River Pang, Pangbourne

Advisory Visit April 2017

Key Findings

- **This section of the River Pang has significant potential for enhancement.**
- **The current management regime is sensitive to the needs of both angler and the environment but if increased wild trout production is required then changes to the current management are recommended.**
- **Riparian habitat quality is generally good.**
- **The channel shape requires more physical diversity to promote an enhanced chalkstream environment.**

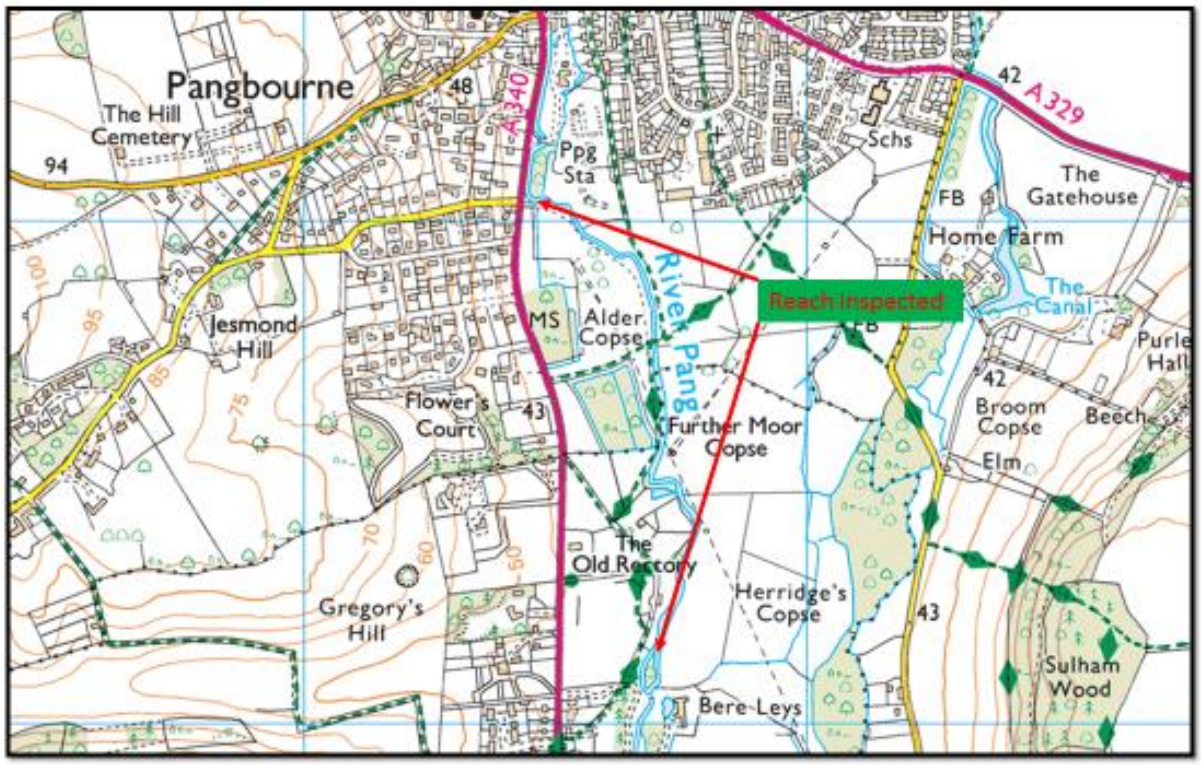
1.0 Introduction

This report is the output of a site visit to the lower River Pang in Berkshire. The 1km reach of channel inspected runs from National Grid Reference SU 63444 76051 down to SU 6370375145. The request for the visit came from Mr Peter Devery who is a committee member for the controlling fishing syndicate.

The syndicate is run along the lines of a club, with the members undertaking their own fisheries maintenance and management work. The fishery is annually stocked with both brown trout (*Salmo trutta)* and rainbow trout (*Oncorhynchus mykiss*) and also supports a reasonable number of wild fish. Mr Devery is keen to review the group's policies, especially with regard to habitat management, but also to review the current stocking programme.

The Pang is classified under the Water Framework Directive as Waterbody ID No. GB106039017340 and is currently assessed as being in good ecological condition.

Comments in this report are based on observations made during the site visit and discussions on the day with Mr Devery. Normal convention is applied with respect to bank identification, i.e. left bank (LB) or right bank (RB) whilst looking downstream. Upstream and downstream references are often abbreviated to u/s and d/s, respectively, for convenience. The Ordnance Survey National Grid Reference system is used for identifying locations.



Map1. River Pang. © streetmap

	River Pang
River	River Pang
Waterbody Name	River Pang
Waterbody ID	GB 106039017340
Management Catchment	Thames and Chilterns South
River Basin District	Thames
Current Ecological Quality	Good Status
U/S Grid Ref inspected	SU 6344476051
D/S Grid Ref inspected	SU 6370375145
Length of river inspected	1.0km

Table 1. Overview of the waterbody. Information sourced from http://environment.data.gov.uk/catchment-planning/WaterBody/GB1060400013360

2. Catchment Overview

River Pang rises from chalk springs near the village of Compton in the Berkshire Downs. The exact location of the source varies according to prevailing groundwater levels, with the upper reaches being winterbourne. The river initially flows due South and then West before swinging North East to join the Thames at Pangbourne, a distance of approximately 23km.

The Pang has until comparatively recently been severely affected by groundwater abstraction pressures for potable supply. Changes to the abstraction at Compton have significantly reduced groundwater losses from the catchment, with a noticeably beneficial impact on river flows.

3. Habitat Assessment.

Habitat quality within this reach of the Pang is typical of many chalkstream channels. The channel here is comparatively uniform in shape and contained within predominantly low banks, which have been fenced to exclude grazing livestock (photo 1). This has enabled a valuable mixture of riparian plants and trees to become well established, providing some excellent bank protection and promoting diverse in-channel and riparian habitat.

A luxuriant fringe of emergent plants is well established in many areas where there is a combination of a shallow toe to the bank and access to direct sunlight (photo 2). These well covered margins provide important refuge habitat for the adult life-stages of many river flies and also provide important winter cover when emergent plants die back and then fold down into the margins.

Photo 1. Stock fencing provides protection for both river banks and has enabled a range of plants to become well established.

Photo 2. A thick fringe of emergent plants has established where sufficient light hits shallow margins, helping to squeeze the channel width and maintain brisk flow velocities, in turn helping to sweep fine sediments away and in places exposing a clean gravel bed.

Woody flow deflectors have been installed by the Environment Agency at various locations (photo 3) to help promote a more diverse river bed topography. Some of these structures have had the desired effect. However, the uniform shape and modest size of some of the woody features has resulted in only modest changes to the shape of the river bed.

Photo 3. A woody flow deflector helping to promote changes in flow patterns and bed shape.

Sections of fallen, or partially fallen willow have been removed from the channel adjacent to a site that appears to be ideal for trout spawning (photo 4. gravel ramp). It is highly likely that the fallen willow branches that were previously here contributed towards the formation of this valuable feature and, now removed, there is a strong possibility that the local gravels will become infiltrated with fine sediments, reducing their value as a high quality spawning site. This area still supports habitat that an adult trout would find attractive but without the addition of the overhead cover, any fish taking up residence here is likely to feel nervous and more vulnerable to predation. Striking the balance between creating habitat for fish and access for angling is difficult. For any fishery to flourish, particularly for wild trout, it is imperative to retain habitat features that are likely to provide both cover and promote diversity in the physical shape of the channel.

Towards the bottom end of the beat there are long shallow runs that provide potentially good spawning and nursery habitat (photo 5). A slightly wider and shallower channel profile would make these sites even more valuable. Options for enhancement are discussed further in the recommendations sections of this report.

Photo 4. A trimmed willow tree adjacent to a potentially good spawning location.

Photo 5. A long shallow run towards the downstream end of the fishery. The channel width dimensions are extremely uniform throughout the reach and typical of a managed chalkstream. Well covered shallow margins with low flow velocities are required for optimum nursery habitat.

Opportunities to create improved lies for fish exist via hinging live willow down into the margins (photo 6). A partial hinge cut into these leaning trunks and folding them down into the margins creates high quality habitat with the minimum amount of work or materials.

Photo 6. The bottom two or three leaning trunks can be easily folded down into the LB margin following a partial hinge cut on the top side of the trunks.

Photo 7. Example of a typical hinge cut

Habitat quality in the upper half of the fishery is of mixed quality for brown trout. There were some excellent examples of low, overhanging marginal cover adjacent to pacey glide habitats providing good quality holding lies (photo 8 & 9)

Photo 8 Good quality holding lie where the combination of depth, flow velocity and proximity to overhead cover make these sites attractive for trout holding

Photo 9 As for Photo 8, physical diversity creates a mosaic of habitat features which trout will find attractive

There were also examples of deep, comparatively featureless glides (photo 10), particularly in the reach immediately upstream of the access bridge. It is understood that these sections are quite popular with some of the older members due to ease of access and because they tend to hold some of the stocked fish quite well, particularly rainbows. The lack of any notable flow velocity through these deeper reaches mean that brown trout are far less likely to take up a suitable individual feeding station. Stocked triploid brown trout and rainbows may well find this benign deep glide habitat attractive, as these fish often gather in small pods and adopt a more mobile approach to feeding than wild brown trout, which rely more on adopting an energy saving lie adjacent to pacey water, where the flow brings food items within easy reach.

Photo 10. Long, deep glides are not usually associated with high densities of wild brown trout. The great tussock sedges are a particularly attractive feature of this fishery.

Several cattle drinking bays (photo 11) have been created in this top section. These are not thought to provide valuable habitat for trout in their own right but do provide high quality refuge habitat for juvenile coarse fish and, as such, can contribute towards supporting food items for adult trout located nearby.

It is understood that these structures are unpopular with some of the members and appear to be a source of sediment and nutrient. The cattle fencing and associated drinkers have protected the soft river banks and margins to excessive damage and should therefore be retained. The settled sediments within the drinking bays (Photo 12) may well be derived from the river rather than directly from the adjacent land or livestock and are unlikely to be a significant source of nutrient rich sediment.

Photo 11. Cattle drinking bays and fenced river banks are a good option to protect vulnerable chalk stream margins from being damaged by too many grazing animals.

Photo 12. These sites are hugely valuable for coarse fish fry which can provide another food source for predatory trout.

Approximately 400m from the top boundary, the river swings through a sharp "S" bend at the head of which the channel is impounded by a full width weir structure (photo 13). This was built to create a head of water to feed a small ornamental pond located adjacent to the LB.

The impounding nature of the weir is severely restricting sediment transport and the development of any high quality in-channel habitat in the reach above. In addition, the amount of flow diverted through the pond has almost certainly resulted in a rapid build–up of settled sediments within the pond itself. Weir removal is not an option for the club without agreement from the neighbouring land owner. Removing the weir impoundment would represent a significant enhancement for the river. The adjacent lake could be restored and would be perfectly viable without a constant through-put of water. Blocking the outlet to the pond and digging out the inlet to river channel bed level will enable the pond to mirror river levels and keep the pond viable as a wildlife and ornamental resource. Some periodic maintenance will still be required but potentially this scenario would deposit significantly less sediment within the pond compared to the current flow regime. A dialogue with the pond owner to explore options is recommended.

Photo 13. Full width weir built to create a head of water for the inlet to a small ornamental pond.

Another low weir has been installed further upstream using blocks and concrete bag work. This weir is not acting as a barrier to free fish migration but it is still having an adverse impact on habitat quality upstream. Removing the central section will create a flume into the downstream pool and restore sediment transport, reducing the risks of the bed rising further in the reach above.

Photo 14. A low bag-work weir is promoting upstream bed deposition and should be notched out or completely removed. The wings of the existing weir could be replaced with log deflectors to promote the flume into the downstream pool.

Some good examples of the use of woody flow deflectors were seen (photo 15). These structures can be further improved via locally loosening the river bed materials to promote some enhanced bed scour. The upwelling and turbulence promoted by the logs, coupled with slightly deeper water is likely to be attractive for holding trout. In addition the bed material that is loosened will be deposited into a ramp just downstream and could provide some enhanced spawning opportunities.

Photo 15. Opposing upstream "V" deflector promoting elevated flow velocities in the centre of the channel. Loosening the bed material with a fencing spike in the area marked in red would further enhance habitat quality at this site.

Near the top boundary, the LB river margin has been severely degraded with inappropriate timber revetment (photo 16). The lush, natural margin adjacent the RB is at least providing some useful habitat and is likely to be infinitely more resilient to erosion following a high flow year. It would seem unlikely that this work was sanctioned by the Environment Agency. It is possible to mitigate the impacts by creating a low-level wet toe to the margin which could then be planted with energy absorbing emergent plants. These need not be tall species but plants like iris, sedge and reed sweet grass which could help to protect the boarded revetment and provide important habitat for a wide range of species.

Photo 16. Long section of inappropriate bank protection. This type of timber revetment will be ineffective against long-term bank erosion and is biologically impoverished as well as being aesthetically ugly when viewed from the RB.

Land use adjacent to the vast majority of this section of the Pang appeared to be reasonably river friendly (photo 17). The meadows adjacent to the LB in particular have obviously only been used for light grazing or hay production and are considered to be ideal for the bottom of a chalkstream valley. Grazing pressures adjacent to the RB were a little more intensive but currently are not cause for concern.

Photo 17. Meadows adjacent to the LB support rough pasture and scrub as well blocks of mature woodland. Ideal land use for a river valley bottom.

4. Stocking

Long sections of the River Pang are perfectly able to support sufficient numbers of wild brown trout without the need to resort to any trout stocking. Whilst many clubs and commercial fisheries still do stock chalk streams with domesticated farm-reared fish, increasingly more clubs and syndicates are benefitting from investing in better habitat management and a cessation of stocking, and reaping the benefits as a result in the shape of increasing numbers of wild trout coming through. This approach is not for every club and it is true that fishing for wild fish in a wild environment is infinitely more challenging than catching stocked fish in a linear stew pond.

It is unusual for rainbows to be stocked into rivers these days and their constant movement is unsettling for both stocked browns and wild trout. The following text has been pulled together by my colleague Gareth Pedley and encompasses many of the issues associated with trout stocking which may help to inform the syndicate:

The native trout populations of Britain possess great genetic diversity, being the product of several separate colonisations following the last ice age. Many are now further distinct from each other, having adapted to their local environments over time. The natural genetic variability of these populations makes them amazingly resilient and adaptable to changing environmental conditions, which they should continue to do providing human impacts upon them and their habitats can be limited.

However, over the last 150 years, human impacts upon fish populations has increased exponentially, with major issues arising from the way in which we manage land and rivers. To compound these issues, direct interference with wild fish populations also increased, with large numbers of hatchery bred fish being introduced to rivers. The artificial mating that occurs within a hatchery bypasses vital chemical and visual aspects of mate selection; a process that exists to ensure genetic compatibility and maximise the fitness of wild fish. Stocked fish (both diploid and triploid), are also affected by domestication and natural selection for the farm environment, even within one generation in the hatchery (so this includes fish from wild brood-stock schemes). After all, farmed fish are the individuals that have survived within a concrete raceway, earth pond or tank etc. and are therefore poorly adapted for the very different conditions of a natural river. Adaptation to a farm environment is cumulative, with genetic diversity, natural behaviours, and survival rates when released to the wild all decreasing with each generation in captivity.

Stocking fish therefore produces a *'no-win'* situation: if they don't successfully reproduce in the wild, or are infertile (triploids), they are simply a negative impact upon the ecosystem; if they do survive long enough to breed, their offspring have much poorer survival than the offspring of wild fish. However, stocked fish do still temporarily take up space and resource within a river that

could have been used by wild fish. Naïve stocked fish also make an easy target for predators, potentially increasing predator survival rates, attracting greater densities of predators, and increasing the negative impact they have on a river.

So, what is the other option?

Natural rivers (without stocking) have a far greater capacity to produce and hold healthy fish populations. As stated, they were successfully producing an abundance of fish for a long time before we started interfering.

A major key to the success of wild salmonids is their life strategy: over-production of offspring that are then subject to density-dependant mortality. The greater the habitat availability in any year, the greater the number of trout that will survive, thereby mitigating for mortalities and annual fluctuations in the population. This also means that populations can be easily increased by improving habitat quality.

As soon as they emerge from the gravel, trout fry disperse throughout the available habitat, constantly competing to maintain territories. This ensures that the fittest, dominant fish control the best lies, with easy feeding for low energy expenditure. They will then remain there until they challenge for a new territory or are displaced by a more dominant individual. Wild fish production therefore ensures habitat is fully utilised and a river holds the optimal number of fish, with the available space being naturally repopulated each year. Such efficient habitat utilisation is impossible to achieve through artificial stocking or alongside stocking, because stocked fish disrupt the wild population structure and hierarchies.

While wild fish constantly defend their adopted territory and strive to stay within it, stocked fish have little affinity or suitability to the arbitrary reach in which they are stocked. A large proportion of fish stocked into rivers therefore leave the stocking location or lose condition and die within a short time (particularly during high flows). Consider where the thousands of fish previously stocked into fisheries are at the beginning of each season and why there is even a requirement to restock. In contrast, un-stocked wild fisheries provide some of the best fishing early season, as the fish begin feeding post-spawning.

Consequently, most angling clubs actually report increased catches after ceasing stocking, as demonstrated by the ever-increasing number of case studies on the WTT website - www.wildtrout.org/content/trout-stocking. There is sometimes a lag period as the wild fish population begins to recover but an increase in juvenile numbers is often evident from year one. Anecdotal evidence from an increasing number of fisheries also suggests that grayling stocks proliferate once stocking ceases.

An excellent video produced by Wild Fish Conservancy North West documents how the state of Montana in North America ceased stocking after realising the

major negative impact it was having – www.youtube.com/watch?v=U_rjouN65-Q&app=desktop

5. Conclusion

This section of the River Pang supports some good quality habitat for trout and overall the club manage the fishery sensitively. However, the river channel is ripe for further habitat enhancement. Balancing the conflicting needs of anglers, especially those who might be elderly, or slightly less skilled than others, with the habitat requirements of a healthy chalk stream is always challenging.

There are options for substantial enhancement at relatively low cost via the creation of further cover using introduced woody materials. More radical measures might include reshaping the channel to create a more diverse bed topography and planform. A reduction, or cessation of stocking will also help wild fish to become better established throughout the fishery.

Perhaps restricting stocking to the very short section of deep glide habitat adjacent to the access bridge might satisfy those less able to fish wild water for wild fish.

Establishing some high quality spawning and nursery habitat in the top section of the beat would help to improve the whole fishery.

6. Recommendations

- Open up a dialogue with neighbours over the role of the existing weir and the possibility of a joint venture to improve both the river channel and the creation of a sustainable natural pond environment. A move towards removing the weir might attract funding from the Environment Agency.

- Offer to help your upstream neighbour to protect their toe boarding with a low, natural margin of emergent plants. This approach is often more effective than simply complaining.

- Move, but do not remove, fallen woody material that is deemed to be causing a local issue; elsewhere, leave it to establish naturally.

- Look for opportunities to "hinge" leaning marginal trees.

- Retain as much brash and brushwood in marginal zones as possible. This is particularly important adjacent to any shallow riffle habitats.

- Consider the possibility of pulling back the river margins adjacent to potential spawning and nursery sites to create some shallow riffle habitat with very shallow margins. This type of habitat is rare on many managed chalkstreams but is a critical component of wild trout habitat.

- Have a debate within the group about stocking policy. Initially suggest that stocking is only undertaken in the deep glide upstream of the access bridge. Experiment with reduced densities and insist on a catch return for all rods. It is not unusual to find that a reduction in stocking densities leads to an increase in rod catch.

- Encourage all the rods to move towards catch & release if at all possible. This reduces stocking costs and the risks of valuable wild broodstock being killed, and can help to eventually move the rods towards a sustainable wild fishery.

- Consider the possibility of a radical habitat enhancement project to create improved wild trout spawning and nursery habitat. The WTT can design a scheme via a Project Proposal and help the group to explore options for funding.

- No actions are required regarding the cattle drinkers although constructing improved stiles for improved river access will help.

6. Making it Happen

The WTT can provide further assistance to help implement the above recommendations. This includes help in preparing a project proposal with more detailed information on design, costs and information required for obtaining consents to carry out the works. If required, a practical visit can be arranged to demonstrate habitat improvement techniques. Demand for these services is currently high but WTT is able to provide further advice and information as required. Further advice on fund-raising can be found at www.wildtrout.org/content/project-funding

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 www.wildtrout.org/product/rivers-working-wild-trout-dvd-0 or by calling the WTT office on 02392 570985.

The WTT website library has a wide range of materials in video and PDF format on habitat management and improvement.

7. Acknowledgement

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

8. Disclaimer

This report is produced for guidance; no liability or responsibility for any loss or damage can be accepted by the Wild Trout Trust as a result of any other person, company or organisation acting, or refraining from acting, upon guidance made in this report.