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## **Macroinvertebrate survey of Loch a' Mhuilinn, Wester Ross**

**July 2011**



## **Loch a'Mhuilinn (Loch Milton) Macroinvertebrate survey, 19/07/2011**

### **Introduction**

A survey of the macroinvertebrate fauna of Loch a' Mhuilinn was undertaken on 19 July 2011 to assess the invertebrate community of the loch prior to the loch being re-stocked with brown trout *Salmo trutta*. Loch a' Mhuilinn is a mesotrophic loch, an unusual habitat in north-western Scotland, and a UK Biodiversity Action Plan habitat. The loch has been stocked with trout intermittently in the past, although as there is no suitable spawning habitat it is unlikely that the trout populations will be self-sustaining. Between stocking events fish populations in the loch may be minimal, possibly allowing the development of a rich and diverse invertebrate fauna. A previous invertebrate survey of the loch was undertaken by Sandra Hogg of the Joint Nature Conservancy Council on 28 August 1986. The loch contains a variety of habitats including rocky and deep-silt substrates and extensive macrophyte beds (mostly *Juncus* and *Carex* spp.).

### **Methodology**

Invertebrate samples were taken using a kick / sweep net (1mm mesh, 500mm depth) in as wide a variety of habitats as possible for ten minutes at each of the sites shown in figure 1, below. Invertebrates were picked from the nets immediately and preserved in ethanol to be identified at a later date. The majority of invertebrates captured were identified to species level, mostly using the Freshwater Biological Association identification keys. For individuals which could not be identified to species level with certainty the highest taxonomic level possible was recorded.

Loch Milton invertebrate sampling sites, 19/07/2011



## Results

A total of 22 taxa were identified. In addition to the taxa captured adult great diving beetles and dragonflies were spotted but not captured in the surveys. A full list of the taxa captured appears in the table below.

Taxa	Common Name	Count	Percentage of Total
Chironomidae	Non-biting midge larva	5	3.4%
<i>Gerris lacustra</i>	Pond skater	2	1.4%
Daphnia	Water flea	1	0.7%
<i>Cloeon simile</i>	Lake olive	42	28.8%
Unknown ephemeridae	Mayfly	9	6.2%
<i>Centroptilum luteolum</i>	Small spurwing	1	0.7%
<i>Ischnara elegans</i>	Blue tailed damsel	5	3.4%
<i>Lymnaea peregra</i>	Wandering snail	1	0.7%
<i>Hydrodoma</i> spp.	Water mite	4	2.7%
<i>Athripsodes aterrimus</i>	Caddis	3	2.1%
<i>Glossiphonia complanata</i>	Leech	1	0.7%
<i>Potamopyrgus antipodum</i>	Jenkins' spire shell	13	8.9%
<i>Sialis lutaria</i>	Alderfly	5	3.4%
<i>Helobdella stagnalis</i>	Leech	1	0.7%
<i>Dytiscus</i> spp.	Diving beetle larvae	3	2.1%
Cladocera		1	0.7%
<i>Sphaerium</i> spp.	Orb-shell cockle	2	1.4%
<i>Polycentropus</i> spp.	Caddis	1	0.7%
<i>Cymatia bonndorffi</i>	Water boatman	5	3.4%
<i>Callicorixa praeusta</i>	Water boatman	2	1.4%
<i>Sigara scotti</i>	Water boatman	3	2.1%
Unknown corixidae	Water boatman	36	24.7%

The number of taxa recorded (22) was the same as that recorded in 1987. However, the make-up of the community varied slightly between the two surveys. Differences are shown in the table below. In both years the fauna was dominated by Corixidae and Ephemeroptera, the water boatmen and mayflies.

Taxa found in 1986 but not 2011 (no. found)	Taxa found in 2011 but not 1986 (no. found)
<i>Pisidium milium</i> (20)	<i>Gerris lacustris</i> (1)
<i>Pisidium nitidum</i> (?)	<i>Centroptilum luteolum</i> (1)
<i>Caenis horaria</i> (4)	<i>Ischnara elegans</i> (5)
<i>Haliphus</i> spp. (2)	<i>Hydrodroma</i> spp (4)
<i>Oulimnus tuberculatus</i> (11)	<i>Athripsodes aterrimus</i> (3)
<i>Tinodes waeneri</i> (16)	<i>Potamopyrgus antipodum</i> (13)
<i>Limnephilus rhombicus</i> (32)	<i>Sphaerium</i> spp. (2)
<i>Armiger crista</i> (1)	

As surveys of this nature are unlikely ever to identify the complete fauna, the presence or absence of the less abundant taxa found in small numbers in either survey cannot be interpreted. However, it is unlikely that taxa appearing in larger numbers in one survey were overlooked in another.

Of the trichoptera (caddis flies), both *Tinodes waeneri* and *Limnephilus rhombicus* were absent in 2011. Although the majority of trichoptera are univoltine (having a single year life cycle), as the 2011 sample was taken a few weeks earlier than the 1986 sample it is unlikely that all larvae of both species would have emerged and therefore not been present in the 2011 samples.

The mayfly *Caenis horaria* was also present in large numbers in 1986 but was not found in 2011. This species is bi- or multi-voltine and should be present in larval form throughout the year.

The most obvious change to community composition appears to have taken place amongst the molluscs. The invasive Jenkins spire shell, *Potamopyrgus antipodum* was abundant in 2011, but not recorded in 1986. Little information is available on this non-native species, originally from New Zealand, other than that it is now widespread in Europe and North America, and throughout the whole of the United Kingdom. No literature appears to be available on its impacts or control. *Pisidium* species, abundant in 1986, were absent in 2011, and it is possible that their niche has been occupied by the invasive spire shell, although no data can be found to support this hypothesis. Both the species found in 1986 (*P. milium* and *P. nitidum*) were noted as being scarce on the northwest mainland, while the nautilus ramshorn (*Armiger crista*), was noted as extremely uncommon on the north west coast. Only a single individual of this species was found in 1986 and none in 2011.

As in 1986, the samples in 2011 were dominated by the mayfly *Cloeon simile*. The second most populous taxa in both years were the corixidae (water boatmen). Both samples contained the same three species (*Sigara scotti*, *Cymatia bonsdorfii*, *Callicorixa praeusta*), although in both years it was not possible to accurately identify all individuals due to the size and developmental stage of the specimens and it is possible that further species may be present.

Very few zygoptera (damselflies and dragonflies) were found in either survey, which was surprising given the number of airborne adults encountered at the loch. Some of these species are univoltine and may not be found in the water in the summer months.

### **Conclusions and implications for management**

The disappearance of the native molluscs and appearance of the non-native *Potamopyrgus antipodum* may warrant further investigation as the molluscs which were not found in the 2011 survey were regionally rare and not known in any nearby lochs.

The lack of zygopteran larvae may be a result of the presence of the stocked trout, which may also explain the relatively poor water beetle populations in both years. The free-swimming corixidae were numerous in both surveys and would seem to be an obvious prey item for trout, although both *Sigara scotti* and *Cymatia bordsdorfii* are known to co-exist with fish populations (Savage, 1989).

The macrophyte beds are an important habitat for macro-invertebrates in the loch, and their management should allow for continued growth in appropriate areas.

As trout have been stocked into the loch at regular intervals in the past and as recently as 2009, it is unlikely that further stocking will have a serious impact upon macro-invertebrate populations, however annual or bi-annual sweep and kick netting may help gauge the effects accurately if stocking is to be continued, and would also record the progress of *Potamopyrgus antipodum*.

### **References**

Savage, A.A. (1989) *Adults of the British Hemiptera Heteroptera – A Key With Ecological Notes*. Freshwater Biological Association. Ambleside, UK.