



**Advisory Visit**

**Barningham Hill Tarn, Co. Durham**

**June 2014**



## **1.0 Introduction**

This report is the output of a site visit undertaken by Tim Jacklin of the Wild Trout Trust to Barningham Hill Tarn (also known as Cow Close Lake), near Barnard Castle, County Durham on 13<sup>th</sup> June, 2014. Comments in this report are based on observations on the day of the site visit and discussions with Micheal Brown of Jervaulx Fly Fishers ([www.jervaulxflyfishers.co.uk](http://www.jervaulxflyfishers.co.uk)).

## **2.0 Catchment / Fishery Overview**

Barningham Hill Tarn is situated on moorland above the village of Barningham, near Barnard Castle, County Durham, within the River Tees catchment (National Grid Reference NZ064096). The lake has an area of approximately four acres and was formed around 25 years ago by damming the course of some small streams draining the moors. The average depth is reportedly 3 – 5 feet with some deeper areas near the dam. It lies at an altitude of 250 metres above sea level on the edge of the moorland line, the surrounding catchment area being managed for rough grazing and grouse shooting.

The surrounding area is within the North Pennines target area for Higher Level Stewardship and is an area rich in bird life, including black grouse, curlew, grey partridge, lapwing, red shank and snipe. In addition to being an emergency source of water for livestock and fire-fighting on the moors, the lake was created with bird conservation in mind, incorporating a nesting island used by black-headed gulls and a sand martin nesting wall; geese are also present on the lake. Further information on the lake is contained in this article by Michael Brown on the Jervaulx Fly Fishers' website: [www.jervaulxflyfishers.co.uk/stories](http://www.jervaulxflyfishers.co.uk/stories).

The lake was originally fished by Jervaulx Fly Fishers, then by a private syndicate for about seven years which stocked with large rainbow trout of 8 – 15 lbs. Jervaulx acquired the lease again in 2014 and have stocked 100 rainbow trout of 1.5 – 2.5 lbs. Two anglers present on the day of the visit were catching rainbow trout regularly. Brown trout are present in the lake and have been observed gathering at the mouth of the Goredale Gill inlet in autumn and running upstream into the Gill (Photos 1 - 3). Brown trout have been caught from the lake to 16 inches in length and small brown trout were observed jumping on the day of the visit. The club rules stipulate

mandatory catch-and-release for brown trout, although it appears from catch returns that members also release the great majority of rainbows caught. The fishing season on the lake starts on 1<sup>st</sup> June to avoid disturbance of nesting birds.

### **3.0 Habitat Assessment**

The low intensity land use within the surrounding catchment of the lake ensures it has good water quality. Submerged aquatic plants (*Potamogeton pectinatus* and *Ranunculus* sp.) are present in the shallow margins on the north-west side and emergent marginal vegetation including rush (*Juncus* sp.) and yellow flag (*Iris pseudacorus*) is common around the lake, except in areas more heavily grazed by livestock and geese (Photos 4, 5). Bushes and trees are present on some banks and recent tree planting has been carried out near the derelict property on the north-west bank. Marginal vegetation and riparian bushes and trees play an important role in the lifecycles of aquatic invertebrates by providing habitat for emergence, moulting and egg-laying. Species from groups such as sedge or caddis flies (Trichoptera), damsel and dragon flies (Odonata) and mayflies (Ephemeroptera) benefit from healthy marginal and riparian vegetation, with knock-on benefits for their predators including birds, bats and fish.

Indigenous brown trout present in the moorland streams have colonised the lake and appear to have established a self-sustaining population. Goredale Gill is the main feeder stream, those at the southern end reportedly drying out during prolonged dry periods. Goredale Gill is very small and there is a significant drop (a waterfall about 0.6m high) a short distance above the lake (Photo 2), so spawning opportunities within this watercourse may be limited. There is however an area of gravel at the mouth of the Gill which is of the ideal calibre for trout spawning; brown trout have been observed gathering in this area at autumn spawning time (Photo 3).

Although brown trout are thought of as chiefly spawning on gravel in flowing water, many populations exist in upland lakes unconnected to flowing water, spawning instead on gravel margins. Successful spawning in these circumstances probably relies upon good water quality linked to altitude and land use (relatively low water temperature and consistently high dissolved oxygen content). Good water quality within Barningham Hill Tarn, in

addition to the flow of water at the mouth of the Gill, appears to provide suitable spawning conditions for sustaining the brown trout population.



**Photo 1 View of the tarn from Goredale Gill inlet**



**Photo 2 A drop in bed level of Goredale Gill a short distance upstream from the lake may hinder trout spawning migration**



**Photo 3 Gravel of suitable size for trout spawning in the mouth of Goredale Gill**

Wild brown trout are one of the most genetically diverse vertebrate species known and it is testament to this fact that the trout in Barningham Hill Tarn have adapted from living in tiny moorland streams to colonise the very different conditions found in the stillwater.

During the visit it was discussed whether the introduced rainbow trout could negatively impact upon the stocks of wild brown trout in the lake. This is a difficult question to answer because of the number of variables involved, but there is likely to be an impact via direct predation of brown trout by rainbows and/or competition for food resources. The limited spawning habitat available to brown trout means that juveniles are likely to either drop back out of the feeder streams at an early stage, or actually emerge from gravel within the lake margins; this makes them vulnerable to predation from spring onwards – just the time when rainbows are introduced. Diverse, complex marginal habitat (rushes, reeds, submerged bushes, boulders and cobbles, etc.) will reduce predation pressure from both rainbows and adult brown trout.

There is a degree of separation of diet between rainbows and browns, with the latter feeding more on benthic (bottom-dwelling) prey, particularly in the colder months. However, the upland nature of this lake means productivity is relatively low and therefore food competition may occur, especially for surface food during the summer. Both predation and competition are likely to be correlated with stock density and currently this is approximately 25 rainbows per acre (62 fish per hectare), most of which persist throughout the season because of catch-and-release. This stock density is comparable with stocking rates on productive lowland reservoir fisheries (50 – 80 fish per hectare) but lower than small put-and-take fisheries (150 – 200 fish per hectare).

A second, smaller moorland lake, Haythaite Tarn was inspected following the visit to Barningham Hill Tarn. Located a short distance away on higher moorland, Haythaite also appears to be man-made, largely shallow, with a dam across one side and a central island. Water drains from the surrounding moorland into the lake and the margins are soft and peaty and dominated by wet moorland plants. There appears to be one main inlet, a very small stream with a sandy bed (Photo 6), and an outlet in the corner of the dam which is ultimately a tributary stream of the Tees about five miles away.



**Photo 4 Margins with emergent plants provide good habitat for juvenile trout and invertebrates**



**Photo 5 In contrast, heavier grazing pressure produces a relatively bare margin. Note the valuable overhanging bushes on the far bank and the sand martin nesting structure.**

Brief fly-fishing of Haythaite produced one 10" trout landed and another similar hooked. Along with flat calm conditions which allowed accurate observation of rising fish, it was concluded that the lake has a low density of wild brown trout. These may have been present in the stream when the lake was created, or have colonised subsequently from the inflowing or outflowing stream during high water conditions. The very small, sandy nature of the inflowing stream is not conducive to successful trout spawning and may underlie the apparently low density of trout in the lake. Despite this, the presence of a self-sustaining population of wild brown trout in this location indicates the tenacity and adaptability of the species. Fly life on the tarn appeared good with observations of pond olive imago, sedges and various terrestrial species.



**Photo 6 Inflowing stream to Haythaite Tarn. The sandy substrate here and lack of gravel/stone substrate in the margins of the lake probably limit trout spawning success in this water.**



**Photo 7 Haythaite Tarn, looking towards the dam.**

#### **4.0 Conclusions and Recommendations**

Given the likelihood that any impacts of introduced rainbow trout upon wild brown trout stocks are on a continuum and the current stocking density is relatively high, consideration should be given to ceasing or reducing stocking and managing the fishery to maximise wild brown trout stocks. Stillwater fisheries with self-sustaining wild brown trout stocks are rare in England and Barningham Hill Tarn has the potential to be a valuable resource in this respect.

If stocking is continued, the following points are recommended:

- That rainbow trout continue to be used rather than brown trout. There is a chance of interbreeding between fertile, farmed brown trout and wild brown trout which reduces the survival chances of the wild stock in the longer term.
- Stock fish are removed from the fishery during the season rather than returned. Over-winter survival of stock fish is likely to be poor in this

upland lake and prolonged high rainbow densities throughout the season increase the likelihood of impacts on wild brown trout.

- Catch-and-release of brown trout should continue.

In terms of habitat improvement, the following points are recommended:

- Consider introducing some gravel 10 – 30 mm in diameter into the margins of the lake in the vicinity of the inflowing streams at the southern end and the outflow (Photo 8) at the northern end to provide increased spawning opportunities for brown trout. The depth of gravel should ideally be at least 30cm with a similar minimum water depth over it.
- Protect the known spawning area at the mouth of Goredale Gill – prevent access for livestock and people to this area between October and April.
- Manage the grazing pressure around the lake margins to maximise the availability of emergent marginal plants and bushes, to provide good habitat for juvenile trout and invertebrates.



**Photo 8** Outflow from the lake – an area where gravel could be introduced to increase trout spawning opportunities.

## **5.0 Acknowledgement**

The Wild trout Trust would like to thank the Environment Agency for their continued support of the advisory visit service

## **6.0 Disclaimer**

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We have produced a 70 minute DVD called 'Rivers: Working for Wild Trout' which graphically illustrates the challenges of managing river habitat for wild trout, with examples of good and poor habitat and practical demonstrations

of habitat improvement. Additional sections of film cover key topics in greater depth, such as woody debris, enhancing fish stocks and managing invasive species.

The DVD is available to buy for £10.00 from our website shop <http://www.wildtrout.org/product/rivers-working-wild-trout-dvd-0> or by calling the WTT office on 02392 570985.

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