



## **The Pagham Rife at Runcton**



**Advisory visit February 2016**

## 1. Introduction

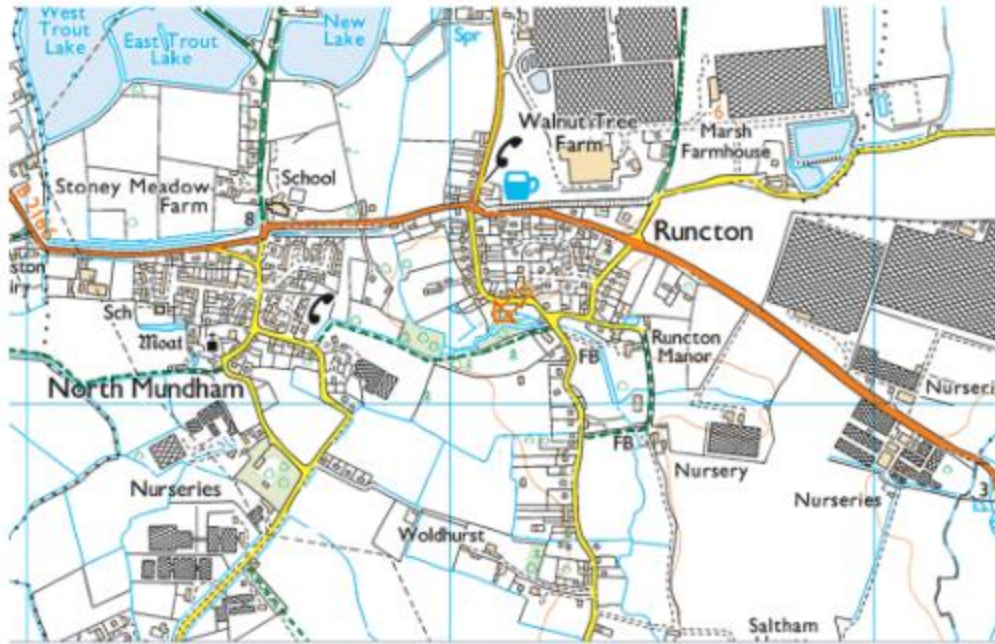
This report is the output of a site visit to the headwaters of the Pagham Rife, located at Runcton Mill in West Sussex. The request for the visit came from Stephen Sharpe who owns the Mill, as well as the mill pond, a by-wash channel, and a short section of outlet channel running downstream of the mill house. The site inspection was carried out from the road bridge at the bottom boundary (National Grid Reference SU882021) up to the point where the neck of the mill pond splits off from the by-wash channel (SU880021), in total approximately 150m of channel.

Mr. Sharpe has recently purchased Runcton Mill and is keen to develop the mill pond as a recreational fishery, and explore options for enhancing the stream. Last year, Mr. Sharpe found a handful of small dead brown trout *Salmo trutta* in the stream which had unfortunately succumbed to an unknown water quality issue. The presence of a wild trout population in this system was not known to the WTT prior to being contacted by Mr. Sharpe.

The Rifles make up a collection of relatively small streams flowing across the Chichester Plain. In many places they have been widened, deepened, and/or straightened to suit local farming and flood risk management practices. Where they flow into the sea, most have outfalls and sluices protecting the Rifles from seawater inundation, although in many of the watercourses there is still a tidal impact caused by the backing-up of flow during each high tide. In various locations stop-boards have been installed to maintain water levels. Some of these boards are only in place during summer months, which perhaps explains how a trout population has developed at this particular site.

The Pagham Rife is one of several freshwater rifles which flow into Pagham Harbour which is an internationally important site for bird conservation, designated as a Specially Protected Area, a Site of Special Scientific Interest, and a RAMSAR site. It is designated under the Water Framework Directive as waterbody ID number GB 107041012880, collectively known as the "Western Streams". When previously assessed by the Environment Agency at a site in South Mundham, approximately 2km downstream of Runcton, the stream was failing water quality objectives for both phosphates and dissolved oxygen; it was also assessed as being in poor condition for fish.

Comments in this report are based on observations on the day of the site visit and conversations with Mr. Sharpe. Normal convention is followed with respect to bank identification, i.e. banks are designated Left Bank (LB) or Right Bank (RB) whilst looking downstream.



Map1. Pagham Rife, Runcton Mill

## **2. Habitat Assessment.**

### **2.1 Downstream of the Mill**

The section of channel downstream of the mill building and on to the bottom boundary consists of a wide, shallow channel flowing over a mainly flat bed. This section has potential for providing opportunities for trout spawning but currently supports very little cover for trout of any life stage. Habitat for trout fry, parr and adult fish was very limited and mainly restricted to the arches of the downstream road bridge shown on the cover photo.

The downstream section of the LB margin is boarded by a vertical wall (photo 2), with the RB constructed of earth banks forming part of the curtilage of the property. A tiny amount of cover is provided by some trailing vegetation and overhanging branches located just upstream of the walled section.

There is also a modest plunge pool that has formed at the exit from the mill race which could potentially provide some refuge for an adult fish but the lack of any low, overhanging cover seriously compromises its ability to hold fish comfortably.

### **2.2 By-wash Channel**

Bypassing the mill is a 100m plus long by-wash channel (photo 3 and 4). The steep gradient and narrow channel has maintained a clean gravel bed and appeared to potentially be an ideal spawning and nursery site. This was confirmed with what appeared to be at least two definite trout redds (nests of trout eggs) shown in photos 5 and 6.





Photo 2. Broad, shallow channel with very little cover for fish



Photo 3 By-wash channel.





Photo 4. By-wash channel. Gravel rich but lacking cover and diversity.



Photo 5. The light mound of gravel appears to indicate trout spawning activity.





Photo 6 A more obvious "redd" in exactly the type of location where trout spawning would be expected. The size of this redd would indicate brood stock of a significant size, a possible indication of the presence of sea trout.

The by-wash channel is man-made and although supporting rich seams of gravel and a vigorous flow velocity, ideal for trout, the overall topography of the stream bed was comparatively flat, with precious little variation in channel depth or width and chronically lacking any significant cover. Any trout utilising this site for spawning is highly likely to run up in darkness, or possibly down from the well covered site above, spawn, and then return to areas affording more cover from the attention of predators.

If this site is indeed being used for spawning by either resident brown trout or migratory sea trout, then its productivity could be greatly improved via a range of simple measures. These might include changes to the riparian maintenance regime and the provision of cover for both pre and post spawning adults, as well as for fry and parr. A prescription for managing the by-wash channel is highlighted in more detail in the conclusions and recommendations section of this report.

At the head of the by-wash channel is a water-level control structure consisting of a drop-board arrangement (photo 7). A similar structure is in place on the parallel channel that forms the neck of the mill pond, which also has a grill or grate designed to contain stocked trout which are to be introduced into the mill pond.

It is understood that stocking is to be carried out with a modest number of farm-reared triploid brown trout following an EA consultation. It is likely that a high proportion of the stocked trout placed into the mill pond will spend most of their

time residing in the inlet neck, where the flow is likely to attract them. In many ways, stocked rainbow trout might be a better “fishing” product for the mill pond and represent less of an environmental hazard to the local wild brown/sea trout stock should any escape. Rainbows are also more tolerant of warm water with low oxygen content and are more mobile, generally mooching about and providing better opportunities for angling in the pond itself. Depth of water in any still water trout fishery is considered to be very important and helps to buffer against the effects of warm water and low dissolved oxygen.

Currently the impounding boards placed into both channels are having an adverse impact on the section or Rife running upstream above the flow split (photo 8). Reducing the height of the impounding boards on both the by-wash channel and the mill pond channel will result in improved habitat developing on the upstream reach.



Photo 7. Water level control boards at the head of the by-wash channel.

In many ways, prioritising flow splits into the by-wash channel by lowering the drop boards at this location will have two direct benefits for the site as a whole.

Increased flow via this route could be harnessed to create some modest pool habitats in the by-wash channel itself, thus creating some holding habitat for adult trout. The extra flow would also benefit invertebrates and gravel quality and potentially boost spawning success.

In addition, if the amount of flow entering the mill pond is throttled it will also reduce the rate of sedimentation within the pond itself. All that is required within



the mill pond is enough flow to maintain a desired water level. Any additional flow will not necessarily enhance the fishery quality of the pond itself, however brown trout will require cool, well oxygenated water and any reduction in flow will potentially impact on how the stocked trout behave and survive during periods of hot weather. Certainly during the cool autumn, winter and early spring months, more flow could easily be diverted down the by-wash channel route. Stability of flow into the by-wash channel is important and constant changes to flow rates via regular board installation and removal is not recommended.



Photo 8. The Rife upstream of the mill pond is adversely impacted by the impoundment. If run slightly lower and faster, better quality habitat would eventually establish.

#### **4. Conclusions**

If the Pagham Rife system supports a wild trout population, as it would appear it almost certainly does, then it is most likely that the entire population is reliant on this short 150m section of by-wash channel at Runcton Mill as the only viable spawning site on the whole system. The lack of any significant bed slope in the vast majority of the Pagham Rife would suggest that sites like the Runcton Mill by-wash channel are critically important in sustaining any viable population. There is some reasonable trout habitat downstream of the road bridge (photo 9) but the vast majority of the Rife is more akin to a big ditch system than a flowing stream conducive to supporting a viable trout population.





Photo 9. Section of good juvenile trout habitat downstream of the road bridge.

The Runcton Mill site is very close to the perennial source of the groundwater feeding into the Pagham Rife system. Although the EA has identified significant water quality concerns on the downstream reach near South Mundham it is possible that the reasons for the WFD failures are generated locally via intense local agricultural land-use activities, compounded by the deep and wide channel morphology and may not be impacting on this upstream section. Walking upstream from the Runcton Mill site to investigate adjacent land use might help to allay fears that similar activities do not pose any significant threats to the Runcton Mill fishery below.

Building a healthy and viable trout population in the reach at Runcton will potentially help to raise the profile of the stream as one worthy of further protection and possible enhancement. Currently the limited protection that the Rife is afforded by the regulators from activities such as licenced discharges and abstractions is more focused on providing protection for the Pagham Harbour site rather than the Rife itself. Identifying the presence of a viable trout population in the headwaters should be brought to the attention of the EA so that its presence can contribute towards any future decisions the regulators have to take with regard to local environmental protection. Identifying whether the population is underpinned by resident brown trout or migratory sea trout will also have a bearing on how the whole Rife should be managed.

The key to enhancing the Runcton Mill site for wild trout is to prioritise flow into the by-wash channel, introduce more diversity into the shape of the stream bed, and provide more low overhead cover.

An easy first step is to set up a buffer strip adjacent to both banks of the by-wash channel. Ideally the buffer strips should be several metres wide but even a 1m wide strip of uncultivated or less-intensively managed garden will help to protect the banks and create an improved environment for trout. The buffer strips should not be strimmed, mowed or planted with non-native garden plants; a big challenge in a garden environment. Allow some low scrubby plants to develop and trail into the margins. The scruffier the better.

Consider introducing some large woody material (big logs, branches or boughs) firmly secured to the stream bed with driven posts. The woody material will help to scour deeper pool habitat, sort river bed sediments and provide enhanced spawning opportunities. The woody materials also provides food for aquatic invertebrates and vital in-channel cover for small trout. There is masses of information on the benefits of woody material found on our web site (at <http://www.wildtrout.org/content/wtt-publications>), as well as instructional manuals and videos on how to create these improved habitats.

Care must be taken when introducing woody material flow deflectors so that they do not pose a risk of breaking away and causing a hazard downstream. Also the configuration within the channel is important as incorrectly installed, flow deflectors can cause significant bank erosion. This may, or may not be desirable depending on the location.

'Cover' logs popped in parallel to the flow and adjacent to the toe of the bank can also encourage trout to take up residence in open, shallow environments. The section of channel immediately downstream of the mill looks ideal for one or two cover logs.

The principle of the cover log is that there is a gap underneath where trout can safely hide from predators but also safely nip out into the flow to intercept passing food items. To be effective they need to be positioned adjacent to the margin that carries the majority of the flow velocity. A cover log is shown up on the bank ready for deployment in photo 10 and how they should look once installed into the channel, mimicking an undercut bank (photo 11). Simple brushwood bundles installed (photo 12) in similar fashion are also hugely effective, especially on sections immediately downstream of known spawning sites.





Photo 10. Cover log sat up on two woody rings cut from the end of the log, drilled and ready to be pinned to the bed with steel re-bar.



Photo 11. Correctly installed parallel to the flow and tight against the river bank.



Photo 12. A simple brushwood bundle wired to a driven chestnut post providing cover for newly hatched trout fry in a shallow gravelly margin.

## 5. Recommendations

- Encourage rougher, more naturalistic river margins to develop by reducing bankside maintenance. This will protect the banks and provide habitat for fish and the food of fish.
- Plant low, overhanging trees and bushes to provide enhanced cover
- Experiment with the drop boards at the top of the by-wash channel to prioritise as much flow as possible via this route. Keep the impounding height of both sets of boards as low as possible to help improve habitat quality in the reach above and promote improved fish passage.
- Introduce woody material to the channel to promote bed scour and provide cover. Use large woody material to promote bed scour, parallel cover logs for adult trout cover, and brushwood for enhanced fry and parr cover.



- Consider attending a training course in river-fly monitoring. This will potentially enable some self-monitoring of local water quality via a simple assessment of the presence or absence of key aquatic invertebrates. For further information visit [www.riverflies.org](http://www.riverflies.org)
- Attempt to find out exactly what fish are digging redds in the by-wash channel. Look carefully at the by-wash channel in the early autumn following any rise in water levels for signs of scrapes. Investigating after darkness with a torch may help to determine whether or not large trout are finding their way into the system from the sea. Share any information with the Environment Agency. The presence of migratory trout in this system would be amazing!
- The WTT can potentially help with a Practical Visit. Further details are available on our website:

<http://www.wildtrout.org/content/river-habitat-workshops-and-practical-visits>

## **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 <http://www.wildtrout.org/content/project-funding>

## **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 and not for specific advice; 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. Accordingly, 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 comments made in this report.

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.

The WTT website library has a wide range of materials in video and PDF format on habitat management and improvement: <http://www.wildtrout.org/content/index>