SURVEY REPORT

FRESHWATER PEARL MUSSEL SHORE-BASED SURVEY

NORTH MUIRTON

RIVER TAY

05.12.2018 (Version 1)

PREFACE

This document is a report for ecological services to be carried out by the company.

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REVISION AND SIGN OFF

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EXECUTIVE SUMMARY

This report details the results of a freshwater pearl mussel survey undertaken on 20.11.2018 on behalf of Fairhurst in relation to plans to remove and replace an existing surface water outfall that has failed. The outfall is located at NO 11097 25871 on the south west bank of the River Tay approximately 2.75km upstream of Perth city centre.

Shore-based transects were carried out by two surveyors using bathyscopes to scan the riverbed for signs of freshwater pearl mussels from 150m downstream to 50m upstream of the proposed outfall. The riverbed is composed of a mix of natural and man-made boulders interspersed with cobbles, pebbles and coarse sand. There was little silt and the habitat was generally considered to be suitable for freshwater pearl mussels despite the strong current in places.

No evidence of freshwater pearl mussels was found during the survey. No direct impacts are predicted to freshwater pearl mussels as a result of the proposals. However, as freshwater pearl mussels are known to be present further downstream there is potential for any silt or other pollution run-off to negatively affect mussels downstream. Therefore a detailed Construction Method Statement (CMS) should be produced and implemented. The CMS should detail how silt run-off (and other pollutants) will be avoided and contained to prevent pollution of the river Tay both during construction and operation of the outfall.

An emergency procedure should be in place should a freshwater pearl mussel be encountered during operations. Details of other species encountered during this survey are in a separate report.

CONTENTS

1 PROJECT INFORMATION

1.1 SCOPE AND CONSULTATION

This report presents the results of a shore-based freshwater pearl mussel survey undertaken in November 2018. The survey work was undertaken on behalf of Fairhurst in relation to plans for the replacement of an existing surface water outfall that has failed. The survey of a stretch of river on the south bank of the River Tay to the north of Perth was requested by Scottish Natural Heritage (SNH) as freshwater pearl mussel are known to be present within the area.

1.2 SITE LOCATION AND DESCRIPTION

An outfall is to be installed on the south bank of the River Tay at NO 11097 25871 (figure 1). This section of the river is not tidal with steep grass banks on both sides. Scone Palace parkland borders the north east bank, while amenity grassland and footbaths follow the south west bank.

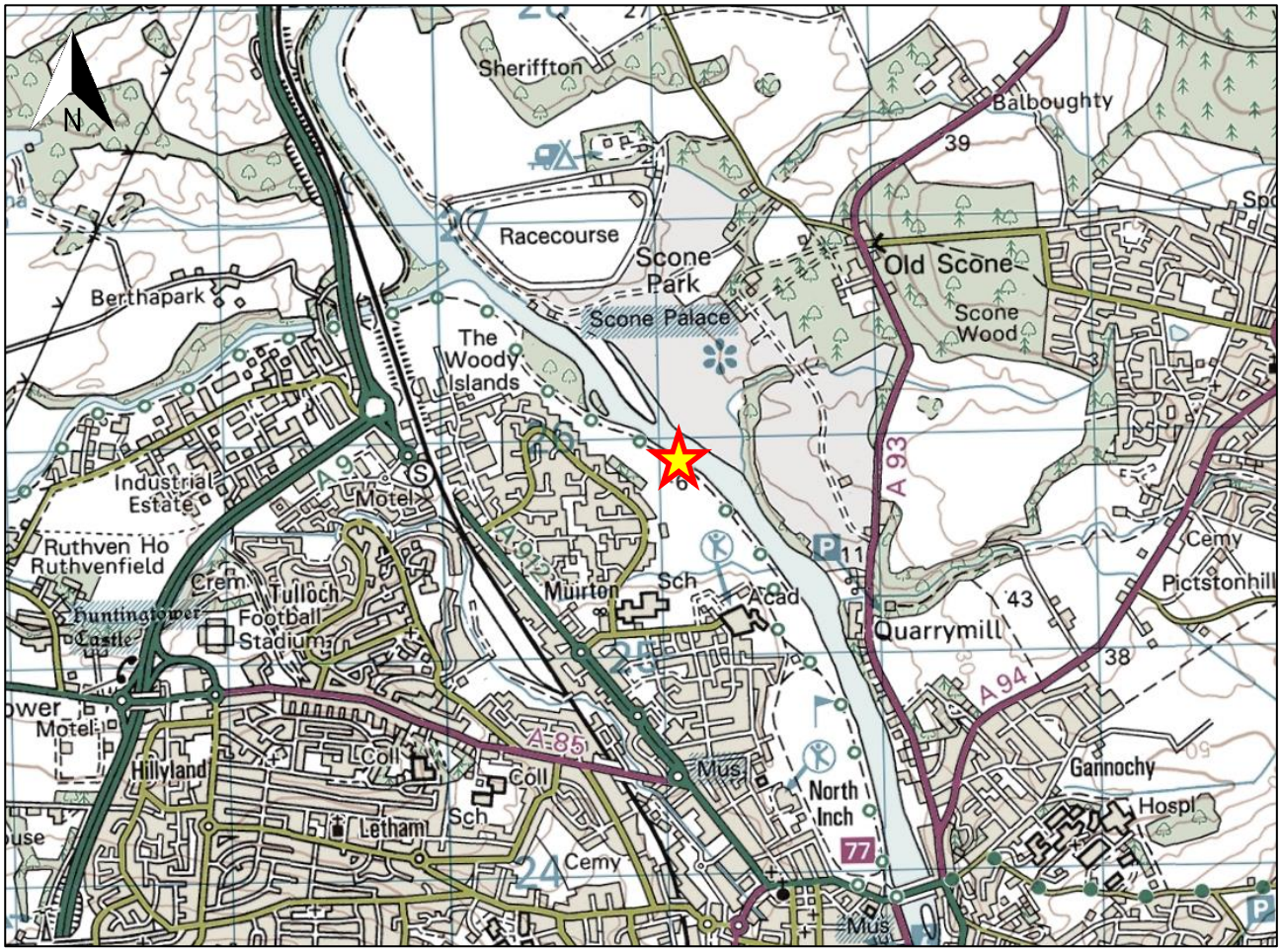

Figure 1: Site location indicated by yellow star - Contains OS data © Crown copyright and database right (2018)

1.3 RELEVANT LEGISLATION

This section of the River Tay is Part of the River Tay Special Area of Conservation (SAC) designated under the European Habitats Directive. The qualifying features of the SAC are Atlantic salmon, three species of lamprey (brook, river and sea), some freshwater habitat and otter. The SAC and its qualifying features are afforded special protection to ensure that development and other activities do not adversely affect the conservation objectives of the site. Details are provided in Appendix 1.

Freshwater pearl mussels receive full protection by their inclusion on Schedule 5 of the Wildlife and Countryside Act 1981 (as amended), meaning it is an offence to kill, injure, disturb or take specimens of this species or to damage or destroy habitat used by this species. If activities are likely to contravene the legislation, licences can be applied for to allow certain operations to proceed under certain conditions.

1.4 FRESHWATER PEARL MUSSEL ECOLOGY

The freshwater pearl mussel is endangered in every part of its range (Skinner *et al.,* 2003); and in many river systems populations no longer have any active recruitment and therefore could die out. Scotland holds some of the largest known remaining populations. Whilst originally the main threats to the species were freshwater pearl collection and industrial pollution, a host of other threats are now present, including river engineering (e.g. for hydro-schemes and flood defences), acidification, forestry operations and agricultural run-off, including chemical sheep dip (Young. *et al.,* 2000). Declines in migratory salmonids are also believed to be a contributing factor to freshwater pearl mussel population declines, as these fish are necessary for the mussels to complete their life cycle (the larvae, or 'glochidia', attach onto the gills of salmonids fish species during their early growth, before dropping off to settle on the substrate) (Skinner *et al.,* 2003).

Within the Tay catchment salmonid populations have been relatively stable in recent years, benefitting from catchment wide management to improve habitat for salmon and remove potential barriers to fish migration (Tay District Fisheries board 2017).

Freshwater pearl mussels need unpolluted, oligotrophic (low nutrient) rivers and streams, and are found within areas of fine gravel and coarse sand (often in the lee of boulders or cobbles), where the mussels partly or wholly bury themselves (Young. *et al.,* 2000).

Freshwater pearl mussels are a Scottish Biodiversity List Species and are listed on the Tayside Biodiversity Partnership Local Biodiversity Action Plan 2005. The species is considered to be critically endangered by the IUCN in Europe.

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2 SURVEY METHODS

2.1 SURVEY METHODS

2.1.1 SHORE BASED SURVEY FOR FRESHWATER PEARL MUSSEL

Shore-based survey for freshwater pearl mussel was undertaken along all accessible areas of the south west shore for 50m upstream of the outfall, and 150m downstream, using 50m transects (figure 2). This survey was conducted using the methods approved by SNH for freshwater pearl mussel transect surveys (Young *et al.* 2003). In addition, and intensive survey was undertaken in the area of the proposed outfall.

Using waders and bathyscopes, two surveyors worked in parallel, walking along the transects to scan the riverbed up to 2m either side of each surveyor. This allowed a strip of 7-9m from the riverbank to be intensively surveyed for evidence of live mussels or dead shells; details of riverbed habitat were summarised for each transect section.

Other species of note including otter signs and non-native invasive plant species were also recorded (reported separately).

Photo 1: Shore based survey for freshwater pearl mussel using bathyscopes

2.1.2 Survey limitations

The survey was limited to shallower areas of water up to c 1.5m accessible from the bank. A stretch of the river between NO 11138 25850 and NO 11166 25821 (around 40m) was unable to be surveyed due to deep water, and between NO 11138 25850 and NO 11127 25860 (figure 2)

Strong currents made venturing further than around 7m into the river channel too difficult.

2.1.3 SURVEY PERSONNEL

Survey work and reporting was managed and overseen by Redacted , Principal Ecologist. She is an experienced ecologist with 18 years' experience, a full member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and has an SNH freshwater pearl mussel survey licence. The main survey was undertaken by Beccy Osborn and Phoebe Shaw Stewart (Ecologist, GradCIEEM) on 20.11.2018.

Table 1: Survey times and dates

DATE	SURVEYORS	SURVEY TYPE	START / FINISH	WEATHER
20.11.2018	Redacted Redacted	Shore based freshwater pearl mussel survey	11:30 / 14:30	Rain: 1-2 Temperature: 7ºC Wind Speed: 1-2 CC: 6
Key: Rain = 0-4 (0 = dry); Temp = Temperature (ºC); WS = Wind speed - 0 (calm) 12 (hurricane); CC = Cloud cover (in eighths)				

3 RESULTS

3.1 DESK STUDY

3.1.1 DESIGNATED SITE SEARCH

Reference to the Scottish Natural Heritage Interactive Map indicates that there is a Special Area of Conservation (SAC) within 2km of the survey area as summarised in the table below. Although there are noted to be good populations of freshwater pearl mussels on the river Tay they are not a qualifying or notified feature for the SAC.

Table 2: Results of designated sites data search

PROTECTED AREA	DESIGNATION & LOCATION	STATUTORY INTEREST DETAILS
River Tay	Special Area of Conservation (SAC), the development site sits within this SAC.	Qualifying features include: Atlantic Salmon (*Salmo salar*) Brook Lamprey (*Lampetra planeri*) Clear water lakes or lochs with aquatic vegetation and poor nutrient levels Otter (*Lutra lutra*) River Lamprey (*Lampetra fluviatilis*) Sea Lamprey (*Petromyzon marinus*)
Key: SPA – Special Protection Area (EU level protection)		

3.1.2 FRESHWATER PEARL MUSSEL RECORDS

The River Tay is known to have good populations of pearl mussels. Surveys undertaken by Direct Ecology earlier in 2018 identified freshwater pearl mussels from around 4km downstream of the site and in 2016 around 3km downstream of the site. In 2018 DEL confirmed a small population of mussels within 1 km upstream.

3.2 SURVEY RESULTS

Details of the transects undertaken are provided in Appendix 2.

3.2.1 GENERAL

No freshwater pearl mussels were recorded during the survey. The habitat was generally considered to be suitable for freshwater pearl mussels, with some (limited) patches of sand and silt between areas of large boulders, cobbles and pebbles. Further into the central river channel it is thought likely that the strong currents might scour the riverbed reducing suitability for freshwater pearl mussels (photo 4). Close to the shore is evidence of anthropogenic disturbance with old wooden posts and frequent areas of concrete blocks.

The bankside vegetation is largely rough neutral grass along a steep-sided bank with very few trees and amenity grassland behind. On the opposite bank is Scone Palace parkland.

3.2.2 OUTFALL AREA

The area surrounding the proposed outfall was subject to a thorough survey on all sides and into the river channel as far as was possible. The water immediately in front of the outfall location was protected from the strong current by a slight curve in the bank just upstream (photos 2 & 3 & 6). The water was clear and the riverbed generally clear of silt. There were multiple large boulders, both natural and man-made (likely remnants of historic modification of the river in this area). Pebbles, cobbles and sand were found in between along with parts of bricks.

3.2.3 UPSTREAM OF OUTFALL

The river was surveyed for 50m upstream of the outfall location. The riverbed was similar to in front of the outfall, with fewer man-made boulders on average (photo 5). The current was strong for most of the length of the transect and the riverbed free from settled silt.

3.2.4 DOWNSTREAM OF OUTFALL

The frequency of man-made boulders present increased as the survey continued downstream of the outfall location. Historic records indicate that there was once an embankment in this area that would account for the presence of both concrete block and wooden posts found in the riverbed. Parts of the embankment appear to still be intact and allowed the surveyors to continue surveying very close to the bank in areas that were too deep to remain within the water. Parts of the transects in this section were subject to very strong currents even close to the bank. As with the other sections of the survey there was little settled silt on the riverbed and the substrate consisted of a mix of cobbles, pebbles and course sand in between the larger boulders (photos 7-9). Some areas of logs or other debris have led to small pockets of sand and silt being present (photo 8).

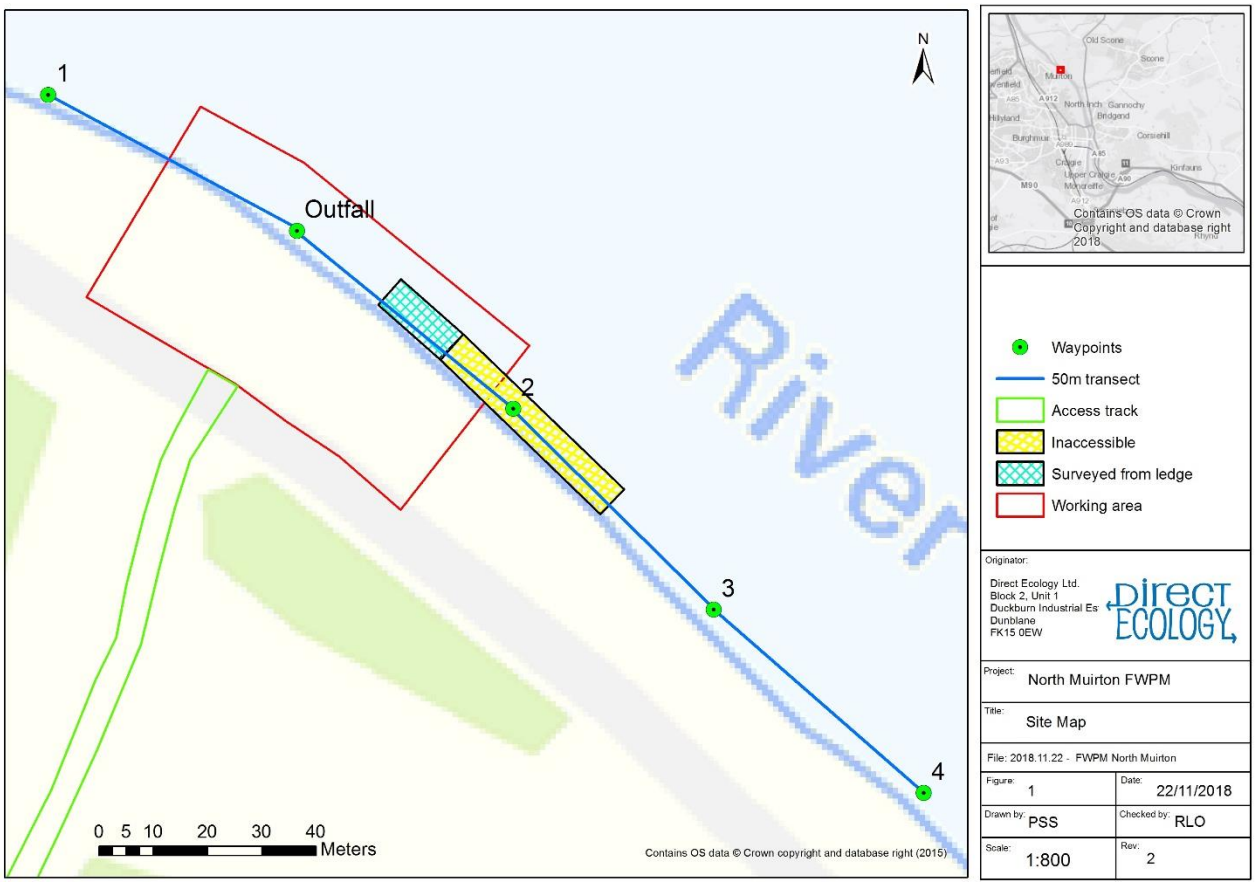

Figure 2: Site survey map with 50m transects

	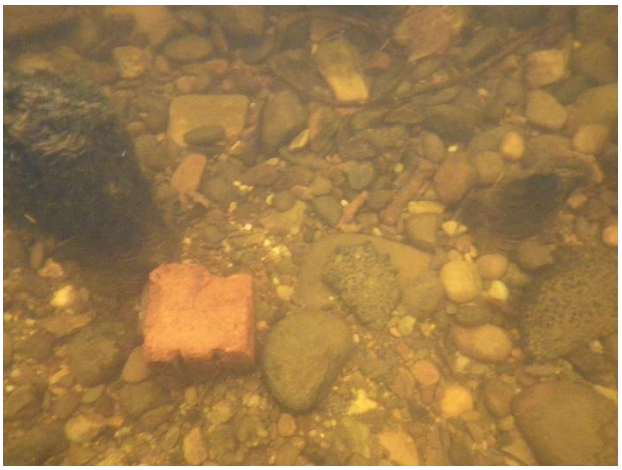
Photo 2: Shore near outfall location	*Photo 3: Riverbed at outfall location*
	
Photo 4: River Tay looking downstream	*Photo 5: Habitat at transect 1 (upstream outfall)*
	
Photo 6 River bed at outfall location	*Photo 7: River bed at transect 2 (downstream of outfall)*

	
Photo 8: River bed at transect 3	*Photo 9: River bed at transect 4*

4 IMPACTS AND RECOMMENDATIONS

4.1 INTRODUCTION

This section analyses potential impacts as a result of the proposed outfall works.

4.2 IMPACTS

No freshwater pearl mussels or dead shells were located on-site during the survey including within the area of works and it is therefore not anticipated that the works will directly impact upon freshwater pearl mussels

Although no freshwater pearl mussels were found mussels are known to be present downstream of the site and therefore there is potential for mussels downstream to be damaged due to silt run-off (or pollutants) from the construction of the outfall and any release of silt during operation of the outfall.

4.3 MITIGATION

A Construction Method Statement (CMS) should be produced and implemented. The CMS should detail how silt run-off during construction will be minimised and contained to prevent any entering the watercourse.

All works should be undertaken in accordance with best practice such as by using methods prescribed in Scottish Environment Protection Agency Pollution Prevention Guidelines, to ensure that the watercourses within and downstream of the site are not adversely impacted by the proposed works from silt, chemicals or debris. This includes (but is not restricted to):

- PPG 1: Understanding Your Environmental Responsibilities - Good Environmental Practices.
- GPP 2: Above Ground Oil Storage Tanks.
- GPP 5: Works and maintenance in or near water.

An emergency procedure should be in place should a freshwater pearl mussel, any other protected species or their resting site (e.g. active bird nest or otter holt) be encountered during operations. All work should cease in the area immediately and an ecologist should be consulted to determine any mitigation requirements i.e. suitable set-backs or buffer zones, and consultation with statutory bodies or licence applications if required.

No silt should be allowed to enter the river as a result of the works during construction or operation.

5 REFERENCES

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6 APPENDIX 1 – RELEVANT LEGISLATION

6.1 EUROPEAN PROTECTED SPECIES

European protected species are those that are protected by the EC Habitats and Species Directive 92/43/EEC. The Conservation (Natural Habitats, &c.) Regulations 1994 translates this European legislation into UK law. This has been amended in Scotland by The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 and 2007 and the Conservation (Natural Habitats, &c.) Amendment (No. 2) (Scotland) Regulations 2008. EPS includes bats (all species), otter, wildcat and great crested newt. These Regulations make it an offence to deliberately or recklessly:

- capture, injure or kill an EPS
- harass a wild animal or group of wild animals of EPS
- to disturb such an EPS while it is occupying a structure or place it uses for shelter or protection
- to disturb an EPS while it is rearing or otherwise caring for its young
- to obstruct access to a breeding site or resting place of an EPS or to otherwise deny an EPS use of a breeding site or resting place
- to disturb an EPS in a manner that is, or in circumstances which are, likely to significantly affect the local distribution or abundance of the species to which it belongs
- to disturb an EPS 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
- to disturb such an animal while it is migrating or hibernating

It is also an offence to:

- damage or destroy a breeding site or resting place of such an animal
- keep transport, sell or exchange or offer for sale or exchange any wild animal or plant EPS or any part or derivative of one (from 1st May 2007)

In relation to protected species of animal, licences can be issued under Regulation 44 to permit, for specific purposes, certain actions that would otherwise be against the law. Scottish Natural Heritage (SNH) is responsible for all EPS licensing under the Habitats Regulations (with the exception of some areas of licensing for whales and dolphins).

There is no provision for development licences as such, however, under Regulation 44 (2e) of the Conservation (Natural Habitats, &c.) Regulations 1994 licences may be granted for:

- Preserving public health or public safety or other imperative reasons of overriding public interest including those of a social or economic nature and beneficial consequences of primary importance for the environment.

However a licence will not be granted unless, importantly under 44 (3), the appropriate licensing authority is satisfied:

- That there is no satisfactory alternative; and

That the action authorised will not be detrimental to the maintenance of the population of the species concerned at a favourable conservation status in their natural range.

6.2 WILDLIFE AND COUNTRYSIDE ACT 1981

The Wildlife and Countryside Act 1981 provides protection to species and habitats. The Nature Conservation (Scotland) Act 2004 and Wildlife and Natural Environment (Scotland) Act 2011 amends the Wildlife and Countryside Act 1981 in Scotland.

6.2.1 SCHEDULE 5 ANIMALS

Enhanced protection is provided for species listed on Schedule 5, including red squirrel, water vole, pine marten and freshwater pearl mussel. It is an offence to recklessly kill, injure or take animals listed on Schedule 5, with the exception of water vole. Water voles are protected in respect of section 9(4) only (in Scotland), meaning that water vole habitat is protected, although the animals themselves are not.

It is also an offence to recklessly damage, destroy or obstruct access to any place used for shelter or breeding. Licences are available for development purposes if certain conditions are met. Applications for licences should be made to SNH.

6.3 RIVER TAY SPECIAL AREA OF CONSERVATION (SAC)

Designations date: 17 March 2005

Administrative area: Angus; Argyll and Stirling; Perth and Kinross; Stirling

Qualifying Interests for which the site is designated:

Lampetra fluviatilis	River lamprey
Lampetra planeri	Brook lamprey
Lutra lutra	Otter
Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and/or of the *Isoeto-Nanojuncetea*	Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels
Petromyzon marinus	Sea lamprey
Salmo salar	Atlantic salmon

6.3.1 CONSERVATION OBJECTIVES FOR RIVER TAY SPECIAL AREA OF CONSERVATION (SAC)

- To avoid deterioration of the qualifying habitat (listed below) thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and
- To ensure for the qualifying habitat that the following are maintained in the long term:
    - Extent of the habitat on site
    - Distribution of the habitat within site
    - Structure and function of the habitat
    - Processes supporting the habitat
    - Distribution of typical species of the habitat
    - Viability of typical species as components of the habitat
    - No significant disturbance of typical species of the habitat

Qualifying Habitat:

- Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels

To avoid deterioration of the habitat of the qualifying species (listed below) or significant disturbance to the qualifying species, thus ensuring that the integrity of the site is maintained and the site makes an appropriate contribution to achieving favourable conservation status for each of the qualifying features; and

- To ensure for the qualifying species that the following are maintained in the long term:
    - Population of the species, including range of genetic types for salmon, as a viable component of the site
    - Distribution of the species within site
    - Distribution and extent of habitats supporting the species
    - Structure, function and supporting processes of habitats supporting the species
    - No significant disturbance of the species

Qualifying Species:

- Atlantic salmon
- Brook lamprey
- Otter
- River lamprey
- Sea lamprey

8 APPENDIX 2 – SURVEY RESULTS

TN	NGR Start	NGR End	Pearl Mussels Found?	Photo no.	River width /m	Substrate type along transect (%)								Adjacent land-use types	Notes
						Silt	Fine sand	Course sand	Gravel	Pebble	Cobbles	Boulders	Bedrock		
1	NO 11067 25902	NO 11112 25877	No	1948 - 1956	100	0	<5	<5	5	5-10	30	50	0	Neutral grass, steep-sided banks with very few trees - only some small saplings. Scone Palace parkland to the north and amenity grassland to the south	Fresh otter spraint, grey wagtail and Himalayan balsam
2	NO 11112 25877	NO 11152 25844	No	1971 - 1986	105	0	5	5	10	20	10	50	0		Too deep at NO 11127 25860 (next to otter RUS with fresh spraint) - surveyed from ledge until NO 11138 25850
3	NO 11152 25844	NO 11189 25807	No	1966 - 1970	110	0	10	10	20	30	20	10	0		Too deep at NO 11166 25821
4	NO 11189 25807	NO 11228 25773	No	1957 - 1965	120	0	0	5	5	40	40	10	0		Occasional large concrete blocks historically added to river. Less modified from around 4-5m from bank. Suitable habitat for mussels.