



River Bray – Challacombe Reservoir



An advisory visit carried out by the Wild Trout Trust – June 2008

1. Introduction

This report is the output of a Wild Trout Trust advisory visit undertaken on the Challacombe reservoir and the River Bray at Swincombe on the 15th July 2008.

The upper reach of the River Bray at Swincombe is bisected by the Challacombe reservoir. The reservoir and section of stream inspected is owned by the South West Water company and leased to Mr Alec Whitchurch, who actively manages the reservoir as a recreational trout fishery. The reservoir is no longer used for water supply and Mr Whitchurch is keen to explore the potential of the stream for augmenting the wild trout brown trout *Salmo trutta* stocks that are known to inhabit the fishery.

The whole site has a high conservation value, falling within the Exmoor National Park with part of the site also forming a Site of Special Scientific Interest. For further information go to www.exmoor-nationalpark.gov.uk

The comments and recommendations made in this report are based on the observations of the Trust's Conservation Officer, Andy Thomas and discussions with Denise Ashton, WTT Fundraising and Communications Officer, Fleming Ulf-Hanson from Natural England and Alec Whitchurch.

Throughout the report, normal convention is followed with respect to bank identification i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.

2. Description of the Fishery

2.1 Challacombe Reservoir



Challacombe reservoir looking towards the dam

Challacombe reservoir is a typical small (1.5 hectares) upland storage reservoir formed by damming the headwaters of the River Bray, which cuts through a steep U-shaped valley. The dam is a substantially engineered structure but the majority of the margins are formed from the naturally steep slopes that feed down from either side of the Bray valley. At the inlet of the reservoir, where the inflowing stream discharges there is a comparatively shallow batter to the reservoir bed and some useful marginal cover by way of some large goat willow or sallow *Salix caprea*. This is the only area where there are substantial shallows, with the majority of the reservoir having very steep margins dropping down to a maximum depth of 9 metres.

Currently the reservoir is annually stocked with rainbow trout *Oncorhynchus mykiss* of various sizes to sustain the fishery. Occasional small brown trout are captured and the odd larger fish reported. Last year the fishery suffered from a significant trout mortality post stocking. Mr Witchurch still has some concerns over the exact cause of the incident and believes that a possible water quality problem was responsible. No conclusive evidence has been found of any pollutant or naturally occurring toxin that might explain this fish kill. From discussions with all parties, it would appear that the little river Bray feeding the reservoir provides superb water of the highest quality, derived from an unimpacted moorland catchment.

It is the author's opinion that the reservoir provides an excellent environment for a still water trout fishery. The comparatively deep water provides an ideal cool water habitat for stocked trout, the only potential danger being the possibility of stratification during hot settled spells. It is unlikely that the inflowing stream is rich in dissolved nutrients, although Mr Witchurch did report that some algal activity had been noted in the past. During the inspection there was no evidence of any significant algal growth. One possible area for future monitoring could be the possibility of acidic run-off from the moorland catchment. Trout can tolerate low pH values but rapid changes in pH values can cause stress and occasional mortality, as well as impacting on the natural productivity of the fishery as a whole.

The reservoir is known to support wild brown trout. It is quite possible that reasonable numbers of adult brown trout inhabit the deeper areas of the fishery, however, unlike stocked rainbows, wild brown trout will require a range of habitats to flourish.

The inflowing stream is a superb little spawning and nursery stream and comments relating to its quality and potential are described in the next section.

Downstream displacement of brown trout into the reservoir will be an annual occurrence. For juvenile trout to flourish in the reservoir they will need their own habitats to populate. These will consist of marginal shallow areas, where they can mature before being able to exploit the large habitat niches found in the deeper, more open areas of the fishery. These marginal areas are often rich in food items and are usually too shallow for larger trout and other predators such as cormorant to effectively hunt. Small trout in still waters flourish in these shallow marginal zones, which unfortunately are comparatively limited in extent on the Challacombe site.

These shallow marginal areas are not only crucial for juvenile trout, they are often the richest zones for aquatic invertebrates, essential in promoting survival and growth in wild stocks and for enhancing fly-fishing opportunities.

The area adjacent to the inflowing stream undoubtedly has suitable habitat and the overhanging goat willows lining the short section on the left bank will provide additional cover from predators and a source of allochthonous food items. It would be sensible to increase the amount of marginal cover adjacent to these shallow zones to provide as much cover as possible. It is also possible to create further areas of shallow water by creating large marginal shelves, either by re-profiling the existing margins with a large tracked excavator or by importing suitable material to create wide shallow shelves. Environment Agency, Water Company, Natural England and possibly local authority consent would be required for any works of this nature. This work would also be very expensive and not make a significant difference to the bulk of catches made by anglers.



A shallow margin with excellent cover – good wild trout habitat

2.2 River Bray

In addition to the reservoir, the fishery includes approximately 300 metres of the inflowing stream. Before being cut-off by the construction of the reservoir, this stream would have formed the headwaters of Bray river and may well have been an important nursery stream for migratory sea trout as well as resident browns. The available spawning gravels were of a good mixed size and appeared to be loose and silt free. During the inspection several small trout were observed darting around the shallow pools formed in this delightful little stream.



A typical little plunge pool. Note the eroded geotextile on the RH bank.

During the inspection there was evidence of attempts to protect the banks from erosion using plastic geotextile. It is understood that this area is quite heavily used during driven shooting events. To ensure that brown trout production is maximised over this comparatively short section of river, it would seem sensible to ensure that disturbance to banks and bed are kept to a minimum during the peak spawning period - November to February.

Currently mature trout wishing to migrate to conducive spawning grounds upstream from the reservoir, will only have about 100 metres of channel to utilise before reaching a significant man-made impoundment. The weir was constructed to facilitate the use of an overflow pipe. The pipe was apparently used during the reservoir construction and could also potentially be used if there is a requirement to divert flows away from the reservoir. The height of the head loss covering the downstream to upstream water levels was estimated to be

approximately 750mm. At the time of the visit the stream was flowing strongly but the structure would certainly limit effective upstream migration. It is possible that during a significant spate the tail water level could rise to an acceptable height making free migration possible. It is generally accepted that any jump greater than 300 mm for trout is deemed excessive and will hamper spawning migrations. Retaining the bypass facility may be a necessary part of the infrastructure of the site, so removing the weir may not be a practical option. A possible solution is to reduce the overall head loss by creating a simple timber pre-barrage using tree trunks.



The weir 100m above the reservoir – A possible block to upstream migration

At the tail of the weir pool there is a naturally pinched section where large woody debris (LWD) could be wedged and pinned to create a small debris dam. This will have the net effect of backing up water levels to the weir following a rainfall event and should facilitate easy migration. Debris dams in their own right rarely cause difficulties for migrating fish and fulfil a range of other useful functions, including the trapping of finer gravels and sediments as well as providing a primary source of food items for invertebrates and ultimately trout.

In steep catchments, prone to significant spate events, woody debris that slows the rate of flow and traps finer gravels can help to improve and protect spawning habitats. It is recommended therefore, that any fallen timber found is left within the channel and even actively placed there to help stabilize bed material and provide micro pool habitats for spawners. Although there is no suggestion that

LWD material was being actively removed from the channel, it was noticeable how little there was present in the stream above the reservoir.



A shooting platform adjacent to a spawning riffle. A bit too close perhaps?



A good example of LWD on the section of stream below the reservoir

3. Conclusions

The component of wild brown trout stocks that reside within the reservoir and the inflowing stream could be increased with improvements to local habitats.

Access to the excellent spawning and nursery habitat found upstream of the weir should be improved. It is possible that in some dry years large broodstock migrating from the lake will only have approximately 100 metres of spawning habitat available. Opening up access for migration could significantly boost production and ultimately displacement of more juveniles back into the reservoir.

Improvements could be achieved using tree trunks and LWD to reduce head loss at the structure and to stabilise spawning gravels during heavy rainfall events.

An inspection of the weir following spate conditions during the autumn/early winter period may confirm if the structure is passable by trout. Fish seen jumping at the site is an indication that free passage is difficult.

Increasing the size and extent of shallow marginal zones will boost lake productivity and provide habitats for juvenile trout displaced from the stream above.

The top 50 meters of the reservoir is a critically important habitat for juvenile trout.

Further shallow lake margins could be created and should be managed to maintain a mosaic of light and shade, interspersed by cover afforded by marginal trees and shrubs. Large woody debris in the lake margins will also help promote further cover and habitat for invertebrates.

It is recommended that no stocking of fertile farm reared brown trout is contemplated. Any brown trout captured can then be positively identified as from natural production and given the protection they require.

It is worth considering a programme of self monitoring. Looking at invertebrate populations in the inflowing stream is a valuable way of picking up potential problems. Training can be obtained via the Riverfly Partnership at www.riverflies.org. Some upland streams have suffered as a result of pollution incidents via the use of sheep dip chemicals. Regular monitoring of a range of simple indicator organisms will help to give you confidence that the stream and reservoir are performing as expected.

4. Recommendations

- Construct a natural debris dam a few metres below the existing weir to raise water levels and facilitate easier spawning migration.
- Do not remove any woody material from the stream and actively place LWD to help stabilize finer gravels.

- Raise awareness to the group responsible for managing the shoot to ensure the stream is given as much protection as possible during the important winter spawning period.
- Consider planting more willow on the lake margins, particularly near the shallow top section.
- Do not stock with fertile brown trout and if possible only stock sterile rainbows. Environment Agency consent required.
- Monitor the lake margins following improvements to evaluate presence of small browns.
- Undertake regular monitoring of aquatic invertebrates.
- Consider creating further marginal shelves in the deeper parts of the lake. Note this work will be potentially difficult and expensive and require various consents from EA, NE and your local authority.

It is a legal requirement that some works to the river may require written Environment Agency consent prior to undertaking any works, either in-channel or within 8 metres of the bank. Any modifications to hard defences will require a land drainage consent on any river designated as "main river". Advice can be obtained from the Development Control Officer.

5. Making it happen

There is the possibility that the WTT could help to start an enhancement programme. Physical enhancement works could be kick-started with the assistance of a WTT 'Practical Visit' (PV). PV's typically comprise a 1-3 day visit where an approved WTT 'Wet-Work' experts will complete a demonstration plot on the site to be restored. This will enable project leaders and teams to obtain on the ground training regarding the appropriate use of conservation techniques and materials, including Health & Safety equipment and requirements. This will then give projects the strongest possible start leading to successful completion of aims and objectives.

The WTT can fund the cost of labour (two/ three man team) and materials (max £1800). Recipients will be expected to cover travel and accommodation expenses of the contractor.

There is currently a big demand for practical assistance and the WTT has to prioritise exactly where it can deploy its limited resources. 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.

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