

Protect, restore, enhance

SSE plc Biodiversity Report 2018



About SSE

SSE plc is one of the UK and Ireland's leading energy companies, involved in the generation, transportation and supply of electricity and in the extraction, storage, transportation and supply of gas. Its purpose is to responsibly provide the energy and related services needed now and in the future. Its vision is to be a leading provider of energy and related services in a low-carbon world. Its strategy is to create value for shareholders and society from developing, owning and operating energy and related infrastructure and services in a sustainable way.

About this report

This report sets out the steps SSE has taken across its business to achieve the aims set out in its Biodiversity Strategy. The scope of this report is focused on activities for the 2018 calendar year, however, some data presented covers the financial year 2017/18 in line with the SSE Group reporting calendar. Much of the photography in this report has been provided by SSE employees and the stakeholders with which SSE works, who have been credited accordingly.

Feedback is encouraged and is very welcome. Please get in touch by emailing sustainability@sse.com if you have any comments or queries relating to any of the initiatives mentioned within this report.

UN Sustainable Development Goals

SSE is aware of the role its activities play in contributing to wider societal goals. The UN Sustainable Development Goals (SDGs) are 17 global goals aimed at ending poverty, extreme inequality, and climate change by 2030. SSE is committed to supporting the SDGs and recognises that they are not only for governments to achieve, but for business and civil society to contribute to as well. More information on how SSE contributes to the SDGs most material to its business can be found in SSE's Sustainability Report 2018.

SSE's work to protect restore and enhance biodiversity contributes to the following SDGs



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Foreword

SSE's Biodiversity Report 2018 is published at a time when there is deep concern about the future of the world's ecosystems. In February 2019, the first scientific review of insect species at a global level was published. That research found there is global rate of decline of 2.5% a year which, as the authors point out, is devastating for the proper function of ecosystems.

The root cause of this decline is intensive agriculture with urbanisation and climate change playing a contributory role. So, what can an energy company focused on low-carbon energy do to help?

While we might not have the most material impact on the global decline in biodiversity, we must understand, respect and contribute to the solution.

The first contribution we can make to supporting ecosystems is in the role we play to decarbonise electricity. SSE's entire business strategy is focused on that challenge. We invest, develop and build renewable energy and we build and develop the electricity infrastructure that connects more renewable energy to the grid.

In 2018, SSE made more progress to that decarbonisation aim, completing the nationally significant Caithness-Moray submarine electricity cable, enabling many hundreds more megawatts of renewable energy to connect to the national grid. We also made progress on the Beatrice wind farm, 13 km offshore from the Caithness coast which, when complete will add a further 588MW of renewable energy to the UK's generation capacity.

But we must not stop there. In doing these things, we can impact – positively or negatively – on natural environments.

This report outlines SSE's Biodiversity Strategy and the governance arrangements it has for improving its impacts. The report tells the story of its performance through 20 different case studies. The case studies are powerful, but they don't give a quantitative picture of the overall impact SSE has made on biodiversity in the past year. This is, as we all know, a difficult ambition to meet.

That is why the development of complex plans by one part of SSE's business, the north of Scotland transmission network, is so welcome. Within the Scottish Hydro Electric (SHE) Transmission sustainability plan, it is proposed to ensure there is no net loss of biodiversity from transmission infrastructure projects by 2020, aiming for net biodiversity gain by 2025.

This means we will undertake a scientific quantification of biodiversity value before and after an investment project. That will show us exactly how we can develop projects in a way that results in biodiversity being better than before we started the project.

Because in the long run it is, without doubt, in all our interests that a sustainable solution is found to prevent further devastation of ecosystems and the precious life they support.



Rachel McEwen
Chief Sustainability Officer



SSE's approach to biodiversity

As a large energy company, the breadth of SSE's activities means it interacts with the environment in a variety of ways and inevitably impacts on the natural world on which economies and societies depend for their resources. Accordingly, SSE works to actively manage its impacts on biodiversity in a responsible and sustainable way.

While managing its environmental impacts represents a challenge to SSE, there are also opportunities that arise from working with the natural environment. Whether it's the opportunity to enhance or create new habitats or harnessing natural resources such as water and wind for renewable energy generation, SSE seeks to realise these benefits in a sustainable way.

As part of its responsible approach, SSE works to: build partnerships and work constructively with stakeholders; assess its impacts on key biodiversity issues and; make decisions which take account of these impacts.

Working with stakeholders

SSE recognises the importance of working with a range of stakeholders in order to protect biodiversity. SSE's key environmental stakeholders include:

-  Statutory organisations, including environmental regulators
-  Environmental charities and groups
-  Employees
-  Suppliers and contractors
-  Communities

The case studies outlined throughout this report seek to give practical evidence of the way in which SSE approaches its stakeholder relationships.

The above icons are used throughout the report to highlight which stakeholders SSE has been working with for various initiatives.

SSE's Biodiversity Strategy

SSE's Biodiversity Strategy provides enduring principles to guide SSE and its employees when undertaking activities, encouraging consideration of the environment and ensuring that SSE takes responsibility for any impacts it may have on biodiversity, whether negative or positive.

The strategy has three key aims which are underpinned by a number of goals. It is informed by legislation in the countries it operates in, underpinned by the requirements of the European Union's Biodiversity Strategy and the Aichi Targets set by the International Convention on Biological Diversity.

1. Protect and restore biodiversity in the environments in which we work and operate, and to support healthier ecosystems.

- Reduce direct and indirect carbon emissions
- Minimise adverse impacts and enhance positive impacts from development and operational activities
- Work with stakeholders to protect, restore and enhance biodiversity
- Contribute to research to inform decision-making and best practice

2. Connect people with the natural world, for their health and wellbeing and to involve them more in decision-making about their environment.

- Make selected sites accessible to provide biodiversity amenities for society
- Encourage and support employees to volunteer on biodiversity-related projects
- Provide community funding for projects that protect, restore and enhance biodiversity

3. Realising the economic benefits of a diverse natural environment and the services it provides.

- Use, or enable use of, renewable resources to produce energy
- Take measures to ensure the value of the natural world is not reduced for others

Protecting, restoring and enhancing biodiversity

SSE recognises that, as well as the global-scale impacts that arise from the generation of electricity, it has direct and localised impacts on the environment when developing and operating its assets. That is why SSE's approach is to actively manage its activities, and the impacts they have, in order to minimise negative impacts and maximise positive ones.

Tackling climate change

Climate change presents the most significant risk to global biodiversity. SSE's most material environmental impact is the carbon emitted when generating electricity. It is working to reduce the carbon intensity of the electricity it generates to limit its impact on global climate change. In November 2018, SSE signed an open letter to the UK Prime Minister calling for her to aim for net zero emissions in the UK by 2050 at the latest. It has also joined a call from the WWF and other organisations to urge the Scottish Parliament to do the same.

At the heart of SSE's strategy is a commitment to contribute substantively to the transition to a low-carbon electricity system in the UK and Ireland. It is doing this in two key ways:

- **Investing significantly in renewable energy:** SSE has invested over £3.5bn in renewables since 2010 and has the largest renewable energy capacity across the UK and Ireland at around 3.7GW (inc. pumped storage).
- **Enabling more renewable generation to connect to the electricity network:** In 2017/18, around 91% (over 5GW) of all generation currently connected to SSE's electricity transmission network in the north of Scotland is renewable.

New carbon targets for 2030

In 2018, SSE set a new, longer term carbon intensity target: it aims to halve the carbon intensity of the electricity it generates by 2030, based on 2018 levels. The target is in line with the ambitions set out by the Paris Agreement, and meeting it will represent a 75% cut in carbon intensity since 2006.

SSE's Irish business also signed up to Business in the Community Ireland's Low Carbon Pledge – a commitment by Irish business to lead on the transition to a low-carbon economy, by reducing Scope 1 and 2 carbon emissions intensity by 50% by 2030.

More information on what SSE is doing to address climate change can be found within its Sustainability Report and on its website.

Photo credit: Graham Baldock, SSE



Developing and operating assets responsibly

SSE manages impacts from its activities by taking a strategic approach and adopting methods that take account of the environment at the point of project initiation and design, as well as during construction and operation of the asset.

Underpinning SSE's decisions are statutory obligations governing designated sites and protected species, but where possible and practical, it seeks to go beyond minimum requirements.



Project development

When developing new or existing projects, SSE begins by considering options such as reusing or extending existing assets, or factoring in future growth requirements. Assessing different options for infrastructure sites and routes at this early stage can significantly reduce the impacts of a development.

SSE meets planning obligations by undertaking detailed Environmental Impact Assessments (EIA) for large projects, and completing an environmental assessment for projects where an EIA is not a statutory requirement.

Where projects are expected to have significant impacts on biodiversity, SSE strives to offset these impacts through actions such as developing Habitat Management Plans for renewable developments in the EIA stage, or funding conservation activity conducted by other groups. SSE also provides mitigation measures as part of planning proposals for all construction projects.



Construction

During construction of major projects, SSE adopts detailed measures to mitigate adverse environmental impacts, often under the guidance of a professional ecologist. These include implementation of relevant Species Protection Plans and Habitat Management Plans, that allow SSE to progress construction while protecting sensitive species. This could involve only undertaking aspects of work during certain times of the year, to reduce disruption to species during mating season. SSE will undertake any monitoring of biodiversity during construction that has been committed to during the planning phase, with additional measures taken if required.



Operation

SSE focuses on meeting permit conditions associated with the operation of its assets, and prioritises minimising any negative impact of operations in environmentally sensitive areas. Many of SSE's assets operate to an Environmental Management Systems (EMS) to manage environmental impacts and to drive continuous improvement in environmental performance.

As with construction, during the operational phase of a project any monitoring commitments made in the planning stages are undertaken. This may be underpinned by an Habitat Management Plan for example.

Protecting pollinators

In November 2018, representatives of 196 countries attended the 14th UN Biodiversity Conference COP14 in Sharm El Sheikh, Egypt. The aim of the conference was to help address the crisis of the global loss of nature and biodiversity, and stimulate accelerated international and national action on achieving the Aichi Biodiversity Targets, agreed in 2010, from now until 2020.

One of the key topics focused on was fostering conservation and sustainable use of biodiversity and of pollinators beyond food production. As well as being critical for food production, pollinators play an essential role in maintaining and promoting biodiversity, but their populations are currently in decline around the world.

SSE believes that businesses have a role to play in enabling national and international environmental targets to be met, and is supporting these wider global ambitions by implementing initiatives to support pollinators across areas of its business.

A strategic approach to protecting pollinators

In 2018, SSE Ireland signed up as a Business Supporter of the All-Ireland Pollinator Plan to help protect Ireland's 98 native bee species, half of which are in decline mainly due to the loss habitats and overuse of pesticides.

The same year, it launched the SSE Pollinator Plan which unifies existing strands of work under a central initiative and takes new steps to protect bee populations and raise awareness about their importance. SSE will continue to roll the plan out during 2019, which includes:

- Creating, restoring and protecting valuable habitats, such as heathland and wildflower, where bees can thrive.
- Good land management, for example hedgerow management and maintaining earth banks on wind farm sites which provide ideal nesting sites for bees.
- Trialling pollinator-friendly weed control methods, helping to reduce the use of pesticides.
- Supporting local beekeeping initiatives, through SSE Ireland's Wind Farm Community Funds.

SSE's Pollinator Plan in action



In 2018, SSE developed two projects putting its pollinator plan into action: Dunneil wind farm apiary and Great Island wild flower garden.

At Dunneil wind farm in Sligo, Ireland, an apiary was developed through the long-standing relationship between SSE through its Community Fund, the site supervisor and local beekeepers. In 1998, in an attempt to eradicate the Varroa mite (a parasitic mite that attacks the honey bees and can lead to the complete collapse of the colony) all bee hives in the area were destroyed. For many years, the area was largely devoid of bees and beekeepers and the recovery is on-going. As of 2019 Dunneil wind farm is now home to six native Irish honey bee hives.

Great Island power station is situated on the shores of Waterford Harbour, Ireland, and has been commercially operational since 1967. In 2018, 0.5 acres of field was sown with Irish wildflowers at the site as part of SSE Ireland's Pollinator Plan. A wild flower garden was also created at the power station by erecting 25 bird nesting boxes and 15 bat boxes and sowing a strip of Irish wildflowers along the edge of the boxes.

These projects highlight SSE's support for biodiversity and local community engagement across Ireland.



External recognition for wildflower planting



SSE's Networks business, SSEN, won three BIG Biodiversity Challenge Awards in 2018, including "Overall Winner", for its work to protect the Great Yellow Bumblebee in northeast Scotland. This species is amongst the rarest of bees in the UK with its numbers declining by around 90% in the past 50 years. This drop in numbers is thought to be mainly due to loss of habitat and intensification of farming processes. One of the bees' last strongholds is Caithness, where they can still be found across the region. The flower-rich grassy meadows in the region have different flowering plants, which provide the ideal habitat for the Great Yellow Bumblebee.

SSEN's Thurso South substation is part of its Caithness-Moray submarine cable installation project and in recognition of the presence of this rare species of bumblebee, SSEN sought advice from the Bumblebee Conservation Trust to ensure that its essential works did not negatively impact the local bee population. Following this advice, work was undertaken to create a more bee-friendly habitat by planting a flower-rich landscape with around 10 hectares of earth re-seeded around the substation site. By providing a different mix of flowers, including early flowering plants and nesting and hibernation places, it is hoped that other species will also benefit from this biodiversity enhancement.

Monitoring habitat improvement efforts

For the past seven years, SSE has worked closely with consultants and contractors at Griffin wind farm to manage the environment on site in a way that benefits wildlife and enhances the habitats on which these species rely. This work forms part of SSE's commitment to deliver a Habitat Management Plan to create ecological benefits across the site and mitigate or compensate for impacts identified during the development phase of the project. Through these ongoing efforts to enhance and manage the

environment, habitat condition has improved since construction of the wind farm.

To assess the impact of the HMP and the operation of the wind farm on species at the site, annual monitoring is being undertaken at Griffin between 2012 and 2021, and then at five-year intervals until 2036. Results of the monitoring for 2018 have shown:

- Black grouse numbers have increased by a total of eight males across two breeding sites since 2017.

- Breeding hen harrier at a historic nesting area which was vacant in 2017.

- Small mammal numbers have increased threefold as a result of felling commercial forestry, opening up of habitat and habitat creation projects.

- Breeding merlin were present, which were absent in 2017.

As well as determining the impacts of the wind farm and habitat management on these species, this information is invaluable to inform best practice and future assessment.

Biodiversity on the Isle of Wight



As part of its ground maintenance work for National Air Traffic Services (NATS), SSE Enterprise is introducing an innovative approach to land management. Much of the work currently carried out at the site on the Isle of Wight involves grass cutting which is time consuming and labour intensive, and whilst some variety of species is present, the approach limits the biodiversity value of the site.

During 2018, SSE Enterprise worked with NATS and landscape architects to develop a future management strategy, which aims to reduce the environmental impact of its activities on the site. The plan will be implemented in spring 2019 and will involve the introduction of cattle grazing to manage areas of coarse grassland. This method will produce a more varied and diverse grassland sward and will reduce the height of other vegetation generally. The increased botanical diversity will create improved habitat for butterflies and ground nesting birds. The cattle will be sourced from a local farmer and moved off site in certain months to ensure no conflict with ground nesting birds.

If this initial pilot study is successful, the approach could be introduced to more than 100 other NATS sites.



Photo credit: Sarah Miller, Ellendale Environmental

Contributing to research

Plans to manage biodiversity must be evidence-based to be effective and research plays a valuable role in informing decision-making at SSE. SSE collects ecological data itself and also supports and funds others to collect necessary data to inform risk assessments and/or impact assessments of its operations.

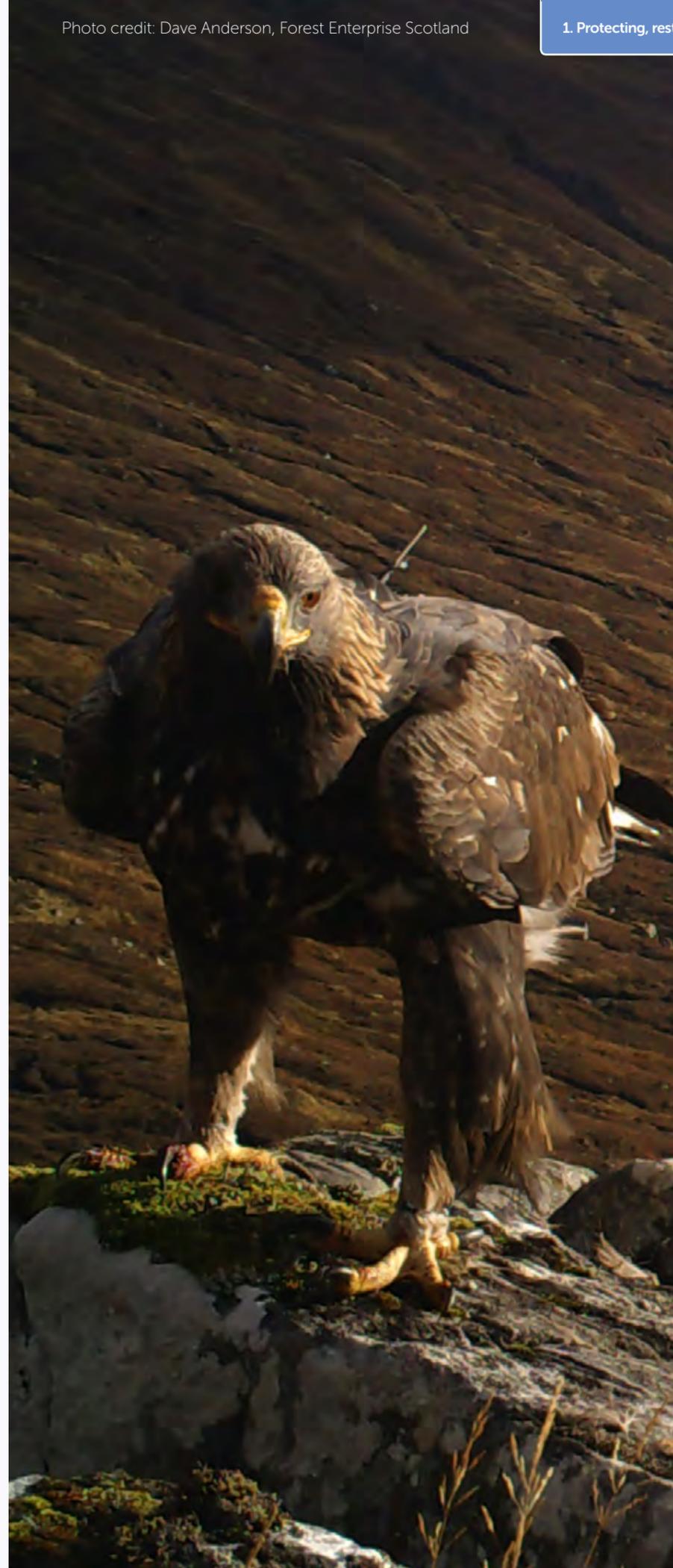
Enhancing golden eagle conservation in the Scottish Highlands



SSE's Dunmaglass wind farm is situated south of Inverness in a Natural Heritage Zone (NHZ), which is home to golden eagle. As part of the wider Habitat Management Plan for the wind farm, SSE commissioned a Regional Eagle Conservation Management Plan (RECOMP) to review the status of breeding golden eagle in the area. The aim is to provide an accurate reflection of factors influencing population numbers and eagle distribution to promote territory occupation and help boost the local population.

SSE provides funding and management assistance within the NHZ to enhance the conservation of breeding golden eagles. This has included the funding of a dedicated Golden Eagle Project Officer to support the RECOMP. The first three years focused on surveys, satellite tagging of eagles and analysis, the results of which has provided significant insight into behavioural ecology and contributed to emerging good practice surrounding golden eagle distribution in the upland landscape.

In 2018, considerable survey effort has established that the NHZ conveys one of the most rapidly increasing golden eagle populations in Scotland, albeit with many seemingly suitable areas remaining vacant. In a UK context, these increases are unprecedented. The fundamental research programme continues to narrow knowledge gaps and will serve more widely as a successful model for golden eagle conservation.



Innovative land management



In 2018, SSEN's Distribution business introduced an innovative land management pilot, supported by SSE's internal 'Group LEAN' initiative, which encourages more efficient ways of working across the business. The project, which took part within the Ridgeway region in central southern England, involved reducing the use of herbicides around substations sites through altering spraying techniques. While the initial driver of the project was to realise time and cost efficiencies, additional environmental benefits resulted from pilot. The results of the project showed:

- a 50% reduction in the volume of herbicide used per site
- a reduction from five separate

- herbicide products to two
- over 300 working hours saved per annum, through a different process for sites with troublesome vegetation
 - annual saving of £6,300 in herbicide budget

At the end of the pilot, a comparison of the old and new spraying techniques showed similar results in effectiveness of clearing and managing vegetation.

Ensuring minimal disturbance to wildlife



During 2018, refurbishment work of overhead lines between Fort Augustus and Fort William in Scotland was carried out by SSEN. Prior to work commencing, ecological surveys took place in which two owl boxes were discovered near one of the towers. Follow-up surveys revealed

that one of the boxes was regularly occupied by a barn owl. There was concern that when work started, it would cause a disturbance to any breeding attempts of the owls.

The project team decided to erect two additional boxes and temporarily close the existing boxes whilst works were carried out. A new location for the owl boxes was agreed through close collaboration with the Nevis Partnership and the Forestry Commission Scotland. As work within the areas selected for the boxes had already been recently completed, any owls using the boxes would not be disturbed by operational activities.

This work resulted in: greater opportunity to increase biodiversity with more owls able to nest in the area; limited disturbance to owls using the new boxes and; potential risk of delay to the project prevented.

Increasing ecological value at Gordonbush wind farm



As part of the Habitat Management Plan at Gordonbush wind farm, SSE has established areas of cattle grazing in 2018 to help manage the vegetation on site. This increases the ecological value of the ground and encourage wader and diver bird species to use these areas for foraging and nesting. The Habitat Management Plan also details that SSE will encourage small scale agriculture and crofting in the area. In order to achieve this, SSE is working with a local crofter who has now been able to establish a herd of various native breeds of cattle on land which hasn't been used for this purpose for over 60 years.

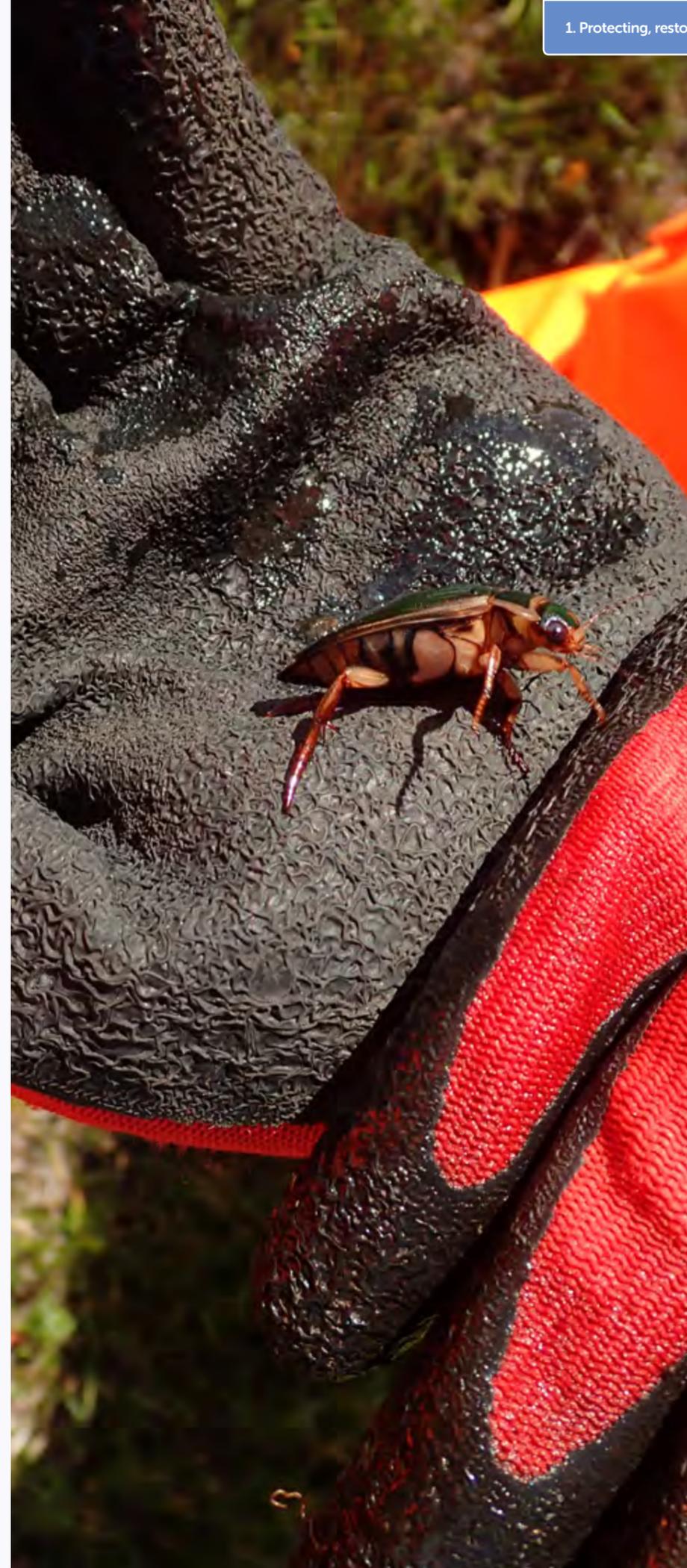


Enhancing biodiversity through proactive site management



In 2018, SSEN completed construction of the Melgarve substation in the Scottish Highlands. The site is located adjacent to various internationally, nationally and locally valued sites and habitats. An Environmental Impact Assessment of the site was carried out by environmental and landscape consultants prior to and during works which identified that impacts from the business' operations could positively impact biodiversity in the area. As part of the drainage scheme of the site, small ponds were created which acted as freshwater reservoirs, encouraging several species of aquatic invertebrates into the area. Aware that these reservoirs provided an opportunity to increase the biodiversity of the area, the business chose to install effective, low maintenance structures to preserve these reservoirs in the long-term. Bird species associated with water have also been noted which would not have been in the area without the creation of these water reservoirs. Channels were also created as part of the drainage scheme, one of which is to be retained as it was recorded that water voles may be using it and the edges of the channel would, over time, provide further habitat for invertebrates and amphibians.

This project demonstrated that environmental management during construction projects can result in measured environmental gains protecting and enhancing site biodiversity within an area of international environmental importance.



The Salmon Story

SSE's hydro-electric assets in the Scottish Highlands means that it has a duty of care to ensure that any negative environmental impacts from its hydro stations are minimised. This duty of care dates back to an Act of Parliament in 1943 which stated: 'the Board should have regard to avoiding as far as possible, injury to fisheries and to the stock of fish in any waters'. 75 years on, this remains SSE's ethos.

The salmon fishing industry brings economic and social benefits to rural, local communities across the country, supporting many jobs and businesses. The management of these fisheries within SSE's hydro assets is just one of the challenges that SSE faces. SSE's responsibilities don't end once the salmon have made it up to the top of the rivers. It invests a great deal of resource in tracking the journey the young salmon (smolts) make out to sea and how they cope with navigating their way through SSE's hydro assets.

Fitting the smolts with tags allows the progress of individual fish to be tracked. This work is ongoing on a number of rivers including the Conon, Ness, Tay, Shin and Awe and is conducted by SSE in partnership with the Fisheries Board, Scottish Environment Protection Agency (SEPA) and other experts.

Morar and Lochalsh power stations were the beginning of SSE's hydro revolution, when its early iteration - The North of Scotland Hydro Electric Board - brought renewable power to the highlands of Scotland. December 2018 marked 70 years since the switch-on of the first two hydro power stations developed by the North of Scotland Hydro Electric Board - a monumental moment in the company's hydro history.

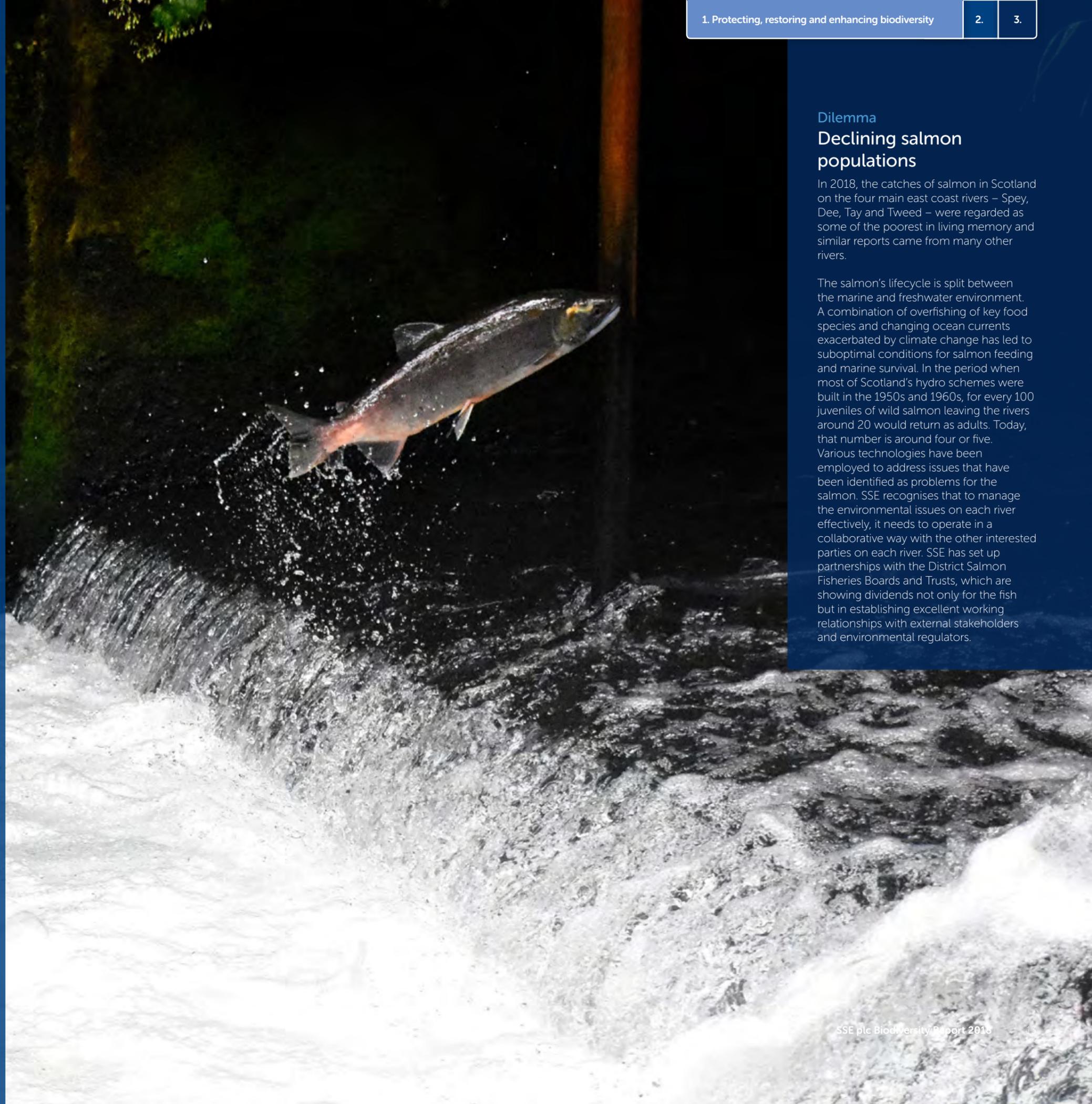
Seventy years on since SSE's first two renewable assets became operational, SSE has constructed over 60 hydro power stations and over 60 onshore and offshore wind farms.

Dilemma

Declining salmon populations

In 2018, the catches of salmon in Scotland on the four main east coast rivers – Spey, Dee, Tay and Tweed – were regarded as some of the poorest in living memory and similar reports came from many other rivers.

The salmon's lifecycle is split between the marine and freshwater environment. A combination of overfishing of key food species and changing ocean currents exacerbated by climate change has led to suboptimal conditions for salmon feeding and marine survival. In the period when most of Scotland's hydro schemes were built in the 1950s and 1960s, for every 100 juveniles of wild salmon leaving the rivers around 20 would return as adults. Today, that number is around four or five. Various technologies have been employed to address issues that have been identified as problems for the salmon. SSE recognises that to manage the environmental issues on each river effectively, it needs to operate in a collaborative way with the other interested parties on each river. SSE has set up partnerships with the District Salmon Fisheries Boards and Trusts, which are showing dividends not only for the fish but in establishing excellent working relationships with external stakeholders and environmental regulators.



Reacting swiftly to environmental incidents

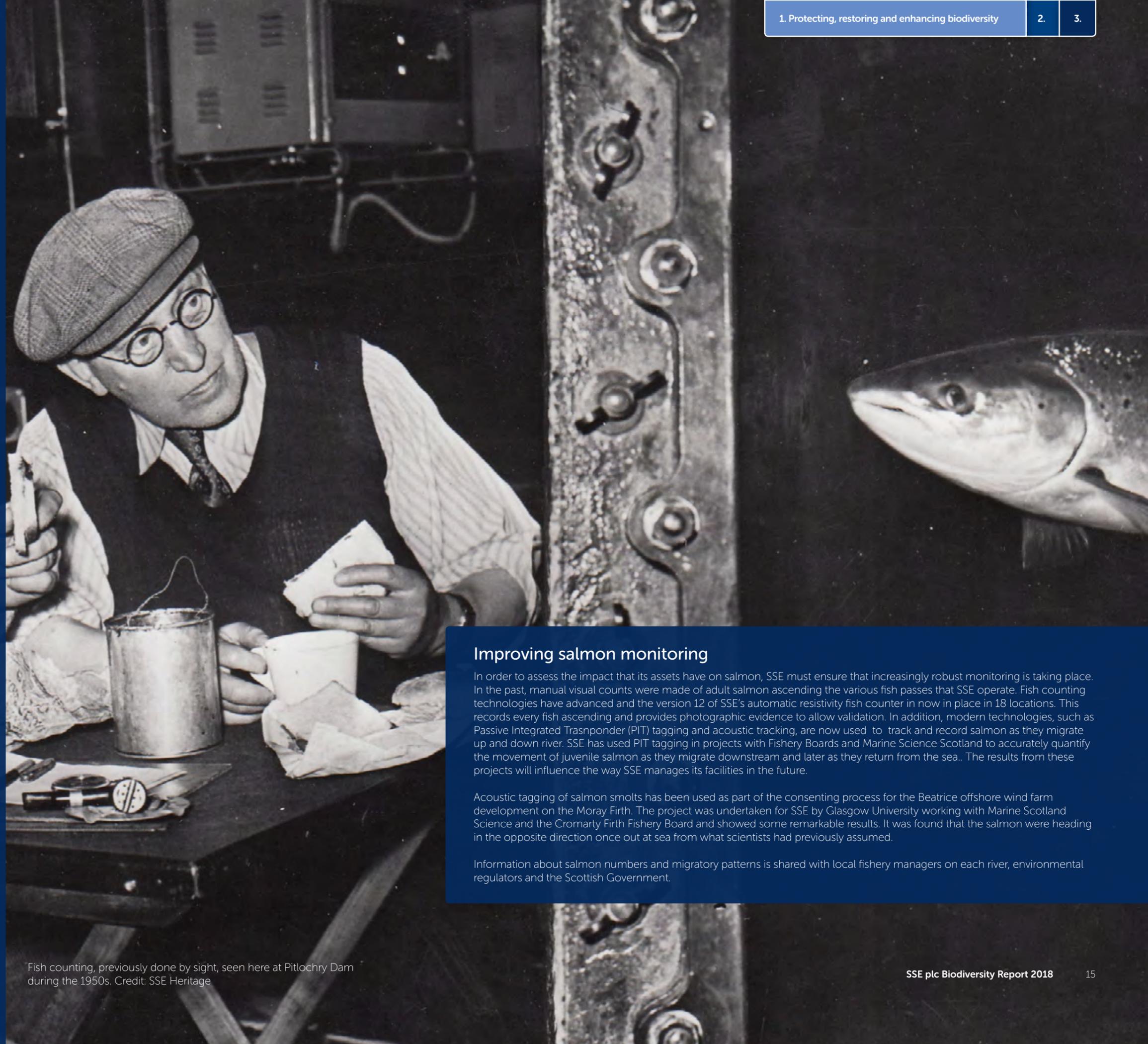
Every year in spring, the salmon smolts start heading down Scotland's rivers and migrating to the sea. SSE has a responsibility to give the fish the best chance of getting safely past its hydro assets which are obstacles along this journey.

In 2018, the UK experienced an exceptionally dry spring meaning SSE had to intervene to ensure smolts were able to continue their migration downriver. Three incidents occurred where smolts became trapped at Inverawe, Aigas and Kilmorack dams. As per statutory requirements, SSE informed environmental regulators and then began work with local fishery boards to rescue the smolts and return them to the river. In total around 8,800 smolts were captured at Aigas and Kilmorack, representing around 10% of the annual smolt run on the River Beaully. This is a significant number considering salmon numbers have been reported at record lows by many fishery boards. SSE engineers have subsequently worked to prevent fish from getting trapped, thus reducing impacts that SSE has on the Atlantic Salmon migration.

Andy Jacobs, Lead Environmental Advisor in SSE's Renewable Generation Team, said "The importance of doing all we can to preserve salmon numbers should not be underestimated. The Atlantic Salmon is an iconic species and attracts many visitors to Scotland. It justifies its protected species status and the efforts to do all we can to allow safe passage to and from their spawning grounds."

Supporting salmon migration

At Dunalastair dam, adult salmon were missing the entrance to the fish pass, due to an attractive flow of water from the flood gates during maintenance. Following discussions with SEPA and the local Fishery Board, it was decided to attempt to electro fish them out. The Fishery Board staff utilised a large net with an electrical current running through it which attracts the fish into the net and allows them to be caught without harm. The fish were then transported up to the main reservoir.



Improving salmon monitoring

In order to assess the impact that its assets have on salmon, SSE must ensure that increasingly robust monitoring is taking place. In the past, manual visual counts were made of adult salmon ascending the various fish passes that SSE operate. Fish counting technologies have advanced and the version 12 of SSE's automatic resistivity fish counter is now in place in 18 locations. This records every fish ascending and provides photographic evidence to allow validation. In addition, modern technologies, such as Passive Integrated Transponder (PIT) tagging and acoustic tracking, are now used to track and record salmon as they migrate up and down river. SSE has used PIT tagging in projects with Fishery Boards and Marine Science Scotland to accurately quantify the movement of juvenile salmon as they migrate downstream and later as they return from the sea. The results from these projects will influence the way SSE manages its facilities in the future.

Acoustic tagging of salmon smolts has been used as part of the consenting process for the Beatrice offshore wind farm development on the Moray Firth. The project was undertaken for SSE by Glasgow University working with Marine Scotland Science and the Cromarty Firth Fishery Board and showed some remarkable results. It was found that the salmon were heading in the opposite direction once out at sea from what scientists had previously assumed.

Information about salmon numbers and migratory patterns is shared with local fishery managers on each river, environmental regulators and the Scottish Government.

Connecting people with the natural environment



SSE recognises the important role it can play in helping to connect both employees and the communities it works in with the natural environment. Encouraging people to engage in biodiversity conservation or to simply enjoy the nature around them through leisure activities can help to improve the quality of people's lives.

Providing educational and recreational amenity to the public

Fiddlers Ferry Educational Resource Centre

SSE runs a free Educational Resource Centre (ERC) at its Fiddler's Ferry Power Station in Warrington, Cheshire. In 2018, the ERC engaged with over 7,000 people through visits, outreach, attendance at STEM related events and community engagement events. Students and young people can visit the centre to see how energy is produced in a reliable and sustainable way, and the nature reserve offers a wealth of wildlife, ideal for studying habitats, food chains/webs and ecological sampling from primary school level to university.

Pitlochry Dam Visitor Centre

In January 2018, SSE's Pitlochry Dam Visitor Centre celebrated its first full year

of operation. The centre showcases the unique history of hydro-electricity in the north of Scotland, telling the story of remarkable feats of engineering and demonstrating how the introduction of electricity to these areas greatly improved people's lives. It also allows visitors to learn more about what SSE is doing to protect, restore and enhance biodiversity local its assets. The free visitor centre is open all year and welcomed over 130,000 visitors in 2018 alone.

The Galway Wind Way

The Galway Wind Way recreation and interpretive trails are helping people to understand onshore wind and the place it holds in tackling climate change. The vision to develop the 169MW Galway Wind Park as more than just a wind farm and the trails have been an integral part of this challenge. Working closely with community stakeholders, special interest groups, trail design and interpretive experts, the Galway Wind Way was brainstormed, designed and six trails were constructed.

The Galway Wind Way overarching theme is the evolving use of the landscape over time. Coupled with this there are three key strands to the interpretative signage: environment, turbine technology and cultural heritage.

The Galway Wind Way has hosted schools and universities from Ireland and abroad, Global Wind Day 2018 celebrations, trails festivals, running events, and an EU panel on alternative uses for forestry.

While continuing to generate real benefits for the local area, tourists and educational institutions, the team strives to connect people with the local environment and increase their understanding of biodiversity, cultural and natural heritage which co-exists with Ireland's largest onshore wind farm.

Throughout 2018, the Galway Wind Way recreation and interpretive trails have attracted more than 17,000 visitors.

Photo: Pitlochry Dam and Visitors Centre



Employee-led volunteering

SSE encourages employees to give something back to the communities in which they live and work through its 'Be the Difference' programme. Through the programme, every employee is entitled to take one paid working day per year to volunteer for initiatives that are important to them. In 2017/18, SSE employees volunteered a total of 2,494 days, supporting over 850 projects across the UK and Ireland. Some employees chose to use this day to take part in biodiversity related projects, helping to connect them with the nature in their local area.



Volunteering with the Countryside Education Trust

Over the past seven years, over 250 SSE employees based in the company's network area in central southern England have used their 'Be the Difference' day to volunteer with the Countryside Education Trust (CET). CET work with children from inner city areas and disadvantaged groups to connect people to nature by introducing them to outdoor learning, rural life and farming.

In 2018, SSE employees were involved in a variety of manual tasks such as tree planting, building boardwalks, repairing bridges, clearing areas for classes and hedge pruning for forest and meadow maintenance. Previously, SSE employees have also erected bird and bat boxes in Beaulieu forest to support CET's conservation efforts in the area, providing habitat for different species.



Langstone Beach Clean

In 2018, 15 SSE employees from SSE Energy Services took part in a clean-up project at Langstone beach. The project has been running for a number of years with growing interest in 2018 through increased public concern surrounding plastic pollution in the marine environment. On average, each employee collected three to four bags of rubbish which was then taken to a waste management site.

Beach clean-up in Durness, Scotland
Photo: Plastic@Bay



Diver recovering discarded fishing equipment
Photo: Wexford Sub Aqua Club

Community funding

SSE is a large private funder of community projects across the UK, and one of the top five Irish companies providing financial support to voluntary and community organisations across the island of Ireland, according to analysis by Business in the Community Ireland. In 2017/18, SSE's community investment totalled over £6.5m across these countries. This contribution includes SSE's Community Investment Funds, the SSEN Resilient Communities Fund, charitable donations and the financial value of SSE's employee volunteering. Of this contribution, more than £370,000 was granted towards projects which help protect and enhance the environment.

Supporting communities to tackle plastic pollution



Pollution, particularly from plastics, is a major concern for the ecological health of the world's oceans. In 2018, SSE supported a number of communities in tackling this problem in their local areas. SSE's community funds provided £65,000 to Plastic@Bay, a social enterprise which is setting up a marine plastic recycling centre in Durness, northwest Scotland. Beaches in the area receive up to 20kg of plastic daily meaning this location is wellsuited for this project. This project is based on the circular economy model, whereby plastic pollution collected from local beaches will be recycled into useful items for resale, and profits from recycling go directly back into beach cleans and research projects.

2018 marked ten years that SSE has supported beach clean-ups organised by Wexford Sub Aqua Club in County Wexford, Ireland. Since 2008, SSE Ireland has contributed €11,816 from its Richfield wind farm fund to the organisation.



Realising the benefits of a diverse natural world

As one of the largest generators of renewable energy in the UK and Ireland, SSE understands the benefits of using natural resources, such as wind and water, for positive economic purposes. SSE is supporting the UK and Ireland's efforts to combat climate change by: developing, constructing and operating renewable energy assets and; supporting the connection of renewable energy to the grid via its electricity network.

SSE has a wider responsibility to locate, construct and operate its assets sustainably, ensuring impacts on biodiversity are managed effectively. SSE's Biodiversity Strategy provides a framework to ensure SSE meets this responsibility.

Harnessing the benefit of natural resources

Onshore and offshore wind generation are key technologies needed to help combat climate change and lessen negative impacts on biodiversity. In the last decade, SSE more than tripled its installed onshore wind capacity and currently has a consented offshore wind development pipeline totalling 3.3GW. In 2017/18 alone, SSE delivered over 500MW of new onshore wind projects across the UK and Ireland and by 2020, SSE's portfolio of renewables is expected

to comprise over 4.2GW of capacity. This is capable of generating around 12TWh of electricity per annum in a typical year. SEN's transmission network is supporting more renewable energy to connect to the grid in the north of Scotland, with renewable generation connected to the grid increasing over the last five years from 3.3GW to over 6GW today. In 2017/18, SSE's Networks business successfully connected 449MW of low carbon generation, with more than 1GW on track to be connected in 2018/19.

Demonstrating environmental leadership

In 2018, SSE's Transmission business, was awarded 'leadership' status by the energy regulator, Ofgem, for its environmental work to support the transition to a low-carbon economy. The Environmental

Discretionary Reward (EDR) recognises the business' commitment to supporting local environments. The business achieved a leadership score which resulted in a financial award of £4m. A key factor which contributed to this year's EDR award is the improvements that the business is making in its system planning and network development, designed to identify and implement the best whole system solutions for our customers and wider society. This includes the business' North of Scotland Future Energy Scenarios work, which contains a scenario that would deliver a decarbonisation pathway for the north of Scotland in line with that required globally to limit the temperature increase to 1.5 °C. SSE is determined to play its part in minimising the impact of global warming and its Transmission business has committed to setting a science-based greenhouse gas emissions target.

Delivering a biodiversity net gain for transmission projects

As a responsible developer, SSE has a responsibility to protect and promote the natural environment. In 2018, SSE's Transmission business published its Sustainability Strategy outlining its commitment to achieving an overall 'No Net Loss' of biodiversity on new infrastructure projects gaining consent from 2020 onwards. To meaningfully measure this, the business has committed to: developing criteria to assess the impact of its construction projects on biodiversity; define and develop a mechanism to report on its baseline biodiversity footprint and year on year improvements and; collaborate with partners to develop an approach to measuring biodiversity net gain.

SSE's Transmission business's capital expenditure of £434.2m in 2017/18 represents a substantial project delivery programme. As its asset lives span multiple decades, it is essential to ensure this development expenditure is undertaken in a sustainable manner to protect the natural environment now and for the benefit of future generations.



SSE's environmental governance

Policy

SSE's Environment and Climate Change Policy sets out SSE's approach to managing its environmental impacts and activities. Through this policy, SSE commits to protecting the environment, preventing pollution, minimising adverse environmental impacts and bringing about environmental improvements where it can. SSE continues to engage with stakeholders, using their feedback on environmental issues to inform its activities. SSE's Environment and Climate Change Policy is publicly available on SSE's website and is signed-off by the Chief Executive.

Accountability

SSE's Chief Executive, Alistair Phillips-Davies, has overall lead responsibility for environmental performance, including at Board-level. The Safety, Health and Environment Advisory Committee (SHEAC) advises the Board on matters relating to safety, health and environment (SHE). The work of the SHEAC is designed around SSE's eight SHE Enduring Goals, one of which is *Environment: Protecting the environment and operating in a sustainable way*. The SHEAC is responsible for setting SHE performance targets, which include environmental performance.

SSE has an Environment Subgroup which advises the business on the Environment Enduring Goal. In 2018, the Environment Subgroup continued to: support the Group environment vision and strategy; drive improved environmental performance through shared learning and working efficiently; and meet with external organisations to discuss best-practice methods and knowledge sharing regarding environmental performance.

At business level, the heads of individual business units are accountable for environmental performance and for managing environmental impacts by applying SSE's SHE Management System.

Environmental Management

In 2018, SSE's thermal and renewable generation, Enterprise Contracting and gas storage businesses completed the transition from ISO14001:2004 to the latest ISO14001:2015. This is an international standard which specifies requirements for an effective environmental management system. SSE now has a single corporate certification for ISO14001:2015 where it used to have 20 local certificates. This means the company is now positioned to set objectives and action plans in a cohesive manner and has a system that can be extended to other SSE businesses.

During 2017/18, SHE Transmission has been working towards a distinct certification under the wider group systems. This is to align with the new environmental management system structure created corporately across the group and to allow Transmission to tailor its focus areas to specific risks and opportunities. An example of this will be the commitment to set a transmission specific science-based target for greenhouse gas emissions, and a commitment to work towards biodiversity net gain for new construction projects.

Training

All relevant employees are provided training in environmental management. Determination of which employees are relevant is undertaken on a local-level basis and training is relevant to the nature of the business they are involved with. A series of training workshops explaining the transition to ISO14001:2015 was held with relevant colleagues and outlined the new system. A quarterly forum consisting of relevant individuals from each relevant business unit has also been established to drive improvement and share best practice.

Reporting environmental performance

A monthly report of Group Safety, Health and Environment (SHE) incidents split by business unit is published internally, which is used to monitor SSE's environmental performance and highlight any issues as they arise so that action can be taken. Annual key performance indicators (KPIs) are reported externally in SSE's Annual Report and, in more detail, in its Sustainability Report. Selected environmental KPIs can also be found in this report on page 49.

The breadth of SSE's operations means that its activities are subject to a number of environmental regulations. Therefore, where necessary, SSE regularly reports environmental performance to the environmental regulators in the countries it operates in.

Creating a culture for employees to speak up

SSE's employees are encouraged to report incidents of wrongdoing, including environmental concerns, through both internal and external mechanisms. If employees are not comfortable raising incidents with their line managers, they can contact one of the five designated senior managers who have been trained to take calls for whistleblowing incidents.

SSE also has an externally hosted 'Speak Up' phone line and email service, hosted by SafeCall, through which incidents can be reported anonymously. SSE put the SafeCall service in place to ensure that employees can be confident that there will be no recriminations if they report incidents of suspected wrongdoing. Whether speaking up through internal or external mechanisms, SSE's employees can remain anonymous if they choose.

Disclosing environmental impacts

Disclosure of SSE's environmental impacts is an important way to increase transparency to our stakeholders and to ensure the company is accountable for its actions and decisions. This section contains a number of key performance indicators (KPIs) relating to SSE's environmental performance.

SSE has reported against a range of Global Reporting Index (GRI) indicators for a number of years. Where relevant, it is highlighted throughout this section where KPIs and information provided align with GRI Environmental indicators.

Networks assets in protected areas

Scottish and Southern Electricity Networks (SSEN) forms part of the SSE Group. SSEN's electricity distribution and transmission networks carry electricity to over 3.7 million homes and businesses across the north of Scotland and central southern England.

This essential infrastructure covers a vast geography so will naturally cross protected areas. Much of the network has been in place since before protected designations were established. SSE's focus is to maintain and operate these assets with minimal impact on biodiversity.

Total length of overhead line* in protected areas** (km)	16338.2
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*includes overhead line carry capacities from low voltage through to 400kV

**Protected areas: National Nature Reserves (NNR), Site of Special Scientific Interest (SSSI), RAMSAR, Special Areas of Conservation (SAC), National Parks and Areas of Outstanding Natural Beauty (AONB).

Habitat management plans

For some planned renewable energy projects, as initially proposed, there can be potential impacts on biodiversity. In these cases, SSE strives to offset the potential impacts by developing Habitat Management Plans (HMPs), or fund conservation activity conducted by other groups.

As far as is practical, SSE's plans shall be long-term commitments to manage and monitor identified target species and habitats in order to ensure a positive environmental impact. These projects may also deliver net biodiversity enhancement and through projects such as restoring degraded peatland or native broadleaf woodlands.

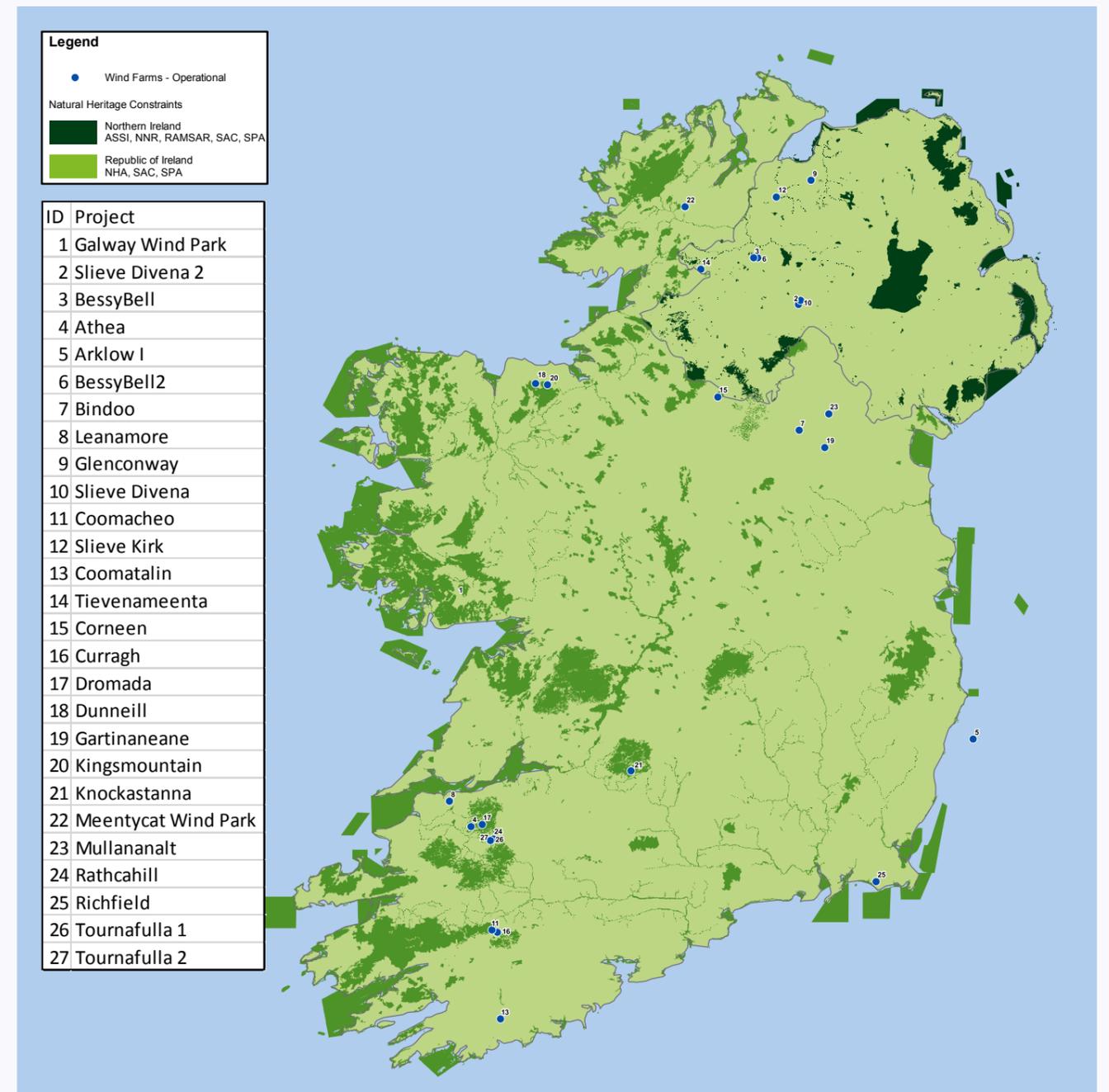
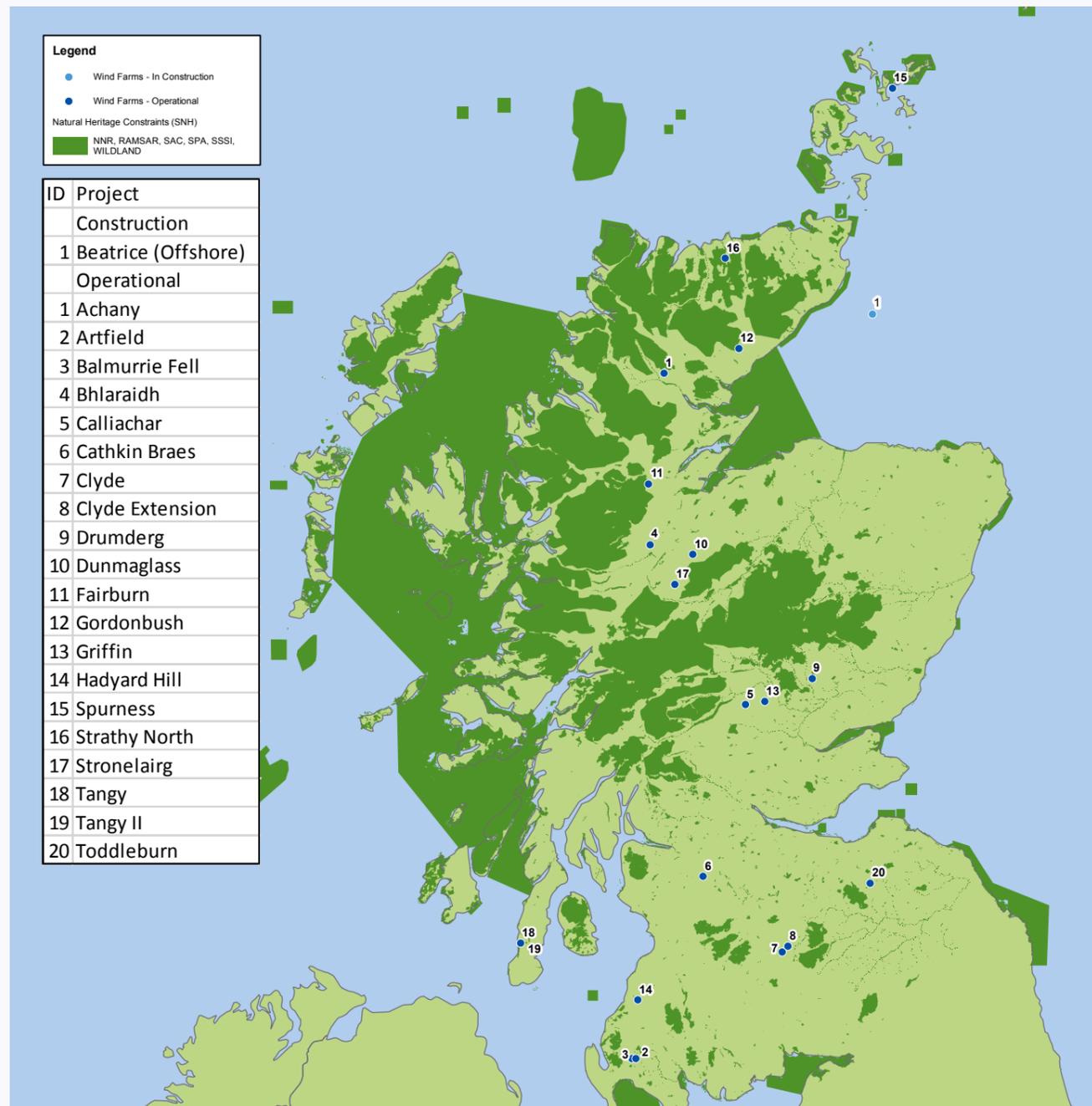
Site	HMP details	Area of HMP (Ha)
Scotland		
Achary	Black grouse and water vole habitat enhancement, peatland habitat enhancement (with focus on foraging ground for upland waders), maintain populations of dwarf birch and mountain bearberry.	c 2
Balmurrie Fell	Peatland habitat enhancement.	2.6
Bhlaraidh	Native woodland replanting, grouse habitat enhancement.	18
Calliachar	Management of wetlands, scrub, water margins, habitat mosaics, moorland management, bracken control, wild bird cover, late-mown grassland, open grazed grassland, woodland creation and extended hedge management.	223

Site	HMP details	Area of HMP (Ha)
Clyde	Native woodland replanting, blanket bog and heathland restoration, grazing reduction, experimental Molinia control/heather seeding.	c. 2880
Clyde Extension	Native woodland replanting, blanket bog restoration, predator control.	2411
Dunmaglass	Habitat management, ditch blocking for blanket bog creation, deer management, heather cutting rather than muirburn, predator control.	1899
Fairburn	Habitat management for hen harrier, merlin and golden eagle. Heather management, bracken control and broad-leaved planting. Ditch blocking.	4711
Gordonbush	Forestry removal, moorland restoration, heather management, drain blocking, native woodland restoration, small scale agricultural activities, deer management.	5350
Griffin	Native woodland planting, black grouse habitat enhancement, enhance habitat for mammal species.	892
Strathy North	Hen harrier enhancement, peat restoration, riparian native woodland, short sward.	1020
Stronelairg	management for eagles.	481
Toddleburn	Enhancement of existing woodland SSSI, native woodland planting in other areas, create mix of wetland areas and tussocky grassland.	c. 70
Northern Ireland		
Glenconway	Peatland management, drain blocking, invasive species removal. Habitat and bird monitoring. Bat monitoring.	21.62
Slieve Divena 2	Habitat and bird surveys. Red grouse, peat and snipe management.	17
Slieve Kirk	Peatland and bird monitoring, grazing management, invasive species removal, aquatic habitat creation, watercourse protection.	580
Tievenameenta	Habitat and bird surveys. Habitat restoration, ditch blocking, peat management.	42
Ireland		
Athea	Extensive habitat, bird and amphibian monitoring over the wind farm area with habitat restoration and invasive species management.	Under review
Dromada	Forestry removal, peatland restoration, drain blocking and hen harrier monitoring.	Under review
Galway Wind Park - Cloosh	Conifer felling, replanting offsite, drainage blocking, bog reinstatement and monitoring.	59
Galway Wind Park - Seecon	Conifer felling, replanting offsite, drainage blocking, bog reinstatement and monitoring.	174
Galway Wind Park - Uggool	Fencing, grazing management and quadrat vegetation monitoring.	16

Wind generation assets in relation to protected areas

During the project planning stages, as a responsible developer, SSE ensures sites are sensitively chosen when locating assets, to avoid legally protected areas. The following maps show SSE's wind farm projects, including joint ventures, in relation to protected areas. The maps focus on Scotland and the island of Ireland, where the vast majority of SSE's wind assets are located. Some designations and data available differ between countries.

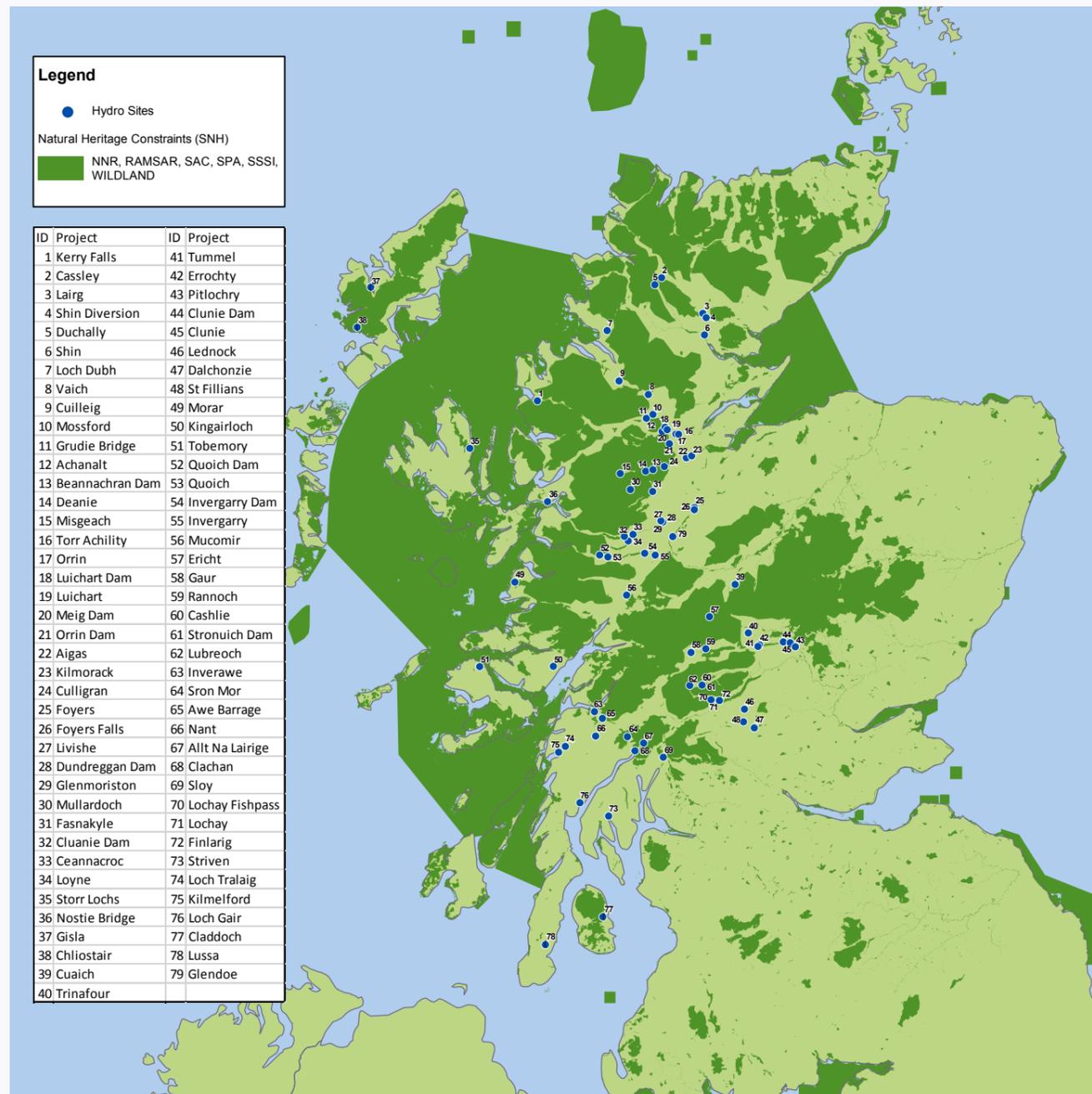
It should be noted that areas may be protected for certain species or habitats which SSE's assets will have minimal, or no, impact on. Due to the scale of the maps, project locations are approximate.



Hydro assets

SSE's heritage has its foundations in the large scale development of hydro-electricity in the north of Scotland in the 1940s and 1950s, bringing power to people in the north for the first time with dams, tunnels and power stations which serve customers across the UK to this day. The vast majority of SSE's hydro-electricity assets have been in place since before protected designations were established. SSE works very closely with regulators, environmental organisations and local communities to ensure its hydro-electricity operations have minimal impacts on these stakeholders and the environment.

The following maps show SSE's hydro assets in relation to protected areas. Due to the scale of the maps, project locations are approximate.



Environmental performance

Environmental incidents

SSE has adopted an internal classification of environment related incidents, which reflects their scale and impact and are aligned with those used by SSE's principal regulators.

	GRI Indicator	2017/18	2016/17	2015/16
Number of major environmental incidents	GRI 307-1	0	0	0
Number of serious environmental incidents	GRI 307-1	11	8	11
Number of minor environmental incidents	GRI 307-1	44	57	20
Number of environmental prosecutions	GRI 307-1	0	0	0

Carbon emissions

Details of SSE's carbon emissions are provided in the following table, broken down by scope 1, 2 and 3 emissions. For more detail on how SSE calculates its carbon emissions, see SSE's criteria for GHG emissions reporting which is available at www.sse.com/beingresponsible.

	GRI Indicator	2017/18	2016/17	2015/16
Scope 1 emissions ¹ ('000s tCO ₂ e)	GRI 305-1	10,155	8,004	11,021
Scope 2 emissions ² ('000s tCO ₂ e)	GRI 305-2	832	1,034	1,138
Scope 3 emissions ³ ('000s tCO ₂ e)	GRI 305-3	10,621	10,357	10,375
Total carbon emissions (million tCO ₂ e)		21,609	19,395	22,534
Carbon intensity of electricity generation (kgCO ₂ e/MWh)	GRI 305-4	307	304	397

¹ Scope 1 comprises emissions from operations owned or controlled by the organisation.
² Scope 2 comprises emissions from the generation of purchased electricity, heating and cooling.
³ Scope 3 comprises emissions that occur outside of the organisation in support of its activities.

Emissions to air

Details of SSE's emissions to air are provided in the table below. These emissions result from SSE's thermal generation and electricity transmission and distribution activities. For more detail on how SSE calculates its emissions to air, see SSE's criteria for GHG emissions reporting which is available at www.sse.com/beingresponsible.

	GRI Indicator	2017/18	2016/17	2015/16
SO ₂ (tonnes)	GRI 305-7	1,791	1,564	10,685
NO ₂ (tonnes)	GRI 305-7	5,612	5,555	6,704
SF ₆ (kg)	GRI 305-7	518.6	394.5	434.1

Water use

SSE uses water across its thermal and hydro-electricity generation assets, and also in its non-operational buildings. The vast majority of water abstracted by SSE was used in its hydro generation operations (over 97%) and was therefore returned to the environment almost immediately.

	GRI Indicator	2017/18	2016/17	2015/16
Total water abstracted (million m ³)	GRI 303-1	24,044	22,658	28,856
Total water consumed (million m ³)	GRI 303-1	7.6	5.0	8.2
Total water returned (million m ³)	GRI 303-1	24,037	22,654	28,848

Protected area key

ASSI	Areas of Special Scientific Interest
NHA	National Heritage Areas
NNR	National Nature Reserves
RAMSAR	Wetlands of international importance designated under the Ramsar Convention
SAC	Special Areas of Conservation
SPA	Special Protection Areas
SSSI	Site of Special Scientific Interest
Wild Land Areas	Areas considered to represent the most extensive areas of high wildness and given national importance in Scottish Planning Policy



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