

PRI INNOVATION FOR INDUSTRY

SMART CATCHMENTS

A new approach to delivering ecosystem services

The Smart Catchments concept is a new approach to delivering ecosystem services. The concept uses a network of low-cost sensors distributed throughout a waterbody/catchment, and open-source data and local information. This allows a data-rich, real-time and interactive view of the catchment to be created – this is a Smart Catchment.



Our Approach

Reaseheath College is working with our partner FreeUP Ltd to create an autonomous, low-cost turbidity sensor. The new sensors are able to monitor turbidity and transmit data to a cloud-based platform.

The platform incorporates a dashboard displaying real-time turbidity maps of the waterbody/catchment and allows overlays with open-source data such as weather and rainfall, land use, crop and land cover, soil type and topography. The dashboard is accessible via any device with an internet connection and web browser.

Smart Catchments

The Smart Catchment concept will provide mechanisms to deliver a wide range of ecosystem services to:

- model and optimise deployment of interventions to reduce diffuse pollution
- model and optimise deployment of interventions to slow the flow and facilitate natural flood management
- monitor, validate and value the interventions deployed
- create financial incentives, rewards and penalties to deliver ecosystem services.



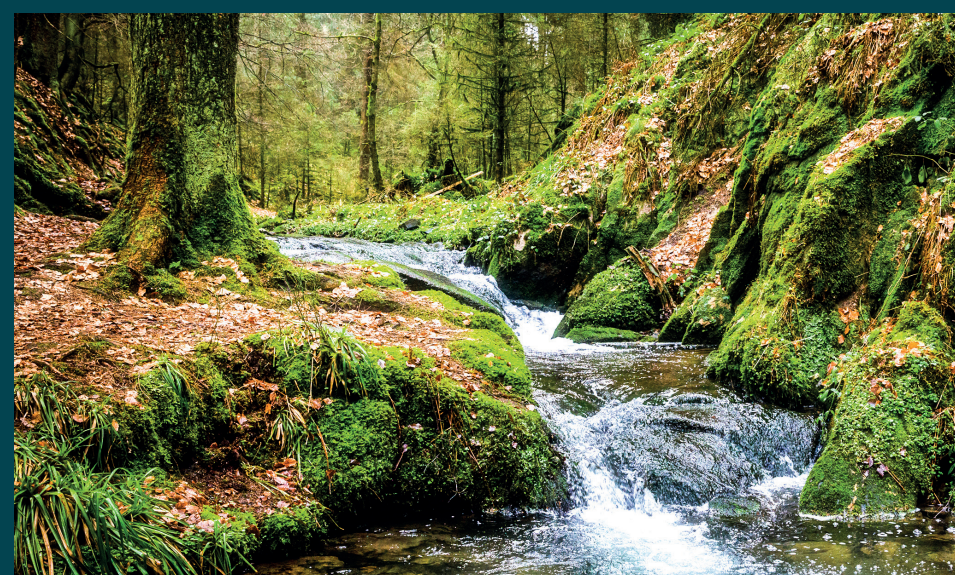
What is turbidity?

Turbidity is a measure of water cloudiness.

The cloudiness is caused by microscopic suspended particles and is often used as an indication of water quality.

Turbidity is measured in nephelometric turbidity units (NTU). In rivers, streams and ponds it is often assessed using a turbidity meter called a sonde. Sondes are expensive costing between £1,500 and £4,000.

The new sensors are a fraction of the cost of a conventional sonde, are simple to install and do not require civil engineering for the installation, making deployment throughout a catchment practical and financially feasible.



Phase 1

A prototype sensor that measures turbidity, with an accuracy of +/- 2% has been developed. This sensor is battery powered and remotely transmits data to the platform.

The sensor is being deployed in a water body on Reaseheath College land and will collect and transmit data every 30 minutes. In addition to data collection, system alerts will notify users via SMS when turbidity exceeds pre-defined parameters. The trial will last around four months.

Phase 2

The next stage of development will include a real-time sample collection facility. Users will be able to automatically collect water samples when turbidity exceeds predefined parameters. This allows an incident to be recorded and water samples collected for analysis.

Phase 3

The third phase of development will be the addition of features to the sensor and platform. These will include modelling and functionalities that support the delivery of ecosystem services:

- turbidity may be leveraged as a proxy for other water quality parameters such as phosphates;
- real-time hydrographs can be generated by sensing flow rate and water levels



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