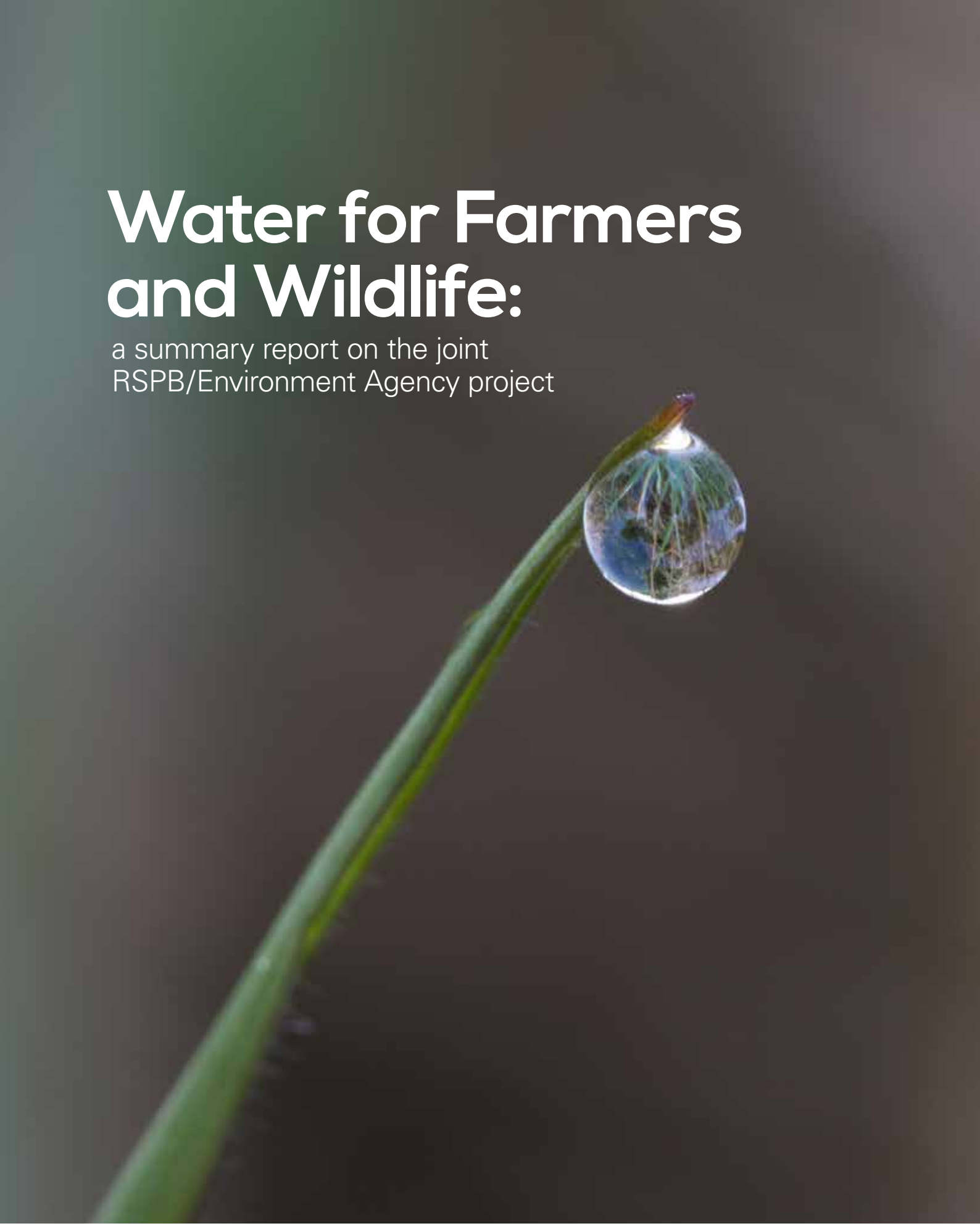
Water for Farmers and Wildlife:

a summary report on the joint RSPB/Environment Agency project



Working together to give nature a home

rspb giving nature a home

In partnership with Environment Agency

An introduction to the project

There are over half a million hectares of productive land in the Humber Estuary and Humberlead Levels region, and 97% of that is high quality Grade 1 to Grade 3 agricultural land. Agriculture provides jobs for almost 6,000 people here.

The area is also home to a range of fascinating and rare birds, such as marsh harriers, bitterns, curlews and lapwings. These birds and many more thrive on the wetland and estuarine habitat around the Humber, but much of this wildlife habitat is heavily degraded and fragmented.

The land around the Humber Estuary and Humberhead Levels is at risk of flooding from a number of different sources, including tidal, river, groundwater and surface water.

Rising sea levels, and changing weather patterns resulting from climate change, mean that the risk of flooding will increase in future. With limited government funding available, it will be difficult to maintain the current level of protection from flooding across the whole area. Flooding in some places will become more frequent.

Water for Farmers and Wildlife is a partnership project. The RSPB and the Environment Agency have explored and assessed the feasibility of various multifunctional wetland habitat creation and flood storage techniques on land in the Humberhead Levels and inner Humber Estuary. These could provide significant benefits to farming, flood risk management, and wildlife.

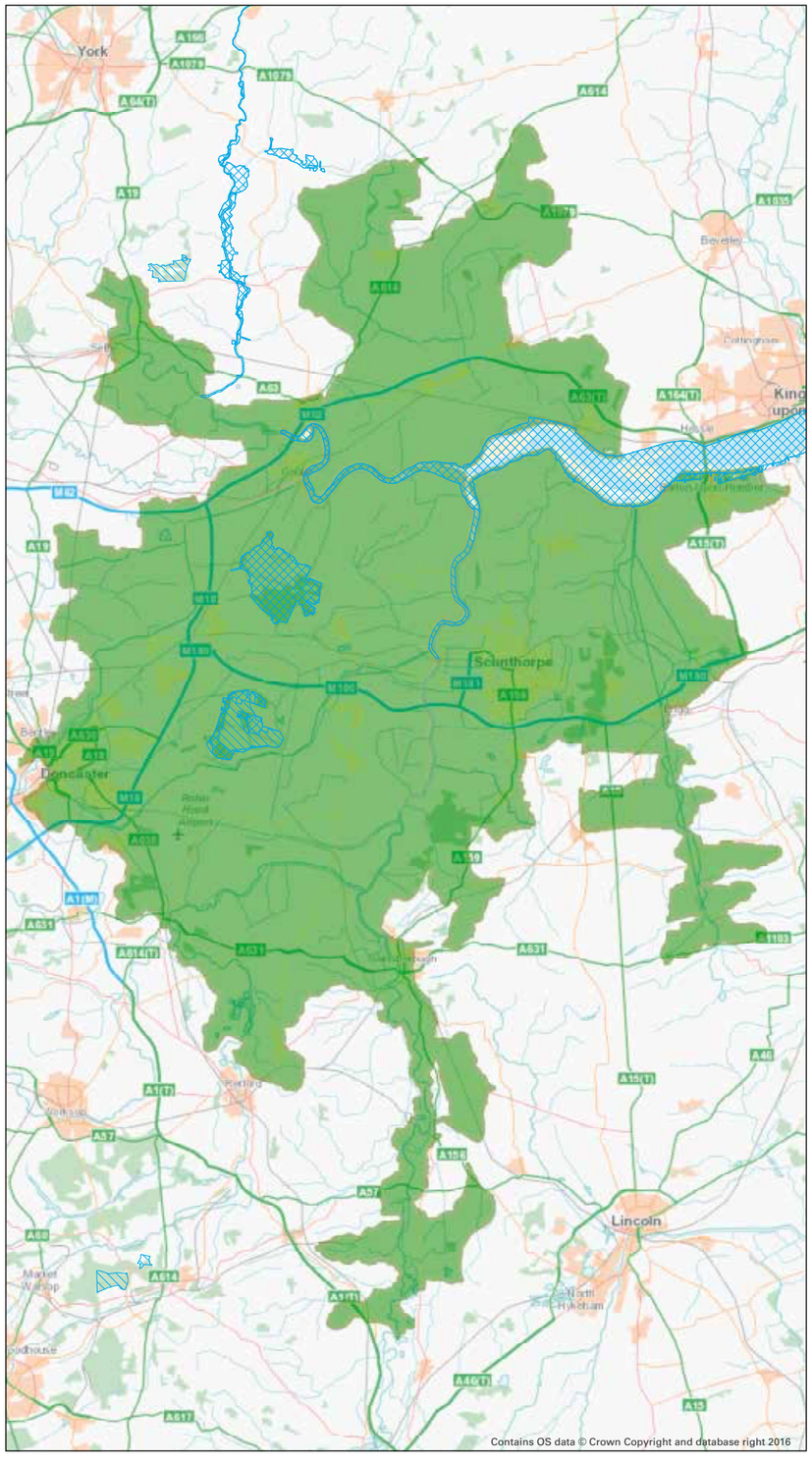
The project has also investigated the financial implications of the techniques, possible funding streams, legislative requirements and support, and potentially suitable locations to implement the techniques in the project area.

The project team hope their work will contribute to a future that is profitable for farming, in a landscape richer in wildlife, and with better, sustainable and cost-effective management of potentially harmful flooding.

This report was written prior to the referendum vote to leave the European Union. The information contained was to the best of our knowledge at the time.

Ben Andrew (rspb-images.com)

The project is working for a more profitable future for farmers, in a landscape richer in wildlife (such as this bittern) and with better, sustainable and cost-effective flood management.



Water for Farmers and Wildlife Project Area Map

SACs (UK)
SPAs (UK)
Water for Farmers and Wildlife Project Area

Map scale = 1:250,0
Date printed: 12/07/201

0 2.5 5 10 km

Figure 1 – Map of Water for Farmers and Wildlife project area

Managing the water: techniques

The project has explored a number of techniques. These include small-scale changes such as management of ditches and banks, silt ponds, and buffer strips, and large-scale changes such as wildlife-rich storage reservoirs for irrigation, temporary wetlands, washlands and wet grassland, and constructed wetlands.

The small-scale changes present opportunities to connect wildlife habitats within the Humberhead Levels. However, on their own, they are unlikely to provide significant benefits to farming, flood-risk management, and wildlife. Realistically, these can only be achieved through implementing large-scale techniques.

Wildlife-rich storage reservoirs

Many farmers have turned to storing irrigation water on-farm, because of the high cost of summer abstraction licensing and shortages in water availability. Conventional irrigation reservoirs have generally provided few benefits for wildlife. However, it has been demonstrated elsewhere in the UK, that it is possible to design storage reservoirs to help a wide range of species, as well as providing flood-risk management and farming benefits. This can be cheap and simple if planned from the outset. Options include:

- Using on-site natural clay
- Incorporating shallow, muddy margins
- Linking the reservoir to other wetland habitat
- Planting trees and shrubs on the edges
- Where embankments are present, grazing with sheep, or sowing a wildflower mix
- Creating shallow margins around the edges to encourage reed and rush growth
- Shaping to include shallow and deep areas of water
- Allowing aquatic plants to colonise the margins
- Establishing floating islands in deeper areas, and covering with shingle or vegetation
- Creating shallow dips in areas adjacent to the reservoir, to provide habitat for wading birds
- Establishing reed, scrub, and wet grassland habitat on the land surrounding the reservoir.

There must be sufficient capacity to hold flood water, and to ensure that water is available for irrigation throughout the season. The design should also account for fluctuating water levels.

Temporary wetlands

The concept of rotationally flooding agricultural fields was first devised and tested in the USA, at Tule Lake and the Lower Klamath National Wildlife Refuges, and Washington's Skagit Valley. Croplands were flooded rotationally, using specific water-management regimes that rapidly restored wetland habitat for birds. The cropped fields were flooded for one to four years, often as part of a typical crop rotation.

There were a number of positive effects. The experimental wetlands at Tule Lake supported up to four times more species than the control fields, with fewer crop pests and pathogens, enhanced soil fertility and tilth, less use of agrochemicals, and yield increases of up to 25%.

In the Ivory Coast and the Netherlands, short-term flooding (5-12 weeks) successfully controls nematodes in banana and bulb fields, respectively. In the UK, this method has been used to control potato cyst nematodes (PCNs). Results suggest that it is an effective alternative to PCN nematicides.

Ben Hall (rspb-images.com)

Large-scale water storage techniques (as here on RSPB Otmoor reserve) can be cheap and simple if planned from the outset.

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Application in the UK

Bunds are constructed, about one metre high, around a field. Water from a local ditch or river is pumped on until it reaches a depth suitable for wading birds and wildfowl, ideally varying, but less than 12 cm. The field is kept under water for a specified period (12-14 weeks, one year, or two years+), but may be drained during the summer if water is limited. No intervention is required beyond maintaining water levels. Once the flood rotation is complete, the land can then be returned to production by slowly draining the water into the soil, or, potentially, by pumping it back into the drain/river post-flood. This will require consent, and may be subject to local water-quality conditions.

The success of a temporary wetland, and the time it takes to get the land back into production, will depend on a number of factors including soil type; topography; local hydrology; abstraction licensing; crops and rotations.

Pete Short (RSPB)

Creating temporary wetlands on farmland, such as this one in the Netherlands, is simple to do, and can bring surprising and impressive benefits.

Warping

Warping was used in the area from the 18th to 20th century, and shares similarities with temporary wetlands. However, warping used estuarine water, which was allowed to flow naturally onto bunded fields during certain tides. Water control structures and warping ditches managed the tidal water, depositing silt onto the fields. This helped improve soil fertility, resulting in higher yields and significant reductions in fertiliser use.

In summary

These techniques can reduce flood risk to farms and local communities. Control measures manage the flooding, increase resilience and preparedness, and reduce the economic impact. Design and application will vary depending on location, the source of flooding, and expected frequency. The techniques may form part of wider large-scale flood storage. Solutions which reduce flood risk may be eligible for government funding.

Chris Gomersall (rspb-images.com)

Well-planned flood storage can be very attractive to lapwings and other threatened wildlife – and can also increase the resilience and preparedness of farms and local communities. These solutions may be eligible for government funding.

Economic costs and benefits

The project looked at integrating wetland creation and flood storage within a profitable farming operation, identifying the capital and ongoing costs associated with the main techniques, as well as any financial benefits.

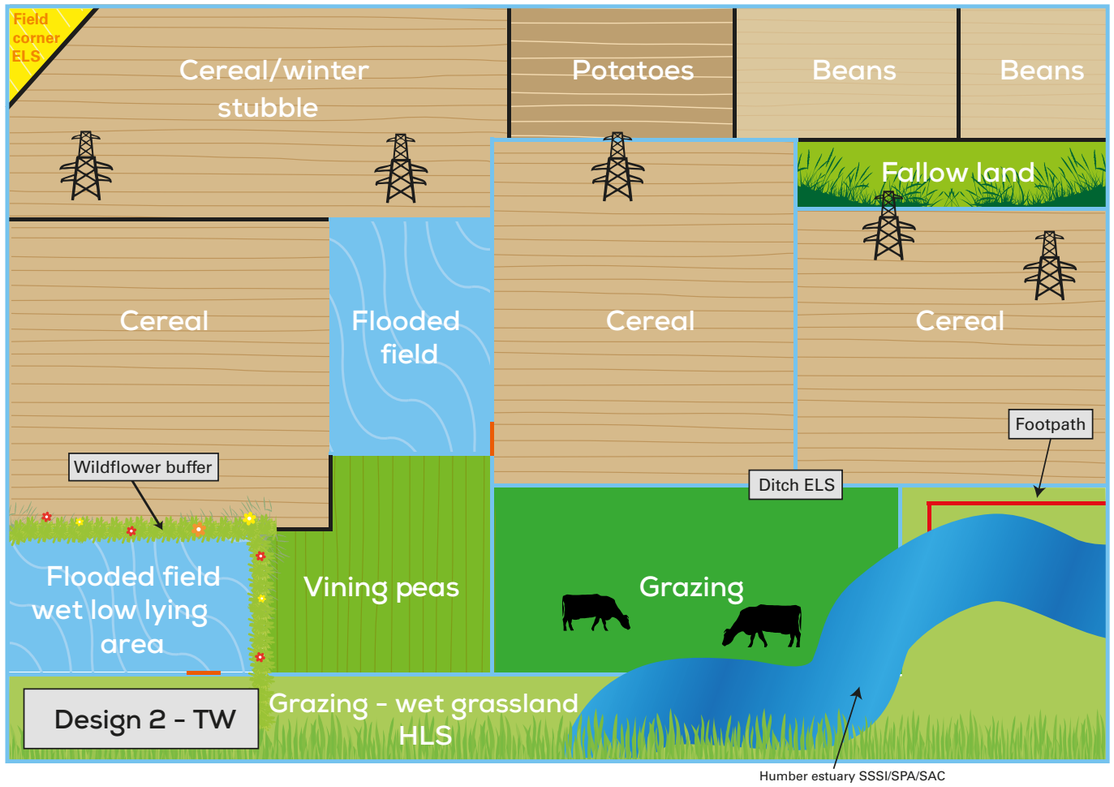
The project produced conceptual designs to inform typical costs of capital works and maintenance for the schemes. Detailed site-specific economic assessments for the Humber Estuary will be undertaken during phase two of the project (see page 11).

Temporary flooding

Costs arise from the labour, machinery, and materials to set up and maintain the rotation. While costs will vary substantially between sites, it's anticipated that the total capital outlay would be somewhere in the region of £380 per ha per year. This figure is based the hiring of contractors to build bunds, generic consenting fees (eg prior notification and environmental permits), purchase of two pumps, and land-drain plugging. Capital costs will vary depending on the design and landholding.

The loss of productive land and Basic Payment Scheme monies/ purchase of entitlements would also lead to a significant loss in income for that year, as well as additional ongoing costs such as abstraction fees and fuel.

However, research has shown that, under the right conditions, benefits can outweigh costs, with a net benefit for farmers. The profitability of a temporary rotation relates to reductions in chemical application post-flood, as well as crop yield increases. Data from studies in the USA and Netherlands indicate that potential cost benefits include a reduction in fertiliser and pesticides (nematicides, herbicides), and increased yields. However, these benefits will vary with soil type, duration of temporary rotation, climate, crop rotations and market prices.



Example of a temporary flooding design. Design includes Higher Level Scheme (HLS) and Entry Level Scheme (ELS) land, protected areas (SPA/SAC/SSSI), and factors that could affect the application of the technique (eg presence of electricity pylons, footpaths).

Wildlife-rich storage reservoirs

The costs associated with the construction and maintenance of conventional reservoirs are relatively well reviewed in other literature. This study, therefore, assessed the comparative costs and benefits of conventional reservoirs, and reservoirs designed for flood-risk management (FRM) and wildlife. Additional costs for wildlife-rich and FRM reservoirs could include:

- The need for more land and, therefore, a greater loss of productive land
- Additional water control structures
- Seeds/plants established on banks and surrounding land
- Floating islands
- Management of stock.

Despite the costs, several additional benefits were identified for wildlife-rich/FRM reservoirs. These included improved water quality, increased grazing land (where farmers already own and manage cattle), more access to biodiversity, FRM, Water Framework Directive funding, and greater flood resilience.

Funding – how do I pay for all of this?

It may be necessary to apply for funding to supplement initial capital costs, so funding streams and opportunities were identified and reviewed. Funding channels include flood-defence grants, water-quality improvement grants, habitat-creation/restoration grants, and science, research and innovation grants. In addition, businesses that contribute to certain flood defence measures have the option of claiming tax relief.

Grants potentially available include (this list is not exhaustive, and whilst there are many grants available, the application process is often very competitive):

- Tax relief (flood defence)
- Countryside Productivity Scheme (water management grant)
- Rural Development Programme for England: LEADER funding
- Countryside Stewardship Facilitation Fund
- Heritage Lottery Fund: Landscape Partnerships
- Real Farming Trust.

The feasibility of implementing these techniques will depend on their economic benefits and potential funding sources. A thorough site-specific assessment will be required to confirm the techniques are economically viable.

Environment Agency

Water storage schemes such as Devil's Causeway on the Humber Estuary cost money, but various funding channels are available.

A legislation checklist

In this study, the project reviewed European and UK legislation and policy relevant to the main techniques, including the water environment, wildlife and protected habitats, planning and agriculture.

Designs for the techniques could incorporate certain elements to provide greater wildlife benefits, water-quality improvements, and flood-alleviation measures; thereby supporting local, national, and EU policy plans and regulation.

It is important that landowners are familiar with the relevant policy and legislation, and this is pertinent to the successful application of the techniques on their landholding. Legislation and policies that could be relevant include:

- National Planning Policy Framework: planning permission may be required for some designs
- The Floods Directive (2007) and associated River Basin Management Plans/Flood Risk Management Plans
- The Water Resources Act (1991) and Water Act (2003): relevant to abstraction and licensing
- Reservoirs Act (1975): relevant to the amount of water a storage area can hold before it meets the restrictions of the Reservoirs Act
- Water Framework Directive (2000): relevant to water-quality measures and mitigation, should the techniques negatively impact local water quality
- Common Agricultural Policy, including BPS, Greening, Countryside Stewardship & Cross Compliance
- The Conservation of Habitats and Species Regulations (2010): relevant to EU protected sites, protected species, and management of land
- The Wildlife & Countryside Act (1981): relevant to UK-protected sites, protected species, and management of land.

Andy Hay (rspb-images.com)

A water storage project that benefits farmers and wildlife (including the seriously-declining curlew) is achievable, but be aware of legislation.

What consents and permits should be considered?

A landowner might need to apply for consent for various works associated with the techniques, so we reviewed the relevant consents, including the time required to obtain them, and associated costs.

The requirement for consent will vary across sites and designs, and the table on page 9 illustrates those to be considered as part of the process. However, it's highly unlikely that a farmer would need to acquire all the consents listed; this information is provided so that farmers are aware of every eventuality.

Site-specific designs will be developed during phase two of this project. These will provide detail on the more common consents and legislation.

List of consents that may be required

Consent	Fee	Timescale
Flood defence consent	£50 for each structure.	A decision will be reached within two months (upon acceptance of the application).
Ordinary watercourse consent	£50 (regardless of complexity of scheme).	A decision will be reached within two months (upon acceptance of the application).
Abstraction licence/ impoundment licence	Varies per site and requirements (£25-£1,500 application charge and possible £100 additional administration fee to advertise, plus charges for abstraction @ £1,000/m^3). Please refer to gov.uk/government/uploads/system/uploads/attachment_data/file/466353/LIT_9909.pdf for full details.	Temporary licence applications (upon receipt) within 28 days. All other applications (upon receipt) within four months. Please note that not all catchments are open to abstraction, and this should be discussed with the Environment Agency at the beginning of the process.
Environmental Impact Assessment (EIA)	Varies per site – typically around £2,000 for a reservoir EIA.	EIA: Screening: three weeks to determine. Scoping: five weeks to respond. Submission (statement and planning application): 16 weeks to determine. EIA (AGRI): Screening: five weeks to determine. Scoping opinion: five weeks. Consent application: six to eight weeks to determine.
Protected species/site consent/licence	Varies per site – ranges from preliminary/scoping survey @ approx £250+ to full surveys at £2,000+. More than one species/habitat survey may be required.	If a survey is required, this can be done fairly quickly (approximately two to nine months), but will need to be completed during the right time of the year for the species in question. Natural England will typically respond to planning proposals/ consents within 21 days, but allow more time.
Planning permission	Dependent on whether prior notification (£80) or full planning permission required. If full planning permission required, will incur fees for planning and EIA/surveys etc.	Non-major: eight weeks Major: 12-13 weeks. Major applications have greatest potential to require EIA.
Scheduled monument consent	No fee to gain consent. Archaeological surveys vary between £5,000-£7,000 for a reservoir.	Varies – minimum two weeks, longer for more complex cases.
HLS/CS derogation	No fee for derogation. Fine/repayment costs incurred for early retirement from schemes/options.	Varies – should be concluded within 28 days.
Waste transfer note	No fee.	Online resource – no waiting time required.
Access permissions (neighbours, utilities)	No fee (possible fee for utilities, and wayleave costs may be applicable in some instances).	Variable.
Right of way diversion permission	Varies across local authorities. North Yorkshire County Council (CC): £424 plus VAT, plus the cost of two adverts at approx £250 each; East Yorkshire CC: £2,500 - £10,000 (unopposed) or £3,000 - £11,500 (opposed). Lincolnshire CC: £1,700 administration, and cost of two advertisements.	Approximately four to six weeks unopposed, significantly longer if opposed and it goes to Public Inquiry (reserve up to one year for this process).
Mineral extraction permit	No fee – but full planning permission likely required.	See planning permission.
Tree Preservation Order	No fee.	Within eight weeks (upon receipt of application). This process could be longer with more complex cases.

Where can these techniques fit?

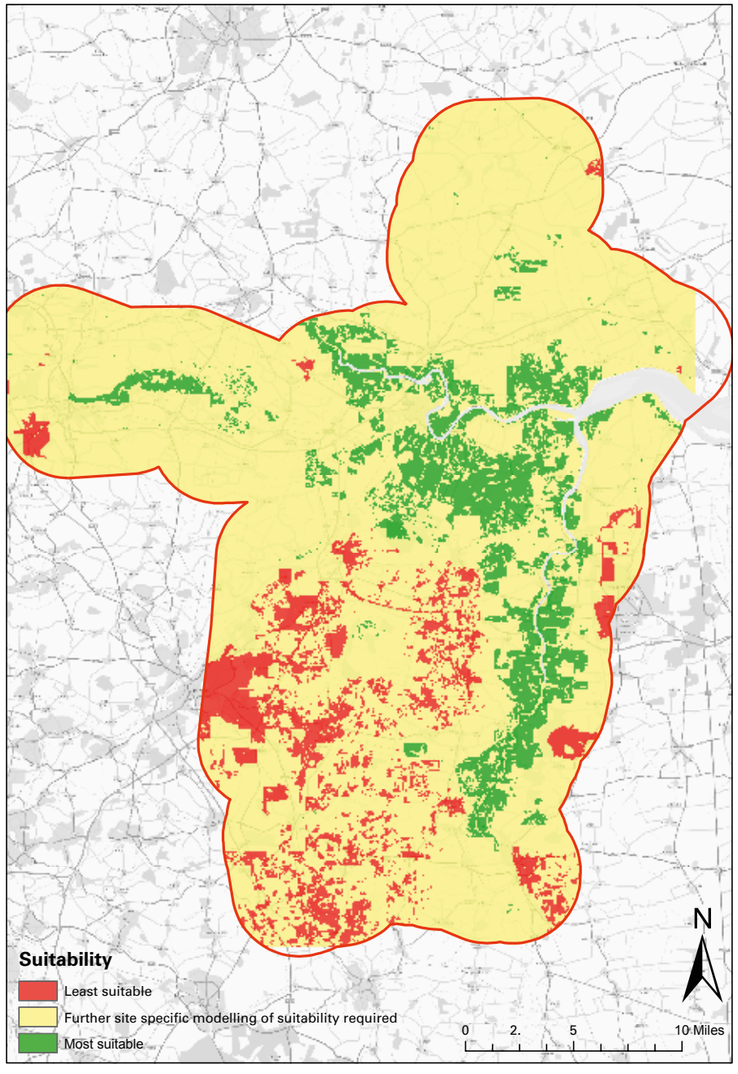
The project developed a method to broadly identify the most suitable locations to apply the techniques within the Humberhead Levels and inner Humber Estuary. This analysis was conducted at a broad scale, and doesn't provide information on the suitability of specific sites.

The most important factors identified for the application of temporary wetlands were abstraction, hydrology, soil type and landcover. Important factors for wildlife-rich storage reservoirs included land cover, land use, soil type, abstraction and hydrology, and the presence of designated sites (such as Special Protection Areas, Special Areas of Conservation and Sites of Special Scientific Interest).

Of the features considered, some were essential for the practical application of the technique, while others were more important from an economic standpoint.

Chris Gomersall (rspb-images.com)

Various factors determine suitable locations for techniques. Birds such as this marsh harrier will make their choice of location later.



The maps provide an indication of suitable areas for temporary wetlands on medium soils, and wildlife-rich storage reservoirs.

Figure 2 – Suitability of study area for temporary wetlands

Figure 3 (right) - Suitability of study area for wildlife-rich storage areas

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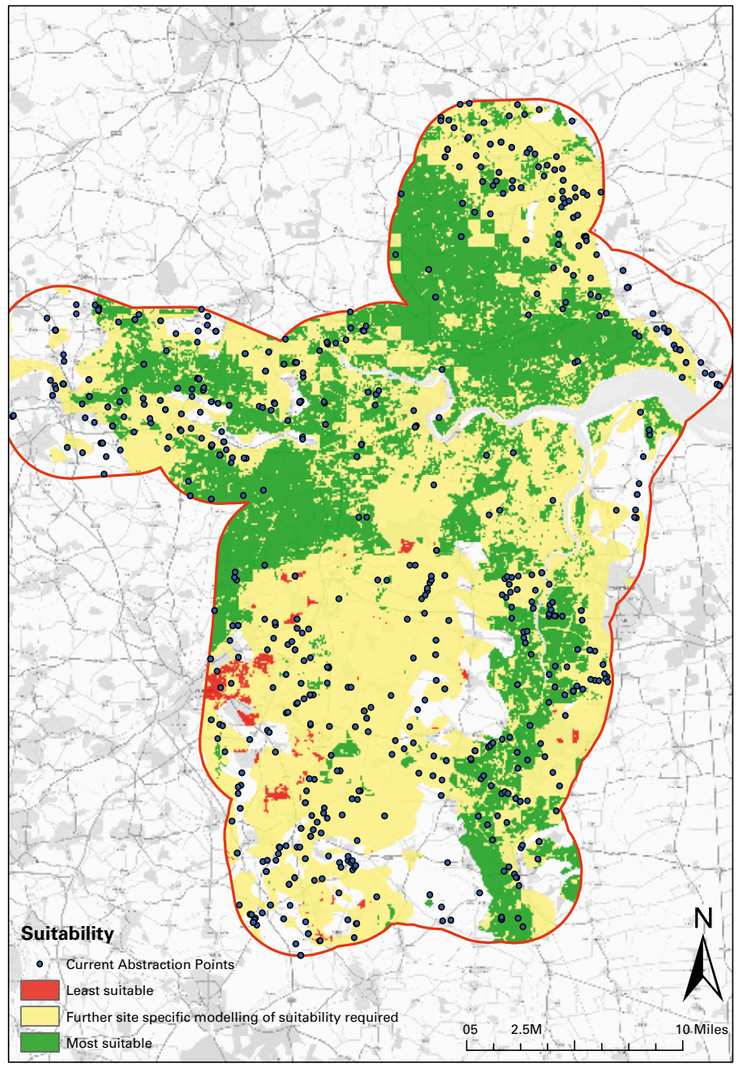
Next steps...

David Broadbent (rspb-images.com)

The project team would like to hear from farmers within the Humberhead Levels and the inner Humber Estuary.



The Water for Farmers and Wildlife project entered its second phase in July 2016. The team will use example sites to develop site-specific designs, and will assess the economic and legislative impacts of the techniques in more detail.

We have produced a financial spreadsheet that can be used to better understand the financial implications of the temporary wetland method on your land.

The second phase of the project will take account of the consequences of the referendum vote to leave the European Union.

Natalie Pagett

Whilst working on this project, I have learned so much more about the Humber, and the many challenges and opportunities that nature and the farming community face.

I am hopeful that the second phase of this project will provide much-needed information about the economic costs and benefits of the techniques, and how to tailor them to individual landholdings.

We can then address the detrimental effects of flooding on local communities, whilst enhancing farm businesses and providing a landscape richer in wildlife.

For further information, or to get involved, please contact me. **natalie.pagett@rspb.org.uk**, or call **07710 019918.**

rspb.org.uk

For further information and advice please contact the project officer, Natalie Pagett:
e-mail **natalie.pagett@rspb.org.uk**
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Thanks to all the individuals and organisations who have provided advice and comments throughout the process.

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Front cover: farming on the Humber by **Suave Air Photos**