Significant Water Management Issues for Scotland

19 December 2019



Working together to protect and improve our water environment

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1 Introduction

Scotland is renowned worldwide for the environmental quality of its rivers, lochs, wetlands and seas. They are some of the country's greatest natural assets: attracting visitors, contributing to the health and well-being of its people, supporting a rich diversity of wildlife and providing for the sustainable growth of its economy. Water is a resource that underpins key industries like food and drink production. Maintaining this enviable reputation for the quality of Scotland's water environment is important for Scotland's continued economic success and well-being.

Our environment is facing unprecendented threats, however, from the overuse of energy, materials and water. Biodiversity is in decline and parts of our freshwater environment and oceans are polluted with waste materials. We are also facing a crisis from the changing climate with nine of the 10 warmest years occurring since 2002, and seven of the 10 wettest since 1998. Climate change could see summers in Scotland up to 4.8 degrees warmer and 40% drier, with droughts becoming more frequent. At the same time we are also likely to experience more frequent and damaging floods.

Recent evidence shows widespread decline in the abundance of many species of plants and animals in Scotland. Some of our most iconic species are facing particular threats. The population of adult Atlantic salmon returning to Scotland is estimated to be less than half of the level in the 1960s, and angling catches have been in particularly steep decline over the last decade.

Scotland's growing population is placing greater demands on land and water, as we build more homes and infrastructure, increase water demand, grow more food and produce more waste.

We need immediate and ambitious actions to tackle these challenges and river basin management plans (RBMPs) have an important role to play. By protecting water resources and promoting the re-naturalisation of rivers, the actions in RBMPs will increase the resilience of the water environment to the droughts, floods and higher temperatures caused by climate change. Furthermore, river basin planning can make a significant contribution to improving the resilience of the water environment and therefore the resilience of our society and economy. The improvements drive the

changes in resource use and greenhouse gas emissions which are needed to address the climate emergency.

The water environment plays a central role in connecting people to the environment in which they live. As a legacy of our industrial past these links have become broken in many locations. Actions in the river basin plan will restore this sense of connection, and act as a focal point for putting the environment at the heart of local decision making. This will help protect wildlife, businesses and communities into the future.

The second RBMPs for Scotland's rivers, lochs, estuaries, coastal waters and groundwaters were published at the end of 2015. The plans identified where our waters are in a good or excellent condition and where they are under pressure. They also set improvement targets for 2021 and 2027 and put in place a programme of actions for achieving them.

Since the publication of the second RBMPs, we – the Scottish Government, the Scottish Environment Protection Agency (SEPA) and all Scotland's other responsible authorities and public bodies – have been working with water users and land managers to make the improvements needed to achieve our targets for 2021 and 2027. SEPA has also been carrying out monitoring to improve its understanding of the pressures and impacts on the water environment and the effectiveness of the actions we have been taking. In that time our understanding of impacts on the water environment has greatly improved. We are now seeing the results of all the effort and strengthened partnership working being translated into improvements in the water environment.

With the publication of the third RBMPs due at the end of 2021, we now need to begin setting out our approach for the future. This must put our water management work in the context of the wider climate emergency and the biodiversity crisis.

This report is the first stage in that process. It covers all of Scotland and sets out our assessment of the biggest challenges for the future of Scotland's water environment. These are the issues we consider will be the most significant for water management between 2021 and 2027. The third river basin plan will describe in more detail the actions we need to take to address these priorities.

The document includes a consultation that gives you the chance to comment on our conclusions. The consultation is part of a wider, ongoing engagement with stakeholders and advisory groups.

This consultation is supported by technical documents and maps which are available our SEPA's website. These include a summary of the condition of the water environment and the progress we have made towards achieving the improvement targets set for 2021 and 2027.

2 The main issues affecting the water environment

We have made progress in improving the condition of Scotland's waters and more work is planned to deliver further improvements. We have prioritised the most significant water management issues that lie ahead for the third RBMP cycle. They are:

- water scarcity
- waste water discharges
- rural land use
- restoring resilience in physically modified rivers
- manmade barriers to fish migration
- hydropower
- fish farming and wild fish interactions
- invasive non-native species

These are the areas where addressing significant impacts on the water environment will have the greatest influence in addressing wider environmental priorities: making our water environment more resilient to climate change impacts, helping to reduce resource use and greenhouse gas emissions, and improving the health and wellbeing of people and communities. Our approach will be to focus on resource use, building resilience in natural systems and improving the lives of communities, so that the third RBMPs become a key tool to help Scotland tackle the climate emergency and biodiversity crisis.

We will use the experience we have gathered from previous RBMP cycles to maximise the opportunities to achieve our goals in the third RBMP cycle. In particular

we will use the information and evidence to set clear a strategy with appropriate tactics and the right people to implement them.

2.1 Water Scarcity

We need effective catchment management of water availability alongside fair and efficient use of water in our homes and businesses to ensure Scotland's resilience to climate change.

The summer of 2018 was one of the hottest on record for Scotland with record low river levels in many regions and 24 smaller rivers recorded as having completely dried up. Scottish businesses were affected in a number of ways by these conditions. For cereal production, Scotland saw a 12% drop in yield and the dry weather contributed to excessively high nitrogen levels in two thirds of spring sown barley intended for malting. Distillery production stopped for up to a month longer than normal due to low river levels and high water temperature, and hydropower electricity generation was down by around 25% compared to the recent average. Salmon fishery statistics for 2018 show that the reported rod catch of wild salmon and grilse was the lowest since records began in 1952 and six fish kill events were reported in July and August across Scottish rivers. Freshwater pearl mussels were stranded and died, or were rescued from stranding, in six rivers.

The predicted rate of environmental change is unprecedented. It is clear that pressure on water supplies will increase, but the impacts at the catchment level and the rate of change remains uncertain, making it difficult to plan with confidence. Predictions are for a higher frequency of severe weather events. This means that any regulatory controls, for example to control abstraction as low flow periods develop, have to be sufficiently flexible and responsive.

2.2 Waste water discharges

Considerable investment over recent decades has led to major improvements in the collection and treatment of waste water (sewage) discharges resulting in large scale improvements in the environment. Our assessment is that discharges of waste water still contribute to adverse effects on water quality in at least 70 water bodies in Scotland, affecting local wildlife, and the recreational and amenity value of rivers and bathing waters. Treating waste water takes a lot of energy however, and Scottish Water is one of the largest electricity consumers in Scotland. The challenge for the

future is to deliver measures that drive large reductions in carbon emissions whilst delivering our planned environmental improvements.

There is increasing recognition that the waste that is generated in sewage treatment has an intrinsic value, for example as fertiliser for agriculture or land restoration. Maximising the recovery of this material and treating it as a resource rather than waste, will contribute to addressing the remaining pollution issues. It will require investment in new technologies for recovering different materials from waste, and developing new markets for these products.

While most of the impacts arise from waste water treatment works serving the public sewerage network to which most properties in Scotland are connected, it is also important to note that 10% of the Scottish population is served by private sewage treatment systems. If the design, maintenance and upgrade of privately operated waste water treatment systems is not adequate, localised pollution of water courses can occur.

When parts of the sewerage network are overloaded by rainwater during storms, they overflow into water courses to prevent worse damage elsewhere in the system. This can result in pollution of our water courses, bathing waters and shellfish waters. We know that addressing these overflows and other waste water discharges are large and expensive tasks that require considerable funding from the public purse. The delivery of improvement actions will therefore have to be properly planned and phased throughout the remaining planning cycle.

Most of the actions needed to address waste water discharge problems fall to Scottish Water to carry out**.** The programme of actions must therefore be properly planned and phased so that they can manage their resources to ensure they can fulfil their obligations by 2027. In addition to this work we will also need to take action to address private waste water discharges.

In many cases there are multiple impacts on water quality from several sources. We need to understand the relative contributions of the different sources of pollution so that investment can be appropriately targeted, and Scottish Water is working with SEPA to achieve this. However it will also be important to take timely action where

we have reasonable confidence that impacts are occurring, even if the precise contribution is yet to be determined.

We recognise that environmental protection and resource efficiency can also be improved by reducing the level of pollutants discharging to sewer in the first place. SEPA is working with Scottish Water to develop plans for businesses, retailers and product manufacturers to ensure that opportunities are taken to achieve this. It will take time for these initiatives on source control to take effect.

After taking action, the general timescale for environmental recovery from some of the effects of pollution will also vary, typically being longer for lochs and estuaries than for rivers. As a consequence, some water bodies and protected areas are not expected to recover until after 2027.

2.3 Rural land use

The rural land use sectors have a big influence on Scotland's environment, and changes to the management of soil and land can play a large part in reducing greenhouse gas emissions, increasing resource efficiency and reducing pollution.

Scotland is widely recognised as having one of the leading approaches in Europe for dealing with rural diffuse pollution. The Rural Diffuse Pollution Plan for Scotland identified 57 priority catchments for focused effort to reduce diffuse pollution impacts. These contain some of Scotland's most important waters for conservation, drinking water, bathing and fishing. Farm visits have started in 44 priority catchments with work due to begin in the remaining 13 before the end of the second RBMP cycle.

Rural sectors such as agriculture and forestry have made substantial progress in improving their practices, and compliance with environment legislation has increased significantly since the initiative started. For example in the Tay and South Esk catchments compliance with the diffuse pollution rules relating to cultivation has increased from 62% at the time of the first farm visit to 94% at the time of revisit. Likewise in the Galloway coastal priority catchment, which is a predominantly livestock catchment, compliance with the diffuse pollution rules has increased from 26% at the initial visits to 95% after revisits. While SEPA has taken the lead in much of the priority catchment work, partnership working has been essential in raising awareness of land managers to the problem of diffuse pollution.

Despite this significant progress, further changes to the way in which rural land is managed will better protect the environment. Too much soil and too many nutrients are lost from land, creating waste which then pollutes watercourses. A shift towards more efficient resource use, for example through nutrient and soil management planning will help to address the remaining issues. This will increase farm resilience as well as reducing environmental damage.

We are confident that more sustainable use of land will make a positive contribution to protecting soils and improving water quality and SEPA will continue to monitor these catchments and undertake farm visits to ensure there is no deterioration. However our current best estimates suggest that further action is needed to achieve the required improvement.

Water quality has improved in some rural catchments and while this is positive we know that lag times mean that it can take many years for diffuse pollution actions to translate into significant changes to the condition of the water body.

2.4 Restoring resilience in physically modified rivers

The physical condition of Scotland's water environment includes the beds, banks and shores of rivers, lochs and coastal waters. In some areas, the physical condition of the water environment has been altered to make space for urban development and agriculture and thereby allow economic development and growth. These alterations have included actions such as straightening, building embankments, removal of riparian vegetation and dredging.

The restoration of the affected rivers creates opportunities to provide benefits for wildlife and people. Promoting natural processes also helps to reduce harmful erosion, and limit soil loss. In the right place, working with partners, river restoration in particular can act as a catalyst for urban regeneration, making better places for communities that offer opportunities for recreation, amenity and active travel. Such projects will increase resilience to higher temperatures and more frequent floods caused by climate change.

SEPA is reviewing the tool used to assess the physical condition of rivers. The new tool will give SEPA greater confidence in its assessment of the scale of any damage done to the ecology of rivers by physical alterations. We hope to include the results

of this in the third river basin plan for Scotland to help identify the best place to focus efforts.

Larger river restoration projects involve major civil engineering challenges. Similar to the removal of fish barriers, it takes about five years to scope the options, design, and complete a project to restore a river. Each step requires specialist technical expertise, so capacity needs to be considered. Working with a range of partners is essential to the successful delivery of these actions.

The Scottish Government has increased the level of funding available to support restoration projects through the Water Environment Fund. SEPA has been developing projects in partnership with local authorities and others to deliver benefits for public amenity, health and wellbeing, active travel, flood risk management and biodiversity. It is important that we can identify and take advantage of any funding available to support delivery of those benefits.

2.5 Manmade barriers to fish migration

The water environment hosts a wide range of structures that people have built for navigation, water abstraction, road and rail crossing, and water storage. These provide important functions and support economic development but do not always allow migratory fish such as salmon and sea trout to travel freely to and from their breeding and rearing grounds. The affected fish, in particular Atlantic salmon and sea trout, are iconic species for Scotland, as well as being important for the local economies of many areas, bringing in valuable income from fisheries. They are, however, facing significant challenges from a number of pressures, including the effects of climate change. There is an urgent need to support these populations and build resilience where possible to counter these effects. Addressing artificial barriers to migration is usually the most cost-effective, reliable and fastest way to achieve this. In many urban areas of central Scotland, where water quality has greatly improved in recent decades, barriers to fish migration are now the main factor preventing fisheries fulfilling their potential.

We know that at least 200 barriers will need to be addressed in the third RBMP cycle to fulfil RBMP objectives, which will make a major difference to the resilience of many populations of migratory fish. We are still finding fish barriers, with around 40 more identified since the publication of the second plans. We are also working to

understand more about the extent of habitat above barriers, and using this information to make sure that the benefits justify the costs involved, and that projects are suitably prioritised.

Larger barrier projects involve major civil engineering challenges. It takes about five years to scope the options, design, and complete a project to remove or ease a fish barrier. Each step requires specialist technical expertise, so capacity needs to be considered. Working with a range of partners is essential to the successful delivery of these actions.

As well as taking several years to remove or ease a barrier to fish migration, the process is expensive. We must be mindful of the financial burdens involved in addressing the problems. For some small scale industries even a small number of actions could impose severe financial burden. For local authorities the issue may be that they are responsible for a large number of fish barriers the removal of which will require a disproportionately large investment and a phased approach.

2.6 Hydropower

Hydropower makes an important contribution to Scotland's commitment to generate the equivalent of 100% of its annual electricity needs from renewable sources by 2020. Many hydropower schemes hold water in reservoirs so it can be used to generate electricity when it is most needed. This makes it a valuable supplement to other renewable energy sources that are unable to generate on demand. However, water abstraction and the infrastructure associated with large scale hydropower schemes means that about 40 water bodies have severe flow impacts and around 70 restrict fish migration.

As climate change impacts become more apparent, water resources will come under greater pressure. The efficient use of water resources will become more important, and the balance between water use by industry and environmental flows will need greater emphasis.

We are working with partner organisations to develop a programme that identifies sites at which we are confident mitigation actions are required. We need to increase our understanding of the ecological impact in other waterbodies where the benefits of mitigation actions are less certain.

SEPA is working with partners to understand the challenges with fish passage at large dams including downstream smolt migration. This is technically challenging and expensive research, and more work is needed to build confidence in some instances in the scale of the issue and the most appropriate delivery programme. The investment required would fall on a small number of companies, so the programme of investment must be planned and phased throughout the remaining planning cycle.

2.7 Fish farming and wild fish interactions

The population of wild Atlantic salmon in Scotland has declined by more than 50% since the 1960s and significant declines in adult sea trout numbers have also been reported. Many different pressures contribute to this decline, but the principal reason is a significant fall in the survival rate of Atlantic salmon during the marine migration phase of their life cycle over the last 40 years. The causes of losses at sea are not fully understood, but a major factor is thought to be changes in predator and prey relationships in their marine feeding grounds, driven by climate change. Interactions with farmed fish may also be contributing to these losses. The finfish aquaculture sector has high ambitions for growth, and it will be important that this takes place without unacceptable environmental harm.

There is increasing international evidence indicating that sea lice abundance in coastal waters can be elevated where open pen fish farming takes place, and that high abundances of sea lice can contribute to some of the losses of wild salmon and sea trout at sea. Escaped farmed fish can also interbreed with native fish, resulting in adverse genetic effects on wild populations.

A new spatial management framework is being developed by Scottish Ministers to enable more effective planning of aquaculture developments based on the best available data, enhanced monitoring and adaptive management, ensuring that the sector can grow sustainably while properly managing impacts on wild salmon and sea trout populations.

2.8 Invasive non-native species

There are currently no specific RBMP actions planned to address invasive non-native species (INNS), but they are becoming a challenge which will require attention if ecological deterioration is to be avoided in the future. Scotland has 21 of the 36

species of plant and animal listed as having a high impact on the water environment in the UK. Of them, 11 are in fresh water and the others are marine species. If we don't address the problem of INNS now they will continue to spread and result in greater harm in the future.

INNS impact our ecosystems by out-competing native species, which diminishes biodiversity and reduces the resilience of systems to adapt to change. In a number of places, INNS are a significant cause of damage to river banks, and prevent communities benefitting from, and connecting with, their local environment. Climate change will further shift the balance, and will mean that a wider range of non-native species become invasive in future.

Most actions to address INNS focus on preventing the introduction and further spread of high risk species. This is more cost effective and less environmentally damaging than attempting to control the species once they have become established. Eradication of INNS is usually expensive and complex, with a high risk of failure. Early detection and targeted removal of smaller, isolated outbreaks is most likely to be successful. In order to succeed, however, actions have to be delivered at the catchment scale with a strategic approach, clear leadership and effective partnerships between those involved. This needs community support and involvement.

3 Consultation opportunity

Do you think we have identified the most important issues that are impacting on our water environment in Scotland?

This consultation covers the whole of Scotland, including all of the Scotland River Basin District, and the parts of the Solway Tweed River Basin District which lie in Scotland.

You can respond to this consultation online or by sending your comments on the proposal to:

SEPA RBMP Unit
Strathallan House,
Castle Business Park,

Stirling,
FK9 4TZ.

Responding online will help us collate and analyse the information you provide and we would prefer responses to be submitted in this format.

Alternatively, if you are unable to access the online tool, you can respond by email to rbmp@sepa.org.uk

This consultation runs from 19 December 2019 to 19 June 2020.