APPENDIX 9.5: AQUATIC BASELINE

1. INTRODUCTION

1.1 Ecological Background

1.1.1 The Burn of Greens is a small watercourse within the river Ythan catchment, and a tributary of the Littlewater Burn. Following consultation with the Ythan District Salmon Fisheries Board (DSFB) in July 2024, it is understood that the Littlewater Burn is a good quality habitat for all age classes of salmonid fish.

1.1.2 Previous walkover surveys by WSP UK undertaken October 2023 identified the Burn of Greens as having suitability for fish, including salmonids based on visual sighting of salmonids in the watercourse.

1.1.3 Land use surrounding the Survey Area is predominantly arable, although there are several cattle grazing fields in the wider area.

1.2 Brief and Objectives

1.2.1 To provide baseline data regarding the fish community and associated habitats present within the Burn of Greens, WSP UK was commissioned to:

- complete a fish population survey to determine whether protected and notable species or suitable habitats are present;
- to provide recommendations to enable compliance with relevant legislation and planning policy; and
- identify the need for avoidance, mitigation, compensation and enhancement measures.

2. LEGISLATION CONTEXT

2.1 Legislation

Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003

2.1.1 The Salmon and Freshwater Fisheries (Consolidation) Act[1] brings most Scottish salmon and freshwater fisheries laws together under a single piece of legislation. It makes it an offence to obstruct the passage of salmon and sea trout to spawning grounds and to knowingly take, kill or injure, or attempt to take, kill or injure, any Atlantic salmon, trout, or freshwater fish, which is unclean or immature.

2.1.2 The Act also makes it an offence to cause or knowingly permit to flow, or puts or knowingly permits to be put, into any waters containing fish or into any tributaries of waters containing fish, any liquid or solid matter to such an extent as to cause the waters to be poisonous or injurious to fish or the spawning grounds, spawn or food of fish. Defences exist where it can be proved that best practicable means, within a reasonable cost, has been undertaken to prevent such an event.

2.1.3 Recommendations have been made within **Section 5** for consideration within the Proposed Development design to enable compliance with this legislation.

The Water Environment and Water Services (Scotland) Act 2003

2.1.4 The Water Environment and Water Services (Scotland) Act (WEWS)[2] is the Scottish legislation transposed from the Water Framework Directive (WFD). The WFD is the short name for Directive 2000/60/EC of the European Parliament and of the Council of 23 October 2000 establishing a framework for community action in the field of water policy. It sets out objectives for the water environment, including the protection, enhancement and restoration of surface water, groundwater and water-dependent protected areas and prevention of deterioration.

2.1.5 Under the WFD, member states are required to achieve "good ecological status" in inland surface waters, transitional waters, and coastal waters. Ground waters must also be protected and restored to ensure the quality of dependent surface water and terrestrial ecosystems. Through these regulations the Scottish Environment Protection Agency (SEPA) is empowered to control activities likely to have an impact upon the water environment (i.e. pollution, abstraction, impoundment, and engineering). Consequently, SEPA can recommend and enforce regulations upon controlled activities, including the development of monitoring programmes.

2.1.6 When considering the effect of a scheme or activity on a water body it is a regulatory requirement under the WFD to assess if it will cause or contribute to a deterioration in status or jeopardise the water body achieving good status in the future.

2.1.7 Where a scheme is considered to cause deterioration, or where it may contribute to the failure of the water body to meet Good Ecological Status or Good Ecological Potential, then an Article 4.7 assessment would be required which makes provision for deterioration of status provided that certain stringent conditions are met.

[1] UK Gov. (2003). Salmon and Freshwater Fisheries (Consolidation) (Scotland) Act 2003. Accessed online at https://www.legislation.gov.uk/asp/2003/15/contents (September, 2024)

[2] UK Gov. (2003). Water Environment and Water Services (Scotland) Act 2003. Accessed online at https://www.legislation.gov.uk/asp/2003/3/contents (September, 2024)

3. METHODOLOGY

3.1 Electric Fishing Survey

3.1.1 A general fish population survey was carried out by a team of Fisheries Management Scotland (FMS) electrofishing team leader certified ecologists on the 2 July 2024. Weather conditions were partial cloud with scattered showers, and water levels were average for the time of year.

3.1.2 The 'Survey Area' as it will hereafter be referred to in this report is a 60 m stretch of the Burn of Greens located immediately upstream of the proposed access track location shown in **Volume 3, Figure 9.5.1 Burn of Greens Aquatic Baseline**. The upstream extent of the survey was at NGR: NJ 82840 46960 and the downstream extent was at NGR: NJ 82851 46903.

3.1.3 Electric fishing is the term applied to a process that establishes an electric field in the water in order to capture fish. When exposed to the field, most fish become oriented toward the anode and as the density of the electric field increases, they swim toward it. When the fish are in close proximity to the anode, they are immobilised.

3.1.4 Electric fishing followed a standard electric fishing method and technique following guidelines developed by the Scottish Fisheries Coordination Centre which conform to British Standard BS EN 14011:2003 Water Quality – Sampling of Fish with Electricity (British Standards Institution, 2003)[3] and was carried out with Marine Scotland and Ythan DSFB authorisation. Authorisation from both organisations was granted 26 July 2024.

3.1.5 Sampling was carried out by a two-person fishing team who waded the watercourse whilst sampling using an E-Fish 500W Backpack System.

3.1.6 The Survey Area was isolated using stop nets and fished multiple times until a depletion of fish was noted.

3.1.7 On each survey run, the fishing team of two worked in an upstream direction, with one surveyor moving the anode side to side and up and down to "draw" fish towards the current. The second surveyor removed immobilised fish from the electrical field with the use of a dipnet.

3.1.8 Sampled fish were transferred to an aerated container from which they were identified to species level, measured from the tip of their snout to the end of the middle caudal fin rays (fork length); before being returned safely to the watercourse.

3.1.9 Once electric fishing had ceased, a fish habitat survey was carried out following standard Scottish Fisheries Coordination Centre methodology (SFCC, 2007[4]). This survey includes an assessment of water depth; channel, bank and bed widths; flow, substrate composition; and bank characteristics of the watercourse as well as other in-channel features of interest. The vegetation types present, along with percentage canopy cover and percentage fish cover, were also recorded.

3.2 Notes and Limitations

3.2.1 The Survey Area does not encompass directly, the area in which the proposed access track is located. Due to land access requirements, the survey was located immediately upstream of the proposed access track. However, the aquatic habitat and species data collected within the Survey Area is representative of the proposed crossing point on the Burn of Greens.

[3] British Standards Institution (2003). BS EN 14011:2003: Water Quality Sampling of Fish with Electricity. London, BSI
[4] SFCC. (2007). Habitat Surveys Training Course Manual

4. RESULTS

4.1.1 A total of 55 fish were caught during a 3-sample survey along a 60 m long section (**Table 4-1**). Brown trout (fry and parr) and brook lamprey (ammocetes) *Lampetra planeri* were sampled.

Table 4-1 Numbers of Fish Caught on 2 July 2024 during a 3-sample Electric Fishing Survey of the Burn of Greens

Common Name	Latin Name	Sample 1	Sample 2	Sample 3	Total
Brown trout	*Salmo trutta*	10	0	0	**10**
Brook lamprey	*Lampetra planeri*	9	30	6	**45**
Total		**19**	**30**	**6**	**55**

4.1.2 Brook Lamprey were the most abundant species sampled, accounting for 82% of the total number of fish caught.

4.1.3 Two distinct size classes of brown trout were sampled: 50-55mm (0+ years old - fry), 90-145mm (1+ years old - parr) (**Plate 4.1**).

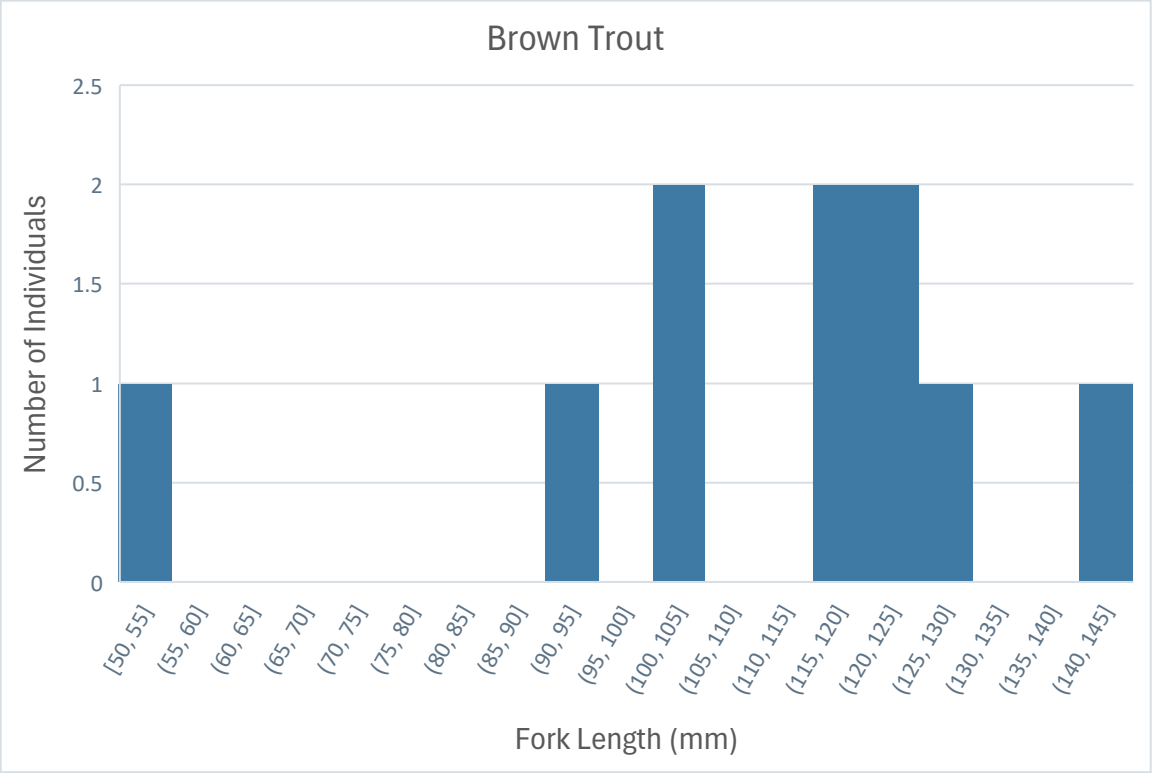

Plate 4.1: Chart showing Length Frequency Distribution of Brown Trout Salmo trutta Sampled the Burn of Greens.

4.1.4 The substrate of the Burn of Greens within the Survey Area comprised of silt (10%), sand (65%), gravel (10%), pebble (10%) and cobble (5%).

4.1.5 The depth of water throughout the survey section was variable, ranging between <10cm and 30cm.

4.1.6 The flow type through the surveyed section of water course was found to be variable and consisted of shallow glides (5%), runs (85%) and riffles (10%).

4.1.7 The banks of the Survey Area were undercut along approximately 80% of the total bank length. They were also found to be draped by vegetation (50% of total bank length) and covered by marginal vegetation in places (15%). There was a high degree of overlap between cover types along the bank length.

4.1.8 Overall, the banks were found to provide a high-quality habitat for fish, with approximately 90% of the total bank length providing cover.

4.1.9 Instream cover was poor-moderate, with some scattered patches of moss and larger cobble, the majority of fish cover in the Survey Area is provided by the banks, with the majority of trout caught from within the undercut sections.

5. CONCLUSIONS

5.1 Brown Trout

5.1.1 10 brown trout were caught during the electric fishing surveys undertaken on the Burn of Greens. These numbers are consistent with expectations, given the size and habitat characteristics of the watercourse.

5.1.2 Protection for brown trout exists in terms of exploitation controls within fisheries legislation, and sea trout are further protected within fisheries acts relating to the protection of 'Atlantic salmon' where the same protections apply. Both brown trout and sea trout are on the Scottish Biodiversity list and are of conservation importance in Scotland.

5.1.3 The electric fishing surveys collected two age classes of brown trout: fry and 1+ year old parr. This would indicate the presence of a viable breeding population and that the Burn of Greens provides some suitable spawning and nursery habitat as well as sufficient cover for parr. The lack of any 2+ parr or adult trout is consistent with the size, depth, and flow regime of a small watercourse such as the Burn of Greens.

5.1.4 The fish habitat survey found that the Burn of Greens provides high quality habitat for brown trout parr; with variable flows, undercut banks and draped margins providing a high level of cover. Small patches of suitable spawning gravel were observed, although the Survey Area is generally more suited for parr than for spawning or fry.

5.2 Brook Lamprey

5.2.1 High numbers of brook lamprey ammocetes (larvae) were caught and observed during electric fishing surveys. The electric fishing methodology deployed did not specifically target these organisms. Lamprey burrow into fine sediment (Hardisty and Potter, 1971[5]) and are therefore less likely to be caught compared to fish species inhabiting the water column. It is therefore likely that the abundance of brook lamprey within the Burn of Greens is higher than that indicated by the fish survey data presented in this report.

5.2.2 The fish habitat survey found that the Burn of Greens provides suitable habitat for brook lamprey; silt and sand provide substrate into which they can burrow whilst gravel provides spawning substrate.

[5] Hardisty, M.W. and Potter, I.C. (1971). The biology of lampreys. Academic Press, London.