

Welland Catchment 5 Year Plan

An action plan of collaborative projects to drive improvements in the water environment.



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Cover image: Simon Armitt

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1.0 Background

The purpose of this document is to build upon the vision set out by the Welland Valley Partnership (WVP) Plan in 2013, to summarise lessons learnt from the implementation of several schemes carried out as recommended by the Plan, and to ensure the WVP is best placed to secure funding and deliver projects over the next five years.

The vision set out by the Welland Valley Partnership was for the River to:

- Be cleaner and healthier
- Support more fish, birds and other wildlife
- Meet the needs of drinking water suppliers and business
- Provide a more attractive amenity for people to enjoy
- Be sensitively managed by everyone whose activities affect it
- Continue to provide drainage and manage flood risk

To realise this vision, the Partnership works alongside individuals, land managers, local communities, businesses, voluntary bodies, local authorities, government agencies and charities.

The WVP Plan set out an action plan to achieve this vision through the:

1. Development of a clear understanding of the issues affecting the Welland Catchment
2. Involvement of local communities through sharing evidence, listening to ideas and providing a platform for communications
3. Prioritising actions to address issues identified by the plan
4. Delivering integrated actions through schemes and pilot projects

Key Issues

The Plan recognised key problems within the catchment with sediment, nutrient and pesticide inputs each having severe impacts on water quality.

- Elevated phosphate levels have caused excessive plant growth leading to sections of river becoming overrun by weed and algae. Excessive growth has slowed flow velocities and reduced dissolved oxygen concentrations so that the river is unable to support healthy populations of freshwater organisms. Sources of phosphate include farmland run-off and domestic wastewater from septic tanks and sewage works.
- Sediment and accumulation of other small material particulates obstruct riffle gravels reducing invertebrate habitat, fish spawning sites, and the viability of fish eggs. As sediments settle on the riverbed, they are known in some reaches, to release phosphate and pesticides from arable land, or oil from roads into the water. Excessive sediment accretion has also led to increased flood risk through obstruction, and reduced water storage capacities. Sources of sediments include run-off

from roads, eroding riverbanks, soil that is washed over the land after heavy rainfall, and livestock trampling riverbanks.

- Pesticides are detrimental to the health of the river system, terrestrial species and human health. Highlighted for concern in the Welland Catchment is metaldehyde due to drinking water contamination concerns, and cypermethrin due to toxicity for invertebrates. Drinking water standards have low tolerance limits for pesticides, as parts of the Welland lie within a defined Drinking Water Safeguard Zone. Thus, it is vital to ensure pesticides are targeted effectively and that their levels in drinking water and the wider environment are minimised. Cypermethrin is a known factor leading the decline of freshwater shrimp abundance. Shrimp numbers within the Welland Catchment have been found to be very low, detrimentally impacting fish populations.
- Further issues from channelisation and heavy dredging have left much of the Welland upstream of Stamford overly wide, straight and deep to function as a healthy river. In some areas, the riverbed is up to three metres below its natural level. Below Stamford, the Welland flows in manmade embanked channels, often at higher levels than the surrounding land. In addition, structures in-channel throughout the catchment (including weirs, sluices and flood defences), segregate channel sections and obstruct fish migration. Investigations show these modifications are negatively impacting habitat, invertebrate, and fish diversity by removing the natural habitat features that are vital for wildlife including riffles, pools and meanders. Similarly, altered flow patterns result in increased erosional scour during high flow events, and inefficient low flow regimes which fail to provide suitable conditions for fish during summer months.

Involvement of local communities

Communities throughout the Welland catchment have become disconnected and uninterested in the river environment. Land drainage, channelisation and modification has led to altered functioning and poor accessibility of river sections and therefore detached communities. However, local communities are increasingly concerned with flood risk issues. Therefore, involving communities through education, activities, and developing media platforms to promote the activities of the WVP is a key part of sustainable river schemes.

Actions

To begin to tackle the challenges identified in the WVP Plan, an Action Plan was developed to set out a catalogue of projects and schemes. The projects are individual, and at varying scales – at reach and catchment scale. Projects cover aspects of resource protection, habitat, water resources, communication and statutory duties. A number of these projects were implemented (as listed in Appendix 1) including:

- In-channel schemes
 - Market Harborough Welland for People and Wildlife: Channel narrowing and meandering of the low flow channel, obstruction removal, riffle/pool habitat creation and community engagement.
 - Habitat management (catchment wide): Habitat creation by restoring natural features, improving flow rate, bank protection and community engagement.
 - Fish Pass Project (catchment wide): Alterations to weir structures and obstruction removal.
- Land management schemes
 - Welland Diffuse Pollution/ Catchment Sensitive Farming: Offer practical advice and promote good practice to farmers through advisory farm visits and workshops for reducing diffuse pollution.
 - Environmental Stewardship: Promoting Entry Level and Higher-Level Stewardship schemes to land managers to encourage changes in use and management.
 - Water Friendly Farming: Investigate the effectiveness of rural land management measures to protect freshwaters and the ecosystem services they provide. Including: diffuse pollution mitigation measures, pesticide and herbicide management, habitat creation, flood risk management and community engagement.
- Infrastructure schemes
 - Septic Tank Awareness: Promoting good practice in managing septic tanks among householders, businesses, and via contact with parish councils
 - Phosphate reduction: Modification of sewage treatment works and, community engagement to reduce P use and encourage sustainable water use.

These initial projects, as well as others not listed, provide an integrated catchment-wide approach to addressing the key issues affecting the catchment. Many of these projects are ongoing, and are being further developed, incorporating the results of regular monitoring. Gathered evidence from monitoring is then applied to new projects within the catchment, to refine design principles and the implementation process, and to maximise impact and value for money.

Throughout the delivery of this range of interventions, several consistent themes have emerged that have been universally significant to the success of projects:

1. Habitat Improvement
2. Education
3. Conservation

Habitat improvements are changes to the function of the system, towards a sustainable and resilient regime and typically consists of; in-channel re-configuration to recreate natural physical processes, or, off-channel changes to land management practices designed to reduce the levels of pollutants and sediment entering the system. Engagement of local communities and landowners is invariably essential to enabling delivery of restoration schemes. Re-connecting the community through educational engagement improves understanding of river management options, enabling greater stakeholder input into the design and consenting process whilst providing a sense of community ownership once the project has been completed. Increased appreciation of the benefits from restoration schemes also increases the likelihood that both the schemes themselves, as well as the surrounding natural environment, are further enhanced through continued conservation efforts and responsible land use.

2.0 Aims and Objectives

The aims set out in the 2013 WVP Plan were to:

1. Improve water quality
2. Improve habitat quality
3. Improve water resources
4. Improve the river for People and Wildlife

An action plan was developed to fulfil these aims through the integrated delivery of in-channel, land management and infrastructure projects, at strategic locations within the catchment (see appendix 1 for mapped locations). The broad purpose of this report is to summarise lessons learnt from these schemes and to ensure a viable medium-term plan to maintain momentum over the next five years.

Therefore, the aims of this document are:

1. To develop a direction for the WVP over the next five years
2. To ensure the WVP is best placed to win funding for future projects

The objectives with which to achieve the aims are to:

1. Summarise results of lessons learnt from the delivered projects
2. Prioritise projects based on these lessons learnt
3. To make all Partners aware of current actions, funding shortfalls and to identify appropriate funding solutions
4. To have a plan for the securement of future funding and project delivery

3.0 Lessons Learnt from Delivered Projects

During the delivery of projects recommended by the 2013 WVP action plan, a number of problems and delays have been encountered at all stages of delivery. The following aims to capture these problems as lessons learnt in order to avoid re-occurrence on future projects and to also aid in the initial scoping of new projects. Lessons learnt are split into four categories of project delivery; the design stage, consultation and consenting, implementation, & monitoring.

1. Design Stage

- a. A high level of detail is required during the design stage so as to get an accurate estimate of cost. A detailed Bill of Quantities (BoQ), enables each element to be itemised and priced, and thus eliminate subjectivity. In addition to this, utilising a specification, allows the price to be set at the design stage to include all materials and operation eventualities, and thus avoid added costs during implementation stage.
- b. The client must be specific in their requirements of principal designers and contractors, ensuring that the designer carries out a high level of detail before progressing to the implementation stage.
- c. An early services search enables a design to encompass any features, plan adaptations and determine risk.
- d. Buildability of design – marry up scientific basis of design with acceptable level of risk.

2. Consultation and Consenting

- a. Early engagement with consenting authorities provides a necessary foundation for the project to avoid delays later on during the process. Ensuring both sides are fully aware of the nature of the work to be carried out, and the level of detail necessary from the client and designer avoids unnecessary holdups related to the omission and re-submission of information.
- b. Equally important, is early engagement with all stakeholders, specifically landowners and local authorities, to ensure permissions to carry out work are obtained and any necessary design alterations due to a lack of agreement are discovered early in the consent process. A wide, community-based engagement strategy with easily obtainable information about the project, and design principles helps ensure the project is well received and understood. This also supports a sense of community ownership which often encourages volunteer opportunities.
- c. Further benefits of a comprehensive stakeholder/community engagement strategy (i.e. educational community events and engagement with local schools) include opportunities for contributions in kind (CiK) from landowners from mutually beneficial projects and the delivery of Ecosystem Services (ES).

3. Implementation

- a. Site supervision throughout the construction and implementation stage provides timesaving and capital when difficulties in implementation occur. This also requires both

a thorough understanding of the design, and for the design to have enough flexibility to adapt to a change in circumstance.

- b. Further delays due to unforeseen circumstances such as bad weather must also be factored into project management to ensure delivery remains viable and uncompromised where possible. Contingency plans are important in this respect.
- c. A capacity to fully manage and deliver projects, through the appointment of an appropriate number of staff and a realistic view of the timeframe a project will require is fundamental to the successful completion of a scheme.

4. Monitoring

- a. Understanding the end consequences and outcomes of the project has been essential for appraising the methodology and implementation techniques. To ensure that useful, qualitative information is received, it is necessary to have time and funding allocated for monitoring during planning stages for completion of before and after data collection. Making use of good students for data collection and analysis provides value for money and extends the monitoring of a project beyond the original funding timeframe constraints. Similarly, involving the community through RiverCare groups and citizen science to perform monitoring enables further extension of the project and provide more information to evaluate the design.

4.0 Welland Catchment Projects

Using lessons learnt from the delivered projects of the Action Plan; a catalogue of projects, schemes and sites has been developed. These incorporate ongoing and funded projects; ongoing projects with the potential to continue further requiring more funding; and aspirational projects. Monitoring results of the previously completed projects has also enabled further sites to be added, following environmental success, into similar suited locations.

These schemes remain true to the key aims and objectives of the 2013 WVP Plan while based upon the three highlighted themes from the initial project delivery (restoration, education and conservation); ensuring that the new schemes remain focussed upon the key issues and build upon experience and positive results.

The provenance of this catalogue is based on the involvement of each of the Welland Valley Partnership members in a workshop enterprise. This also included determining the feasibility, deliverability and priority of each project.

The projects have been ordered by priority, with high, medium and low priority based on the success of the monitoring evidence and lessons learnt from the completed interventions.

Currently underway projects are also listed below if they are at risk and require future funding; otherwise these are listed in Appendix 2.

4.1 Welland Catchment Projects - 5 Year Plan

Location of each scheme can be seen on the recommended interventions map (*Figure 1*).

Ref	Location	Scheme Name	Description	Key issues addressed	Est. Total cost	Capacity to deliver Achievable in Timescale	Funding sources	Owner	Start date and time scale	Feasibility	Priority	Measured deliverable
P01	Werrington Brook, Peterborough	Werrington Brook improvement programme	A 5 year partnership programme that began in 2015 to improve and sustain Good Ecological Potential of 6.5Km of rural and urban waterbody in NW Peterborough	Biodiversity; community engagement; barrier removal; sediment; phosphate; morphology	600,000	Design contracted. Project underway and is on target. Project is delivering benefits	CiK; GiA, PCC, AW, local businesses	EA	5 years beginning in 2015	Yes- cost benefit completed	High	Distance of channel narrowed; area of habitat created; biodiversity surveys + DO and phosphate testing
A05	Eye and Stonton Brook Headwaters, Leics	Water Friendly Farming	Well established integrated rural diffuse pollution and flow mitigation project at a unique landscape scale in the Upper Welland, utilising an extensive farmer network, which is working towards WFD targets whilst farming profitably	Phosphate; sediment; biodiversity; community engagement; pesticide; morphology; flood risk	500,000	Project began in 2010 with initial mitigation measures put into place in 2013 and 2014. Project is on target and delivering a wide range of monitoring output	GiA, CiK, FCRM, Businesses	GWCT, FHT, UoY	Began in 2010, funding being sought for next 5 years from 2021	Yes	High	Implemented mitigation measures; monitoring and modelling

A07	Upper Welland Catchment (u/s of Stamford)	Welland Diffuse Pollution: Resource Protection Group	A catchment partnership project addressing rural pollution	Phosphate; sediment; pesticides; biodiversity; community engagement	84,000	Underway and on target. Report on outcomes of CSFO activities due 2017	WFD GiA	NE, (CSFO), GWCT, AW, NFU	Began 2016, funding sought for next 5 years from 2021	Yes	High	Number of successful applications; land area changed
A08	Lincolnshire	Anglian Rivers Sea Trout Project	Habitat Management and fish passage	Biodiversity; community engagement; barrier removal; morphology	-	In place and delivering	EA, NE, CiK, EU	Consortium led by WTT	Project began in 2007	-	High	Barriers removed; fish passes installed; length of channel restored
A10	Lower Welland and Nene	Fish and Eel pass Project	High Priority fish and Eel pass sites	Biodiversity; barrier removal; morphology	-	In place and delivering	National	EA and IDB	Underway	Yes	High	Barriers removed; fish passes installed
A02	Seaton Meadows, Mkt Harb STW land area, Ashley Village, Barrowden Bend, Stamford Priory and Haringworth	Welland Floodplain Habitat Opportunities (Middle Welland)	To restore parts of the Welland Floodplain back into water/wet meadow to provide flood risk management and address diffuse pollution	Biodiversity; flood management; sediment; community engagement	650,000	Will need to contract for design and construction. Can project manage	HLF; Defra Countryside Stewardship, FCRM, RFCC, AW	EA, NE CSFO, WRT, AW	4 years starting 2020/21		Med	Length of channel restored; area of habitat created; biodiversity monitoring; DO + phosphate monitoring

A03	Stonton Brook Catchment	Stonton Brook Habitat Improvement	Continue habitat improvement work in lower to mid Stonton Brook. Extend measures from WFF project with focus on tackling diffuse pollution	Phosphate; sediment; biodiversity; community engagement	15,000	Will need additional staff with expertise to deliver	WFD GiA; other	WRT	2 years commencing 2020/21	Yes	Med	Length of channel restored; area of habitat created; water quality monitoring
A04	Eye Brook Catchment	Eye Brook Habitat Improvement	Continue existing habitat improvement work in lower to mid-section of Eye Brook. Extend measures from WFF project with focus on tackling diffuse pollution	Phosphate; sediment; biodiversity; community engagement	15,000	Will need additional staff with expertise to deliver	WFD GiA; other	WRT	2 years commencing 2020/21	Yes	Med	Length of channel restored; area of habitat created; water quality monitoring
P06	Headwaters catchment – Lubenham	Welland Headwaters Improvement Project	The project aims to improve ecological potential by addressing biodiversity and diffuse pollution issues.	Phosphate; sediment; biodiversity; community engagement	45,000	Project has been designed and contracted to Five Rivers Environmental Consulting; delivery will begin Autumn 2019.	WEG; CiK	WRT	Underway	Yes	Med	Ecological and water quality monitoring; area of habitat created; length of channel rest.
A09	Rutland	Slug it Out	Metaldehyde substitute program for natural catchment of Rutland Water	Pesticides; community engagement, water quality	-	In place and delivering	AW	Anglian Water	Multi-year project started in 2016	Yes	Med	Number of landowners engaged and changes made; water quality monitoring

A11	Whole Catchment (Details in appendix 3)	Catchment wide habitat enhancement	Multiple habitat improvement schemes/ tertiary treatment schemes/ riparian habitat and in-channel physical improvement works. Opportunity to utilise Neighbourhood Plans and River Warden information	Sediment; phosphate; biodiversity; community engagement	10,000	High capacity to deliver through WRT staff. Multiple small discrete projects at low cost. Co-ordinate with Parish Councils and Via River Warden scheme	Various small funds	WRT; Parish councils, Neighbourhood Plans	5 years commencing 2020	Yes. Small, low cost projects	Med	Length of channel restored; area of habitat created; number engaged
P02/3/4/5	Harrington, Drayton, Sutton Bassett, Gretton	Welland Habitat Enhancement	Past works in these locations to be further improved with measures to increase habitat biodiversity and provide fish refuge	Biodiversity; community engagement; barrier removal; keeping rivers cool; tree planting	8,000	Yes - dependent on quantity of other projects - will need to allocate more time or additional staff	Angling Trust; WFD GiA, CiL, S106	WRT	5 years beginning 2020	Small, low cost intervention	Med	Length of channel improved; number of improvements; barriers removed
A13	River Gwash near Little Casterton	Gwash Habitat Improvements	Gravel augmentation and rubble insertions to raise the riverbed to a more natural level	River morphology, biodiversity	160,000	Will use Gwash Fishing Club volunteers to deliver	EA GiA, GFC CiK, National Fund	GFC	Underway	Yes, GFC have experience delivering this work	Med	Length of channel improved
A15	Whole Catchment	Catchment Partnership - Project Officer	Funding from the Water Environment Improvement Fund (WEIF) for Catchment Partnership Hosting Support to fund a part time Project Officer	Community engagement, project delivery,	75,000	Underway	WEIF	WRT	5 years, underway	Yes	Med	Number of engagements; contributions received; delivery and coordination of projects

A16	Whole Catchment	Our Welland – Heritage, Heath and Home	Year long community engagement project with dedicated officer to understand how people want to interact with their rivers	Community engagement	32,000	Funding secured but postponed due to COVID-19	Lottery Community Fund	WRT	1 year beginning 2020	Yes	Med	Consultation received, new projects developed, future funding secured
A14	River Jordan – Braybrooke to Welland	River Jordan Improvement Works	Measures to reduce sedimentation caused by widened, straightened channel.	Flood risk management; habitat creation	30,000	Outline project designed, could be delivered with current WRT staff	S106	WRT / HDC	2 years commencing 2020/21	Yes	Low	Length of channel improved ; reduction in flood risk
A01	Glens Catchment	Lincolnshire Fens Integrated Catchment Management Plan	Wetland creation and land management	Phosphate; sediment; biodiversity; community engagement	85,000	Project has commenced and is delivering	HLF, Leader, WFD GIA, RFCC/FCRM, CiK	South Lincs Fens Partnership	Underway	Yes	Low	Area of habitat created/improved; number of landowners engaged; changes made
A06	River Welland – Peakirk to Spalding	Welland Washes	Feasibility study	Community engagement; flood risk management	30,000	Ongoing - Contracted out to Royal HaskoningDHV	WEG	WRT	Underway	Staff or contractor required	Low	Delivery of study

A12	Whole Catchment	River Wardens	Site identification, monitoring, Parish Council link, pollution and other issue report	Community engagement, biodiversity, monitoring	4,000	Ongoing under the Welland Rivers Trust	Tesco Bags of Help, GLNP, LRFC, WF Southall, Hickinbotham Trust	WRT	Underway	Yes, low cost	Low	Number of wardens; length of channel covered; number of results received
P07	Stamford	Stamford Millstream Improvement Project	Measures to restore and improve flow along historic mill stream channel whilst improving the habitat and aesthetic value.	Community engagement, biodiversity	57,000	Ongoing project I	AW, SKDC, Local community funds	EA; AW; WRT	Underway	Yes, with contractors and community volunteer input	Low	Length of channel improved, numbers of volunteers engaged, community survey
P08	Welland headwaters catchment – Thorpe Lubenham Hall	Thorpe Lubenham Wetland	Excavation of an online wetland within a meander bend to provide new habitat, store floodwater and treat effluent. Offshoot from Welland Headwaters Improvement Project.	Biodiversity, water quality, flood risk management, community engagement	48,000	Project designed, landowner agreement secured and financed with Partnership Grant. Will be delivered at same time as P06	AW, CiK, EA PG, WRT	WRT	2 months in Summer 2020	Yes	Low	Area of habitat created, ecological monitoring, volunteers engaged
P09	Welland – Gwash Confluence d/s Stamford	Gwash Confluence Restoration	Creation of new wetland area by reconnecting old meanders to the Welland and Gwash through excavation and bank lowering.	Biodiversity; flood risk management; river morphology	?	Early stages with initial proposal approved by Burghley Trustees. Funding secured for modelling work	CiK, EA PG, Burghley Estates, Augean Community Fund	WRT	4 months commencing 2020/21	Yes, but feasibility needs exploring to understand scale of work needed.	Low	Area of habitat created, ecological monitoring

P10	Stamford	Stamford Meadows Restoration	Investigation into restoring botanical diversity with changes in land management.	Biodiversity; community engagement	1,000	Early stages of project – community group active with soil samples to be taken and trial sites to be established.	Local Authority, CiK, Local community funds	WRT	Underway	Yes on small scale, large scale changes will require significant work.	Low	Area improved, monitoring, community surveys, volunteers engaged.
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Table 1: Identified Projects

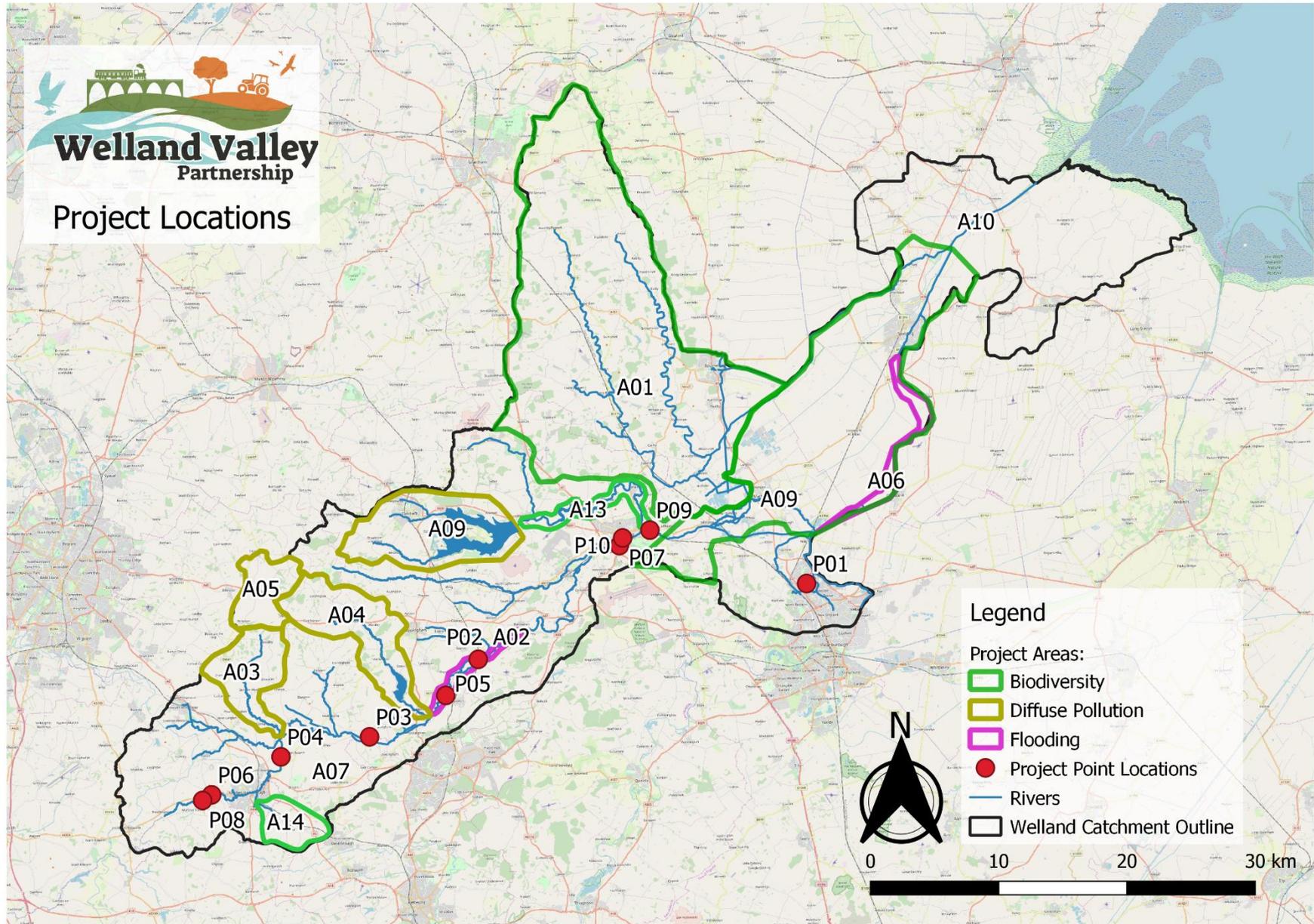


Figure 1: Map of recommended intervention and current project locations. Number labels refer to the Ref. ID in *Table 1*.

4.2 5 Year Plan Timetable

Key Task	FY 2016-17						FY 2017-18						FY 2018-19						FY 2019-20						FY 2020-21					
	A pr	J un	A ug	O ct	D ec	F eb	A pr	J un	A ug	O ct	D ec	F eb	A pr	J un	A ug	O ct	D ec	F eb	A pr	J un	A ug	O ct	D ec	F eb	A pr	J un	A ug	O ct	D ec	F eb
Develop 5 yr Plan																														
Complete 5 yr Plan																														
WVP Meetings																														
WRT Meetings																														
Share plan via social media																														
Update project lists																														
Gap analysis																														
Develop further projects																														
Identify potential funding partners																														
Target key stakeholders																														
Identify contribution in kind through collaboration or partnership																														
Update CiK and funding records																														
Plan bidding strategy																														
Ranking of funding and resource opportunities																														

4.3 Typical approach and key tasks to deliver a project

1. Develop a clear framework for the project
2. Plan the bidding strategy by identifying possible sources and adapting project for maximum compatibility
3. Target key stakeholders for consultation and possible partnership or collaboration
4. Specific landowner consultation to disseminate project and seek land access permissions
5. Identify contribution in kind through partnership or collaboration
6. Apply for funding for specific projects
7. Funding approval
8. Advertise and share progress via social media
9. Identify key needs and resources
10. Appoint additional staff or resources
11. Data and information gathering
12. Produce designs
13. Stakeholder engagement
14. Produce monitoring scheme
15. Initial monitoring
16. CDM
17. Project specification, bill of quantities and risk assessment
18. Apply for consents
19. Share progress and site information via social media
20. Assign contractor or organise delivery through landowner or volunteer group
21. Design adjustments
22. Implement improvements
23. Progress monitoring
24. Share construction progress via social media
25. Post construction monitoring
26. Consolidate project achievements
27. Post project monitoring
28. Share achievements via social media

5.0 Project Summaries

The following pages contain summaries for all the projects identified in the plan. This is to provide the background detail of the location, purpose of the scheme, aims and objectives, timescale and finance information required for funding applications.

5.1 Werrington Brook Improvement Programme

P01

Location

Werrington Brook in Peterborough

Lead Organisation

Peterborough Environment City Trust, Peterborough County Council and Environment Agency

Background

The key issues this project will address are: biodiversity; community engagement; barrier removal; sediment; phosphate; morphology and water quality.

The project has been launched following completion of a feasibility study in 2014 by Peterborough City Council and the Environment Agency. The study looked at potential ways that the water quality, biodiversity and amenity function of the water bodies could be improved for the benefit of all.

Purpose

The purpose of this project is to look at ways of holistically improving the sub-catchments of the River Welland in the Peterborough area. This includes Marholm Brook, Brook Drain, Paston Brook, Werrington Brook and Cuckoo's Hollow. The project involves physical works to the river, and community and business behaviour change work, tackling a wide range of pollutants at source.

Timescale

Project is underway, and began in 2014. It is a 5-year project, due for completion in 2019.

Funding

Over the next 4 years the project is expected to cost £600,000.

This is through WFD GiA and various other contributors through CiK

5.2 Welland Habitat Enhancement

P02/P03/P04/P05

Location

Five sites identified: Drayton, Sutton Basset, Gretton, and Haringworth

Lead Organisation

Welland Rivers Trust with Wild Trout Trust

Background

The key issues this project will address are: biodiversity; community engagement; and barrier removal.

These sites have been restored in the past, focusing on morphology, flow and habitat. Further improvements are required to address fish barriers including providing suitable shelter, additional spawning habitat and shading. These sections of channel are fished but can be difficult to access.

Purpose

This is an aspirational project. The purpose is to provide fish refuge habitat improvement and improve accessibility. This will include in-channel improvements, and tree and bush planting.

Timescale

This is an aspirational project planned to be carried out over a 5 year period; beginning 2020/21.

Each scheme is likely to fill a 6 month timeframe, averaging at 1 site per year.

Funding

£8,000 over 5 years; estimated £2,000 per scheme

Sources likely to include the Angling Trust and possibly WFD GiA

Output and Monitoring

The deliverables are to be determined at point of project development, however, are likely to include length of channel restored, number of improvements made, quantity or area of trees planted, and barriers removed.

5.3 Welland Headwaters Improvement Project *Phase 3*

P06

Location

Welland headwaters catchment, within Lubenham village and Thorpe Lubenham Hall.

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: phosphate; sediment; biodiversity; and community engagement.

Key findings from Phases 1 and 2 in 2014/2015 suggest the current poor ecological status is understood to be a result of pressure placed on the headwaters from communities, businesses and infrastructure. One such pressure is related to the quantity of sediment transporting chemicals and nutrients into the headwaters. Sources of sediment were identified as Water Recycling Centres, road infrastructure, arable and livestock farming, recreational activities and quarrying. The sediment enters into the headwaters via general drainage systems or directly off the adjacent land. Other pressures included changes to the way the river flows and natural (e.g. excessive trees) and man-made (e.g. concrete weirs) barriers to fish passage.

Purpose

The purpose of phase 3 of this project is to address the poor ecological status through a series of physical in-channel restoration and riparian intervention. Improved community access to the river will also be achieved through the measures.

Timescale

Project is underway and contracted out to Five Rivers Environmental Contracting. Capital works to deliver the physical in-channel improvements were postponed after heavy rain in January 2020. The scheme should now be delivered in July / August 2020.

Funding

The full cost of phase 3 (~£45k) has been covered by the Water Environment Grant (WEG).

Future phases of the project have potential to get an additional funds from contribution in kind through stakeholder engagement.

5.4 Stamford Millstream Improvement Project

P07

Location

Stamford

Lead Organisations

Stamford Civic Society, Environment Agency, Anglian Water, Welland Rivers Trust

Background

The key issues this project will address are: biodiversity and community engagement.

The millstream is an historic site linked with Stamford's identity, first mentioned in the Domesday Book in 1086. Originally fed from the Welland, work in the 1970s at Tinwell Pumping Station meant that the millstream was cut off and a small water pump was installed to keep some flow going down the millstream. Despite various community efforts over the years, the millstream has become heavily silted, stagnated and dominated by vegetation. An investigation by Anglian Water in 2017 revealed that the stream was not flowing because of a backup caused by debris and a leak in the supply pipe.

In December 2018 efforts to improve the millstream were renewed with the formation of a new community steering group.

Purpose

The purpose of this project is to restore a reliable flow of water to the millstream and engage the local community and businesses in delivering various in-channel and bankside works that will improve the amenity and biodiversity value of the site.

Timescale

A four year project delivery timetable (2019-2022) has been drawn up by the steering group with a number of habitat management work parties engaged, coir roll installation at the Town Meadows, repair of the feeding pipe and pump and desilting of the settlement basin all taking place in Spring / Summer 2019.

Funding

Anglian Water supplied the ~£25,000 needed to replace the pump and pipework to feed the stream. The Environment Agency have supplied ~£5,500 to install the coir rolls and desilt the settlement basin.

Further funds are needed to narrow the channel at various points to increase flow speed and reduce vegetation of the channel (~£18,000). Sources could include SKDC Community Projects funding and Mick George community project funding.

5.5 Thorpe Lubenham Wetland

P08

Location

River Welland headwaters within the grounds of Thorpe Lubenham Hall.

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: biodiversity, water quality and flooding.

The Water Framework Directive (WFD) 2016 designates the Welland headwaters catchment as being in "Poor Status". It is failing for measures including fish, macrophytes, phytobenthos, phosphate and hydrological regime.

This project is a result of opportunities identified during the WEG funded Welland Headwaters Improvement Project. The focus for this project is to excavate an online wetland area of approx. 0.5 acres within a meander on the River Welland located just downstream of the confluence with the Marston Trussell Brook. This will provide habitat for a variety of native wetland plant species, invertebrates and fish, create a flood storage area capable of holding approximately 1500 cubic metres of water and reduce pressure from high phosphate effluent flowing down the Marston Trussell brook from the local water recycling centre. Opportunities for community involvement lie in the planting up of the excavated area and future maintenance work parties to maintain good functioning of the wetland.

Timescale

This project will be delivered by Five Rivers Environmental Contracting in Summer 2020 at the same time as the Welland Headwaters Improvement Project *Phase 3* (P06).

Funding

£10,000 has been awarded from the Anglian Water Flourishing Environment Fund, with an additional £38,000 from an Environment Agency Partnership Grant.

5.6 Gwash Confluence Restoration

P09

Location

Confluence of the Rivers Welland and Gwash downstream of Hudd's Mill, Stamford.

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: biodiversity.

Burghley Estates joined the Welland Valley Partnership in 2019 with a view to exploring how they could contribute towards achieving catchment objectives as part of their overall estate management.

Initial discussions highlighted the opportunity to devise a restoration scheme at the confluence of the River Gwash and the River Welland, where paleochannels exist in a publicly accessible field managed in-house by the estate.

Purpose

The purpose of this project is to reconnect the meanders through a combination of in-field excavation and bank lowering from the Welland the Gwash. Depending on the feasibility and scale of the project desired by Burghley Estates, water could permanently flow through the site or just be reconnected during times of higher flow. This will create new wetland habitat, flood water storage and provide a publicly accessible area to view wildlife.

Timescale

This is an aspirational project to be carried out over a two-year period from 2020/21.

Funding

£9,000 has been secured through an Environment Agency Partnership Grant. This will pay for a contractor to survey and model a range of sustainable restoration scenarios that account for the heavily disconnected state of the project site.

No funding has been secured for future physical works. Potential sources include the Augean Community Fund for community and environmental projects.

5.7 Stamford Meadows Restoration

P10

Location

Stamford "Second Meadow"; land between The Millstream and River Welland

Lead Organisations

Stamford Meadows Community Group, Welland Rivers Trust

Background

The key issues this project will address are: biodiversity and community engagement.

Current management practices on the publicly accessible meadow are unfavourable for the survival of wildflower species and have resulted in a largely nettle, dock and thistle dominated sward.

A community group interested in the biodiversity and aesthetic value of restoring wildflowers to the meadow was formed in Summer 2019 to investigate the possibility of changing land management to restore wildflowers.

Purpose

The purpose of this project is to run several tests on the nutrient level, water content and characteristics of the soil in the meadow to determine whether restoration is possible and if so, how to go about it.

Natural England's floodplain meadows ambassador for Lincolnshire is providing an advisory role in the project.

Timescale

2 year initial project to understand soil characteristics and develop trial areas.

Funding

Phase 1 of the project to conduct soil testing and installation of dip wells to monitor the hydraulic characteristics of the site is estimated to cost ~£600.

Possible sources of money are the South Kesteven Community Fund and Augean Community Fund.

5.8 Lincolnshire Fens Integrated Catchment Management Plan

A01

Location

East of Bourne, West of Spalding, and North of Market Deeping

Lead Organisation

South Lincolnshire Fenlands Partnership

Background

The key issues this project will address are: Phosphate; sediment; biodiversity; and community engagement

Purpose

The purpose of this project is to recreate fenland through wetland protection, creation and better land management. Baston and Willow Tree fen are the priority areas.

Further aims are: to protect heritage; improve access to greenspaces; celebrate the uniqueness of fenland; and promote fenland farmland, businesses and reduce the impact of climate change.

Timescale

Currently ongoing, but seeks funding over a 5 year timescale

Funding

£85,000 comprising £35,000 for scoping and £10,000 per annum

Sources likely to include HLF, Leader, WFD GiA and RFCC/FCRM

5.9 Welland Floodplain Habitat Opportunities

A02

Location

Various possible locations: Seaton Meadows, Market Harborough STW land area, Ashley Village, Barrowden Bend, Stamford Priory and Haringworth

Lead Organisation

Welland Rivers Trust/Environment Agency/Anglian Water/Natural England

Background

The key issues this project will address are: biodiversity; flood management; sediment; phosphate; and community engagement

Purpose

The purpose of this project is to increase wet floodplain habitat to the Welland. This will include creation or restoration of water meadow and wet woodland, slowing the flow, and providing diffuse pollution mitigation. Increased areas of land that are able to become wet and remain wet during high water levels will provide flood risk mitigation.

This project will enable land parcels to be more valuable, providing greater ecosystem services. This could be done through creating a wetland area, reed bed, or by braiding/meandering the channel through this area.

Community involvement can be a key theme, as these sites could become nature trails/visitor areas.

Timescale

This is an aspirational project to be carried out over a 5 year timeframe

Individual schemes likely to take 1-2years

Funding

Approx. £500,000 in total over the 5 years

£150,000 specifically for MH STW scheme

Sources likely to include: Defra Countryside Stewardship; Anglian Water Cik, AW water for life, RFCC, FCRM underspend, WFD GiA, Lottery HLF bid

5.10 Stonton and Eye Brook Catchments Habitat Improvement

A03 & A04

Location

Middle and lower Stonton Brook catchment, and the Middle and lower Eye Brook catchment, joining the existing Water Friendly Farming project area in the upper catchments

Lead Organisation

Freshwater Habitats Trust and the Game & Wildlife Conservation Trust

Background

The key issues this project will address are: biodiversity; phosphate; sediment; and community engagement.

Significant successes have been recorded in the upper catchment through extensive landowner engagement, adaptations to land management practises, and flow mitigation to address biodiversity issues through the Defra Countryside Stewardship Scheme and the work of the Catchment Sensitive Farming Officer particularly in the Stonton Brook catchment. In addition, there have also been positive impacts upon diffuse pollution and flood risk management.

These successes can be extended and replicated throughout the remaining catchment.

Purpose

The purpose of this project is to repeat the successes of the diffuse pollution work from the Upper catchment here.

This will include looking at land management practises through developing a farmer network, and physical works including flow mitigation, run-off and habitat improvement.

Timescale

This is an aspirational project to be carried out over a two-year timeframe commencing 2020/21.

Funding

£30,000 over the 2 years

Sources could be WFD GiA, small local funds, along with 25% CiK

5.11 Water Friendly Farming

A05

Location

Eye Brook and Stonton Brook Headwaters

Lead Organisation

Freshwater Habitats Trust and the Game & Wildlife Conservation Trust

Background

The key issues this project will address are: phosphate; sediment; biodiversity; community engagement; pesticide; flood risk; and morphology.

Water Friendly Farming is a research demonstration project assessing the effectiveness of measures to protect freshwater habitats and the ecosystem services they provide in the rural environment, whilst maintaining the profitability of farm businesses. The project began in 2010, creating a 3 year a detailed physical, chemical and biological baseline description of the water environment. In 2014 mitigation measures were implemented to hold back sediments, nutrients and water, and increase the variety of freshwater wildlife (biodiversity) across the landscape. These included on-line measures to reduce sediment and nutrient loss with earth bunds on ditches to trap sediment, interception ponds on field drains and off-line ponds to trap flood water.

Purpose

Continuation of this project will enable further research into the effectiveness of mitigation measures.

The project is already demonstrating successful results for freshwater biodiversity, flood risk management, flow and sediment modelling, diffuse pollution, soil and land management practise changes including fertilisers, herbicides and pesticides.

Timescale

This is an established project seeking further funding for continuation over 5 years.

Funding

£500,000 required over the 5 years with a £24,000 WFD GiA request.

£32,500 is secured through CiK.

5.12 Welland Washes

A06

Location

Wide Welland in the vicinity of Crowland and u/s of Spalding

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: community engagement, flood risk management and floodplain habitat biodiversity.

The lower Welland catchment is low-lying land, some fenland, which in the past frequently flooded. Through increased cultivation and pressure for land, much of this area has been drained.

Purpose

The purpose of this project is to complete a feasibility study for restoring the Welland Washes, returning the current intensively managed arable landscape to one of wet grazing, increased biodiversity and improved community access.

Timescale

This is to be carried out over a 1 year period 2019/2020. The project was paused in March 2020 due to the COVID-19 lockdown and will be restarted when the restrictions on social distancing are reduced.

Funding

£27,600 funding secured from the Water Environment Grant.

5.13 Welland Diffuse Pollution: Resource Protection Group (RPG)

A07

Location

Upper Welland Catchment (u/s of Stamford)

Lead Organisation

Delivered by Welland RPG comprising Natural England (CSFO), Game & Wildlife Conservation Trust, Anglian Water, and NFU

Background

The key issues this project will address are: phosphate; sediment; pesticides; biodiversity; and community engagement.

Purpose

The purpose of this project is to encourage farmers and land owners to engage in careful land management that keeps diffuse pollutants below the Water Framework Directive stated levels.

Work includes managing the use of fertilisers, manures and pesticides; promoting good soil structure and rain infiltration to avoid run-off and erosion; protecting watercourses from contamination along with free advice. A number of capital grants are also available to aid water quality improvements. This is achieved through workshops and one to one farm visits by an Officer.

Timescale

This is in progress and seeks further funding over the next 5 years

Funding

Catchment Sensitive Farming grants have been incorporated into the Countryside Stewardship Scheme, with Catchment Sensitive Farming Officers providing free advice on the best use of grants and options for mid-tier agreements and standalone grants.

Possible sources of funding might be Natural England (CSFO), GWCT, AW, NFU.

5.14 Anglian Rivers Sea Trout Project

A08

Location

Lincolnshire

Lead Organisation

Wild Trout Trust consortium

Background

The key issues this project will address are: Biodiversity; community engagement; barrier removal; and morphology.

The diversity of habitats in the Anglian Rivers has however been greatly modified in recent decades through changes in farming and land management practices, and in response to flood-risk policies. The most recent and pernicious impact was the widening and dredging during flood defence schemes in the 1970s and 1980s. The result was a lowered river bed lacking in gravel, the loss of riffle and pool habitat and bankside wetland habitat, increased siltation, and poor submerged plant growth and impoverished fish and invertebrate communities. Although sea trout are known to enter the lower reaches of Anglian rivers their opportunities are limited by tidal gates and sluices, and their progress upstream to suitable spawning areas is blocked by weirs and mills.

Purpose

The purpose of this project is to conserve and improve the habitat and wildlife using sea trout stocks as a barometer of river health. Its aim is to deliver a prioritised programme of conservation projects to improve river habitat and the wildlife connections between habitats.

Timescale

On-going since 2007

Funding

Funding for the project has been provided by the Environment Agency, Natural England plus many contributions in kind from other partners; the project has also been able to access matched funding from the EU Interreg Living North Sea Project.

5.15 Slug it Out!

A09

Location

Rutland Water Catchment

Lead Organisation

Anglian Water

Background

The key issues this project will address are: pesticides; and community engagement.

Although harmless to humans, Metaldehyde is very difficult to remove at water treatment works and meeting tough EU targets on it is a real challenge for the region. The regulatory level of Metaldehyde stipulated by the European Union's Water Framework Directive is 0.1 micrograms per litre (or parts per billion) in treated water. This is the same as one drop in an Olympic sized swimming pool. Levels in reservoirs in the Anglian region regularly exceed this and removing it is not currently possible.

Purpose

The project is aimed at reducing the levels of the slug control pesticide Metaldehyde in waters before they reach treatment works. The project will incentivise farmers to stop using Metaldehyde and use an alternative chemical instead. The farmers will receive payments to cover their costs and for taking part.

A failure to tackle Metaldehyde levels in water now will inevitably result in additional regulation being forced on farmers further down the line, affecting individual farm businesses and the industry as a whole. On top of this, Anglian Water spends large amounts of money removing pesticides from drinking water at treatment works – this raises customers' bills and wastes energy.

This new Catchment Management approach is a proactive, responsible way of improving the water in rivers and reservoirs while protecting customers, the farming community and the environment.

Timescale

Project is in progress and on target

Funding

Anglian Water is funding this project

5.16 Fish and Eel Pass Project

A10

Location

Lower Welland and Nene

Lead Organisation

Environment Agency

Background

High Priority Eel pass sites

The key issues this project will address are: biodiversity; barrier removal; and morphology.

Many sections of channel throughout the Welland catchment suffer from the effects of channelization, having lost natural channel habitat features and have been impounded by weirs, sluices or locks. These obstructions limit fish and eel movements, preventing natural migration to upstream spawning points.

Purpose

The purpose of this project is to deliver effective solutions to the fish and eel migration obstructions through weir removal, channel by-passes or fish and eels pass construction.

Timescale

This is in progress, and carried out on a year by year basis

Funding

National funding is currently available; however, this is subject to change following the arrival of the DEFRA 25year plan.

5.17 Catchment-Wide Habitat Enhancements

A11

Location

Catchment-wide sites to be determined

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: sediment; phosphate; biodiversity; and community engagement.

Many sections of channel throughout the Welland catchment suffer from the effects of channelization, having lost natural channel habitat features such as riffles, pools, meanders and riparian habitat space.

The recent development of neighbourhood plans, and other high-profile river projects and media events has led to a rise in awareness and concern for local rivers. Parish Councils and Neighbourhood Planning teams can be contacted with a view to identify projects and funding.

Purpose

The purpose of this project is to deliver simple, proven, cost effective measures over various sites throughout the catchment. This will include in-channel habitat improvement works, tertiary treatment, meadows and riparian habitat measures.

Identification of sites and potential funds may come through Neighbourhood Plans and Parish Council led schemes.

Timescale

This is an aspirational project to be carried out over a 5 year period.

Funding

£10,000 over 5 years. Sources likely to include small local funds and S. 106.

5.18 River Wardens

A12

Location

Catchment wide representation

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: Community engagement, biodiversity, and monitoring.

With increasing public awareness of environmental issues and the climate and biodiversity crises, this project aims to connect people back with their local water courses and assist them in understanding the pressures on the aquatic environment. In addition, the development of Neighbourhood Plans also presents an opportunity for River Wardens to influence local planning and policy surrounding future development on or around the river.

Purpose

The purpose of the project is to recruit a network of local volunteers as River Wardens. Their responsibilities would include monitoring, pollution and incident reporting, site identification for potential projects, and providing a point of contact with Parish Councils.

The River Warden network will also be used to understand how the partnership can better facilitate community enjoyment and benefit from the river as a springboard for future projects and engagement.

Timescale

Project began in Summer 2018 with the training of eight initial groups. These groups are now working independently and feeding data back. The scheme continued in 2019 with participation in EarthWatch's FreshWater Watch programme and the training of six new groups.

The project continued in 2020 but was heavily affected by the restrictions introduced to deal with COVID-19. A River Warden conference including training and discussion sessions had to be cancelled but will be rescheduled for later in the year.

Funding

A total of £12,500 was raised from Tesco's Bags of Help scheme, the Leicestershire and Rutland Community Foundation, The WF Southall Trust, The Hickinbotham Trust and the Greater Lincs Nature Partnership.

5.19 Gwash Habitat Improvements

A13

Location

River Gwash near Great Casterton, Little Casterton and Ryhall.

Lead Organisation

Guash Fishing Club

Background

The key issues this project will address are: River morphology and biodiversity.

Like many rivers in the U.K. the River Gwash has historically been dredged in an attempt to reduce flooding. However, dredging of rivers has a range of negative impacts on a river's ecology and wildlife. For example, plant communities can be completely removed from a river ecosystem, and invertebrates and fish can be impacted through loss of habitat, which has knock on effects for animals higher up the food chain.

Purpose

The purpose of this project is to raise the River Gwash's riverbed to a more natural level, using both gravel augmentation and rubble insertion. This would deliver improvements to the river's flow morphology, and well as associated improvements to biodiversity and species richness.

Timescale

This project is already underway.

Funding

Although gravel has already been augmented into the river to raise the bed level, a total of £160,000 needs to be secured to insert further rubble into the River Gwash to raise the level of the deepest pools.

Potential sources are through EA fund, GFC CiK and national funds such as the Esmee Fairbairn Foundation.

5.20 River Jordan Improvement Works

A14

Location

River Jordan between Braybrooke village and confluence with River Welland at Market Harborough.

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will address are: Flooding and Biodiversity.

The Water Framework Directive (WFD) 2015 designates the River Jordan as being in “Poor Status”. It is failing for measures including fish, macrophytes, phytobenthos, phosphate and invertebrates.

The focus for this project is to address sections of river where channelisation is causing high sediment deposition, which is suffocating in-stream habitat and reducing channel capacity leading to increased flood risk. Following a walkover survey and desk-based study, opportunities have been recognised which could seek to improve the River Jordan by:

- Creating habitats-
- Enhancing existing habitats
- Providing better land management within the catchment to reduce sediment run-off
- Improving or maintaining flood flow conveyance through areas vulnerable to flooding
- Providing flood mitigation for urban areas by reducing flood flow velocities at rural upstream sections less vulnerable to flooding

Timescale

This is an aspirational project to be carried out over a two-year period from 2021-2022.

Funding

This project needs properly costing, but an estimated £30,000 should cover the physical works needed to deliver the desired improvements.

S.106 money from development within Market Harborough is the primary target for sourcing money for this project.

5.21 Catchment Partnership Coordinator

A15

Location

Catchment wide representation with stakeholders and volunteers

Lead Organisation

Welland Rivers Trust

Background

To increase the output of the WVP, progress project development and engage more widely with new stakeholders and communities, it was decided that a part time partnership coordinator should be appointed. The coordinator will organise and minute meetings, create and manage digital output on social media and the WRT website and ensure that the projects listed in the 5 year plan are progressing.

Timescale

The partnership approved funding for five years starting in 2016. This will be reviewed in 2021.

Funding

£15,000 from WEIF Catchment Partnership Hosting Grant is received annually to pay for the Welland Rivers Trust's Project Manager to coordinate the Welland Valley Partnership.

5.22 Our Welland – Heritage, Health and Home

A16

Location

Catchment wide engagement project

Lead Organisation

Welland Rivers Trust

Background

The key issues this project will target are: community engagement

To boost the involvement of local communities in water environment related projects and encourage them to reconnect with the rivers and streams of the Welland catchment the partnership agreed the need to appoint a dedicated Community Engagement Officer. The first year of the project will be an information gathering exercise with local parish councils, existing volunteers and community groups to understand how people are already interacting with rivers and what improvements they would like to see. This will be funded by a Development Grant from the National Lottery's Community Fund.

A community steering group will be formed to develop new project ideas and led by a newly appointed Community Engagement Officer who will work for WRT. After the first year, a package will be presented to the Community Fund as part of a bid for increased funding to deliver catchment wide engagement projects.

Timescale

Potential for multi-year rolling project. First year was set to begin in April 2020 but was postponed due to COVID-19. New start date is planned for September 2020.

Funding

£32,000 has been secured from a National Lottery Community Fund Development Grant to employ a dedicated full-time Community Engagement Officer and run a series of engagement events. Future funding from the Community Fund will depend on the success of the first year and is not guaranteed.

6.0 Glossary

Accretion – the gradual accumulation of sediments on a river bed.

Biodiversity – a contraction of "biological diversity," generally refers to the variety and variability of life on Earth. One of the most widely used definitions defines it in terms of the variability within species, between species, and between ecosystems.

Biotope – a specific area of habitat within a river channel.

Catchment – the area of land in which all surface water from rain, or snow, drains into the river.

Channelisation – a historic engineering action to widen, deepen and straighten a river channel.

Contribution in Kind (CiK) – the contribution of an individual, organisation or business to a project. This can be monetary, volunteering hours to work, lending equipment or donating materials.

d/s – Abbr. of downstream.

Diffuse pollution – the release of pollutants into the water, generally comprising large quantities of sediment, phosphate and nitrogen, but also other chemicals. These can be from both rural and urban environments.

Erosion – This is the movement of sediment from one location and transported downstream.

Fish pass – this is the construction of a free flowing, unobstructed path of water around an obstacle such as a weir, sluice or lock to allow free fish and eel movements.

Headwaters - a tributary stream of a river close to or forming part of its source.

High flow event – A large volume of water within the channel during or following significant heavy rainfall.

Invertebrates – Invertebrates are animals that neither possess nor develop a vertebral column, and reside within the river channel.

Low flow – A small volume of water within the river channel. Low flow is the usual or normal state of the river.

Macrophyte - an aquatic plant that grows in or near water and is either emergent, submergent, or floating.

Morphology – the shape of the river channel. Channelised stretches of river have poor morphology, as there is no change in direction (as they are straightened).

Pools - In a flowing stream, a riffle-pool sequence (also known as a pool-riffle sequence) develops as a stream's hydrological flow structure alternates from areas of relatively shallow to deeper water. This sequence is present only in streams carrying gravel or coarser sediments. Riffles are formed in shallow areas by coarser materials such as gravel deposits over which water flows. *Pools* are deeper and calmer areas whose bed load (in general) is made up of finer material such as silt.

Riffles – In a flowing stream, a riffle-pool sequence (also known as a pool-riffle sequence) develops as a stream's hydrological flow structure alternates from areas of relatively shallow to deeper water. This sequence is present only in streams carrying gravel or coarser sediments. *Riffles* are formed in shallow areas by coarser materials such as gravel deposits over which water flows. Pools are deeper and calmer areas whose bed load (in general) is made up of finer material such as silt.

Riparian – the banks and surrounding area of the river channel.

RiverCare – an organisation consisting of multiple local groups with an interest in caring for the environment.

Runoff – refers to all water that comes into a river water system from sources such as rainfall, snowmelt and groundwater. Runoff includes water flowing over the land into the water system and water that sinks into the soil to join the water system.

Scour – fast flowing water aggressively eroding rock or sediment in a particular section of channel.

u/s - Abbr. of upstream.

Water Framework Directive (WFD) - is a European Union directive which commits European Union member states to achieve good qualitative and quantitative status of all water bodies.

WRC or STW – Abbr. of water recycling centre – or more commonly known as sewage treatment works.

Appendix 1: Delivered Projects Map

Projects delivered since the formation of the WVP are mapped below (omitting ELS/HLS/other NE schemes and work carried out by the Wildlife Trusts).

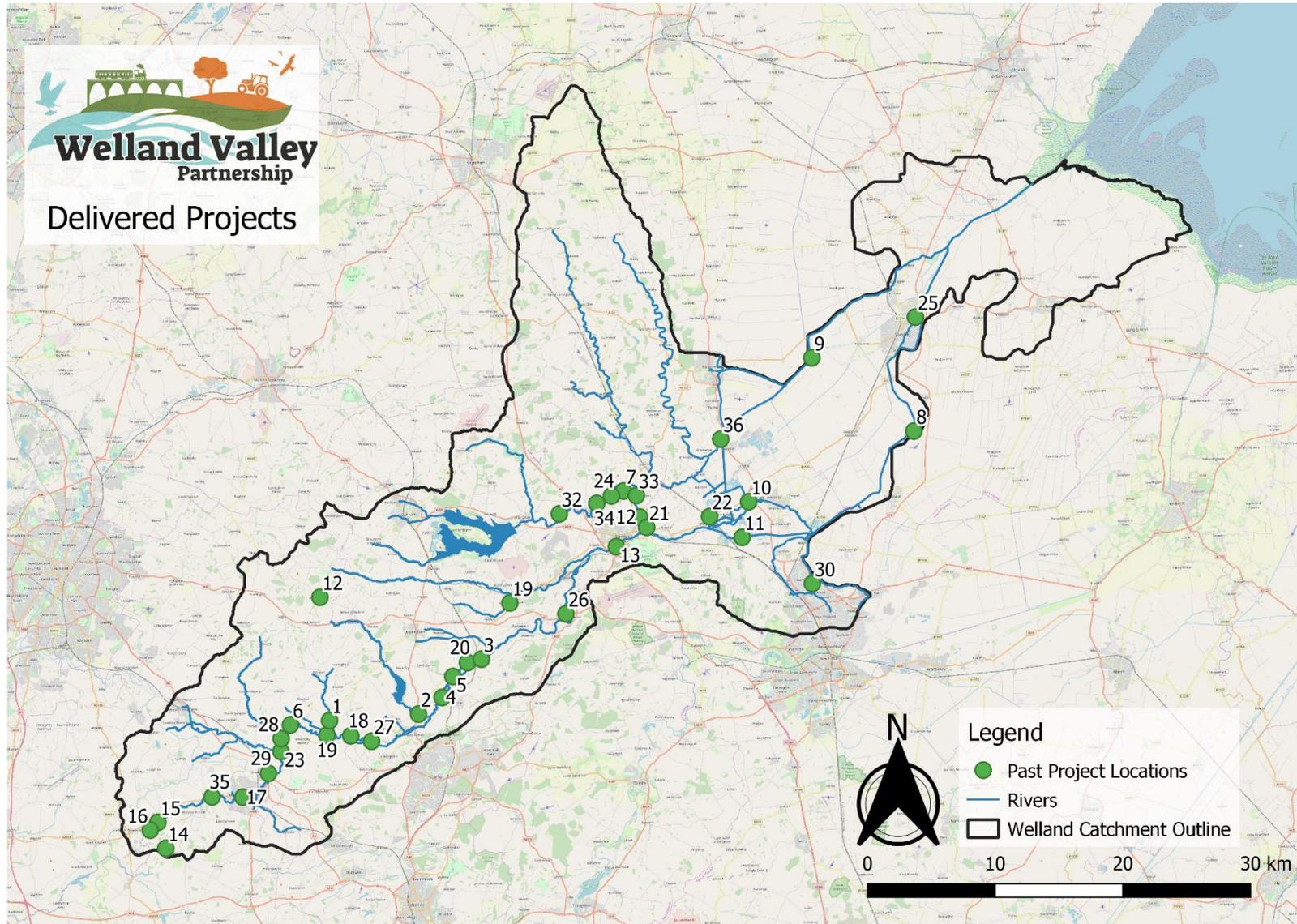


Figure 2: Map of delivered WVP projects. Number labels refer to the Map ID in the delivered projects table in *Appendix 2*.

Appendix 2: Delivered Projects Table

Brief record of main inclusive projects based in the catchment to deliver WFD benefits.

Map ID	Ref	Location	Scheme Name	Description	Key issues addressed	Cost	Completion Dates	Funding source	Lead Organisation	Project Outcome
1	C001	Medbourne	Operations Delivery Enhancement Projects	Habitat Management	Biodiversity		2010		Environment Agency Anglian Northern 21 7894	0.1km of river channel restored
2	C002	Caldecott	Operations Delivery Enhancement Projects	Habitat Management	Biodiversity		2010		Environment Agency Anglian Northern 21 7891	1.1km of river channel restored
3	C003	Harringworth	Operations Delivery Enhancement Projects	Habitat Management	Biodiversity		2010		Environment Agency Anglian Northern 21 7892	0.45km of river channel restored

3	C004	Harringworth	Keeping the Welland Cool	Habitat Management	Biodiversity; Cool Rivers		2018	EA; CiK	WRT	50 trees planted alongside community volunteers
3	C005	Harringworth	Habitat Work: River Welland Restoration Projects	Habitat Management	Biodiversity		2014		Environment Agency	1km of river channel restored
4	C006	Gretton	Habitat Work: River Welland Restoration Projects	Habitat Management	Biodiversity		2014		Environment Agency	2km of river channel restored
4	C007	Gretton	Keeping the Welland Cool	Habitat Management	Biodiversity; Cool Rivers		2018	EA; CiK	WRT	300 trees planted alongside community volunteers

4	C008	Gretton Siphon	Fish Pass Project		Biodiversity; barrier removal				EA	barrier removed
5	C009	Thorpe by Water	Habitat Work: River Welland Restoration Projects	Habitat Management	Biodiversity		2014		Environment Agency	0.6km of river channel restored
5	C010	Thorpe By Water Weir	Fish Pass Project		Biodiversity; barrier removal				EA	barrier removed
5	C011	Thorpe by water to Haringworth	River Corridor habitats improvements on River Welland catchment	Gravels, deflectors, drinkers, narrowing	Geomorphology; biodiversity		2014		EA	5km of river channel restored
6	C012	Welham	Habitat Work: River Welland Restoration Projects	Habitat Management	Biodiversity		2014		Environment Agency	1.5km of river channel restored

6	C013	Welham to Slawston	Welham to Slawston Improvement Works		Biodiversity				WRT	
6	C014	Welham	River Welland Habitat Works		Biodiversity		2012		EA	2km of river channel restored
6	C015	Welham	Habitat Work: River Welland Habitat Works	Habitat Management	Biodiversity; sediment; cool rivers		2013		EA	1.7km of river channel restored
7	C016	Ryhall	Habitat Work: River Welland Restoration Projects	Habitat Management	Biodiversity		2014		Environment Agency	2.5km of river channel restored
8	C017	Nr Deeping St Nicholas	Welland ART	Habitat Management	Biodiversity		2010		Environment Agency Anglian Norther 17 7884	0.25km of river channel restored

8	C018	Nr Deeping St Nicholas	Welland ART	Habitat Management	Biodiversity		2010		Environment Agency Northern Anglian 17 7901/7940/7900	3 Ponds created
9	C019	Nr Gunthram Gowt	South Lincs Fens and Willow Tree Fen Project	Habitat Management	Biodiversity		2010		Environment Agency Anglian; Northern-28 - 7903	
10	C020	Market Deeping	Wherry Mills Fish Pass	Habitat Management	Biodiversity; barrier removal; morphology		2011		Environment Agency	0.1km of river channel restored and barrier removed
11	C021	Maxey cut	Northern area fish barriers	Habitat management	Biodiversity; barrier removal		2011		Environment Agency 2010/11- Anglian; Northern-16 - 7883	0.2km of river channel restored and barrier removed

12	C022	Loddington	The Allerton Project	Research for the impact of farming methods on wildlife and the environment	Biodiversity; sediment; morphology; community engagement; phosphate		Ongoing since 1992	CSS	GWCT	Field for the future report outlines results of 20 years of research
13	C023	Mill Stream Stamford Meadows	Stamford Mill stream	Habitat Management	Biodiversity; sediment; community engagement				WRT Joint project with Rivercare and Anglian Water	1km of scrub cleared; barrier removed, 1km footpath cleared for public access
14	C024	Sibbertoft	Welland Headwaters Improvement Plan	Habitat Management	Biodiversity; sediment; phosphate	10000	2015		WRT and EA	1km of river channel restored
14	C025	Sibbertoft, the Wrongs	Welland Headwaters Improvement Plan	Habitat Management	Biodiversity; sediment; phosphate	10000	2015		WRT and EA	1 pond habitat created

15	C026	Hothorpe	Welland Headwaters Improvement Plan	Hothorpe Hall grounds	Biodiversity; sediment; phosphate	10000	2015		WRT and EA	Barrier removed, 5 riffle habitats created, 0.25km of channel restored, backwater channel re-opened
16	C027	Pebble Hall	Part of MWH in Kind contribution		Biodiversity; sediment	0	2015		WRT and EA	1 riffle and 1 pool habitat created. 15m ² reed-bed habitat created
17	C028	Market Harborough	Welland for People and Wildlife	Geomorphology	Biodiversity; sediment; community engagement; barrier removal	500000	2014		WRT	2km of river channel restored, 1 pond created, 8 barriers removed

17	C029	Market Harborough	Keeping the Welland Cool	Habitat Management	Biodiversity; Cool Rivers		2018	EA; CiK	WRT	180 trees planted alongside community volunteers
18	C030	Ashley		Geomorphology River and weir	Biodiversity; barrier removal		2011		EA	Barrier removed and 0.75km channel habitat improved; 1km trees planted
18	C031	Ashley	Habitat Work: River Welland Habitat Works	Habitat Management - deflectors, bank protect, trees	Biodiversity; sediment; cool rivers		2013		EA	3.5km of river channel restored

18	C032	Ashley	Ashley Habitat Improvement Project	Bank reprofiling, channel meandering, gravel insertion, flow deflectors	Sediment; biodiversity; fish habitat	55,000	2019	EA	EA; WTT	Approximately 0.75km of river channel improvements
19	C033	Morcott Brook, South Luffenham	The Morcott Brook Project	Drinkers and bank protection	Biodiversity				WRT	Drinker installed
19	C034	Morcott Brook, South Luffenham	River Welland Habitat Works	Habitat Management	Biodiversity		2012		EA	0.8km of river channel restored
20	C035	Seaton Mill	Fish Pass Project	Fish passage	Biodiversity; barrier removal		2016		Environment Agency	barrier removed
21	C036	Newstead Mill Stamford	Fish Pass Project		Biodiversity; barrier removal				EA	barrier removed
22	C037	Tallington Weir	Fish Pass Project		Biodiversity; barrier removal		2014		EA	barrier removed

23	C038	Sutton Bassett	River Welland Habitat Works		Biodiversity		2012		EA	2.7km of river channel restored
24	C039	River Guash Nr Casterton	Guash Habitat Restoration Project		Geomorphology; biodiversity		2012		Guash Fishing Club Help from WTT, funded by EA	
25	C040	Fulney Lock	Fish Pass Project	1 structure	Biodiversity; barrier removal				EA	barrier removed
26	C041	Duddington Weir	Fish Pass Project	1 structure	Biodiversity; barrier removal				EA	barrier removed
26	C042	Duddington	Keeping the Welland Cool	Habitat Management	Biodiversity; Cool Rivers		2018	EA; CiK	WRT	35 trees planted alongside community volunteers
27	C043	Drayton	River Welland Habitat Work		Biodiversity		2012		EA	1.7km of river channel restored

27	C044	Drayton	Keeping the Welland Cool	Habitat Management	Biodiversity; Cool Rivers		2018	EA; CiK	WRT	20 trees planted alongside community volunteers
28	C045	Weston by Welland	Habitat Work: River Welland Habitat Works	Habitat Management	Biodiversity; sediment; cool rivers		2013		EA	1.7km of river channel restored
29	C046	Great Bowden	Habitat Work: River Welland Habitat Works	Habitat Management	Biodiversity; sediment; cool rivers		2013		EA	0.74km of river channel restored
30	C047	Werrington Brook	Werrington Brook improvement programme	River restoration scheme	Biodiversity; community engagement; barrier removal; sediment; phosphate; morphology	51000	2015	CiK; GiA Funded Phase 2 Design	PCC/EA	Barriers removed, channel narrowed; on-going ecological and water quality monitoring

31	C048	Borderville	River Welland Habitat Works	Habitat Management	Biodiversity; barrier removal		2012		EA, Guash FC, UoL	0.13km of river channel restored and barrier removed
31	C049	Borderville- River Guash	Guash to Glen Flows	River restoration and habitat management: Meandering, barrier removal, riffle/pool habitat	Biodiversity; barrier removal; sediment; morphology	10000	2016	GiA and WRT	WRT with AW and Guash Fishing Club	0.8km of channel restored; barriers removed; 2 cut-off meanders re- opened
32	C051	u/s Tickencote River Guash	Guash to Glen Flows	Habitat improvement and fish refuge	Biodiversity; sediment; morphology	3000	2016	AW	Guash Fishing Club with AW and WRT	

33	C052	45m d/s Belmesthorpe River Guash	Guash to Glen Flows	Habitat improvement and fish refuge	Biodiversity; sediment; morphology	3000	2016	AW	Guash Fishing club with AW and WRT	
34	C053	River Guash btw Gt. Casterton and Tolethorpe	Guash Habitat Improvement	Channel meandering, habitat improvement, fish spawning and fish refuge	Biodiversity; morphology	9000 (18000)	2016-2017	Guash Fishing Club funds and EA	Guash Fishing club	
35	C054	Lubenham	Keeping the Welland Cool	Habitat Management	Biodiversity; Cool Rivers		2018	EA; CiK	WRT	1,500 trees planted alongside community volunteers

36	C055	Waterside Garden Centre, West Deeping	Kates Bridge riparian and wetland habitat restoration	Channel meandering, habitat improvement, fish spawning and fish refuge	Sediment; biodiversity; community engagement		2017	EA	South Lincolnshire Fenlands Partnership	Approx. 0.5km of river channel restored
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Table 3: Delivered projects

Appendix 3: Identified Potential Sites for Catchment Wide Habitat Enhancements

The sites identified in table 4 below, are example locations which would contribute to the catchment wide habitat enhancement project. Sites can be anywhere within the catchment, provided the purpose is for habitat improvement to keep within the remit of the project. Furthermore, this wide range of projects and locations will provide multi-benefits through addressing other key issues in addition to biodiversity.

Input from Parish Councils, Neighbourhood Planning groups, community interest groups or landowners are a valuable mechanism to deliver this project, and are welcome to identify sites, complete their own projects, and collaborate with the Welland Valley Partnership.

Preliminary Site Locations	Description	Key issues addressed	Expected cost	Capacity to deliver Achievable in timescale	Funding source	Owner	Feasibility
Little Bowden	Woody debris berms and flow deflectors	Flow; biodiversity; cool rivers; natural flood risk management	£3k	Yes	S106; CiK	WRT	Small, low cost intervention
Smeeton Westerby, East Langton, Langton Brook Farm to confluence, d/s of Medbourne, Medbourne, Hallaton	Straightened sections of channel could benefit from woody debris to deflect flow and trees for shading	Flow; biodiversity; cool rivers; natural flood risk management	£3k	Yes	S106; CiK	WRT	Small, low cost intervention
Great Easton	Could use woody debris flow deflectors, berms and gravel for riffles	Biodiversity; natural flood risk management	£3k	Yes	S106; CiK	WRT	Small, low cost intervention

Table 4: Potential sites identified for the catchment wide habitat enhancement project