CREW CENTRE OF EXPERTISE FOR WATERS

Natural Capital and River Basin Management Planning

Protecting and Improving Scotland's Water Environment

Policy Brief

Lorna J Cole, Julia McCarthy, Alistair McVittie, Sarah Buckingham, Victoria Barthelmess, Brady Stevens, Rebecca Audsley

SAC CONSULTING
Part of Scotland's Rural College (SRUC)

THE UNIVERSITY OF EDINBURGH

SRUC

Scottish Government
gov.scot

CREW CENTRE OF EXPERTISE FOR WATERS

Background

The fourth River Basin Management Planning (RBMP) cycle provides an opportunity to embed a natural capital approach as a common framework linking water, climate, biodiversity, health and wellbeing, planning, and land use policy. Catchments provide the right spatial scale to understand environmental pressures, linkages between terrestrial and freshwater environments, and to identify risks, opportunities and beneficiaries of ecosystem services. With increasing pressures on land and water resources and limited public funding, joined-up thinking is essential to drive investment choices that ensure public expenditure generates multiple returns and to create opportunities for private investment in nature. By tailoring a natural capital approach within catchments, there is an opportunity to leverage existing opportunities and actions to enhance benefits for the water environment.

A natural capital approach strengthens the evidence base for investing in actions that protect, enhance and restore natural assets, including sustainable agriculture, flood risk management, peatland restoration and woodland creation, which all benefit the water environment. Applying a natural capital approach within RBMP will help align decision-making, investment and action across sectors, supporting activities that not only improve the water environment, but also deliver multiple benefits and contribute to broader national targets and strategies, including for climate resilience and biodiversity.

Recommendations

Strategic priorities for embedding a natural capital approach within RBMP

Strategically align policy and funding decisions.
Ensure climate, nature, health and wellbeing, planning and sustainable land use policies recognise and account for natural assets and the benefits they provide for the water environment. Better alignment and integration across these areas will help deliver more targeted and effective outcomes.

Adopt a whole catchment-scale approach to RBMP.
Catchments provide an appropriate scale for decision-making both ecologically and for coordinating action across policy areas. Managing land and water at this scale enables cumulative pressures and interactions to be understood and strategically addressed.

Strengthen evidence and integrated modelling.
Improve understanding of how different NbS impact the water environment and wider ecosystem services. Modelling to account for trade-offs, synergies and climate change to inform more robust decisions, reduce unintended consequences and build climate resilience.

Develop an integrated monitoring framework.
Establish an integrated monitoring and evaluation framework that aligns metrics with RBMP priorities and reflects underlying ecosystem functions. Consistent, transparent and quantifiable metrics will build confidence among regulators, investors and delivery partners.

Unlock private investment.
Private investment is needed to close the funding gap for nature restoration. Credible blended finance models can attract investment where barriers to market participation are addressed and high-integrity mechanisms are developed to drive demand.

Support practical delivery.
Share learnings, develop clear guidance and build capability to translate strategy into effective catchment-scale action. To facilitate delivery, collate existing data and tools. Strengthening capacity on the ground is essential to embed a natural capital approach in catchment management.

Summary

Scotland's societal and economic wellbeing depends on healthy, functioning natural capital assets including rivers, soils, wetlands and biodiversity. These assets provide a flow of benefits such as clean water, flood regulation, health and wellbeing and climate resilience. With Scotland's natural resources under increasing pressure from climate change, land use change and development there is a need to protect, restore and enhance our natural capital to safeguard the benefits they provide. River Basin Management Planning (RBMP), an established framework to addresses and alleviate pressures on the water environment, offers a clear opportunity to apply a natural capital approach ensuring Scotland's natural assets and the benefits they provide are properly recognised and accounted for in decision-making.

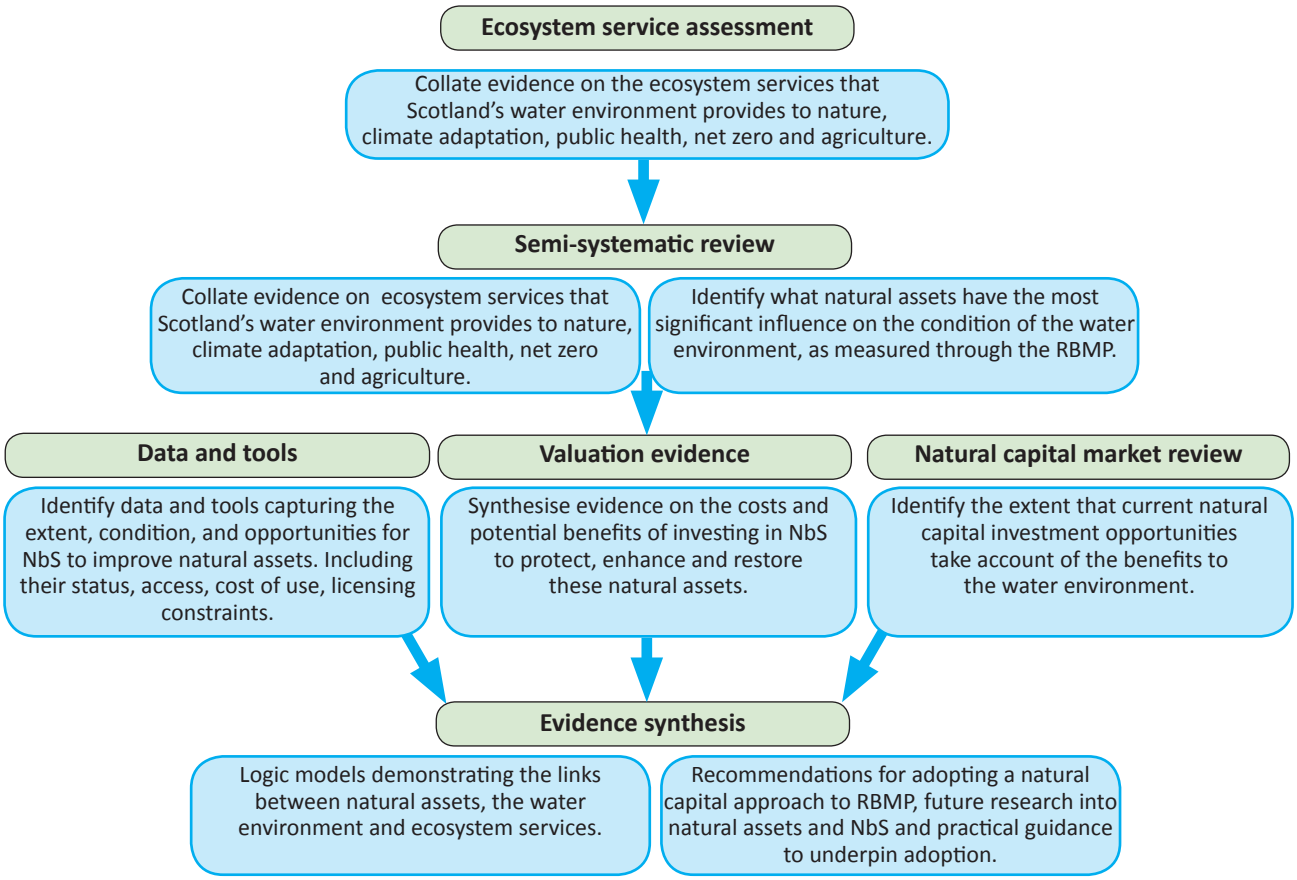
The stocks and flows of ecosystem services are strongly impacted by a catchment's natural assets. Nature-based Solutions (NbS) targeted to enhance and restore these assets can deliver multiple benefits to the water environment and beyond. Building the evidence on the benefits that NbS provide to society is key to unlocking the private investment needed to close the funding gap for nature restoration.

RBMP is entering its fourth cycle, providing a timely policy window to adopt a more holistic natural capital approach to catchment management. Through a shared framework, a natural capital approach to RBMP will promote joined-up delivery across policy areas.

A natural capital approach to RBMP offers a powerful mechanism to foster alignment across policy areas, helping meet the Scottish Government's ambitions for water, biodiversity, climate resilience, public health, net zero and sustainable land use.

Nature-based solutions (NbS) are actions to protect, sustainably manage and restore natural and managed ecosystems, targeted to address societal challenges whilst providing well-being and biodiversity benefits.

Research Undertaken



Key findings

Approximately 70% of ecosystem services are underpinned by a healthy, well-functioning, water environment, highlighting its crucial role in providing us with a wide range of benefits including fresh water, food, recreation, biodiversity, flood protection, climate resilience, water flow regulation and water purification. Key Scottish industries strongly rely on ecosystem services that the water environment provides including agriculture, fisheries, forestry, water and sewage, spirits and malting and tourism (Scottish Government 2025a).

We found clear linkages between the natural assets within a catchment, the water environment and the ecosystem services it provides. The extent, type, location, management and condition of these assets all impact on the stocks and flows of these ecosystem services. Many NbS targeted to protect, enhance and restore these assets (e.g. restoration of native woodlands, wetland creation and establishment of buffer strips) provide a wide range of benefits extending beyond the water environment. Benefits to the water environment for other NbS (e.g. lowland grazing management, hedgerow creation, control of invasive non-native species, and reduction in upland grazing pressure) were less strongly evidenced at the catchment scale, providing scope for future research.

While the evidence base for valuing NbS continues to grow, values for some services are lacking (particularly regulatory services) and many valuations are English focused and context-dependent. Targeted, place-based assessment is therefore essential to optimise the outcomes of NbS and identify clear routes to investment from emerging market mechanisms.

Funding for NbS may be supported by a range of existing and emerging market-based mechanisms within Scotland, including voluntary carbon and nature markets, as well as other market-based mechanisms that deliver bespoke outcomes to beneficiaries. There is value in engaging with market developers to promote the inclusion of water metrics and outcomes within developing codes and standards and other market-based mechanisms in Scotland. Additionally, engaging across sectors will ensure policies and strategies prioritise water outcomes and create the right economic incentives to drive market participation.

Within the next RBMP cycle, it would be useful to develop an integrated monitoring and evaluation framework to better communicate water-related outcomes and, where possible, align what is measured under RBMP and WFD monitoring with other programmes (e.g., protected areas monitoring) and emerging natural capital market mechanisms.

Our findings demonstrate that a catchment-scale natural capital approach can help prioritise on-the-ground action to ensure that NbS are designed, spatially targeted and managed to improve the water environment and provide multiple benefits (i.e. the best NbS in the best place). RBMP's catchment-based approach provides a strategic scale that aligns well with both water quality goals and emerging natural capital markets. Early engagement with both the supply (land managers) and demand (buyers, beneficiaries) side to co-design interventions will build trust and ensure that interventions are investible and socially, economically and environmentally sustainable.

Conclusions

Scotland's societal, environmental and economic wellbeing relies strongly on the ecosystem services provided by the water environment, with RBMP playing a central role in strategic planning to protect and enhance these services. The fourth RBMP cycle provides a timely window to bring water management, sustainable land use, planning, nature recovery, public health and wellbeing and climate policies into closer alignment through a natural capital approach. By integrating a natural capital approach, RBMP can better articulate how natural assets within the wider catchment influence water outcomes and identify where investment in NbS will deliver the greatest benefits.

At a catchment-scale, this type of approach could support strategic mobilisation of private finance for nature restoration whilst aligning decision-making, investment and action across policy areas, increasing the visibility of water-related benefits and reinforcing the cross-sectoral relevance of RBMP. For example, by aligning the interests of beneficiaries with delivery of ecosystem services, including businesses looking to reduce risks, operational costs or impacts, insurance companies looking to reduce flood risks, or corporations seeking to build resilience within their supply chain. To build confidence and improve transparency, robust monitoring, high integrity markets and early stakeholder engagement are essential to create investible project pipelines (Scottish Government 2024).

References

Scottish Government, 2024. *Natural Capital Market Framework.* Edinburgh: Scottish Government. https://www.gov.scot/binaries/content/documents/govscot/publications/advice-and-guidance/2024/11/natural-capital-market-framework/documents/natural-capital-market-framework/natural-capital-market-framework/govscot%3Adocument/natural-capital-market-framework.pdf

Scottish Government, 2025a. *Making the Case for Nature: Insights from Scotland's Natural Capital Analyses.* Edinburgh: Scottish Government. https://www.gov.scot/publications/making-case-nature-insights-scotlands-natural-capital-analyses/

Contributors

Dr Lorna Cole

Lorna draws on over 25 years of experience as an applied ecologist with expertise in ecosytems, their species and functions and the impact of management on benefits provided. She is experienced in translating research into policy relevant guidance.

Lorna.Cole@sac.co.uk

Julia McCarthy

Julia has over 20 years of experience as a freshwater ecologist. She brings ecological expertise to multi-disciplinary teams working in the freshwater and nature finance sectors, with projects and research aimed at improving governance, implementation and policy, and advancing science-based approaches to support ecological outcomes.

Julia.McCarthy@ed.ac.uk

Alistair McVittie

Alistair has 24 years of experience in the economic evaluation of land use policies. This has included the application of economic valuation to ecosystem services. He also contributes to interdisciplinary research in the areas of natural capital and ecosystem services.

Alistair.McVittie@sruc.ac.uk

Sarah Buckingham

Sarah has over 12 years research expertise in sustainable agriculture, in particular soil management for carbon sequestration and GHG reduction in the agricultural sector. Sarah has expertise in systematic reviews and expertise in Scottish policy and integrated catchment management.

Sarah.Buckingham@sac.co.uk

Victoria Barthelmess

Victoria is a sustainability economist with a background in ecological economics and macroeconomics, bringing over eight years of applied and analytical experience spanning energy, environmental, and land-use systems.

Victoria.Barthelmess@sac.co.uk

Brady Stevens

Brady has been working as an SAC Consultant in the natural capital space for over three years. He has experience in assessing natural capital tools and methodologies and assessing opportunities for nature-based solutions projects.

Brady.Stevens@sac.co.uk

Rebecca Audsley

Over 24 years of experience in development of good practice guidance and knowledge transfer within the agricultural sector. She has led a range of initiatives/outputs with a practical approach to water management and climate change mitigation and adaptation actions, highlighting wider environmental benefits and business gains.

Rebecca.Audsley@sac.co.uk

Published by CREW – Scotland's Centre of Expertise for Waters. CREW connects research and policy, delivering objective and robust research and expert opinion to support the development and implementation of water policy in Scotland. CREW is a partnership between the James Hutton Institute and all Scottish Higher Education Institutes. The Centre is funded by the Scottish Government.

This document was produced by:
Lorna J Cole[1], Julia McCarthy[2], Alistair McVittie[3], Sarah Buckingham[1], Victoria Barthelmess[1], Brady Stevens[1], Rebecca Audsley[1]

[1]SAC Consulting, Food & Footprint Team, The King's Buildings, West Mains Road, Edinburgh, EH9 3JG
[2] University of Edinburgh, School of Geosciences at Drummond St, Edinburgh EH8 9XP
[3] Scotland's Rural College (SRUC), The King's Buildings, West Mains Road, Edinburgh, EH9 3JG

CREW Project Manager: Rebekah Burman

Please reference this policy brief as follows:
Cole, L.J., McCarthy, J., McVittie, A., Buckingham, S., Barthelmess, V., Stevens, B., Audsley, R. 2026. *Natural Capital and River Basin Management Planning Protecting and Improving Scotland's Water Environment*. Policy Brief. CRW2024_04. Centre of Expertise for Waters (CREW).

Available online at: www.crew.ac.uk/publications/natural-capital-and-rbmp

ISBN: 978-1-911706-46-5

Dissemination status: Unrestricted

Acknowledgements: We are indebted to the project steering group for their valuable input and guidance throughout. Their feedback helped shape the research direction and ensured that a wide range of perspectives were considered. We are grateful to Louise Bond (SEPA), Aidan Robson (Scottish Government), Matylda Graczyk (Scottish Government), Oliver Slater (Scottish Government), Donya Davidson (NatureScot), Ewan Lawrie (NatureScot), and Mark Williams (Scottish Water) for their support, advice, and constructive feedback during the duration of the project. In particular, we are grateful to Roy Richardson (SEPA) for his consistent support and advice and thoughtful contributions and insights on River Basin Management Planning and the role that Natural Capital has to play going forward. Special thanks go to Rebekah Burman (CREW), who coordinated the project and played a key role in organising meetings, and providing thoughtful insights into the project's direction. Her assistance and support throughout the process were greatly appreciated.

Cover photographs courtesy of: Lorna Cole.

Please contact enquiries@crew.ac.uk, to request policy brief in an alternative format.

CREW CENTRE OF EXPERTISE FOR WATERS

Centre of Expertise for Waters

James Hutton Institute
Craigiebuckler
Aberdeen AB15 8QH
Scotland UK

www.crew.ac.uk

CREW publications can be accessed here:
www.crew.ac.uk/publications

@crew_waters CREW-scotland Bluesky @crew-waters

Scan to access all project outputs

CREW is a partnership between the James Hutton Institute and all Scottish Higher Education Institutes and Research Institutes. The Centre is funded by the Scottish Government.

Scottish Government
Riaghaltas na h-Alba
gov.scot