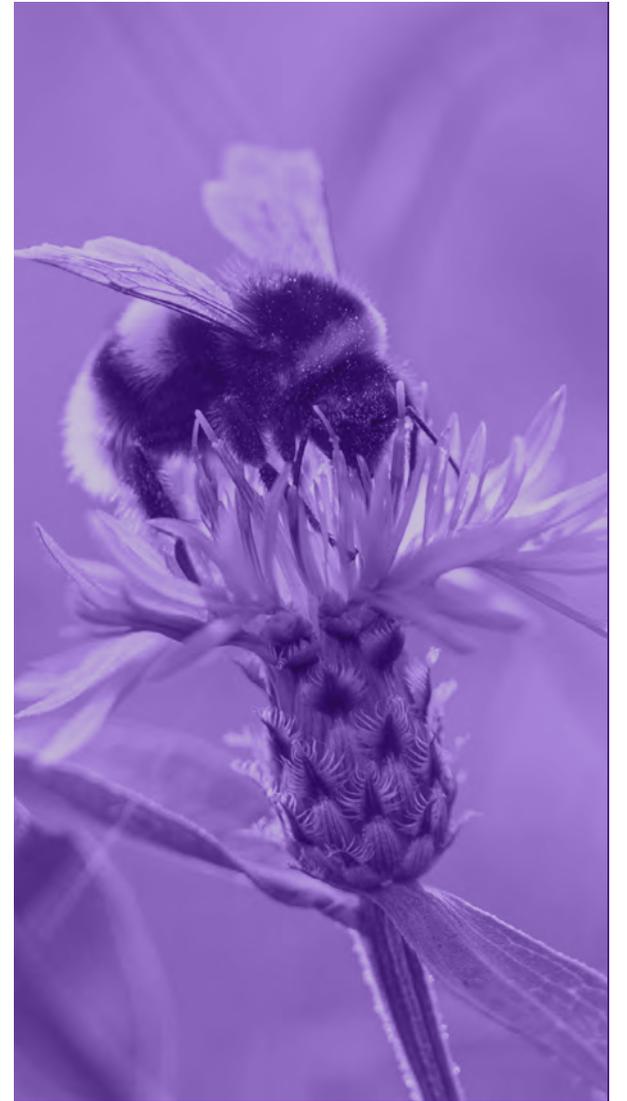




**Scottish  
Water**  
Trusted to serve Scotland

# SCOTTISH WATER BIODIVERSITY REPORT 2023 TACKLING THE NATURE EMERGENCY



# CHIEF EXECUTIVE'S REPORT

## ALEX PLANT



We are pleased to present our triennial Biodiversity Report, published in line with our duty under the Wildlife and Natural Environment Act 2011.

Since our last Report in 2020, we have delivered a range of biodiversity gains across our landholdings. We have also significantly improved our understanding of the overall status of biodiversity, which helps us target where we can make further improvements, manage our land effectively, and track our progress in the coming years. This report sees for the first time the publication of our Natural Capital Accounts.

Our focus on biodiversity reflects the increasing role that the sustainable management of our landholdings has in the provision of our core water and waste water services, our journey to net zero and long-term climate resilience, and in playing our part in responding to the global nature emergency.

We rely on a good quality environment and healthy ecosystems to support the delivery of our services to customers and society. We benefit from nature's capacity to provide sufficient high-quality water resources, to recycle waste waters, and to absorb excess rainwater without flooding homes and properties.

As a public body in Scotland, we reflect the duty to “further the conservation of biodiversity” in the way we deliver our core services – managing water resources and recycling Scotland’s waste waters in ways that support good ecological status.

But we can do much more. Our reservoirs and landholdings are a significant part of Scotland’s natural capital, with the potential to make a very positive contribution to Scotland’s biodiversity and its enjoyment by people across Scotland as well as visitors to our country.

We welcome the publication of the Scottish Biodiversity Strategy to 2045 and will work with NatureScot and the Scottish Government to support the forthcoming Biodiversity Delivery Strategy.

The strategy’s observation that the Global Climate Emergency and the Nature Emergency are “twin reinforcing crises” is well made and we can achieve multiple benefits by investing in biodiversity on the land we own.

Our [Strategic Plan](#) responds to this by committing us to enhance our natural environment, use our land and assets to increase biodiversity, restore peatland and increase the amount of carbon captured on our estate through woodland creation. All of these activities can also help to improve

water quality and make our catchments more resilient to climate change – investing in nature is core to our [net zero commitment](#).

We also have a role in providing safe access for the public to enjoy the nature and landholdings we own. Enhancing biodiversity can help create healthy places for all of us to live, work and play. To maximise the potential in these areas, we will work in partnership with other organisations and we commit to supporting Scotland’s ambitious Biodiversity Strategy.

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**Alex Plant**  
Chief Executive, Scottish Water





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# INTRODUCTION

Scottish Water's purpose is to Support a Flourishing Scotland. We set three strategic outcomes in our 2021-27 Strategic Plan:



Service excellence – adapting to a changing climate, dealing with our ageing assets and meeting our customers' evolving expectations.



Beyond net zero emissions – showing leadership in mitigating climate change and enhancing Scotland's natural environment.



Great value and financial sustainability – customers will receive great value, now and in the future, and we will be financially sustainable.





We look to deliver biodiversity gain through our day to day operations and annual investment programme as our contribution to addressing the nature emergency. Since our last report we have signed the Edinburgh Declaration for biodiversity.

With over 2,000 water and waste water treatment works, thousands of pumping stations and over 100,000km of water and waste water pipes across the country we interact with the environment every day through the land we manage around our catchments, the water we abstract from the environment and the waste water we treat and recycle to the environment.

We work to protect biodiversity and the wider environment by complying with our environmental permissions around the management of water resources and meeting discharge standards. Abstractions from and discharges to the water environment are regulated by the Scottish Environment Protection Agency (SEPA), responsible for environmental protection and improvement.

We own around 23,000 hectares of land distributed across Scotland, the majority of which is associated with our water

catchments. The focus for our land management is ensuring it supports our core services – providing sufficient good quality water to produce and supply drinking water to customers.

More widely, landscapes can provide other benefits: holding water and slowing flows to support flood alleviation, supporting the rural economy, hosting energy generation and providing access and recreation for people to enjoy our landscapes.

For day-to-day management most of our land is let to tenants for a variety of purposes, including arable farming, grazing land, windfarms and forestry. We consider the effect on natural capital as well as monetary value and aim to find the best value solution when balancing agriculture, energy, biodiversity, and other interests.

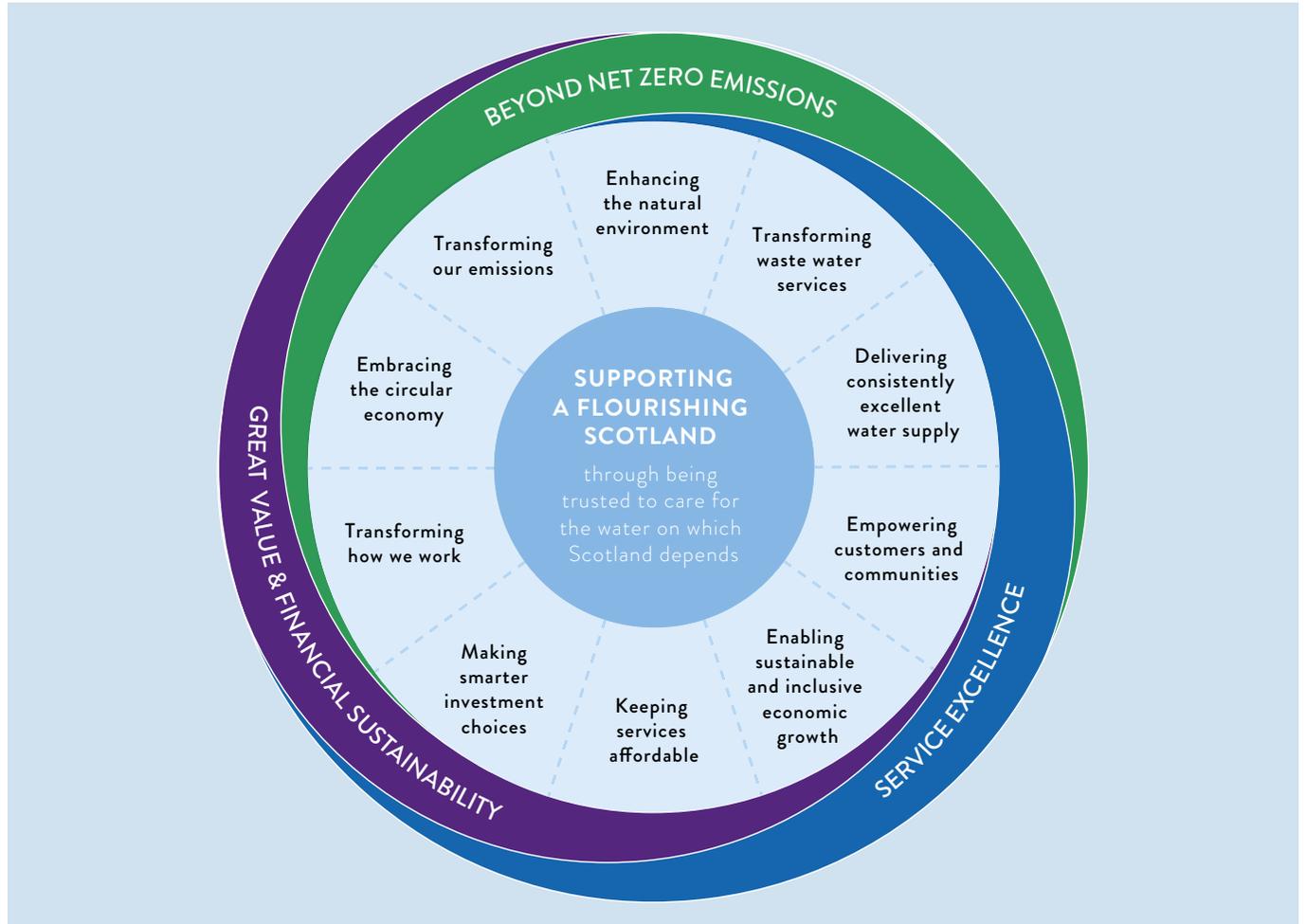
We look after around 300 of Scotland's lochs and reservoirs, with many of them being sources of drinking water. While that is an essential part of their role, they are also stunning natural spaces that we welcome you to visit and enjoy, bearing in mind [reservoir safety](#) and being a [responsible visitor](#).

Our Strategic Plan states:

“ Scottish Water’s reservoirs and other landholdings are a significant resource and part of Scotland’s ‘natural capital’. We will manage them in a way that increases the contribution they can make to our natural and social capital. ”

Our Strategic Plan states:

“ We will seek out opportunities to enhance the natural environment, reducing the water we take from the natural environment and using our land and assets to increase biodiversity, planting trees, restoring peatlands and creating better places to live. ”





Every day, we contribute to the overall good ecological status of water bodies through our core service delivery – stewarding water resources and safely recycling waste water to the environment.

This biodiversity report focuses on additional actions we have taken to enhance biodiversity on our landholdings and beyond, aligning with the three core aims of the [Scottish Biodiversity Strategy](#), namely:



By 2045, Scotland will have restored and regenerated biodiversity across our land, freshwater and seas.



Our natural environment, our habitats, ecosystems and species, will be diverse, thriving, resilient and adapting to climate change.



Regenerated biodiversity will drive a sustainable economy and support thriving communities, and people will play their part in the stewardship of nature for future generations.

### How we are progressing delivery of the six outcomes of the strategy:

- Accelerate restoration and regeneration
- Protect nature on land and at sea, across and beyond protected areas
- Embed nature-friendly farming, fishing and forestry
- Recover and protect vulnerable and important species
- Invest in Nature
- Take action on the indirect drivers of biodiversity loss

# ACCELERATE RESTORATION AND REGENERATION

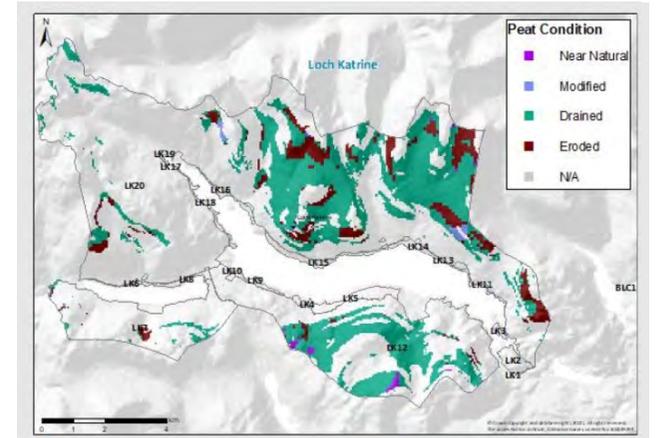
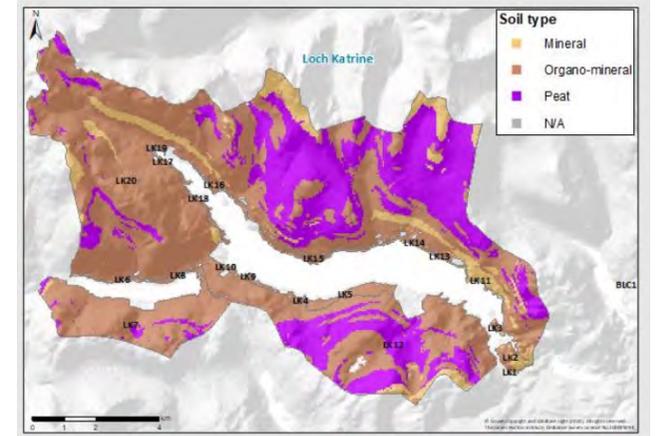
We are working across our different land types and at different scales to deliver improvements. We are aiming to accelerate the delivery of restoration and regeneration as we recognise the work will deliver multiple benefits for not only biodiversity but also carbon and water quality.

## LANDSCAPE SCALE IMPROVEMENT - LOCH KATRINE LAND MANAGEMENT PLAN

At almost 9,600 hectares, Loch Katrine is our single largest landholding and an important asset in achieving our net zero commitment. It accounts for 45% of our total biodiversity units. Located at the heart of the Loch Lomond and Trossachs National Park, the estate is partly located within two National Scenic Areas and contains most of a Site of Special Scientific Interest and Special Area of Conservation. The estate is a significant tourist/recreation destination as well as an important drinking water source for Greater Glasgow.

Our natural capital and biodiversity assessment of the estate shows a diverse landscape with several important habitat types across the catchment.

The carbon assessment indicates that the site is capturing carbon in woodland areas, but expected to be losing significant amounts of carbon from peatland that is classed as drained or actively eroding across large areas.



Our land at Loch Katrine is under a long-term lease to Forestry and Land Scotland (FLS) and we have worked with them to develop a ten-year Land Management Plan (LMP) for the site. Over the last three years, this has been subject to local events and public consultation.

The draft plan, which can be viewed here: [Loch Katrine Land Management Plan](#) includes views gathered from a range of different stakeholders, most particularly from local communities. It will see significant changes and restoration of a natural landscape.

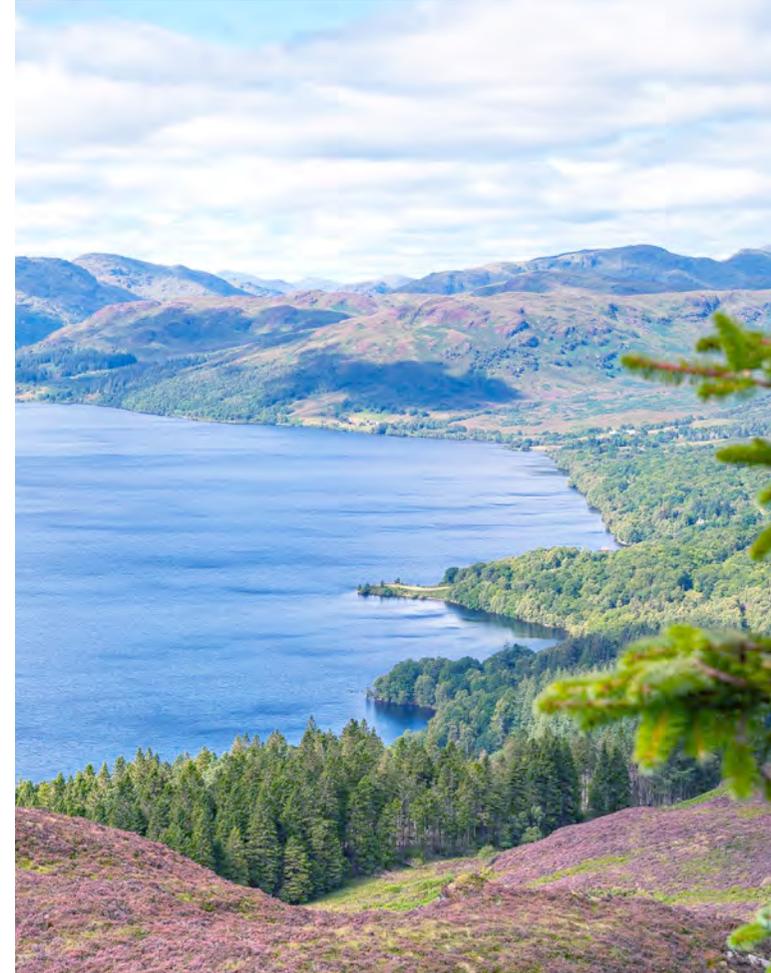
#### The project is expected to deliver:

- Over 4,600 hectares of new native woodland, mostly developed through natural regeneration of the landscape.
- 400 hectares of peatland restoration to near natural condition.
- Up to 1 million tonnes of carbon capture over the next 60 years.
- 40% increase in the biodiversity units on the site.
- Improved access and recreation opportunities through the creation of new access tracks and pathways that link with others in the Loch Lomond and Trossachs National Park area.

The plan is currently with Scottish Forestry for approval and will be delivered by 2032. We will report progress as the project is delivered in the coming years.

#### The key elements included within the plan are:

- Protecting water quality – as a catchment vital for the drinking water supply of Glasgow, we need to ensure that water quality is protected and the landscape resilient to future climate change.
- Expanding native woodland – much of the catchment is heavily browsed by herbivores such as deer and there is significant scope to increase native woodland cover and contribute to an expansion of the Great Trossachs Forest.
- Peatland restoration and protection (being progressed in parallel with the land management plan) will support biodiversity, carbon capture and longer-term water quality.
- Invasive species removal – rhododendron and other invasive species exist across the area. Their removal will significantly improve the biodiversity status of the catchment.
- Restoring plantations on ancient woodland sites (paws) – areas of the catchment were planted with commercial sitka and other species a number of years ago. Removal and replacement with native woodland will significantly improve biodiversity status.





## WATER QUALITY, BIODIVERSITY AND CARBON GAIN THROUGH PEATLAND RESTORATION

Through our natural capital and carbon baseline work, we have identified there may be circa 4,600 hectares of peatland across our landholdings, in varying, mostly poor conditions – modified, drained, or actively eroding. In recognition of risks to drinking water quality from dissolved organic carbon (DOC) in upland water sources, we work with landowners, NatureScot and others to improve peatland condition within drinking water catchments. Our peatland restoration programme began in 2017, and peatland restoration is now part of the drinking water protection scheme, which supports land managers to improve their practices beyond the regulatory minimum.

Badly eroded peatland emits large volumes of greenhouse gases, in addition to higher volumes of DOC. Peatland in near natural condition emits very little carbon, and pristine peatland can capture carbon. Therefore, the better the condition of the peatland, the less it contributes to global warming. We can improve the condition of our peatland through restoration activities such as re-profiling and re-vegetating, thereby significantly reducing emissions

from our landholdings. The first step towards this is to find the areas in need of restoration. The restoration work delivers biodiversity improvements by increasing the amount of vegetation on the land which increases insect and bird life.

Over the last three years (2021-2023) we have restored over 80 ha of peatland in drinking water catchments, both on our own land and working in partnership on third party land. We plan to restore all peatland on Scottish Water lands by 2027.

# PROTECT NATURE ON LAND AND AT SEA, ACROSS AND BEYOND PROTECTED AREAS

**We are working to improve the condition of protected areas on our land such as Sites of Special Scientific Interest (SSSI). We also have hundreds of small landholdings across Scotland at operational sites. Whilst these sites are small, they have a role to play in improving biodiversity within the sites but also in improving connectivity between adjacent habitats.**

## Protected Sites

Our landholdings and activities have the potential to host or impact sites that are protected for nature – such as Special Areas of Conservation (formerly European designations for species or habitats of global significance) and Sites of Special Scientific Interest (SSSI).

There are approximately 1,400 SSSIs in Scotland. A site could be designated to protect any number of features, from invertebrates to golden eagles. The majority are UK level SSSI, but some also have international protection (e.g. Special Areas of Conservation). Many designations cross land ownership boundaries, meaning that a single organisation may not be able to improve the overall status of the SSSI.

It is estimated that approximately 17% (3,688 ha) of our landholdings across 37 sites are designated as important for biodiversity protection; with around 5% (1,005 ha) internationally protected for biodiversity.

SSSI are periodically monitored by NatureScot to determine their condition, identify pressures, and put in place remedies. Sites may be classed as favourable or unfavourable based on the condition of the habitat and the species within it.

There are 37 SSSI where it has been identified that Scottish Water may have a role in maintaining or improving the status (e.g. from unfavourable to favourable), although they are designated across multiple landowners.

The latest condition monitoring of these 37 sites shows that:

- 80% of protected features across these sites are in favourable condition (compared with 76% for Scotland as a whole).
- Of those that are unfavourable, over two thirds have no onsite remedy that can help.
- ‘No onsite remedy’ means there are no direct pressures within the protected area or nearby, yet the feature remains unfavourable because of factors outwith local management control. For example, changes in the distribution and abundance of food sources elsewhere due to climate change or interactions with fisheries.
- In many cases the habitats meet the requirements of the species features they support and can therefore be considered favourable, aligning with UK Biodiversity Action Plan reporting.
- Once this is accounted for, the proportion of features in favourable condition on land Scottish Water owns or impacts rises to 96% (84% nationally).

## Improving SSSI and Designated sites

Where there are opportunities for Scottish Water to improve a site from unfavourable to favourable, we have been taking action.



## BIODIVERSITY GAIN ON OPERATIONAL SITES

Over the last two years we have undertaken field surveys at 21 sites to better understand existing biodiversity and the sorts of opportunities for improvement that exist within our treatment works sites. Most of our sites are small, and without the opportunities offered by the scale of Loch Katrine. But taken as a whole, our operational sites cover around 500 ha and are spread across the length and breadth of the country. Also, they do not exist in isolation, and taking account of adjacent landholdings has potential to improve connectivity within the landscape. We therefore have opportunities to enhance biodiversity at many sites across Scotland.

We are currently implementing biodiversity improvements at several pilot sites, which has included planting of new native hedgerows along site boundaries, small scale native tree planting, installation of bird and bat boxes, removal of invasive non-native species (INNS) and reseeded of species-poor amenity grassland areas with species-rich native grass and wildflower mixes.

While we envisage bespoke biodiversity projects to continue at a small number of sites, we now have the intelligence to 'mainstream' biodiversity activities at many sites through changes in our operational maintenance and in our capital investment programme. For example, rather than regular uniform mowing of all grassland, most sites will have areas that can be left to grow longer and mown rotationally to create more variety in sward heights, which improves their value for invertebrates. Following engineering works as part of a capital investment project, there is often landscaping work as part of the reinstatement that offers opportunities for biodiversity improvements. We are developing guidance on standard products for biodiversity to enable capital projects to add value.

# EMBED NATURE-FRIENDLY FARMING, FISHING AND FORESTRY FARMING AND FORESTRY

**In looking to improve biodiversity and carbon capture on our land, we recognise that we need to work with our tenant farmers and local communities to ensure that what we do does not hamper farming activities and is supported by the local community.**

## BIODIVERSITY AND CARBON GAIN THROUGH WOODLAND CREATION

Our woodland creation programme delivers two benefits - it increases the carbon we capture and is also a great opportunity to improve biodiversity on our landholdings.

Most of our land is under agricultural lets. It is important to us to work with our tenants and lessees to support the rural economy, and we seek to develop our woodland creation programme in a way that respects tenants and delivers multiple beneficial outcomes.

We have screened the vast majority of our landholdings for their suitability for woodland creation. Some were too small, and some were unsuitable for operational reasons. A number of our larger landholdings host wind farms, which preclude tree planting due to interference with wind flow patterns.

Where we find a location with potential for woodland creation, we develop a planting scheme that is suitable for the local landscape and habitats. Open ground is always factored into our plans and is informed by habitat, bird and archaeological surveys, ensuring we don't benefit woodland species to the detriment of existing species that require other habitats, as well as respecting local history and the requirements of our tenants for farming.

We also engage local communities to build in their requests such as for footpaths or to include a wetland area to encourage particular local species.



**We have planted some small pilot sites to test and improve our woodland delivery process. Within this we trialled different models, such as:**



Small patches of trees within the grounds of treatment works.



Whole fields of woodland adjacent to treatment works.



A field of 'woodland pasture', planted at much lower density, to allow the farmer to continue their activities on site.

We also planted a mid-sized site at Middle Coul in the Angus glens. We are now starting to develop plans for some of our larger woodland sites.





## RECOVER AND PROTECT VULNERABLE AND IMPORTANT SPECIES

**In delivering our core water and waste water services, and in the way we manage our landholdings we can take steps that help vulnerable and protected species to thrive in Scotland.**

### SPECIES INTRODUCTION-BEAVERS

Scottish Water supports the Scottish Government policy that intends to help establish beavers in Scotland. We were involved in developing the Centre of Expertise for Waters (CREW) report 'Establishing the potential influence of beaver activity on the functioning of rivers and streams and water resource management in Scotland'. We worked on the steering group of NatureScot's National Beaver Strategy, we are members of the Beaver Advisory Group in Scotland, and we have contributed information and advice to local translocation projects.

We do not own sufficient land to independently seek a licence to translocate beavers. A key challenge is to engage with tenants and neighbouring landowners to build consensus over the approach, and to work in partnership.

Given the likely increase in beaver distribution we will see in the coming years, their presence is to be expected throughout the catchments we work in. Our teams will work around them whilst carrying out our investment programme, as we do for all other protected species.

## INVEST IN NATURE

Our management approach for ‘Enhancing Biodiversity and Natural Capital’ sets out our policy to allow us to promote investment in this area. It covers our approach to understanding our baseline position, continual monitoring and reporting, and increasing biodiversity and natural capital on our landholdings.

Our annual investment programme presents many opportunities to deliver biodiversity gain as a project is delivered. The earlier example of the flower meadow at Daldowie waste water treatment works is an example of this. In scoping projects we are also looking to adopt, where we can, Nature-Based solutions (NBS).

NBS use nature to help tackle environmental and social challenges, providing benefits to people and nature. They help us to mitigate and adapt to climate change and conserve biodiversity. In the water industry context, NBS can do this through improved water security and quality, and reduced flood risk. Peatland restoration is an example of an NBS.

Our strategy for surface water management also incorporates NBS. To address the increased risk of flooding as a result of climate change, we are working with Local Authorities across the country to deliver our Stormwater Strategy that looks

to remove surface water from the sewer and manage it on the surface. To deliver this, we are deploying what is termed “blue- green infrastructure” in urban environments. As well as addressing flood risk – “the blue”, nature – “the green” is a key part of the design. Careful selection of plants ensures that the features promote biodiversity.

We have also trialled the installation of raingardens at some of our properties. These disconnect surface water from the sewer network, reducing the risks of sewer flooding and spills to the environment. They also increase biodiversity by providing plants in areas of hardstanding.

We have also been improving the way stormwater is managed at a household level. For example, we have been working with customers in the Dalbeattie area to install rain garden planters and water butts on the down pipes of their houses. This will reduce the volume of rainwater flowing to sewers from roofs during the peak of storm events, reducing the risk of sewer flooding.





## CONNECTING PEOPLE AND NATURE

We welcome and encourage people to visit and enjoy Scotland's landscape and nature on our land- we recognise the health and wellbeing benefits of spending time by water and in nature.

In the past we have co-funded rangers in the Pentland Hills, Edinburgh and Lomond Hills, Fife. Recognising the growing number of visitors wishing to use our water and land assets, we began our Enabling Responsible Access pilot study. The evidence-gathering and consultative phase recommended trialling a 'boots on the ground' presence at our more challenging visitor hotspots, to help address anti-social behaviour and provide a welcoming human interface between visitors and the reservoir. As a result, we created seasonal posts for visitor rangers, covering Gladhouse, Carron Valley and Milngavie Reservoirs.

The initiative was made possible through Service Level Agreements between Scottish Water, NatureScot and our partner organisations – East Dunbartonshire Council, Forestry and Land Scotland, and Midlothian Council – who provided significant commitment and assistance.

Our rangers are initially shadowing experienced rangers to learn the skills. This new ranger team offers an integrated site management approach with regard to nature, recreation, education, operations and data recording.

Speaking to people whilst patrolling their patch is the mainstay of a ranger's job. Their branded clothing makes them identifiable points of contact on site. Being able to engage with our visitors face-to-face allows us to share knowledge of the site, ensure visitors are informed about water safety and appropriate behaviour around the lighting of campfires and use of disposable barbecues, helping people get the best experience from rural locations<sup>1</sup>. Please have a chat if you see one.

Although our rangers' primary function is to provide a welcoming presence on site, their work also has a positive impact on biodiversity. They enjoy sharing their love of the natural world and hearing about the wildlife that visitors have spotted in the area. Feedback on visitors' experience of our sites is also welcome.

<sup>1</sup>Based on Scottish Outdoor Access Code guidance (SOAC)



**Between November 2022 and September 2023, the rangers interacted with over 6,000 visitors. Examples of how our rangers are contributing to the biodiversity across our sites includes:**

- Tree identification walk for a class of 9-year-olds (Gladhouse).
- Helping NatureScot with the pink-footed/greylag geese counting (Gladhouse).
- Contributing to the design and instalment of signage on South Island to prevent disturbance to breeding pair of Schedule1 raptor species (Osprey Monitoring at Gladhouse Reservoir).
- Being the first on the scene to record and report outbreaks of avian flu (Gladhouse and Carron Valley Reservoirs).
- Guided walk to contribute to Bird life International's Global Bird Count Day on 14th October (Gladhouse and Milngavie).
- Guided evening bat walks with a bat detector (Milngavie).
- The Big Butterfly Count 2023 with visitors (Milngavie).
- Keeping visitors SOAC compliant in regard to chopping down trees for firewood and reducing the risk of wildfires during our regular annual drought periods (all sites).

## TAKE ACTION ON THE INDIRECT DRIVERS OF BIODIVERSITY LOSS

Our individual actions can have an indirect negative impact on biodiversity. We are working to reduce the impact of plastic waste in the marine environment.

Scottish Water is working with the water industry and academic institutions across the UK and Europe, to more fully understand the sources of, impacts from and behaviours of microplastics in our water and waste water systems. This further research and development aims to reduce harm and deliver benefits for our customers and communities, the environment and biodiversity.

### Top Up Taps

We continue to expand our network of top up taps and now have over 100 delivering free, fresh water across Scotland. They are helping people stay hydrated on the move, save money and reduce single-use plastic.

Use of the taps has helped to prevent the equivalent of 7.5 million single-use plastic bottles so far. Locations have been chosen through collaboration and partnership with communities, interest groups and other organisations. In the last year taps have started flowing in areas as diverse as Mabie Forest, Loch Katrine, Drumnadrochit, Cathkin Braes and Edinburgh Meadows.





### Plastic Waste

The release of plastics to the marine environment has negative impacts on biodiversity. In February 2022, we launched our public awareness campaign 'Nature Calls' to raise awareness of the problems caused by inappropriate disposal of items into the waste water system. The campaign aims to reduce the 36,000 sewer blockages annually and to protect the environment. It calls on the public to "follow the 3 Ps rule and only flush Pee, Poo, and Toilet Paper down the toilet", "bin the wipes", and to support a ban on wipes containing plastic. The Nature Calls campaign has been promoted through TV, radio, social media and localised campaigns focusing on communities with a lot of blockages.

# NATURAL CAPITAL ACCOUNTS

Since our last Biodiversity report we have carried out work to understand the biodiversity and natural capital status of our landholdings. As well as setting a baseline the work has highlighted where we can deliver improvements. The following tables set out our natural capital accounts for the first time. Details on the methodologies used to develop the natural capital accounts can be found in the Appendix.

## LAND ASSET CLASSIFICATION

Scottish Water's landholdings are classified by type in accordance with UK Habitat Classification:

### Baseline of estimated natural capital assets by landcover type

Landcover Type	Classification	Hectares	Sub-total
Grassland	Acid grassland	498	9,334 ha
	Calcareous grassland	40	
	Neutral grassland	8,101	
	Modified grassland	71	
	Bracken	624	
Heathland and scrub	Dense scrub	37	5,305 ha
	Dwarf shrub heath	5,268	
Hedgerows and trees outside of woodlands		105	105 ha
Woodlands	Lowland mixed deciduous woodland	28	2,753 ha
	Upland birchwood	340	
	Upland mixed ashwood	12	
	Upland oakwood	223	
	Wet woodland	173	
	Other broadleaved or mixed woodland	605	
	Native pine woodland	277	
	Other coniferous woodland	1,095	
Arable and horticulture		286	286 ha
Sparsely vegetated land	Sparsely vegetated land	263	303 ha
	Inland rock	35	
	Coastal sand dunes and shingle	5	
	Coastal saltmarsh, lagoons and beaches	0.2	
	Maritime cliffs	0.1	
Built-up areas and gardens		255	255 ha
Wetlands	Blanket bog	1,912	5,403 ha
	Other bog	2,288	
	Reedbeds	<0.1	
	Lowland fens	13	
	Purple moor grass and rush pastures	158	
Surface water	Other wetlands	1,032	2,180 ha
	Large rivers and lakes, including reservoirs	2,180	
<b>Total area</b>			<b>25,924<sup>2</sup></b>

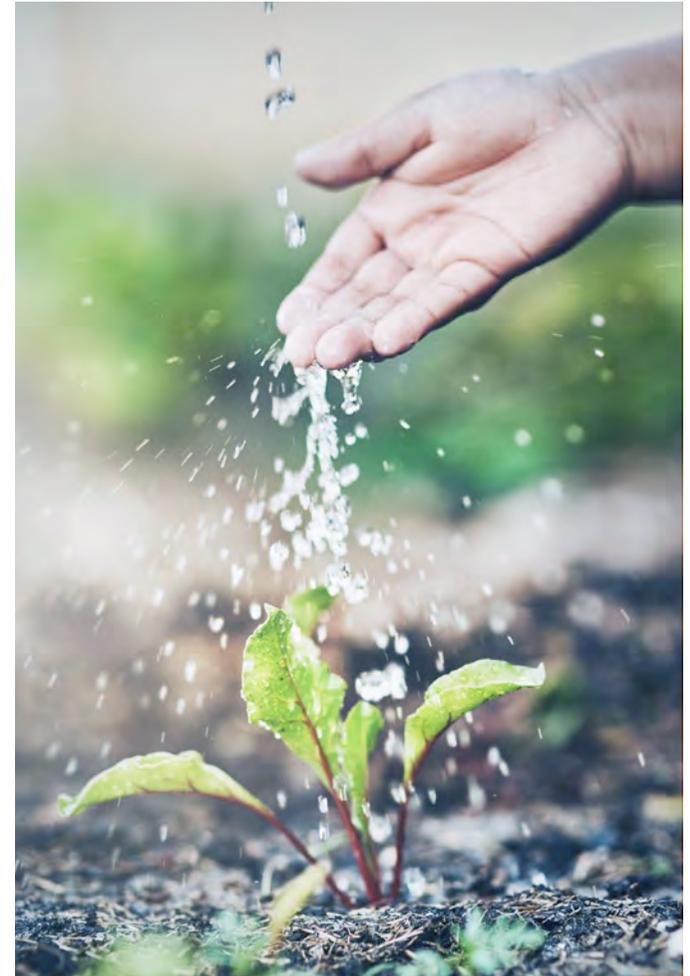
<sup>2</sup>The assessment includes water bodies under Scottish Water control (not just landholdings) but does not cover all land at small operational sites so is not a complete picture. We will look to address this at the next review.

# NATURAL CAPITAL ACCOUNTS

Our land can also be classified by soil type. Soil type is significant because it relates to the amount of carbon the soil can store long term.

## Baseline of estimated natural capital assets by soil type

Soils		Hectares	Sub-total
Mineral	Alluvial soils	560	<b>11,152 ha</b>
	Brown soils	2,112	
	Humus-iron podzols	5,199	
	Minerals gleys	2,467	
	Montane soils	814	
Organic	Peat	2,589	<b>2,589 ha</b>
Organo-mineral	Peaty gleys	4,842	<b>10,508 ha</b>
	Peaty podzols	5,666	
Urban	Urban/un-surveyed	107	<b>107 ha</b>
Water	Loch sediment	1,568	<b>1,568 ha</b>
<b>Total area</b>			<b>25,924 ha</b>

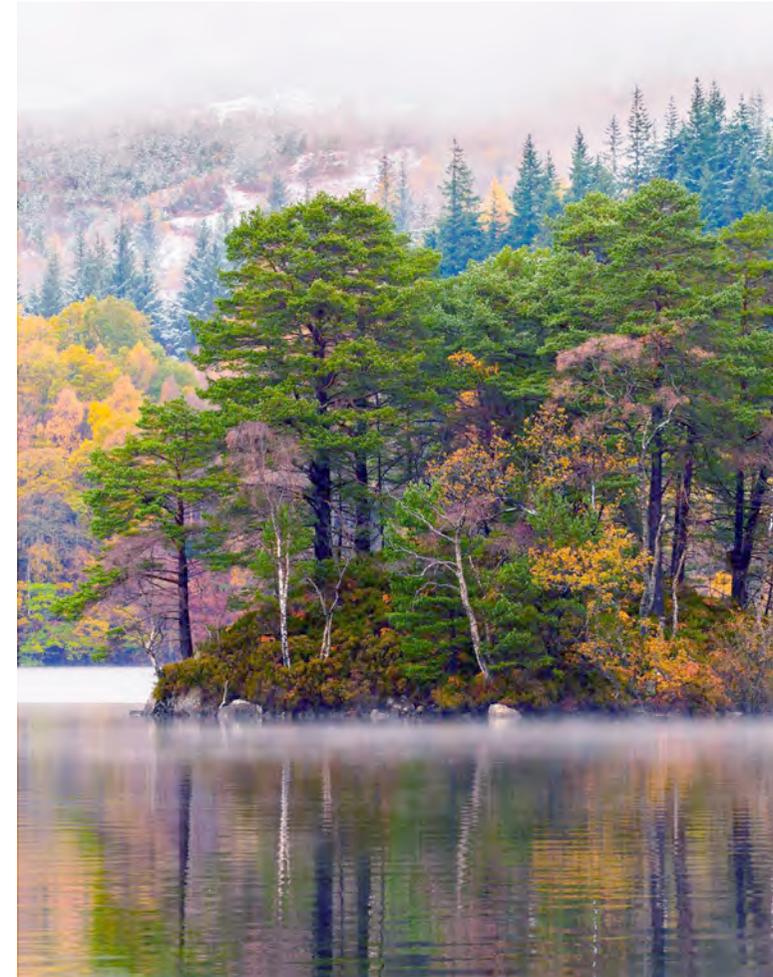


# NATURAL CAPITAL ACCOUNTS

Based on the land cover assessment, we estimate the following flows of benefits from Scottish Water landholdings to key elements of natural capital.

## Natural Capital Accounts: Total estimated ecosystem services

Ecosystem Service Flows		
Soil Erosion Prevention	4,789,486	tonnes soil loss avoided/year
Flood Risk Reduction	27,636,154	m <sup>3</sup> runoff avoided/year
Drinking Water Abstraction	3,898,656	ML/year
Recreation	231,300	number of visits/year
Important areas for supporting insect pollinators of crops	5,490	ha
Important biodiversity areas	3,721	ha



# KEY POINTS

## Soil Erosion

In their current condition our landholdings are assessed as preventing over 4.7 million tonnes of soil from being eroded, providing a valuable service to help reduce silting of watercourses, maintain nutrients on the land, and prevent additional release of GHG emissions to the atmosphere. We need to take action to ensure soil not eroded and ideally is increased over time.

## Flood risk reduction

In their current condition our landholdings are estimated to support the slowing of flows into watercourses and holding over 27 million cubic metres per annum, contributing to downstream flood risk reduction. We need to take action to maintain flood risk reduction impact and ideally increase it over time.

## Drinking water abstraction

Water sources we own are estimated to provide around 3.9 million megalitres per annum. This does not include water we abstract from non-Scottish Water owned sources such as rivers and lochs. We need to take action to safeguard drinking water sources and ideally reduce abstraction over time.

## Recreation

Using high level estimates from social media it is estimated that there are over 230,000 recreational visits to Scottish Water sites per annum. We recognise that this is an underestimate of visitors. We have installed counting devices at Milngavie and in the last twelve months over 100,000 visits have been made. We are building better data gathering systems and are investing in measures such as rangers to facilitate safe access to our sites. We need to take action to ensure a healthy balance between recreation and protecting drinking water and ideally engaging with more visitors over time.

## Pollination

Over 5,000 hectares of Scottish Water’s land is considered to have important habitat and vegetation that supports the pollination of agricultural crops. Through peatland restoration, woodland creation, and biodiversity measures, we hope to be able to increase this over time.

## Important Biodiversity Areas

Scottish Water has over 3,600 hectares of land designated as important for biodiversity (protected sites, SSSI etc.). We need to take action to safeguard these areas and ideally improve them over time.

We are also able to dimension the financial cost of managing our estates and the income streams that we receive from them.

## Natural Capital Accounts: Costs and income of Scottish Water estates

Financial position of Scottish Water estates 2022/23	£k
Cost of operating our estate *	1,154
Annual income from: **	
Tenancies and grazing agreement rental	
Forestry timber revenue	
3 <sup>rd</sup> party windfarm rents	
Income Total	6,232
<b>Net position</b>	<b>5,078</b>

\*This is the 2022/2023 costs of our Estates, Land and Sustainable Land Management Teams for activities on Scottish Water owned land.  
\*\* For commercial confidentiality, these incomes are presented as a total. Surplus from land management activities is used to deliver service improvements for customers.



## CARBON

We have assessed the carbon stock that is locked up within the vegetation and soils of our landholdings and the amount of carbon released or sequestered (removed from the atmosphere) annually.

### Baseline of total estimated carbon stocks

Total Carbon Storage	tCO <sub>2</sub> e
Carbon storage in woodlands and forests	366,803
Carbon storage in trees and vegetation outside of woodlands	135,601
Carbon storage in topsoil <sup>3</sup>	5,589,739
<b>Carbon storage in vegetation and soils</b>	<b>6,092,143</b>

### Baseline of total estimated annual carbon released to or removed from the atmosphere by our land

Annual Carbon Emissions (kt CO <sub>2</sub> e/year)	Area (ha)	Minimum net emissions	Maximum net emissions
Peatland	4,614	28	52
Woodland/Forestry	3,808	-54	-24
Grassland	5,898	-7.8	-4.7
Other landcover types	8,899	14	14.9
<b>Total</b>	<b>23,219</b>	<b>-19.8</b>	<b>38.2</b>

Carbon values are expressed as a range and will be improved in the coming years in accordance with the methods agreed with the James Hutton Institute (JHI). Negative values mean that carbon is being removed from the atmosphere, whilst positive values mean carbon is being released to the atmosphere.

The largest proportion of greenhouse gas emissions from our landholdings comes from peatland, which suggest that most of our peat is poor condition and in need of restoration, which underlines our focus in this area. The majority of carbon sequestration takes place in our woodlands and forestry.

The ranges reflect the need for more accurate data, and we have work underway to deliver this. We will also be exploring what opportunities there are to improve carbon capture on

<sup>3</sup>Calculated to one metre depth. The stock is likely to be significantly greater due to peat often being much greater than 1m in depth.

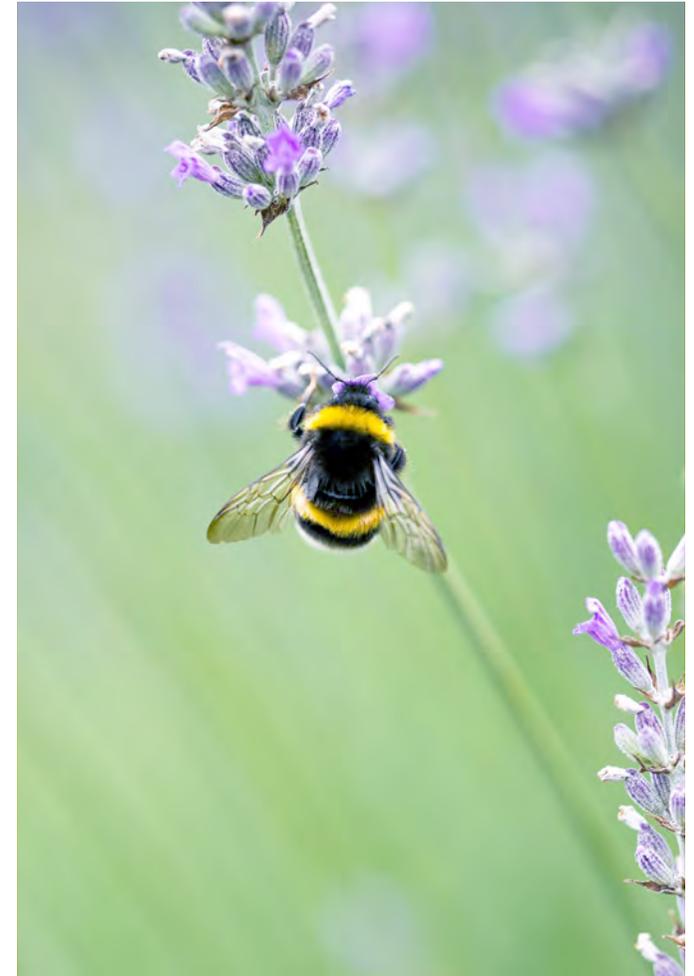
## BIODIVERSITY

We have assessed the biodiversity on our landholdings.

These tables form our first set of natural capital accounts. It is our intention to refresh these on a three-yearly basis and publish them as part of our biodiversity report, using 2023 as a baseline. This will allow us to see if we are making progress in delivering biodiversity gain and increasing natural capital.

### Baseline of estimated biodiversity across Scottish Water landholdings

Biodiversity metric	Possible score range	Average per ha	Description
Protected species - submetric	1 to 5	3.52	Medium to high
Distinctiveness - submetric	0 to 8	3.63	Low to moderate
Condition of SSSIs - submetric	1 to 3	2.44	Recovering to favourable
Nature connectivity - submetric	1 to 1.15	1.04	Low to medium
Water quality of lochs and lakes - submetric	1 to 5	2.55	Poor to moderate
<b>Total area (ha): 25,924</b>			
<b>Total biodiversity units: 375,739</b>			



# APPENDIX - ESTABLISHING OUR NATURAL CAPITAL ACCOUNTS

## BIODIVERSITY AND NATURAL CAPITAL STATUS OF OUR LANDHOLDINGS

Since our last Biodiversity report we have carried out work to understand the biodiversity and natural capital status of our landholdings. As well as setting a baseline the work has highlighted where we can deliver improvements.

In previous biodiversity reports we provided information on projects such as improving areas of peatland, developing nature-based solutions for drainage and removing invasive species from water bodies. Whilst these delivered benefit, we had limited information on the overall biodiversity and natural capital condition of our landholdings.

This limited our ability to understand where the priority areas (excluding the protected sites reported above) might be for further biodiversity action, and to track our progress in supporting the goals of Scotland's biodiversity strategy.

Given the scale and diversity of our land types and management practices, it has become important for us to understand the status of our landholdings and the 'ecosystem services'<sup>4</sup> they provide (benefits such as water, agriculture, biodiversity and amenity) – how our land

supports our services, society and nature, and where and how we can make improvements to the way it is managed to support outcomes such as water quality, climate resilience and biodiversity.

Our 23,000 hectares of land across Scotland range from large sites such as the 9,500 hectare Katrine Estate around Loch Katrine, the source of much of Glasgow's drinking water, to small patches of land around the hundreds of treatment works we operate across the country.

On our land we expect there will be major opportunities to deliver benefit, for example restoring the condition of eroded peatland or creating new woodland habitats, but there may also be simple measures we can take to encourage the improvement of the condition and value of biodiversity.

We commissioned a baseline assessment of natural capital and biodiversity on our landholdings from the natural capital consultancy Natural Capital Research Ltd (NCR). To focus our efforts and identify where and how we can support biodiversity, we developed a Biodiversity and Natural Capital Baseline of our landholdings<sup>5</sup> to understand:

- What we have – the land cover, use, habitat types and status of the biodiversity.
- Where and how we might seek to deliver improvements – where we can increase biodiversity or improve the quality of the environment for water and carbon.

<sup>4</sup>More information at [Ecosystem services - nature's benefits | NatureScot](#)

<sup>5</sup>Our natural capital baseline work was carried out across our main landholdings, mostly tenanted sites, reservoirs and larger treatment works sites.

## Natural Capital Assessment

Natural capital is the term used to describe those parts of the natural environment (species, habitats, communities, landscapes, soils, water, air) that provide essential ecosystem services, such as carbon sequestration and storage, waterflow regulation, soil erosion protection, pollination and important areas for biodiversity. These services, in turn, underpin key societal benefits including equable climates, flood risk reduction, clean water, clean air, physical and mental wellbeing and thriving wildlife.

The baseline assessment utilised national data (e.g. UK habitat maps, land cover and soil type databases) and satellite imagery to set out an inventory of Scottish Water’s natural capital and the services it is expected to provide. This has helped to build our understanding of the habitats we have and where we might make improvements to support a resilient natural ecosystem.

## Land Carbon Assessment

A key part of natural capital is the amount of carbon lost and gained from land each year. To use our landholdings to help support net zero, we need to show their ‘net’ position – the balance of carbon lost e.g. from eroding peatland, and carbon gained (sequestered) e.g. in woodlands. Our land has potential to be a net sink or a net source for carbon emissions.

Given the importance of this, we undertook extensive work with the JHI, Scotland’s leading soil science and agricultural

institute, to focus on the carbon status of our landholdings to understand how we can turn Scottish Water’s land into a net carbon sink to support net zero emissions.

JHI identified carbon losses and gains across our estate and reported the net position. They used publicly available datasets, satellite imagery and the latest models of soil and land cover type, together with emission or sequestration factors from established sources such as the Woodland Carbon Code and Peatland Code<sup>6</sup>, to apply to Scottish Water landholdings. This enabled a projected annual performance of our land in terms of expected losses or gains, as well as identifying priority habitats for improvement to support carbon and biodiversity.

## Biodiversity Assessment

Biodiversity is defined as the variability among living organisms, species, biological communities, and ecosystems. It is part of natural capital. It can be both an asset (stock) and a flow (service) of natural capital.

There is no established standard metric for biodiversity in Scotland so a key enabler for the biodiversity baseline work was the creation of a ‘biodiversity metric’ with support from NatureScot. This was based on Defra’s Biodiversity 3.0 adjusted to reflect important Scottish species and habitats, and to also reflect ‘connectivity’ – the link between biodiversity on a site with its surrounding habitats.



<sup>6</sup>[Woodland Carbon Code](#) and [Peatland Code](#)

## Biodiversity Metric – how It is compiled and used

A number of sub-metrics are used to build up the biodiversity units based around:

- Distinctiveness – this is based on the type of habitat present. Habitats that are scarce or declining typically score highly relative to habitats that are more common and widespread.
- Protected species – NCR identified a list of species from the Scottish Biodiversity List, which were modelled along with environmental factors to produce a prediction of the number of species suited to each location. (This is a model and not based on observed presence.)
- SSSI condition (where appropriate) – a simple 3-band structure based on scores taken from NatureScot’s national monitoring programme for the condition of SSSIs.
- Lakes and loch quality – based on the Water Framework Directive (WFD) Ecological Status, adjusted to remove Hydromorphology. As with WFD, the lowest score of the ecological status sub-metrics is used. A reservoir is, by necessity, a ‘highly modified water body’. Without removing the hydromorphology sub-metric, the overall ecology score would always be Poor or Bad, which would not reflect any future improvements or deterioration in the other sub-metrics.



**Schematic diagram  
of the enhanced  
biodiversity metric**

LAND-BASED ASSETS		DISTINCTIVENESS		PROTECTED SPECIES		SSSI CONDITION		NATURE CONNECTIVITY	
Area of habitat (ha)	X	Possible scores: 0 (Very Low) 2 (Low) 4 (Medium) 6 (High) 8 (Very High)	X	Possible scores: 1 (Very Low) 2 (Low) 3 (Medium) 4 (High) 5 (Very High)	X	Possible scores: 1 (Unfavourable) 2 (Recovering) 3 (Favourable)	X	Possible scores: 1 (Low) 2 (Medium) 3 (High)	
		A score based on the type of habitat present		A score based on the potential number of rare, threatened and vulnerable species in the habitat and location		A score based on the quality of the SSSI, where present		A score based on the proximity of the habitat patch to similar habitats	
WATER BODIES		DISTINCTIVENESS		LAKES & LOCHS QUALITY		SSSI CONDITION			
Area of habitat (ha)	X	Possible scores: 0 (Very Low) 2 (Low) 4 (Medium) 6 (High) 8 (Very High)	X	Possible scores: 1 (Bad) 2 (Poor) 4 (Moderate) 6 (Good) 8 (High)	X	Possible scores: 1 (Unfavourable) 2 (Recovering) 3 (Favourable)			
		A score based on the type of habitat present		A score based on the condition of lakes and lochs present		A score based on the quality of the SSSI, where present			

The score for each sub-metric is used as a multiplier. So, for example, a 5-hectare site might score as follows:

AREA OF HABITAT		DISTINCTIVENESS		PROTECTED SPECIES		SSSI CONDITION		NATURE CONNECTIVITY	
5 ha	X	6	X	3	X	2	X	1.15	
This example is a habitat patch of 5 ha of native pinewoods		Native pinewoods have a high distinctiveness		This example has a medium score for the potential number of rare, threatened and vulnerable species in that habitat and location		This area is protected as a SSSI, which is in recovering condition		This large area of contiguous woodland has a high connectivity score	
= 207 SW biodiversity units									

The metric can be applied at both the site and portfolio level across Scottish Water land. Scores for each of the sites were added together to give the Scottish Water total.

# IMPROVING OUR DATA AND METHODS

The top-down methods of inventory approach used to estimate the biodiversity, natural capital and carbon associated with our landholdings were well-researched and tested. We are confident that they are robust in their methodology. They can still be improved, and we are already working with both JHI and NCR to do that.

The results are only as good as the data we input. We are therefore undertaking a range of activities to improve our data. This will allow us to:

- Improve our next inventory.
- Better target improvement measures.
- More accurately forecast our net zero position.

## PEATLAND

We have focussed on growing a better understanding our peatland as it is the largest source of carbon emissions from our land. In 2023 we commissioned experts to undertake on-the-ground surveys of our largest areas of peatland, to check the baseline estimates and to locate and quantify specific areas for restoration. To date, we have surveyed around 3,000 hectares of the estimated 4,600 hectares.

The survey work has found that:

- There is less peatland than the baseline approach calculated.
- Generally, it is in better condition than the baseline approach expected.

The overall effect is to reduce calculated carbon emissions from peatland. This was reported in our 2023 Annual Return and will feed into the next JHI update of our carbon inventory.

As a result of the surveys, we now know where to target our peatland restoration programme, and we plan to restore all poor condition peatland on Scottish Water land by 2027. In parallel, we will continue to work with third party landowners to restore peat where it impacts raw water quality.

## WOODLAND

We hold little data on the age or species of our woodlands. In order to estimate sequestration rates, the inventory approach made assumptions around the age range and species of trees. This created large ranges in estimated sequestration.

We are working with our land management agent to understand what data we have on our existing woodland. Once this has been established, we will begin on-the-ground surveys of our woodlands to gather age and species data, along with other key information, to improve the accuracy of data used in our next inventory, giving us more realistic sequestration rates.

## NATURAL CAPITAL & BIODIVERSITY

Following our initial baseline biodiversity assessment, we identified two key areas of development: invasive species, and ground-truthing of satellite survey data. We had data from on-site surveys of sites we had identified for piloting biodiversity improvements. At six of these, we trialled an updated biodiversity metric that could be compared to the original desktop baseline assessment.

The original methodology did not account for the presence of Invasive Non-Native Species (INNS), despite this being a direct driver of biodiversity loss. This was addressed by applying a multiplier to reduce the score of a site where INNS were present. Where we have data on INNS on our landholdings, we will include this in future biodiversity assessments.

Comparison of our on-site survey data to the satellite baseline assessment highlighted limitations in the satellite method, especially for small sites. Onsite surveys found small-scale features such as buildings and sealed surfaces are often missed from open-source data, where resolution is not fine enough to pick up features much smaller than 5m x 5m. As a result of the onsite surveys, a greater area received a very low (0) distinctiveness score, and therefore lower biodiversity metric scores for the sites. This is likely to apply to many of our small sites. Onsite surveys will not be practical for all our sites. We therefore need a hybrid method for future use, using satellite data for all sites and harnessing extra information from onsite surveys where available. Upskilling of our site staff and improving data sharing will allow valuable biodiversity information to be collected alongside existing activity, for example where surveys are taking place due to capital investment projects.

Our on-the-ground surveys demonstrate the importance of gathering real data. These results give us a more accurate picture of the state of our landholdings. They also ensure we target the right areas for restoration and enhancement, making the biggest impact for both carbon emissions reductions and biodiversity gains.

## RECREATIONAL VISITS

To improve our understanding in this area, we will be installing devices to count the visitors at several locations.

