

Barnwell Inner Backchannel

Location: Barnwell Country Park, Oundle

Upstream Grid Ref: TL 0364987028

Downstream Grid Ref: TL 0363187629

Length: 950m

Completion date: 11th October 2018

Cost: £23,617

Partners: National Lottery Heritage Fund, Environment agency, Northampton County Council, Nene Valley Catchment Partnership, Nenescape LP & Barnwell Manor Estates.

Summary of activities

The Barnwell inner Backchannel scheme comprised of 4 activities. The activities were:

Activity 1 – Clean gravel introduction to improve the gravel bed topography and quality of fish spawning habitat.

Activity 2 – Bank revetment to repair visitor erosion and reduce fine sediment inputs.

Activity 3 – Hinging and pinning overhanging trees and pleaching small riverside trees to increase in-stream woody habitat and create flow variation to improve the natural cleansing of the gravels.

Activity 4 - Tree planting to increase shade over the river and suppress the growth of emergent vegetation.

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Location map

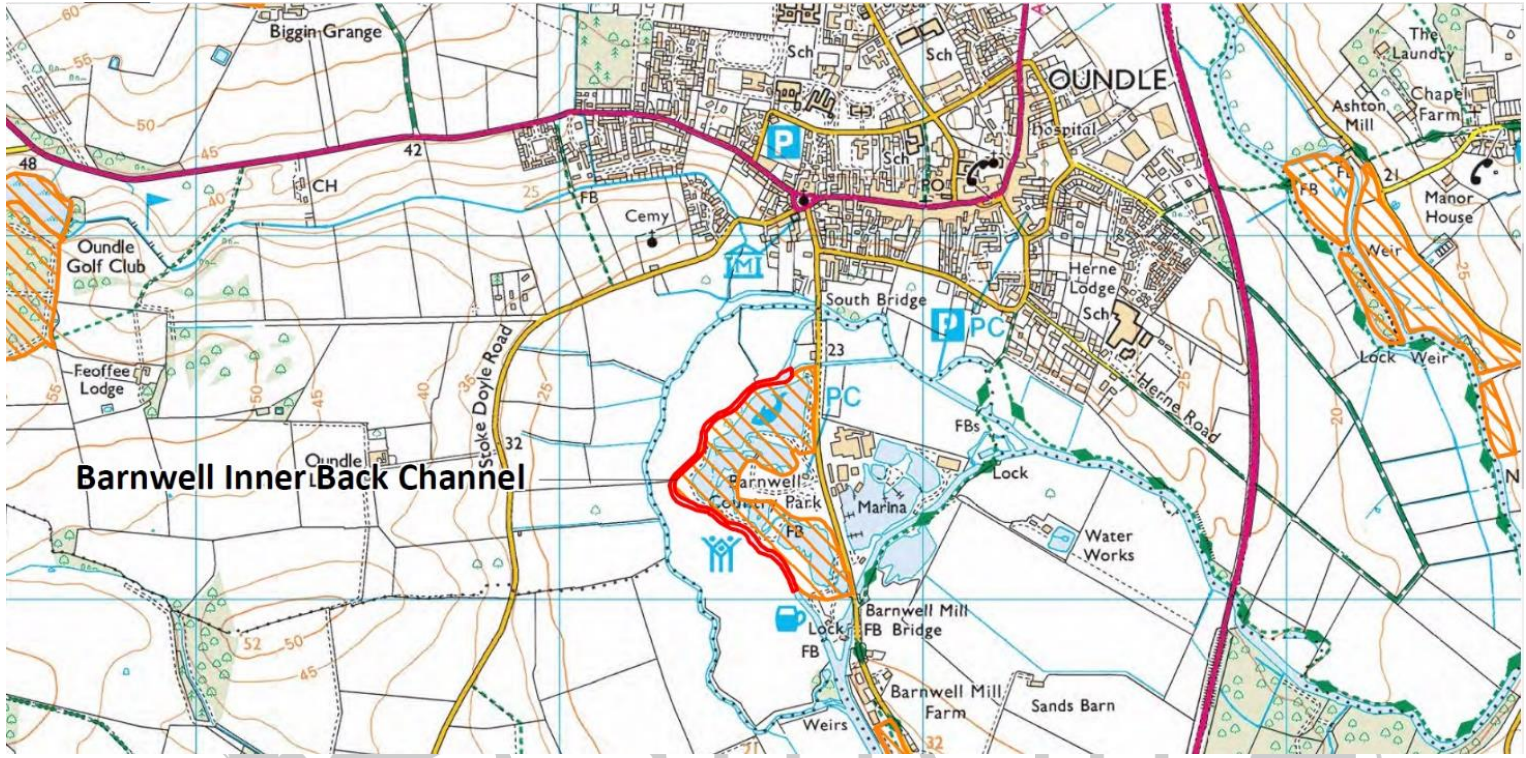


Figure 1 Map of Barnwell Inner Backchannel

Background to project

This project was part of the Resilient River project, part of the Nenescape Landscape Partnership. Barnwell Inner Backchannel was previously in generally good condition with some shallow gravel runs and some deeper pools. However, the gravel runs had a fairly uniform topography and are choked with fine sediment. This makes an undesirable environment for fish to spawn in. In the well-lit, silty sections dense beds of emergent vegetation (vegetation which rise above the water surface), in particular common club-rush (*Schoenoplectus lacustris*), had developed and these required regular maintenance by the Environment Agency. In the shadier sections emergent vegetation was less of an issue. The Environment Agency manages the river from the left bank, where the land use is arable, meaning the land is suitable for growing crops. A fairly wide rough grass and nettle buffer margin limited the potential for sediment run-off in the upper reaches, but in the lower reaches the buffer margin is very narrow.

Individual cricket bat willows had been planted along much of the left bank and are at varying stages of maturity. These willows were originally planted to eventually be made into cricket bats but due to poor maintenance this did not happen. Prior to the scheme taking place there had been some fairly recent

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planting, but there were also some long open, unplanted sections. There was very little woody habitat against this bank. Some of the more mature willows had been pollarded.

In contrast the entire right bank is managed by Barnwell Country Park. The upper section is heavily treed, mainly through natural regeneration, and there is a good mix of mature trees and shrubs, some in-stream woody habitat and plenty of shade. Lower down the reach the riparian tree stock was much sparser. Here the banks were dominated by nettles and the densest club-rush beds are found in this part of the river. Visitors to the park access the river in several places and this has resulted in bank erosion which is introducing some fine sediment to the watercourse.

Objectives

Although the Barnwell Inner Backchannel is in generally good condition there were a number of opportunities for enhancement which address the issues described above. The objectives of the enhancement scheme were to:

- Improve the gravel bed topography and the quality of spawning habitat through clean gravel introduction.
- Reduce sedimentation by repairing eroded sections of bank.
- Increase in-stream woody habitat and create flow variation to improve the natural cleansing of the gravels by hinging and pinning or pleaching riverside trees and shrubs.
- Increase shade and reduce the growth rate of emergent weed beds by new tree planting.



Figure 2 map of the work completed

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Activities

Gravel Introduction

160 tonnes of gravel was deposited over three locations along the backchannel. The aim of this was to alter the speed and direction of the water flow creating a range of habitats within the backchannel. The size of the gravel introduced ranged from 4-40mm in size. This is important because gaps are created within the gravel which allows oxygenated water to flow through it, creating good habitat for invertebrates and for fish spawning. The range of gravel size also helps the gravel bed to hold together during flood conditions to minimise movement. Figure 4 shows the excavator which was used to place the gravel into the backchannel.



Figure 3 4– 20m long reach excavator for placing the gravel in the channel

Hinging & Pinning/pleaching Overhanging Trees

This is where large limbs or whole small trees have a notch cut into the base of the trunk (a hinge) and are dropped on to the bank or into the water in a controlled way before being pinned into the bank using hardwood stakes and heavy-duty wire. This technique was carried out fifteen times across the back channel to increase woody habitat, providing refuge for juvenile fish such as Chub and invertebrates as well as birds and mammals throughout the year. Figure 5 shows one of the fifteen trees that were hinged and pinned across the back channel.



Figure 4 A large hinged and pinned tree

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Revetments

Two different techniques of revetment have been used to protect the banks from erosion. Firstly, there has been 40m of brushwood bundles installed, using stakes and wire to pin them to the riverbed, in front of an area of eroding bank. This will allow marginal vegetation to establish behind the revetment in order to re-claim the riverbank. This technique can be seen in figure 6.

Two large willow limbs were also pollarded due to the potential for them to fall and block the channel. They staked and pinned tight to the bank in areas of erosion to help protect from further damage. This highlights one way that materials can be re-used during a restoration project.



Figure 5 Faggot bundle revetment mid-channel to deflect flow

Tree planting

Native British trees such as hawthorn, elder, blackthorn, hazel and dog rose were planted along the riverbanks in a number of locations. These trees will create vital shade once matured, keeping the water cooler and slowing reed and weed growth in the channel.

Wooden sculptures

Two wooden sculptures were also installed in the country park. One was sculpted in the shape of a Pike and the other was sculpted in the shape of a Chub. Both of these fish species are native to the river informing the community in an innovative way that although they might not see the fish in the river, they are there. Figures 6 and 7 show the wooden sculptures after they were completed.



Figure 6 Chub Bench at the downstream end of the restored section



Figure 7 Pike sculpture near the upstream end of the project

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Future projects:

Originally there was meant to be an extra 300 tonnes of gravel introduced to the backchannel in a number of locations downstream but due to funding this was not able to happen. This additional gravel is already permitted to be introduced so if/when funding can be found the project can be completed in full as it will greatly benefit the backchannels bed topography and quality of fish spawning habitats on a more sluggish and deeper section of the backchannel.

Contact information

For further information regarding the restoration project that took place at Barnwell or any other enquires please contact the River Nene Regional Park:

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Contractor Information

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Gravel introduction - Pearce Environment

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Hinging and pinning – Dominic Crawley Woodland & Water Management

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Wooden Sculptures – The Wood Artist

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