

CASE STUDY 1

Beaver impacts on floodplain pasture

KEY THEMES OF INTEREST

Management of beaver dams to mitigate negative land drainage impacts

Benefits for wildlife

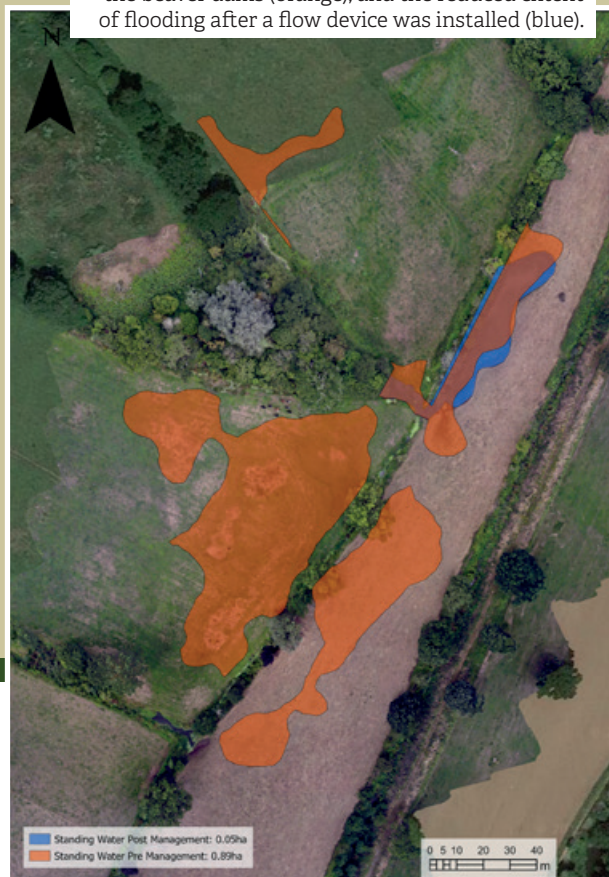
Education and outreach

Impacts on agriculture

Overview of site and beaver behaviour

- This pastoral site, in the lower floodplain of the River Otter, supports a dairy farm linked with an agricultural college. The intensively managed pastures lie over heavy, clay soils which are drained via a network of ditches and field drains.
- In September 2016 beavers were first noticed by college staff when a dam was constructed in a drainage ditch.
- The flooding of 0.57 ha of low-lying farmland was deemed acceptable for the first part of the winter but the college required all available grazing land the following spring.
- ROBT staff installed England's first beaver flow device in this location, returning the water levels back into the ditch network, and facilitating grazing whilst retaining the beaver territory.

Figure 6.1 Aerial photo of the area, showing the maximum extent of flooding as a result of one of the beaver dams (orange), and the reduced extent of flooding after a flow device was installed (blue).



Beaver population

First signs of beavers were detected in September 2016. A young pair were confirmed by trapping and tagging in January 2017. Beavers are still present and assumed to have bred subsequently but this is not confirmed.

This is one of the few locations where beaver scent mounds have been found. These are piles of mud and vegetation covered with castoreum that are used as territorial markers.

Photo: David White



Management of beaver dams to mitigate land drainage impacts



Initially 'notching' of the dam was used to reduce the water levels. Beavers were persistent in rebuilding, and it became clear this was not a sustainable solution at this location.



In December 2016 a flow device was installed to reduce water levels

Flow devices (aka 'beaver deceivers')

- This intervention is used to reduce water height behind beaver dams whilst maintaining beaver presence.
- The structure comprises a pipe that allows water to bypass or flow through the beaver dam. The pipe inflow is situated in a submerged cage to prevent beavers detecting the source of the leak and blocking the pipe.
- This flow device was installed at a cost of £500. Due to the design and location of this device, consent from Local Authority was not required.



Following the installation of the flow device, the beaver activity at this location declined significantly. It is thought that the beavers moved and began damming in another location 200 m downstream, possibly in response to the installation of the device. They remained active throughout the territory, with no further agricultural impacts noticed throughout 2017.

In Autumn 2018, a new dam was constructed 20 m downstream of the piped dam. At this point staff at the college were content to retain the beavers, and this allowed the wetland habitat to become extensive, with 0.57 ha of open water created and ca. 0.5 ha of wet grassland habitats.



When the device was installed, the water levels dropped significantly, reducing the extent of flooding in the adjacent fields.

Benefits for Wildlife

The speed with which wildlife-rich wetland habitats can be created by beavers in such a flat landscape was demonstrated very clearly at this site. Table 6.1 shows the return of snipe and teal and other wildfowl using the beaver ponds in the winter months. Due to the lack of standing surface water prior to beaver damming, such birds were absent from this farmed landscape.

Bird species	Numbers
Snipe - <i>Gallinago gallinago</i>	6
Teal - <i>Anas crecca</i>	28
Mute swan - <i>Cygnus olor</i>	4
Mallard - <i>Anas platyrhynchos</i>	10
Little egret - <i>Egretta garzetta</i>	2
Heron - <i>Ardea cinerea</i>	1

Table 6.1 Wetland wildfowl observed using the beaver ponds, 27th February 2019.



28 teal have been counted on this site on one occasion. Photo: David White

Camera trap and video footage shows a grey heron feeding on trout, eels, and brook lamprey around the dams whist in spate.



▶ **Heron catching elver**

Education and outreach

The location of this beaver territory within the grounds of an agricultural college has provided a valued educational resource. College students from a diverse range of courses have received informal and formal information and training regarding the behaviour and effects of beavers on the agricultural systems since 2016.

Impacts on agriculture

In 2016 0.89 ha of floodplain pastures were inundated by surface water due to beaver damming. One management solution would be to fence off this area and accept the loss of pasture as grazing land. There are financial implications of this approach, both in terms of the value of the land to the business and

in terms of secondary impacts such as movement of cattle between different fields. The John Nix pocketbook¹ estimates the financial impact of the loss of this land to be £1,566 per year. Now the flow device is installed and the area of land under water is 0.054 ha, the estimated financial impact is £95 per year.

Additional secondary costs would need to be estimated on a site-specific basis.

The opportunity cost is the loss of the wealth of ecosystem services that the wetland could provide. Future Environmental Land Management Schemes (ELMS) could involve payments to farmers to make space for water, helping to mitigate conflicts in future and rewarding farmers for providing a diverse array of ecosystem services.

Landowner perspective

"From my point of view, trying to balance the overall college view as well as the need for a commercially operating farm and talking with Devon Wildlife Trust, we were really trying to find a way forward that meant the farm could continue to operate as a commercial business but in a way that was allowing the beavers to create a habitat."

[On lessons for the future] "The sooner that the conversations could be had between the different parties, the better. And regular communication is critical so that no party really suddenly gets a nasty surprise about something that's going on. [...] communication always is critical."

1. Redman, G. *The John Nix Pocketbook for Farm Management 2019*. (Agro Business Consultants, 2018).