

CASE STUDY:

**Nature Based
Solutions in the Exe
Catchment
June 2022**



Annabel Martin

Westcountry



Rivers Trust

Background to farm/catchment

A farm under new ownership located in the Exe catchment became engaged with Upstream Thinking 3 through Westcountry Rivers Trust Farm Advisor Annabel Martin in 2020. The new owners wanted to implement environmental improvements across their farm, including the slowing and storage of water generated by heavy soils at the highest point of the farm; the beneficial management of soil to improve water percolation and reduce surface runoff; and improved grazing management (most likely with cattle or ponies) to increase biodiversity.



Approximately 80% of the farm is free-draining soil with groundwater springs emptying into the valley that runs through the holding. The remaining 20% of the land has loamy topsoil and clay subsoil, producing standing water and surface runoff throughout the winter and early spring. The Exe valley experiences flooding and high turbidity levels after prolonged wet spells.

What is the problem/issue?

Water runoff and water quality - during the wetter months, the impermeable soil (mainly Rushy field) generated a huge amount of surface runoff which, when combined with the springs in the valley system, caused water to funnel down through the existing watercourse, leaving the farm very quickly, to join the main River Exe 2.5 miles downstream. The speed of runoff caused erosion of stream banks, and hedge-banks where the watercourse had been ditched.

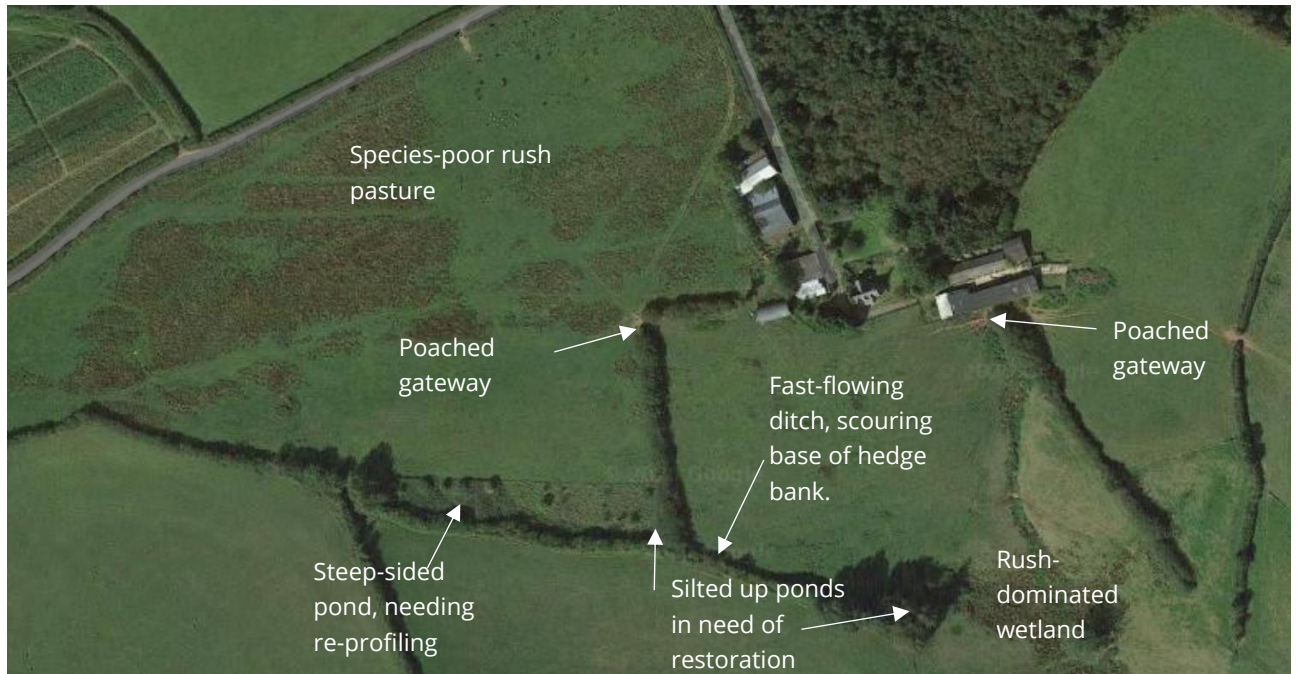
Biodiversity - while the farm had some existing biodiversity interest (hares, snipe, skylarks), the two areas of rushy wetland were mainly species-poor, particularly Rushy Field. When surveyed in June 2020, the lower area of wetland adjacent to the 'Armada Oak' contained a variety of species including Greater bird's-foot trefoil, Wild angelica and Square-stemmed St John's wort among many others (Full list in Section 3 of the attached appendix).

What was done to address the solution?

A plan was drawn up with the landowner to restore existing ponds, create new ponds, and to improve the connectivity between these features. The plan was designed to use Nature Based Solutions, with the aim of slowing water through the valley, encouraging it

to spill out of connecting watercourses and to find more natural pathways through the landscape, instead of carving ever deeper channels. Two gateways that had been churned up by stock and vehicle access were made more resilient by installing culvert pipes and stoning over the top. The plan of works were approved by South West Water and funded through their Upstream Thinking 3 project via a Conditional Grant Agreement put together by Annabel Martin.

Aerial photos to show A. issues prior to grant-aided work, B plan of grant-aided wo



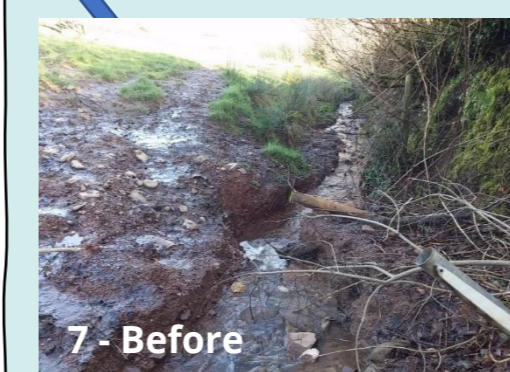
Imagery ©2020 CNES / Airbus, Getmapping plc, Infoterra Ltd & Bluesky, Maxar Technologies, Map data ©2020

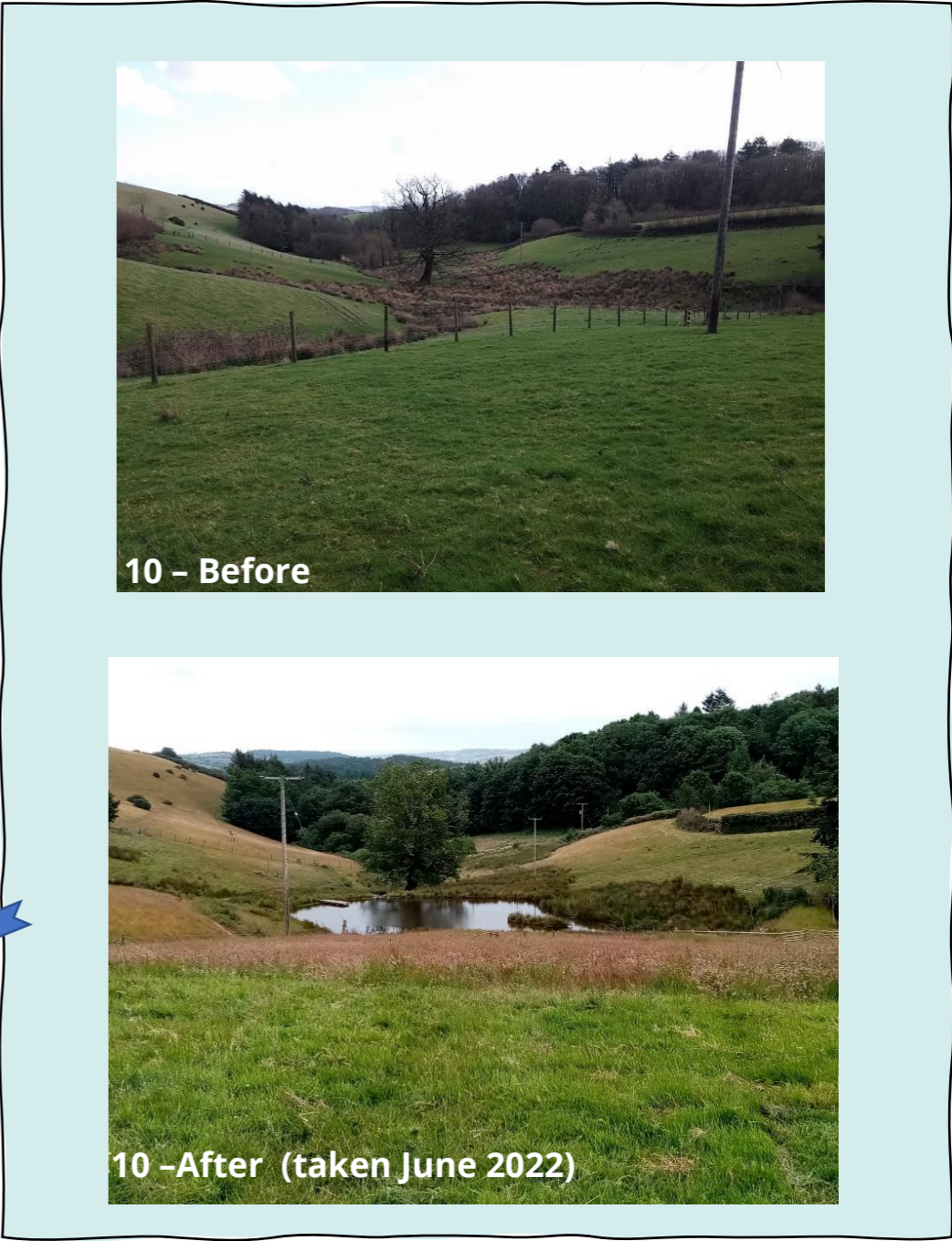
- 1 = Large new pond, connecting to...
- 2 = smaller round pond
- 3 = 2 shallow scrapes
- 4 = re-profiled existing pond
- 5 = 2 woody dams on ditch
- 6 = restored silted pond

- 7 = new pond in place of scoured eroding corner
- 8 = meandered stream to create wetland
- 9 = restored silted pond
- 10 = large new pond
- 11 = culverts under poached gateways



Above: Before image on Google Maps (Left) and updated image from DEFRA's MAGIC Map (Right) to show new ponds and flow pathways.





What was the outcome and how will it be monitored?

During the autumn of 2020, works were undertaken to improve the connectivity of current and new features, aiming to slow water flow through the valley. The works included:

- Creating 4 new ponds
- Restoring 3 ponds
- Creating 2 new scrapes
- Improving 2 gateways to reduce sedimentation of the watercourse

This has led to approximately 1 hectare of land being 're-wetted'

So far, monitoring has been anecdotal, including increased numbers of bird species and amphibians, and of course floristic diversity – i.e. greater bird's foot trefoil has been noted to be spreading out from the new scrapes in Rushy Field (previously almost entirely soft rush). During a walkover, willow warblers were identified at pond number 9 in the map, along with their fledglings. Willow warblers are on the Birds of Conservation Concern Amber List, showing moderate declines in recent years, so it was great to hear them singing and to see the fledglings.

Now that the new and restored features have become established, it is intended to install wildlife cameras to monitor activity in different locations over time. It may also be possible to use timelapse, fixed-point photography to monitor the movement of storm water through the holding to evidence the effectiveness of the nature-based solutions that have been created / enhanced.

What is the benefit to SWW / the customer / the environment?

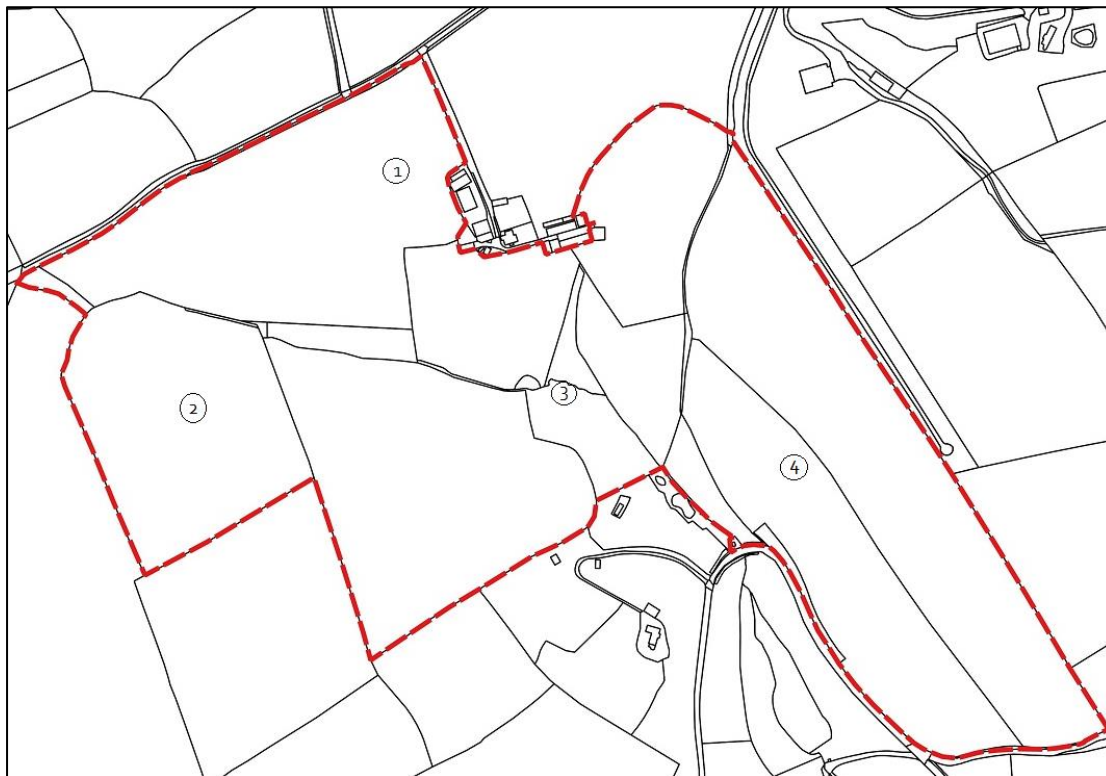
As a consequence of implementing nature-based solutions:

- Approximately 1 hectare of land has been re-wetted.
- It has been calculated that up to 6,200m³ of water can be stored in the restored and new ponds / scrapes
- The connectivity of current and new feature has been improved, with the aim to slow water flow through the valley system. Resulting in:
 - improved water quality,
 - enhanced ability to reduce flood – drought extremes, and
 - increased biodiversity.
- The visual impact of the project has improved landscape value, as it can be seen from the public footpath through the holding.

Appendix

Species lists

25th June 2020. Ecological walkover survey of key areas 1-4 identified for pond creation and other enhancements. The survey recorded the dominant plant species within each area.



1. Rushy field

English name	Scientific name
Broad-leaved dock	<i>Rumex obtusifolius</i>
Common nettle	<i>Urtica dioica</i>
Creeping buttercup	<i>Ranunculus repens</i>
Crested dog's tail	<i>Cynosurus cristatus</i>
Cuckoo flower	<i>Cardamine pratensis</i>
Greater bird-foot trefoil	<i>Lotus uliginosus</i>
Marsh foxtail	<i>Alopecurus geniculatus</i>
Soft rush	<i>Juncus effusus</i>
Sweet vernal grass	<i>Anthoxanthum odoratum</i>
Yorkshire fog	<i>Holcus lanatus</i>

2. Square field and Coffin Down

English name	Scientific name
Cat's-ear	<i>Hypochaeris radicata</i>
Common bird's foot-trefoil	<i>Lotus corniculatus</i>
Common mouse-ear	<i>Cerastium fontanum</i>
Common sorrel	<i>Runex acetosa</i>
Creeping thistle	<i>Cirsium arvense</i>
Crested dog's tail	<i>Cynosurus cristatus</i>
Daisy	<i>Bellis perennis</i>
Dandelion	<i>Taraxacum officinale</i>
Hogweed	<i>Heracleum sphondylium</i>
Meadow buttercup	<i>Ranunculus acris</i>
Meadow foxtail	<i>Alopecurus pratensis</i>
Perennial rye-grass	<i>Lolium perenne</i>
Red clover	<i>Trifolium pratense</i>
Ribwort plantain	<i>Plantago lanceolata</i>
Selfheal	<i>Prunella vulgaris</i>
Sweet vernal grass	<i>Anthoxanthum odoratum</i>
White clover	<i>Trifolium repens</i>
Yarrow	<i>Achillea millefolium</i>
Yorkshire fog	<i>Holcus lanatus</i>

3. Armada Oak field – location of proposed pond (L)

English name	Scientific name
Greater bird-foot trefoil	<i>Lotus uliginosus</i>
Wild angelica	<i>Angelica sylvestris</i>
Crowfoot species	<i>Ranunculus sp.</i>
Brooklime	<i>Veronica beccabunga</i>
Square-stemmed St John's wort	<i>Hypericum tetrapterum</i>
Floating sweet-grass	<i>Glyceria fluitans</i>
Water mint	<i>Mentha aquatica</i>
Soft rush	<i>Juncus effusus</i>
Jointed rush	<i>Juncus articulatus</i>
Marsh bedstraw	<i>Galium palustre</i>
Forget-me-not species	<i>Myosotis sp.</i>
Greater tussock sedge	<i>Carex paniculata</i>

4. Ash slope

English name	Scientific name
Common bent	<i>Agrostis capillaris</i>
Red fescue	<i>Festuca rubra</i>
Common bird's foot-trefoil	<i>Lotus corniculatus</i>
Yarrow	<i>Achillea millefolium</i>
Cat's-ear	<i>Hypochaeris radicata</i>
Fairy flax	<i>Linum catharticum</i>
Red clover	<i>Trifolium pratense</i>
Common mouse-ear	<i>Cerastium fontanum</i>

