

WILD Project

Rivers Management Plan

for Fairford Parish

May 2016



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1 Background to the Report

This report provides an ecological overview of the River Coln for Fairford Parish as part of the WILD project. It sets out broad objectives for the ecological and environmental enhancement of these sections of river. The WILD project will issue similar reports to parishes covered by the project in order to provide relevant information for future works over and beyond the lifespan of the WILD project.

1.1 Overview of the River Coln

The River Coln rises at a spring line north of the village of Brockhampton and flows in a south easterly direction to its confluence with the Thames at Fairford, via the villages of Withington, Fossebridge, Coln Rogers, Winson, Ablington, Bibury, Quennington and Fairford. In total the river is around 51km long and the underlying geology is limestone and the river has a good gravel base thanks to the alluvial deposits of the Thames floodplain.

There are a number of online lakes and ponds along the length of the River Coln along with mill buildings and aquiculture (trout farm at Bibury) the river has been subject to significant modification along its length. It is also receives point source pollution from Waste Water Treatment works at Andoversford, Withington, Bibury and Fairford, but its water quality assessment is considered was Good from 2009 through to 2015.

In the Upper Thames Catchment the Environment Agency considers the River Coln in one Waterbody section within the Cotswold Water Park Area known as River Coln 29990 (Source to Thames).

Cycle 1 Waterbody Summary Report River Coln 29990 (Source to Thames)

In 2013 the river was classified as Moderate under the Water Framework Directive failing under the ecology elements due to scoring Moderate for fish although the river had good plant and invertebrate life. The reasons for failure were considered likely to be due to groundwater abstraction and physical modification and also suspected predation of fish eggs and fry by signal crayfish and barriers to movements.

In the 2015 round the fish status had dropped to poor probably due to changes in monitoring points and updated data, similarly chemical water quality has also remained the same staying at Good.

1.2 The River Coln at Fairford Town Parish

The section of the river which is included in the parish of Fairford is about 4.8km long the most upstream point within the Fairford parish is actually located just south of the village of Quennington and the land to the west. The first section of River in Coln within the Fairford parish has good meandering and is contained within a much more obvious valley than most of the rivers in the Water Park area. The river and its associated channels have been damaged in a number of places via livestock accessing the watercourse.

The over half of the river through the Fairford parish has been subject to major modification to its morphology it being effectively dammed by the mill at Fairford thereby creating an online lake within Fairford Park where the river (called Broad Water) would have naturally had been. This changes the ecology of the habitat to that of standing water rather than a river which obviously changes the species that can thrive in this habitat.

Once the river has passed Fairford Mill it is split for a short length before it reaches another weir and then becomes one channel again around Horcott, but here the river has been straightened and is very wide and shallow so again does not provide great habitat for river fish.

1.2.1 Stakeholders

Within the Fairford parish the land surrounding the riparian corridor is owned by relatively few landowners including a Trust, a Public House and farmers. The fishing interest along this stretch is intense with at least 2 fishing syndicates operating along this stretch.

1.2.2 Riparian land-use

Land use next to the river is largely farmland mainly grazing for beef cattle and sheep with some arable, some woodland planting and general recreation fishing and walking.

1.2.3 Flood risk

The part of the village closest to the northern bank of the River Coln as it flows through the village is considered to be within Flood Zone 3 a flood that has a 1 per cent (1 in 100) or greater chance of happening each year. This is largely to do with the topography of the area as the land to the north is a steeper valley and once it reaches the village the land opens out and it lower lying to the north so at times of high rainfall this is where water will spill out onto what was naturally the floodplain.

<http://apps.environment-agency.gov.uk/wiyby/default.aspx>

Concerns about flooding have lead to further habitat degradation via the remove of course and large woody debris from the river.

1.2.4 Public access/Footpaths

The local parish has good access to the river to the south of the village and a small section to the north.

1.3 River Coln Biodiversity Value

The walkover survey was conducted in April 2014 so the assessment was not a full ecological survey but notable species were recorded.

1.2.1 Flora

Most of the survey work was carried out during the spring meaning it was not possible to record the full floral assemblage, but notes on any visible flora were made. On the water margins there are dense stands of Reed Sweet-grass *Glyceria maxima*, Lesser pond-sedge *Carex acutiformis*, Water mint *Mentha aquatic*, Meadow Sweet *Filipendula ulmaria*, Butterbur *Petasites hybridus*, Water Forget-me-not *Myosotis scorpoide*, Marsh Marigold *Caltha palustris* and Flag Iris *Iris pseudacorus*.

There was some aquatic vegetation noted Water-starwort *Callitriche spp.* in this section but only in small quantities and local residents have expressed concern about the lack of Watercrowfoot *Ranunculus spp.* which used to be very prolific in the river until around 2007 when large quantities were lost after summer flooding.

1.2.2 Fauna

- Invertebrates

No specific invertebrate survey was conducted but casual observations are noted however the early spring date of the survey meant that no invertebrates were noted on the day.

Signal crayfish *Pacifastacus leniusculus* are present in high numbers on the Coln and are undermining the bank in places. The Environment Agency and Local Records Centre would have detailed data on freshwater invertebrate assemblages if required.

- **Fish**

Some fish were noted at the time of survey but these were stocked Brown Trout who are used to being fed at the Fairford Mill bridge. No natural fish were noted at the time of survey but water levels were very high and the river was running fast obscuring views otherwise more fish would have been spotted the Coln is known to have a reasonable fish species range with an Environment Agency electro-fish sample upstream at St Aldwyns in 2010 found large numbers of Brown Trout *Salmo trutta*, Grayling *Thymallus thymallus*, Eel *Anguilla anguilla*, Minnows *Phoxinus phoxinus* and Bullhead *Cottus gobio*.

Unfortunately the extensive fishing activity on the River Coln in Fairford parish is facilitated by stocking of large numbers of sterile Brown Trout; this introduction of stocked fish will have a negative effect on the survival of the natural fish via predation and competition for food and habitat.

- **Birds**

A number of riparian birds have been recorded on this section of the River Coln such as Mallard Duck, Heron, Moorhen, and Grey wagtails. Species more typical of hedgerows and woodland were also noted including Long-tailed tit, Robin, Chaffinch, Wood Pigeon and also Song Thrush.

- **Mammals**

Although a detailed survey was not carried out signs of Otter were recorded along this stretch of the river. Otter suffered dramatic declines from the 1950s to the 1970s but have made a significant recovery in recent decades.

Water Vole signs were observed at intervals along the Fairford Parsh stretch where the bank side vegetation is healthy particularly in the marginal Reed Sweet-grass *Glyceria maxima* stands. Water vole declined extensively across the UK since the 1900s largely due to habitat loss, but conservation work in the Cotswold Water Park coupled with a series of mild winters has facilitated population stabilisation and expansion in the local population in recent years. (Harris G 2005). The local river keeper and a nearby neighbour have mink rafts on the Coln which are regularly monitored by the Trust with any mink caught euthanized.

Both these mammals are UK Biodiversity Action Plan species and are included on both the Gloucestershire and CWPT Local Biodiversity Action Plans indicating the importance of these species.

The Gloucestershire Wildlife Trust and the Ernest Cook Trust have been working on a project together to reduce shading along the parallel channel that connects with the Broad Water in order to improve habitat value for Water Vole.

1.2.3 Main conclusions

Overall the Coln through Fairford parish is of ecological value despite the modification and the detrimental impact some river uses, there are a number of ways the ecology of the river habitat could be improved but it would required a high degree of landowner co-operation.

2 Future management options to improve ecological status

2.1 Fencing & Bank Repairs

There are some sections along an associated channel of the River Coln where riverside fencing would be beneficial to the ecology of the river because the bank was damaged by livestock accessing the water to drink and cool down. This damages vegetation eventually leading to increasing erosion of the banks and pollutes the water via sediment/mud being washed into the river.

2.2 Tree management

The river has a good mix of more open and more shaded sections so overall is well balanced for light particularly in the upper meandering sections. The parallel channel next to Broad Water which offers better river habitat was quite shaded at the time of survey, however in winter 2014/15 the Gloucestershire Wildlife Trust were working on this channel to reduce shading for Water Vole which will have a significant benefit to the ecological value of the river.

2.3 Invasive Species Control

2.3.1 Mink

Since 2002 the Cotswold Water Park Trust have run a Mink Control Program which involves constant monitoring of mink rafts in the area followed by trapping and euthanizing any captured individuals. There are a number of mink rafts on the Coln but luckily there has been no mink recorded in recent years. The Cotswold Water Park Trust would welcome any support with this project.

2.3.2 Signal Crayfish

Introduced for food in the late 1970s and 1980s the North American Signal Crayfish *Pacifastacus leniusculus* spread quickly across much of the UK. It can spread up and downstream and may cross land to colonise adjacent water bodies and human activity still continues to transfer the species, although illegal, via indirect (contaminated fishing equipment) or intentional releases. Negative impacts include the almost complete loss of the native crayfish through the spread of disease and direct competition. They also undermine riverbanks through burrowing and can predate on native fish eggs and aquatic invertebrates.

Their small lobster-like appearance makes crayfish easy to recognise. Compared to the native species, the signal crayfish is much larger and its claws are red underneath with a small turquoise / white blotch on the surface. There are several other non-native crayfish species, but these are relatively rare. Signal crayfish is listed under Schedule 9 to the Wildlife and Countryside Act 1981 with respect to England, Wales and Scotland. As such it is an offence to release or to allow the escape of this species into the wild. In the UK it is an offence to keep any crayfish without a license, except in some parts of southern England. If trapping of signal crayfish is planned, an application should be made to the relevant environmental protection agency.

Trapping is relatively easy but requires a license from the Environment Agency and must use otter proof traps. Some studies have found trapping to actually increase the local population because most trapping is done to obtain food the larger more dominant specimens are harvested disproportionately which then increases the survival of the smaller crayfish because cannibalism is common with this species. Furthermore it is thought that as larger males guard females from rival males if they are removed it effectively increases the fecundity of the females because they then have more males to breed with.

Consequently to date there is no known effective method of control for this species.

<http://www.snh.gov.uk/docs/C209050.pdf>

For new methods and up to date information about invasive non native species please refer to the invasive non-native species in Great Britain website

<http://www.nonnativespecies.org/home/index.cfm>

2.6 Barriers to Fish Migration

There are three barriers/constraints to fish movements/migration within the parish of Fairford, two at Fairford and one at the top of the Broad Water. Any modification or removal would obviously require a high level of landowner co-operation which may difficult when high levels of fish stocking are routine.

2.7 Impact of Climate Change

Over the next twenty to fifty years it is likely that climate change will have an impact on our local rivers. In general terms it is predicted that winters will get warmer and wetter with more frequent storm events, while summers will generally get hotter and drier. This will result in more flooding events and more frequent drying up of the rivers during the summer.

This would suggest that any future land management practices should aim to create more flood water storage capacity for storm events and modification of the rivers to narrow the summer channel should be welcomed in an attempt to retain water flow during drought periods while creating pools and wetland habitat in which species can survive the dry spells may also help wider biodiversity.

2.8 In channel enhancements

The Coln is has some good morphological sections in the upstream section of the Fairford Parish however the straighter sections which would benefit from Large Woody Debris deflectors and channel narrowing works. Creating structures such as simple log-berms or flow deflectors to narrow the channel diversify the flow of river currents, scour gravels or adding gravel to create a more diverse river habitat is key to supporting species like native wild Brown Trout. See Appendix 5: WTT Manual Large Woody Debris.

There is a small channel that runs parallel to the river through Fairford Park which is closer to a river habitat, if this channel could be enhanced to create meanders via re-routing or the introduction of large woody debris and gravel it could potentially provide a connecting habitat for river species past the unsuitable Broad Water.

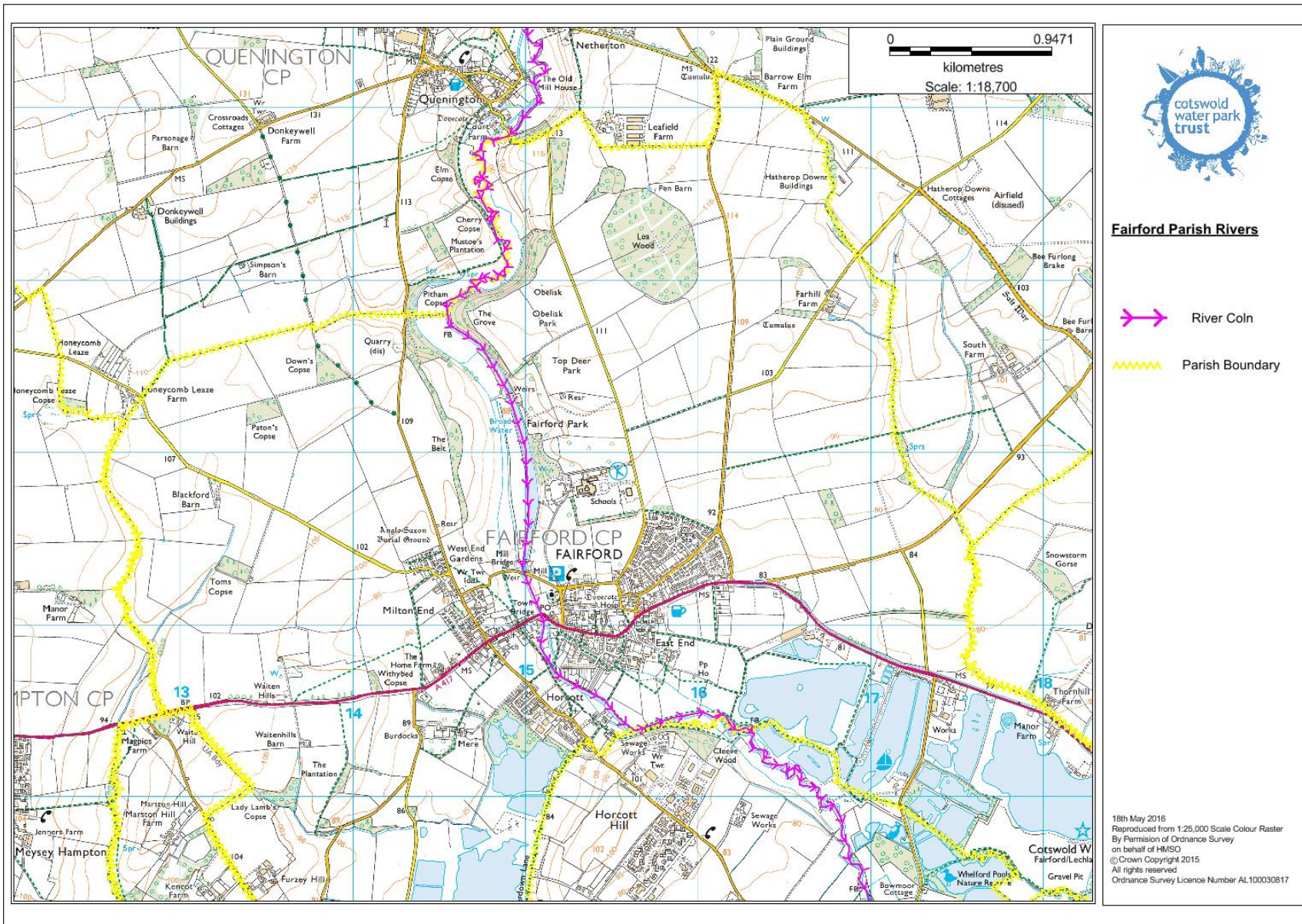
Table 2.9 River Biodiversity Management Summary Table

Issue	Implication	Solution
Bank damage	Increased sedimentation to the water course degrading riparian habitats and causing pollution.	Install drinking bays or pasture pumps for livestock and install new fencing with buffer to protect and allow bank-side vegetation to establish.
Shading	Dense shade inhibits aquatic and marginal vegetation which limits biodiversity and destabilises banks and in channel features. Lack of shade increases the overall temperature of the water which reduces oxygen levels	Thin dense tree scrub stands and use timer for Large Woody Debris to enhance the ecology of the river. Plant trees in more open environments to keep the water cool during the summer

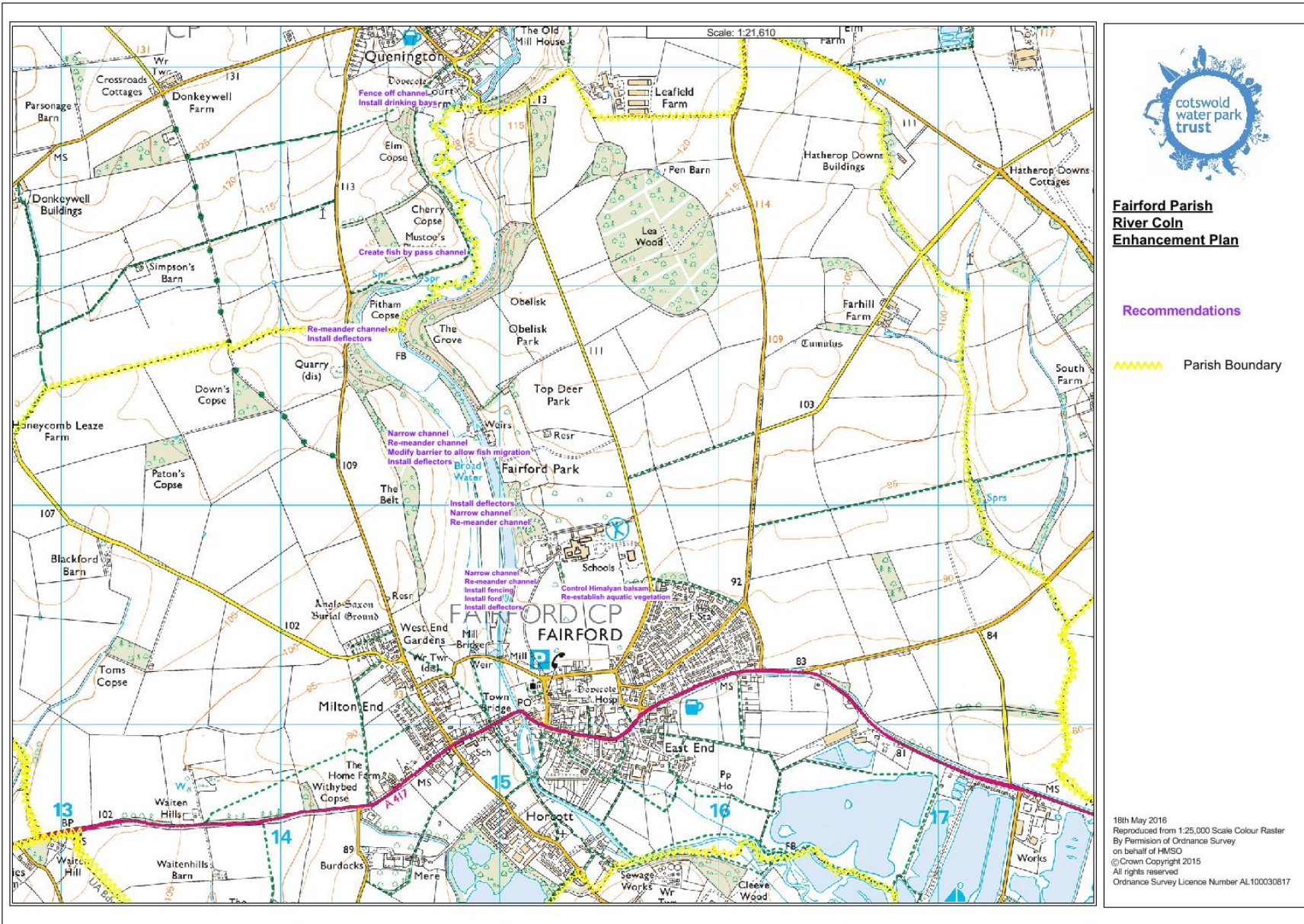
	which in turn can reduce biodiversity	
Barriers to Fish Migration	Reduces diversity and abundance of fish populations	Modify the weirs to allow fish passage
Impact of climate change	Increased flooding & drought	Create wetland areas and flood storage areas. Create a 2 stage channel to allow the river to survive both high and low flow periods.
Straightened and over wide channel	Reduced habitat diversity leads to reduced biodiversity	Create in channel meanders via the installation of LWD and narrow the channel to maintain water during dry periods. At Broad Water enhance the parallel channel to replace lost river habitat

Appendix 1 Maps

Fairford Rivers Location Plan



Fairford Parish River Coln River Enhancement Recommendations



Appendix 2 Species Recorded During Fieldwork

Mammals recorded

Species	Conservation Status	Legal Protection
Otter	UK & CWP BAP	Full protection under the Wildlife & Countryside Act
Water Vole	UK & CWP BAP	Full protection under the Wildlife & Countryside Act

Birds Recorded

Species	Conservation Status
Blue tit,	
Carrion Crow	
Chaffinch	
Duncock	Amber listed
Fieldfare	Amber listed
Goldfinch	
Great tit	
Greenfinch	
Grey wagtail	Amber listed
Heron	
House Sparrow	Red listed
Kingfisher	Amber listed
Little Egret	Amber listed
Long tailed tit	
Mallard	
Moorhen	
Pied wagtail	
Redwing	Amber listed
Song thrush	Red listed
Wood Pigeon	
Wren	

For more information about species recorded locally referring to the National Biodiversity Network (NBN) gateway database available online is a useful tool. <https://data.nbn.org.uk/>

If more detailed data is required local records centre's can be useful resources but there is often a charge for this data. Any proposed development will require an ecological survey to be conducted so there is often no need for communities to collate local information themselves.

Appendix 3 Photographs

River Coln- Fairford Parish

Photo 1 the river at the most upstream end of the Fairford parish is very wide straight and shallow and the adjacent land use is arable



Photo 2 the river is overwide and straight providing a very poor variety of habitats; however there is some Large Woody debris present providing some variation



Photo 3 the river is still over wide shallow and straight with no variation in the habitat



Photo 4 the river here has a island in the middle which improves flows by narrowing the river to two channels



Photo 5 at the downstream end of the island there are two weirs which are obviously one of the many barriers to fish migration along the River Coln



Photo 6 where the island narrows the channel has better flow allowing aquatic plants like *Ranunculus spp.* to grow this however this is the only area it was noted



Photo 7 this photo taken of the Broad Water section of the river shows how the river has effectively been dammed to create an online lake, obviously this will not provide a suitable habitat for river species like wild brown trout hence the requirement for artificial stocking but would suit Carp



Photo 8 shows the Mill at Fairford which is effectively the dam on the Broad Water and also another barrier to fish movement, the channel here is actually split in two with a bypass channel which may be easier to modify for fish migration



Photo 9 the River in Fairford between the Mill and the main road bridge is again overwide, straight and shallo. It did have good marginal vegetation for species like water vole but was not ideal for natural fish populations although one fisherman reported regularly catching Grayling here.



Photo 10 the road bridge at Fairford



Photo 11 downstream of the bridge there are some homes built very close to the river and the channel soon splits again to indicative of another historic mill site.



Photo 12 the river downstream of the town is still overwide and straight but it does have footpaths alongside it meaning local people have a good connection to the river



Photo 13 as the river moves away from the town the land becomes more pastoral here the banks have been damaged by vehicle access across the river



Photo 14 yet again the river returns to its over-wide, straight form overall the river was one of the most featureless sections of river within the waterpark area



Appendix 4 Cycle 1 Waterbody Summary Reports

Cycle 1 Waterbody Summary Report River Coln 29990 (Source to Thames)
See separate report

Appendix 5 Wild Trout Trust; Use of Large Woody Debris

See separate report

Appendix 6 Background to the Wild Project

The WILD Project stands for Water and Integrated Local Delivery partnership project. It's a collaborative project including the Gloucestershire Farming and Wildlife Advisory Group (FWAG), Countryside and Community Research Institute (CCRI), Cotswold Water Park Trust (CWPT) and Gloucestershire Rural Community Council (GRCC) and is funded by the Environment Agency (EA).

The project aims to enable local communities in the Cotswold Water Park to work to improve the 'water environment'. The Leach driver in this is the government's responsibility to meet its commitments under the Water Framework Directive (WFD).

Under WFD legislation UK Rivers and streams are assessed according to how close they are to a natural state on a number of parameters

- Hydrology
- Ecology
- Chemistry (pollution)

FWAG South West is focusing on water courses that are failing for water quality issues, (i.e chemistry under WFD) particularly diffuse pollution.

The waterbodies failing GES for chemistry in the project area are;

- The River Thames (Colnton Coln)
- Cerney Wick Brook
- River Leach
- Marston Meysey Brook
- River Ray

The Cotswold Water Park Trust has been assigned the following priority water bodies, namely;

- Swill Brook
- Ampney & Poulton Brooks
- River Thames (Kemble to Fairford)
- River Churn
- River Coln

These watercourses are all failing to achieve the required ecological standard under the WFD for Ecology. There are often a number of reasons that a waterbody would fail for ecology but in the local area it is largely due to historic modification of the watercourse making the river less natural than they should be, this reduces the diversity of habitats within the river and consequently reduces the species that can live there.

Technically all the priority watercourses within the Cotswold Water Park biodiversity boundary have been modified to some extent with most river channels being wider and deeper than they would be naturally due to years of dredging. The Ampney and Poulton Brooks in particular have been straightened extensively in the past probably hundreds of years ago when flooding of the meadows was the best way to fertilise the land. The River Coln has been split in to numerous channels and impeded by weirs to power mills; and on the Thames, trees that were pollarded in the past for animal fodder, are no longer actively managed sometimes resulting in excessive shading.

Consequently ecological enhancement works could be done almost everywhere but as we are limited by resources and the need to acquire landowner agreement, we have to identify priority areas first which offer the best value for money. The process of identifying what enhancement works we would like to pursue is conducted by reviewing survey information, existing fluvial audit information and well established river restoration techniques.

Areas are being identified for proposed works which could be as small scale as some tree works to reduce shading but if landowners are willing we will look at raising funds to conduct more dramatic habitat enhancement works for a high profile flagship venture like restoring meanders.

So in summary with local community input and commitment from local landowners, the project aims to devise and deliver a plan of enhancements and management advice over the project lifespan (until March 2016) to achieve Good Ecological Status in water bodies within the Water Park area in the long-term.

Appendix 7 Bibliography

Buffer- a strip of land left unused to protect the river from land use activities. The ideal width is 10metres as this provides good protect of the river and allows access by machinery to conduct any maintenance that cannot be done or is too labour intensive by hand.

Leat- artificial watercourse or aqueduct dug into the ground especially one supplying water to a watermill or its mill pond.

Appendix 8 References

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Signal Crayfish www.nonnativespecies.org

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