

The use of large wood structures in river restoration in Scotland

Section 1: Project Overview

Introduction

The Centre of Expertise for Waters (CREW) intends to commission a **capacity building project**, aligned with CREW's **land and water resource management** theme. The project will develop an interim decision-support framework to inform decision-making about using LWS in river restoration projects in different environmental settings.

Background

With the twin crises of biodiversity loss and climate change, there is increasing recognition of the value of restoring natural processes in river systems. One of the techniques being used is the installation of LWS in rivers. These structures are intended to produce various environmental benefits, including modifying hydromorphology, increasing the diversity and extent of habitat, reducing bank erosion, and ameliorating the effects of high and low flows. The intention is to enhance the physical processes consistent with the presence of natural riparian woodland and the recruitment of large wood. These structures are intended as a temporary measure, with existing guidance suggesting that riparian planting should always be undertaken alongside their installation.

For the purposes of this project a LWS is one that:

1. Comprises one or more pieces of untreated wood, i.e. trunks with or without their root bole, or main branches. Locally sourced boulders or other sediment may be used to help anchor the structure; in some instances, cables or steel pins may be used.
2. Is intended to change the contemporary functioning of a river through localised changes in hydraulics and geomorphology, i.e. patterns of erosion and deposition, channel features. These localised effects may initiate more widespread change both down and upstream.
3. Is designed for a specific purpose, e.g. to initiate or expedite the formation of a bar, to begin or encourage the development of a scour pool, to encourage channel-floodplain reconnection.
4. Is installed or placed by hand or with machinery.

Through the project, it is intended that a review group will refine and agree the definition of Large Wood Structures (LWS), ensuring that it reflects current guidance and is sufficiently robust to inform the development of the Decision Support Tool. **See 'Project scope and key questions' section.**

Policy relevance

The installation of LWS is one of the measures mentioned in the [Scottish Wild Salmon Strategy](#) under the priority theme of improving river condition and providing salmon access to cold, clean water. More broadly river restoration contributes to Objective 1 (Accelerate Restoration and Regeneration) of the [Scottish Biodiversity Delivery Plan 2024–2030](#), which supports ecosystem restoration, and Scotland's [River Basin Management Plan](#) (2021-2027) which aims to ensure that 81% of all of Scotland's waterbodies achieve *good* or better ecological status by 2027. Hydromorphology forms part of this classification, and restoration measures such as LWS installation may therefore help some rivers to achieve *good* ecological status.

Knowledge gap

LWS are widely used in river restoration projects in Scotland. There is an assumption that altering channel hydraulics and morphology will increase the amount and/or heterogeneity of available habitat and thereby increase species number, biomass or diversity. However, most of the available studies have been focussed on heavily impacted river systems (e.g. canalised and dredged to remove roughness) rather than the more natural and dynamic rivers where they have recently been applied. Furthermore, there is limited evidence to indicate what effect they have on habitat availability and species response. Consequently, uncertainties remain about both the ecological outcomes associated with LWS and the circumstances in which their use may be beneficial or detrimental. These knowledge gaps are outlined below.

1. Limited information on the ecological response to the use of LWS

The ecological response to the use of LWS is currently less well understood than the hydromorphological response, and the evidence supporting benefits for habitats and species remains limited. A [literature review](#) has recently been undertaken by the University of Exeter on the role of large wood in river restoration, but search terms relating to ecology, habitats, and species were not included.

Although concerns regarding the effects of LWS on Atlantic salmon were a key driver for this project request, this project will consider a broader range of aquatic biota since 1) the specific issues around Atlantic salmon are already being considered in detail by the Wild Salmon Strategy (WSS) Science and Evidence Board (SEB), including a review of peer reviewed literature and 2) LWS are also used with the intention of benefiting other species.

It is acknowledged that further research is also needed on other aspects of LWS use, including the hydromorphological effects in different settings (e.g. highly engineered compared with relatively natural channels, and channels with riparian woodland compared with channels without), as well as the longer-term response of channels. However, this element of the project will primarily focus on identifying evidence gaps and recommendations for filling them.

2. Uncertainty about where LWS may be beneficial or detrimental

Some research into the effects of LWS on morphology and ecology (mainly fish populations) is underway, but until the results are available uncertainty about the circumstances and locations in which LWS installation is likely to be beneficial or potentially detrimental will remain. To support decision-making on funding applications for LWS installation, an interim decision-support framework is needed to assist both applicants and those assessing applications. The framework could also be used by other stakeholders, such as river and fisheries managers. This would enable more consistent decision-making regarding the risks and benefits of LWS in different settings, thereby increasing the likelihood of achieving meaningful hydromorphological and ecological benefits. Furthermore, the development of a decision support framework would assist SEPA in regulating activities affecting rivers, including restoration.

Aim

The overall aim of this project is to develop an interim decision-support framework to inform decision-making about using LWS in river restoration projects in different environmental settings, including the refinement and agreement of a definition of LWS to underpin the framework in Scotland. The project will also identify and define knowledge gaps and make recommendations for filling them.

The outputs will inform practice, policy, and priorities for restoration pending delivery of more robust scientific evidence. The framework will help to identify where LWS are most likely to produce positive river restoration outcomes and where particular activities are likely to be associated with greater risks and negative outcomes.

The project will:

- a) Identify priority evidence gaps about the effects of LWS installation on river habitats and species in different environmental settings and set out recommendations for filling them.
- b) Strengthen the shared understanding within the river restoration community regarding the definition, role, risks, benefits, and limitations of different types of LWS in different environmental settings, including the riparian zone.
- c) Develop an interim decision support framework for use by funding applicants, those assessing funding applications for LWS installation, and other stakeholders to guide the choice of intervention in different environmental settings, including where they may be inappropriate.

The project scope and key questions

Evidence landscape review

Through an evidence landscape review¹, this project will synthesise the findings from recent reviews, alongside those from past and ongoing projects, to provide an overview of the current state of knowledge, identify remaining gaps, and develop recommendations for filling them.

The review will address the following key question:

1. What does the current evidence from reviews and projects suggest about the effects on habitats and species of installing different types of LWS in different environmental settings, what priority evidence gaps exist, and what recommendations can be made to fill them? This will need to take account of the different aims and objectives of projects that use LWS.

The findings of the evidence landscape review will inform stakeholder discussions at the review group and workshop.

***Please note:** The synthesis of findings from recent reviews alongside those from past and ongoing projects is intended to provide context to inform subsequent project activities (e.g. prioritization of evidence gaps, recommendations, review group, workshop and decision-support framework) and **should not** represent a major part of the work undertaken.*

¹ This would include a broad review of the [literature review](#) undertaken by the University of Exeter and findings from the CREW report [Prioritising research and development gap opportunities for river woodlands](#). Awareness of ongoing work in Scotland and elsewhere is important when identifying knowledge gaps and making recommendations.

Review group

A review group² will be established, comprising a small number of key stakeholders and subject matter experts.

- This group will support the refinement and agreement of the definition of LWS, drawing on evidence from the literature review and insights generated through the development of the decision-support framework.
- The group will provide a forum for discussion, challenge, and consensus-building to ensure the definition is robust, practical, and fit for purpose.

Stakeholder workshop

A stakeholder workshop² will be held and aim to:

- Strengthen the shared understanding between individuals and organisations involved in river research, management or restoration regarding the role, benefits, risks, and limitations of different types of LWS in different environmental settings; and
- Support discussion and refinement of an interim decision-support framework³.

A key component of the workshop will be discussion of the proposed interim decision-support framework (*see below*), using the evidence landscape review findings to help agree how decisions regarding LWS installation should be made. The aim will be to seek broad stakeholder support for the framework's application in Scotland.

Decision-support framework

The project will develop an interim decision-support framework, refined through an iterative process, to assist both applicants seeking funding for LWS installation and those responsible for assessing applications. The framework will support more consistent, evidence-informed decisions regarding the site-specific suitability of different types of LWS across a range of river environments and will be suitable for revision as new evidence becomes available.

In developing the decision-support framework, you will consider the agreed definition of LWS, and the following key questions:

- If an intervention is needed, why has LWS been selected rather than other techniques?
- What is the intended aim and outcome of the LWS?
- What is the most appropriate LWS to achieve that outcome?
- Where is it suitable (context, catchment, channel type)?

² The project steering group should be consulted early in the project and help develop the review group and workshop invite list. The review group can be held online, but the workshop will be held in person in a neutral venue. You must appoint an external, independent facilitator with recognised expertise, who can operate without bias or vested interest and provide objective oversight for **both** the review group and workshop.

³ This should align with the European Committee for Standardization (CEN) 'Water quality: Guidance standard on a strategic approach to river restoration' ([EN 18025:2025](#)).

Deliverables

- A professionally presented⁴ decision support framework, including appropriate visual materials⁵ to support usability and communication. All images must have appropriate photo credits.
- A final report of 25-30 pages, excluding annexes and the bibliography, and including:
 - The evidence landscape review - a structured synthesis;
 - Identified evidence gaps, and recommendations on how to fill them;
 - Agreed definition of LWS - presenting the definition as determined by the review group, with brief context on how it was developed;
 - Stakeholder workshop synthesis – including key insights, consensus points and areas of agreement and divergence; and
 - Cover image(s) with associated photo credits.
- A plain English summary of aims and results (up to 1 page)
- Website summary (200 words)
- Communications and impact plan, developed with support from CREW at the start of the project and refined throughout delivery.

Events/meetings

- 2 Online and 1 in-person Project Steering Group meetings (throughout the project lifecycle⁶)
- 2 Review group meetings²
- 1 In person stakeholder workshop²

⁴ The decision support framework must be professionally presented with the intended audience considered in the design. Early input from a graphic designer is required to help shape the format and design of the document and production of clear, engaging visuals. Some examples of effective visual design can be found here: <https://www.therrc.co.uk/manual-river-restoration-techniques>

⁵ Visual materials should be based on real-life examples and include photographs. Each example should present the original photograph alongside a corresponding graphic interpretation, where a designer recreates the scene to highlight the key LWS features, function, and context. Examples should be drawn from specific, real-world cases (not generic or idealised scenarios) and include both appropriate and inappropriate applications, with clear explanation of the intended purpose.

⁶ Please note, CREW requests a brief written update c. two weeks prior to project steering group meetings.

Intended impacts

There are multiple pathways for a project to achieve impact, and multiple factors that can impact the project’s ability to achieve what it intends to do; both along the project lifecycle (A.IMPACT) and beyond project completion (B.IMPACT) (Figure 1).

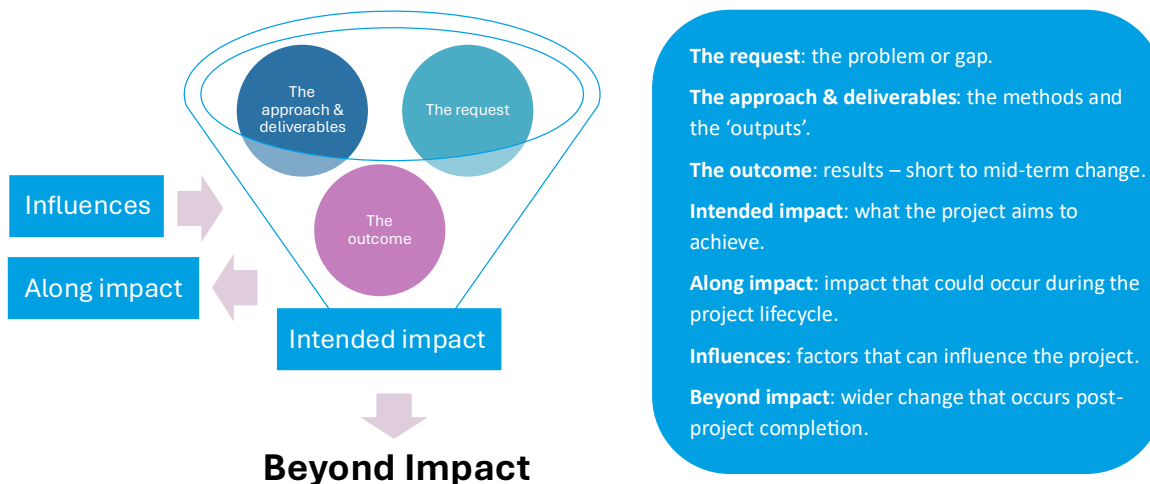


Figure 1: Pathways to impact.

Along Impact (A.Impact):

The following stakeholders are expected to be a key influence on this project: NatureScot, SEPA, Scottish Government, River Restoration Centre, and Forestry and Land Scotland. Individuals and organisations involved in river research, management or restoration are also key stakeholders.

Beyond Impact (B.Impact):

The intended audience of the outputs would include: River managers, District Salmon Fishery Boards, Fishery Trusts, SEPA, NatureScot, Forestry and Land Scotland, Scottish Government (including the Science Evidence Data and Digital (SEDD) portfolio of the Marine Directorate). It is hoped that appropriate selection of LWS, placed in appropriate locations for appropriate reasons, will improve lotic habitats and increase their resilience to climate change. The project tasks, notably the development of the decision support framework, will ensure that decisions to install LWS are based upon the best available information. The use of LWS will therefore accord with Scotland’s restoration ambitions including those originating from the Natural Environment (Scotland) Bill.

Section 2: Further information for applicants

Eligibility

CREW Capacity Building funding is open to applications from **all relevant Scottish HEIs and Research Institutes (approved subcontractors)**. One eligible organisation must lead the bid, however an eligible organisation can sub-contract work in accordance with the Grant Terms which would include putting in place an appropriate agreement with the relevant sub-contractor(s) (updated December 2022). Any UK based HEI, RI or SME can be sub-contracted. Where successful, CREW funding would be subject to agreement to the CREW Grant Offer

Letter and T&Cs (“Grant Terms”). CREW encourages applications from experienced to early career researchers (ECRs) under the supervision and mentorship of experienced researchers.

Expectations and award criteria

A copy of expectations and the award criteria are provided on page 8 and 9 respectively.

Project management

Day-to-day communication will be between the research/review team (the contractor) and a CREW Project Manager and is likely to involve short catchups as agreed.

Communications and impact

CREW’s impact officer will engage with the research team and project steering group on any agreed upon comms and impact activities throughout the project and for post project evaluation.

Project steering group

A CREW representative, and representatives of Scottish Government and its delivery partners, will form part of the project steering group. They will meet with the preferred bidder(s) for a pre-contract meeting.

A pre-contract meeting will take place approximately **15th/16th July 2026**. The review group invitee list should be discussed at this meeting.

Anticipated timescale (c. 6 months)

- The project will commence on the **20th July 2026**, depending on contract processing and signage.
- The first review group meeting should be held **online in mid-August**.
- The 1st PSG meeting should be held **in-person** during the **wb. 7th September**. Initial evidence landscape review findings should be presented and plans for the workshop proposed and discussed. A draft workshop agenda should also be reviewed, and stakeholder mapping undertaken to identify participants to invite to the workshop. *(The CREW impact officer can support with stakeholder mapping)*
- Workshop invitations should be sent to stakeholders during the **wb. 14th September**.
- The second review group meeting should be held **online in mid-September**.
- A first draft of the Decision Support Framework should be submitted for feedback **by the 25th September**. *Please allow 1 week for the project steering group to review the draft.*
- A 2nd PSG meeting should be held **online** on the **6th/7th/8th October**. Feedback on the Decision Support Framework should be discussed, along with final planning arrangements for the workshop.
- The in-person workshop should be held **3rd/4th November**.
- The first draft of the project report and second draft of the Decision Support Framework should be submitted **by the 20th November**. *Please allow 2 weeks for the project steering group to review the draft.*
- The third PSG meeting should be held **online** during the **wb. 7th December**, following the project steering group review period.
- The second draft of the report, third draft of the Decision Support Framework, and first draft of the plain English summary and website summary should be submitted **by the 6th January 2027**. *Please allow 2 weeks for the project steering group to review the draft.*
- All final outputs should be submitted **by the 29th January 2027** for sign-off by the CREW Director and report formatting.

Funding

The maximum amount of funding available **exclusive of VAT** (where applicable) is **£97,000**.

This includes an associated budget to cover:

- An external independent facilitator
- A graphic designer
- 1 in-person PSG meeting, including room and equipment hire
- 1 in-person workshop, including food, room and equipment hire
- Research teams travel and subsistence

Submitting a proposal

Please complete a **CREW Call Down Application form** outlining your proposal.

Proposals need to be submitted to Procurement@crew.ac.uk for evaluation **by 15:00 Thursday 18th June 2026**.

We aim to notify the preferred bidder during the **wb. 6th July 2026**

Please contact Procurement@crew.ac.uk **by Thursday 11th June 2026** if you would like any clarification on any of the above. You should highlight any potential conflicts of interest in your proposal. For queries about what may constitute a potential conflict of interest please contact the CREW Manager (Nikki.Dodd@hutton.ac.uk).

Expectations

No.	Criteria	Descriptor
1	Duration	The proposed duration will align closely to the details provided in the anticipated timescales section of the specification.
2	Staff time and effort	The proposed allocation of staff time and effort is appropriate and includes all deliverables. The proposal provides a commitment that named staff members will be available to work on the contract if the bid is successful. For any unnamed staff, appropriate risk identification and mitigation measures are provided.
3	Project costs	The estimated breakdown of project costs is realistic and inclusive of all deliverables.

Award criteria

No.	Criteria	Descriptor
1	Understanding the project ask and policy background	The proposal should include an introduction which demonstrates a clear understanding of the project requirements. This should include an understanding of the policy background and the supporting role of this project; the need for this research; the project aim; and how the proposal will address this aim.
2	Proposed methodology	The proposal should demonstrate a high quality and workable methodology, including: how the evidence will be identified, reviewed and assessed; consulting relevant stakeholders and/or experts where appropriate to address the key questions and produce the deliverables in the timescales required. Proposals should clearly outline the methodology for developing the decision-support framework. It should explain the suitability, robustness and limitations of the proposed methodology.
3	Milestones	The project milestones are logical, practical and include all deliverables.

4	Project Management	The staff, resources and expertise are appropriate for conducting the proposed project. The proposal should name the project lead and outline their project management experience.
5	General and specific topic expertise and experience	<p>The proposal should provide details of individual staff members who will work on this project and demonstrate how they will meet the project requirements, specifically:</p> <ul style="list-style-type: none"> - general research experience and expertise; - specific experience and expertise on the topics of Hydrology, Hydraulics, Fluvial geomorphology, Freshwater biota., Freshwater ecology, Freshwater habitats and species, River restoration, Stakeholder engagement, Knowledge exchange, Workshop design and facilitation. <p>Early input from a graphic designer is required to help shape the format and design of the document and production of clear, engaging visuals.</p> <p>You must appoint an external, independent facilitator with recognised expertise, who can operate without bias or vested interest and provide objective oversight for <u>both</u> the review group and workshop.</p>
6	General communication and deliverables	The proposal should describe the approach to producing the deliverables, which will be published on the CREW website. It should detail who will take lead responsibility for report-writing and overall report quality. It should provide examples of previously published reports, decision support frameworks and any workshops in which they have been involved.
7	Quality assurance	The proposal should provide details of quality assurance procedures to demonstrate how the contract will be continuously delivered to a high standard. It should specifically address issues of quality control at different stages of the project, including evidence gathering, analysis and report writing. It should include a timetable for delivery of tasks, project milestones and allocation of staff and staff time against each task, covering the duration of the contract.
8	Risk	The proposal should provide a risk assessment matrix detailing any risks identified in relation to the delivery of this contract, and proposed mitigation measures to minimise their probability and impact, focused particularly on risk to completion on time.

Annex A. Relevant reports, studies and policies

- SEPA *Will the river do the work? A practical guide for assessing river recovery potential and directing when passive river restoration measures can be used to allow rivers to self-heal.*
<https://www.sepa.org.uk/media/ifcaytdm/will-the-river-do-the-work.pdf>
- SEPA's *EASR Guidance: Engineering Activity Guide- Instream and In-lock Structures*
[wat-g-025_engineering_activity_guide_instream_and_in-lock_structures.docx](https://www.sepa.org.uk/media/ifcaytdm/wat-g-025_engineering_activity_guide_instream_and_in-lock_structures.docx)
- Gurnell *et al.*, 2019, Trees and wood: working with rivers natural processes. Water and Environment Journal. <https://onlinelibrary.wiley.com/doi/abs/10.1111/wej.12426>
- Ogilvy *et al.*, 2022, Riverwoods Evidence Review.
<https://www.riverwoods.org.uk/resource/riverwoods-evidence-review/>

- Prioritising research and development gap opportunities for river woodlands. <https://www.crew.ac.uk/publications/prioritising-research-and-development-gap-opportunities-river-woodlands>
- Scottish Wild Salmon Strategy documentation. <https://www.gov.scot/publications/scottish-wild-salmon-strategy/pages/6/>
- Soulsby, C., Youngson, A., & Webb, J. (2024). The ecohydrology of rewilding: A pressing need for evidence in the restoration of upland Atlantic salmon streams. *Hydrological Processes*, 38(5), e15142. <https://doi.org/10.1002/hyp.15142>
- Ghazaleh Nassaji Matin, Diego Panici, Georgie Bennett, Richard Brazier2026. Understanding the role of large wood in restoring river systems across scales and structures: A systematic review. *Earth Science Reviews*, 277. <https://doi.org/10.1016/j.earscirev.2026.105450>