STEWART ROBERTSON PROJECTS LTD

Tay Ghillies Association

The River Ericht
CATCHMENT RESTORATION INITIATIVE

STOPPING ATLANTIC SALMON SMOLTS ENTERING THE MILL LADE AT BLAIRGOWRIE TO MAXIMISE THEIR CHANCES OF SUCCESSFUL MIGRATION

INTRODUCTION

For many years wild fish have had access from the River Ericht to the Mill Lade which runs from the Lade gates above Brig 0' Blair for a distance of about 2.4 miles through West Haugh, Ashfield, Milton of Rattray and West Mill to a point just south of Lochlands Farm where the lade re-enters the River Ericht. It also feeds another shorter lade which was built to service East Mill Fish Farm and is now out of use. The Mill Lade was built to provide water energy to power the many mills which sprung up during the Industrial Revolution. These Mills may have gone, but there are still many historical and recent man-made obstacles in the Lade which are encountered by any wild fish which have gained access to the Lade.

The premier wild fish in the River Ericht is the Atlantic Salmon – the Ericht feeds the River Tay via the River Isla and has been one of the most important spawning grounds in Scotland for wild salmon. Unfortunately, the numbers of Atlantic Salmon have decreased rapidly in recent years and this iconic fish is now endangered to the point that extinction is a possibility without radical action. Recognising this, the Scottish Government has created a Wild Salmon Strategy with its associated Implementation Plan.

The plan is all encompassing and is focussed on river catchments to ensure, for example, premium water quality, removal of defunct man-made barriers, introduction of trees to provide shade in warming waters, and tackling the ongoing issues of predation. The main aim is to maximise the number of salmon smolts leaving the river during their migration to the North Atlantic. By maximising the number of smolts leaving it is hoped that more adult fish return to spawn in the river of their birth. A quote from the Scottish Government Wild Salmon Strategy Implementation Plan is here:

"Coordinated interventions at a river catchment scale that aim to optimise the number and quality of healthy, naturally produced salmon smolts leaving Scottish rivers and coasts are the critical basis to achieving our objectives".

The Scottish Government's plan has flowed down to the District Salmon Fisheries Boards and the River Ericht comes under the auspices of the Tay District Salmon Fisheries Board (TDSFB). The TDSFB website (2024) states:

"The Board's strategy for the protection and improvement of salmon stocks is based on maximising the number of smolts which put to sea each year from the rivers of the Tay district".

The smolt migration in the River Ericht starts in April each year and lasts for around 3 months. The smolts gather in their thousands and leave the river en masse. Unfortunately, depending on weather conditions and river levels, the smolts can be blocked from travelling downstream of the weir above Brig o' Blair and they will gather at the Mill Lade gates before passing through the gates and travelling down the lade. This is where they encounter a number of man-made obstacles which can cause stress, injury and death. In order to maximise the number of smolts leaving the

river it is important to STOP smolts entering the lade and keep them in the river. This has been recognised by the TDSFB as the Minutes of the June 2024 Board meeting point out:

David Godfrey, Convenor, TDSFB stressed "that preventing smolts entering the lade had to be the main objective".

Since July 2023, the Tay Ghillies Association, (TGA), the River Ericht Catchment Restoration Initiative (RECRI), and latterly, Stewart Robertson Projects Ltd (SRPL) have been considering options and working together to design and cost a solution which could be implemented at pace, subject to funding, which will stop all Atlantic Salmon smolts *and adult fish* entering the lade, thereby maximising the chances of the smolts leaving the Ericht on their epic journey. The following sections describe the various "pinch points" in the Mill Lade and demonstrate why smolts must not be allowed in the lade. It is also important to note here that the solution to stop the smolts entering does not hinder the ability of businesses which extract water for the Lade from operating to their licensed abstraction.

PINCH POINTS

There are 6 pinch points in the lade – these are described here, starting with Pinch Point and finishing with number 1, the Lade Gates where all of the issues in the Lade can be fixed.

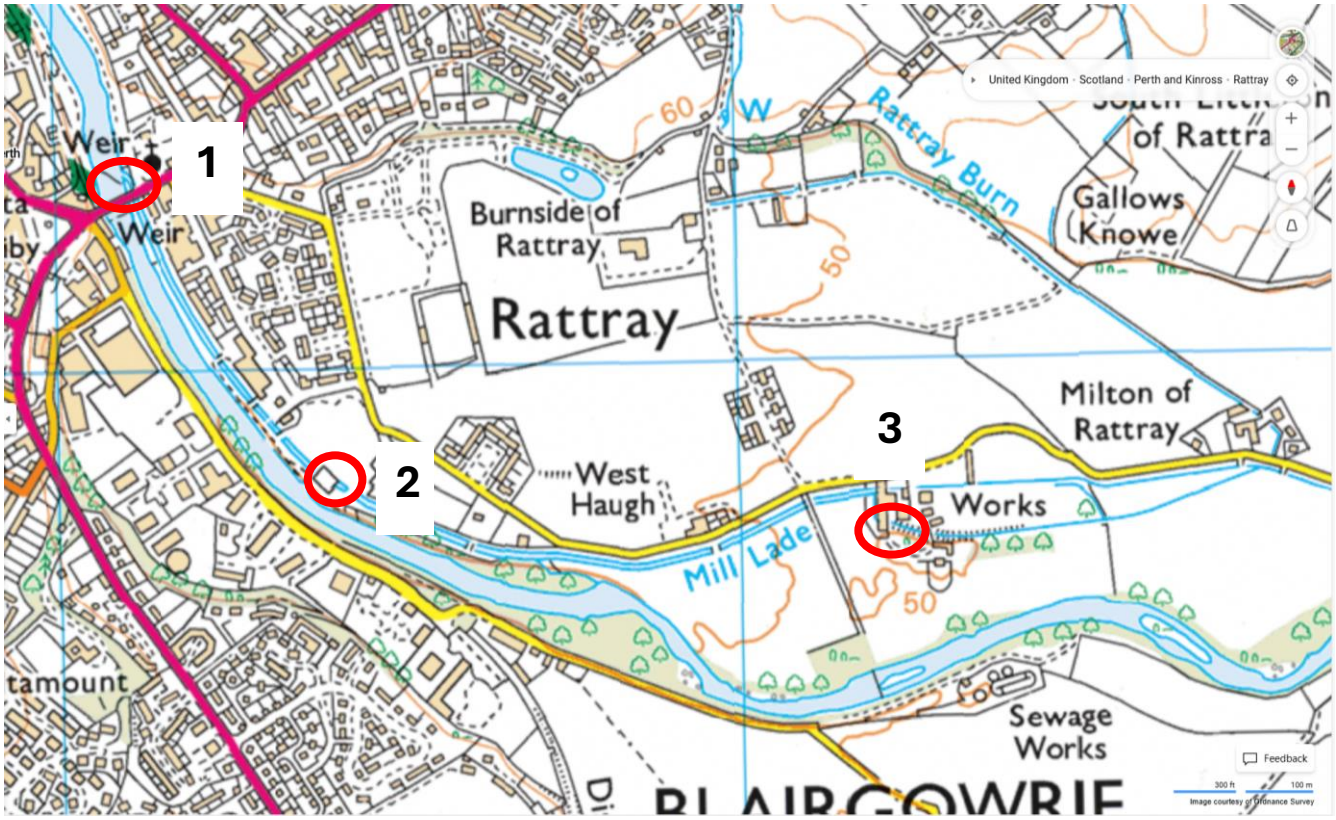

Figure 0A – The first three pinch points – 1 = Lade Gates, 2= The Haugh and 3 = the Hydro Turbine

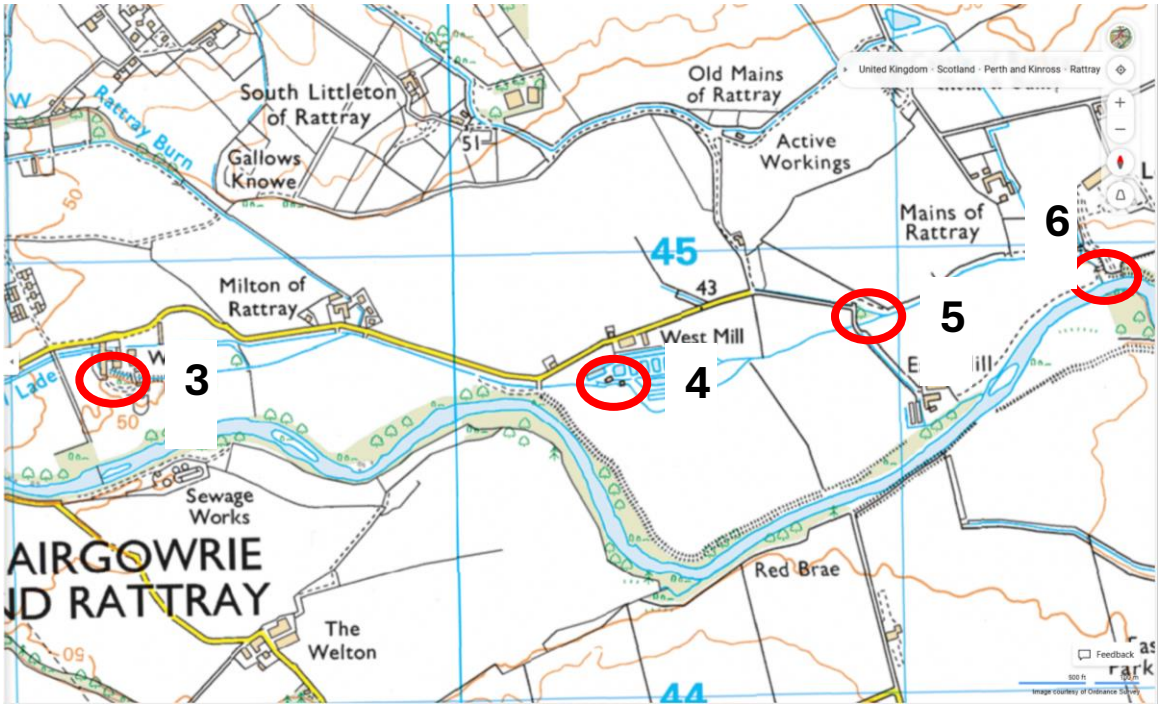

Figure 0B – The remainder pinch points – 3 = the Hydro Turbine, 4 = West Mill Farm Intake, 5 = East Mill Farm intake and 6 = the Lade outflow

PINCH POINT 1 - THE HAUGH

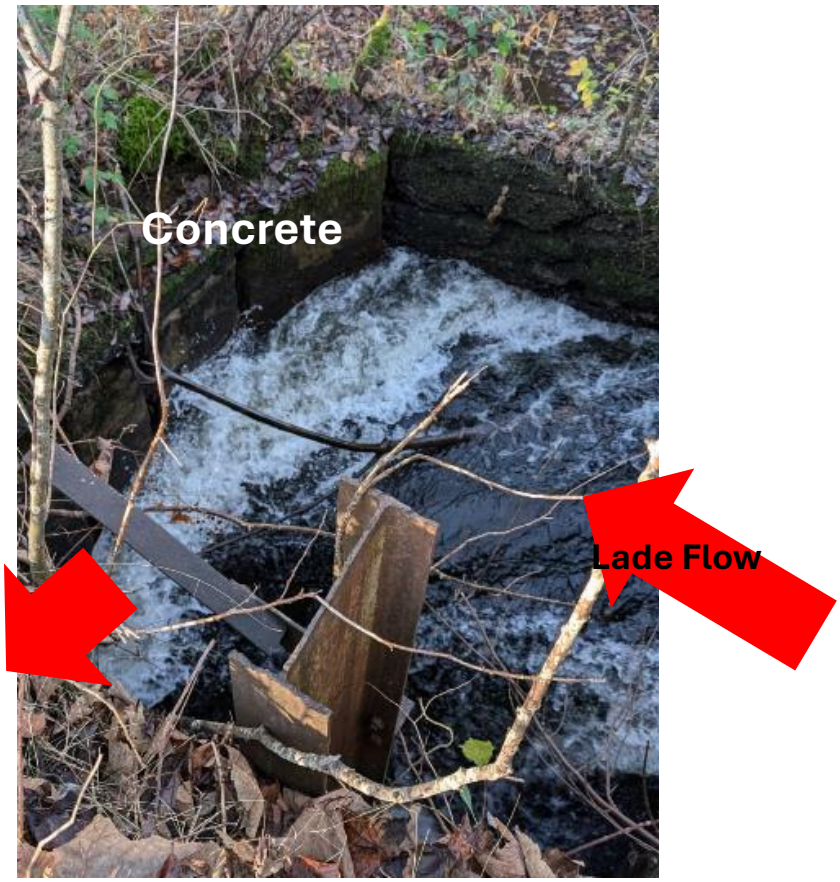

Figure 1 – The lade "pinch point" at the Haugh where the force of water drives smolts onto the concrete wall potentially causing fatalities or life-threatening injuries

At the Haugh, where the Smedleys factory once stood, there is a right-angled bend. In good flows in the lade, during the smolt migration, the force of water drives smolts into the concrete wall before they can continue their journey down the lade. This can kill smolts or injure them such that death is possible later in their journey when they enter salt water. After this point in the Haugh, the lade enters a 50m tunnel under the concrete plinth of the old factory.

PINCH POINT 2 - THE HYDRO TURBINE

Figure 2 – The Hydro turbine – an Archimedes screw system which allows smolts to enter and journey through the screw

The hydro at Ashfield Mill is an Archimedes screw system. If there are adult fish in the lade they are stopped from entering the Archimedes screw by an adult screen and they are forced down a by wash by a volume of flow which is barely adequate to ensure adult survivability. This screen will not stop smolts and they will transit through the Archimedes screw which is deemed to be "smolt friendly" with rubber sleeves on the screw blades. This statement is very unlikely to be 100% accurate and, in any case, we should not be subjecting valuable smolts to this sort of treatment if it can be easily avoided

PINCH POINT 3 - WEST MILL FISH FARM

West Mill Fish Farm has a requirement to abstract water from the lade to ensure that the ponds of rainbow trout have clean, oxygenated, water. The abstraction point has a smolt screen with a mechanical screen clearer. To help guide water into the abstraction point, a dam was built to create an impoundment. (See figures 3 & 4)

Figure 3 – West Mill Fish Farm abstraction point, mechanical screen cleaner and dam

Figure 4 – West Mill Fish Farm – Dam and Impoundment

The main issue here is that the Dam does not allow free passage down the river during low flow. There are pipes at the bottom of the dam which, theoretically, allow smolts through, but these are often blocked. With nowhere to go, the smolts congregate at the abstraction point and become

entangled in the mechanical cleaner and die. As the smolts mill around looking for a way out they are subject to predation from piscivorous birds and otters. At the moment the dam has been removed but it is likely to be reinstated in 2025.

PINCH POINT 4 – EAST MILL LADE ABSTRACTION POINT

Before the main lade outflow there is a split in the lade which allows water down the old East Mill Fish farm abstraction point. Smolts could easily be diverted down this East Mill exit and probably get lost because it is has significant barriers for its length before its outfall into the river. (See Figure 5:

Figure 5 – North of East Mill, the lade splits into 2 – straight on to Normal outfall point or bear right to enter this now redundant lad. If smolts enter, there is a number of areas where they might get stuck

PINCH POINT 5 – LADE RETURN INTO RIVER

Figure 5 – The Lade returns to the river south of Lochlands Farm

The Lade returns to the river to the south of Lochlands Farm. There is an adult screen to stop adult salmon migrating up the River from entering the Lade. Unfortunately this needs cleaned regularly because the upstream side of the screen gets blocked due to trash which mainly stems from beaver operations in the lade. The blockage stops smolts from swimming through the screen and if not cleared, they will die. The cleaning of the screen is the responsibility of the TDSFB.

Figure 6A – the adult screens at the lade outflow

The following still is taken from a video which was filmed in 2023 when the outflow of the lade was blocked and smolts gathered unable to find a way through:

Figure 6B – A still picture taken from a video showing smolts trapped behind the lade outflow screen which is blocked by trash

LADE ENTRY POINT - THE LADE GATES

To avoid these pinch points it is necessary to stop ***ALL*** Atlantic Salmon entering the lade – this is achieved by fitting smolt screens to the gates. To ensure stakeholders who abstract water from the lade are unaffected, the screens must allow the licenced abstraction flows. The concept to allow this is fully described in the paper written by Stewart Robertson Projects Ltd entitled "**Ericht Lade Abstraction Assessment Abstraction Control and Mitigation".**

Wild fish enter the Mill Lade at the Lade gates upstream of the weir above Brig O' Blair. In high water, with good flow over the weir, smolts will stay in the river and go over the weir and continue their journey downstream. However, in lower flows, when there is little flow over the weir, smolts will be attracted to the flow through the gates. There is a route over the weir but the flow through the gates may be more attractive especially when the gates are up, and the only screen is a trash screen with 50mm gaps.

Figure 7 – The river at diminished flows showing the gates and minimal flow immediately downstream of the gates

Figure 8 - A close up of the gates showing the trash screens. These stop heavy logs crashing into the gates during spates and also act as screens to stop adult fish entering the lade

At very low flows there is very little flow over the weir except at the right-hand bank ie there is no easy escape route for smolts over the weir and the lade is the only option. A smolt screen will stop smolts entering the lade but an escape route, or by-wash, will be necessary to allow smolts encountering the screen to sense flow to the right of the screens and follow that route. The by-wash could be in the form of a pipe which could direct the smolts into the main river flow and away from dry rocks below the weir.

Figure 9 – At low river levels , flow over the weir diminishes markedly. A by-wash will be necessary close to the gates and proposed smolt screens (Point A) to allow smolts an escape route

CONCLUSIONS

The lade is a significant challenge to Smolt Migration due to historic and more contemporary man-made obstacles and barriers and there can be no doubt that stopping smolts entering the lade is the optimum solution to ensure safe passage of valuable salmon smolts during their migration. Smolt screens will go a long way to meeting the Scottish Government's desire of "*optimising the number and quality of healthy, naturally produced salmon smolts leaving Scottish rivers"* and the Tay District Salmon Fisheries Board "*strategy for the protection and improvement of salmon stocks is based on maximising the number of smolts which put to sea each year from the rivers of the Tay district"*. Smolt screens at the lade gates also fully meet the statement made by David Godfrey, Convenor, TDSFB, *"that preventing smolts entering the lade has to be the main objective"*.

In addition to protecting valuable smolts the screen also has significant benefits for those involved in managing their responsibilities in the lade. For example, the hydro may well have a simplified process in managing the bywash; the Fish Farm can simplify the abstraction point by removing the mechanical screens; and the TDSFB can minimise visits to clear the outfall screen because there is no need to allow smolts through.

The paper written by Stewart Robertson describes a solution for smolt screens and is open for discussion and criticism by the various stakeholders within the new Ericht Project Advisory Group of which TGA, RECRI and SRPL are members, which is designed to fix all of the issues of salmon migration on the Ericht at Blairgowrie. The smolt screen solution can be modified, taking account of stakeholder comments, and the end result will be a solution which meets stakeholder requirements and no smolts enter the lade. With focus, and funding, this solution could be put in place before the 2026 Smolt migration.