

Loch a' Mhuilinn SSSI potential extension – dragonfly survey 2016





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RESEARCH REPORT

Research Report No. 1087

Loch a' Mhuilinn SSSI potential extension – dragonfly survey 2016

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RESEARCH REPORT

Summary

Loch a' Mhuilinn SSSI potential extension – dragonfly survey 2016

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Loch a' Mhuilinn; Odonata; survey; SSSI; potential extension; dragonfly; damselfly.

Background

Loch a' Mhuilinn Site of Special Scientific Interest (SSSI) lies on the north-west coast of Sutherland, 5 km south of Scourie. The site is of national importance for its woodland, lichens and the assemblage of dragonfly species.

An extension to this SSSI was suggested to the north, south and as far east as the A894. This report contains the results of the 2016 survey of the dragonfly assemblage within the potential extension area.

Main findings

- Twelve areas of suitable wetland habitat were identified within the potential extension area.
- Seven areas held at least one species of Odonata (dragonfly or damselfly).
- Eight species of Odonata were identified within the potential extension area.
- Proof of breeding was found for six of these eight species.
- The dragonfly assemblage within the survey area is typical of the north-west Highlands.

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1. INTRODUCTION

Loch a' Mhuilinn Site of Special Scientific Interest (SSSI) lies on the north-west coast of Sutherland, 5 km south of Scourie. The site is of national importance for its mixed deciduous woodland, the exceptional woodland lichen flora and the assemblage of dragonfly species. An extension to the existing SSSI has been suggested. This report gives the results of the 2016 survey of the Odonata (dragonflies and damselflies) found in the potential extension area.

Ten species of Odonata have been recorded within Loch a' Mhuilinn SSSI (Hewitt & Moran, 2002; Willet, 2011; Willet, 2020a). The dragonflies are the azure hawkler *Aeshna caerulea*, black darter *Sympetrum danae*, common darter *Sympetrum striolatum*, four-spotted chaser *Libellula quadrimaculata*, golden-ringed dragonfly *Cordulegaster boltonii* and common hawkler *Aeshna juncea*. The damselflies recorded are the emerald damselfly *Lestes sponsa*, large red damselfly *Pyrrosoma nymphula*, blue-tailed damselfly *Ischnura elegans* and common blue damselfly *Enallagma cyathigerum*.

2. METHODS

Surveying for upland species of adult insects is unpredictable due to rapidly changing weather conditions and very local weather systems. The techniques used in this survey have been developed in the field over the last ten years.

The combined adult and larval survey took place over two days during the best weather conditions in September 2016.

2.1 Order of site survey

The map of the suitable Odonata habitat on the site was analysed and an order of survey was devised. Twelve sites potentially suitable for Odonata were identified within the survey area. The numbering of the sites indicates the order in which they were visited. The first seven sites were visited, starting at Loch Duartbeg, in a roughly anti-clockwise direction.

2.2 Larval survey

Though weather is not a key consideration for larval sampling it is best to do it when it is not too cold, too windy or after or during heavy rain. Larval sampling took place when the temperature was 15°C or above, the wind speed was at or below force 4 and there had not been significant rainfall for three days. Most species' larvae had started emerging by June, so the ones caught when sampling were in the final larval stages and hence most straightforward to identify due to their size.

Larval sampling was undertaken by "guddling", this involves using a colander as a net and sweeping it through emergent vegetation, along the pool edge or along the pool's bottom. This is the tried and trusted Scottish larval sampling technique and is the most useful when dealing with pools with lots of sphagnum that tend to choke pond nets.

When approaching a pool, there is a hierarchy of survey actions to follow:

- Observe for any adult activity.
- Observe the edges of the pool and any marginal vegetation for signs of emerging adults or exuviae (the cast larval skin left behind after the emergence of the adult).
- Identify any exuviae and/ or emergent adults.
- Mark the site of any emergent adults to avoid them being damaged during the survey.

- Start larval sampling, until larvae are found or a maximum of twenty dips.
- Record all Odonata species as adult or larva, seen/ captured and any other readily identifiable species.

This was repeated for all the sites visited.

2.3 Adult survey

Although there was not a formal adult transect survey, a day was set aside for recording adults. Hence this took place during the best weather conditions available to the surveyor. Ideally these would include a temperature of over 17°C, very little wind and under 50 % cloud cover. These conditions did not occur during the study when the surveyor was available, so the survey was carried out on a sub-optimal day. High wind speed and significant cloud cover are the two key factors inhibiting adults flying if the temperature is over 15°C. These were not a factor on the survey date.

A suitable vantage point was identified at each of the survey locations allowing a view over potential basking/ perching sites and breeding pools. Ten minute watches with five minute breaks took place at various sites between 1100 and 1600.

2.4 British dragonfly society proof of breeding criteria

The criteria from Taylor (2003) were used to indicate the breeding status of the species recorded at a particular site.

Breeding is inferred if one of the following states is recorded:

1. Confirmed breeding: exuviae or larvae present or teneral (newly emerged) adjacent to suitable water body. To this I would add the presence of cast larval moult skins where they can be identified to a particular species. It should be noted that only the presence of an exuvia constitutes absolute proof that at least one specimen has completed a cycle from egg to adult at the site.
2. Probable breeding: pair copulating or female ovipositing or regular presence of both sexes at suitable water body (normally annual presence or a repeated period consistent with the species' life-cycle length).
3. Possible breeding: female seen at a water body suitable for the species where at least one male has been observed to be engaged in some form of reproductive behaviour, such as territoriality or pursuing females.

3. RESULTS

3.1 Habitat survey dates and weather conditions

10/9/2016. 16°C. 10 % cloud cover and a Force 2 wind.

11/9/2016. 15°C. 50 % cloud cover and a Force 3 wind.

In the west, the spring of 2016 had been very dry and sunny but with a persistent northerly wind. June was overall a fine month with some warm days until the third week when the weather broke. July and August was very changeable with many windy and rainy days with cool temperatures. There was an improvement in mid-August onwards, with the weather becoming sunnier, more settled and warmer.

3.2 Survey site descriptions

XLAM1

Loch Duartbeg. NC16643881. Altitude 10 metres.

Large loch with little emergent or floating vegetation.

XLAM2

Partially-drained wetland. NC16453839. Altitude 0 metres.

Area of wetland dominated by common reed *Phragmites australis*. A one metre-wide drainage channel extending across the site towards the sea. Water still held in the wetland and in the ditch.

XLAM3

Lochan. NC16713840. Altitude 30 metres.

Lochan with white water lily *Nymphaea alba* and other floating vegetation. Emergent vegetation at the centre but deeper water at the edges, little emergent vegetation there.

XLAM4

Lochan. NC16853839. Altitude 30 metres.

Shallow lochan with lots of emergent vegetation and some *Sphagnum* at the edge.

XLAM5

Drained Lochan. NC16913825. Altitude 20 metres.

Shallow lochan that has been lowered about a metre by a drain at the south end. It still holds water and had plenty emergent vegetation. It appears to have fluctuations in water level.

XLAM6

Roadside lochan. NC17373859. Altitude 70 metres.

Deep lochan with a small island to the south and an area of shallow outflow with lots of emergent vegetation. Some emergent vegetation round the edges including water lobelia *Lobelia dortmanna*.

XLAM7

Lochan. NC17543862. Altitude 70 metres.

Small lochan with infrequent emergent vegetation and steep sides. Most of the emergent vegetation is at the outflow at the west end.

XLAM8

Loch a' Chreagain Daraich. NC17003952. Altitude 20 metres.

Large loch with a small island at the east end and extensive shallow areas at this end. Steep sides around the rest of the loch. Regular level fluctuations and small areas of marginal and emergent vegetation.

XLAM9

Long narrow lochan. NC17193918. Altitude 70 metres.

Steep sides and very little marginal and emergent vegetation. Nearly all of this vegetation is at the outflow at the west end.

XLAM10

Bogbean lochan. NC17363910. Altitude 70 metres.

Small, shallow lochan with the largest area of bogbean *Menyanthes trifoliata* of any waterbody surveyed on this site.

XLAM11

Loch east of Sgeir a' Chait. NC16114047. Altitude 30 metres.

Steep sided loch with steep sides and very little marginal or emergent vegetation.

XLAM12

Rubha Gisgil Bog Pools. NC16474071. Altitude 50 metres.

Area of shallow, *Sphagnum*-choked bog pools that showed signs of having dried out completely over the summer. The only area of extensive bog pools in the survey area.

3.3 Results of 2016 species survey

Table 1. Species recorded at each survey site. b – Indicates proof of this species breeding. This included sightings of larva, exuvia (cast larval skins left behind after emergence of the adult) and pre-flight, recently emerged adults. A dot indicates only the adult stage was seen. Eight Odonata species were recorded with proof of breeding found for six.

Species	Present/ proof of breeding
Black darter	•
Blue-tailed damselfly	b
Common blue damselfly	b
Common darter	b
Common hawk	b
Emerald damselfly	•
Four-spotted chaser	b
Large red damselfly	b

3.4 Existing records on the NBN database in the study area and adjacent 10 kilometre squares

Table 2. Odonata recorded in adjacent 10 km squares. Note: all data comes from the NBN, the most recent of which were from 2015. NC13 is the 10 km square occupied by the potential extension to Loch a' Mhuilinn SSSI.

Species	NC14	NC24	NC03	NC13	NC23	NC02	NC12	NC22
Azure hawk				•	•		•	•
Black darter	•	•	•	•	•	•	•	•
Blue-tailed damselfly	•	•	•	•	•	•	•	
Common blue damselfly	•	•	•	•	•	•	•	•
Common darter	•	•	•	•	•	•	•	•
Common hawk	•	•	•	•	•	•	•	•
Emerald damselfly	•	•	•	•	•	•	•	
Four-spotted chaser	•	•	•	•	•	•	•	•
Golden-ringed dragonfly	•	•	•	•	•	•	•	•
Large red damselfly	•	•	•	•	•	•	•	•
Total	9	9	9	10	10	9	10	8

The number of species recorded in each 10 km square is much more down to recording effort than any habitat suitability issue, it is highly likely that all 10 km squares in this area will have at least ten species. On average a 10 km square in Scotland has nine recorded species of Odonata.

4. DISCUSSION

4.1 Species recorded

This survey found two fewer species than the Site Condition Monitoring survey at Loch a' Mhuilinn SSSI that took place earlier in the same year. That is not to say that the two species not found during this survey do not breed in the survey area. As the survey took place in September it was outwith the flight period of the azure hawk and at the end of that of the golden-ringed dragonfly. This could explain the lack of sightings of these adults. However, in suitable habitat larvae can be found at this time of year.

It is almost certain that the golden-ringed dragonfly does breed within the potential extension area as there is plenty suitable breeding habitat, namely small burns. Unfortunately, the larvae of the golden-ringed dragonfly are very difficult to find even in suitable habitat.

The azure hawk might breed in the potential extension area but the bog pool habitat that was found was not in good condition due to it having dried out earlier on in the summer. As the pools there are very shallow this looks like a regular annual occurrence during dry spells.

Overall the Odonata species found during this survey are widespread and common and represent the assemblage one would expect to find in the north-west Highlands.

4.2 Survey sites

The survey sites can be grouped into broad habitat types.

Loch – XLAM1, 8 and 11. These were all quite deep with steep sides that meant there was little aquatic marginal and emergent vegetation. This meant they were difficult to sample and find Odonata larvae but not poor habitat for Odonata.

Lochan – XLAM3, 4, 6, 7, 9 and 11. These small to medium-sized lochans were similar to the above only smaller. Any dense aquatic marginal and emergent vegetation only covered a small area at the outflow of the waterbody. XLAM3 and 10 were shallower had more emergent vegetation than the rest.

Drained Lochan – XLAM5. This lochan had been drained in the past but still held water though it was on the whole very shallow and had more evidence of water level fluctuations than the other lochans. It had a great deal of aquatic emergent and marginal vegetation and looked to be good breeding habitat for the golden-ringed dragonfly.

Partially-drained Wetland – XLAM2. This site had a long metre-wide drainage channel dug into it. However, the site was still wet and held standing water. The vegetation was dominated by dense reed bed and there was very little open standing water outside the drainage ditch.

Bog pools – XLAM12. This was the only area of bog pools found in the survey area. The *Sphagnum* moss in the pools looked to have dried out completely in the summer and much of it appeared to be dead. The pools themselves were shallow and marginal Odonata habitat. Unusually for the north-west Highlands, bog pools are not well represented in either the SSSI or the potential extension.

All survey sites are visible on the 1:25000 OS Explorer Map, they are marked as water bodies. Only XLAM12 is not marked as a wetland. The northern part of the potential extension does not have much wetland habitat.

No Odonata were found at four sites. Of all these survey sites, only XLAM12 was in poor condition, due to drying out. The other three sites XLAM3, 10 and 11 looked to be in good condition and Odonata are strongly suspected to breed there.

4.3 Site management recommendations

Aside from looking at damming the drained wetland and lochan (XLAM2 and 5 respectively) the other habitat on site is in good condition for Odonata. If tree cover increases on the site this will be unlikely to significantly impact the Odonata found there.

5. REFERENCES

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ANNEX 1: ODONATA RECORDS FROM THE SURVEY

Common name	Date	OS Grid Ref	Location	Site Code
Common darter	10/09/16	NC16733867	Loch Duartbeg	XLAM1
Common blue damselfly	10/09/16	NC16733867	Loch Duartbeg	XLAM1
Large red damselfly	10/09/16	NC16453839	Rubh' a' Mhucard	XLAM2
Emerald damselfly	10/09/16	NC16853839	Loch Duartbeg	XLAM4
Blue-tailed damselfly	10/09/16	NC16853839	Loch Duartbeg	XLAM4
Common darter	10/09/16	NC16853839	Loch Duartbeg	XLAM4
Large red damselfly	10/09/16	NC16853839	Loch Duartbeg	XLAM4
Four-spotted chaser	10/09/16	NC16913825	Loch Duartbeg	XLAM5
Large red damselfly	10/09/16	NC16913825	Loch Duartbeg	XLAM5
Common hawkler	10/09/16	NC16913825	Loch Duartbeg	XLAM5
Black darter	10/09/16	NC16913825	Loch Duartbeg	XLAM5
Emerald damselfly	10/09/16	NC17543862	Loch Duartbeg	XLAM6
Large red damselfly	10/09/16	NC17543862	Loch Duartbeg	XLAM6
Common hawkler	10/09/16	NC17543862	Loch Duartbeg	XLAM6
Common blue damselfly	10/09/16	NC17543862	Loch Duartbeg	XLAM6
Four-spotted chaser	10/09/16	NC17543862	Loch Duartbeg	XLAM6
Common blue damselfly	10/09/16	NC17373859	Loch Duartbeg	XLAM7
Four-spotted chaser	11/09/16	NC17003952	Loch a' Chreagain Daraich	XLAM8
Large red damselfly	11/09/16	NC17003952	Loch a' Chreagain Daraich	XLAM8
Blue-tailed damselfly	11/09/16	NC17003952	Loch a' Chreagain Daraich	XLAM8
Common blue damselfly	11/09/16	NC17003952	Loch a' Chreagain Daraich	XLAM8
Large red damselfly	11/09/16	NC17193918	Loch a' Chreagain Daraich	XLAM9

ANNEX 2: MAP OF THE ODONATA SURVEY SITES

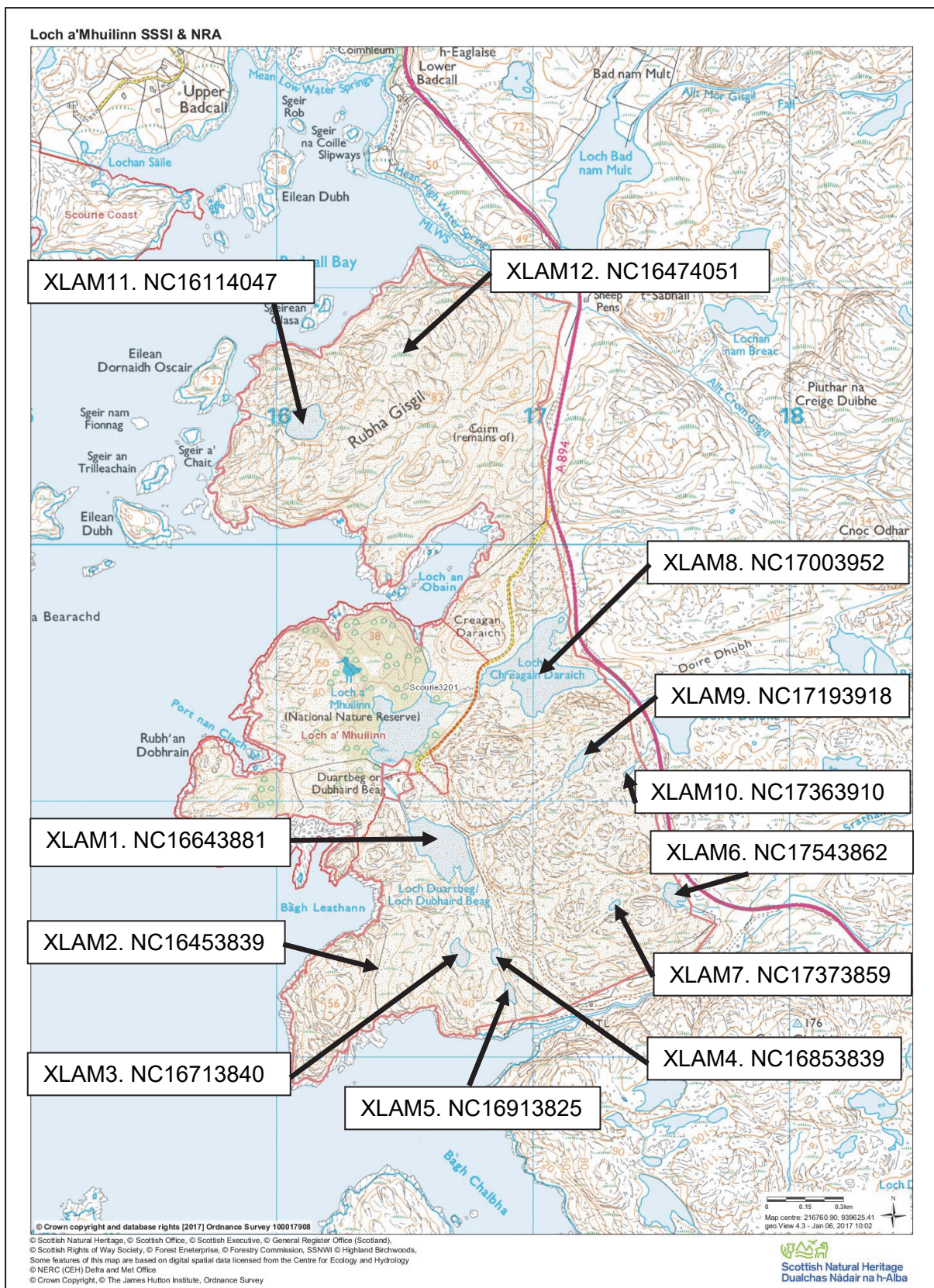


Figure 1. Map of the Odonata survey sites. © Crown copyright and database right 2017. Ordnance Survey 100017908.

ANNEX 3: PHOTOGRAPHS OF SURVEY SITES



Figure 2. XLAM1. 10/09/2016. NC16763870. Bearing 315°.



Figure 3. XLAM1. 10/09/2016. NC16763870. Bearing 0°.



Figure 4. XLAM2. 10/09/2016. NC16383828. Bearing 0°.



Figure 5. XLAM3. 10/09/2016. NC16723833. Bearing 0°.



Figure 6. XLAM4. 10/09/2016. NC16843832. Bearing 30°



Figure 7. XLAM5. 10/09/2016. NC16933832. Bearing 340°.



Figure 8. XLAM6. 10/09/2016. NC17493863. Bearing 135°.



Figure 9. XLAM9. 11/09/2016. NC17123907. Bearing 45°.



Figure 10. XLAM10. 11/09/2016. NC17343906. Bearing 45°.



Figure 11. XLAM11. 10/09/2016. NC16314050. Bearing 270°.



Figure 12. XLAM12. 11/09/2016. NC16434058. Bearing 0°.

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