



Catchment Laboratories Project:

A new study to scope potential long-term monitoring sites to quantify benefits of woodland creation for water. This work is designed to underpin the ongoing development of a Woodland Water Code (WWC).

For further information on the project please visit [Developing a Woodland Water Code](#) or contact Andrea.Baggio@Forestresearch.gov.uk





What is the Catchment Laboratories project?

A new study is underway to scope **potential long-term monitoring sites to quantify benefits of woodland creation for water**. This work is funded via Forest Services as part of the Nature Returns Programme. Its main purpose is to underpin the ongoing development of a Woodland Water Code (WWC), which is separately funded by Defra (Nature for Climate).

The WWC is a crediting mechanism to encourage greater private investment in woodland creation as a **nature-based solution to help tackle diffuse pollution, flooding and rising water temperatures**. We will target locations most impacted by water pressures and work with partners to identify suitable sites for quantifying the effectiveness of woodland creation for reducing these pressures. **Our goal is to locate and agree the top 5-10 sites to form a network of catchment laboratories**, to develop study designs and submit funding proposals to establish these.

How will catchments be selected?

We are looking for sites that meet the following criteria (note that a site does not need to meet all criteria to be eligible, although must involve large-scale woodland creation):

Site Criteria:

- **Opportunity for large-scale woodland creation within catchment** (minimum of 20% of catchment area and ideally >50%, most likely involving >50 ha of tree planting);
- **Waters impacted by one or more of following pressures:**
 - **diffuse pollution** (water body failing due to pollutant runoff from the land);
 - **flooding** (local community or assets at risk of frequent flooding);
 - **thermal stress** (watercourses lacking shade);
- **Current land use aligned with water pressure(s)** and likely to continue for baseline monitoring period (3-5 years);
- **Catchment area of ~100-500 ha**, guided by need for large-scale woodland creation;
- For an assessment of water balance, a **catchment underlain by impermeable geology and soils**;
- **Catchments with previous or ongoing monitoring**, providing baseline or post planting data;
- **A strong local partnership and supporting land ownership** – expectation of commitment to woodland creation and access/support for long-term monitoring (20+ years).



We are interested in all types and forms of woodland creation (e.g. conifer, broadleaved, mixed, short rotation or unmanaged woodland), **provided the planted woodland is designed and sustainably managed according to the UK Forestry Standard.** Where woodland creation involves a mix of woodland types, we would generally not attempt to try and separate their effects as this would complicate the study.

Similarly, it would be difficult to separate the effects of different nature-based solutions, such as river restoration, peatland restoration or the installation of flow attenuation features (e.g. swales and bunds), so we would prefer to avoid such catchments.

Another need is for an adjacent or nearby undisturbed catchment that could act as a suitable control to separate the effects of background changes due to climate or other natural drivers.

The preference would be to establish catchment laboratories across all UK countries to cover a mix of site conditions, although this will depend on local support and access. Lowland locations involving 'Main' watercourses and impacted by point sources of water pollution are unlikely to be suitable.

Water monitoring within catchment laboratories is likely to focus on the catchment outlet. Ideally, this would involve a flow control structure to contain and measure water flows, including extreme flows. Alternatively, the presence of a stable, natural rock channel section may suffice.

At a minimum, water quality monitoring would involve the collection and analysis of monthly stream water samples for the main pollutants of interest, typically including different forms of nitrogen, phosphorus and sediment, and ideally total or individual pesticides plus FIO counts. **Where possible, 'smart' sensors will be installed to enable semi-continuous monitoring of some water quality parameters, including water temperature.** Ideally, annual fish and benthic macroinvertebrate surveys would be undertaken to integrate the effects of water quality changes.

Although it would be best for catchment laboratories to measure water quality, water flows and freshwater biology, circumstances may prevent this at many sites. Consideration will therefore be given to establishing separate catchment laboratories for individual water elements where appropriate.



While our primary focus is on long-term, catchment scale monitoring to quantify the water benefits of woodland creation, **we are also interested in measuring the specific contribution of woodland buffers, especially riparian buffers.** An assessment of the effects of riparian buffers may be possible at the catchment scale where planting creates an extensive network of riparian woodland but is **more likely to involve 'nested' reach or plot scale studies.**

Criteria for a reach scale riparian woodland buffer study are:

- **A small river or stream (<5m wide) abutted by productive farmland, ideally arable cropping or intensive grazing;**
- **Scope to plant at least a 10m width of riparian woodland buffer along a field edge, and where possible, up to a 50m width;**
- **Impeded soil drainage so that runoff from adjacent land interacts with the riparian buffer, including scope to block field drains to avoid bypass flow;**
- **An adjacent field with similar site conditions and baseline farm practices to act as a suitable control site;**

- **The design and management of the woodland buffer tailored to addressing the pollutant(s) involved;**
- **No flood embankment and preferably a narrow floodplain abutted by gently sloping land (e.g. 3-6 degrees);**
- **A supporting landowner committed to long-term management of the riparian woodland buffer and access for monitoring regime.**

Monitoring is likely to involve plot-based measurements and sampling of water quality and flows across the riparian buffer to determine the effects of increasing buffer width.

If you would like to find out more about our project or have a site to offer that meets some (or all) of our criteria for a catchment laboratory or reach-scale riparian buffer study, please visit our website:

[Developing a Woodland Water Code](#)

Or contact:

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