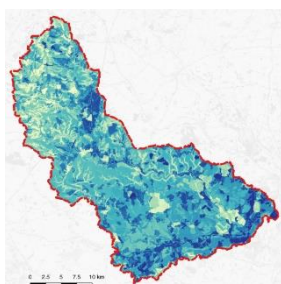
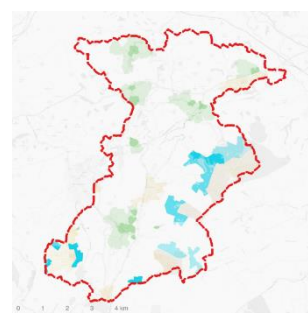


# ECOSYSTEM SERVICES: PRIORITISATION AND IMPACT MODELLING



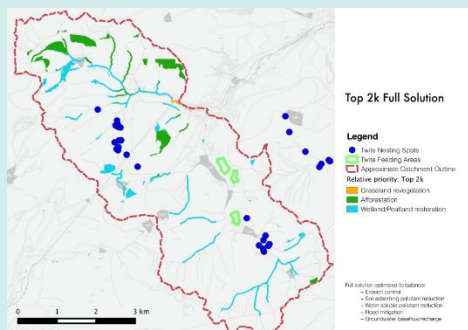
Viridian identifies the best ways to use natural habitats to benefit communities and business. We combine sophisticated, numerical modelling of landscapes with map-based data analysis (GIS) and local priorities/constraints to give clients swift, accurate and useable answers on:

- 1) Natural flood management (NFM)
- 2) Landscape planning
- 3) Natural capital valuation/accounting
- 4) biodiversity compensation
- 5) Infrastructure
- 6) Agricultural production



Viridian can firstly identify and map your natural capital assets, then translate this into the benefits they deliver, and plan how best to protect or improve the situation for least investment.

## Case study: Twite-sensitive NFM in the Wessenden



Viridian 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 whilst protecting the Twite. We also undertook a multi-benefits analysis for a basket of ecosystem services.

## How it works

Most organisations model ecosystem services using GIS alone. This can be useful for broad-brush policy matters, but is inappropriate for anything involving implementation as it can give inefficient or misleading answers. Rather, services need to be divided into water-flow and place-based services, with the former requiring numeric calculation of flow-paths and habitat interactions throughout the landscape. This will properly identify the best ways to optimise ecosystem services for the local context at least investment.

The Viridian system models catchments to show (1) how hard each part of the landscape is working to provide the specific benefits needed locally, then (2) identifies which habitats to create and where to create them to produce the greatest improvements in service provision at least cost. Alternatively, (2) can be reversed to show where degradation of existing habitats will lead to the greatest loss in service provision.

The backbone of Viridian modelling are the water-flow services, since these have to be mathematically modelled for interactions across entire landscapes (simple data-overlays and rule-bases can give misleading results for water-flow services, even though commonly used). In the UK, our model mixes hydrology, soil interactions, habitats and GIS to rank each 5m pixel of the landscape for its current and future ability to solve:

1. erosion
2. reduction of soil adsorbing pollutants (e.g. phosphates)
3. reduction of water soluble pollutants (e.g. nitrates)
4. flood mitigation
5. groundwater recharge/baseflow control

It is worth noting that those areas with highest potential to provide services (high opportunity) are often not the same as those areas where interventions will make the most difference (high impact); Viridian understands this and incorporates it into solution design.

We then calculate comparative provision scores for other, place-based ecosystem services:

1. recreation/access/connection to nature (terrestrial and marine)
2. tranquillity/naturalness and Heritage
3. carbon storage
4. urban infrastructure
5. terrestrial biodiversity
6. marine biodiversity
7. air quality
8. noise abatement
9. pollination
10. food production (farming).

Finally, the water-flow and location-specific services are combined as layers within the GIS display, showing synergies and trade-offs. With local consultation as to priorities, we can produce maps showing best overall solutions and valuations from local to national scale.

Viridian are proud to aspire to these Sustainable Development Goals

