Fish Survey Report and Stocking Advice for Loch Milton

(Loch a'Mhuilinn), May 2011

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Loch Milton (Loch a'Mhuilinn) Fish Survey Report

Survey Undertaken 21/05/11 by Jonah Tosney (Freshwater Fisheries Biologist, Wester Ross Fisheries Trust), Sam Brigdewater (Project Manager, Applecross Landscape Partnership Scheme), Donald McBeath (Applecross Angling Society) and David Abraham (Applecross Angling Society).

Background

This survey was commissioned by Applecross Landscape Partnership Scheme(ALPS) to establish the nature of the fish community in Loch Milton with a view to restocking the loch with brown trout, *Salmo trutta,* for angling purposes. The loch has been stocked with fish (probably brown trout) in the past (Bridgewater, 2011) and was last stocked with approximately 140 adult brown trout in 2009.

Loch Milton is a mesotrophic loch, an unusual habitat in north-western Scotland, and a UK Biodiversity Action Plan habitat. As such, consideration is given to the wider ecology of the loch.

Habitat

The loch is fed by groundwater and by small burns on the eastern and southern sides. Both the feeder burns are too small to support fish populations and there appears to be no suitable salmonid spawning habitat accessible from the loch. The outlet on the western side flows directly into the sea, is also very small and appears to be impassable to migrating fish moving upstream, meaning the loch is effectively a sealed system and natural recruitment is unlikely.

The substrate is a mixture of cobbles, boulders and silt and at the time of the survey aquatic vegetation covered approximately 25 – 35% of the surface area of the loch. Algal growth appeared to be minimal. The loch is shallow at the margins but deepens in the middle to depths greater than 1.5m.

Methodology

Four sites on the loch were surveyed usingElectracatch back-pack electro-fishing equipment. Each site was fished for 10 minutes and all catches recorded. Large areas of the loch were inaccessible due to water depth and silt depth, so coverage was low. A variety of habitats were surveyed and brief habitat descriptions of each of the four sites appear in Table 1, below. Any trout caught were anaesthetised using MS-222, measured and photographed. As only a single trout was caught and it was clearly too small to be of stocked origin no scale samples were taken as an age would have revealed little and the sampling would have distressed the fish unnecessarily.

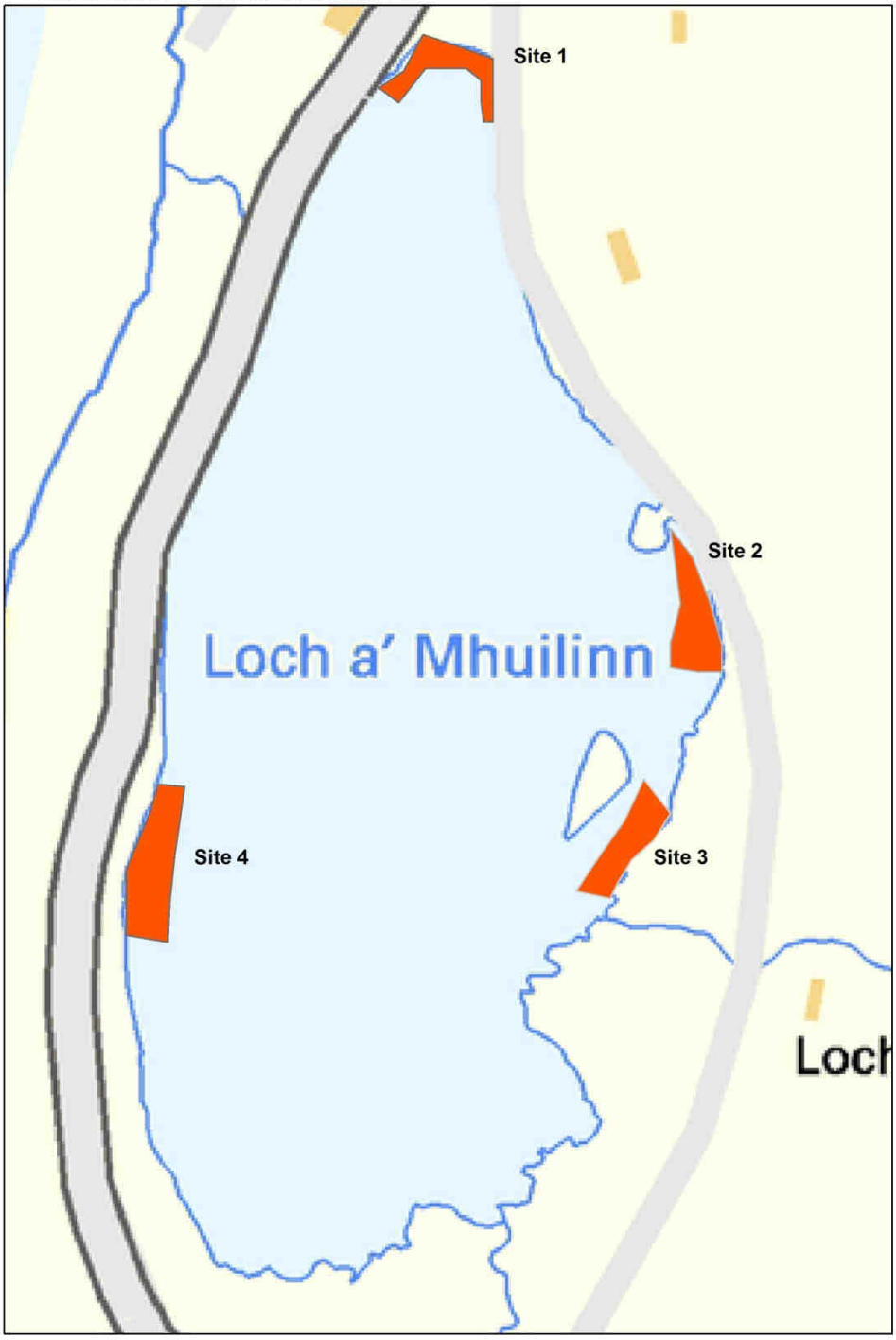
In addition to the fish surveys, invertebrate samples were taken using a kick net (1mm mesh) at various points around the loch to ascertain food availability and water quality.

Table 1: electro-fishing site characteristics

Site Number	Location	Depth of survey area	Habitat notes
1	Northern end	0 – 80cm	Cobble substrate, no vegetation, large amounts of wind-blown detritus
2	East bank	0 – 80cm	Silt and cobble substrate, 50% vegetation cover
3	East bank	0 – 80cm	Silt substrate, 50% vegetation cover
4	West bank	0 – 80cm	Silt and cobble substrate, 50% vegetation cover

Locations of the sites are shown in Figure 1, below.

Loch Milton Electro-fishing sites, 19/05/2011



Results

A summary of the fish caught at each site appears in Table 2, below.

Table 2: Fish captured at each survey site

Site	Fish Caught
1	1 brown trout (169mm) 1 eel (450mm approx.) Missed fish: 2 eels
2	0 fish
3	0 fish
4	0 fish

The single trout captured as well as the three eels were all amongst the wind-blown detritus at site 1. Large numbers of tadpoles were also present in this area, probably providing a good food source for both trout and eels. The trout, measuring 169mm, was smaller than those stocked in 2009 and presumably of wild origin. The fish appeared to be in excellent condition and was well-fed.

One eel was captured and two missed at site one, all between 200 and 500mm.

Figure 1: Brown trout captured at northern end of Loch Milton

Figure 2: Eel captured at northern end of Loch Milton

Fishing conditions were difficult at sites 2, 3 and 4 due to the depth of silt. Explorations of vegetated habitat revealed no fish, although this by no means proves fish were absent from these areas.

Macroinvertebrate surveys revealed excellent abundance and diversityin all accessible parts of the loch. The brief netting sample revealed at least 12 taxa. Finds are summarised in Table 3, below. The tadpoles present appeared to be both frogs and toads. No newts were found.

Table 3: Macroinvertebrate survey results

Taxa	Number of species found
Leech (*Hirudinae*)	1
Mayfly (*Ephemeropter*)	3
Cased caddis (*Trichoptera*)	3
Pond snail (*Mollusca*)	1
Water boatman (*Corixidae*)	1
Beetle larva (*Coleoptera*)	1
Damselfly larva(*Zygoptera*)	2

Conclusions and Management Recommendations

Trout and fish stocking

Although none of the 2009 stocked fish were found it is possible that some of these fish remain in the loch, as the majority of the loch was inaccessible for electro-fishing and the deeper, more heavily vegetated central areas appeared to provide excellent habitat and refuge.

The single brown trout found was smaller than the fish stocked in 2009, and therefore probably of wild origin. The feeder burns appear too small to support wild populations and the spawning habitat in them is of poor quality (silty substrate, little water even following rain) and juvenile fish cannot

migrate into the loch from downstream due to the proximity to the sea. The fish was possibly the offspring of the 2009 stocked fish which may have managed to spawn in the feeder burns or loch margins, although its size suggests it may be slightly older than this. No fry were found, so there does not appear to have been much successful spawning recently and it is unlikely that the populations in the loch will be self-maintaining.

Despite the lack of good spawning habitat the loch appears to be capable of supporting a number of adult fish if stocks are topped up to compensate for predation and natural mortality. Food appears to be available in large quantities and the diversity of the invertebrates should provide a supply throughout the year. The deeper, weedier areas provide excellent refuge and cover.

As the loch has been stocked frequently in the past and still supports trout and eels, further stocking is unlikely to damage the invertebrate fauna. However, as it is thought that the loch may contain a valuable invertebrate fauna it is recommended that a full invertebrate survey is undertaken prior to stocking and again one year after stocking and at regular intervals thereafter.

It is possible that stocked fish may escape through the outflow to sea and interact with local wild populations. For this reason it is recommended that stocked fish should be bred from broodstock sourced locally.

Around 140 adult trout were stocked in 2009, and this would seem a reasonable number for this size of loch. It is likely that a large proportion of these fish will perish each year, however the habitat should allow for a proportion to persist and grow. A larger number of fish would have a greater impact on the loch's ecology and limit the potential for growth of individual fish. Further stocking can be carried out as stocks decline and fishing success decreases, probably annually or bi-annually. Depending on the numbers of fish thought to be remaining in the Loch at the time of re-stocking, numbers required may be as high as the number of fish originally stocked.

Stocking permission

Permission to stock non-migratory fish must be sought from Marine Scotland
http://www.scotland.gov.uk/Topics/marine/Licensing/fishintros

As Loch Milton is not in a designated conservation area permission is not required from Scottish Natural Heritage, although they have expressed an interest in the loch due to its locally rare mesotrophic status .

Eels

Eels are currently suffering a major decline in Western Europe with numbers thought to have dropped by up to 95% in the past 25 years (Environment Agency data). As Loch Milton appears to support a number of eels, their conservation should be encouraged. This means ensuring the outlet remains passable to eels migrating both upstream and downstream and maintaining the vegetation in the loch which supports the invertebrates on which both the trout and eels feed. With this in mind, pores on the screen covering the outlet should be as large as possible whilst still preventing the escape of stocked adult trout and an eel ladder may be constructed to assist the passage of elvers and adults over the outlet screen. A 30 mm diameter pore size on the screen should allow the

passage of most eels and prevent the escape of larger fish. The screen should be made of an inflexible material to prevent entrapment.

Vegetation Management

Although a degree of vegetation management may become necessary to avoid the loch silting up and to allow easy fishing, a proportion of vegetation cover should be maintained to provide cover for fish and a food source for the invertebrates upon which they feed. At the time of survey the loch appeared to contain sufficient vegetation to meet the needs of the fish and invertebrates without hindering fishing efforts. The vegetation also has aesthetic value and provides a hiding place for possible giant trout to lurk.

As Loch Milton is a UK BAP habitat, the macrophyte community in the loch may be of conservation value, and therefore macrophyte surveys prior to and post stocking may be advised.