North Devon Focus Area Estuary Pollution Project Report 2018 - 2019

Purpose of report

To review the North Devon Focus Area Estuary Pollution Project's second year, which seeks to reduce diffuse pollution arising from agricultural practices within the River Caen Catchment.

The project was commissioned by Devon County Council through the North Devon Biosphere Reserve Partnership and funded by the Environment Agency on behalf of the Water Environment Investment Fund, which supports the Taw Torridge Catchment Partnership.

The project delivery and reporting were overseen by the North Devon's UNESCO World Biosphere Reserve.

Report compiled by Sophia Craddock (SJC Consultancy) Estuary Project Manager with contributions and additions from other members involved in the project.

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1.0 Introduction and Focus Area

The North Devon Focus Area Estuary Pollution Project's (NDFAEPP) primary aims are to improve water quality and reduce soil erosion from agricultural land. This is achieved by installing various yard and in-field interventions to separate clean and dirty waters and reduce both sediment and FIO input into the watercourse. The secondary aim for the project is to install natural flood management (NFM) measures such as log dams and attenuation features, where suitable, to reduce the impact of flooding to downstream communities. Additional benefits also include improvements to on farm biodiversity and habitat connectivity. The overarching aim of the project is to also support the Environment Agency's work to achieve a step change in water quality measurements for particular catchments that are failing with a 'poor' Water Framework Directive (WFD) status, such as the River Caen. In light of this, now in its second year, the project has identified its focus area as the River Caen, Knowle Water and Bradiford Water Catchments, as shown in Map 1 below overlaying the soils of the catchments.

Map 1: Focus Area and Soil Composition Map
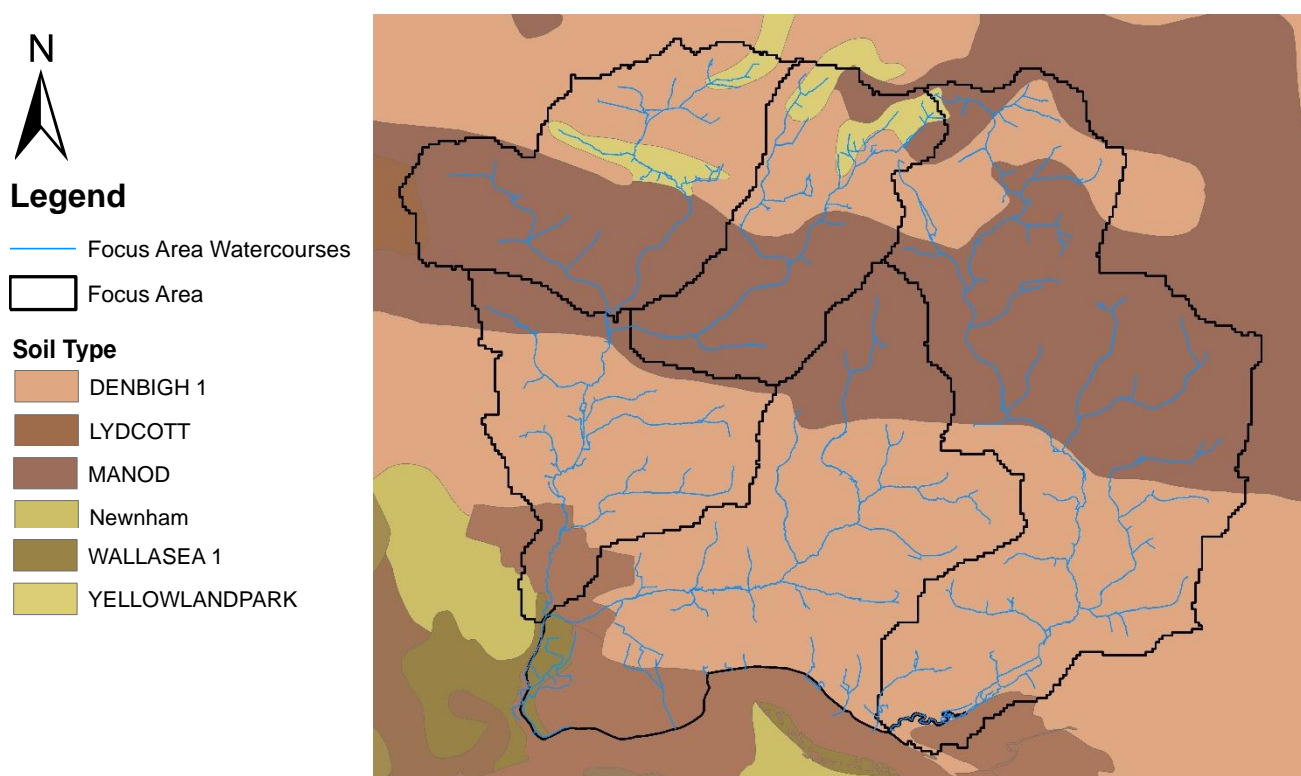
As this is a competitive scheme, project grants were only available to successful applicants within the River Caen and Knowle Waters with Soil Runoff Mapping being undertaken in the Knowle and Bradiford Waters. Please see the Soil Runoff Mapping Report for further details on this work.
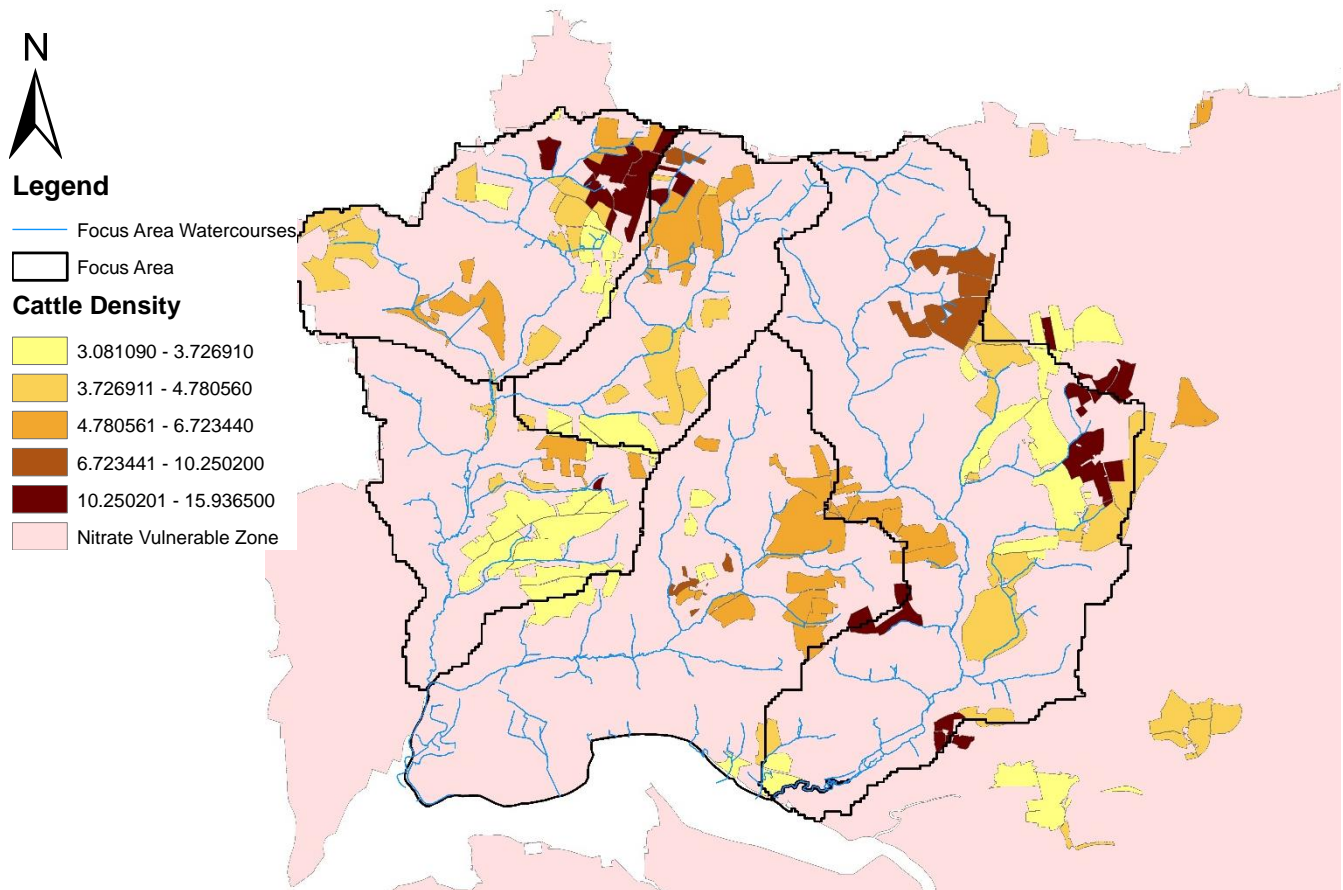
2.0 Methodology

2.1 Desktop Research

Initial research was conducted to identify which waterbodies were within a Nitrate Vulnerable Zone (NVZ) and failing for water quality and subsequently had a low WFD status (see Map 2 below).

Map 2: Focus Area's Water Frame Work Directive Status Map

Legend
— Focus Area Watercourses
▢ Focus Area
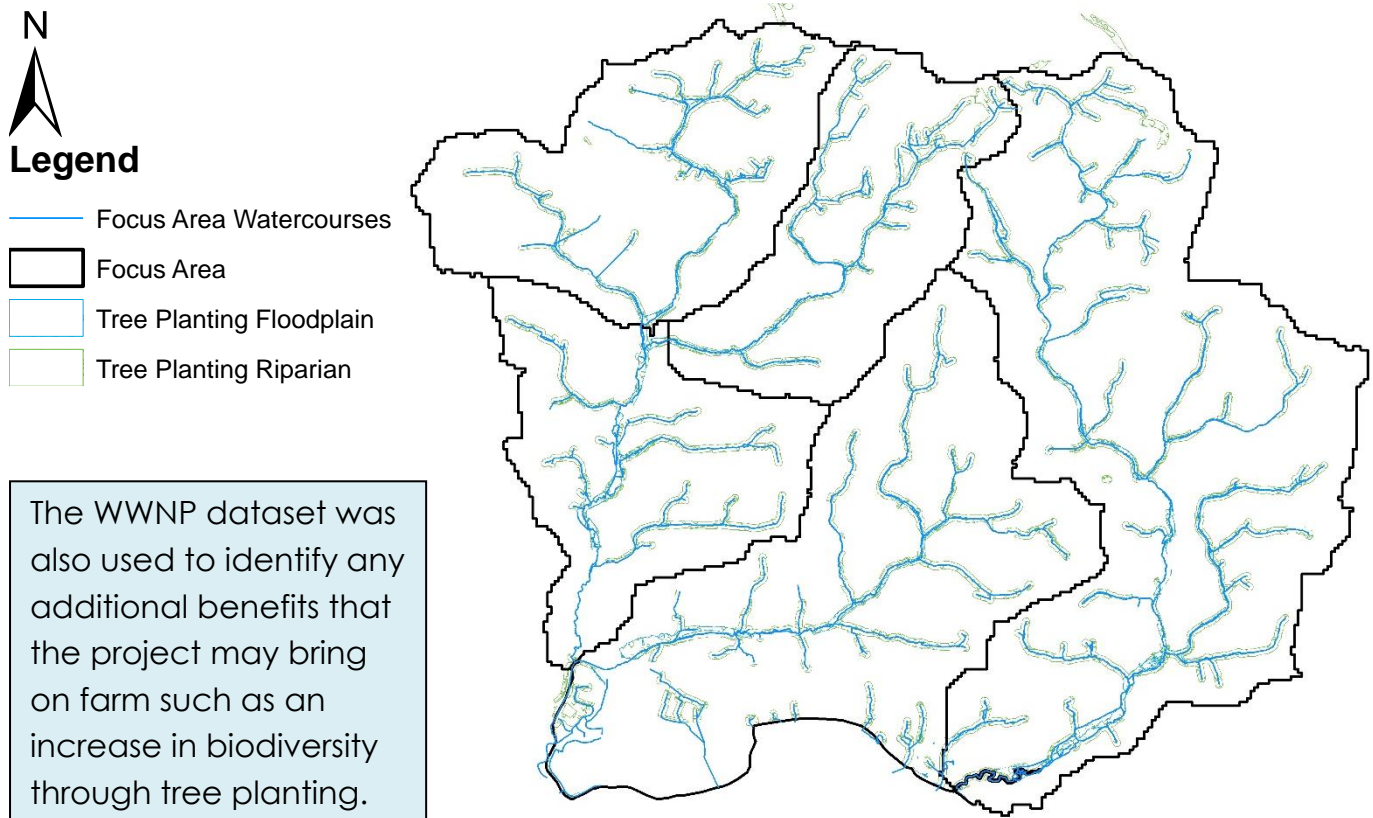**Focus area WFD status**
- Good
- Moderate
- Poor
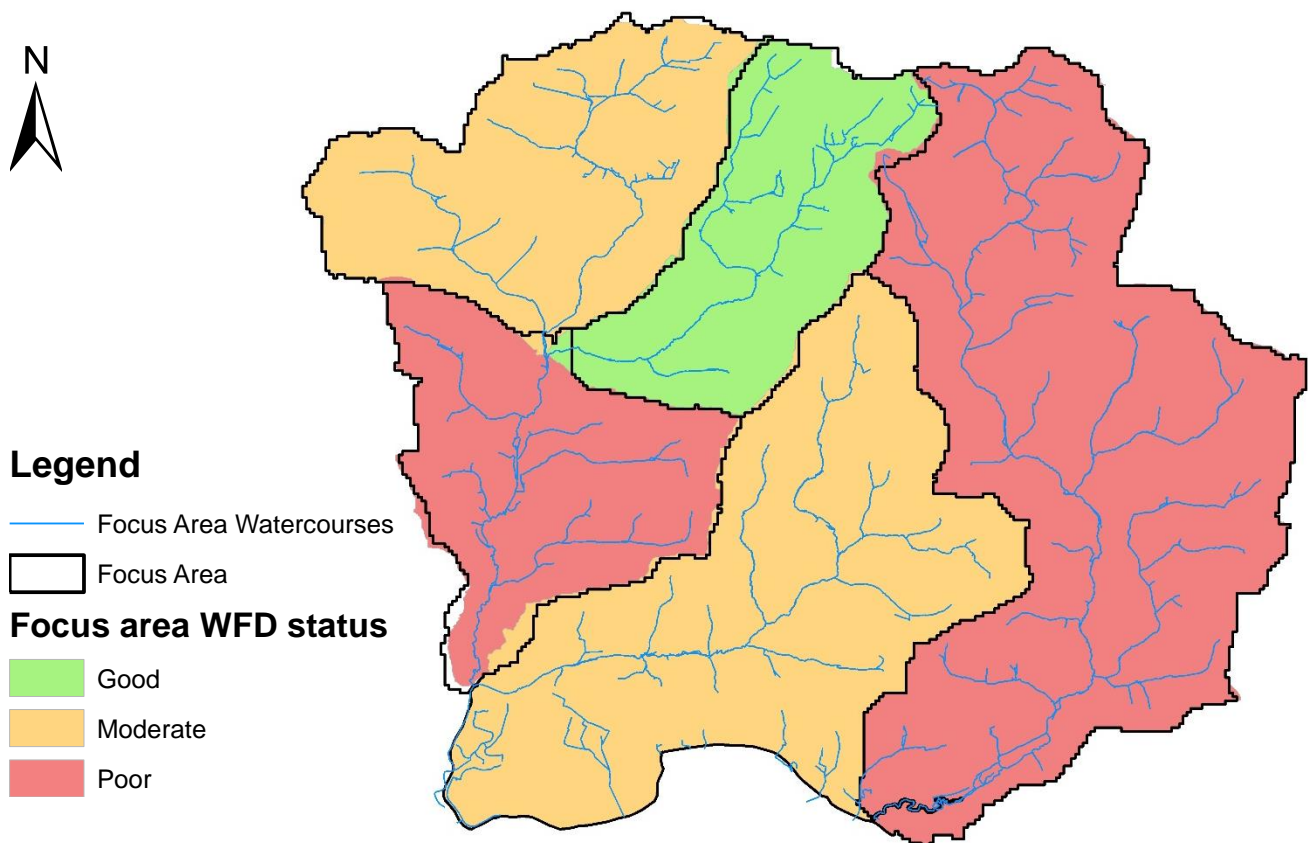
As depicted above, these catchments were found to be the River Caen which is stated currently as 'Moderate' and the Knowl Water, as 'poor' (Catchment Data Explorer, 2016). The Bradiford Water was not identified as failing for water quality, thus this waterbody was not allocated grant funding for landowners. To highlight the key landowners and farm holdings which may require grant fund assistance, datasets such as the rural land registry, the Environment Agency's WWNP, opportunity maps for water quality and cattle density supported the identification of the top 10 farms which the project may approach (see Maps 3 & 4 below).

Map 3: Focus Area Nitrate Vulnerable Zone and Cattle Density Map

N

Legend

— Focus Area Watercourses

☐ Focus Area

Cattle Density

☐	3.081090 - 3.726910
☐	3.726911 - 4.780560
☐	4.780561 - 6.723440
☐	6.723441 - 10.250200
☐	10.250201 - 15.936500
☐	Nitrate Vulnerable Zone

Map 4: Focus Area WWNP Mapping

N

Legend

— Focus Area Watercourses

☐ Focus Area

☐ Tree Planting Floodplain

☐ Tree Planting Riparian

The WWNP dataset was also used to identify any additional benefits that the project may bring on farm such as an increase in biodiversity through tree planting.

Due to health and safety implications, it was also important that these holdings were also screened against a dataset of potential active Environment Agency prosecutions and to remove these from the list of holdings to approach. In addition, soil runoff mapping research, derived in the first year of the project, was also drawn upon. This mapping enabled the project team to identify key land parcels which may have runoff and soil compaction issues. In light of this data collection and analysis, the project contacted the remaining landowners. Further, four landowners who had previously expressed an interest in the project, either at a workshop or external event, were also contacted.

2.2 Field Research

Post data analysis, the projects field research aspect consisted of contacting landowners and farm advisors producing a Water and Soils Management Report. In line with the project aims, these reports identified the on-farm issues and solutions to improve water quality and reduce soil erosion where necessary. All farm reports were produced by consultants working for the North Devon Biosphere and were verified and quality assured by ADAS, an independent agricultural consultancy. Valuable existing ecological and historic areas were also screened before interventions were adopted, as shown in Appendix 6.2.

During this project year, three workshops were hosted in partnership with the local Braunton Facilitation Fund, to advertise the multiple benefits of the project. These workshops covered an introduction to the NDFAEPP, NFM and solar pumping systems for field troughs.
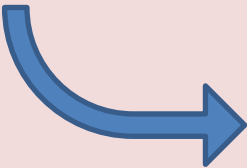
The solar pump systems workshops supported the dissemination of the new Rules for Water by promoting the importance of fencing off watercourses and excluding livestock from the stream.

3.0 Case Studies

3.1 Case Study A

Catchment	Knowl Water, Taw Catchment
Location	Beara, North Devon
Project Aim	To fence off the watercourse and provide an alternative drinking supply.
Before	Unfenced watercourse running through the field where livestock drink. Potential for NFM measures to optimise the floodplain.
After	Fenced off watercourse. Alternative drinking supply. New crossing point for maintenance access.
Outcomes	1. Fencing - reduced contaminants and potential FIO's entering the watercourse as livestock previously drank from the stream. 2. Troughs – alternative drinking supply. 3. Scrape area – improvements to on farm biodiversity. 4. Log Dams – natural flood management benefits.
Project Costs	**£11,834.72 (Grant: £5,917.36)**

3.2 Case Study B

|	
Catchment	River Caen Headwaters, Taw Catchment
Location	West Down, North Devon
Project Aim	Stage 2: To reduce contaminants entering the watercourse via runoff processes and to install NFM interventions.
Before	Cattle accessing the watercourse thus poaching the riverbanks.
After	Tree Planting Adapted Wetland
Outcomes	1. Reduced contaminants and potential FIO's entering the watercourse from surrounding agricultural land. 2. Cattle excluded from the watercourse. 3. Eliminated bankside soil erosion. 4. Improvements to on farm biodiversity. 5. Natural flood management benefits.
Project Costs	**£2,040.90** (Grant: £1,020.45)

3.3 Case Study C

Catchment	River Caen, Taw Catchment
Location	North Devon
Project Aim	To reduce contaminated loaded sediments from entering the watercourse.
Before	Before sediment trap and settlement pond location. Sediment loaded trackway
After	Sediment trap and settlement pond/ attenuation system.
Outcomes	1. Reduced contaminants and potential FIO's entering the watercourse from yard sediments. 2. Improvements to on farm biodiversity. 3. Natural flood management benefits.
Project Costs	£7,319.66 (Grant: £3,659.83)

3.4 Additional Natural Flood Management Benefits

Additional NFM benefits created during this year's project includes the below attenuation pond. This pond was constructed in a natural field depression to enlarge a water collection point. This waterbody will also provide key on farm habitat and improvements to local biodiversity once established.

The picture (right) shows an adapted hedgerow with field side ditches and inset pipework. This inclusion of pipework inset into the bank controls the runoff causing outfalls at the desired and appropriate locations while the ditch captures water borne pollutants contained within the mobilised sediments.
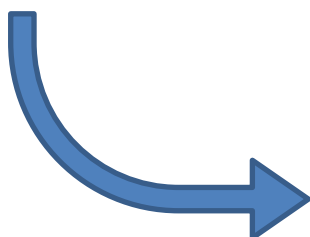
4. Results and Discussion

As outlined in Table 1 below, eleven farm schemes received grant funding this financial year. However due to unforeseen circumstances such as positive TB tests on farm and a lack of secure match funding, three schemes were removed from this year's project and moved into the contact list for reproaching next financial year, when match funding would be available. Unfortunately, two project schemes were unsuccessful due to the lack of FIO input into the watercourse and therefore not in line with the projects business case.

Table 1. Water and Soil Management Report Outcomes

Outcome	Farm Holdings
Received Grant Funding	11
Proceeding Next Financial Year	3
Funding Unsuccessful	2

These figures are reflected in the grant funds allocated per farm scheme, as depicted in Graph 1 below.
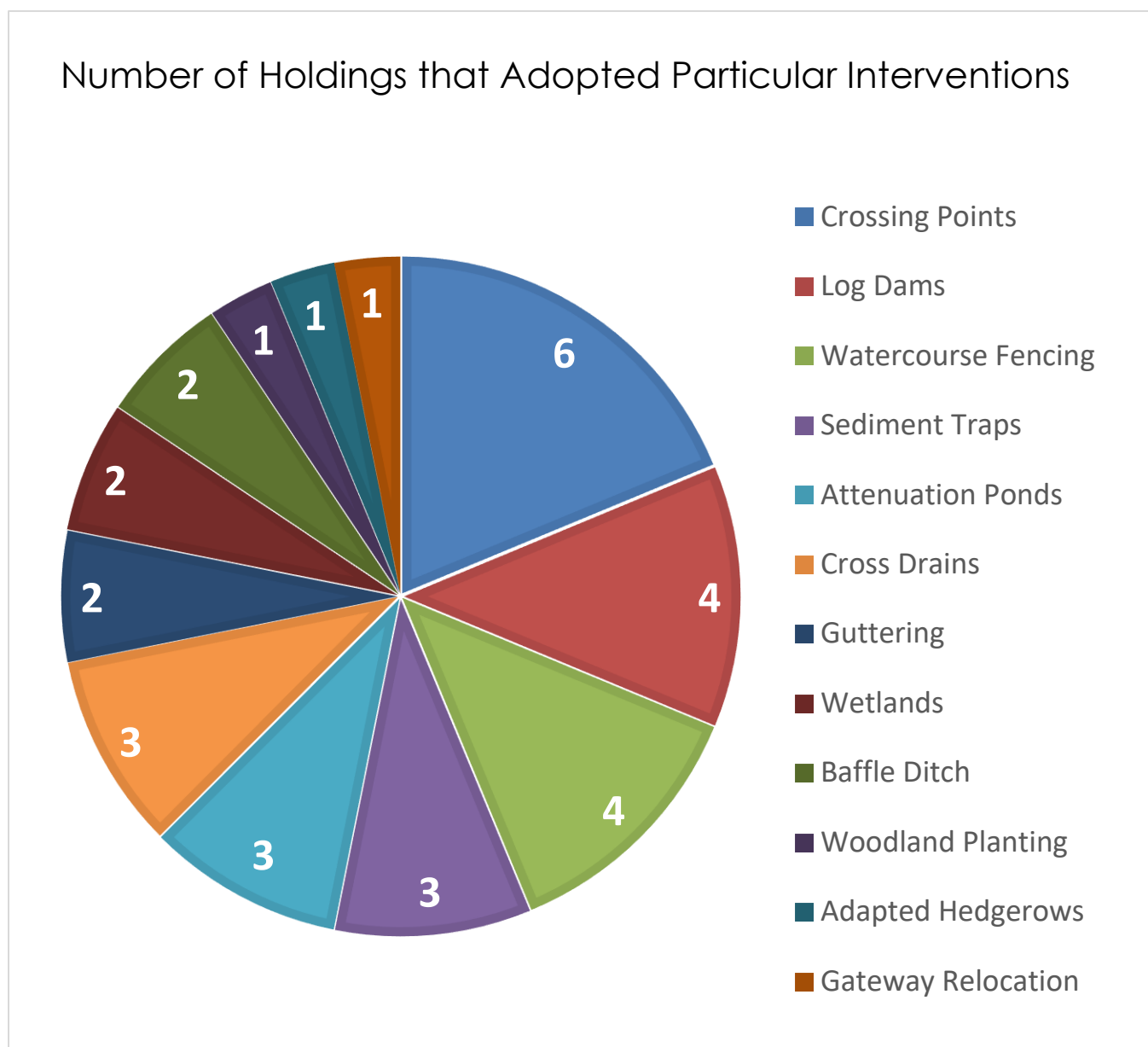
Graph 1: Focus Area Grant Fund Allocation
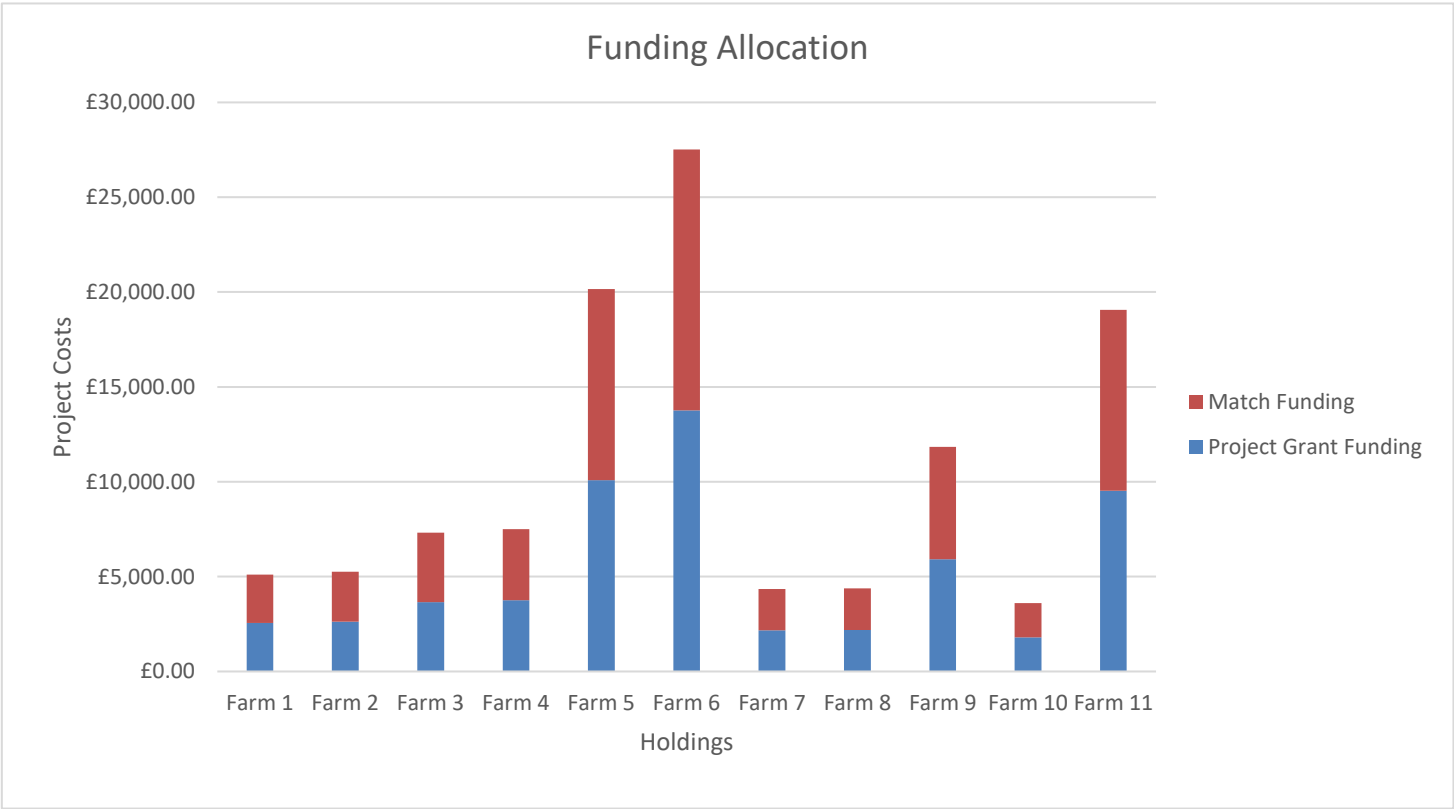
The 32 measures that were implemented on the 11 farms who received grant funds to improve water quality, reduce soils erosion and provide flood attenuation. Their associated benefits are summarised below and in Graph 2:
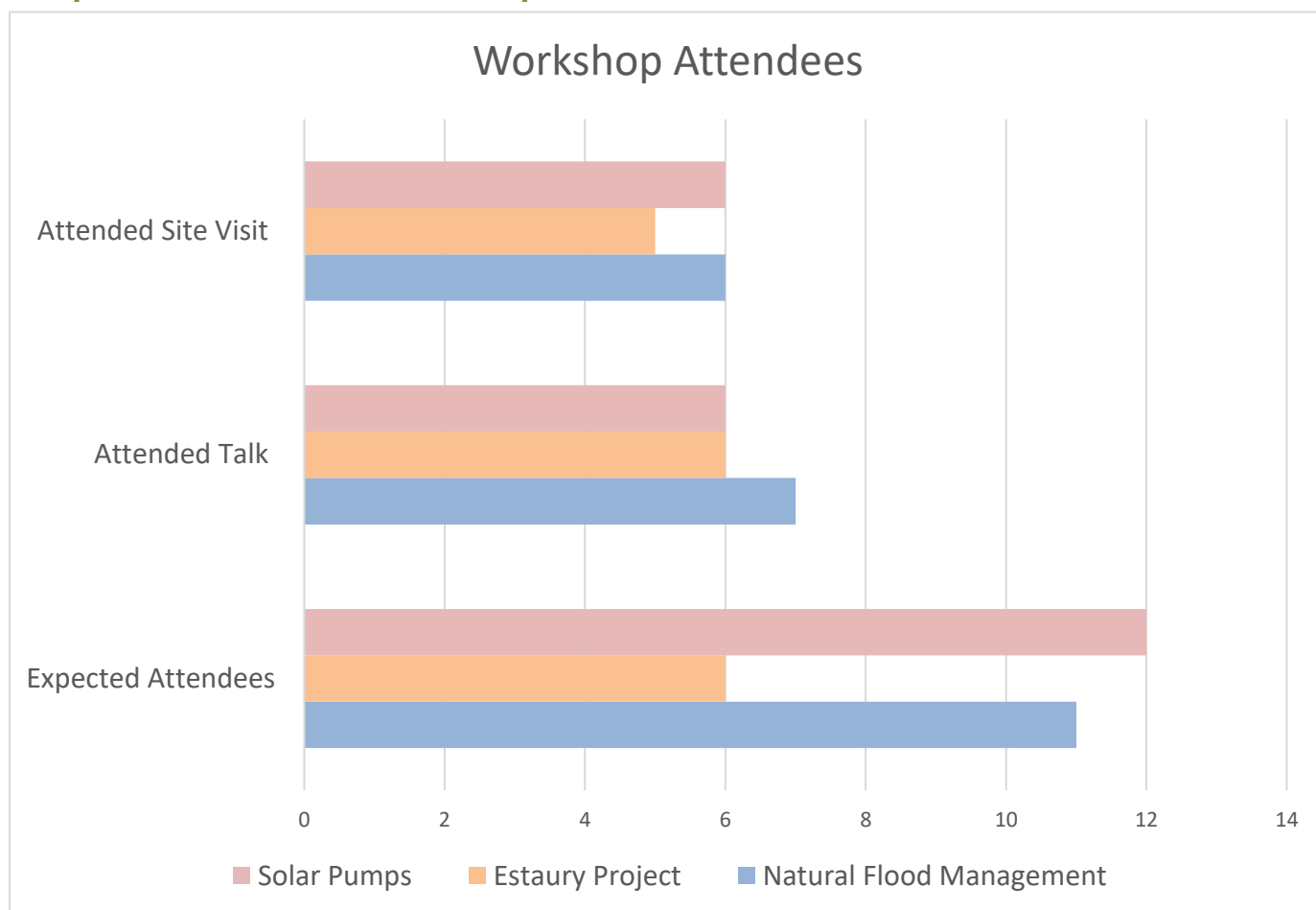
1. **Guttering (and associated drainage)** – to separate clean and dirty waters from mixing in yards and cow sheds. This reduces the volume of dirty waters that need to be kept in the slurry store. This is beneficial particularly to landowners within the NVZ focus area as this reduces pressures on spreading within the closed period.
2. **Sediment Traps** – to settle out yard borne suspended sediments within the yard area itself and separate particulate FIO's. These are designed by the landowner to be easy to maintain, using their own equipment.
3. **Wetlands and Attenuation Ponds** – to slow the flow of flood waters, settle out sediments and FIO contaminates from the water column and provide on farm habitats and improvements to biodiversity.
4. **Log Dams** – an additional NFM measure to slow the flow of small feeder streams that join the main watercourses.
5. **Woodland Planting** – to slow the flow of agricultural runoff, particularly on steep slopes, reducing the possibility of FIO's and other contaminants reaching the watercourse.
6. **Adapted Hedgerows** – to slow and provide a physical barrier to accumulating field runoff and control the outfalls at desired locations within the adjoining downslope field parcel.
7. **Watercourse Fencing** – to protect river banks and to exclude livestock from the streams. Troughs were also included to provide and alternative source of drinking water for livestock.
8. **Crossing points** – to provide a safe crossing for dairy cattle across the stream to reduce FIO input from direct defecation.
9. **Cross Drains** – to provide an alternative passage for field runoff waters and direct flows away from the yard, separating clean and dirty waters.
10. **Gateway Relocation** – to block up existing gateways located on the downslope boundaries of field parcels and relocate them at the top of the field/or in an alternative suitable location. This creates a physical barrier to slow and block runoff from joining trackways which would otherwise act as a conduit for flow, increase the waters velocity and the likelihood of flash flooding.
11. **Baffle Ditches** – to improve water quality and slow the flow.

Number of Holdings that Adopted Particular Interventions

- Crossing Points
- Log Dams
- Watercourse Fencing
- Sediment Traps
- Attenuation Ponds
- Cross Drains
- Guttering
- Wetlands
- Baffle Ditch
- Woodland Planting
- Adapted Hedgerows
- Gateway Relocation

As mentioned, the project also hosted three workshops, alongside the Braunton Facilitation Fund, to promote the benefit of the scheme to landowners and land managers within the focus area catchments. These small workshops were advertised to local farming groups and were attended by a variety of farm businesses across all sectors, including sheep, beef and dairy holdings. The workshops were kept to a limited number of attendees, as seen in Graph 3 below, to encourage conversation and questions between both the group itself and the advisors. However, there was a a large difference between the number of expected attendees and the number of landowners who attended the workshops. This could be due to the timings of the workshops as they are during the middle of the day, leading to the conclusion that perhaps evening workshop sessions may be a more convenient time.

Graph 3: Focus Area Workshop Attendees

Workshop Attendees

Category	Solar Pumps	Estaury Project	Natural Flood Management
Attended Site Visit	6	5	6
Attended Talk	6	6	7
Expected Attendees	12	6	11

Legend: Solar Pumps, Estaury Project, Natural Flood Management

The small groups were found to work very well, as 100% of attendees who took part in the workshops proceeded to either have a scheme draw up and completed the same financial year or have subsequently arranged an advisor visit for next financial year of the project, 2019/2020. Further, it was determined that the schedule of the workshops also worked well; by firstly holding a presentation indoors and then going out on farm for the afternoon session to look at the measures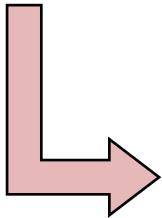 on the ground and in situ. This helped landowners visualise how these or similar measure would function on their own holdings (see picture left).

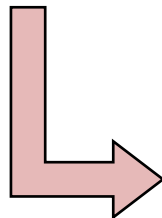NDFAEPP Natural Flood Management Workshop, 2019. Viewing Log Dams.

5.0 Recommendations for Further Work and Conclusion

Recommendations:

1. To complete works with landowners within the River Caen Catchment.

2. To relocate the focus area to the Knowl Water.

3. To analyse soil mapping work undertaken in the Bradiford and refer any major issues found.

Lessons Learnt

1. During this year's project and all years, each landowner's way of farming should always remain at the forefront of any project works to make sure any interventions installed are easy to protect and maintain.
2. Land Drainage Consenting Process – to apply for consent to the local risk management authority as soon as possible on agreement with the landowner, to avoid any delays to the project and timescales.
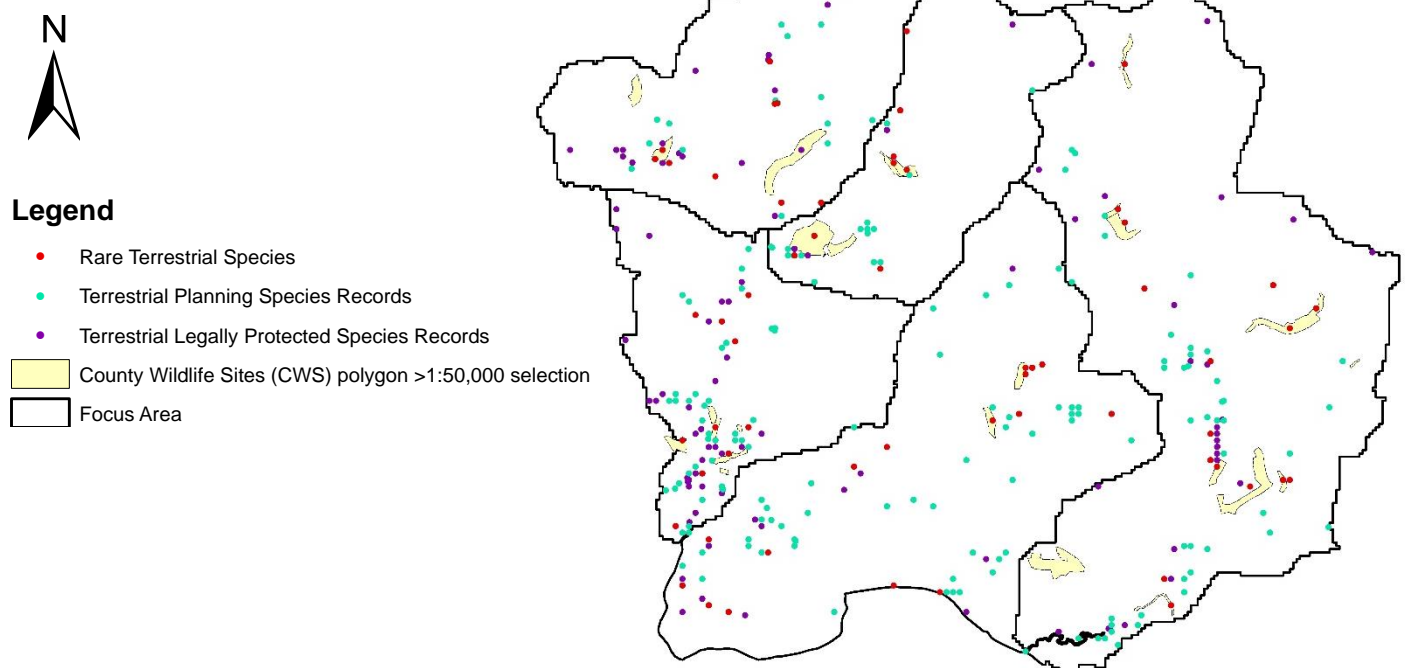
Therefore, this report concludes its summary of the implementation of over 30 interventions to improve water quality and reduce soil erosion from agricultural land.

6.0 Appendix

6.1. Opportunities Map: Farms who expressed an interest in Year 3
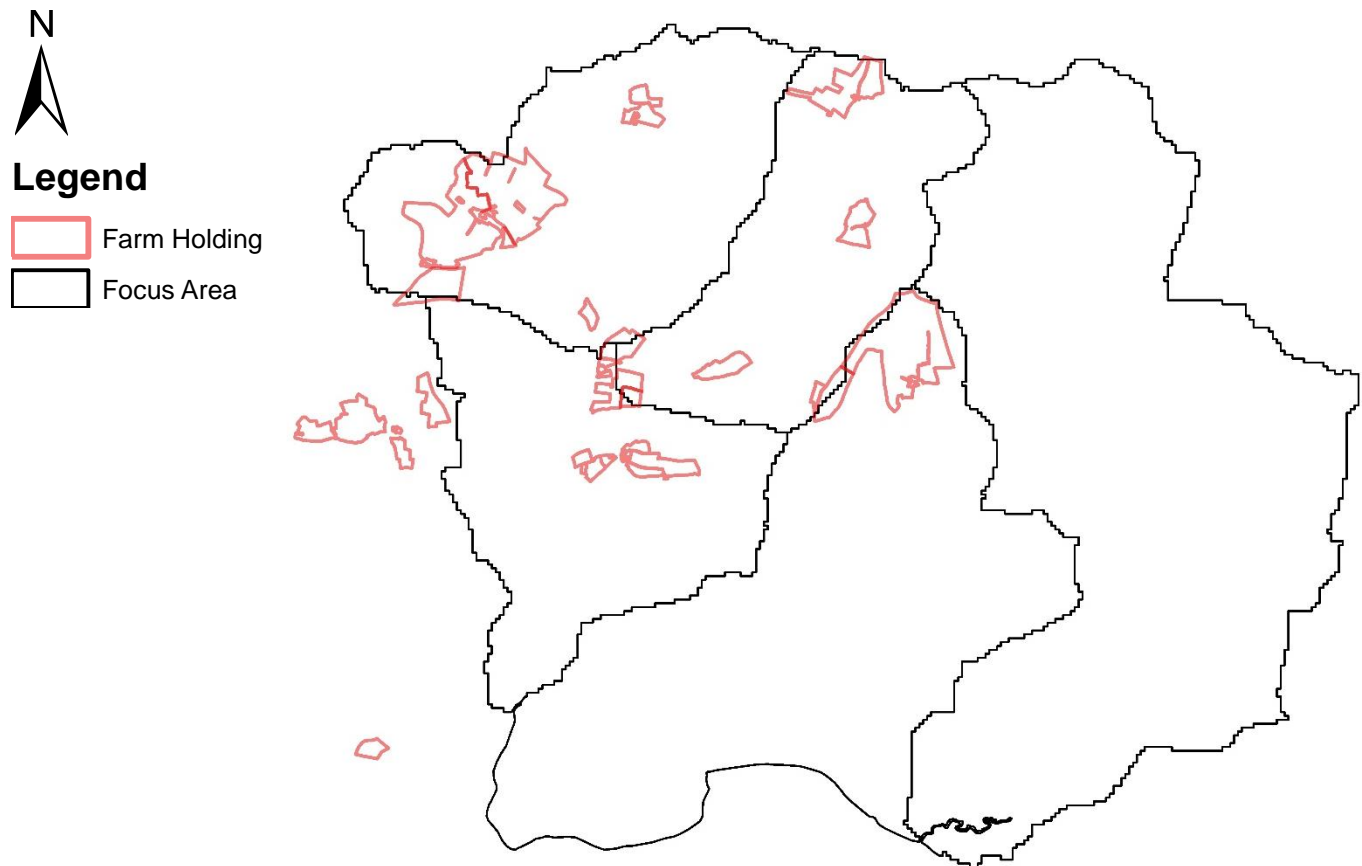
6.2. Constraints Map: Present Important Ecological & Historical Features

Legend

- County Geological Sites (by region)
- HER Scheduled Monuments
- △ Monuments (point)
- Monuments (poly)
- Focus Area