

River Spey Catchment Management Plan

(Draft for consultation, 2nd February 2023)

2023 – 2030

“The threats that face the Spey catchment are real, present and vast, but so is the skill, enthusiasm and energy for meeting these challenges head on and bringing imaginative, practical solutions which benefit climate, biodiversity and critically, the community of people who live, work and visit here. In the last five years the achievements of the many organisations working across the Spey catchment have been significant. There is tremendous energy for the next seven years and beyond which will see even more ambitious improvements achieved for the benefit of all.”

Ewan Harris, Chair, Spey Catchment Initiative Steering Group.

The waters of the Spey catchment are closely linked to quality of life for its inhabitants. The high value resource they provide is essential for drinking water, the iconic Malt whisky and salmon fishing for which the Spey is globally famous, and the outstanding biodiversity, landscape and recreation opportunities which attract the tourists so important to the local economy. Farmers, businesses and communities are directly affected by flood and drought conditions. Improving understanding and management of all aspects of the catchment is more important than ever as we face the twin crises of climate change and biodiversity loss.

Catchment Management Planning

Throughout the Spey Catchment there are many organisations involved in river management or related activities, each with its own remit for delivery. This revised Catchment Management Plan (CMP) brings together the activities of partner organisations and sets out priorities for 2023 to 2030, building on previous successes and incorporating lessons learnt.

The plan is presented as a set of eight Priority Themes with associated Objectives to guide activities in the Spey catchment for the next seven years. It is intended to be a working document which will be regularly reviewed and updated to reflect important changes during the period. The plan is the result of wide-ranging consultation with partners, stakeholders, communities and the public.

The underlying principles of considering environmental quality and human activity in the catchment holistically and integrating action to deliver multiple benefits remain unchanged. A key over-arching aim is still to promote partnership working to reduce conflict and work towards the most widely beneficial solutions possible.

Figure 1: Catchment Planning Timeline

First Spey Catchment Management Plan published	2003
Review of progress against 2003 CMP	2015
Second CMP published, 2016 - 2021	2016
Review of progress against 2016 CMP	2022
Third CMP published, 2023 - 2030	2023

Much has been achieved during the previous CMP periods and on many levels the Spey compares favourably with other catchments. However, continued vigilance and careful management are as critical as ever to maintain and improve standards and ensure that new, growing threats are addressed.

Since the 2016 CMP was published, the ‘twin crises’ of climate change and biodiversity loss have emerged as issues of huge importance requiring urgent attention. Previously recognised priorities to protect the water environment, whilst achieving other important goals such as managing flood risk and securing adequate water supplies to meet growing demand remain, and in many cases these challenges are now exacerbated by the effects of the climate and biodiversity emergencies. The new CMP recognises this urgency, and climate change and biodiversity are integral across all themes.

Legislation and Policy

Scotland’s waters in general, and many aspects of catchment management, are heavily influenced and controlled by multiple layers of statutory and non-statutory policy and guidance, much of which has been updated during the period of the previous CMP. The main legal and policy framework currently applicable to the Spey catchment is summarised in Figure 2. Many of the Priority Themes and Objectives are closely related to the legislation and associated targets which guide the activities of stakeholders working across the catchment.

Figure 2 Legislation Diagram

National Legislation:

- Land Reform (Scotland) Act (2003) & 2016
- Salmon & Freshwater Fisheries (Consolidated)(Scotland) Act 2003
- Water Environment and Water Services (Scotland) Act (2003)
- Habitats Regulations (1994) amended 2019 to cover EU Habitats Directive requirements.
- Nature Conservation (Scotland) Act (2004)
- Planning (Scotland) Act (2006)
- Climate Change (Scotland) Act (2009)
- Flood Risk Management (Scotland) Act (2009)
- Water Environment (Controlled Activities) (Scotland) Regulations 2011

National Plans and Strategies

- Scottish Government Climate Change Plan 2018 - 2032
- River Basin Management Planning Third Cycle 2022 - 2027
- Scotland’s Biodiversity Strategy 2022 – 2045
- Scotland’s Forestry Strategy 2019 - 2029
- Wild Salmon Strategy (2022)
- UK Forestry Standard 2023

Local Plans and Strategies

- Cairngorm National Park Partnership Plan 2022 - 2027
- Findhorn Nairn & Strathspey Local Flood Risk Management Plan 2022 - 2028
- Local Forest and Woodland Strategies (Highland and Moray)

- Local Development Plans
- Local Biodiversity Action Plans
- Cairngorms Nature Action Plan 2019 - 2024
- Spey Fishery Board Strategy and Management Plan

Key Issues

Climate Change and Biodiversity Loss

Climate change is there for us all to see. The exceptionally hot and dry summer of 2018 saw river levels drop to historic lows, in places confining wildlife to small channels and pools and heating water temperature to close to lethal levels for salmon and trout. Storm Frank in 2015 caused the worst flooding in decades and the effects on the catchment were long-lasting. The year 2022 has seen more evidence of the very the real impacts of the climate crisis; violent winter storms tore through the catchment in January and February, and the UK recorded its hottest ever summer temperatures.

Across all emission scenarios presented in the UK 2018 Climate Projections, there is a general consensus that Scotland's future climate will be characterised by average temperatures increasing across all seasons, more variability in weather patterns, warmer, drier summers and milder, wetter winters. Intense, heavy rainfall events will increase in frequency in both winter and summer. All these trends will have direct and significant impacts on the catchment.

All the while biodiversity continues to decline at terrifying speed, and the Spey catchment is by no means immune. The Cairngorms National Park, around half of which is in the Spey catchment, is home to almost 1,200 species considered to be nationally or internationally important. Nevertheless, two of the four species for which the Spey is designated as a Special Area of Conservation (SAC) are under serious threat. Atlantic salmon are a keystone species in the freshwater ecosystem and act as a 'canary in the environment', reflecting the overall health of the river. Marine Scotland monitoring indicates that only 3% of salmon smolts entering the sea now return as adults to breed, compared to around 25% 40 years ago. In the Spey, the rod catch records for salmon show a steady decline since the 1980s. Fresh water pearl mussels are now only found in a handful of Scottish rivers, and the Spey is no longer a reliable stronghold, with numbers known to have declined by 50% between 2001 and 2014 and further population impacts evident during recent extreme low summer flow conditions.

Despite concerted effort to control them, Invasive Non Native Species remain a threat to native species and river functioning. The expected return of beaver will be an exciting addition to the wildlife of the catchment, but is likely to pose some challenges too, requiring careful management.

Climate change and biodiversity loss are inextricably linked and interdependent, both in terms of causes and solutions. Mitigation and adaptation are equal partners and many measures available to us offer solutions to both priorities.

Nature-based Solutions

Nature-based Solutions are management techniques which work with nature to address societal challenges. The advantages of restoring land to a more natural state and working

with natural processes to tackle issues in the catchment are increasingly recognized and applied.

Peatland restoration is now a widely used technique which not only protects peat as an important carbon sink, but also slows the flow of water from the hills, releasing it slowly so that more stable river water levels are maintained for longer. This helps to reduce damaging peak flows, and to retain more water in the catchment to act as a reservoir during lower rainfall periods.

The Spey system is recognised for its geomorphological interest and some sections such as the River Feshie and Insh Marshes are noted as outstanding examples of river and wetland processes and landforms. River restoration seeks to return rivers to a more natural state by undoing interventions such as straightening, embankment and damming, and restoring natural geomorphological processes. The re-naturalised watercourse provides space for flood water and encourages proper sediment dynamics, soaking-up the potentially damaging energy of flood flows. The flow is slowed, and pools are created where water temperature is cooler for longer, and at the same time more diverse habitat is created for river life to thrive. Planting or allowing native trees to regenerate along river banks provides shade, improves habitat diversity and quality, and adds nutrients to enrich the ecosystem. Another essential Nature-based Solution to the problem of habitat fragmentation is to enhance and extend the existing network of wetland and riparian woodland habitats, allowing species to adapt their ranges to the changing climate by moving through a 'nature network', boosting their resilience.

There is an emerging market for land within the Spey catchment to provide Nature-based Solutions, at present focused on carbon sequestration, and during the current CMP period it is expected to grow rapidly, with a market for Biodiversity Net Gain credits emerging soon. SCI, along with other CMP partners, has succeeded in raising awareness and inspiring land managers to engage in habitat restoration projects such as peatland and river restoration. Expanding the wider uptake of these activities is a key objective during this CMP timeframe.

Abstraction

The River Spey is one of the most heavily abstracted rivers in Scotland. Water is diverted from 51 sites across the catchment, but just two of these are responsible for 91% of all the water taken. These sites divert water away from the top 13% of the catchment to generate hydroelectricity out with it, and in so doing have denuded the river below of its groundwater resupplies. Over the eighty years that these hydroelectricity schemes have been in place, they have had a devastating impact on the ecology of the River Spey, as it is the groundwater supplies that sustain the river during periods of low flows, which we are seeing more and more as the impacts of climate change become apparent. These schemes are outdated and account for a small and diminishing amount of Scotland's renewable energy, as modern technologies have enabled more efficient power generation from wind turbines, as well as solar and tidal resources.

WATER QUALITY, QUANTITY AND ENVIRONMENT

Improving the waters of the Spey for the benefit of biodiversity, communities and the economy.

W1	Maintaining water status
W2	Improving water status
W3	Water quality
W4	Water quantity

Water quality in the Spey catchment is generally considered to be good, but the condition of the water environment is threatened by pressures generated on a local, national and global scale. These include climate change, spread of invasive non-native plants and animals, shifts in land use practices, and the introduction of diseases that can damage the health of aquatic wildlife.

Control of potentially damaging impacts from operations around water has been in place since 2006, through the Water Environment Controlled Activities (Scotland) Regulations 2011 (CAR). The regulations require an authorisation to be in place for activities such as point source discharges, water abstraction and river engineering work. These authorisations are issued and enforced by SEPA, ensuring activities do not cause deterioration of the water environment and are carried out in such a way that it is protected and where possible improved.

The River Basin Management Plan (RBMP)

The River Basin Management Planning process, for which SEPA is the lead authority, sets out objectives to protect, manage and improve the water environment where it is affected by historic activities that pre-date the CAR Regulations. Currently we are in RBMP cycle 3 (2021-2027).

Rivers are classified under RBMP based on their quality for a range of criteria including water quality, ecological quality, access for migratory fish and morphology. Of the 100 defined water bodies within the Spey catchment, 60 are currently High or Good status, 17 at Poor status and 2 at Bad status.

During the RBMP cycle 3, SEPA have committed to improving the status of 41 waterbodies within the Spey catchment by 2027, 16 of which are downgraded due to manmade barriers.

W1 Maintaining Water Status

The good water quality that we already have needs to be safeguarded and protected from deterioration, not least to meet increasing demand for safe drinking water and other economically important water uses. The licencing regime and associated site sampling and inspection under the CAR Regulations safeguards against deterioration in water status. However there should be a continual aspiration to go beyond the regulatory minimum and seek to achieve High water quality status wherever possible.

Significant investment by Scottish Water and other sectors over the last 20 years has addressed the majority of the point source pollution issues previously associated with waste water treatment. We now need to ensure there is no future risk of water quality deterioration associated with these plants. Septic tank discharges (private and public) are still an issue in some areas, as is disposal of fats and wipes down drains which can cause blockages and polluting discharges from public sewer networks. Awareness of waste water best practice has improved vastly since the first CMP, particularly through initiatives such as Scottish Water's TV, radio, and social media campaigns. However, there is a continued need to promulgate awareness of best practice in order to maintain and improve upon previous achievements.

OBJECTIVE W1

Continue to maintain and enhance RBMP water status in the Spey catchment.

W2 Improving Water Status

Many of the actions required to improve the ecological status of currently “below Good” water bodies are targeted by the RBMP process for completion by 2027 (see RBMP section above). For example, where downgrades are due to barriers such as abandoned weirs and dams, there may be opportunities to demolish the obstruction and create a more naturally functioning water course. However, to achieve this will require continued partnership working between agencies, landowners and interested groups, and financial support through mechanisms such as SEPA’s Water Environment Fund and agri-environment schemes. The resulting improvements will contribute to the continued expansion of businesses that depend on a high quality water environment whilst also improving the health and range of biodiversity across the catchment.

Although not falling within the criteria to be a “named water body”, many smaller watercourses within the catchment also suffer from a degraded water environment often due to diffuse pollution or modifications such as straightening or embankments. These now need to be identified and the issues then addressed at a local level.

OBJECTIVE W2

Improve the status of water bodies failing to meet Good RBMP status by 2027. Identify and address issues in ‘unnamed water bodies’.

W3 Water Quality

Water quality refers to the chemical, physical and biological characteristics of water. Measurement of these parameters often only provides a ‘snapshot’ of water quality at one point in time, however a comprehensive survey of water chemistry in the Spey in 2014 indicated high water quality. Macroinvertebrate surveys are an established tool to measure integrated water quality and a suite of indices which can be derived from species diversity and abundance provide a cost effective and replicable assessment of the health of a water course as an alternative to potentially resource-intensive measurement of chemical parameters.

Atlantic salmon and Fresh water pearl mussel (FWPM), both designated species for the Spey SAC, are among the species which are particularly sensitive to water quality. FWPM are in critical decline and more monitoring and research is necessary to determine the water quality requirements of this species and their importance to its conservation.

With the impacts of climate change increasingly being felt by river systems, water temperature, both in terms of increasing maximum and average temperatures, is arguably the water quality characteristic of most concern. Salmon and trout are especially vulnerable to warmer temperatures. Salmon feeding and breeding activity starts to be affected above 18 degrees and temperatures above 25 degrees can be lethal. Marine Scotland Science has an established programme of on-going river temperature monitoring which includes many data points in the Spey catchment and has enabled modelling of where future impacts are likely to be most serious, and these sites need to be prioritised for mitigating action such as riparian tree planting for shade.

OBJECTIVE W3

Address issues degrading water quality throughout the Spey catchment.

W4 Water Quantity

Ensuring that there is enough water available to meet all abstraction requirements whilst protecting the needs of the natural environment is a sensitive balancing act. The economic

wellbeing of communities and businesses depends on a reliable and continuous supply of this natural resource, however wildlife, water quality (due to reduced dilution of pollutants) and river functioning can be adversely affected by reducing natural flows. Extended periods of dry conditions across Scotland have resulted in an increase in the number of areas experiencing water scarcity. In places ground water is at the lowest recorded levels since measurements started in 2009.

Within the Spey catchment, the main pressures are from water abstractions for hydroelectric generation and industry. Over time, artificially diminished flows can lead to scoured, incised water courses with reduced extent, quality, diversity and connectivity of aquatic habitats. All abstraction activities are controlled through CAR and can be altered either to increase or reduce the abstraction rate if there is justification to do so. Increasing the residual flow in abstracted rivers can provide a range of benefits including re-wetting dry rivers, helping restore runs of migratory fish and improving conditions for many species.

The long term negative impacts of reduced flow due to abstraction on the ecology and functioning of particular water bodies within the catchment are now well understood. Finding ways to resolve them is increasingly critical as the severity of the effects of low water levels due to abstraction are exacerbated by climate change-induced drought periods. A review of the impacts of abstraction in the upper catchment by consultants EnviroCentre (<https://www.riverspey.org/wp-content/uploads/2022/01/Envirocentre-Spey-Abstractions-2021-Report.pdf>) was commissioned by the Spey Fishery Board in 2021 and illustrates the impacts on both rivers and groundwater reserves. In order to maintain water environment quality, adequate flows are required in all our rivers and burns.

OBJECTIVE W4

Manage abstractions to protect biodiversity and river functioning and improve resilience.

FLOOD AND DROUGHT MANAGEMENT

Better understanding and managing water flow at catchment and local level.

FM1	Sustainable flood management
FM2	Natural flood management
FM3	Drought management

Flooding is a natural process but can be devastating for those that are caught up in its path. Its impacts during peak flows can be exacerbated by many activities that, intentionally or otherwise, affect the natural functioning of watercourses and floodplains. This includes land drainage, the diversion of watercourses, canalisation, artificial embankments, built development, or poor agricultural and forestry practices. Climate change is also increasing the uncertainty in water resources, with many areas in Scotland, including the Spey catchment, experiencing dry enough conditions to cause water scarcity. The weather is already changing towards a pattern of intense precipitation events alternating with periods of prolonged dry weather, and the frequency and severity of floods and drought in Scotland is clearly on an upward curve. The extreme temperatures and low flows experienced in summer 2018 are predicted to occur every two years by 2050. This means that there is ever increasing pressure on flood risk and drought management just to maintain the current levels of protection and resilience. In the long term no single approach will be sustainable on its own and more holistic approaches are now required.

Flood Risk Management in Scotland

In Scotland a framework for delivering a more sustainable approach to flood risk management has been legally established under the Flood Risk Management (Scotland) Act 2009. This has led to the development of Flood Risk Management Plans and Local Flood Risk Management Plans (LFRMP) across Scotland. The Spey catchment falls within the Findhorn, Nairn and Speyside Local Plan District. The LFRMP (<http://apps.sepa.org.uk/FRMStrategies/findhorn-nairn-speyside.html>) identifies the river sub catchments which contain areas at risk of flooding and defines corresponding Potentially Vulnerable Areas (PVAs). It also suggests in broad terms a range of actions required to improve the situation. The LFRMP then specifies the detailed six year plan of specific actions, with anticipated timescales and responsible leads, to tackle or alleviate the greatest risks identified in the Flood Risk Management Plan.

FM1 Sustainable Flood Management

Whilst the LFRMP addresses specific local issues based around PVAs, a catchment wide strategic vision for flood management needs further development such that flood management is achieved wherever possible by the restoration of a more natural flooding regime. Re-naturalisation of previously modified burns using Nature-based Solutions to achieve Natural Flood Management (NFM) should be routinely considered as an alternative or addition to hard engineering. Ideally funding and other incentives should recognise the downstream benefits (including to the PVAs) that derive from appropriate up stream actions (outside the PVAs).

Flood risk management, particularly NFM, and resilience-building against the impacts of climate change, will need to become further embedded in all infrastructure development and land use decisions, and any negative impacts of development mitigated. .

OBJECTIVE FM1

Implement sustainable flood management via restoration of a more natural flooding regime and delivery of the Findhorn, Nairn and Speyside Local Flood Risk Management Plan.

FM2 Natural Flood Management

NFM involves balancing and integrating the restoration of natural features and processes with existing land uses to manage the sources and pathways of flood waters, with the aim of providing flood protection and climate proofing to the wider river system. It will not necessarily provide protection from large flood events but can contribute to reductions in flooding during smaller, more frequent events, while simultaneously delivering many other benefits such as improved river morphology or better riverine habitats. There is an increasing need for Government to see the real long term value in NFM and to properly fund on-going compensation for potential production loss for land owners/ managers, reflecting the potential huge cost savings by reducing frequency and severity of flood damage to downstream assets.

OBJECTIVE FM2

Promote the use of NFM techniques at appropriate locations to contribute to flood management.

FM3 Drought Management

Many of the NFM interventions which can help to moderate flood flows can also contribute to improving resilience to drought conditions. Reconnection of flood plains, peatland restoration and expanding catchment and riparian woodland all help to retain water for longer periods, allowing time for groundwater reserves to be recharged through infiltration. Groundwater then acts as a reservoir to maintain a basal flow level in rivers during periods of low rainfall. This is especially valuable in the upper parts of the catchment where a significant proportion of the total water reserve is abstracted for hydro power.

In order to build resilience against drought it is also important that industrial and domestic water users are able to plan ahead and use water responsibly, reducing usage when necessary. SEPA have developed a National Water Scarcity Plan to identify how water users and key organisations can manage water during periods of low rainfall.

OBJECTIVE FM3

Increase awareness of the effects of droughts and promote the use of Nature-based Solutions to mitigate them.

BIODIVERSITY

Protecting, restoring, and enhancing the outstanding nature of the waters and wetlands of the Spey catchment.

B1	River, riparian and wetland habitats
B2	Designated species
B3	Other species
B4	Invasive non-native species

The natural heritage of the Spey catchment is one of the richest and most important in Scotland. However maintaining and protecting the special qualities of this diverse landscape and the species it supports can be challenging in the face of economic, political, and climate-related pressures. There is an urgent need to conserve and enhance threatened species and habitats, some of which are protected under environmental legislation.

The main rivers of the catchment are designated as a Special Area of Conservation (SAC) and a Site of Special Scientific Interest (SSSI) with four qualifying species. Throughout the Spey catchment there are many other SACs including floodplains, alluvial alder woodland, vegetated shingle bars and mire and bog habitats that together form part of the European sites network. Further information on designated sites, protected species, conservation policy and biodiversity in general may be found at NatureScot's website.

B1 Riparian, river and wetland habitats

Healthy riparian, river and wetland habitats are a vital part of the natural landscape but have diminished in quality and abundance due largely to human activity. It is estimated that in the UK we have lost 90% of wetland habitat over the last 100 years. Many of our most threatened freshwater and wetland species are wholly dependent on availability of suitable habitat and urgent action to protect, restore and expand it is critical for their survival. Due to their linear nature, river corridors form important habitat networks, essential to enable species to extend their range as a response to the changing climate, habitat loss and fragmentation and other pressures.

Functioning wetlands and riparian zones with healthy woodland and vegetation are also important for carbon capture and storage and resilience to climate change. When in good condition, they help to buffer against drought and floods by slowing runoff rates, increasing water infiltration into the soil, and providing space for flood water storage. Trees shade rivers, keeping water temperatures lower. River and riparian habitats are closely linked to natural river functioning, for example tree roots stabilise banks and dead wood in the river channel enhances the diversity of physical habitats and adds nutrients. Land managers are encouraged to undertake positive works in water margins such as riparian planting and green engineering works, supported by schemes such as the Agri-Environment Climate Scheme (AECS).

OBJECTIVE B1

Halt habitat loss, and restore and improve degraded habitats to enable biodiversity to thrive.

B2 Designated species

The Spey and its main tributaries are designated as a SAC and SSSI for Atlantic salmon, Fresh water pearl mussel (FWPM), otter and sea lamprey. Insh Marshes is also designated as a Special Protected Area (SPA) for its population of breeding osprey, spotted crane, wigeon, wintering whooper swan and hen harrier.

Atlantic salmon is an iconic species that is a vital part of both marine and freshwater ecosystems. Within the catchment the presence of salmon is key to the existence of other species such as FWPM and also serves as an indicator of good water quality. In recent years there has been a global decline in salmon, due to many factors including marine survival, the impact of climate change and habitat loss. International scale conservation of this highly migratory species is being undertaken by organisations such as the North Atlantic Salmon Conservation Organisation and the Atlantic Salmon Trust.

The FWPM is a globally threatened species and the Spey has one of the most important remaining populations, though it is known to be declining (a 2013/14 survey reported a 50% population decline since 2001). FWPM are ecosystem engineers, each filtering and cleaning, about 50 litres of water per day. Changes in water quantity and quality, decline in salmonid stocks, illegal pearl fishing, and inappropriate river engineering are considered to pose the most significant threats. A multi-agency working group is co-ordinating further research and monitoring with the aim of boosting numbers through techniques including translocation.

Sea lamprey are a primitive species of fish which migrates between the river and marine environments and attaches on to salmon. Their range is thought to be declining in the UK due mainly to habitat loss and pollution.

Otters are the fourth qualifying species for the River Spey SAC. Otters are thriving in the Spey catchment due to good water quality and an abundance of prey. They are vulnerable to road traffic, and ensuring that otters are fully considered in new infrastructure projects, for example by installing otter culverts, is crucial to reduce fatalities.

OBJECTIVE B2

Protect and enhance the Atlantic salmon, sea lamprey, Freshwater pearl mussel, and otter populations of the catchment, and improve the condition of water and wetland designated sites.

B3 Other species

The catchment is characterised by a wide variety of habitat types and has the potential to support a corresponding diversity of species where good quality habitats remain, however many species are in decline and urgent action is needed to address the biodiversity crisis.

The water vole is one of the most threatened native mammals on the Spey, primarily due to habitat degradation and fragmentation, but also due to predation by invasive American mink. Continued effort is now required to conserve and enhance the remaining water vole populations.

Led by CNPA and NatureScot, considerable research and consultation has taken place to investigate the pros and cons of re-introduction of beaver to the catchment. As an 'ecosystem engineer' its presence would be considered beneficial to a wide range of species and habitats, though this needs to be balanced against concerns about potential negative impacts on farmland, woodland and fisheries. In 2022 a new policy was introduced to allow translocation of beavers from other parts of the UK to appropriate sites, including on the Spey, and it is likely that releases of beaver will take place from 2023 onwards. Careful support, management and monitoring will be required.

Invertebrates are a critical component of a healthy river ecosystem and a number of key species, including the Northern February Red stonefly and Northern Silver-stiletto fly occur within the Spey watercourses. Many invertebrate species will benefit from targeted river and wetland habitat management and creation such as expansion of shingle banks and increasing dead wood in and around rivers.

Floodplain wetlands, farmland, and areas of open water or marshy grassland, are all important for the survival of a number of bird species. Insh Marshes is nationally important

for wetland birds including goldeneye, lapwing, redshank and curlew. Floodplains in the catchment form one of the largest remaining mainland breeding wader sites in the UK and the Strathspey Wetland and Waders Initiative continues to work with land managers to protect and improve this habitat. Climate change is likely to exacerbate existing pressures on some wetland bird species and many Nature-based Solutions and NFM interventions to improve climate resilience, such as reinstating more natural flooding regimes, will also benefit waders, though woodland creation may have detrimental impacts.

A small naturally occurring population of Eurasian cranes is present in NE Scotland, and they may re-appear in the Spey catchment as a breeding species, either naturally given time or through the Cairngorms Cranes Project which has a vision to assist cranes' return to the catchment.

OBJECTIVE B3

Conserve and enhance key animal and plant species in the Spey Catchment and support carefully managed re-introduction of 'missing' species where appropriate.

B4 Invasive Non Native Species (INNS)

Particularly in the lower Spey catchment there is an issue with a number of non-native plant species including giant hogweed, Japanese knotweed, White butterburr and the floating *Ranunculus fluitans* (water crowfoot) which is believed to have an impact on FWPM and juvenile salmon as well as causing problems for anglers. American mink and more recently pink salmon are also an on-going concern.

Since 2011 there has been Scottish legislation making release of INNS an offence. The Scottish Invasive Species Initiative works with volunteers and local organisations to manage INNS in the catchment by controlling, containing and eradicating particular species. The aim has also been to raise awareness of how INNS can spread and how risks can be minimised using simple biosecurity measures.

OBJECTIVE B4

Eradicate existing INNS and prevent the introduction of new INNS within the catchment.

LAND MANAGEMENT

Promoting good land management practices for the benefit of the water environment.

L1	Diffuse pollution
L2	Slowing the flow
L3	Re-naturalising rivers
L4	Farm wetlands
L5	Peatland restoration

Land management is central to the health of the catchment, and consideration of the river system should be integral to decision making to ensure that changes in land use have positive rather than harmful effects. In the past watercourses were sometimes viewed as little more than a free water supply or the boundary between land holdings, but the benefits of proactively managing them are now much more understood and appreciated. This is reflected through agricultural support schemes which help fund activities that improve water quality, enhance riparian habitats, or aid flood management. A major review of Agri-environment funding is expected in 2024.

Partnership working by public agencies is leading to a much more joined up approach, ensuring that land and water management is integrated as far as possible. Opportunities to work collaboratively across land ownership boundaries and farm land holdings should be promoted where this is most advantageous to maximise benefits.

L1 Diffuse Pollution

Fertiliser and manure application, pesticide use, runoff from farm steadings and soil erosion all have the potential to contribute to diffuse pollution and degrade water quality. In 2008 SEPA introduced a series of Diffuse Pollution General Binding Rules, providing the statutory basis for good practice for a range of farming activities. Compliance has improved in recent years, with a focus on a wide range of land management activities that are liable to cause pollution and the necessary actions that must be taken to help protect and improve water quality. Farming and Water Scotland provide extensive advice on compliance as well as access to the most recent versions of the rules.

Many improvements have been made in recent years in the Spey catchment but where pockets of diffuse pollution remain, usually from livestock poaching, action is needed. Where exclusion of stock from water margins is introduced, alternative waterings are often essential and information and sources of funding for both established and innovative solutions (eg solar and hydro powered pump/trough systems) need to be promoted. .

OBJECTIVE L1

Reduce the impact of diffuse agricultural pollution on the surface and ground water quality of the Spey catchment.

L2 Slowing the Flow

How land, and in particular the riparian zone, is managed can have a significant impact on water absorption, run off and flow rates. The cumulative effect of bare uplands, straightened channels, ditches and embankments on flows may not be evident until many miles downstream. Reconnecting watercourses with their local floodplains, strategically planted woodland schemes and appropriate drain blocking can all contribute to effectively slowing run off into watercourses, reducing the impacts of high flows further downstream.

The idea of allowing a floodplain to re-naturalise through the removal of artificial embankments can be a very sensitive issue, from both an economic and social viewpoint. It is recognised that allowing land to flood is generally counter to the traditions and instincts of farmers and crofters and there can be practical barriers to this approach. However, the impacts of climate change are already altering the balance of priorities and the need to build resilience to extremes of high and low flows has to be considered by all land managers. As catchment scale NFM is developed, those areas that could contribute most will be identified.

Consideration needs to be given to how Government funding should incentivise and compensate farmers for Nature-based Solutions which have significant environmental benefits but may reduce production, for example in areas used to store flood water.

OBJECTIVE L2

Explore appropriately funded Nature-based Solutions to manage water flows on land.

L3 Re-naturalising rivers

Restoration of natural processes to human modified watercourses through farmland enhances river functioning and benefits in stream and riparian ecosystems. Tree planting along river banks can contribute significantly to bank stability, helping to reduce excessive erosion as well as benefiting a range of riparian and instream species. Increasingly 'green engineering' techniques such as log jams and willow spiling are replacing hard engineering to control excessive erosion and protect from loss of farmland, with the additional benefits of cost saving and habitat gain. Maintenance requirements such as regular dredging of straightened river channels can be reduced where rivers are re-meandered into a more natural course, allowing natural sediment dynamics to return. Land managers are crucial partners in enabling the delivery of improved river functioning and continued support is required to build on the significant progress already made.

OBJECTIVE L3

Improve natural functioning of watercourses through farmland to benefit ecosystems, restore natural processes and contribute to NFM.

L4 Farm wetlands

Flooding is a natural phenomenon and there may be scope in some areas to allow land which is prone to periodic inundation to revert to wetland. The creation or enhancement of wetland habitats on the floodplain can have many positive benefits, both for NFM and for biodiversity, particularly riverine and wetland birds. Flood-prone areas are often of the highest quality for breeding waders such as redshank, oystercatcher, lapwing and curlew, all of which have seen a measurable decline in recent years, and the Strathspey Wetland and Wader Initiative (SWWI) continues to work with farmers to enhance conditions for these species by maintaining, enhancing and creating wetland areas and ponds.

Similar to SUDS, Constructed farm wetlands are treatment systems that use natural processes involving wetland vegetation, soils, and their associated microbial assemblages to improve water quality, and can be used for farm waste water treatment.

OBJECTIVE L4

Retain, expand and enhance wetlands and natural ponds for their NFM and biodiversity benefits.

L5 Peatland restoration

According to Nature Scot, more than 20% of Scotland is covered by peatlands which hold most of Scotland's carbon store (they are estimated to hold the equivalent of 140 years' worth of Scotland's total annual greenhouse gas emissions), and so are vital in helping us to tackle climate change. It is estimated that 80% of Scotland's peatlands are damaged. Peatland restoration in practice is blocking old ditches, creating wetland areas in the process

and reprofiling peat hags. Healthy grass and heather is spread out over exposed peat so that it expands over these areas to provide full ground cover.

The Scottish Government funds repair and restoration through Peatland Action, and private finance is available via the Peatland Code. Peatland restoration is a priority in the Cairngorms National Park and the Park Authority supports land managers to implement schemes. There is also a large amount of activity being undertaken independently and through Deer Management Groups. This work not only locks up carbon but also improves habitat and slows the flow of water from the hills by holding it for longer in bogs, blocked ditches and pools, and reducing runoff by intercepting it in restored vegetation.

OBJECTIVE L5

Promote peatland restoration as a crucial component of catchment management.

DRAFT

FISHERIES MANAGEMENT

Recognising the importance of Atlantic salmon and trout as indicator species for successful environmental improvements that generate sustainability and resilience to the climate and biodiversity emergencies.

F1	Fish stocks
F2	Habitat quality
F3	Barriers to fish migration and research
F4	Sustainable angling

Atlantic Salmon

The River Spey is renowned world-wide for its salmon fishing. Its rod fishery industry has a 10-year average catch of over 5,500 salmon and grilse, which generates millions of pounds each year for the local economy and supports hundreds of jobs throughout the catchment.

Adult salmon need access to cold, clean water in order to thrive. They spawn in fresh water and their young develop as fry and parr for up to four years, before migrating to sea as smolts. Smolts migrate into the north and western Atlantic, where they feed and mature for up to four years before returning to their natal river to breed. Monitoring by Marine Scotland Science has suggested that of all the millions of smolts migrating to sea forty years ago, about 25% would return as adults. Now, it is closer to 3%. The reasons for this are multifactorial, but climatic changes in the North Atlantic are believed to play a significant part, with other factors such as predation and exploitation at sea also being likely contributory factors in the marine environment.

For many years, reduced exploitation has been promoted by the Spey Fishery Board (SFB) and others to maximise the numbers of adult salmon surviving to spawn. This has included the promotion of catch and release of rod-caught fish, which since 2019 has resulted in 98% of all rod-caught salmon and grilse being voluntarily released back into the river to spawn. This helps to maximise the number of salmon and sea trout smolts reaching the sea from the River Spey.

In addition to the problems facing salmon in the marine environment, there are several factors which also threaten the health of the Spey's salmon population. These include water abstraction and diversion, man-made barriers to fish passage, water quality issues, increasing incidence of extreme flows (both high and low flows), predation of adult and juvenile fish, degradation of juvenile fish and spawning habitat through civil engineering and pollution, and the introduction of disease, parasites and non-native species. Many of these issues are being addressed by the SFB in collaboration with riparian owners, government agencies, Local Authorities and the Spey Catchment Initiative, through a comprehensive fishery strategy and management plan in support of the Scottish Government's Wild Salmon Strategy.

Trout

Brown trout are ubiquitous throughout the catchment and the sea-going form of the species, "sea trout", provide a significant rod fishery with a 10-year average catch of 1,600. Resident brown trout also provide localised fisheries and many of the factors that affect salmon in fresh water also impact upon trout. The SFB's strategy and fishery management plan therefore encompasses the management and research for all trout in the catchment, as well as salmon.

Other Fish Species

Pike are common in the slower-flowing, middle reaches of the River Spey and also many of the lochs within the catchment, alongside discrete populations of perch. Eight other indigenous fish species are also found within the River Spey catchment: European eel, sea

lamprey, river lamprey, brook lamprey, flounder, minnow, three-spined stickleback and Arctic charr.

An emerging threat has been the arrival of invasive, non-native pink salmon, which have entered the lower River Spey in alternate years since 2017. There are concerns that this fish species will compete with the indigenous Atlantic salmon for habitat and food. Numbers appear to be increasing every two years and although means of effective removal have so far proved elusive, the situation will require careful monitoring.

F1 Fish stocks

In January 2022, the Scottish Government published a Wild Salmon Strategy to optimise the number and quality of healthy, naturally produced salmon smolts leaving Scotland's rivers and coastal areas. The Strategy sets out a bold vision for the management of wild salmon from 2022 until 2030, addressing the 12 pressures on salmon, together with the Government's international obligations and legal requirements, across five priority themes. You can read the full Strategy at: <https://www.gov.scot/publications/scottish-wild-salmon-strategy/documents/>. The SFB has developed its own Strategy & Management Plan in support of the Government's Strategy. Meanwhile, the Scottish Government's Implementation Plan for its Strategy was published in February 2023 and can be read at: [Wild Salmon Strategy Implementation Plan 2023-2028 \(www.gov.scot\)](https://www.gov.scot/publications/wild-salmon-strategy-implementation-plan-2023-2028/documents/).

The River Spey is one of the most heavily abstracted rivers in Scotland and Atlantic salmon need access to cold, clean water in order to thrive. The EnviroCentre Report, "River Spey Abstractions 2021: Water Resource Management Now and Implications for the Future", showed that of all the water diverted from 51 sites across the catchment, just two are responsible for 91% of all the water taken. These sites divert water away from the top 13% of the catchment to generate hydroelectricity out with it. These hydro diversions have had a devastating impact on the ecology of the River Spey below, by denuding it of its groundwater resupplies, which sustain the river during periods of low flows, which we are seeing more and more as the impacts of climate change become apparent. The SFB is working to reduce these diversions and see more water put down our upper tributaries instead, thereby making the River Spey and its iconic Atlantic salmon more resilient and sustainable to the climate and biodiversity emergencies confronting us all. You can see the full Envirocentre Report at: <https://www.riverspey.org/wp-content/uploads/2022/01/Envirocentre-Spey-Abstractions-2021-Report.pdf>

Juvenile salmon and trout stocks, including migrating smolts, are subject to predation by sawbill ducks (Goosanders and Mergansers) and Cormorants. Returning adult salmon are also subject to predation by Grey and Common seals. The management of these species is licensed by the Scottish Government and its agencies, and the SFB will continue to work to ensure that an appropriate balance can be made to secure the sustainability of all protected species, including Atlantic salmon.

Of the other indigenous fish species within the catchment, the three lamprey species are of particular conservation importance as they are listed in Annex II of the Habitats Directive and the abundance of eels is known to be at an unprecedented low throughout its European range. Information on the distribution and abundance of these native fish species is lacking and should be improved, since they all represent an integral part of the river's ecology.

OBJECTIVE F1

Maximise the number of Atlantic salmon and sea trout smolts reaching the sea from the River Spey catchment.

F2 Habitat quality

A key contributing factor to the survival of juvenile salmon is the quantity and quality of suitable habitat within the catchment. Cold, clean flowing water in channels with varied

sediment substrate and dappled bankside shading create the ideal conditions for juvenile salmon to thrive. These conditions are synonymous with a healthy water environment in general and so the presence (& quantity) of salmon is an indicator of overall ecosystem health. Enhancement or restoration activities proposed elsewhere in this plan, be they for farming, forestry, flooding or water environment purposes, all contribute to improving habitat quality for fish too.

In the past, restoration of river banks and in-river habitat was focused on short stretches of rivers and burns. Opportunities now exist to take a more holistic approach and treat each tributary as a sub-catchment of the River Spey, with landscape-scale projects aimed at generating long-term sustainability and resilience to the climate and biodiversity emergencies and Atlantic salmon populations providing an indicator of success.

OBJECTIVE F2

Restore and enhance riparian and instream habitat quality and diversity to optimise fish breeding and survival.

F3 Barriers to fish migration and research

Numerous barriers to fish migration have been removed in recent years, but a number still remain and require attention. Efforts have been made to mitigate against the impact of these barriers by stocking hatchery-reared fish above them, although more work is required to determine the most appropriate strategy for this fishery management tool.

Scientific research & monitoring is also essential to develop our knowledge of the in-river and coastal migration undertaken by Spey smolts and our understanding of invertebrates. Work has been undertaken to enhance our knowledge of water quality issues and check the health of the river by monitoring the young fish populations. This will highlight areas that need help, provide the scientific evidence we need to inform the Government's regulators and help protect the river from harmful developments. This will need to expand to include the impact of beavers, following their impending translocation into the Spey catchment.

OBJECTIVE F3

Further research impacts and implement effective practical river management strategies to ensure the conservation, protection and enhancement of Atlantic salmon and trout stocks.

F4 Sustainable angling

Recreational fishing has an aging demographic and there are real concerns about the declining number of people who participate in the sport, and thereby contribute financially to its management. Angling is also failing to attract new participants, particularly from younger generations and there is a continued scarcity of female participants in the sport. It is essential that there is improved awareness of the River Spey as a fishery resource amongst all age groups. Better marketing is required, alongside new approaches to attracting participants and improving accessibility. The long-term future of the industry must be secured through increased participation levels. Otherwise, without fishing, there will be no income from which to manage the fishery.

Promotion of all aspects of the River Spey fisheries needs to be further developed. The SFB's "Salmon Go To School" programme has been invaluable in generating awareness amongst children about the river, but there is considerable scope to expand this programme to one that also teaches children to fish. A number of local angling associations have begun to do this, but the programme needs to be expanded. The role of stocked trout loch facilities as an entry point to the sport for young people could also be enhanced, with scope for this sector to be integrated more closely with wild fisheries management.

OBJECTIVE F4

Develop sustainable fisheries, maximising the economic value of angling and its role as a valuable form of outdoor recreation.

DRAFT

FORESTRY AND WOODLAND

Expanding and enhancing the rich woodland resource in the catchment at all scales to provide multiple benefits.

FW1	Woodland expansion
FW2	Woodland habitats and biodiversity
FW3	Woodlands and flow management
FW4	Forestry management

Scotland's forests and woodland are a vital asset that offers a huge range of benefits for the economy, people and environment. They are dynamic ecosystems that alleviate flooding, stabilise the soil and provide a home for wildlife. The benefits of woodland for the water environment are well recognised and this relationship now has a bearing on approaches to woodland creation and management.

Floodplain and riparian woodland is part of the natural habitat structure of the low lying ground adjacent to watercourses and is important for fluvial processes as well as biodiversity. Connectivity of riparian woodland is important to form valuable habitat networks and corridors for movement of wildlife. It also benefits water quality, particularly as an efficient filtering mechanism for removing sediment and excess organic matter from runoff.

FW1 Woodland expansion

Today trees cover about 19% of Scotland, about half of the average for EU countries and less than one quarter of what once existed in Scotland. To increase cover to the Scottish Government's target of about 25% by 2050, an additional 650,000ha of new woodland will need to be created, equating to a sustained annual planting target of around 15,000ha rising to 18,000ha per year by 2024/5. This will be composed of native woodlands, mixed woodlands, softwood forests and energy forests.

Within the Spey catchment, there are multiple opportunities to contribute to this expansion policy, particularly in the upper catchment, and this could bring significant benefits to the water environment too. Drivers for woodland expansion include helping to mitigate greenhouse gas emissions through atmospheric carbon sequestration, adapting to and mitigating the effects of climate change, restoring lost habitats and delivering ecosystem services, alongside economic factors such as timber production and carbon credits. Work is needed to promote and deliver woodland creation and expansion, particularly in CNPA target areas and at locations where multiple benefits result.

OBJECTIVE FW1

Deliver appropriate expansion of riparian and catchment woodland whilst contributing towards the objectives of integrated catchment management.

FW2 Woodland habitats and biodiversity

The last 50 years has seen changes in woodland management whereby conifer plantations near watercourses have been cleared, and it is now established practice to plant broadleaved trees within the riparian zone. Native riparian woodlands play a crucial role in helping to maintain the health and productivity of rivers and burns. Fish benefit through reduced siltation of spawning grounds, more cover from predators and increased supply of invertebrates and leaf litter for food. Tree cover also helps reduce thermal stress to freshwater life by the cooling effect of its canopy shade, and can enhance and diversify river channel and bankside morphology through tree rooting and dead wood inputs, providing a wider range of habitats. In the past it was standard practice to remove all dead or fallen wood from many watercourses, but current practice now suggests that fallen wood is left in place unless it is causing a hazard or is detrimental to river functioning. Indeed many

restoration projects involve installing Large Woody Structures to mimic natural dead wood where it is absent.

In some cases continued active management of riparian woodland is needed to realise the maximum benefits for the species it supports. Some riparian woodlands are within designated areas and woodland managers need to work with NatureScot and other partners to maintain and improve their condition.

The Spey catchment within the Cairngorms National Park has been selected for early trials of translocation of beavers, and careful assessment of the potential positive and negative impacts on riparian woodland, and requirements to mitigate any damage, will be essential to ensure the programme is well integrated with woodland objectives.

OBJECTIVE FW2

Improve and expand riparian habitat and biodiversity through appropriate woodland design and management, and improve woodland habitat connectivity.

FW3 Woodland and flow management

Forests and woodland have long been associated with an ability to reduce flood flows compared to other land uses. Studies have found rain infiltration rates to be up to 60 times higher within woodland compared to grazed pasture.

There are four main ways that woodland can help reduce flood flows:

- Greater water use by trees themselves reduces the volume of flood water downstream
- Higher infiltration rates of woodland soils reduces rapid surface runoff
- The greater hydraulic roughness of trees, shrubs and woody debris along stream sides acts as a drag on flood waters, slowing down flood flows
- By reducing soil erosion and interrupting the delivery of sediment (via runoff) into watercourses, the water carrying capacity of river channels is maintained, reducing the need for dredging

A number of sub-catchments on the upper Spey have now been planted to varying degrees (the Raitts burn catchment, River Calder and catchments within the Cairngorms Connect area are examples), and the remaining tributaries will be assessed for opportunities for similar riparian woodland expansion for flow control and other benefits.

OBJECTIVE FW3

Expand and enhance riparian, floodplain and wider catchment woodland to reduce run off rates and sediment input and aid bank stabilisation.

FW4 Forestry Management

Forest management has profound effects on rivers and lochs. Good management enhances wildlife, contributes to water flow control over land and doesn't impact on water quality. Poor management can lead to flooding, increased soil and stream erosion and greater sedimentation. Increasingly forest operations are carried out in harmony with watercourse management through compliance with the Forestry and Water Guidelines. Good harvesting management can do much to minimise the adverse effects of operations on streams, for example by felling in phases and minimising disturbance to soil to avoid excessive diffuse pollution from increased surface water flows. The layout of planting, choice and location of species and timing of management operations can have a great influence on adjoining aquatic environments. The latter can be protected by establishing buffers of broadleaf trees alongside the water, keeping substantial areas open to sunlight, and encouraging thriving bankside vegetation, and this is now a requirement in Forest Plans.

Extensive guidance and financial support from Scottish Forestry, the Woodland Trust and other sources is available to help manage forestry and woodland effectively.

OBJECTIVE FW4

Encourage and promote best environmental practice for forest management in order to protect and enhance water quality and biodiversity.

DRAFT

ECONOMIC DEVELOPMENT

Realising the potential benefits of the river system to local economic development.

ED1	Built development
ED2	Tourism
ED3	Natural capital and carbon

Within the catchment there is a need to enable economic growth through appropriate new development, and protect existing economic assets, by ensuring sustainable water abstraction, maintaining water quality and protecting assets from flooding. Catchment partners have a crucial role to play in regulating and advising on all aspects of economic development to avoid negative impacts and embed positive elements in any new developments. A good example is requiring mitigation or compensation for habitat loss through the Planning process.

ED1 Built development

There continues to be a need for new housing throughout the catchment as set out in Local Development Plans. Managing the impacts on the river and maintaining sufficient water supply and wastewater capacity are key elements to enabling future growth to happen in the right places. As housing, industry and tourism grow, so the pressure on water quality increases and the demand for improved infrastructure, including water supply and sewage treatment, grows.

Major projects underway and in planning include housing expansion in several communities including Aviemore and Carrbridge and the dualling of the A9 and A96. Both these roads run alongside or cut across significant sections of the River Spey and their upgrades have the potential to impact on river and wetland habitats during construction and beyond.

There has been continued substantial growth within the Spey whisky industry. At present 53 distilleries are operating in the catchment and over 50% of all Scotch whisky is now produced on Speyside, providing considerable local employment.

OBJECTIVE ED1

Balance economic growth with appropriate environmental protection and mitigation measures.

ED2 Tourism

Tourism is the biggest contributor to the catchment's economy, bringing an estimated 1.9 million visitors to the area every year within the Cairngorms National Park alone. It accounts for nearly 43% of all employment. The water environment forms a vital part of the area's attraction, from its world class status as an angling destination to its outstanding natural beauty. Loch Morlich in Glenmore has seen record visitor numbers in recent years and has one of only three inland beaches in Scotland designated as a bathing water by SEPA. Multiple opportunities exist to capitalize further on the tourism contribution that the river network can make to local economies, whilst taking every opportunity to promote responsible and informed visits. The rapidly growing sectors of eco-tourism and adventure activities are ideal targets for co-ordinated development of sustainable tourism.

Following the significant upgrade works that have been undertaken to extend the Speyside way the focus should now be to realise the business opportunities associated with this official Long Distance walk, by enhancing visitor experience, developing additional facilities and marketing the route itself. As use of the river and water margins intensifies, there is a requirement to manage the associated impacts, and landowners alongside organisations

such as community tourism associations, VisitScotland, CNPA, the Cairngorms Business Partnership and regulatory authorities need to work together to achieve that aim.

OBJECTIVE ED2

Realise the tourism potential of the River Spey whilst protecting the natural environment on which it depends. .

ED3 Natural capital and carbon

Over the last decade the drivers for land use change and land management choices have changed significantly and with increasing pace. With the broad acceptance of the climate and biodiversity crises now upon us reflected in public policy, the private sector is also ever more aware of the financial opportunities now available in the form of non traditional income streams. The best developed of these is the carbon economy, and growing areas of land are now being managed partly or wholly to generate income from carbon credits payable for woodland creation schemes and peatland restoration. In many cases these land use changes will be beneficial to the health of the water environment, increasing the area of land which will drain more slowly, be more resilient to climate change impacts and potentially mitigate their effects. However, the benefits need to be balanced against concerns about (often unintentional) effects of larger carbon-driven land management changes on the local economy and communities. There is a need for careful and detailed planning and regulation to ensure habitat and biodiversity benefits to the catchment are maximised over the long term. For example, adherence to the Woodland Carbon Code is required, and on-going monitoring of peatland restoration will be needed to refine techniques.

During the span of this CMP the commercial landscape for the monetisation of nature restoration for Nature-based Solutions, carbon capture and biodiversity will develop. Given that most commercial decisions are financially driven, a better understanding of the natural capital value of the water in various parts of the catchment is required. This will inform decision making and the trade-offs between the multiple demands on the river system.

The development of this sector will enable a diversity of funding options and, it is hoped, delivery of significant privately funded projects that will contribute to the wide objectives of the CMP.

OBJECTIVE ED3

Support and facilitate use of emerging carbon and natural capital finance where it can provide opportunities for catchment management interventions with multiple benefits.

COMMUNITIES, EDUCATION AND ENGAGEMENT

Connecting communities with their river environment.

C1	Flood and drought preparedness
C2	Access and recreation
C3	Knowledge, awareness and skills
C4	Cultural heritage

For the communities along the river banks of the Spey catchment, the river environment can be many things, from a visual amenity and place of recreation to a provider of employment. It can also be the source of much concern, especially in times of heavy rain. At a time when public interest and knowledge of the environment is heightened, there is an opportunity to highlight the issues associated with the river environment and the contribution that communities can make to its enhancement and sustainability.

C1 Flood and drought preparedness

There is much that can be done by organisations, communities and individuals to protect themselves from flooding, from signing up to SEPA's Floodline early warning system and keeping up to date with the enhanced Scottish Flood Forecast, to having self-help home protection measures ready should the worst occur.

Community Flood Action Groups can be an important mechanism to facilitate community resilience. They provide a forum where specific concerns can be raised, local knowledge pooled and proactive solutions sought. There has been interest in community-led flood awareness in Newtonmore, Kingussie and Nethy Bridge, often as part of community emergency planning, and support should be given to replicate this approach elsewhere. The latest Findhorn, Nairn and Speyside Local Flood Risk Management Plan includes community resilience as a priority, especially within PVAs.

The effects of climate change on water supply as well as flooding are becoming more of a concern, exacerbated by ever increasing demand. There is a growing need for communities and individuals to be aware of water scarcity and prepared to play their part in conserving water at times of drought and low flows. Key organisations such as Scottish Water provide advice for householders on how to save water.

OBJECTIVE C1

Increase community resilience to the effects of flood and drought conditions.

C2 Access and recreation

The Land Reform (Scotland) Act 2003 provides for a general right of responsible access to land and inland waters throughout the country. With access comes responsibility, and "leave no trace" applies equally well to the river environment as to the hills. The Scottish Outdoor Access Code (2005) provides detailed guidance on these responsibilities and is based on three key principles, namely to respect the interests of other people, care for the environment and take responsibility for your own actions.

Recent years have seen a huge increase in water-based leisure and recreation activities with paddle boarding and wild swimming joining more traditional activities such as angling and canoeing. Opportunities to actively enjoy the scenery, wildlife and other special qualities of the rivers and lochs of the catchment can be instrumental in instilling a sense of value and stewardship.

Demand for low-level walking routes continues to grow, and development of the national Core Paths Network contributes to meeting this need. The Speyside Way, first opened in 1981, has been extended over the years and now runs from Spey Bay to Newtonmore. More now needs to be made of the opportunities associated with this iconic route. Additionally, many local path networks including some that run along watercourses have been upgraded or extended in recent years, and new ones created. Initiatives such as the Health Walks programme and Paths for All support access to riverside walking routes, especially for less active sections of society, and opportunities need to be taken to encourage use of the catchment for responsible, active public enjoyment.

OBJECTIVE C2

Promote responsible access on and beside rivers and lochs, with a focus on enhancing the experience and linking recreation to understanding and valuing the special qualities of the catchment.

C3 Knowledge, awareness and skills

Knowledge and understanding of the natural river environment within the general population is vital if appropriate stewardship and decision making is to happen. It is recognised that when individuals connect with their surroundings, they are more likely to take care of them. In terms of closer engagement, there is no substitute for people getting out beside or on the river. Online resources and social media channels play an important role in making all aspects of the catchment more accessible and promoting what it has to offer at a global scale.

The education sector increasingly incorporates environmental education both formally and informally where resources allow. Over the years primary schools have been engaged through schemes including the Spey Fishery Board's hugely successful Salmon in the Classroom programme, rolled out to at least three schools each year. There is also now improved potential to engage with older pupils via the Curriculum for Excellence and work and volunteering experience programmes. Higher education projects and placements, internships and work experience opportunities are invaluable for those aspiring to careers in all aspects of catchment management, and are critical in helping to attract skilled workers into this growing employment sector.

Many rural communities depend on employment provided through the land management sector for their sustainability. An increasingly wide range of specific skills are required to deliver effective catchment management ranging from fisheries management to construction work, and there is considerable overlap with other environmental programmes such as woodland expansion and peatland restoration. In response, skills and expertise have developed significantly, and in recognition of the importance of supporting the local economy, skills gaps need to be identified and appropriate training supported for local businesses and organisations to ensure they remain competitive.

Volunteering provides a way for communities in the catchment to engage in a hands-on role, learn new skills and improving understanding of the water environment. Groups and individuals from primary school children to local residents and national park volunteer rangers have been involved in practical management tasks such as tree planting and woodland maintenance. INNS control has relied on volunteers working with the Scottish Invasive Species Initiative, many of whom have gained qualifications, for example in herbicide use. Interest groups can play an important role in monitoring wildlife on the river and evaluating the success of interventions by recording changes using methods such as vegetation and bird surveys. Monitoring and data gathering can be time consuming and difficult to fund, and citizen science is a valuable tool to fill this growing requirement whilst building skills, engagement and experience amongst volunteers.

OBJECTIVE C3

Increase knowledge and understanding of the natural river environment, support specialist career opportunities in all aspects of catchment management, and increase volunteer participation.

C4 Cultural heritage

The historic and cultural value of the River Spey and its catchment is often overlooked. However there are significant chapters in local history that have helped shape today's communities and influenced the course of history at a national scale and beyond. Music, song, stories and language contribute hugely to the cultural heritage of the area and much can be learnt of its history from them. A number of tourism providers are now offering guided activities which highlight the stories and characters of the Spey, and there is scope for much more recording and celebration of the cultural significance of the River Spey, both for the benefit of its communities but also to enhance visitor experience.

OBJECTIVE C4

Promote and support research, recording and celebration of the history and culture of the River Spey.

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