry produces approximately 85,000 tonnes of quarried granite annually and these rock products are used mainly to construct transport infrastructure. The main part of the business is however the production of asphalt and an asphalt plant established in 2008, provides product for roads, pavements, car parks and airport runways.

The majority of material is transported by barge, although some material is transported via road. The quarry has a good berth for commercial vessels and the largest boat that has visited the quarry was the long cargo ship; MV Amanda, able to transport up to 1500 tonnes of aggregate.

The size of vessels visiting Loch Etive is constrained by the height clearance of the Connel Bridge and overhead cable at Bonawe. Large commercial vessels are only able to enter or exit the loch at high tide during slack water, and vessels occasionally use Achnacree Bay to anchor while waiting to exit the loch. Vessels of 3.4 m draught can exit the loch at low water.



Bonawe Quarry
Image courtesy of Argyll and Bute Council



Bonawe Quarry
Image courtesy of Argyll and Bute Council

6.4.3 Economics

At Bonawe Quarry, Breedon Aggregates employ 2 laboratory technicians, 3-4 people for crushing operations and 2-8 lorry drivers. No other economic information is available for the shipping operations associated with commercial forestry or Bonawe Quarry.

6.4.4 Potential impacts and interactions with other interests

Potential impacts from commercial shipping can include:

- risk of collision with other vessels, aquaculture sites or grounding, resulting in pollution incidents;
- risk of introduction of invasive non-native species in ballast water.

Sea transport has obvious benefits where there is community resistance to intrusive lorry movements through residential areas or via inadequate public roads, where congestion is likely. In Argyll and Bute, road freight traffic causes disproportionate damage to the road network and necessitates an increased maintenance effort to keep roads serviceable (Argyll and Bute Woodland and Forest Strategy 2010).

6.4.5 Existing Management and Controls

Argyll and Bute Council have prepared an Oil Spill Contingency Plan which will be used by Argyll and Bute Council, Maritime and Coastguard Agency, SEPA, SNH, Port and Pier users and local interest groups when dealing with spills or the threat of spills within the Council area. The Argyll and Bute Council Oil Spill Contingency Plan consists of two volumes:

- Volume 1 (Shoreline Protection Plan) includes the full arrangements for the management of and response to any oil spill within the council area and also includes details of response to pollution to the shoreline.
- Volume 2 (Ports and Piers Oil Spill Contingency Plan) includes the information necessary to plan for and respond to an oil spill occurring within the Council's statutory harbours and in the vicinity of the Council-owned piers.

International controls

The Maritime and Coastguard Agency (MCA), on behalf of the UK Government, enforces the regulations to which vessels in UK territorial waters must adhere. The Merchant Shipping Regulations apply to all vessels (private and commercial) in UK waters and the International Regulations for Preventing Collisions at Sea (IRPCS or COLREGs) apply on or near the coast.

Following the agreement of 'The International Convention for the Control and Management of Ships Ballast Water and Sediments' in 2004, ballast water standards have been introduced and new technologies are being developed to allow these standards to be met.

Existing International Maritime Organisation (IMO) guidelines on ballast water introductions have focused on preventative methods, with exchange of ballast in mid-oceanic water being the only recommended method currently available to reduce the level of non-native species introductions.

6.4.6 Commercial Shipping Policy

The development of a specific policy for Commercial Shipping was not deemed necessary and this activity is guided by the following:

- Infrastructure required to support commercial marine traffic is considered by the Coastal and Marine Infrastructure Policy (Policy LE INF1) in section 6.5.6.
- The Argyll and Bute Local Transport Strategy¹⁰ and Argyll and Bute Woodland and Forestry Strategy¹¹ encourage further transport of goods by sea to reduce environmental impacts and damage to road infrastructure.

¹⁰ <http://www.argyll-bute.gov.uk/content/roadsandtransport/transportationstrategy/movingforward2/>

¹¹ <http://www.argyll-bute.gov.uk/content/planning/developmentpolicy/3271669/>

6.5 Coastal and Marine Infrastructure

The location of coastal and marine infrastructure is mapped in each Policy Zone in section 7 of the Plan.

6.5.1 Coastal Infrastructure

Dunstaffnage Marina

Dunstaffnage Marina is located on the shores of Dunstaffnage Bay overlooking Dunstaffnage Castle at the entrance to Loch Etive and is easily accessible by road (A85), rail, ferry, or by air from Oban Airport. The marina provides a wide range of services which include: berthing (moorings, dry storage including lifting facilities), yacht service and repairs, chandlery and yacht charter, emergency services, and a professional brokerage service for both buyers and sellers of quality vessels.

The marina has 150 fully serviced berths and operates eight swinging moorings in the bay adjacent to the pontoons. Moorings are let either on an annual basis or for the summer season. The yard accommodates approximately 120 boats either on cradles or on the shore. Water and electricity pick-up points are available within the storage area.

Boats for other recreational activities can be launched at the marina's slip for a small charge. Additional services for scuba divers include: compressed air, launch ramp facilities, pontoon berthing, laundry and drying facilities, changing rooms, parking facilities, and sheltered waters for training if required.

Fisherman's Wharf (Camas Bruaich Ruaidhe)

There are a number of moorings, a jetty/pontoon and car parking facilities at the privately owned Fisherman's Wharf. Other facilities include: water, compressed air, equipment washing, engine flushing, trailer storage, and dinghy storage. Boats can be launched from this facility or moored overnight for a small charge.

Hyperbaric chamber

A NHS registered hyperbaric chamber is located at the Scottish Marine Institute at Dunstaffnage, where divers can be treated for decompression illness.

Piers, jetties and slipways

There are a considerable number of small piers, slipways, moorings and anchorages throughout Loch Etive. Some of the piers and slipways are in poor condition and in need of maintenance. Almost all of the piers and slipways are privately owned with access possible at some, with permission from the owner.

Road access & car parking

The section of A85 that runs along from Taynuilt to Oban is part of the Argyll Coastal Tourist Route and is in general of higher carrying capacity for commercial, residential and tourist traffic, compared to



the roads on the north side of the loch, which serve smaller communities, and for the majority of the coast, are only of B classification. Breedon Aggregates use the road network around the northern shore of the loch for transportation of asphalt and aggregate products from Bonawe quarry.

Existing parking provision is not adequate in many places, to allow the public to access the loch for recreation or for vehicles to stop and enjoy the view or explore the coastline.

Overhead cable

A Scottish and Southern Energy cable crosses the Bonawe narrows, from Balure to Eilean Duirinnis, with a clearance above the water of 13m at its lowest point.

6.5.2 Marine Infrastructure

Subsea Cables

There is an out of service subsea telecommunications cable that runs from Taynuilt to Bonawe. Subsea cables can restrict development and marine activities and have the potential to be damaged by moorings, anchoring and some fishing activities.

Pipelines

Most of the pipelines present in Loch Etive are used for effluent discharge and are located near the settlements of Benderloch, Dunbeg, Connel, Taynuilt and Bonawe. The largest of these pipes discharges from the sewage treatment facility at Saulmore at Rubh' Aird nan Leum.



Effluent discharge pipeline at Dunbeg
Image courtesy of Argyll and Bute Council

Navigation markers

The Northern Lighthouse Board is responsible for the management of all lighthouses, buoys and beacons throughout Scotland, under Section 195 of the Merchant Shipping Act 1995. They have various powers and responsibilities in connection with the provision, maintenance, alteration, inspection and control of lighthouses, buoys and beacons together with wreck removal powers. This also covers fish farm beacons, moorings etc.

6.5.3 Socio- Economic Profile

Estimating the economic contribution of Coastal and Marine Infrastructure was not practicable, as most public infrastructure does collect direct revenue. However it is recognised that many activities in the Loch Etive rely on Coastal and Marine Infrastructure to operate, and thus it forms a vital part of the local economy.

6.5.4 Relevant Consents for Coastal Infrastructure Development

Required consents	Regulator	Details
Planning Permission	Argyll and Bute Council	Planning consent is required from the relevant planning authority for coastal development above the mean low water mark.
Seabed Lease	The Crown Estate	Where the foreshore/seabed is owned by The Crown Estate an operator must apply for a lease for the right to occupy the area.
Coast Protection Act 1949 - Section 34 Consent	Scottish Government, Ports and Harbours Division	Section 34 consent is required for any mooring or coastal infrastructure development. The purpose of control under Section 34 is solely concerned with the safety of navigation.

FEPA Licence	Marine Scotland – Science	Consent is required under Part II of the Food and Environment Protection Act 1985 (as amended) (FEPA) for the deposit or placement of substances, articles and materials that it is proposed to use during construction. FEPA consent is also required for dredging material.
Ports and Harbours Orders	Scottish Government, Ports and Harbours Division	This consent aims to regulate harbour developments and activities.

6.5.5 Future Development

Overall, there is a lack of suitable infrastructure, particularly slipways and parking in many parts of Loch Etive. Future development needs for infrastructure to support recreational activities is discussed in section 6.3.10. Improving or adding to existing physical infrastructure is key to supporting and assisting the marine leisure industry and other commercial activities.

6.5.6 Coastal and Marine Infrastructure Policy

POLICY LE INF1 – COASTAL AND MARINE INFRASTRUCTURE DEVELOPMENT

PART A – Policy Framework

There is general support for coastal and marine infrastructure development in appropriate locations, subject to proposals being consistent with:

- general policies (Policy LE GEN 1 & Policy LE INNS 1);
- policy guidance detailed in the relevant policy zone (Section 7); and
- relevant Argyll and Bute and Highland Council Development Plan policies (see Appendix I).

Existing commercial and recreational infrastructure should be safeguarded from development and activity that is likely to adversely affect its use and condition.

Development proposals for new or existing infrastructure should consider opportunities to contribute to:

- greater transportation of goods by sea;
- improved recreational and commercial access to the area;
- improved public access to Loch Etive; and
- increased facilities that can take advantage of the growing leisure cruising market.

PART B - Other Considerations

- New Marina development should consider design structure of pontoons and other equipment to allow efficient and effective cleaning to aid the eradication of INNS and requirements for self contained cleaning facilities to allow cleaning of vessels and safe removal of biological growth and antifouling contamination.
- Proposals for new infrastructure or upgrading of existing infrastructure should consider the potential to provide access and facilities for other recreational and commercial users, including provision of additional parking, dedicated launching points or toilet facilities.
- Marina or large mooring developments should give particular consideration to the potential to affect water quality that may pose a risk to existing shellfish farms, Shellfish Growing Waters and Shellfish Production Areas. Toilet pump-out facilities for recreational vessels should be considered in any large scale marina development or redevelopment of existing facilities.

Justification

Coastal infrastructure such as moorings, pontoons, slipways, piers and harbours are all essential for coastal recreation and commercial marine activities such as fishing, aquaculture and shipping. Marine infrastructure such as telecommunications and power cables are important for providing vital services. There is therefore a need to safeguard these types of infrastructure from inappropriate development and activity.

Improving or adding to existing physical infrastructure is key to supporting and assisting the marine leisure industry and other commercial activities. However, new facilities must complement or be compatible with the character of an area. The aim of this policy is to encourage development but at the same time protect residential amenity and the environment.

The largest volumes of freight in Argyll and Bute are associated with the agriculture, forestry and fishing industries. Much of this freight is transported by road over long distances in large vehicles. This traffic causes disproportionate damage to the road network and necessitates an increased maintenance effort to keep roads serviceable. The shipment of timber and quarry aggregate by sea and rail can relieve pressure on the road network and is therefore supported by this plan.

Large mooring development or marinas may have the potential in specific circumstances, to affect coastal areas reliant on a high standard of water quality, such as protected areas for shellfish growing. The size and location of development should take account of the sensitivity of the adjacent coastal waters to small changes in water quality.

Marina developments have the potential to increase the risk of introduction and spread of INNS. The environment and important aquaculture industry in Loch Etive could be significantly affected by the introduction of INNS, in particular the invasive carpet sea squirt. Appropriate design, facilities and management will be key to minimising these risks.

6.6 Forestry & Agriculture

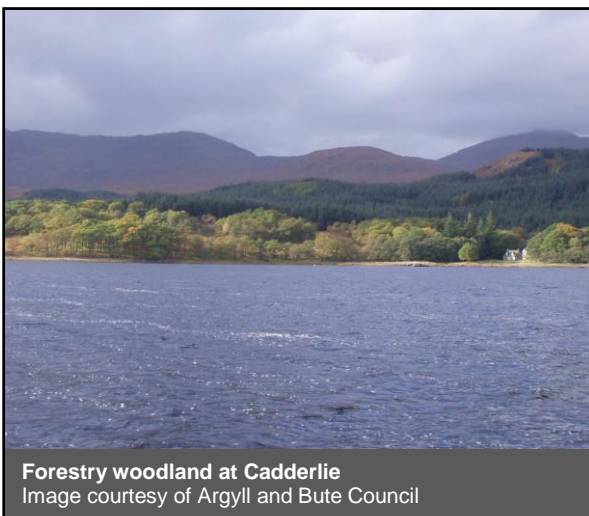
6.6.1 Forestry

Lower Loch Etive and Ardmucknish Bay

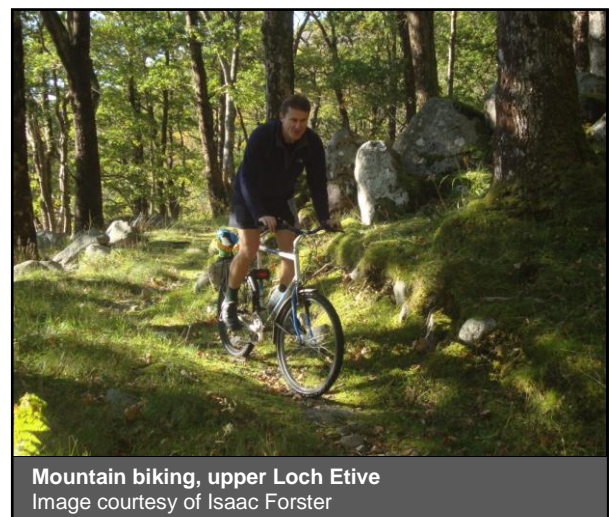
There are several forested areas making up the Loch Etive catchment. Parts of Fearnoch and Barcaldine forests which are managed with timber production as a major objective are included, along with Glen Nant, which is in the process of being restored to an extensive area of native woodland habitat. In addition, the lower basin has several areas of non-commercial mixed woodland.

Upper Loch Etive

There are 3 areas of commercial forestry in the upper basin and several areas of woodland that are currently being managed as native woodland. Bars/Cadderlie and Inverawe Forest are managed by the Forestry Commission. The forestry block beyond the head of the loch is operated by Scottish Woodlands (Ltd) on behalf of Glen Etive Estate. The Barrs and Cadderlie area is a fairly young forest and as yet there have been no harvesting or major felling activities. Inverawe Forest has seen sustained harvesting activities over the past decade (Magill *et al.* 2008).



The forest estate has potential to add value to and provide opportunities for private or community business ventures and some local businesses already derive indirect benefits from recreational forest visitors. There is potential for further development in this area, particularly in relation to walking, equestrian use, cycle hire, archery and paddle-sports (Lorne Forest District – Strategic Plan (2007 – 2017)).



6.6.2 Agriculture

Agriculture in the Etive catchment is dominated by livestock grazing for sheep and cattle. In excess of 5000 ewes and 500 cattle graze within the immediate catchment. Sheep numbers during the summer months, when lambs are present, may be approximately double this estimate. Much of the grazing areas are in close proximity to the shoreline (Magill *et al.* 2008). The main areas utilised by agriculture within the Etive catchment are Ardconnel & Saulmore, Achnacloich & Muckairn, Achnacree & Ardchattan, Glen Lonan and Glennoe.

6.6.3 Potential impacts and interactions with other interests

Agriculture and forestry operations have the potential to affect the water environment through diffuse pollution. Run-off from forestry plantations can cause acidification of water courses and silt run-off from operations can affect habitats for migratory salmon and trout. Run off from agriculture can result in bacterial contamination of coastal waters. These potential impacts can be effectively managed by the existing management and controls listed below.

6.6.4 Existing Management and Controls

River Basin Planning (Argyll and Lochaber Area Management Plan)

SEPA and the Forestry Commission are working together through the River Basin Planning Process to ensure that future forestry plantations meet the requirements of the Water Framework Directive.

General Binding Rules (GBRs)

Under the Water Environment (Diffuse Pollution) (Scotland) Regulations 2008, GBRs came into force in April 2008. They provide a statutory baseline for good practice and their implementation will help to improve water quality. GBRs cover activities such as storage and application of fertilisers, keeping of livestock, cultivation of land, discharge of surface water run-off, construction of water-bound roads and tracks, application of pesticide and operation of sheep dipping facilities. Further information can be found at SEPA's diffuse pollution webpage¹².

Forest and Water Guidelines (4th Edition 2003)

These guidelines give guidance to forest managers on how forests should be designed and operations planned, and to practitioners on how field operations should be carried out in order to protect and enhance the water environment.

West Argyll Forest District Strategic Plan 2009-2013¹³

This plan identifies actions that will be undertaken by Forestry Commission Scotland under each of the seven themes of the Scottish Forestry Strategy. Actions relevant to Loch Etive include:

Climate Change

WA 1.06 - Continue to identify opportunities in existing forests and potential acquisitions for improving habitat networks. Widen this to take a wider scale approach with Scottish Natural Heritage and adjacent landowners and include as a key component of the forest design plan process. Complexes of forest blocks e.g. Loch Etive side will be targeted for this work as design plans are updated.

WA 1.08 - Comply with the latest Forestry Commission Scotland forests and water guidelines in a competent and effective manner. We will audit our operations on production of the 5th edition and modify local practices within six months to ensure we conform to the update.

WA 1.09 - Work with neighbours, water body management groups and other agencies to implement appropriate catchment management plans. Extra sensitive silvicultural techniques and additional site check procedures will be implemented during operations in erosion sensitive areas.

Business Development

WA 3.12 - Be open to new business ideas that match wider social and environmental standards and consider positively proposals that will assist growth or development of local businesses.

¹² http://www.sepa.org.uk/water/diffuse_pollution.aspx

¹³ [http://www.forestry.gov.uk/pdf/WestArgyll.pdf/\\$FILE/WestArgyll.pdf](http://www.forestry.gov.uk/pdf/WestArgyll.pdf/$FILE/WestArgyll.pdf)

Environmental Quality

WA 6.01 - Use detailed site planning and consultation with key stakeholders, particularly the Scottish Environmental Protection Agency and fisheries groups, to identify site and downstream issues for inclusion in subsequent operations. A summary of consultation will be filed in association with each design plan.

WA 6.02 - Work with the Scottish Environmental Protection Agency and Scottish Natural Heritage on delivery of the EU water framework directive and protection of special areas for conservation on rivers and their tributaries. We will draw up a programme of prioritised improvements to engineering structures in relation to the water framework directive by 2011.

WA 6.03 - Areas of unstable ground or with slope stability issues will be treated especially sensitively and will receive additional monitoring to make sure that all guidelines are adhered to or exceeded.

6.6.5 Forestry and Agriculture Policy

The development of a specific policy for Forestry and Agriculture was not deemed necessary and these activities are guided by the following:

- Forest District Plans
- Argyll and Bute Woodland & Forestry Strategy
- Argyll and Lochaber Area Management Plan (River Basin Planning)
- Existing management and controls detailed in section 6.6.4.
- Infrastructure required to support the transport of commercial timber by sea is considered by the Coastal and Marine Infrastructure Policy (Policy LE INF1) in section 6.5.

6.6.6 Recommendations

- Existing measures to minimise affects on water quality from diffuse pollution from agriculture and forestry, including adherence to General Binding Rules and good practice such as the Forests and Water Guidelines should be continued.

6.7 Marine Renewable Energy

6.7.1. Introduction

Argyll and Bute has significant renewable resource of hydro, wind, wave, tidal and biomass, and a long history of renewable energy development. This area therefore has a significant role to play in both the UK and Scottish Climate Change Programme targets for renewable energy. Argyll and Bute Council aim to promote the full range of renewable energy resources available, and to achieve this, partnerships are being developed with renewable energy companies to maximise the benefits for communities throughout Argyll and Bute.

The Scottish Government has a target of meeting 50% of Scottish demand for electricity from renewables by 2020. To do so will require the effective and successful development of new renewable technologies, and it is expected that the contribution of developing sectors like wave, tidal and offshore wind will become increasingly important. The scale of Scotland's marine renewable potential is vast. The total wave resource is estimated at 14 GW (10% of EU total) with 7.5 GW of tidal power (25% of EU total). Scottish Ministers are committed to seeing 10MW of wave and tidal energy deployed by 2010.

A Strategic Environmental Assessment (SEA)¹⁴ of the development of wave and tidal power around the West and North coasts of Scotland has been conducted. The SEA examines the possible environmental impacts and effects associated with the deployment of a range and number of wave and tidal devices in the context of where the best resources are to be found.

6.7.2 Energy resource in Loch Etive

The only marine energy resource in Loch Etive is tidal. The main areas of tidal flow are at the Falls of Lora, Kilmaronaig narrows and Bonawe narrows. While the total tidal energy resource in the loch has not been estimated, tidal speeds of up to 8 knots occur (ebb spring tide) at the Falls of Lora with speeds of 5-6 knots continuing through to Kilmaronaig Narrows. Currents can reach 2.5 knots at Bonawe narrows.



Tidal flow at Falls of Lora, west of Connel Bridge
Image courtesy of Argyll and Bute Council

6.7.3 Potential Impacts/Conflicts – Tidal development

Arrays of tidal marine renewable devices have the potential to restrict navigational or access for fishing vessels, shipping and leisure craft. However, many tidal devices are submerged, which may not restrict boat traffic. Tidal development may also compete for space with activities like commercial fishing and aquaculture.

Habitats that experience rapid tidal flows, but not extremes of wave action, often host particularly diverse communities. As a result of this and their relative scarcity, they have been designated as a UK BAP priority habitat and are listed in the Argyll and Bute LBAP.

The UK BAP for tidal rapids¹⁵ states that:

- Tidal rapid species rely on strong water currents to carry food in, and waste materials and fine sediments away. Any obstruction to water flow can be expected to have adverse effects on the

¹⁴ <http://www.seaenergyscotland.co.uk/>

¹⁵ <http://www.ukbap.org.uk/UKPlans.aspx?ID=39#2>

fauna and flora.

- Depending on scale and local circumstances, tidal generation could have a devastating effect on communities in rapids and within enclosed bodies of water. Existing tidal barriers have generally been built across small, shallow rapids connecting brackish lochs with the sea, and may well have changed the ecology of the lochs considerably through restriction of seawater influence and consequent changes in salinity.
- Whether significant changes in community structure would occur and whether they would be considered deleterious would depend on the degree of change and the nature of the receiving environment.
- Reduction of downstream water flow, if it occurs, will be more significant in straits, tidal rapids and other constricted areas like the Falls of Lora, than along broad areas of open coastline.

6.7.4 Required Consents for Marine Renewable Development

Required consents	Regulator	Details
Electricity Act 1989 – Section 36 Consent	Scottish Government – Energy Consents Unit	Consent required for construction, extension and operation of a wave or tidal power generating station with capacity of 1 MW or more.
FEPA Licence	Marine Scotland Science	Consent required under Section 5 the Food and Environment Protection Act 1985 (as amended) (FEPA) for the deposit or placement of substances, articles and materials that it is proposed to use during construction.
Coast Protection Act 1949 - Section 34 Consent	Scottish Government, Ports and Harbours Division	The purpose of control under Section 34 is solely concerned with the safety of navigation.

6.7.5 Future Development

Benefits from marine renewable development

In addition to the obvious benefits of generating power from renewable resources, there can be significant economic benefits in terms of employment, investment and downstream expenditure. Development may also provide a local supply of renewable energy and other community benefits.

Commercial scale tidal development

The potential for utilising tidal energy at the Falls of Lora has been suggested in the past, but no detailed assessment of the resource potential and the technical feasibility has been undertaken.

A tidal power fact file produced by Institute of Engineering and Technology¹⁶ states that as a guide to judging the economic feasibility of power generation from a barrage, the minimum mean tidal range should be at least 5 metres. The tidal range of Loch Etive is 1.95 metres. Based on this tidal range and a length of tidal area of 300 metres, a total capacity of 28 MW was identified for Loch Etive, which equates to an annual output 55 GWh.

The main requirements for power generation from marine currents are:

- fast flowing water;
- a relatively uniform seabed to minimise turbulence;
- sufficient depth of water to allow large enough turbines to be installed;
- suitable conditions extending over as wide an area as possible to make development cost effective;
- free from shipping constraints; and

¹⁶ Tidal Power – A Factfile provided by the Institute of Engineering and Technology (www.theiet.org/factfiles)

- near enough to a shore-based electricity supply network capable of taking the power delivered.

Assessment of potential at the Falls of Lora

While there may be strong enough currents at the Falls of Lora, the seabed is not particularly uniform and turbulence is likely to be an issue. The water depth is likely to be too shallow for commercial scale tidal devices and the area of resource is not extensive.

Environmental constraints relevant to the Falls of Lora include effects on tidal communities from a restriction of water flow, potential changes to the ecology of the loch as a result of restriction of seawater influence and consequent changes in salinity and potential implications on the migration of wild salmonids.

Socio-economic constraints include possible impacts on safe navigation through the deeper narrow channel at the falls for commercial and recreational vessels, effects on shellfish and trout farming as a result of ecological changes in the loch, and the entire tidal resource area being heavily used for recreational sea and white-water kayaking, including training. In addition, the Falls are also a locally important tourist attraction.

While the Council is generally supportive of marine renewable energy it is considered that the potential constraints and impacts of commercial scale tidal development are likely to outweigh the benefits at this location. Policy Guidance detailed in Policy Zone B therefore identifies a presumption against commercial scale tidal development in this area.

Small scale development

There may be potential for small scale development that would not adversely affect the environment and social and economic activity. Small scale energy generation could assist in meeting the energy needs for specific developments e.g. aquaculture or marina facilities.

There are currently no commercially available small scale tidal devices, although some prototype devices are currently being tested. One such device is the Oceanflow 35, which pending consents will be deployed at a tidal stream site in Sanda Sound off the South Kintyre coast in 2011. Oceanflow 35 is a 35 KW version of the company's Evopod technology and can work as part of a community energy scheme for remote coastal communities.

6.7.6 Policy for Marine Renewable Energy Development

POLICY LE MREN 1 – MARINE RENEWABLE ENERGY DEVELOPMENT

PART A – Policy Framework

There is general support for marine renewable energy development, subject to proposals being consistent with:

- general policies (Policy LE GEN 1 & Policy LE INNS 1);
- policy guidance in the relevant policy zone (Section 7); and
- relevant Argyll and Bute Development Plan policies, particularly Policy LP REN 3.

PART B - Priorities

The Loch Etive ICZM Plan encourages marine renewable energy developments that will:

- contribute to an increase in renewable energy use by local communities;
- maximise local benefit from environmental assessment, construction and maintenance of marine and offshore infrastructure; and
- provide a sustainable energy supply to existing commercial businesses.

Justification

Argyll and Bute has a significant marine renewable resource and a long history of renewable energy development. This area therefore has a significant role to play in both the UK and Scottish Climate Change Programme targets for renewable energy.

The Council is committed to supporting a diverse range of renewable energy technologies at all scales and to encourage the development of emerging and new technologies. The council is likewise committed to the principles of sustainable development and, within that overarching framework, it will seek to maximise the environmental, economic and social benefits which can accrue to the development of renewable energy resources at all scales and in appropriate locations.

Within the context of that general encouragement, the council recognises its obligations to protect designated areas, species and habitats and the historic environment from inappropriate forms of development and to ensure impacts on local communities and other interests are satisfactorily addressed.

6.7.7 Recommendations

- A detailed resource assessment of Loch Etive for small scale tidal energy development should be undertaken in order to identify any opportunities available to local communities to benefit from marine renewable energy.
- The development of micro-renewable technology for tidal energy exploitation is encouraged.

6.8 Marine Science

6.8.1 Scottish Association for Marine Science

The Scottish Association for Marine Science (SAMS) is based at the Scottish Marine Institute, overlooking Dunstaffnage Bay. SAMS is one of the UK's leading independent marine research institutes employing around 140 staff. Research on climate change, marine renewable energy, sustainable use of the marine environment, mitigation of resource extraction, and the Arctic system, helps to guide policy, industry and other marine user groups. SAMS also delivers higher education, undertakes commercial research contracts, and is a learned society.

SAMS operates two wholly owned subsidiary companies: SAMS Research Services Ltd delivers commercial activities, while the European Centre for Marine Biotechnology is a business incubator facility that supports the growth of marine biotechnology companies.



Research, education, and commercial activities are supported by two research vessels with an array of field and sampling equipment, a diving centre, a modern aquarium, conference facilities, numerous well-equipped laboratories, a culture collection of microalgae and protozoa, an experimental artificial reef and a research library.

6.8.2 Dunstaffnage Marine Science Park

Highlands & Islands Enterprise is leading the development of a Marine Science Park at Dunstaffnage, which is estimated to bring up to 270 direct full-time high value jobs to the Argyll area through support to life sciences companies with growth potential.

6.8.3 Economic importance

The significant economic importance of Marine Science both locally and within Argyll and Bute is recognised in the Council's Economic Development Action Plan (EDAP). The EDAP includes a key priority to 'assist partners to progress their plans for the development of SAMS, UHI, the Marine Science Park and the proposed development of the wider Dunbeg area' under the Argyll Marine Science Initiative.

6.8.4 Scientific research in Loch Etive

Close proximity to the Scottish Marine Institute coupled with the unique fjordic nature of the loch, its large fresh water input, relative shelter and isolated upper basin make Loch Etive an important site for marine scientific research.

Loch Etive is of significant marine ecological interest because of the brackish-influenced and tide-swept communities and has seen a large amount of marine biological work from the late 1960s to the early 1990's, which has focussed on sediment and intertidal communities, brackish-tolerant populations of the starfish (*Asterias rubens*), Arctic relict species and fish populations.

Tralee Bay, in Ardmucknish Bay has been and continues to be an important study site looking at the ecology of fish populations, particularly flatfish.

The deep water of Loch Etive in the upper basin is isolated from adjacent coastal waters and has been

the focus of research looking at the processes of deep water renewal and its links to hypoxic (low oxygen) conditions. These relatively deep bodies of inshore water are also of significant geological value. Rapid sedimentation rates of sea lochs can provide large volumes of fine-grained sediments which have the potential to provide valuable high-resolution records of climate change both on a large scale, long term (thousands of years) and short term (annual and decadal) (Howe *et al.* 2002). Loch Etive has been the focus, therefore of research looking at post-glacial deposition and biogeochemical comparison of deep water sediments.

In addition there have been a range of other scientific studies focussing on physical processes (mixing, stratification, tidal exchange), phytoplankton growth, management of mussel species (*Mytilus*), and a SARF project¹⁷ which undertook a detailed sanitary survey of Loch Etive, discussed in more detail in section 5.5.3.

Some of this research work has used and continues to use key locations in the loch which would benefit from being safeguarded from future development or activities that may affect their future use. Such long-term research stations are not only important for science but can also be of benefit to the local users of the loch.

6.8.5 Other marine science work relevant to the Loch Etive ICZM Plan

There are a number of other research projects that have been considered during the development of this Plan and are referred to where appropriate in sections 5 and 6. Current projects of interest that have yet to report but will be considered in future revisions of the Plan include the following two SARF research projects:

- SARF053 - A systematic assessment of the environmental impact of Scottish shellfish farms, including benthos, water column and relevant special interactions; and
- SARF064 – *Mytilus trossulus*: managing impact on sustainable mussel production in Scotland.

6.8.6 Policy for Marine Science

The development of a specific policy for Marine Science was not deemed necessary and any future marine science developments or proposals for research in Loch Etive should consider the General Policies in Section 4 of the plan.

6.8.7 Recommendations

- Argyll and Bute Council should consider current and future scientific research projects that may be able to further inform the management and future use of Loch Etive and its surrounding coast.

Recommendations for future research to improve understanding and assessment of interactions between existing activities and the environment are included where appropriate under earlier individual activity sections.

¹⁷ Risk Factors Associated with Cultured Shellfish – Project SARF013 (www.sarf.org.uk)