



Technical Appendix 8.3

Fish Habitat Assessment Report

Walkover Fisheries Survey In Relation To The Proposed Euchanhead Renewable Energy Development In South West Scotland

(2019)



**Commissioned by
SLR Consulting Ltd**

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Cover photo: Impassable Culvert in the Euchan catchment

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1 Introduction

1.1 Background

The River Nith is a river of major importance as a salmon and sea trout fishery, and is the largest river in south west Scotland. The source is in Ayrshire and flows through Dumfriesshire, spanning approximately one hundred kilometres to its estuary in the Solway Firth, a total catchment area of 1200 square kilometres.

The annual catch of migratory salmonids is of significant economic importance to this rural area. An economic survey has been conducted and that revealed that the Nith accounts for £ 2.2 million being spent in the local economy (Leslie, 2000). There are net fishing interests in the estuarial reaches, with Haaf netting a commonly used method. There are a range of fixed nets on the western boundary, still within the Nith District Salmon Fishery Board area of jurisdiction. Angling is widespread over most of the main stem and some larger tributaries of The Nith. Net fishing and angling produced a joint catch of 630 salmon and grilse and 590 sea trout during 2018 (N.D.S.F.B., 2019).

1.2 Nith District Salmon Fishery Board (NDSFB)

The NDSFB is a statutory body constituted under the Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003, tasked with the management of migratory salmonid species within their catchment area. The Board is empowered to conduct works and execute measures to safeguard, improve and enhance stocks of migratory salmonids within its jurisdictional area. The NDSFB has no remit to manage non-migratory species other than with the permission of riparian owners and only where management of these species would be deemed to be in the furtherance of migratory species. Management of non-migratory species of fish within the Nith catchment is conducted by the Nith Catchment Fishery Trust who works closely with the Board. The NDSFB is active and works in areas of fisheries protection, restocking hatchery programmes, habitat restoration and predator control (NDSFB, 2019).

Salmon populations in the River Nith have dramatically reduced over the last decade. This phenomenon has been experienced right across the range that the species has throughout the north Atlantic region. Recorded catches of salmon in the Nith are down by approximately 80% and this is having a serious economic impact on the rural businesses that rely on the fishery. Unsurprisingly at this time of concern for salmon populations, managers and owners of salmon fishing are scrutinising any potential additional pressure on the resource and this brings into focus construction projects in parts of the catchment where salmonid species utilise as nursery areas. The reduction in salmon populations throughout Scotland is of such concern to the Scottish Government that they have categorised every river according to their ability to sustain populations of this species. The River Nith, had been assigned a Category 2 status for 2019, based on the recorded catch. The Category 2 status dictated that salmon numbers were sufficient to permit a limited harvest. However, the numbers of salmon have continued to reduce and accordingly the grading for the 2020 season has been assigned as Category 3. This means that no salmon harvest will be taken from the River Nith catchment for conservation reasons. It has never been more important than currently, to establish accurate fishery data and to monitor the potential impact that construction projects may have on those populations, to enable validation of mitigation measures employed to protect fish.

1.3 Euchanhead Renewable Energy Development

NDSFB have been commissioned by SLR Consulting Ltd on behalf of ScottishPower Renewables to conduct a walkover fisheries survey covering the watercourses within the general Site boundaries of the proposed Euchanhead Renewable Energy Development. The upper catchments of three major tributaries of the River Nith lie within the Site boundaries to the proposed Development, namely the Shinnel, the Scaur and the Euchan Waters. A tributary of the Water of Ken, the Polvaddoch Burn, is also located within the Site boundary. The construction of a renewable energy development of this nature/scale involves large scale earthworks at the preliminary stages of construction. Following the initial earthworks, borrow pits for the purpose of constructing road infrastructure to service the Site are also worked. Typically, road networks constructed across challenging terrain where windfarms are located involves traversing watercourses draining the hill tops. It is essential to conduct an audit of the habitats within these watercourses in order that the most appropriate mitigation can be put in place to protect those habitats and the species likely to be contained within, during the construction phase of the proposed Development. This audit can be conducted initially by means of a walkover survey. Three of the four main tributaries are generally known to contain salmonid and other species of fish, however the extent of these species reach into individual sub-tributaries is unknown.

1.4 Walkover Fisheries Survey

To conduct the walkover fisheries surveys, NDSFB utilised the services of their own experienced staff with the ability to recognise the habitats utilised by various species of fish at specific stages of their lifecycles. In cases where there was any doubt, the surveyors erred on the side of caution. It is important to understand the life cycle of the fish likely to be present in these upland watercourses. In the Euchan, Scaur and Shinnel waters there is the potential for Salmon and Sea trout to be present and/or their juveniles following their use of the watercourses as spawning/nursery habitats. Brown trout are likely to be present in the uppermost parts of sub-catchment watercourses, even upstream of barriers to migration. These fish can thrive in relatively small watercourses with their offspring eventually migrating downstream to find habitat and food. Eels are known to exist in some of the most remote watercourses in the River Nith catchment where the habitat is so limited that no other fish are present. This species does not require secure migration pathways as it has the ability to traverse over land to gain access to upland pools and small watercourses.

2 This Study

2.1 Aims

This study set out with the following aims:

- (a) To walk the watercourses within the boundaries of the proposed Euchanhead Renewable Energy Development to assess the available fisheries habitat. The survey was extended to a 250 m buffer on the western boundary of the proposed Development Site, where access permission had been granted.
- (b) To note any barriers to upstream fish migration discovered during the course of the walkover fisheries survey.

- (c) To note any signs of the presence of otters, water voles, crayfish and freshwater pearl mussels during the course of the walkover fisheries survey.
- (d) To note any non-native species found during the course of the walkover fisheries survey.
- (e) To report the findings of the walkover fisheries survey to SLR Consulting Ltd.

2.2 Methodology

The walkover survey comprised of the following components; 1) assessing the available fish habitat within watercourses to provide an indication of their ability to sustain fish populations, 2) assessing for barriers that would potentially prevent access to migratory species of fish, 3) assessing the presence of invasive non-native species, 4) noting any evidence of the presence of otters, water voles, crayfish and fresh water pearl mussels along the watercourses.

Fisheries surveys were carried out using habitat protocols developed by the Scottish Fisheries Co-ordination Centre (SFCC, 2007) and adapted from the Environment Agency's manual Restoration of Riverine Salmon Habitats – A Guidance Manual (Hendry and Cragg-Hine, 1997). See **Table 1** for habitat type classification. This method assesses the substrate within a watercourse according to its suitability for different age classes of fish. It also identifies any barriers to migration within the watercourse.

Photographs were taken of each watercourse showing the typical features at strategic points. All photographs are taken facing upstream.

Table 1: Habitat classification for walkover survey method

Habitat Type	Classification
Spawning gravel and silted spawning habitat	Stable gravel up to 30 cm deep that is not compacted or contains excessive silt. Substrate size with a diameter of 0.8 to 10.2 cm
Fry (0+) habitat	Shallow (<20 cm) and fast flowing water indicative of riffles and runs with a substrate dominated by gravel and cobbles
Parr (1+) habitat	Riffle – run habitat that is generally faster and deeper than fry habitat (0.2 – 0.4 m). Substrate consists of gravels (16 – 64 mm), cobbles (64 – 256 mm) and boulder (> 256 mm)
Mixed juvenile habitat	A mix of fry and parr habitat, suited to both age classes in combination – the deeper, faster, larger substrate areas used by parr, and the shallower, slower, smaller substrate areas used by fry
Glides	Smooth laminar flow with little surface turbulence and generally greater than 0.3 m deep
Pools	No perceptible flow and usually greater than 1 m deep Flow constriction Where physical features provide a narrowing of the channel resulting in increased velocity and depth (often combined with a localised increase in gradient and bedrock substrates)
Obstacles/Obstruction to migration	A structure or item identified as a potential obstruction to fish passage at certain water heights (e.g. impassable falls, weirs, bridge aprons, shallow braided river sections preventing upstream migration during low flows)

3 Discussion

Over previous years, NDSFB has conducted electrofishing within the Euchar, Scaur and Shinnel catchments. Whilst this data is not current it stands to corroborate the findings for this habitat survey. Where archive data is available this will be noted as Corroborated by Archive Fisheries Data (CAFD).

Please see **Table 2** for a list of watercourses surveyed and their overall status based on observations of fisheries habitat. All walkover surveys start and finish points are mapped for each catchment in **Appendix 1**. Photographs and a brief summary of each watercourse can be found below. A map showing locations of photographs can be found in **Appendix 2**. The points on the map relate to the photographs located in the following discussions. The points are identified by the numbers assigned to them in the report.

3.1 Euchar Water Catchment

The Euchar Water and its tributaries are suited to salmonid species of fish. The section of the main stem surveyed consists of habitats that would be utilised at various stages of salmonid lifecycles. Whilst the course of the river from its upper most section follows a slight gradient, it is heavily incised through its lower section with a number of falls and obstructions to fish migration. This limits the opportunity for migrating salmonids, salmon and sea trout, to travel upstream from the River Nith.

3.1.1 *Main stem Euchar Water - Lower section*

Survey code: EU01

This section starts upstream from the former water works and consisted of bedrock, very large boulders, fast moving riffles with very limited spawning potential. Potential habitat for parr/adult salmonids. (CAFD)



Photo 1: Euchar Water - Lower section looking upstream

3.1.2 Main stem Euchar Water – Mid-section

Survey code: EU02

The mid-section starts at Glenglass Bridge where the river is slightly wider. Velocity has decreased and the substrate consists a mix of habitats suitable for all stages of salmonid lifecycles. (CAFD)



Photo 2: Euchar Water - Mid-section looking upstream

3.1.3 Main stem Euchar Water – Upper section

Survey code: EU03

The Upper section of the Euchar Water starts at the forestry crossing within Eucharhead Forest. This section consists of suitable spawning substrate for salmonid species. Habitat at this location is also suitable for parr and fry aged salmonids. The source of the Euchar is located on the open hill above the commercial forest, above the limit of this survey. In this section the burn cuts through deep peat with water percolating in along the length of its course. Fisheries potential is limited, upstream from the forest. (CAFD)



Photo 3: Euchar Water – upper section looking upstream



Photo 4: Confluence of Euchar Water and Mid Grain Burn

3.1.4 Unnamed tributaries entering above water works

Survey code: EU04 (a and b)

EU04a – This tributary's course runs outside of the forestry plantation and flows down a steep hillside. When it reaches the public highway it flows through a culvert which will present an obstacle to fish migration. The confluence with the Euchar Water will also present a challenge to fish migrating upstream. The habitat in much of this tributary is suitable for salmonids. (CAFD)

EU04b – This tributary rises within the coniferous forest, thus limiting the habitat for fish. It is completely devoid of light in its upper reaches. The tributary is culverted under the public highway and the lower section has the potential to contain fish. Its confluence with the Euchar Water is chaotic with the water split into multiple channels depending on the height and flow. (CAFD)



Photo 5: Unnamed tributary (EU04a)



Photo 6: Unnamed tributary (EU04b)

3.1.5 Poltallan Burn

Survey code: EU05

The lower section of the Poltallan Burn has good fish habitat and the connectivity to the Euchar Water for fish migrating upstream is unimpeded. However, upstream from the forestry road, there are a number of obstructions for fish migrating upstream. Fish could be present in the section upstream of the obstructions. (CAFD)



Photo 7: Poltallan Burn – looking upstream from confluence



Photo 8: Impassable fall 50 m upstream from confluence

3.1.6 Slot Burn

Survey code: EU06

The lower section of Slot Burn, directly upstream from its confluence with Euchar, has good fish habitat with a mixture of gravels and cobble substrate. This section of watercourse with its mix of fishery habitats has the potential to contain salmonids at various stages of their lifecycle. The ford has been constructed with concrete railway sleepers which will prove difficult for fish migrating upstream. Upstream from the forestry road, the tributary runs through mature coniferous woodland which denies the tributary of light. (CAFD)



Photo 9: Slot Burn – ford at forestry track 15 m up from confluence



Photo 10: Upper Slot Burn

3.1.7 Dalmet Burn

Survey code: EU07

The Dalmet Burn has good fish habitat for all stages of salmonid development. This watercourse is culverted under the forestry road and this will undoubtedly prove challenging for migrating salmonids. The upper section of this watercourse has good fish habitat with the potential to contain fish. (CAFD)



Photo 11: Dalmet Burn – looking upstream from confluence



Photo 12: Dalmet Burn - Culvert at forestry road



Photo 13: Dalmet Burn – upstream of culvert

3.1.8 *Magheuchan Burn*

Survey code: EU08

Magheuchan Burn has good habitat for all stages of salmonid lifecycles consisting of mixed substrate, undercut bankings and draped cover. The culvert under the forestry road will create an impass for upstream migration. The instream habitat upstream of this culvert is of high quality however the upper section of the Magheuchan flows through thick coniferous forest with the associated shade. (CAFD). At the confluence of the Magheuchan and Euchar Water evidence of an otter slide was visible.



Photo 14: Magheuchan Burn – looking upstream from confluence



Photo 15: Magheuchan Burn - culvert at forestry road



Photo 16: Magheuchan Burn – upstream of culvert

3.1.9 Graystone Burn

Survey code: EU09

Graystone Burn has good salmonid habitat in its lower reaches for both fry and parr with a gravel/cobble substrate and undercut bankings. The culvert which conveys the burn under the forestry road will cause difficulty for migrating salmonids. (CAFD) Otter tracks were visible along the lower section of the Graystone Burn.



Photo 17: Graystone Burn - Looking upstream from confluence



Photo 18: Culvert at forestry track



Photo 19: Upstream of culvert

3.1.10 Rye Grain Burn

Survey code: EU10

Rye Grain Burn in its lower reaches has very good fish habitat for all stages of salmonid lifecycles. This burn has recently had a new culvert placed on its course, 30 m upstream from its confluence with the Euchar Water (no fish obstacle). In its uppers section fish habitat is limited by availability of suitable substrate and nearing its source, it consists of peat. (CAFD)



Photo 20: Rye Grain Burn – looking upstream from confluence



Photo 21: Recently installed culvert 60 m up from confluence

3.1.11 Mid Grain Burn

Survey code: EU11

Mid Grain Burn is a sizable tributary almost equivalent in size to the main stem Euchar at the confluence. Fish habitat is very good with a mix of cobble, pebble and gravel substrate suitable for all stages of salmonid lifecycles. At its source the Mid Grain Burn consists of many channels flowing through peat and usable fish habitat is present when the watercourse enters the forestry. (CAFD)



Photo 22: Mid Grain Burn – looking upstream from confluence



Photo 23: Upper Mid Grain Burn (open hill)

3.2 Ken Water catchment

The Polvaddoch Burn is a significant tributary of the Water of Ken, in turn a tributary of the Water of Dee. Migrating species of fish are faced with a number of obstacles to migration in the Dee/Ken catchment by virtue of the fact that this catchment has been harnessed for hydroelectricity generation with the associated dam infrastructure.

3.2.1 Polvaddoch Burn

Survey code: KE01

The Polvaddoch Burn is a tributary of the Ken Water catchment which consists of very good salmonid habitat with a mix of substrates suited to all stages of salmonid lifecycles. The burn has obstructions on its course such as the Irish Ford near Polskeoch and natural rock falls, however these do not appear significant enough to present an obstruction to fish. An obstruction at the forestry culvert near the top of the Polvaddoch Burn will present difficulty to migrating salmonids. The habitat upstream from the forestry culvert has the potential to sustain fish.



Photo 24: Polvaddoch Burn – looking upstream



Photo 25: Irish ford on Polvaddoch Burn



Photo 26: Culvert on forestry road – upper reaches

3.2.2 Pulmulloch Burn

Survey code: KE02

The lower reaches of the Pulmulloch Burn are well suited to a range of stages of salmonid lifecycles. However, a series of falls approximately 30 m upstream from its confluence with the Polvaddoch Burn would present an obstruction to upstream migration. The upper reaches of the Pulmulloch Burn most certainly have the potential to contain resident trout.



Photo 27: Pulmulloch Burn - Looking upstream from confluence with Polvaddoch Burn



Photo 28: Falls on Pulmulloch Burn – 30 m upstream from confluence

3.2.3 *Unnamed tributary*

Survey code: KE03

This was an unnamed tributary which entered the Polvaddoch between the Pulmulloch and the Fortypenny tributaries. This was a very minor tributary with the potential to contain salmonids to a limited degree. This tributary has the potential to dry out during spells of drought.



Photo 29: Unnamed tributary – looking upstream from confluence

3.2.4 *Fortypenny Burn*

Survey code: KE04

The lower section of the Fortypenny Burn has the potential to contain salmonid species. Substrate and instream habitat were suitable for juvenile/spawning stages, and undercut banks provided cover for parr aged or older salmonids.



Photo 30: Fortypenny Burn – looking upstream from confluence

3.2.5 *Pullosh Sikes*

Survey code: KE05

The lower section of the Pullosh Sikes was suitable for salmonid species of fish however, a fall located approximately 15 m upstream from its confluence with the Polvaddoch Burn will present an obstruction to upstream migration. Above this fall habitat was suitable to sustain small salmonids. The watercourse had another obstruction to fish migration where it was culverted by the forestry road.



Photo 31: Pullosh Sikes – looking upstream from confluence



Photo 32: Fall 15 m upstream from confluence



Photo 33: Culvert on forestry road



Photo 34: Upper section of Pullosh Sikes

3.2.6 Unnamed tributary of Polvaddoch Burn

Survey code: KE06

This tributary is a minor watercourse with the potential to contain trout in its upper section. Of significance, this tributary enters the larger Polvaddoch Burn by means of a major fall, thus denying access for fish migrating upstream.



Photo 35: Unnamed tributary – impassable fall 1 m upstream from confluence

3.2.7 Pot Burn

Survey code: KE07

The Pot Burn is a significant tributary of the Polvaddoch Burn with the potential to contain salmonid species at all stages of their lifecycles. Whilst the burn is culverted, those culverts have been well seated and accordingly do not present an obstruction to migration.



Photo 36: Pot Burn – looking up from confluence with Polvaddoch Burn



Photo 37: Pot Burn – culvert on new forestry road



Photo 38: Pot Burn – culvert at main forestry road



Photo 39: Upstream of top culvert

3.3 Scaur Water catchment

The Scaur catchment is considered to be one of the most prolific salmon producing areas on the River Nith system. There are no access obstructions for salmon migrating upstream from the River Nith and habitat in general terms is very good for all stages of salmonid lifecycles.

3.3.1 Scaur Water

Survey code: SC01

The section of the Scaur Water which was surveyed is suitable for salmonid species of fish at all stages of their lifecycles. Areas of substrate were suitable for spawning and there were no obstructions to upstream migrations within this section. (CAFD) Evidence of otter tracking was visible and presence of otter was confirmed by residents living in the area.



Photo 40: Scaur Water

3.3.2 Rashy Grain Burn

Survey code: SC02

This is a major tributary of the Upper Scaur Water. Excellent spawning material for salmonid species existed from its confluence with the Scaur and extended through a canalised section up to the public highway. The culvert at the public highway will prove difficult but not impassable to migrating species of fish. The upper section of the Rashy Grain consists of good salmonid habitat for a range of lifecycle stages.



Photo 41: Confluence of Rashy Grain Burn with Scaur Water



Photo 42: Dredged section of Lower Rashy Grain Burn



Photo 43: Rashy Grain Burn culvert at public road

3.3.3 *Black Burn*

Survey code: SC03

The Black Burn is a very minor tributary of the upper Scaur. Habitat for fish is limited in this tributary as it is deeply incised through peat. Fish could enter this tributary but would find limited opportunities to take up residence or spawning.



Photo 44: Confluence of Black Burn with Scaur Water

3.3.4 Unnamed tributary of Scaur Water

Survey code: SC04

This unnamed tributary of the Upper Scaur does have the potential to contain salmonid species of fish. Habitat exists for a range of stages of salmonid lifecycles and there are no obstructions to fish entering from the main stem Scaur Water.



Photo 45: Confluence of unnamed tributary with Polskeoch Burn



Photo 46: Public road culvert

3.3.5 Polskeoch Burn

Survey code: SC05

This watercourse is a major tributary of the Upper Scaur Water. It has a range of habitats suitable for salmonids. A number of natural rock obstacles exists on its course but none of these are considered to be completely impassable to migrating fish.



Photo 47: Upper Polskeoch Burn



Photo 48: Series of falls on Polskeoch Burn

3.3.6 Unnamed tributary of Polskeoch Burn at Corse Cleuch

Survey code: SC06

This is a minor tributary of the Upper Polskeoch Burn and whilst it is high in the catchment there appeared to be nothing to prevent fish entering and utilising the available habitat in the bed of this tributary.



Photo 49: Confluence of unnamed tributary with Polskeoch Burn

3.4 Shinnel Water Catchment

The Shinnel Water is a very good salmon/sea trout tributary of the River Nith. Excellent habitat extends over the length of this watercourse and its tributaries, however a limiting factor for upstream migration, particularly for large salmon, are the falls at Tynron in its lower reaches.

At the time of survey, torrential rain had swollen the watercourses in the Shinnel catchment and whilst this did not detract from our ability to survey the watercourses, we have used archive photographs of the lower section of Shinnel to provide best evidence of substrate presence for the purposes of this report.

3.4.1 *Shinnel Water/Fingland Burn*

Survey code: SH01

This watercourse has a diverse mix of salmonid habitats with fine gravels utilised for spawning, cobbled areas and pools for parr aged fish. This section of watercourse also has deep pools to facilitate resting adult fish at spawning times. The lower section lacks riparian cover but is more than compensated by the availability of instream cover. (CAFD)

The mid-section has very good habitat for salmonid species with larger substrate and riparian draped cover. There are no obstacles to migrating species of fish in this section of the Shinnel. (CAFD)

In the upper reaches of the Shinnel a considerable waterfall will present migration problems for ascending fish. Above this fall, the habitat is good for salmonid species of fish but their ability to migrate up and down the course will be impeded by a series of more minor falls and rock obstacles.

As the Shinnel enters its uppermost section it is referred to as the Fingland Burn. The watercourse is still significant at this section with the ability to sustain salmonid species of fish. Due to quantity and severity of the obstacles along the course these are likely to be resident brown trout.



Photo 50: Shinnel Water – downstream of Forestry Commission



Photo 51: Shinnel Water – Mid section



Photo 52: Waterfall on Shinnel Water



Photo 53: Shinnel/Fingland Burn upstream of waterfall

3.4.2 *Unnamed tributary at Patties Cleuch*

Survey code: SH02

Ascending up the Shinnel Water from Shinnelhead Farm, an unnamed tributary enters from Patties Cleuch. This is a minor tributary, that whilst it does consist of suitable habitat for salmonid species of fish, it is likely to all but dry up during drought episodes in the summer months. High gradient is likely to limit the opportunities for fish to reside in this watercourse.



Photo 54: Unnamed tributary at forestry culvert

3.4.3 Lamgarroch Strand

Survey code: SH03

Lamgarroch Strand is a significant tributary with the potential to contain salmonid species of fish. Substrate was suitable for a range of salmonid stages and riparian cover was appropriate for fish habitat. The forestry road culvert crossing will prove difficult for migrating fish to navigate.



Photo 55: Lamgarroch Strand at confluence



Photo 56: Lamgarroch Strand at forestry track culvert

3.4.4 White Burn and Unnamed tributary of White Burn

Survey code: SH04

White Burn consists of sections of watercourse which were suited to salmonid species of fish. However, this tributary of the Shinnel Water and its unnamed tributary have issues in fishery terms. The unnamed tributary runs near to the forestry road where active timber operations have been undertaken. To limit silt influx, silt netting/curtain has been placed across the watercourse, which will obviously create problems for migrating fish. The White Burn will prove difficult for fish to migrate into as at its lowest section where it converges with the Shinnel Water, a delta effect has evolved with the main course splitting and flowing between vegetation with no defined channel.

Signs of repetitive use of otter tracks were visible at the confluence of White Burn and the Shinnel Water.



Photo 57: White Burn at confluence



Photo 58: Silt traps on unnamed tributary of White Burn

3.4.5 Grain Burn

Survey code: SH05

Grain Burn is a significant tributary of the Shinnel Water and consists of its two tributaries the Nether Grain and Over Grain Burns. These watercourses do have suitable substrate and therefore habitat for salmonid species of fish. However their ability to migrate through these channels will be hampered by the presence of a series of obstacles typical on tributaries with such gradient decent in their upper sections. The lower section of the Grain Burn consists of the most suitable habitat for salmonid species of fish.



Photo 59: Grain Burn at confluence



Photo 60: Grain Burn at forestry track culvert

3.4.6 Lockerty Burn

Survey code: SH06

Lockerty Burn is a small watercourse converging with the Shinnel Water at its upper most section. This watercourse does consist of suitable instream cover and habitat for salmonid species of fish, however, their populations will be limited due to the presence of obstacles to migration lower down the catchment.



Photo 61: Lockerty Burn at confluence

3.5 Other species

Throughout the course of this walkover fisheries survey, NDSFB staff members remained vigilant for signs of water vole, otter, crayfish and freshwater pearl mussel. Evidence of the presence of otter was found over the course of this survey and is noted throughout the report at the various specific locations. No evidence of white claw crayfish or water voles was found over the course of this survey. NDSFB kept a watching brief for the presence of freshwater pearl mussel and whilst none of this species were found, habitat favoured by freshwater pearl mussels was present in most of the watercourses.

3.6 Non-native Invasive Species

The subject of non-native invasive species was high on the agenda of NDSFB surveyors throughout the course of this series of walkover surveys. It is acknowledged that the aquatic invasive species American Signal Crayfish are present in the Dee Ken catchment, part of which was subject to this walkover survey. American Signal Crayfish have the ability to cross land to get to adjoining aquatic habitats. Accordingly, due to the proximity of the Scaur catchment to the Ken catchment, a precautionary principle should be taken in biosecurity terms. At no stage were any this species found during our visual inspection.

The riparian invasive species, Himalayan balsam, was found to be present at the Shinnelhead Farm steading. At the time of survey the plants had withered but were still identified by NDSFB staff. No other aquatic or riparian invasive species were identified throughout the course of this series of walkover surveys.

4 Conclusions

This study concludes:

- That the walkover fisheries survey of the Eucharhead Renewable Energy Site has confirmed the presence of habitat that is suitable for sustaining salmonid species of fish in the Euchar Water, Shinnel Water, Scaur Water and Water of Ken catchments.
- That archive fisheries data on some of these watercourses proves the above statement for those watercourses.
- That fish are most likely present in some, and potentially present in other watercourses, in the vicinity of this proposed Development Site.
- That whilst potential obstacles to upstream migration of fish species were noted that habitat suitable for sustaining resident populations of fish existed above those obstacles.
- That the presence of inappropriately seated culvert pipes to convey watercourses under forestry track infrastructure is creating a major fishery impact over this survey area.
- That the non-native species of plant, Himalayan balsam, was found to be present in the Shinnel catchment during this walkover fisheries survey.

- That American Signal Crayfish are known to be present in the Ken catchment.
- That signs of otter were present in the Euchar, Scaur and Shinnel catchments.
- That no signs of water voles were found.

5 Recommendations

This study recommends:

- That in order that the findings of this walkover survey can be confirmed, a full series of electrofishing surveys are conducted in all watercourses with potential to be affected by the proposed Development pre-construction, should the Renewable Energy Development be consented, to provide accurate baseline fisheries information.
- That a comprehensive survey of instream aquatic environments within the parts of the Ken and Scaur catchments located within or adjacent to the Site be undertaken pre-construction should the Renewable Energy Development be consented, to establish the exact presence of American Signal Crayfish. Whilst the presence of American Signal Crayfish has only been confirmed in the Ken catchment, the proximity of this catchment to the Scaur catchment is so close and the ability of this species to travel over land dictates that there is a high potential that they could be present in the Scaur catchment.
- That cognisance be taken of the issue of inappropriately seated culverts if the Eucharhead Renewable Energy Development is advanced to planning.

6 References

Hendry, K. and Cragg-Hine, D. 1997. Restoration of Riverine Salmon Habitats. A Guidance Manual. Fisheries Technical Manual 4. Environment Agency, Bristol.

Leslie, T. 2002. The Economic Importance of Salmon Angling In Scotland: The River Nith to Dumfries and Galloway and The River Tweed to the Borders. University of Stirling.

Nith District Salmon Fishery Board, 2019. The River Nith District Salmon Fishery Board, Management Report And Review 2018 Season. Nith District Salmon Fishery Board, Dumfries.

Scottish Fisheries Co-ordination Centre, 2007. Habitat Surveys Training Course Manual. Scottish Fisheries Co-ordination Centre, Pitlochry.

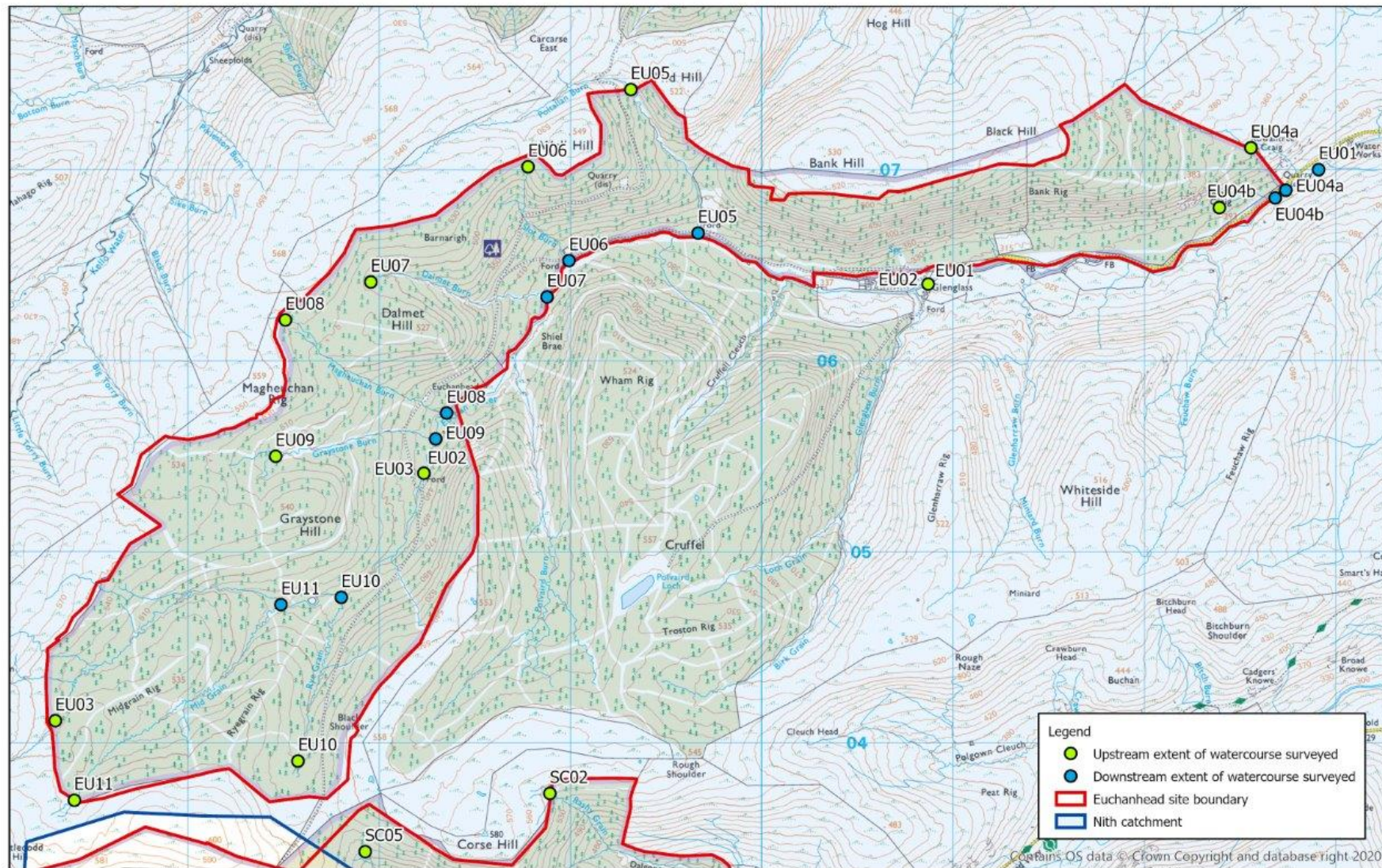
Table 2: Watercourses surveyed – Eucharhead Renewable Energy Development Fisheries Habitat Survey 2019

Watercourse	Survey code	Sub-catchment	Upstream grid ref	Downstream grid ref	Upstream Altitude (m)	Downstream Altitude (m)	Wet width (m)	Overall fish habitat grading
Euchar – Lower section	EU01	Euchar	270870 606401	272912 607001	326	285	9.0	Good
Euchar – Mid section	EU02	Euchar	268235 605410	270870 606401	429	326	10.5	Good
Euchar – Upper section	EU03	Euchar	266309 604114	268235 605410	548	429	4.6	Good
Un-named tributary	EU04a	Euchar	272557 607114	272739 606892	350	287	0.4	Poor
Un-named tributary	EU04b	Euchar	272392 606802	272685 606852	303	288	0.4	Poor
Poltallan Burn	EU05	Euchar	269317 607419	269668 606668	489	359	1.9	Good
Slot Burn	EU06	Euchar	268780 607014	268994 606523	513	385	1.0	Good
Dalmet Burn	EU07	Euchar	267958 606412	268879 606333	508	389	1.3	Good
Magheuchar Burn	EU08	Euchar	267512 606213	268355 605725	537	376	1.2	Good
Graystone Burn	EU09	Euchar	267460 605499	268296 605590	504	420	1.0	Moderate
Rye Grain Burn	EU10	Euchar	267578 603904	267804 604760	560	459	1.4	Good
Mid Grain Burn	EU11	Euchar	266408 603699	267489 604723	559	473	1.6	Good
Polvaddoch Burn	KE01	Ken	266169 603112	267708 601242	583	316	4.7	Excellent
Polmulloch Burn	KE02	Ken	268322 601342	268318 601622	369	339	3.0	Good
Unnamed tributary	KE03	Ken	268620 601348	268388 601677	415	337	0.3	Poor

Table 2 continued: Watercourses surveyed – Eucharhead Renewable Energy Development Fisheries Habitat Survey 2019

Watercourse	Survey code	Sub-catchment	Upstream grid ref	Downstream grid ref	Upstream Altitude (m)	Downstream Altitude (m)	Wet width (m)	Habitat grading (salmonids)
Fortypenny Burn	KE04	Ken	269125 600810	268408 601804	454	342	1.5	Moderate
Pullos Sikes	KE05	Ken	267409 601909	267934 602174	485	390	1.3	Poor
Unnamed tributary	KE06	Ken	267431 602006	267796 602246	470	401	0.8	Poor
Pot Burn	KE07	Ken	266582 602426	267610 602389	525	416	1.1	Moderate
Scaur Water	SC01	Scaur	268448 602113	270038 602675	355	345	1.7	Excellent
Rashy Grain	SC02	Scaur	268894 603734	269711 602673	540	343	1.2	Excellent
Black Burn	SC03	Scaur	269511 601752	269467 602528	440	347	0.4	Poor
Unnamed Tributary	SC04	Scaur	269225 602830	269462 602533	412	347	0.7	Poor
Polskeoch Burn	SC05	Scaur	267928 603430	269333 602474	502	347	1.3	Good
Corse Cleuch	SC06	Scaur	268508 603173	268272 602951	491	418	0.3	Poor
Shinnel/Fingland	SH01	Shinnel	269526 599313	274291 598240	501	234	4.4	Excellent
Unnamed Tributary	SH02	Shinnel	272731 599264	272726 595261	402	283	0.2	Poor
Lamgarroch Strand	SH03	Shinnel	271888 598707	272538 599377	475	289	1.4	Good
White Burn	SH04	Shinnel	271697 599053	272422 599491	489	288	0.8	Poor
Grain Burn	SH05	Shinnel	270331 599206	271597 599949	537	307	1.6	Moderate
Lockerty Burn	SH06	Shinnel	270090 600477	270733 600197	452	359	1.0	Moderate

Appendix 1, Map 1: Walkover Fisheries Survey – Reach of watercourses surveyed in the Euchar catchment

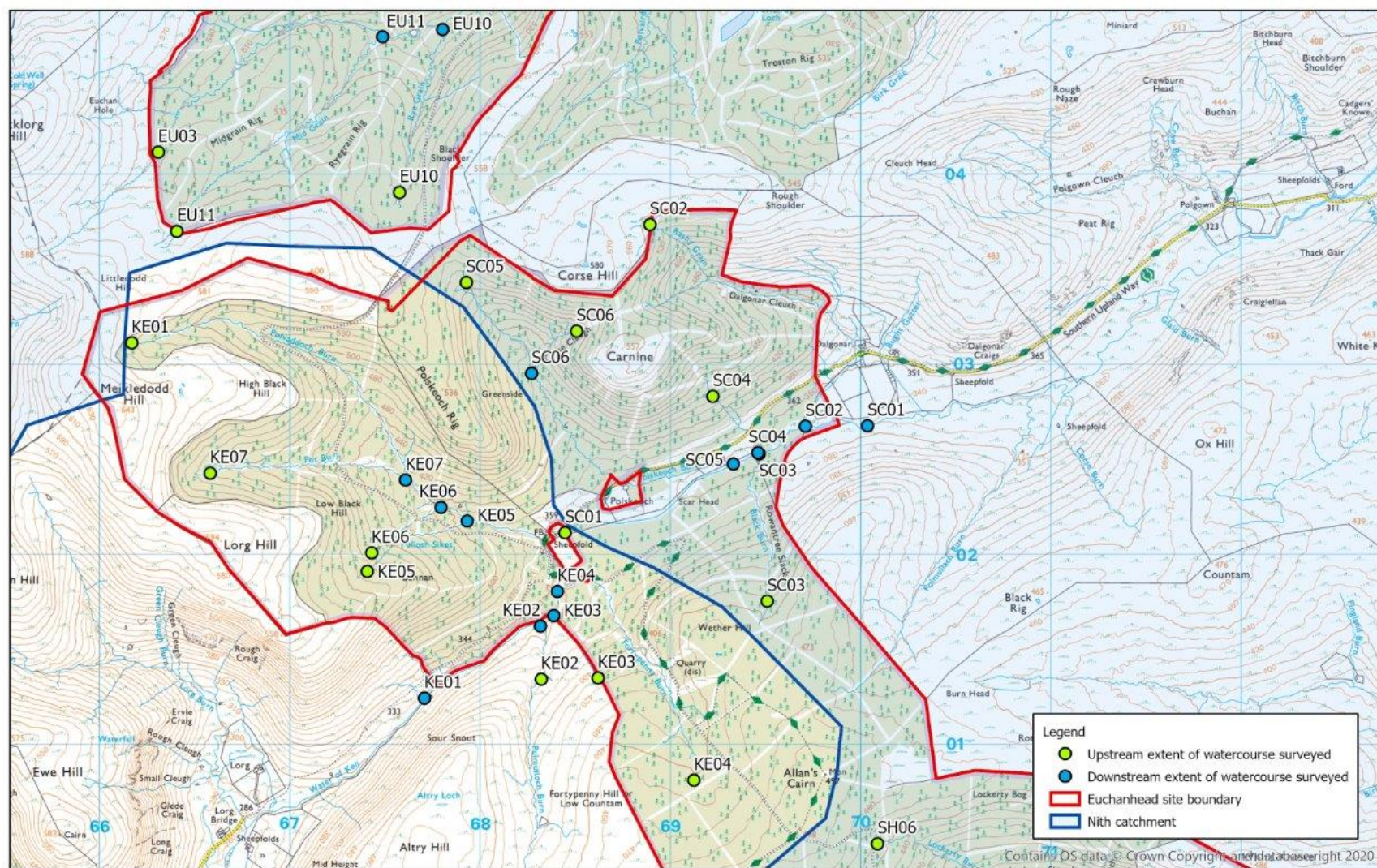


Eucharhead Renewable Energy Development
Fisheries Walkover Survey
Euchar Catchment

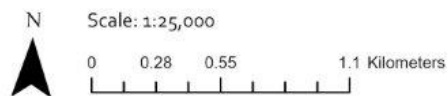


Scale: 1:25,000
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Appendix 1, Map 2: Walkover Fisheries Survey – Reach of watercourses surveyed in the Ken and Scaur catchments



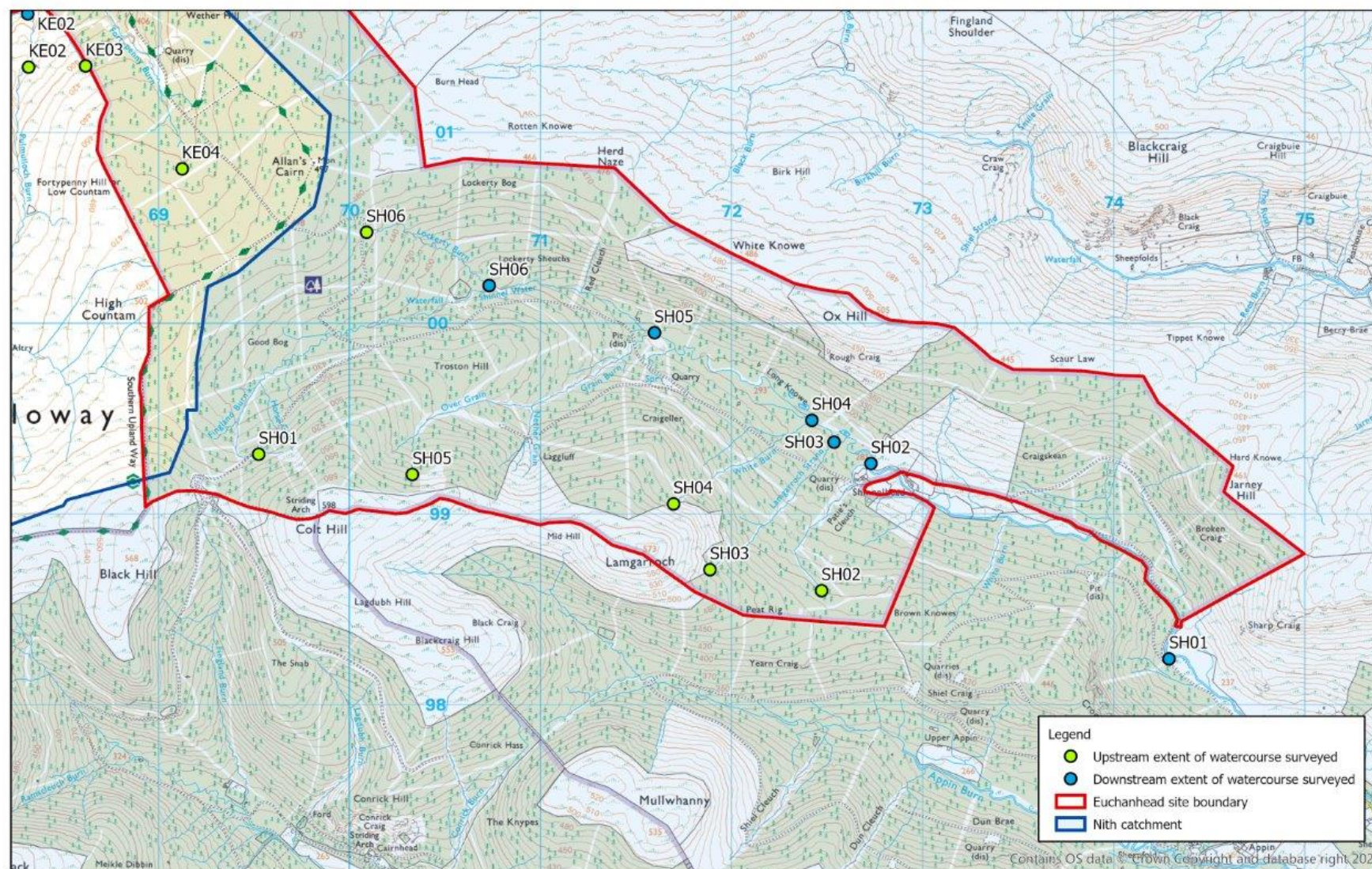
Euchanhead Renewable Energy Development
Fisheries Walkover Survey
Ken and Scaur Catchment



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Appendix 1, Map 3: Walkover Fisheries Survey – Reach of watercourses surveyed in the Shinnel catchment



Eucharhead Renewable Energy Development
Fisheries Walkover Survey
Shinnel Catchment



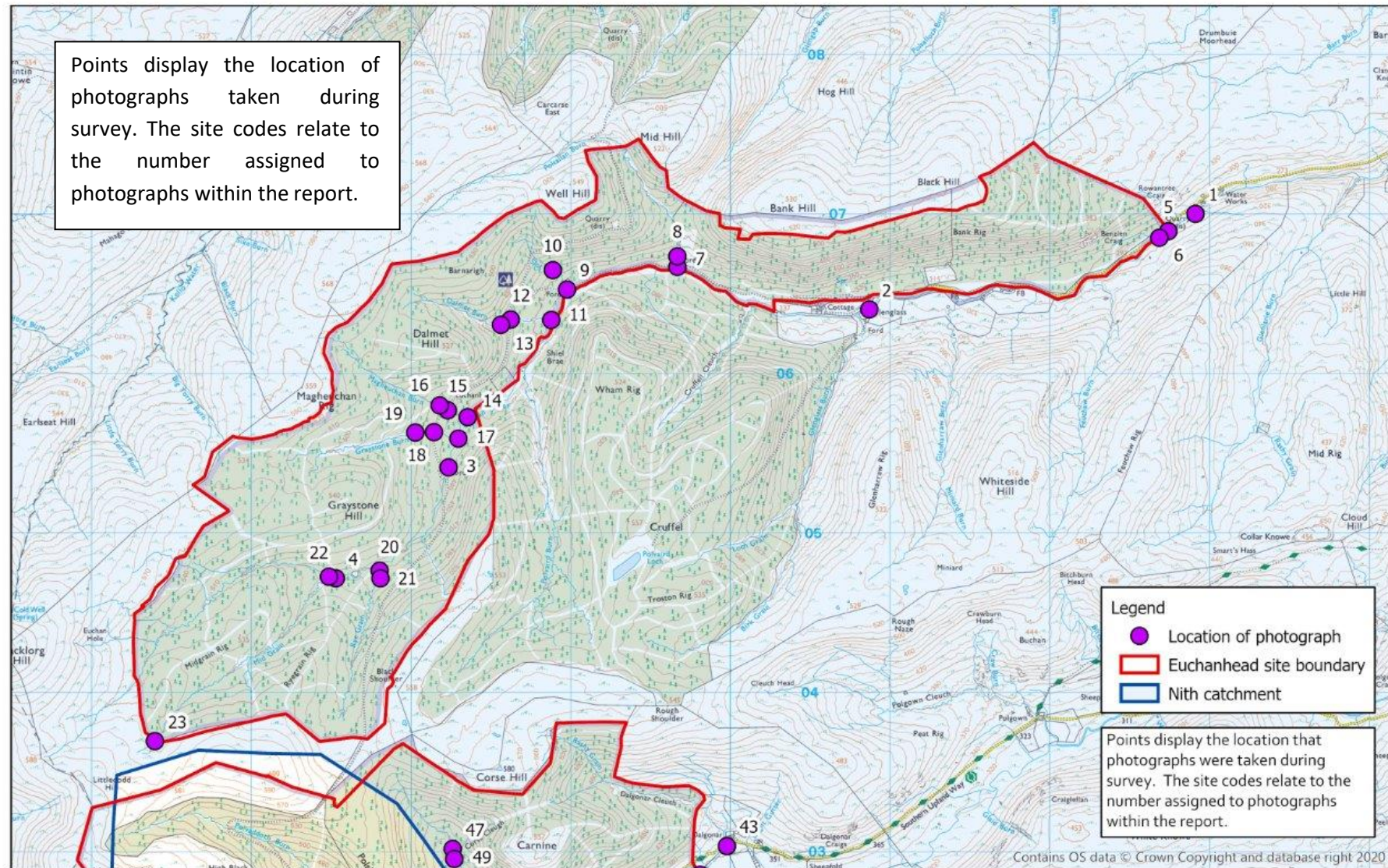
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Appendix 2, Map 4: Map of Photograph locations – Euchan catchment



Eucharhead Renewable Energy Development
Fisheries Walkover Survey



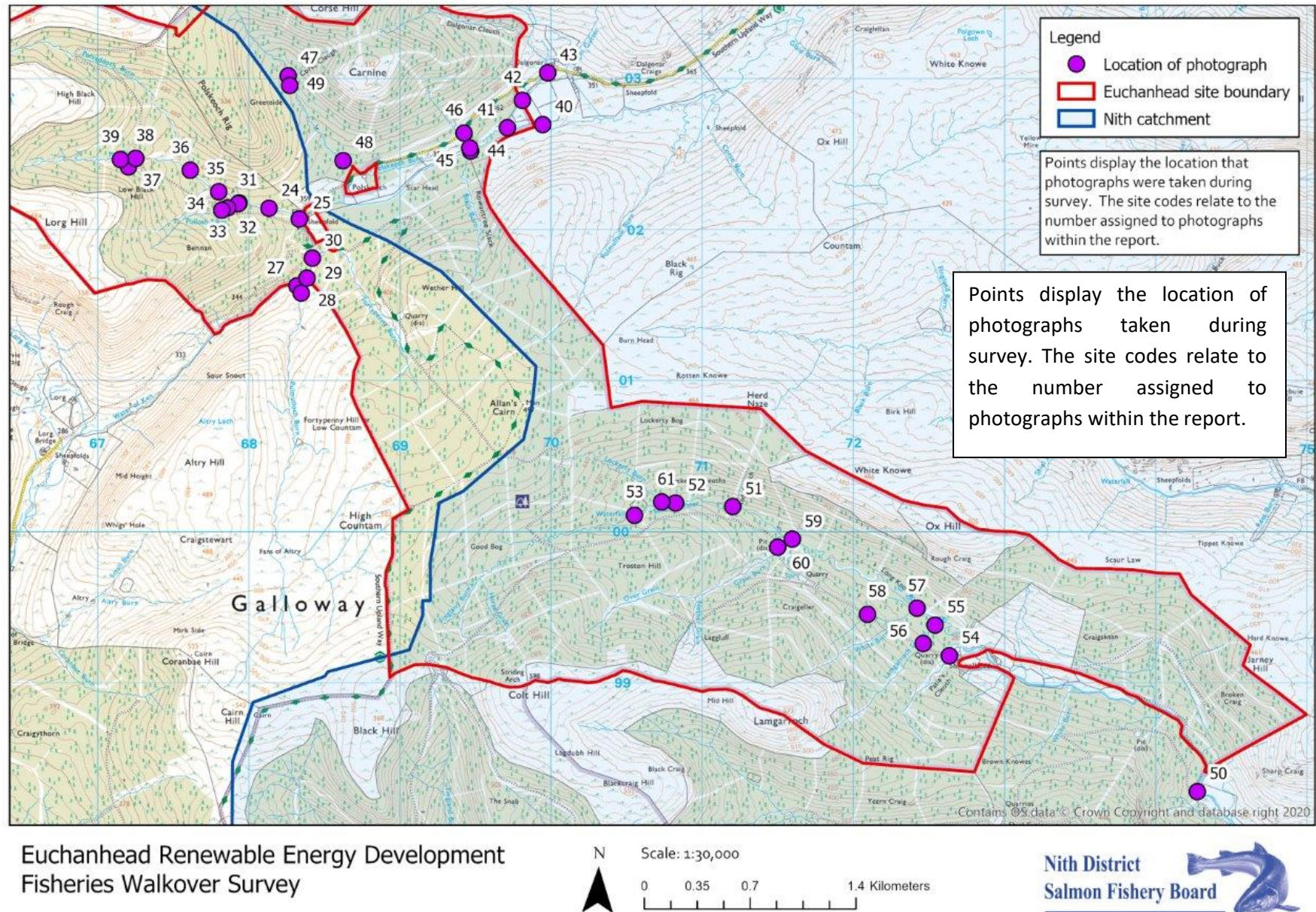
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Appendix 2, Map 5: Map of Photograph locations – Scaur, Shinnel and Ken catchments



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