Bengairn Loch

WILD TROUT TRUST ADVISORY VISIT

PREPARED FOR MR FORTUNE

JUNE 2009

1. Introduction

The Bengairn Loch is a small stillwater (GR: NX 788 522) located on a tributary of the Hass Burn, which outflows into Auchencairn Bay in South West Scotland. The loch is created by a large earth dam and concrete weir which holds the water.

Mr J Fortune (owner of the loch) approached the Wild Trout Trust (WTT) to request that an Advisory Visit be undertaken. The WTT has a well established Advisory Visit scheme, which operates throughout the United Kingdom and Republic of Ireland. Through sponsorship and their own contributions, the WTT can support the costs of having a consultant visit a watercourse that provides habitat for wild trout and make recommendations on ways in which that watercourse can be improved for brown trout and/or sea trout. The recommendations in the report are designed to focus on works that will have benefits for local biodiversity as well as promoting sustainable fisheries management.

The loch owner had become concerned in recent years regarding the management of the loch and wished for advice on how to return the loch to being a good quality trout fishery.

On 21st May 2009, the GFT visited Bengairn Loch under the WTT's Advisory Visit scheme. The following report aims to firstly detail the environmental requirements of healthy trout populations then provide details of the findings of the advisory visit and finally make recommendations for the future management of the loch.

Figure 1: Bengairn Loch

2. Life history requirements of trout

The brown trout (Salmo trutta L.) is a fish that is native to Europe, North Africa and western Asia. It is present in a large number of running waters and many inland stillwaters. It is an unusual freshwater fish in that it can have a variable life history, 'choosing' to be either an adult resident in freshwater or becoming anadromous by migrating to sea. The factors that govern the 'choice' to become either a resident trout or a migratory trout have been the subject of fierce debate. It is thought that genetic factors must play a role in encouraging the adoption of a certain life history but that environmental factors also have a role to play. The greater reproductive energy needs of female trout has sometimes been suggested as a cue for migration, with female trout being more likely to fulfil these needs within the estuary rather than the river system. However, it is known that not all female trout will go to sea even when access is readily available which suggests that there must be a balance of advantage and disadvantage in undertaking migrations. Whatever life history the trout pursues, it has a good reputation as a sport fish and is known for its fine taste on the table. Due to the dam and weir it is not possible for sea trout to access into the loch so only brown trout will be resident here.

Adult trout spawn in the autumn/winter in small rock and gravel substrates, often in clean, running waters but also occasionally in the littoral zone of lakes/lochs if suitable substrates exist. The female fish will excavate a depression within the substrate into which she spawns her eggs which will be fertilised by a male fish and then covered over. This depression is known as a redd and can be recognised by its characteristic shape. The development of eggs within the redd will be determined by water temperature and once sufficient time at a suitable temperature has elapsed, the egg will hatch into an 'alevin'. The alevin stage of the trout is characterised by the presence of a yolk sac which provides all of the nutrients the young fish needs. It is only when the yolk sac is almost exhausted that the young fish will leave the safety of the redd and swim up into the main flow where it will take external foods. The young fish is now known as a 'fry'. In order to ensure that the fry has sufficient resources, it will disperse from the site of the redd and take up a territory which it will defend aggressively against other fish. Fish that fail to feed, or fail to hold a territory, will die. The fish that hold territories will form dominance hierarchies, with the best territories (e.g. those with better food resources, in terms of invertebrate drift) being held by the most dominant individuals. Even then, these territories may be used for feeding by more than one individual at different times of the day, with dominant fish feeding at dusk (when feeding is most profitable due to predation risk being reduced) and subordinate fish feeding at other times. As the fish become larger and older they are termed 'parr' and will look for deeper water in which to live. It is at this stage when in many systems they will leave spawning burns and migrate into lochs or main river channels. It is essential to have easy access for fish migration between these larger water bodies and spawning burns, both for adult spawning fish moving into the burns and for juvenile trout out of the burns.

The number of young trout sustained by a freshwater habitat is related to that habitat's quality and variability. The different life stages of trout have different habitat requirements. Fry generally prefer shallow water (less than 20 cm in depth) with parr being found in deeper water. Trout fry tend to prefer velocities of 25 cm/sec or less with older fish choosing even slower water than this. The avoidance of predators and extremes of temperature are related to both the amount of fish cover present and water

depth available. Fish cover is provided by instream substrates, instream/bankside vegetation, undercut banking, woody debris and, occasionally, man-made debris, which inadvertently enters the watercourse (e.g. road signs etc). In terms of chemistry, trout require waters that contain more than 9 mg/L of oxygen and pH values below 5.0 are harmful to fish. The level of suspended solids in the water can also affect trout. Direct effects on the trout include damaging delicate gill membranes or causing skin abrasion which may lead to secondary infections. Indirect effects include silts infilling intergravel spaces which may result in reduced habitat for invertebrates (upon which the trout feed), compacted substrates which may be difficult for adult trout to mobilise during spawning, and reduced egg and alevin survival due to smothering.

Figure 2: Brown trout

3. Findings of the advisory visit

3.1 Migratory salmonid access into the loch

Although the Hass Burn would be expected to support both salmon and sea trout, they cannot access into Bengairn Loch due to a large concrete sluice. The weir face is over 3 m high. The weir is an obstruction to fish movement and strictly by law there is probably a requirement to fit a fish pass. However, the available habitat upstream is so limited that GFT would not recommend that a fish pass would be cost effective.

The sluice was open at the time of the visit and no flow was topping over the weir structure. It was noted that no fish screening was present on the sluice opening. A badly corroded and incomplete fish screen was present on the weir overflow (Figure 3). Due to the weir being impassable to upstream migration, the trout population within the loch will be a resident (non-migratory) brown trout population. A lack of screening means that fish would be able to leave the loch but not return.

Figure 3: Corroded fish screen

3.2 Integrity of the dam structure

The loch owner raised concerns that the dam structure appears to be leaking as water logged areas are present below the dam structure. Although GFT are not experts on dam integrity it would appear that the dam structure probably is leaking as water was present below the structure on the day of the Advisory Visit. It is advised that a suitable dam engineer is brought in to assess the integrity of the dam and to advise, if necessary, on possible remedial works. In the experience of GFT, trees

are not usually encouraged on dam-faces due to the possible damage their roots will do to the structure of a dam.

3.3 Land use round the loch

The land use of the loch catchment is varied. The catchment covers the area which drains into the loch and any land practice which takes place within the catchment has the potential to influence the water quality of the loch. The majority of the land use around the loch is grazing pasture or silage production (Figure 4). Woodland is present to the north east and south of the loch. Areas of wetland are also present. No livestock feeding or storage areas were seen. It is unlikely that any of the surrounding land uses will cause any great concerns to water quality within the loch.

Figure 4: Land use round loch

3.4 Present fish populations in the loch and inflow burn

GFT undertook no detailed fish surveys during the advisory visit. European eels were seen within the loch. A visual examination of the inflow burn recorded various small fish which appeared to be trout fry and three-spined sticklebacks. During the site visit no fish were seen rising in the loch. The owner reported that the loch was known in the past as a good wild brown trout fishery and supported trout up to 2 – 3 lb. It is reported that rainbow trout used to be stocked into the loch.

3.5 Suitability of the loch for fish

The loch appeared to provide good habitat for adult life stages of trout. Good levels of aquatic weed were present. Detailed water depths in the loch were not provided but the water is at least 8 feet deep near the outflow sluice. It is recommended that a water sample is taken from the loch, which can then be analysed to look at water quality in particular to check for enrichment.

3.6 Suitability of the inflow burn for fish

The inflowing burn to the north west of the loch offers the only available spawning habitat for the trout population of the loch. This small burn (less than 1 m wide) does not appear to contain particularly good spawning substrate and is heavily over-

grazed by livestock but does contain juvenile trout, although possibly in low numbers. It is important that spawning (also known as gravid) trout are able to easily access up the burn to suitable spawning locations. The lower burn is quite badly choked up with weed and low overhanging tree branches – both of which are collecting debris and may cause partial barriers to fish movements. In the lower section of the burn, downstream of the fields, a few clumps of Japanese knotweed are present in and around the burn. This highly invasive non-native alien plant can cause devastating impacts on watercourses by shading out all other native plant species and when they die back in the winter they leave no protective vegetation layer to control erosion. It can take up to 5 years of spraying with Round-up to kill it off! It is strongly recommended to eradicate the knotweed present before it develops into a serious problem.

3.7 Suitability of the loch as a trout fishery

The main problem with angling on the loch is one of access and aquatic reeds. Most of the loch edge is difficult to access and fish from the bank for various reasons e.g. fenced off, overgrown with vegetation (especially brambles), presence of badger sets (protected by law regarding disturbance), too wooded or boggy. In addition, abundant reeds surrounding the loch would make shore based angling nearly impossible (see figure 5). There is one small area on the north bank which could be fished from although reeds would need to be controlled to provide an open fishing area. Really a fishing boat is required to allow anglers to access open water. Again access would need to be considered for a launch point for the boat. The owner has reported that he will shortly be returning a boat to the loch.

Figure 5: Abundant reeds round loch

4. Summary of suggested enhancement works

4.1 Weir structure – although strictly by law there should be a fish pass fitted, this is not suggested by GFT as being a cost effective option for this loch. In fact it may be more beneficial to look at possible screening to make it harder for trout to leave the loch system, in particular if future stocking with rainbow trout is to be considered. If stocking with rainbow trout is to be considered then it will be important to consider fully the possible harm that the stocked fish might have on the wild trout population e.g. through competition for resources and predation on small brown trout. Stocking densities and size of fish to be stocked would also need to be considered and would depend partly on what the present sizes and numbers of the brown trout population. Stocking with rainbow trout also requires to be licences by the Marine Directorate.

4.2 Dam integrity – it is suggested that a qualified dam engineer examines the dam (it is appreciated that this may already be in hand) to comment on possible leakage problems. Usually on dam structures management is undertaken to stop trees and scrub due to possible root damage. Also regular mowing is common to allow the control of burrowing animals such as moles and rabbits.

4.3 Water quality – it is recommended to get a water sample from the loch and inflowing burn analysed to check the quality of the water. This would be relatively easy and in most cases GFT can arrange with the SEPA chemistry laboratory to do the testing for free. Checking the water quality would indicate whether land management practices round the loch are causing any water quality problems in the receiving waters.

4.4 Fish populations present – it would be useful to undertake surveys to see what trout population is present now in the loch and inflowing burn. An electrofishing survey could be completed on the burn to assess the densities of trout fry present. It is advised that at least two sites would be examined. On the loch a gill netting survey could be undertaken to collect a sample of fish but as the size of the population is unknown I would suggest caution when using any method which kills fish (as gill netting does). It is suggested that sampling by angling would be better and finding volunteers is usually easy! Any fish could be returned alive but accurate recording of weight and length should be taken. A few scales should be taken from each fish (and placed in a scale packet which GFT can supply) for reading to accurately age the fish. This data will give information on growth rates.

4.5 Suitability of the inflowing burn for trout – this burn is extremely important for the lochs trout population as it provides all the spawning and juvenile habitat for the loch. Undertaking enhancement works here will be important depending on the electrofishing survey findings. The Advisory Visit noted that the instream habitat quality was low and it would be advisable to add some suitable gravels to the burn to create improved spawning locations. Improving fish access from the loch is also important and work is required to open a channel through the reed bed at the burn outflow. Fallen branches and low tree branches should be cut and removed to assist fish access but care should be taken to leave any branches above the water surface to provide important overhead cover from predators. A spraying programme (for up to 5 years) to eradicate Japanese knotweed around the lower

burn should be started as soon as possible. Round-up sprayed on the leaves two or three times a year (between May-September) is required. When spraying near water courses it is necessary to inform SEPA and apply for permission (no cost involved).

4.6 Predator control – the main mammal predator of concern relating to the trout population is American mink. These aquatic predators can be particularly damaging in small burns where they will kill adult spawning fish and prey on juveniles. It is advised to undertake regular trapping programmes for mink around the loch. The use of the Game Conservancy Trust mink raft is recommended and further details on these rafts/traps see:
www.gwct.org.uk/research_surveys/species_research/mammals/american_mink

4.7 It is recommended to return a boat to the loch to assist with angling.

5. Assistance from Wild Trout Trust

The Wild Trout Trust (WTT) can provide further assistance to help implement the above recommendations in the following ways:

- Assistance with the design and implementation of improvements to the spawning burn, including assistance with preparation of consent applications to the appropriate regulatory authorities.
- A Practical Visit – The WTT can fund the cost of labour (two/ three man team) and materials (max £1800) to implement the practical aspects of improving the spawning burn. The recipient will be expected to cover travel and accommodation expenses.

There is currently a big demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources, but applications for a Practical Visit should be made to projects@wildtrout.org. The Trust is always available to provide free advice and help to clubs, syndicates and landowners through guidance and linking them up with others that have had experience in improving trout fisheries.