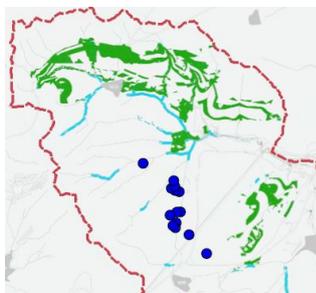


Case Study 1: Wessenden

Viridian were asked to identify the best Natural Flood Management options in the Wessenden valley. A complicating feature was the presence of Twite: a protected species that only likes to nest in areas away from trees and within access to feeding grounds. It was also important to consider budgetary constraints, since both future modelling and implementation would need to offer best value for stretched resources.

Viridian therefore identified the best open-source (free) datasets to use, such as climate, erosivity, and land use. We also blended maps on Twite locations and habits that had been produced by local NGOs. These were processed through the flow-modelling and habitat interaction algorithms to understand how the landscape was currently interacting with flood waters, and how best to improve such interactions.

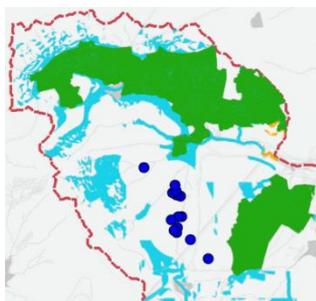
The outputs were maps showing the best new habitats to create and the best places to create them to most reduce flooding for least investment. The maps below are examples: easy to understand and showing exactly what should be done where.



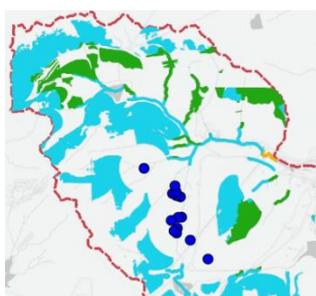
Where to plant woodland and create wetland (using actions such as leaky debris dams) to **most** reduce flooding in the valley, allowing a relative investment budget of 2,000 units. The new woodland is sited mainly on existing grassland areas in the north; the wetland partially involves grip blocking to re-wet peat.

Legend

- Twite Nesting Spots
- Twite Feeding Areas
- Approximate Catchment Outline
- Grassland revegetation
- Afforestation
- Wetland/Peatland restoration



As above, but allowing for a relative investment budget of 10,000 units. The more extensive woodland planting is still focussed mainly on current grassland areas, but the wetland creation is focusing more extensively on re-wetting peat.

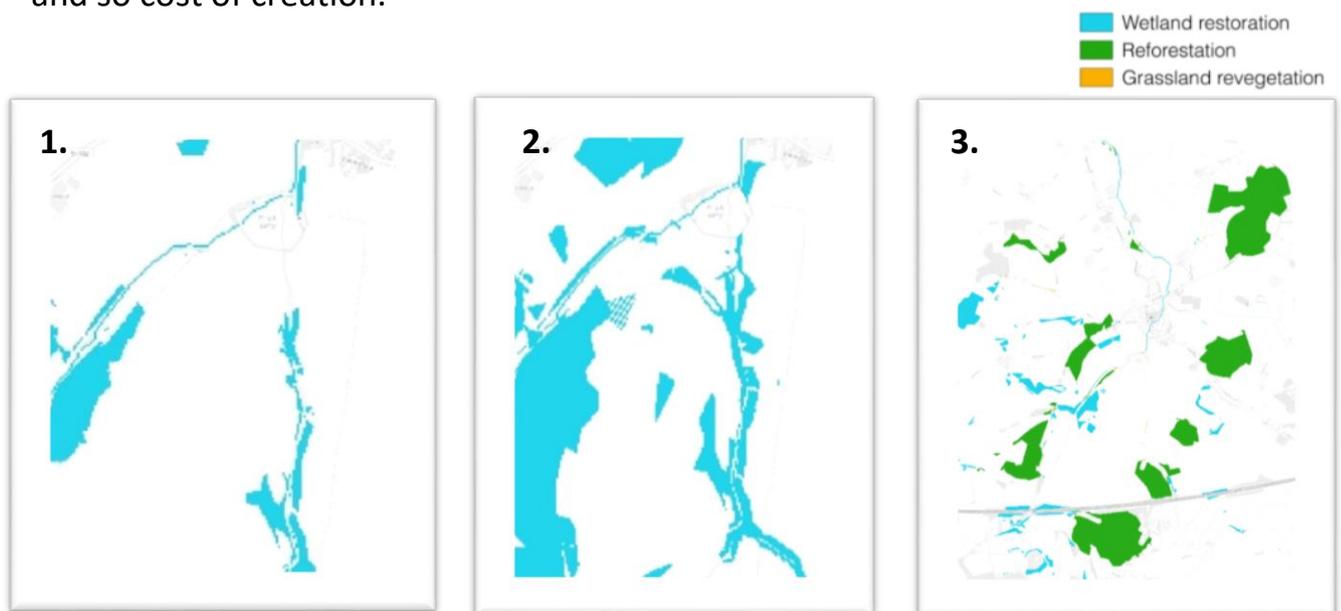


This map show the **best locations** for habitat creation to provide a basket of ecosystem services: erosion control, flood mitigation, pollution reduction and groundwater recharge (baseflow to streams). The budget was set at 10,000 units – the same for the map above. Here the emphasis is much more on re-wetting peat and wetland creation in the valley bottom.

Case study 2: Warwickshire

The Bourne Brook forms a 'flashy' catchment, where heavy rainfall leads to rapid run-off and floods the village of Fillongley. A study for the County Council had identified some traditional mitigation options, including creating engineered holding ponds in unspecified locations upstream of the village. Viridian were commissioned to identify the best natural flood management (NFM) measures in the catchment to reduce flood impact to the village, as well as look at secondary benefits around water flows. A scheduled ancient monument close to the village had to be protected from any NFM measures.

Viridian took a few days to research what had already been done in the area and model accordingly. One aspect was to identify the best locations for pond creation in the valley, with a view to minimising their engineering requirements and so cost of creation.



The images above show extracts from the Bourne Brook sub-catchment, with the village just visible in the north of images 1 and 2; it is fairly central in image 3.

Image 1 above shows the most efficient 5% of actions to take downstream of Fillongley to reduce flooding. This involves creating wetlands close to streams, as well as in-stream measures such as debris dams (detailed design to be determined by local consultation).

Image 2 shows the top 25% of actions to reduce flooding: the larger area will have a greater combined impact than the top 5% of actions alone, but the overall return on investment will be lower (as most of this area is less efficient than the best 5% locations).

Image 3 includes the whole catchment and shows the best 10% of interventions to deliver a basket of ecosystem services: flood reduction, erosion mitigation, diffuse pollution control (soluble and sorbed), and groundwater recharge. Note the greater use of woodland creation to deliver these multiple services.