



Alba Ecology Ltd.

**Freshwater pearl mussel and otter
survey of the River Dee at Old Brig' O'
Dee, Aberdeenshire**



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COMMISSIONED REPORT

Summary

FRESHWATER PEARL MUSSEL AND OTTER SURVEY OF THE RIVER DEE AT OLD BRIG' O' DEE, ABERDEENSHIRE.

Contractor: Alba Ecology Ltd

BACKGROUND

Scotland is a global stronghold for the freshwater pearl mussel *Margaritifera margaritifera*, a species which is now fully protected under the Wildlife and Countryside Act (1981) (as amended). It is also listed on Annexes II and V of the EC Habitats Directive (Council Directive 92/43/EEC) and Appendix III of the Bern Convention. Recent estimates suggest that Scotland holds an important proportion of the world's known remaining viable populations.

Historic Environment Scotland commissioned Alba Ecology Ltd. to undertake and report upon a freshwater pearl mussel and otter survey of a section of the River Dee, at Old Brig' O' Dee, (unsigned rear entrance to Balmoral Estate), Aberdeenshire. This request was prior to the commencement of work to repair damage to the bridge. The River Dee holds an internationally important population of the freshwater pearl mussel *Margaritifera margaritifera* and is designated as a Special Area of Conservation (SAC) for this species.

MAIN FINDINGS

- During May 2016 the River Dee at the Old Brig' O' Dee was surveyed using a standard methodology for the presence of freshwater pearl mussels.
- The majority of the area surveyed was wholly unsuitable for freshwater pearl mussels.
- No freshwater pearl mussels were recorded in the survey area.
- A survey of the use of this area by otters was also conducted at this time.
- No evidence of otter signs were recorded in the survey area.

The implications of these findings are discussed for the proposed work to be undertaken and brief recommendations made.

FRESHWATER PEARL MUSSEL SURVEY OF THE RIVER DEE AT OLD BRIG' O' DEE, ABERDEENSHIRE

1. INTRODUCTION

1.1 Objective

To undertake a riverbed survey of a small section of the south side of the River Dee at the Old Brig' O' Dee Bridge (unsigned rear entrance to Balmoral Estate) ca. NO 186 909 for the endangered freshwater pearl mussel *Margaritifera margaritifera* as well as a survey for the use of the area by Eurasian otter *Lutra lutra*. This was in order to facilitate repair work on the Old Brig' O' Dee without causing harm to any freshwater pearl mussels or otters and their resting places. In order to achieve this, surveys for freshwater pearl mussels and otters were considered necessary.

1.2 Background

Freshwater Pearl Mussel

During the past 100 years, the freshwater pearl mussel has declined throughout its Holarctic range to such an extent that it is now listed as an endangered species (IUCN 1991). Scotland is a major European and global stronghold for freshwater pearl mussels, with recent estimates suggesting that Scotland holds a large proportion of the world's known remaining viable populations (Cosgrove *et al.* 2000a; Young *et al.* 2001a). However, the species has declined in Scotland, with gross industrial and agricultural pollution, over-exploitation by pearl fishermen, decline in salmonid host stocks (the short parasitic larval stage of freshwater pearl mussel is entirely dependent upon salmon and trout fry) and physical river bed habitat degradation due to hydro-electric operations and small-scale river engineering works (Cosgrove *et al.*, 2000a; Watt *et al.*, 2015).

The freshwater pearl mussel is now fully protected under the Wildlife and Countryside Act 1981 (as amended). It is also listed on Annexes II and V of the EC Habitats Directive and Appendix III of the Bern Convention. The freshwater pearl mussel is listed under the UK Biodiversity Action Plan (BAP) as a 'Priority Species' requiring the implementation of a Species Action Plan dedicated to its survival (Biodiversity Steering Group, 1995).

Alba Ecology Ltd. was commissioned by Historic Environment Scotland to undertake and report upon a freshwater pearl mussel survey of an area of the River Dee, within a defined area of the southern side and bank of the river roughly twenty metres upstream and fifty metres downstream of the Old Brig' O' Dee. The information was required as works to repair areas of the bridge are due to take place. This requires work within the river which has the potential to damage any freshwater pearl mussels in the immediate area. The River Dee, which holds an internationally important population of freshwater pearl mussels, is designated as a Special Area of Conservation (SAC) for this species.

Freshwater pearl mussel habitat requirements

Freshwater pearl mussels are found in fast flowing rivers, with detailed studies on Scottish freshwater pearl mussel populations suggesting that optimum water depths of 0.3-0.4m and optimum current velocities of 0.25-0.75ms⁻¹ at intermediate water levels are most suitable (Hastie *et al.*, 2000). River bed substratum characteristics appear to be the best physical parameters for describing freshwater pearl mussel habitat. Freshwater pearl mussels prefer stable cobble/boulder dominated substrate with some fine sandy substrate that allows the mussels to burrow (Cosgrove *et al.*, 2000b). Adult and juvenile mussels tend to have similar habitat 'preferences', although adults are found over a wider range of physical conditions and juveniles appear to be more exacting in their requirements and

sensitivity to environmental disturbance (Hastie *et al.*, 2000).

Freshwater pearl mussels live buried or partly buried in the beds of clean, fast-flowing unpolluted streams and rivers and subsist by inhaling and filtering for the minute organic particles on which they feed (Cosgrove *et al.*, 2000b). Of specific importance to freshwater pearl mussel survival are levels of silt, suspended solids, calcium and chemical compounds generally associated with enrichment (eutrophication) i.e. nitrate, phosphate and biological oxygen demand (Bauer, 1983).

Freshwater pearl mussel host requirements

Freshwater pearl mussels have a short parasitic larval phase on the gills of suitable native salmonid host fish. The larvae (glochidia) of freshwater pearl mussel are very host-specific and can only complete their development on Atlantic salmon *Salmo salar* or brown trout *Salmo trutta*. Usually juvenile fish (fry and parr) are utilised (Young and Williams 1984). The presence of freshwater pearl mussels in any river therefore depends on salmonid host fish availability.

Otter

Otters are classed as European Protected Species (EPS) and are fully protected under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). This lists a number of offences in relation to otters and the places in which they live.

It is an offence to deliberately or recklessly:

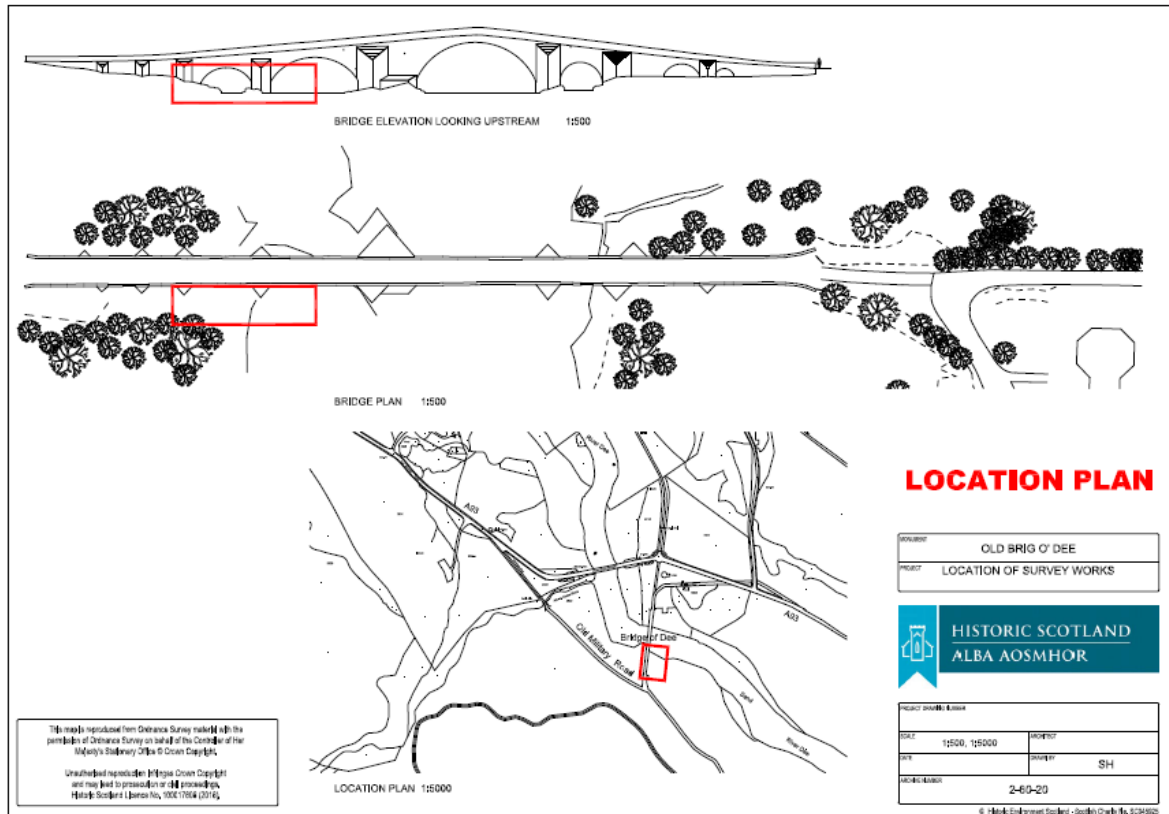
- capture, injure or kill an otter;
- harass an otter or group of otters;
- disturb an otter in a holt or any other structure or place it uses for shelter or protection;
- disturb an otter while it is rearing or otherwise caring for its young;
- obstruct access to a holt or other structure or place otters use for shelter or protection or to otherwise deny the animal use of that place;
- disturb an otter in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species; and
- disturb an otter in a manner that is, or in circumstances which are, likely to impair its ability to survive, breed or reproduce, or rear or otherwise care for its young.

It is also an offence to damage or destroy a breeding site or resting place of such an animal (note that this does not need to be deliberate or reckless to constitute an offence). Consequently, otter surveys specifically target searches for holts or any structures that could be used by otters for resting, shelter or protection.

2. METHODOLOGY

The following investigation was carried out with an appropriate Animal Conservation Licence (No: 46329) issued by Scottish Natural Heritage (SNH) under the terms and conditions of the Wildlife and Countryside Act 1981 (as amended). The survey area was indicated on a map produced by Historic Environment Scotland based on the maximum area they would use for this work (Figure 1)

Figure 1. Defined Survey Area at Old Brig' O' Dee



2.1 Freshwater pearl mussel

A team of experienced, licensed fieldworkers carried out the survey to optimise search efficiency and for Health and Safety reasons. The section of the River Dee concerned was entered and thoroughly searched for freshwater pearl mussels, where Health and Safety conditions allowed, using an adapted version of the standard methodology, as described in Cosgrove and Young (1998) and Young *et al.* (2001b) and recommended by SNH.

A general survey was made of the watercourse and its substrate by walking along the river bank and/or by wading in the water. The aim was to identify specific areas that are most likely to harbour mussels using information on their habitat preferences from previous studies and experience. Once this was complete a thorough survey of the southern section of river concerned (up to 20m upstream and 20m downstream of the bridge) was conducted walking back and forth both upstream and downstream of the bridge.

- Searches were made using a glass-bottomed viewing bucket;
- Viewing was conducted under favourable conditions i.e. bright light, clear water, low flows;
- Searches were made in water sufficiently shallow for safe wading;
- Searches were made in an upstream direction, checking favourable sites e.g. in the shelter of cobbles, boulders or overhanging banks;
- No disturbance of the river bed was required; and
- The substrate was recorded and classified using the standard Wentworth Scale (1922).

2.2 Otter

Surveys for potential otter signs included surveying riparian habitat looking for places they use for shelter or protection (such as couches, lying-up sites, or holts), or for signs of activity (such as slides or sprinting sites).

3. RESULTS

The River Dee by Old Brig' O' Dee was surveyed for freshwater pearl mussels in May 2016 by a team of highly experienced licensed surveyors comprising of Dr Peter Cosgrove and Donald Shields. Surveys were conducted during an extended period of suitable weather when the water levels were low and clear and the weather bright providing optimal surveying conditions. Otter surveys were also conducted at this time.

3.1 Freshwater pearl mussel

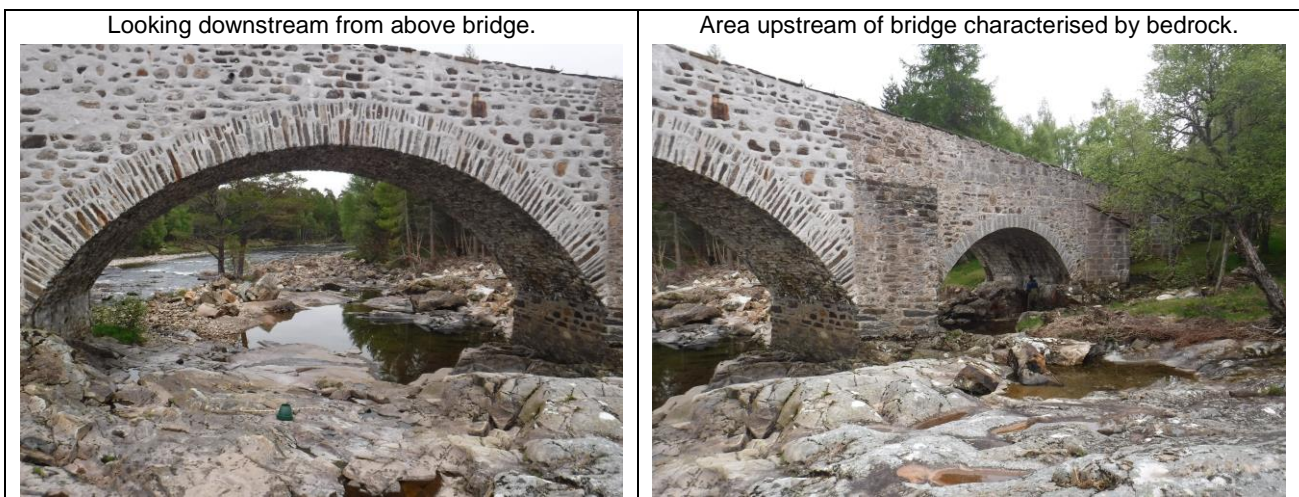
The River Dee is a large river running generally eastwards through a variety of different habitats from the Cairngorms. The southern bank at Old Brig' O' Dee was characterised by mixed native woodland. The section of the River Dee surveyed was wholly unsuitable for freshwater pearl mussels, based on insufficient, permanent flows and bedrock habitats. No freshwater pearl mussels were recorded within the surveyed area. Table 1 and Photos 1-2 provide a summary of the typical River Dee habitats at and around Old Brig' O' Dee.

Table 1. Typical River Dee at Old Brig' O' Dee habitat summary.

Reach surveyed		Substrate stability				Width	Depth	Land use	
Southern side of river.		Stable				35m	0.1m	Woodland	
	Bedrock	Boulder	Cobble	Pebble	Granule	C sand	F sand	Silt	Peat
Substrate	90%	5%	5%	-	-	-	-	-	-
Comments: Unsuitable and no flows, just stagnant pools within bedrock habitat under nearside bridge arch. No pearl mussels.									

+ = substrate type present but less than 5% cover.

Photos 1 & 2. Typical River Dee, Old Brig' O' Dee habitats.



3.2 Otter

During the otter survey, no signs or evidence of otter were recorded within the survey area.

4. DISCUSSION

The study area of the River Dee at Old Brig' O' Dee was unsuitable for pearl mussels, not containing permanent flows and substrates being bedrock dominated. All areas of potential bridge work were easily accessible and so fully surveyed. No live or dead pearl mussels were recorded within the survey area. The lack of suitable habitat in the study area surveyed indicates that this section of the river was unsuitable for freshwater pearl mussels.

The lack of any evidence regarding the presence of otters also suggests the Old Brig' O' Dee study area was unsuitable for resting otters.

Recommendations

As no pearl mussels were recorded within the survey area, and no evidence of otter use of the survey area was recorded; it is advised that there is no evidence of sensitive pearl mussel or otter habitats within the area where bridge repair work is planned.

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