

Monmouthshire Olway and Trothy Project Final Report

Prepared By Wye and Usk Foundation – November 2014.

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Fig 1. The Lower Olway...in urgent need of protection

1. Introduction and Aims of the Project

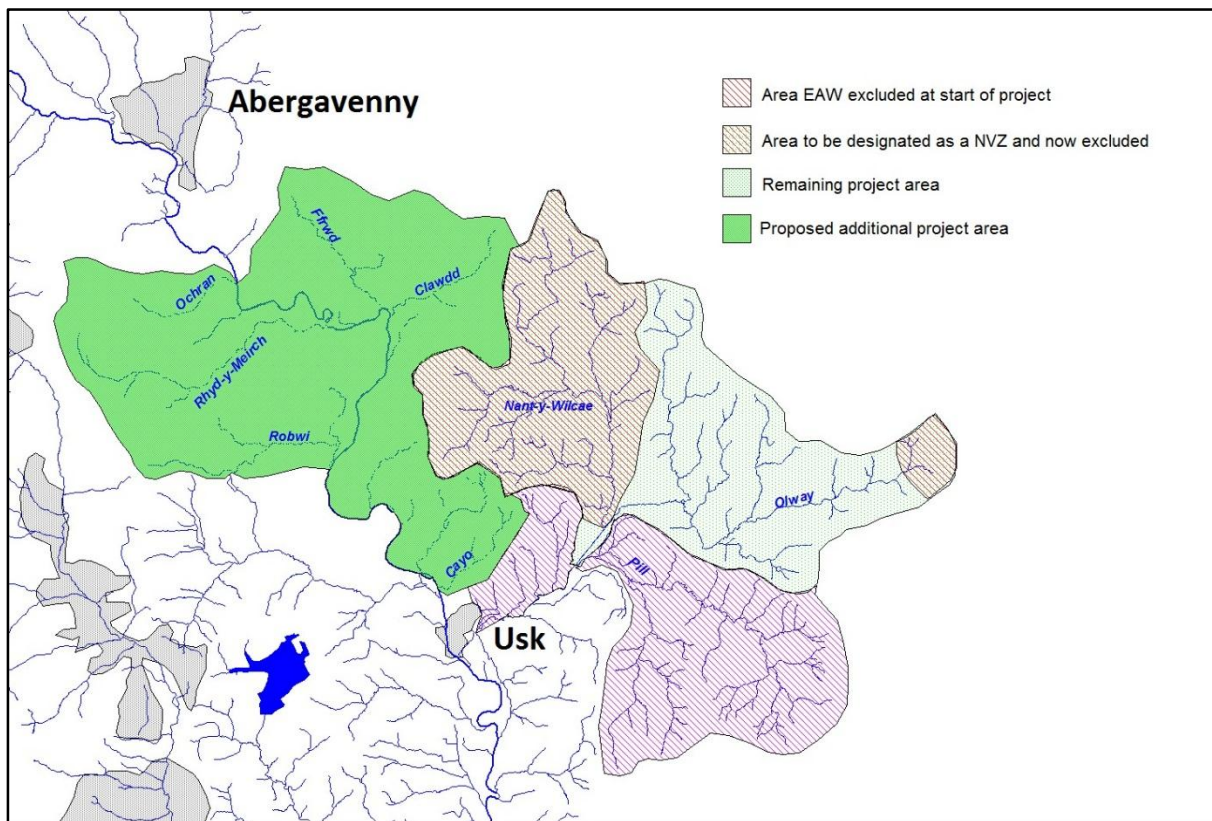
The MOAT project is a partnership project between Environment Agency Wales (EAW), Countryside Council for Wales (CCW), (now Natural Resources Wales, NRW), Dwr Cymru/Welsh Water (DCWW) and the Wye and Usk Foundation (WUF). During the course of this project, Countryside Council for Wales and Environment Agency Wales merged to form Natural Resources Wales.

The project started on the 19th November 2012 and was completed on the 30th September 2014.

The project's aims were to reduce the effects of diffuse pollution from streams arising in Monmouthshire that run into both the Usk and Wye. These include the Olway and Trothy.

In detail, the project sought to:

- Raise awareness in the farming community of the impact they are having on water quality
- Work with 82 farm holdings
- Erect 12km of riparian fencing
- Complete 20 farm infrastructure projects to reduce impact of farming operations on water.



MOAT: revised project area

2. Delivery

From its inception, the project was designed to work closely with EAW to prevent duplication of effort per Welsh Government's "Working Smarter Initiative". EAW originally requested that we did not work in the Trothy as they had a farm visit programme in place in that catchment.

The timeline of the projects delivery and principle events was as follows:

November 2012

Project starts.

Scoping of project area. All available data gathered and analysed.

December 2012

Met with EAW to co-ordinate work. EAW requested that WUF avoid the Pill Brook waterbody as it was believed to be in Good Ecological Status (later found to be otherwise). WUF were also requested to avoid the lower Olway as EAW Biodiversity were active there and a 6km² section of the Olway that was 'shortly to be designated an NVZ.'

National Museum of Wales was contracted to delivery one year diatom programme. Monitoring network established and access for surveyor arranged. Changes in diatom communities show the medium/long term changes in water quality and sediment loadings. The latter is a rough proxy for overland flow.

Start of consenting of the work on the Trothy.

January 2013:

Project leaflet developed to engage farmers.

Project webpage created. <http://www.wyeuskfoundation.org/projects/moat.php>

Farm investigation work started work by targeting the upper Olway above the proposed NVZ. The initial day of cold calling was productive. Two farmers agreed to receive follow up visits; whole farm plans were completed with associated grant assisted and non-grant assisted actions to improve water quality recommended and delivered.

February 2013

2nd meeting with EAW. They requested us to cease working in Olway catchment as it was a priority area for their operations.

March 2013

Retargeted project at main Usk below Abergavenny. Initial cold calling downstream of Abergavenny by project manager and farm staff was positive. 3 out of 4 farmers agreed to subsequent visits and farm plans.

Project leaflet revised to reflect the change in target areas.

The project then continued to work with farmers and landowners in the Lower Usk, Rhyd-y-Meirch, Ffwrdd and Cayo catchments.

June 2013

First stock exclusion and farm infrastructure works completed.

July 2013

Habitat improvement work completed in the Trothy.

Sarah Woodcock joins Neil Donkin to accelerate delivery of farm plans. She started working in the Berthin Brook and Nant Robwi. Limited number of working farms found in this part of the catchment. Mostly comprised of small holdings having little impact on water quality.

August 2013

25 farm plans completed. 1st payment trigger for DCWW.

Electrofishing survey of project area completed.

Project represented at Usk show.

December 2013

Project extended to Sept 2014. The idea was to pause operations whilst NRW completed WFD assessment.

February 2014

Invited to the Trothy by a farmer with multiple holdings. Successful in convincing him that change of practices which corrected major soil loss issues would be beneficial to the farm. This led to a number of invitations from farmers in the Upper Nant-y-Wilcae which, after consulting with NRW we were able to visit and complete whole farm plans.

June 2014

Contacted NRW, and asked if we could start again in Olway. Was informed their staff were still actively contacting farmers in Nant-y-Wilcae (NVZ) and Olway (WFD).

Sept 2014

Project completed despite limited access to rest of Olway

3. Project Outputs

The project has delivered the following outputs:

- **71 holdings visited covering 3,913ha. Holdings are shown in green on the map below.**

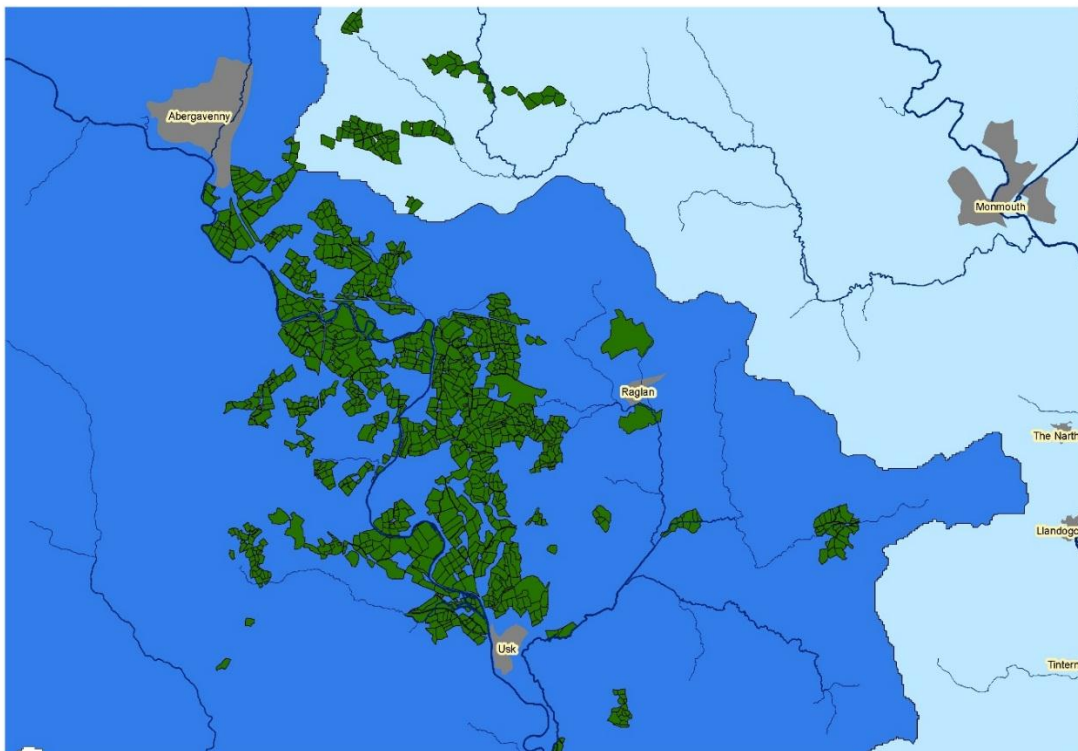


Fig 2. Farm holdings visited in MOAT

- **88 actions to reduce risk of diffuse pollution recommended and worked up with farmers.**
The following is a breakdown of uptake of recommendations at the point of this report after a phone survey of farmers in December 2014.

Principal Recommendation	No of times Recommended	% Uptake
Manage erosion risk post-harvest	3	66%
Use of cover crops	1	100%
Actively reduce compaction	11	82%
Change rotation to reduce risk	7	71%
Breaking pathways for contaminated overland flow	9	44%
Increase Organic matter	1	100%
Improved use of FYM	5	80%
Covering FYM store	1	100%
Moving FYM store to safe location	2	100%
Move ring feeders regularly	2	100%
Clean and dirty water separation	5	20%
Move cattle handling area away from stream	1	0%
Fencing and stock exclusion	35	34%
Bridge crossing point	3	0%
Provision of alternative water	18	50%
Installing buffers	2	100%
Do not drain rush pasture	1	100%
Relocate high risk pesticide filling sites	1	0%
Control invasive weeds	1	100%
Use of barley straw in pond	1	100%
No action required	5 farms	

Table 1 farm recommendations

In the absence of regulation, we are trying to create a culture change within the farming community to increase the importance of the ecosystem services water and soil and what the resultant costs play in decision making. All farms that had land in any use other than permanent pasture had a SCIMAP soil erosion risk map prepared to guide future operations.

It was noticeable that uptake of offers of grant for fencing watercourses is much lower than in a similar project we are running in Herefordshire. There is also no culture of buffering watercourses within the Welsh farming community.

- **Grant assisted works completed in project.**

13.79 km of riparian fencing erected with alternative water provided across 12 sites

13 farm infrastructure improvements delivered.

The sites are shown on the map in Annex 1.

The relatively low uptake of grant assistance in the Lower Usk is reflective of both the culture of Welsh farmers and the area of operation. Away from the Olway catchment there are a high number of tenant farms (many farms were tenants of the Llanover, Coldbrook, Pontypool and Trostry

estates). On the occasions we were able to work in the Olway or Wilace catchments 5 of the 6 offers of fencing made were accepted and completed.

4. Monitoring

Diatom Monitoring

Diatoms (phytobenthos) are the slime on top of rocks. There are a large number of species in the UK each linked with certain ecological parameters. This variation has been used in this project to determine the trophic index (phosphate), % of motile species (sediment), and % of saline tolerant species. Sampled over a year and across the catchment they provide an environmental index of water quality issues showing both spatial and temporal variations. These variations can be used to identify the farming operations causing the problems.

The Trophic Diatom Index is a WFD biological parameter and so excessive divergence from natural causes WFD failure

Diatoms were collected during three surveys in May, August and December 2013 from 2 minor tributaries of the Usk targeted by the project, 2 sites on the main stem of the Usk at the top and bottom of the project area and 9 sites within the Olway catchment. The intention was to monitor changes to pollution levels due to nutrient enrichment and sedimentation. Given the short timeline of the project the aim was to establish a baseline and target the works and actions.

Sampling sites:

O1	Nant y Wilcae	E of Rhiw-lâs
O2	Nant y Wilcae	Llangenny
O3	Penarth Brook	Llanvair
O4	Pontyrhydau Brook	NE of Llanerthill Mill
O5	Nant Olway	SW of Llanerthill Mill
O6	Llangofen Brook	Tregeiriog
O7	Pill Brook	W of The Oaklands
O8	Llan-gwm-Isaf	SW of The Oaklands
O9	Nant Olway	Llanllowell
U1	River Usk	Llanellen
U4	River Usk	North of Usk Town at Beach Hill Farm
U2	Ffrwd Brook	Aberffrwd Mill
U3	Nant y Robwi	W of Goytre, Pont-Kemys Chain Bridge

Samples were taken in riffle sections by brushing the biofilm from c 10 stones in each stream. The samples were preserved in ethanol and processed using standard methods (hot hydrogen peroxide oxidation) and mounted in Naphrax. Diatoms were identified and a minimum of 500 valves were counted at x1000 magnification. The relative abundance of species was then calculated.

To assess the ecological status of stream sites the software DARLEQII (version 2.0.11) was used and metrics for rivers were calculated. They included the Trophic Diatom Index (TDI3) and Ecological Quality Ratios (EQR), methods developed to monitor trophic status and ecological status in U.K. rivers. EQRs were calculated to assess the deviation of diatom assemblages from reference conditions and to determine ecological status classes as defined by the WFD. The percentage of motile taxa, of pollution tolerant taxa and those with tolerance of saline conditions were given which aided project targeting. Uncertainty analysis to assess the risk of misclassification was performed on DARLEQII.

Ecological Quality Ratios and classification of sites clearly varied between seasons with a larger number of sites classified as moderate or worse in summer and winter. In the Olway catchment only the Nant y Wilcae was classified as high in spring and at one site in the summer whereas the Nant Olway and other tributaries were mostly classified as moderate, poor or bad.

The main River Usk was classified as high or good in spring and summer, but moderate or poor in winter. Two of its tributaries, the Ffrwd Brook and the Nant y Robwi, were moderate or worse, except in spring when the Nant y Robwi was classified as high.

The percentage of motile taxa was high at all times in the Nant Olway, Pontyrhydyan Brook, Pill Brook and Llan-gwm-Isaf suggesting that these sites were particularly affected by soil washing off farmland

MOAT Usk / Olway catchment 2013: stream diatom monitoring										
Site	Stream/river	Ecological Quality Ratio (Phosphate)			% Motile taxa			% Organic pollution tolerant taxa		
		May	August	December	May	August	December	May	August	December
O1	Nant y Wilcae									
O2	Nant y Wilcae									
O3	Penarth Brook									
O4	Pontyrhydyan Brook									
O5	Nant Olway									
O6	Llangofen Brook									
O7	Pill Brook									
O8	Llan-gwm-Isaf									
O9	Nant Olway									
U4	River Usk									
U1	River Usk									
U2	Ffrwd Brook									
U3	Nant y Robwi									
			<.35	Awful		>70%	Awful		>75%	Awful
			.36-.5	Bad		55%-69%	Bad		55%-74%	Bad
			.5-.65	Poor		40%-54%	Poor		40%-54%	Poor
			.66-.8	Of Concern		20%-39%	Of Concern		25%-39%	Of Concern
			>.81	No concern		<25%	No concern		<25%	No concern

The percentage of organic pollution tolerant taxa was high in the Nant Olway, Pill Brook, Llan-gwm-Isaf and Penarth Brook in spring and winter, and in the Pontyrhydyan Brook in winter (all on Olway catchment).

Taxa tolerant of higher salinity were always abundant in the Llangofen Brook in the Olway catchment and in the Ffrwd Brook, a tributary to the Usk which takes the drainage from the A40.

Please note that winter diatom results are excluded from WFD classification are included as they complete the picture and allow for targeting of this and future projects.

The water chemistry data collected shows no correlation between nutrient concentrations (PO₄, NO₃) and the diatom index, but this is usually the case when the nutrient concentrations are so high.

Full results for both water chemistry and diatoms are included in annex 2 as an excel file.

Electrofishing Results

A network of 10 fisheries monitoring sites was established and sampled in August 2013 and Aug 2014. This was additional to NRW's existing monitoring programme. Riffle habitat was fished for 5mins using a technique developed by Crozier and Kennedy (2000) and refined by Maltby (2006). This allows for rapid assessment of fish populations.

Overall fish numbers were moderate to poor. Salmon were poorly distributed and only found in moderate numbers in the lower Berthin and trout fry numbers were lower than expected in the smaller tributaries.

The low levels of fish in the upper and middle Berthin is probably reflective of the industrial nature of the headwaters. Barriers to fish movement have been removed in a different project and farming in the catchment is very low impact and has been ruled out as a cause.

Full results are included in annex 2 as an excel file.

5. Discussion

5.1 Lessons Learnt

We hope all parties concerned will take something away from this project that will:

- a) Beneficially enhance working together.
- b) Bring about further significant improvements to water quality caused by poor farming practices.

During early phases of the project, we felt NRW/EAW were unduly controlling in where we went. One of the consequences is that a major pollution event that took place in the Olway happened on their watch in an area we had planned to include. Could it have been averted if we had been left to visit as in the original plan? Clearly, an MO with the new body needed to be established and this was concluded as described ahead.

In England we have developed a highly symbiotic relationship with the EA with both organisations working closely together within the confines of agreed confidentiality. Our project in Herefordshire has resulted in the county being divided with WUF working in the Lugg and western side of the County; EA/ NE in the east. We have completed 302 farm plans including one waterbody where monitoring has shown that by dealing with the worst of issues, a waterbody failing in fisheries, phosphate and phytobenthos (diatoms) can be

restored to good status. The nature of the project funding allowed us to put in place most of the necessary remedial work as well as engage with whole groups of farmers to put in place the benefits of research in techniques. An example of this is our work to reduce post-harvest maize run off.

During the course of the project, we met with the NRW staff engaged with farm pollution management to see what could be done to improve outcomes following initial problems on the Olway. In a free and frank discussion each party outlined their modus operandi and compared outcomes, leading to substantially better level of understanding and cooperation. We learnt that NRW only give advice and do not ensure uptake of any remedial actions. At October 2014, no remedial action had taken place as a result of NRW visits. *(pers comm loan Williams NRW 13th Sept 2014)*

The view of the Foundation is that better results could be achieved using WUFs ability to cold call, work up solutions in confidence and ensure actual delivery of whatever remedial measure is advised. NRW remain the regulator and statutory monitor of environmental issues. Our view is that a future based on these functions would deliver better water quality at less cost.

During the project itself, we were able to increase awareness of the benefit of good soil management for one of the most notorious and unreceptive farmers in the area. He was prepared to change both his farming practices and appear on national TV, extolling these virtues, showing the benefit of the confidential nature of the advisory function <http://www.bbc.co.uk/news/uk-wales-30206631>

Table 1 was derived by telephoning farms post plan. It was apparent that actions that could be shown to have immediate economic benefit to the farmer were fairly widely taken up, whilst those that just improved habitats were less widely acted upon, despite 50% grant being offered. By comparison in England we had a 70% uptake of riparian fencing were a 50% grant is offered. In this project it was 39%. This reflects a different culture of farming and a lack of awareness within the Welsh farming community of the impact they are having on watercourses.

The ruling that we were not able to grant assist solution to issues that were in breach of regulation has meant that there was a substantially lower uptake of items that bring about the greatest water quality improvements: eg only 20% uptake of clean and dirty water separation recommendations were enacted. No doubt it's a question of why should I do something that delivers no short term benefit to me and is a cost.

This is an area that needs urgent and considered discussion. If the current situation of polluting discharges persists, it will be remain unchanged by the current level of farm inspection: on average each farm is visited once in every 100 years, yet the benefit to society of remediating these issues with a grant such as we used in England, would deliver results at a substantially reduced rate when compared to the cost of prosecutions, works orders and even infraction. For a water company, rises in phosphate levels run the risks of them being targeted to use expensive P striping techniques, however unfair this might seem.

Monitoring The monitoring was of too short a duration to prove or disprove the efficacy of the project. However, a baseline has been established and the diatom technique has proven to be a useful targeting tool for future work.

5.2 Where next?

The result of this project has been a new arrangement with NRW which is set out in annex 3. The basis of this agreement is that the advisory function is handed over to 3rd sector organisations. A bid has been submitted to the NRW Joint Working Partnership fund to deliver a project on this basis on the Gavenny and this was announced to have been successful on the 15th December. However, funding for advisor work is very limited and should be considered as a priority

6. Project Expenditure

Cost	Total
Management staff	£15,856
Farm advisory staff	£26,203
Contracted capital works	£10,673
Mileage and travel	£5,503
Materials	£13,286
Training	£0
Publicity	£2,406
Monitoring/contingency	£599
Admin staff	£7,088
Overheads	£3,586
Total cost	£85,198



Moat: Fencing on the Trothy