natural scotland
SCOTTISH GOVERNMENT

A public consultation to inform the development of the second river basin management plan for the Scotland river basin district

Working together to protect and improve our water environment

Data and maps

The maps and charts shown in this document are produced by SEPA's online data tool. In most cases, you can find more detail and view the mapping at a local scale using the online tool. Information is also available here for the whole of Scotland.

Publication date: December 2014

Contents

Foreword

Scotland's water environment is one of our greatest natural assets providing many ecosystem services which support our health, wellbeing, wildlife and the sustainable growth of our economy. Our vision is one where the water environment is improved and these essential services preserved and enhanced for the benefit of current and future generations. This consultation describes how, by working together, Scotland's public bodies, businesses and catchment partnerships can realise this vision.

River basin management planning is at the heart of sustainable water management, securing widespread improvements in the water environment and in turn supporting Scotland's priority agendas. Collaborative working is essential if we are to realise this ambition, actively seeking opportunities to develop a shared vision and achieve common goals.

Scotland's first river basin plans enabled us to develop and trial pioneering approaches to tackling pressures from land management. This catchment-based approach allows the design of complementary solutions, while making the best use of our resources and delivering multiple benefits to all those who rely on the water environment for their livelihoods and leisure. Extending the principles of catchment scale delivery will be a core feature of our vision for an integrated approach to water management.

We can all relate to the impact that severe weather events can have on communities, individuals and businesses across Scotland. With climate change we have an expectation that such events will become more frequent. Flooding events have affected a number of communities over recent years - Flood Risk Management Strategies are being developed and these will be coordinated with river basin management planning. We also need to consider the increasing possibility of sustained periods of low rainfall and the potential implications of such events for communities and key sectors like food and drink. As such, the river basin management plans should be seen as a key component of Scotland's Climate Change Adaptation Programme.

We still face significant challenges ahead and recognise we must make significantly increased efforts as we strive to achieve this vision over the course of the next two river basin planning cycles. But these challenges are ones which also present us with excellent opportunities for exploring synergistic ways of working together.

Over the next few months, SEPA will be working with a wide range of responsible bodies, industries and stakeholder interests to build the partnerships necessary to deliver improvements benefitting Scotland's shared goals and priorities. Your input to this consultation and contribution to the delivery of the second river basin plan is essential in meeting this challenge.

How to respond

This consultation will be open for four months from 9 December 2014 to 9 April 2015. It sets out the changes proposed to the river basin management plan for the Scotland river basin district. We would appreciate your early involvement and engagement in the consultation to ensure your views are known.

It is part of a wider engagement programme and is one way you can influence how we protect and improve Scotland's water environment in the next river basin planning cycles. It also asks for your views on proposals for changes to designations of heavily modified water bodies, which are set out in a separate appendix.

The document is available in print and online. The easiest way to view it and submit a response is online[1] on the Scottish Environment Protection Agency's (SEPA) website. The online version also links directly to supporting maps and data at national, river basin district, catchment and water body scale.

The online tool allows you to:

- Download and read a copy of the consultation first before you consider your response.
- Download a word document to help you prepare your response, which you can then copy directly into the consultation tool.
- Save your online responses in the consultation tool at any time and return to them later. This allows other people to read and edit if you're working collaboratively.

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

If you are unable to access the online tool or do not wish to use it, you can respond by e-mail to rbmp@sepa.org.uk or by posting your response to:

SEPA RBMP Unit
Strathallan House
Castle Business Park
Scotland
Stirling
FK9 4TZ

A paper version of the consultation and response form can also be requested from the e-mail or postal addresses above.

[1] https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

1 Introduction

River basin management is about protecting and improving Scotland's rivers, lochs, estuaries, coastal waters and groundwater. Getting it right is important to ensure we can all enjoy the many benefits – the 'ecosystems services' – a clean and healthy water environment provides to our economy, our health and our social well-being. All our businesses rely on the water environment in some way or another and it plays a prominent role in the success of many, such as tourism, whisky production, fish farming and renewable energy generation. We all depend on fresh surface waters or groundwater for our drinking water and to take away our waste waters.

Our rivers, lochs and seas provide the setting for numerous shore-based recreational activities and a venue for a wide range of water-based ones. Some of the best salmon runs in the UK are found in our rivers and many of our best known landscapes are associated with water. Our coastal waters, inland waters and wetlands support a great diversity of wildlife, including internationally rare or endangered species. From the smallest burns and lochans to the seas around our shores, the water environment remains an important and integral part of Scotland's cultural fabric.

Sustainable management of the many ways we use water is central to river basin planning. Such management requires public bodies, water users and land managers to work together by continuing to build on the partnership approach developed in the first cycle. It will also help us achieve other policy priorities, for example, improving resilience to climate change; and contributing to the goals of our 2020 Challenge for Scotland's Biodiversity, the Scottish Forestry Strategy and flood risk management. It is more important than ever to make the best use of Scotland's resources, working together to deliver multiple benefits for businesses and communities alike - everyone has a role to play in achieving a healthy water environment.

Some of the key benefits of protecting and improving the water environment

- safeguarding and supporting the expansion of businesses that depend on a high quality water environment, such as tourism, fisheries, aquaculture and whisky production;
- providing cooling water for key industries such as distilleries and hydro power;
- providing effective dilution for pollutants;
- protecting drinking water supplies and avoiding increased purification treatment costs;
- maintaining and expanding opportunities for a wide range of recreational activities;
- contributing to the social well-being and regeneration of areas where a high quality water environment is, or has the potential to be, an important community amenity;
- protecting and enhancing wildlife, including rare and endangered species;
- improving our ability to cope with the effects of a changing climate (e.g. more frequent droughts, floods, heat waves etc.).

We are committed to reviewing and updating the river basin management plan every six years and will be publishing a new, updated river basin management plan towards the end of 2015. This consultation sets out our proposals for that second plan; your input will contribute to finalisation of this plan. Further detail on the Scottish part of the Solway Tweed river basin district can be found in the Solway Tweed consultation[2].

In 2013, we published a report on the *Current condition and challenges for the future* (CCCF)[3]. That report provided a detailed description of progress towards the objectives we had set for 2015 and identified where we would need to make a step change in our management of particular pressures if we are to meet our goals for 2021 and beyond.

In December 2009, the first river basin management plan for the Scotland river basin district was published simultaneously with the plan for the Solway Tweed river basin district[4]. It set out our environmental objectives for rivers, lochs, estuaries, coastal waters and groundwater and established a programme of measures designed to achieve them. Information on the costs and benefits of that programme was published alongside the draft of the first plan[5]. For the second plan, although we are proposing changes to the way work to achieve the objectives is phased over the second and third river basin planning cycles, the overall scale of the programme of measures required over that period is in line with that envisaged in 2009.

Our main proposals for the second plan are:

- re-phasing our objectives for 2021 and 2027 to ensure we prioritise those improvements that will bring the greatest benefits;
- step changes in the effort focused on the key significant management challenges;
- new or improved measures for tackling pressures on the water environment to help secure achievement of our objectives.

This consultation is an important part of a wider engagement process led by SEPA and involving discussions with a range of fora, businesses and other stakeholders with interests in the water environment. Your views are important and the outcomes of both processes will help to shape the second river basin management plan. A digest of responses to the consultation will be issued by SEPA in the autumn of 2015.

[2] https://consultation.sepa.org.uk/rbmp/solwaytweedplanconsultation

[3] Current condition and challenges for the future
http://www.sepa.org.uk/water/river_basin_planning.aspx

[4] The river basin plans for Scotland and the Solway Tweed river basin districts were published at the same time. They set out objectives for the sustainable management of the river basin district's rivers, lakes and lochs, estuaries, coasts and groundwater.
http://www.sepa.org.uk/water/river_basin_planning.aspx

[5] Impact Assessment for River Basin Management Plan for Scotland River Basin District.
http://www.scotland.gov.uk/Publications/2009/01/08093718/0

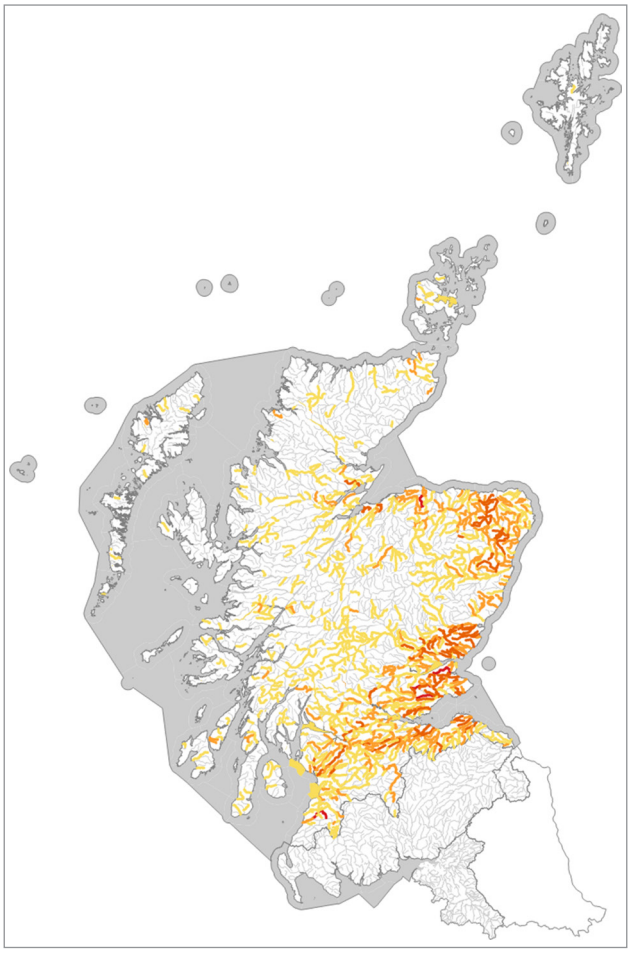
2 Meeting the challenge

The quality of many of the water bodies in the Scotland river basin district is already good or better[6]. However, around one third (approximately 960 water bodies) are expected to be still at less than good status at the end of 2015, shown in Map 1. All maps included in this document are available via the online consultation tool[7]. Improving these water bodies is the challenge for the second (2015 to 2021) and third (2021 to 2027) river basin management planning cycles.

For rivers, lochs, estuaries and coastal waters, our main aim is to ensure their ecological quality is good. This requires:

- water quality to be good (i.e. unpolluted);
- the quality of the physical structure of beds, banks and shores to be good;
- removal of significant man-made impediments to the movement of migrating fish;
- water flows and levels to be good;
- protection from invasive non-native species (INNS).

Map 1: Surface water bodies predicted to be at less than good status in 2015



Note to Map 1

The colouring of each water body indicates how many of the following five environmental requirements for good status are met: good water quality; good flows and levels; good physical structure of beds; banks and shores; good, unimpeded fish migration and protection from invasive non-native species.

Number of environmental requirements not at good status

1
2
3
4

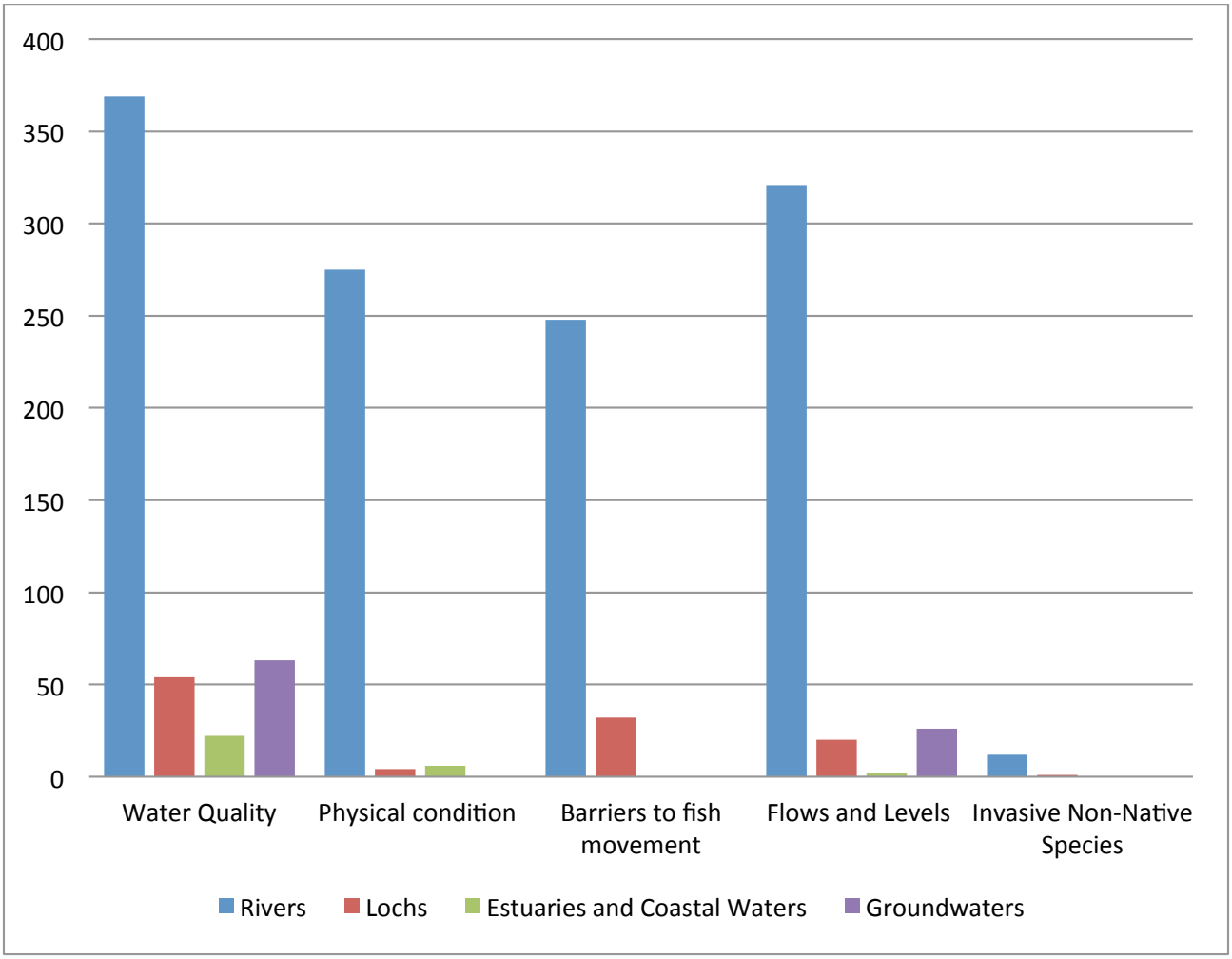
Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

[6] Further detail on the current classification of water bodies can be found at http://www.sepa.org.uk/water/monitoring_and_classification/classification/classification_results.aspx
[7] https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

The maps and figures that follow detail:

- the reasons for water bodies not being at good status in 2015 (Figure 1);
- the different sources of pressures on water quality (Figure 2);
- the distribution of water bodies with worse than good water quality across Scotland (Map 2);
- the different sources of pressures on water flows and levels (Figure 3);
- the distribution of water bodies with worse than good flows or levels across Scotland (Map 5);
- the distribution of water bodies with worse than good physical condition across Scotland (Map 3);
- the distribution of water bodies affected by barriers to fish migration across Scotland (Map 4);
- the distribution of water bodies affected by invasive non-native species across Scotland (Map 6).

Figure 1: Reasons for surface water bodies not being at good status in 2015

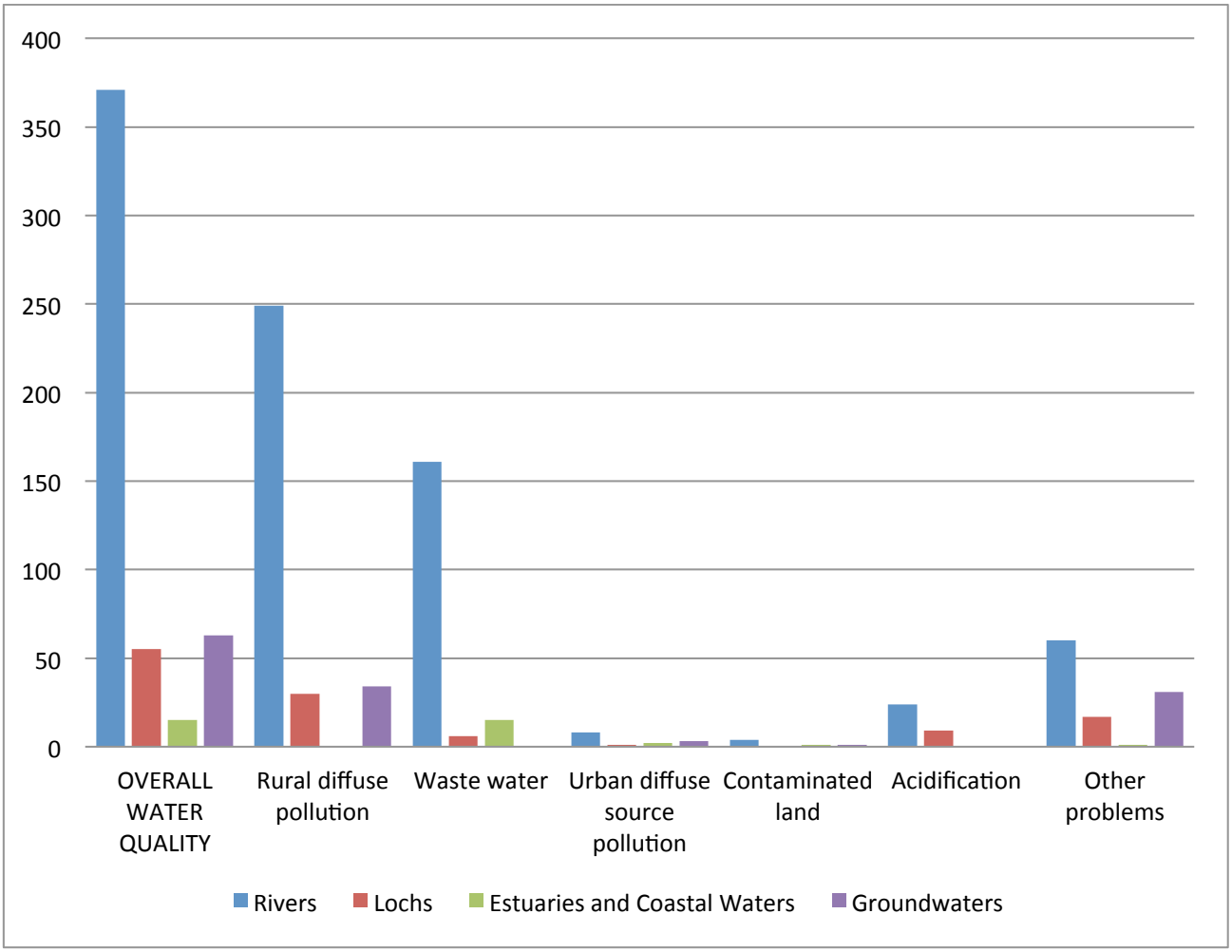


Note to Figure 1

For a number of water bodies, there will be more than one reason for their not being at good status in 2015. Such water bodies are included in the totals in each relevant bar in the bar chart.

More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Figure 2: Sources of pressures on water bodies where water quality is expected to be worse than good in 2015

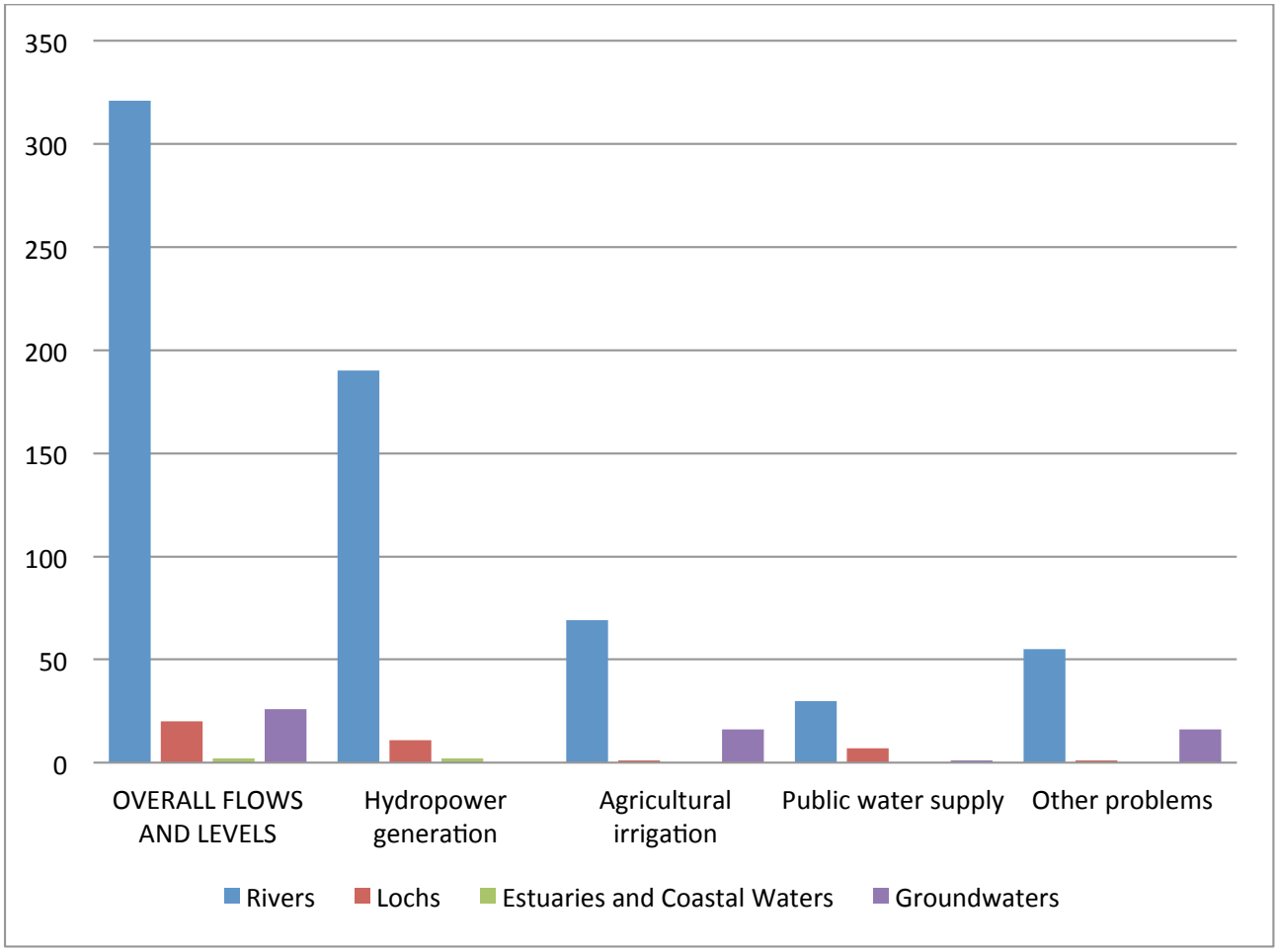


Note to Figure 2

A number of water bodies have more than one source of pollution that is contributing to the impact on their water quality. Such water bodies are included in the totals in each relevant bar in the bar chart.

More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Figure 3: Sources of pressures on flows and levels in water bodies where flows or levels are expected to be worse than good in 2015

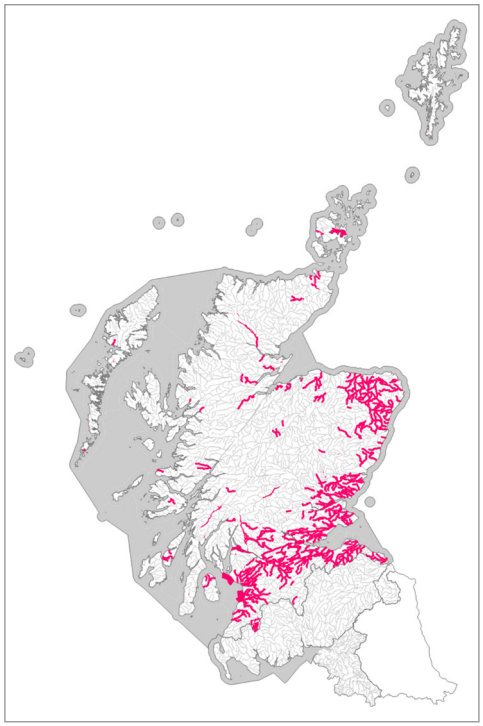


Note to Figure 3

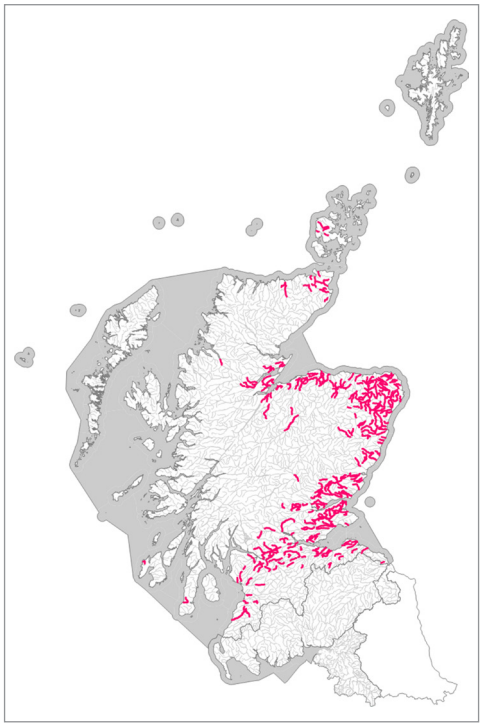
A number of water bodies have more than one source of pressure that is contributing to the impact on their flows or levels. Such water bodies are included in the totals in each relevant bar in the bar chart.

More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

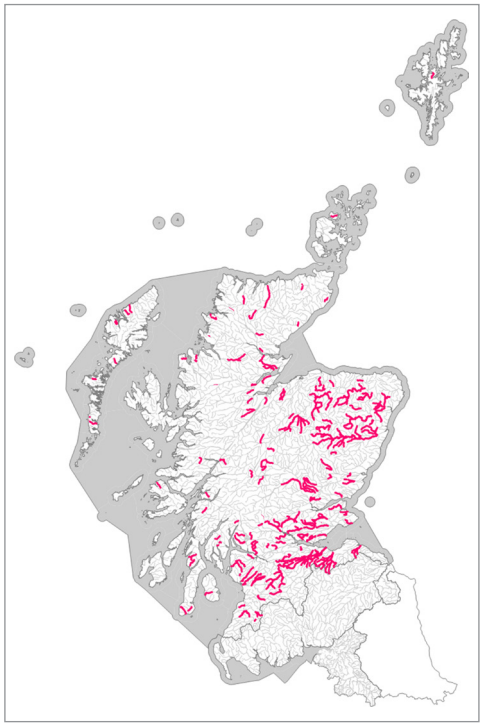
Map 2: Water bodies in the Scotland river basin district predicted to be worse than good status in 2015 due to impacts on water quality



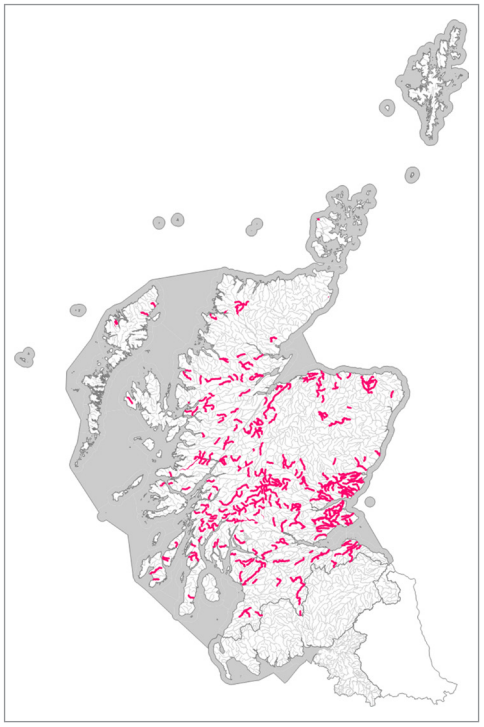
Map 3: Water bodies in the Scotland river basin district predicted to be worse than good status in 2015 due to impacts on the physical condition of their beds, banks or shores



Map 4: Water bodies in the Scotland river basin district predicted to be worse than good status in 2015 due to impact on fish populations of man-made barriers to fish movement

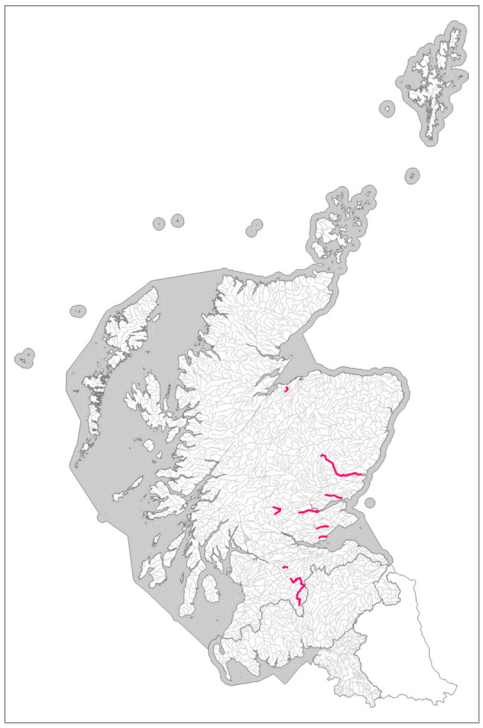


Map 5: Water bodies in the Scotland river basin district predicted to be worse than good status in 2015 due to impacts on flows and levels



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Map 6: Water bodies in the Scotland river basin district predicted to be worse than good status in 2015 due to impacts of invasive non-native species



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Since the first river basin plan was finalised in 2009, we have made good progress towards tackling pressures on the water environment. The approach we established for pressures resulting from activities requiring a license or permit (e.g. water abstraction, point source discharges of pollutants) is working well and we think this will enable us to achieve our objectives. In the case of other pressures, we have identified a number of management challenges[8] that need to be addressed for the next planning cycles.

The challenges include tackling inputs of toxic pollutants into surface waters from urban diffuse sources and into groundwater from contaminated land. Section 3 provides details of our plans with respect to these issues. The most significant challenges by far, however, relate to:

- reducing rural diffuse source pollution;
- improving the physical condition of the water environment;
- removing barriers to fish movement.

We have made important steps forward in managing these pressures during the first river basin planning cycle, but the scale of the task remaining means we will need to do much more in the second and third cycles. Sections 3 (rural diffuse pollution), 4 (physical condition) and 5 (barriers to fish migration) set out a number of alternative scenarios[9] for how we might prioritise and phase our efforts to do so.

Getting the phasing right is important so that we strike the right balance between making significant progress in improving the water environment while not attempting programmes of work that are too large to feasibly manage and deliver.

[5] For further details see the Current conditions and future challenges report, http://www.sepa.org.uk/water/river_basin_planning.aspx
[6] Where the scenarios are described, they are for the whole of Scotland and not just the river basin district.

3 Water quality

Water quality in over 640 water bodies across Scotland is still expected to be worse than good in 2015, with 508 of these in the Scotland river basin district (see Map 2 in Section 2).

There are a wide range of environmental and socio-economic benefits to be gained from protecting and improving water quality, including helping to:

- safeguard and support the expansion of businesses that depend on a high quality water environment such as tourism, fisheries, aquaculture and whisky production;
- protect drinking water supplies and avoid increased purification treatment costs;
- maintain and expand opportunities for a wide range of recreational activities;
- contribute to the social well-being and regeneration of areas in which a high quality water environment is, or has the potential to be, an important community amenity;
- protect and enhance wildlife including rare and endangered species.

The most widespread pressures remaining on water quality will be inputs of nutrients, pesticides and bacteria.

Inputs of these pollutants from waste water discharges will be appropriately and progressively addressed through Scottish Water's investment programme, Quality and Standards (Q&S), over the next two planning cycles.

Rural diffuse sources affect by far the greatest number of water bodies. To reduce these, we will need to build on and significantly expand the approach developed in the first river basin planning cycle.

Waste water disposal

Addressing the impacts of waste water discharges on the water environment requires considerable investment in upgrading sewers and waste water treatment works. These investments are made through Scottish Water's publicly-funded Q&S programme.

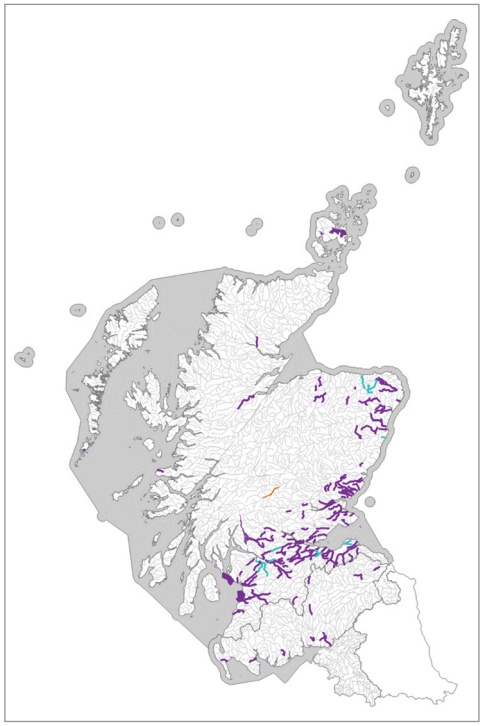
The investments planned for the second cycle include a large investment in Glasgow's wastewater treatment network. This will benefit the River Clyde and its tributaries as well as reducing the risk of flooding in urban communities.

Alongside the planned improvements for the second cycle is a significant study programme, due for completion in 2018, which will inform the improvements needed in the third cycle.

For the purposes of the second river basin management plan, we are working on the basis that discharges of waste water affecting around 200 water bodies in Scotland might need to be addressed in the third cycle. However, until the results of the studies are known, some uncertainty remains around the scale of work required.

We are aiming to meet our targets for waste water disposal through Scottish Water's Quality and Standards programme

Map 7: Water bodies where waste water discharges are known or thought to be contributing to impacts on water quality across Scotland



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Rural diffuse pollution

The scenarios presented in this section are for the whole of Scotland, not just the Scotland river basin district.

The way land is managed affects the quality of the water environment. Rural diffuse pollution can result when rainwater run-off from land picks up soil, fertilisers and pesticides used in agriculture, forestry and other rural land uses. Inputs of pollutants from septic tanks can also contribute but the dominant sources of rural diffuse pollution are typically agricultural.

SEPA estimates that in 2015 rural diffuse source pollution will still be contributing to adverse effects on water quality in around 400 water bodies across Scotland (see Maps 8a and 8b). Most of these water bodies are rivers but the figure includes 35 lochs and around 40 groundwater bodies.

Almost 100 protected areas across Scotland are also affected by rural diffuse sources of pollution. For more information on individual protected areas, go to the online data tool[10] and either search or zoom in on the area of interest.

The areas affected are as follows:

- 13 sites protected under European legislation because of their importance for wildlife conservation;
- 27 bathing waters;
- 52 shellfish waters;
- 7 drinking water protected areas.

The priority catchment approach

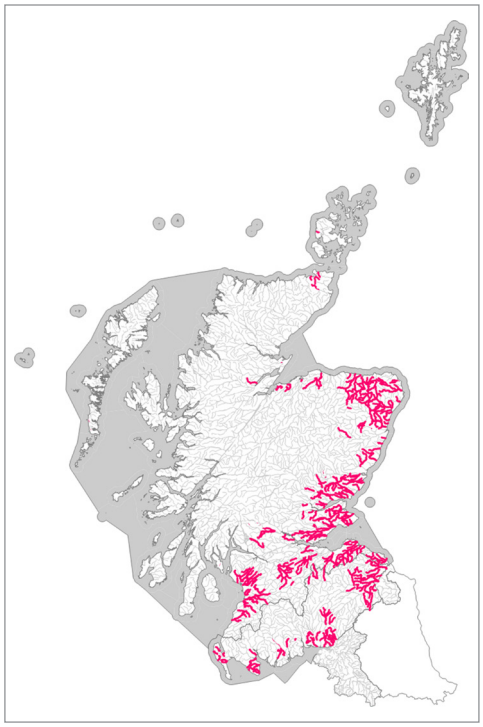
Scotland is widely recognised as having one of the leading approaches in Europe for dealing with rural diffuse source pollution. This approach, which we developed for the purposes of the first river basin plan, involves:

- prioritising river catchments for targeted efforts to tackle diffuse pollution;
- working closely with land managers in those river catchments to reduce diffuse pollution risks through good land management practices.

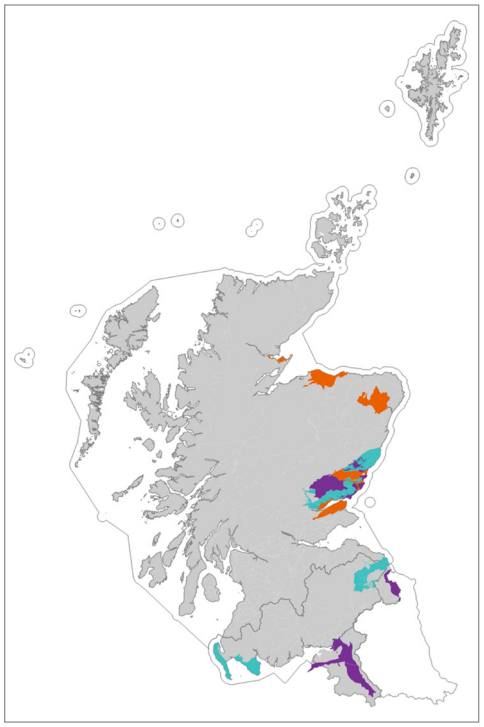
Known as the diffuse pollution 'priority catchment' approach, it is designed for large areas of land where land use is dominated by intensive arable or livestock farming or by forestry. It is proving effective in securing the necessary changes in land management practices. These changes are set out in general binding rules (GBRs)[11]. The work is co-ordinated by the Diffuse Pollution Management Advisory Group (DPMAG)[12], whose members represent a cross section of rural, environmental and wildlife conservation interests. In addition to the priority catchment work, targeted action programmes[13] are in place to reduce pollution of vulnerable groundwater and estuaries by agricultural nitrates.

[7] https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation
[8] In the Water Environment (Controlled Activities) (Scotland) Regulations 2011
[9] DPMAG http://www.sepa.org.uk/water/river_basin_planning/diffuse_pollution_mag.aspx
[10] http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/Environment/NVZintro

Map 8a: Surface water bodies subject to rural diffuse pollution, expected to be at less than good in 2015



Map 8b: Groundwater bodies subject to rural diffuse pollution, expected to be at less than good in 2015



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

For the first plan, we worked with land managers in 14 priority catchments throughout Scotland to deliver improvements in line with the GBRs. On-going work will be needed in the next cycles in these catchments to ensure the required changes in management practices are firmly embedded. There are a further 43 priority catchments where reducing diffuse source pollution will be necessary if we are to achieve our objectives for the water environment.

Work in other catchments requiring a targeted approach

Rural diffuse source pollution can also be a problem outside of areas of intensive arable or livestock farming. These typically include areas where there is low-intensity hill farming and sheep grazing. We have identified over 60 of these areas. Different solutions from those used in the priority catchment approach will need to be developed and then implemented.

The areas concerned are typically much smaller than priority catchments and to distinguish them from these, they are referred to as 'diffuse pollution focus areas' for the purposes of this consultation.

Proposals for the next two river basin planning cycles

We are proposing to:

- prioritise the priority catchments and focus areas according to where we expect work in those areas to deliver the greatest benefits;
- build on the existing approach by increasing the effort focused on tackling rural diffuse source pollution.

The criteria used to help prioritise the priority catchments and focus areas were developed in consultation with DPMAG and are summarised as follows:

Criteria for prioritising catchments for action

- Evidence of adverse ecological impact on water bodies;
- evidence that individual protected area objectives are being compromised, including:
  - bathing waters where further reduction in bacterial pollution is required to meet at least sufficient by 2021;
  - drinking water protected areas at risk from diffuse pollution;
  - shellfish waters and in particular those producing species that are usually eaten raw, e.g. oysters;
  - areas protected for wildlife of international conservation importance.

We would like your views on how we should expand the work to address rural diffuse source pollution across Scotland. Three scenarios are described including:

- a baseline scenario indicating the work that could be done by rolling forward the existing approach without any step change[14],
- two scenarios illustrating how different step changes in effort would affect the phasing of work and hence when we could achieve our environmental objectives.

[14] All the scenarios include all the priority catchments and focus areas in Scotland, including those in Scottish area of the Solway Tweed river basin district. For more information on the Solway Tweed river basin district, see the Solway Tweed consultation document.

Figures 4 and 5 and Map 9 illustrate the phasing of measures in priority catchments and focus areas under each scenario.

Baseline scenario

- In this scenario, the concentrated effort required in 28 priority catchments would be completed by 2027.
- Work would not start in a further 14 priority catchments until well after 2027.
- No work would be possible in focus areas until after 2027.
- For water bodies and protected areas where work is not started until after 2027, the criteria required to allow the setting of less stringent objectives would not be met.

Step change 1 scenario

- The concentrated effort required in priority catchments and focus areas would be phased over the second and third cycles.
- Because of the lag time for ecology recovery[15], water bodies in the priority catchments scheduled for work in the third cycle would not reach good status until well after 2027.
- Phasing some of the work to start in the third cycle means that there is a greater risk of slippage in achieving objectives and the criteria required to allow the setting of less stringent objectives in such circumstances may be difficult to meet.

The additional cost per year for SEPA compared with the baseline scenario would average around £1.3 million in the second cycle and £1.4 million in the third.

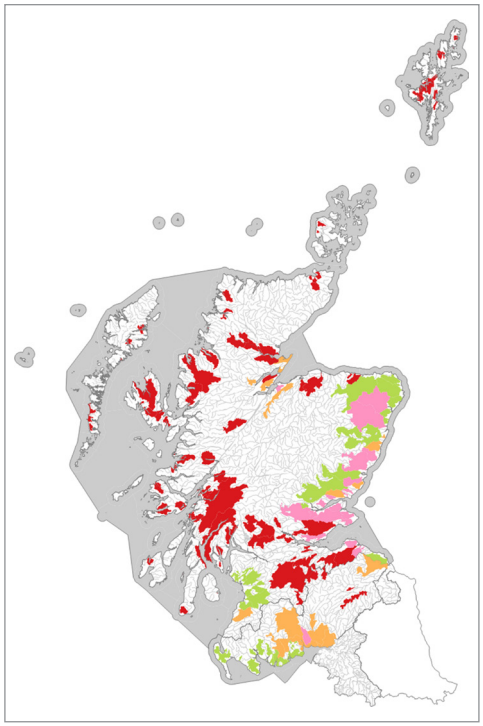
Step change 2 scenario

- The concentrated effort required in priority catchments and focus areas would be completed in the second cycle.
- Starting work in the second cycle would allow ecological recovery in the maximum number of water bodies by 2027.
- There would be challenges in terms of training and recruitment but overall we consider this scenario would be feasible.
- This scenario would more clearly fulfil our commitment to achieve good status by 2027.

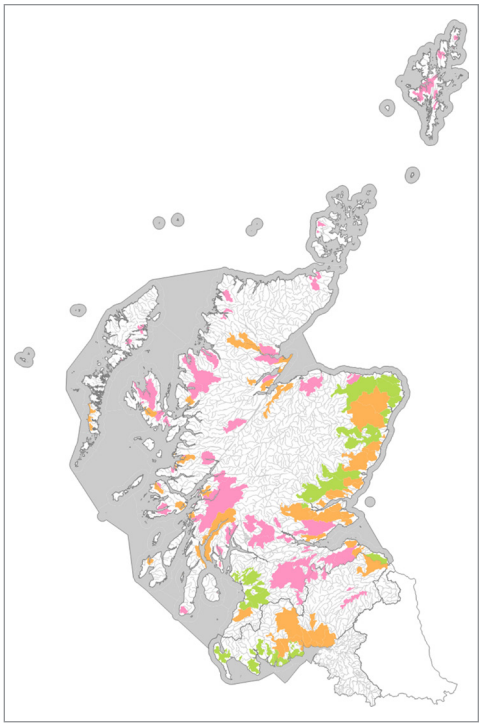
The additional cost per year for SEPA compared with the baseline scenario could average around £2.7 million in the second cycle and £1.1 million in the third. The earlier phasing of the work is reflected in the higher additional cost up to 2027 compared with the step change 1 scenario.

[15] Predicting how quickly water bodies may recover after measures to tackle rural diffuse pollutions have been taken is not an exact science. We have based the scenarios on an average recovery time from nutrient pollution of six years for rivers and 12 years for lochs.

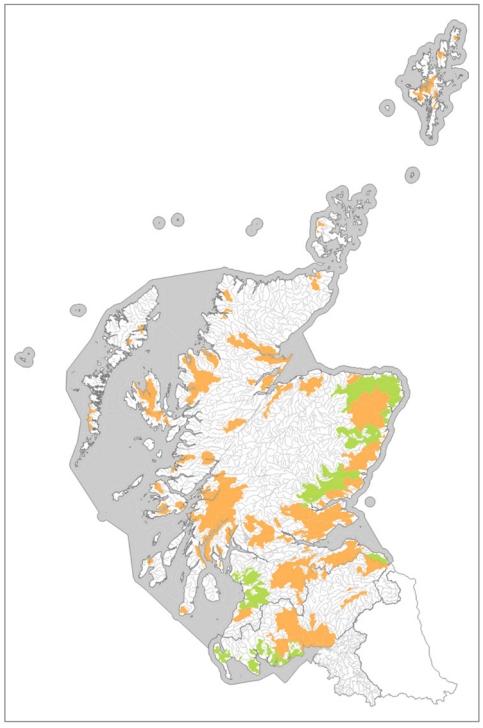
Map 9: Phasing of measures in priority catchments and focus areas under each scenario



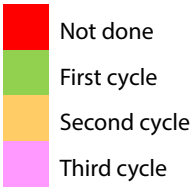
Baseline scenario



Step change 1

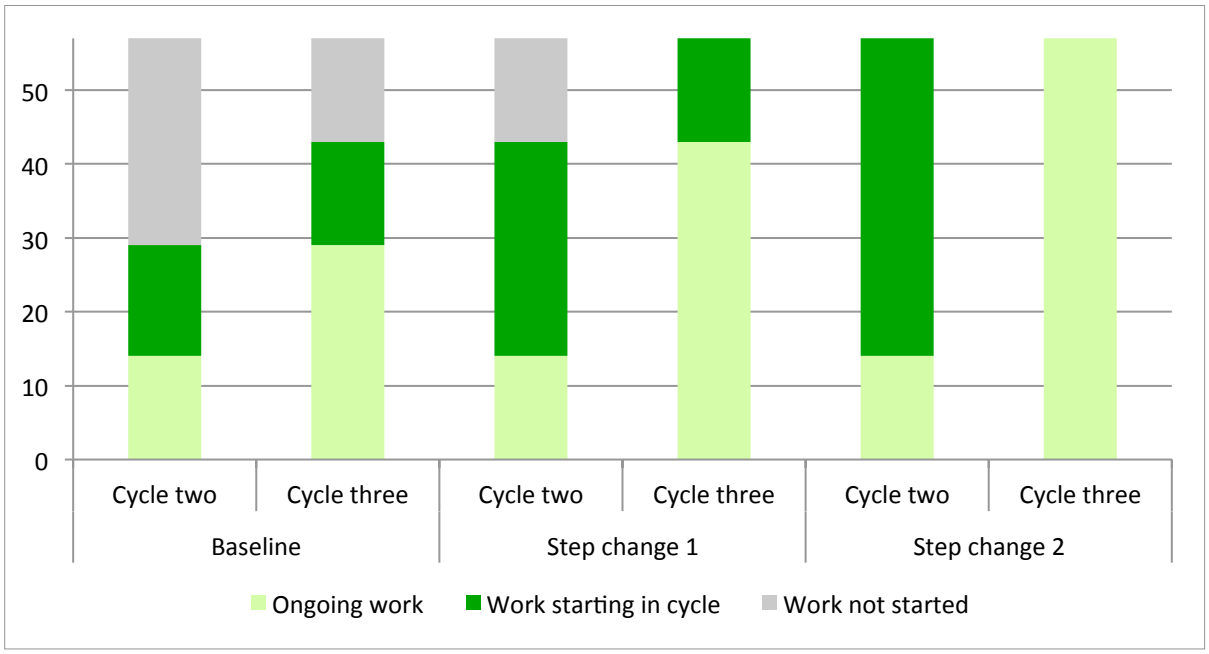


Step change 2



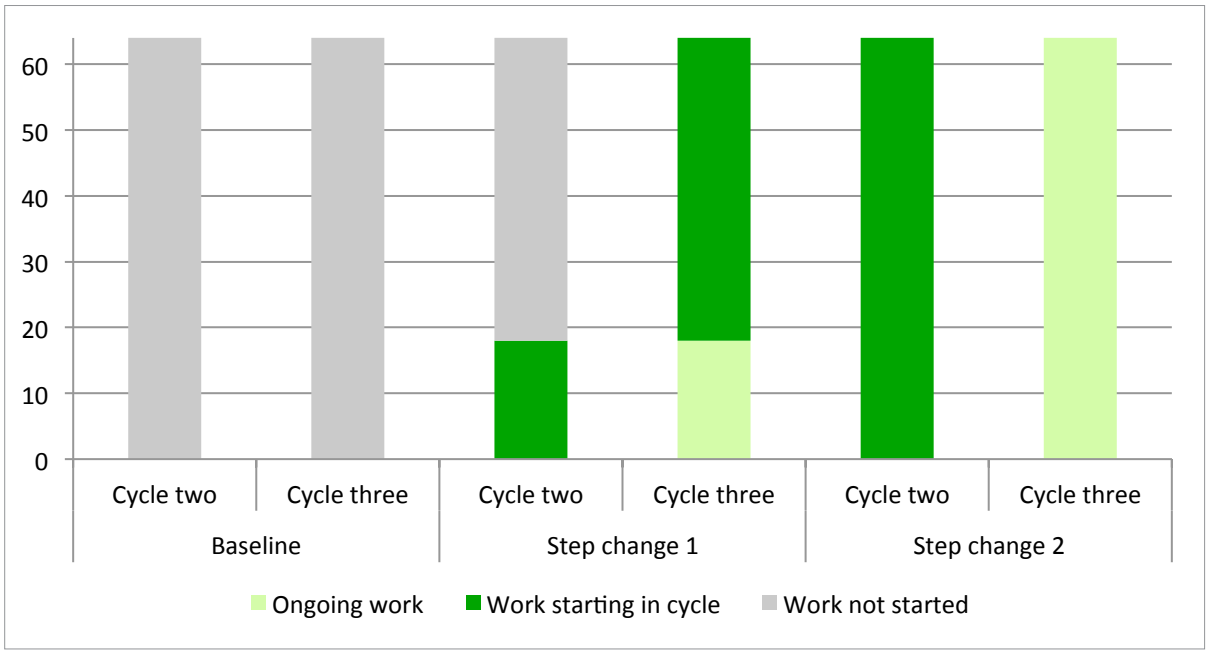
Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Figure 4: Phasing of measures in priority catchments under three scenarios, 'baseline', 'step change 1' and 'step change 2'



Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

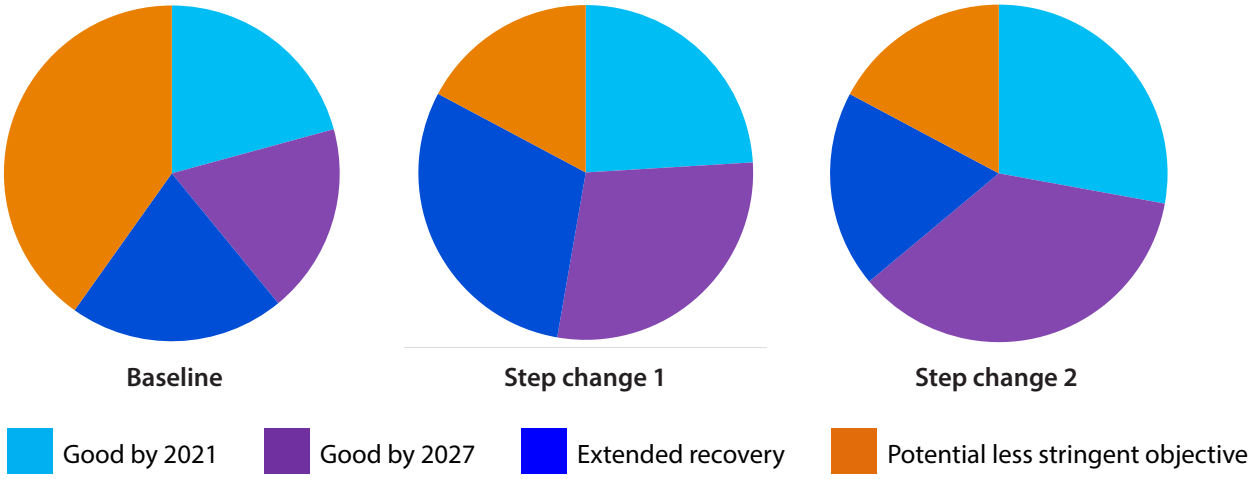
Figure 5: Phasing of measures in focus areas under three scenarios, 'baseline', 'step change 1' and 'step change 2'



Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Carrying out this programme of work is expected to achieve the improvements in water quality described in Figure 6. The improvements shown also factor in the effect of the measures to reduce pollution from waste water discharges.

Figure 6: Expected improvements in water quality in the 366 water bodies within the priority catchments and focus areas that are affected by nutrients and pesticides



Note to Figure 6

'Good' means that both water quality and the ecology previously impacted by worse than good water quality have recovered to good status.

'Extended recovery' means that pollutant inputs have been appropriately reduced by the end of 2027 but, because of the length of time needed for natural recovery processes, the achievement of good will be delayed until after 2027.

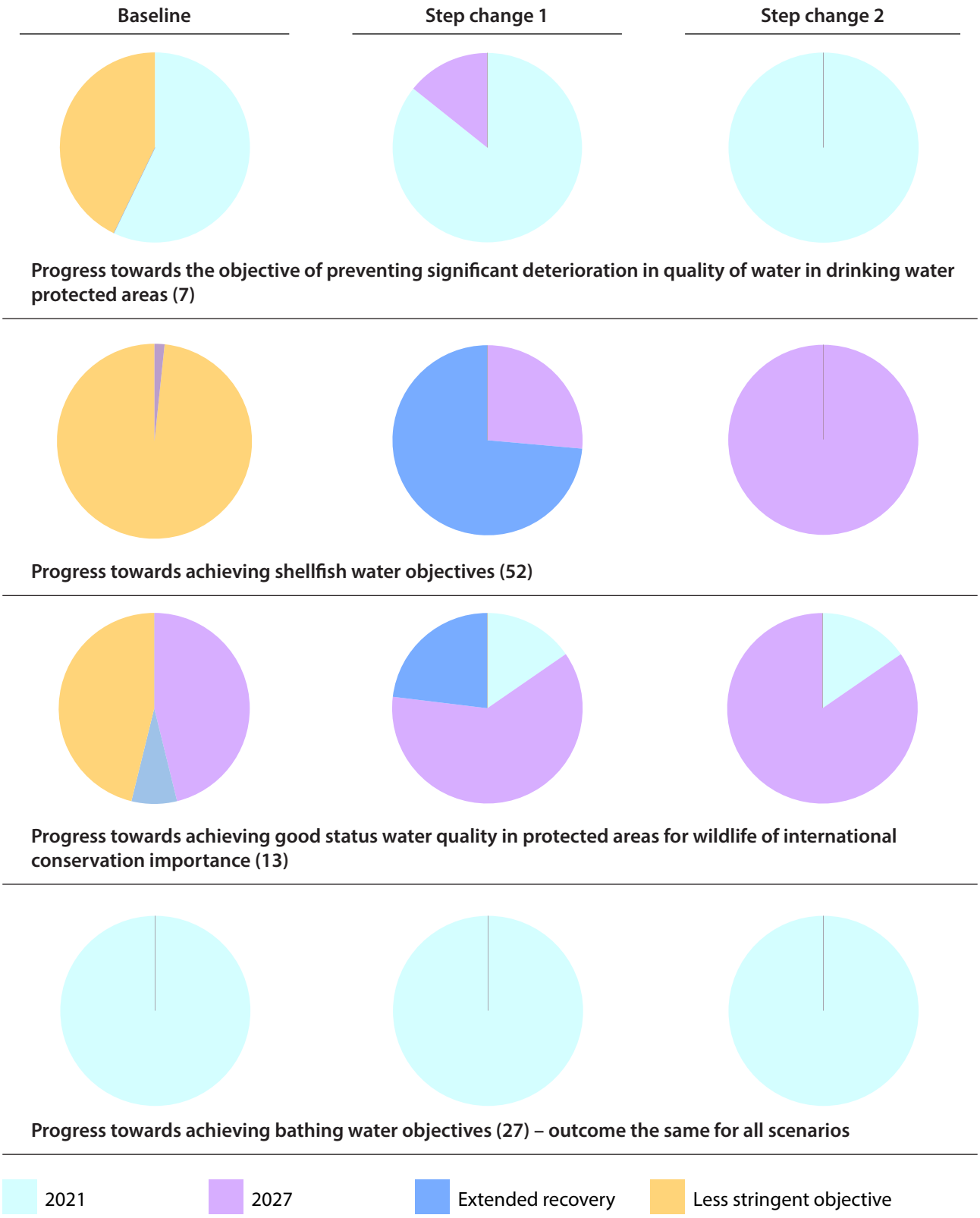
'Potential less stringent objective' means that the measures planned up to 2027 may not be sufficient to achieve good status even when allowing for the time needed for natural recovery.

To set a less stringent objective, we are required to show that it would be infeasible or disproportionately expensive to achieve good status.

Uptake of suitable measures of the type potentially funded under the Scottish Rural Development Programme (SRDP) may reduce the number of potentially less stringent objectives under the step change 1 and 2 scenarios. We will review progress in the second cycle to identify if any further action is needed.

Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Figure 7: Expected improvements in water quality in protected areas under each of the three scenarios for priority catchment and focus area work



Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Consultation question

Q1 **Which scenario do you consider to strike the appropriate balance between effort and feasibility in addressing rural diffuse pollution?** Please give reasons for your views.

Urban diffuse source pollution and land contamination

Toxic pollution arising from diffuse urban sources and land contamination is emerging as a management challenge for the Scotland river basin district. On the basis of SEPA's current monitoring information, the scale of pollution from these sources appears limited. However, SEPA's monitoring does not yet include consideration of a number of pollutants ('priority substances') recently identified at EU level as being of concern and may well underestimate the scale of the problem and technical ability to detect some of the most toxic pollutants, which is currently limited. We have also agreed an ambitious objective of aiming to phase out emissions, discharges and losses to the environment of the most hazardous pollutants, known as priority hazardous substances.

The priorities for the period 2015 to 2021 will be to:

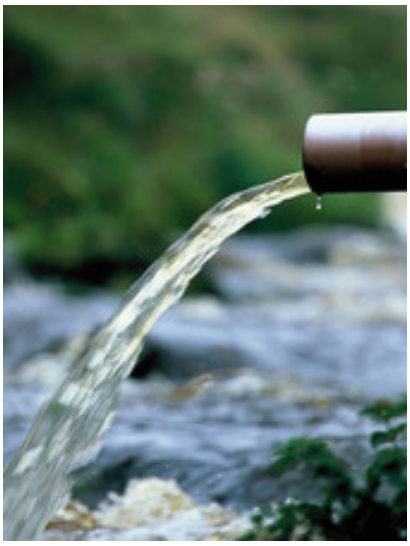
- better understand where the water environment is at risk from toxic pollution;
- where it is at risk, identify key sources of the pollutants concerned;
- design and prioritise action to reduce the most significant sources.

Toxic substances and urban diffuse source pollution

Toxic substances can enter the water environment through a combination of point and diffuse sources. One of the major routes into the water environment is through run-off from roads and other urban surfaces.

SEPA's assessments indicate that there are 13 water bodies within the Scotland river basin district that are at risk of not meeting good status in 2015 due to the effects of toxic substances. Most of these are rivers but the total includes one loch and two estuaries.

We are proposing to target efforts in the second cycle at improving our understanding of the scale of the problem through focussed monitoring and assessment work. This will ensure that any action subsequently required is prioritised towards the most serious problems. We will also continue to work with other agencies across the UK and Europe to raise awareness about pollution risks and how they can be managed, including strengthening legislative controls on the use of specific substances where appropriate.



We are developing new strategies for dealing with toxic substances arising from urban diffuse pollution

Land contamination

Land that has been historically contaminated by pollutants can cause damage to the water environment as those pollutants leach into groundwater. In the majority of cases, this causes localised hotspots of pollution in groundwater but, in a smaller number of cases, the plume of pollutants caused can expand sufficiently to threaten the status of groundwater bodies and the surface water bodies into which they flow. In the Scotland river basin district, five groundwater bodies and five surface water bodies are predicted to be at less than good status in 2015 due to pollution from land contamination.

SEPA is already working with industry and site owners to make improvements to the majority of the water bodies known to be affected. One of these, the outer Clyde Estuary, is expected to reach good status by 2021.The other four water bodies are not expected to achieve good status until after 2027. In the case of the groundwater bodies, recovery to good status is likely to take many decades.

We are improving our strategy for assessing and dealing with waters affected by land contamination

For the second cycle, we are planning to improve our strategy to ensure that contaminated land posing a pollution risk is identified and the risks are then appropriately addressed. This will involve closer working between SEPA and local authorities to understand the extent of the problem through better coordination of their assessments and sharing of information. The Scottish Government will also review the existing legislative framework enabling risks from contaminated land sites to be addressed with a view to strengthening it as necessary.

Consultation question

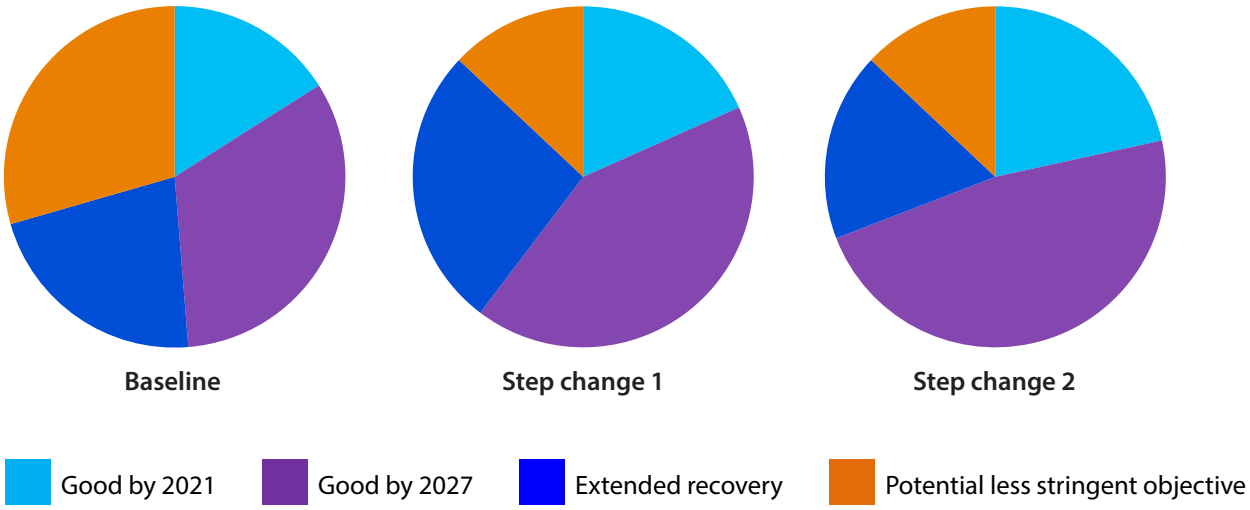
Q2 **Do you agree with the general approach for managing the other pressures on water quality?** Please give reasons for your views.

Overall water quality improvements in the Scotland river basin district

What we can achieve in terms of water quality improvements in the Scotland river basin district in the second and third cycles depends on the combined effects of efforts to reduce pollution from each of the different sources. The efforts include those described in the previous sections in relation to our proposals for action on waste water discharges, rural diffuse source pollution, urban diffuse source pollution and pollution from contaminated land. We will also continue to steadily address other sources through regulation and partnership working (e.g. with the Coal Authority to deal with the impact of polluted water in abandoned mines).

The overall effect of this programme of measures is described for the Scotland river basin district in Figure 8 and Map 10. These illustrate the effect of the effort we devote to tackling rural diffuse pollution on the water quality achieved.

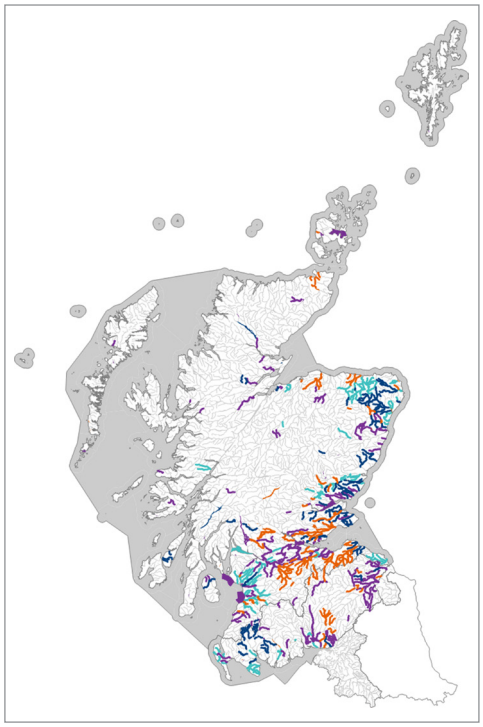
Figure 8: Projected effect of all second and third cycle pollution reduction measures on the water quality of the 431 surface water bodies affected by pollution



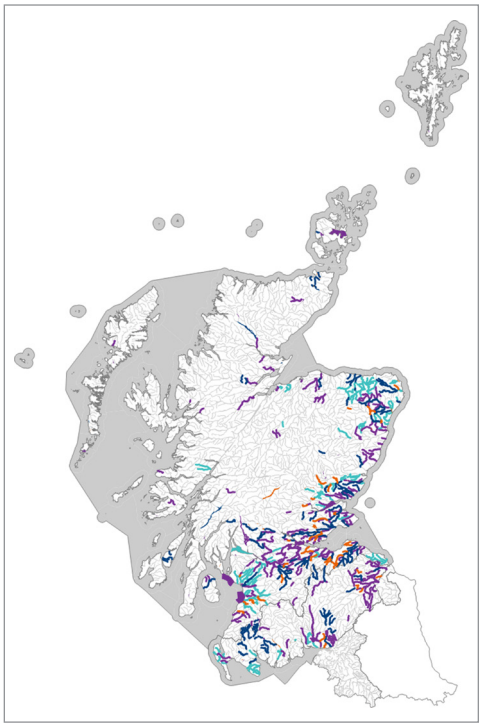
Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Since no protected areas are affected by pressures on water quality, other than those that are covered by the rural diffuse pollution and Q&S work, there is no difference to the potential outcomes shown previously in Figure 6.

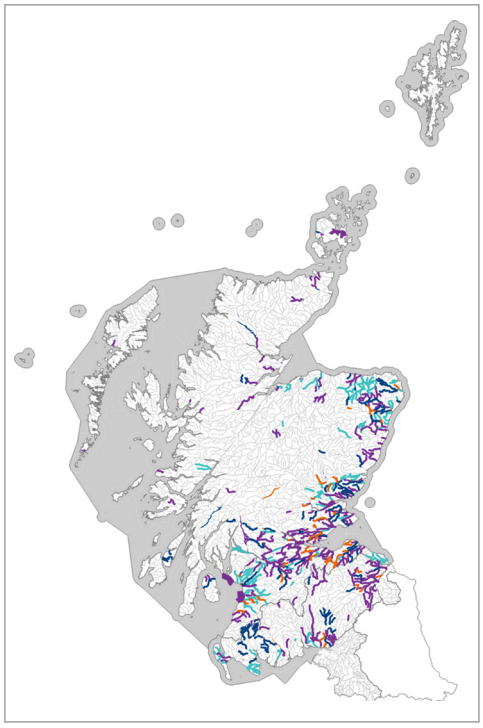
Map 10: Potential effect of rural diffuse pollution scenarios and all other planned pollution reduction measures on the water quality of the 431 water bodies in Scotland river basin district where water quality predicted to be less than good in 2015



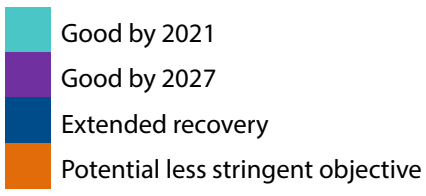
Baseline scenario



Step change 1



Step change 2



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

4 Improving the physical condition of the water environment

The scenarios presented in this section are for the whole of Scotland, not just the Scotland river basin district.

There are more than 300 water bodies across Scotland where the extent, quality or diversity of habitats for aquatic wildlife has been significantly affected by modifications to their beds, banks or shores (see Map 3 in Section 2). Improving the physical condition of these water bodies is even more of a challenge than tackling diffuse pollution. Progress has been made but a good deal more needs to be done.

The Scottish Government's Water Environment Fund (WEF), which is administered by SEPA, has enabled a number of improvements to be made by encouraging and supporting initiatives by groups and individuals. SEPA has also been working with local authorities and land managers in four river catchments with the aim of demonstrating how improvements to river habitats can be combined with measures that help reduce flood risk[16].

Most of the improvements made to date have resulted from removing or easing barriers to fish migration (see Section 5). However, more natural habitats have been restored in a small number of water bodies and we now need to build on these successes. Doing so will provide significant benefits, including:

- contributing to the social well-being and regeneration of areas in which a high quality water environment has the potential to be an important community amenity;
- restoring wildlife habitats and so contributing to the conservation of rare and endangered species;
- expanding opportunities for recreational activities;
- contributing to reducing floods in some areas.

Proposals for the next two river basin planning cycles

We have already outlined a set of principles that will underpin our work in the second and third planning cycles in a supplementary plan *Improving the physical condition of the water environment*[17]. We are now proposing to:

- prioritise water bodies for improvements where we expect those improvements to deliver the greatest benefits;
- work with public bodies, voluntary organisations and businesses to encourge and develop improvement projects;
- expand the role of the water environment fund in supporting measures to improve the physical condition of water bodies;
- work with managers of artificial structures on the beds, banks or shores of water bodies to ensure those structures are appropriately maintained or modified to reduce their impacts on the water environment.

[16] River basin planning and flood risk management pilot catchments project. http://www.sepa.org.uk/water/river_basin_planning/implementing_rbmp/pilot_catchment_project.aspx
[17] http://www.sepa.org.uk/water/river_basin_planning/implementing_rbmp.aspx

The criteria used to help prioritise water bodies for action are shown below:

Criteria for prioritising water bodies for action

- Degree of impact on the physical condition of the water body;
- area or length of water body requiring improvement;
- impact on an area protected for habitats or species, which is in unfavorable condition because of physical changes;
- areas with the potential to provide a high level of amenity and recreation.

We would like your views on how we should expand our work to improve the physical condition of water bodies across Scotland. Three scenarios are described to help you consider this. Their successful implementation will require a range of organisations and individuals to play their part, not least land managers. They include:

- a baseline scenario indicating the work that could be done by rolling forward the existing approach without any step change;
- two scenarios illustrating how different step changes in effort would affect the phasing of work and when we could achieve our environmental objectives, subject to the programme of work demanded being feasible to deliver.

The water bodies considered first in each scenario will be those considered as highest priority. However, SEPA's information on the extent of modifications to the bed, banks and shores of water bodies is incomplete. Under each of the proposed scenarios, the programme of work in the second cycle will involve detailed studies of all the affected water bodies to confirm impacts. This may change our understanding of priorities and we will need to adapt accordingly. We may also need to re-order priorities to take account of the availability of willing partners able to help secure improvements.

Figure 9 illustrates how restoration measures might be phased over cycles two and three under each scenario. Map 11 shows the projected improvements on the physical condition of beds, banks and shores of water bodies in the second and third cycles under each scenario.

Baseline scenario

- This scenario would lead to improvements in 70 water bodies by 2027, which equates to around 20% of the water bodies requiring improvements to their physical condition.
- No improvement work would be undertaken in 265 water bodies until after 2027. This equates to around 80% of the water bodies still requiring improvements to their physical condition.
- For many of these 265 water bodies, we would not be able to meet the criteria required to set a less stringent objective.

Step change 1 scenario

- This scenario would lead to improvements in 169 water bodies by 2027, which equates to around 50% of the water bodies requiring improvements to their physical condition.
- No improvement work would be undertaken in 166 water bodies until after 2027.
- Implementing a programme of work on this scale would be challenging and stretch Scotland's capacity to successfully deliver.
- Significant logistical issues would have to be overcome, including:
  - (i) the complex and lengthy process of designing effective solutions and undertaking the large number of capital engineering works required;
  - (ii) high demands on the limited pool of specialist expertise across Europe;
  - (iii) compressed timescales for developing partnerships; and for negotiating agreements and contracts for improvement works.
- Because of the challenges involved, there is some risk that implementing all the proposed improvement works would be infeasible.

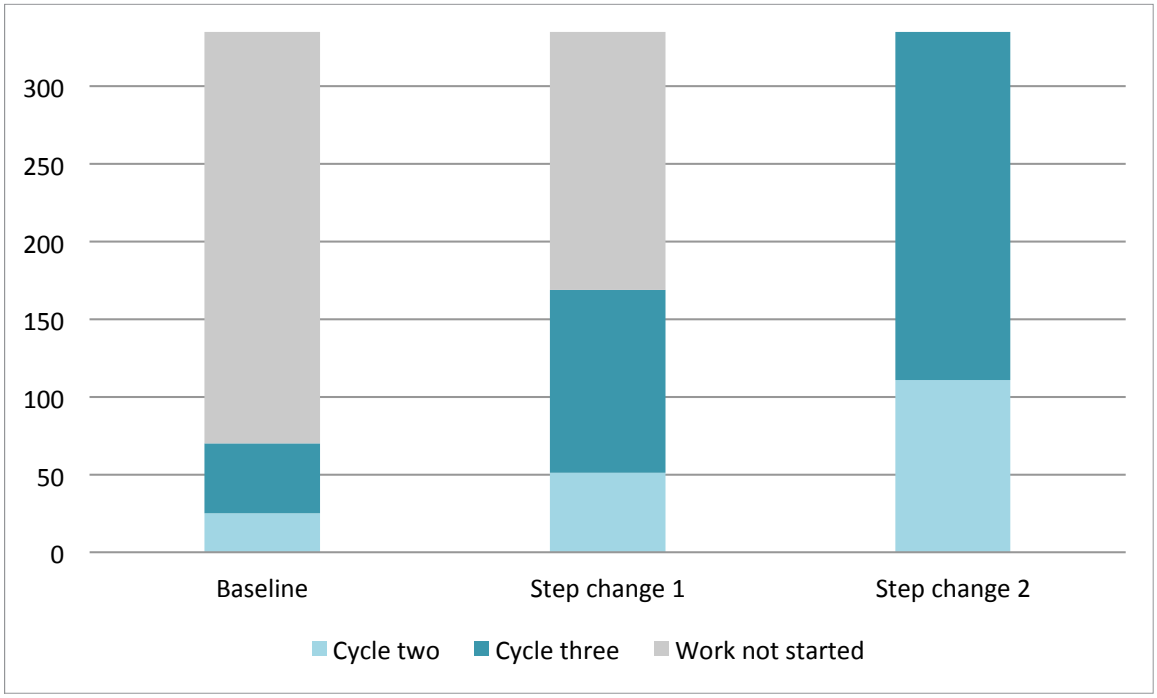
The additional cost per year compared with the baseline scenario would average up to £2.9 million in the second cycle and £6.6 million in the third.

Step change 2 scenario

- This scenario would lead to improvements by 2027 in all 335 water bodies requiring improvements to their physical condition.
- Implementing a programme of work on this scale would be extremely challenging and seriously stretch Scotland's capacity to successfully deliver.
- Very considerable logistical issues would have to be overcome, including:
  - (i) the complex and lengthy process of designing effective solutions and undertaking the very large number of capital engineering works required;
  - (ii) very high demands on a limited pool of specialist expertise across Europe;
  - (iii) extremely compressed timescales for developing partnerships; and negotiating agreements and contracts for improvement works.
- Because overcoming these challenges may not prove possible, there is a very high risk of this scenario being infeasible.

The additional cost per year compared with the baseline scenario would average around £9.1 million in the second cycle and around £16.7 million in the third.

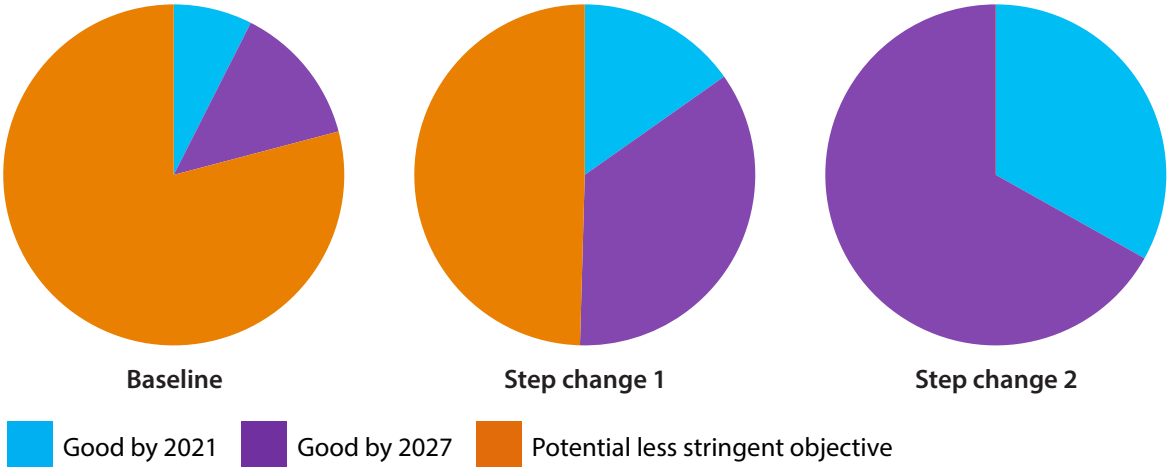
Figure 9: Phasing of restoration measures under three scenarios, 'baseline', 'step change 1' and 'step change 2'



Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Carrying out the programme of work described is expected to achieve the improvements in the physical condition of water bodies shown in Figure 10.

Figure 10: Expected improvements to the physical condition of the 335 river water bodies across Scotland adversely affected by modifications to their beds, banks or shores



Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Note to Figure 10

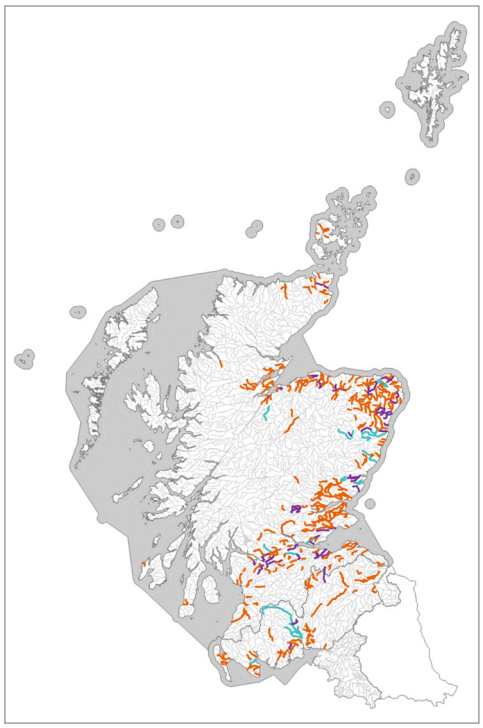
'Good' means that the status of the physical condition of a water body is consistent with the achievement of good ecological status or good ecological potential, as applicable.

'Potential less stringent objective' means that the measures planned in the second and third cycles will not be sufficient to achieve good status by the end of 2027.

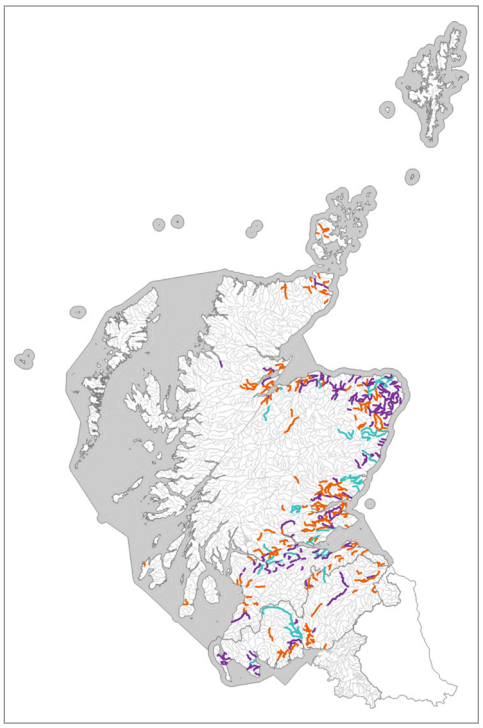
To set a less stringent objective, we are required to show that it would be infeasible or disproportionately expensive to achieve good status.

More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

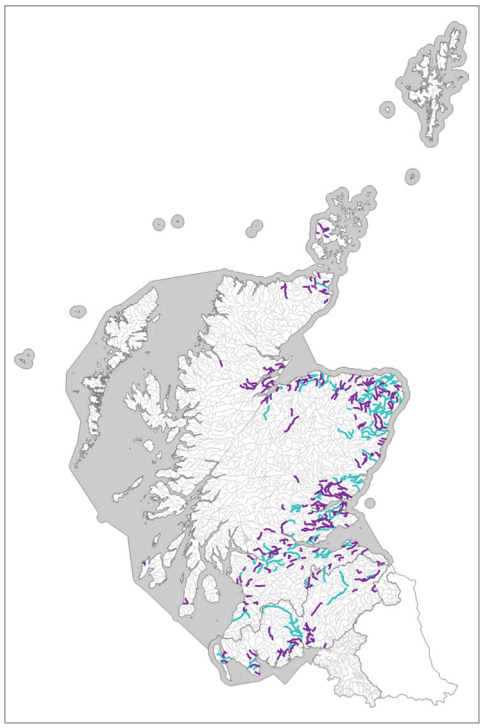
Map 11: Projected improvements on the physical condition of the 335 river water bodies adversely affected by modifications to their beds, banks or shores



Baseline scenario



Step change 1



Step change 2

Good by 2021
Good by 2027
Potential less stringent objective

Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Consultation question

Q3 Which scenario do you consider to strike the appropriate balance between effort and feasibility in improving the physical condition of the water environment? Please give reasons for your views.

5 Barriers to fish movement

The scenarios presented in this section are for the whole of Scotland, not just the Scotland river basin district.

There are around 365 weirs, dams or other man-made structures currently known to be posing a barrier to fish migration in rivers across Scotland. SEPA's latest assessment is that this is adversely affecting the status of fish populations in around 330 water bodies.

Around 100 of the structures are weirs and dams operated by public bodies such as Scottish Water, or by businesses.

There are also around 100 barriers caused by infrastructure such as road culverts and bridge reinforcements. The remaining 170, or so, structures are primarily old, abandoned weirs and dams that are neither serving an economic purpose nor the responsibility of a public body. Many of these structures block fish access to multiple water bodies upstream.

Our understanding of these pressures has increased considerably over the first cycle, however it is still growing, and in particular there is significant potential to understand the impacts of barriers to non-migratory fish over the next few years.

There are significant benefits to be gained from removing or easing barriers to fish movement, including helping to:

- restore salmon runs to rivers that have not known them in generations;
- enhance and strengthen fish populations by restoring access to lost spawning and nursery habitats;
- increase the quality and resilience of salmon fisheries;
- conserve the globally threatened freshwater pearl mussel, which depends for part of its lifecycle on salmon and trout populations.

By the end of the first cycle in 2015, SEPA expects that fish access will have been restored to around 35 water bodies through a combination of the efforts of licensed operators of dams and weirs and initiatives to provide for fish passage at abandoned structures. Many of the latter have resulted from the combined efforts of the Rivers and Fisheries Trusts for Scotland[18] and SEPA and have been supported with funding from the Water Environment Fund (see Section 4).

[18] http://www.rafts.org.uk/

Proposals for the next two river basin planning cycles

We are proposing to:

- prioritise work to remove or ease barriers to fish migration where we expect the greatest benefits;
- work with public bodies and businesses responsible for the management of infrastructure such as culverts and bridges to ensure appropriate and proportionate measures are taken to restore fish passage by the end of 2027;
- expand the level of funding and effort focused on enabling fish passage at abandoned structures.

The criteria used for prioritising barriers for action were developed by SEPA in consultation with the Fish and Fisheries Advisory Group and are summarised as follows:

Criteria for prioritising barriers for action

- Length of river above the barrier that migratory fish would be able to access[19];
- benefit to the conservation of protected species.

We would like your views on how we should expand the work to address barriers to fish migration across Scotland. Three scenarios are described to help you consider this. They relate to the work needed to restore fish passage at the 268 known barriers that are not weirs or dams operated by public bodies or businesses. SEPA will work with the licensed operators of the latter to ensure the necessary provisions for fish passage are made by the end of 2027 as far as reasonably possible. The scenarios comprise:

- a baseline scenario indicating the work that could be done by rolling forward the existing approach without any step change;
- two scenarios illustrating how different step changes in effort would affect the phasing of work and when we could achieve our environmental objectives, subject to the programme of work demanded being feasible to deliver.

Figure 11 and Map 12 illustrate how measures to improve impassable fish barriers may be phased under each scenario. Full details of the barriers are available in the online mapping tool[20].

The barriers considered first in each scenario will normally be those considered as highest priority. However, SEPA's information on barriers and their relative impact on different fish species is incomplete. For example, some structures may prove less significant than currently thought as understanding of the extent of good fish habitat upstream improves. Information on barriers that we have not yet identified may also come to light. This may change our understanding of priorities and we will need to adapt to this accordingly.

[19] Where the benefit of addressing one barrier is dependent on a downstream barrier also being addressed, the downstream barrier has been assigned at least the same priority as the upstream barrier. This is to ensure appropriately-coordinated efforts within river catchments

[20] https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Baseline scenario[21]

- This scenario would restore fish passage at 79 barriers by 2027, which equates to around 50% of the known barriers to fish migration.
- No work would be undertaken to restore fish passage at 189 barriers until after 2027.
- As a consequence, it would not be possible to achieve good, unimpeded fish migration in 152 water bodies until well after 2027. For many of these water bodies, we would not be able to meet the criteria required to set a less stringent objective.

Step change 1 scenario

- This scenario would restore fish passage at 200 barriers by 2027, which equates to 81% of the known barriers to fish migration.
- No work would be undertaken to restore fish passage at 68 abandoned structures.
- Completing a programme of civil engineering works on this scale within 12 years would be challenging and stretch Scotland's capacity to deliver.
- Significant logistical issues would have to be overcome, including:
  - (i) the complex and lengthy process of designing effective solutions and undertaking the large number of capital engineering works required;
  - (i) high demands on the limited number of existing specialists in the design of fish passes;
  - (ii) compressed timescales for the design, approval and commissioning of the works required.
- Because of the challenges involved, there is some risk that undertaking all the proposed improvement works would be infeasible.

The additional cost[22] per year compared with the baseline scenario would average up to £0.5 million in the second cycle and £0.8 million in the third.

Step change 2 scenario

- This scenario would restore fish passage at all 268 of the known barriers before the end of 2027.
- Completing a programme of civil engineering works on this scale within 12 years would be extremely challenging and possibly beyond Scotland's capacity to deliver.
- Very considerable logistical issues would have to be overcome, including:
  - (i) the complex and lengthy process of designing effective solutions and undertaking the very large number of capital engineering works required;
  - (i) impossibly large demands on the limited number of existing specialists in the design of fish passes;
  - (ii) exceedingly compressed timescales for the design, approval and commissioning of the works required.
- Because overcoming these challenges may not prove possible, there is a very high risk of this scenario being infeasible.

The additional cost per year compared with the baseline scenario could average around £0.8 million in the second cycle and around £0.6 million in the third.

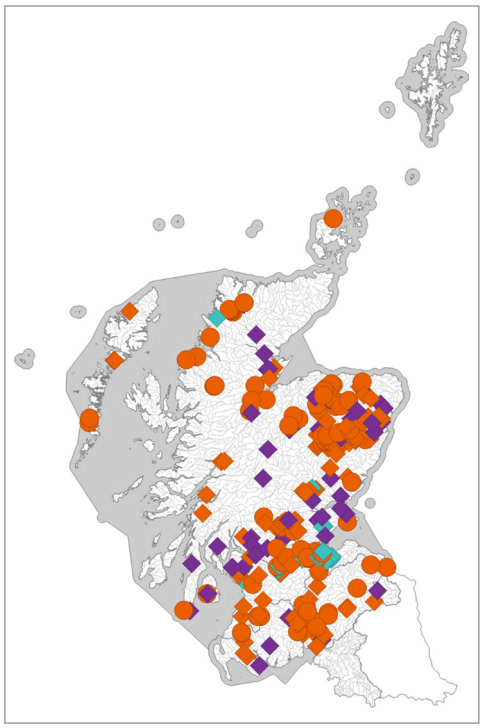
[21] Under the baseline scenario, a significant proportion of the abandoned structures would be addressed and scoping studies would be completed for the remainder of those structures. This is reflected in the relatively small additional costs indicated for the step change 1 and step change 2 scenarios.

[22] The costs referred to are estimates of (i) the full cost of restoring fish passage at abandoned structures, including study, design and build costs and (ii) the cost of SEPA's work with bodies and businesses responsible for the management of infrastructure, such as culverts and bridges.

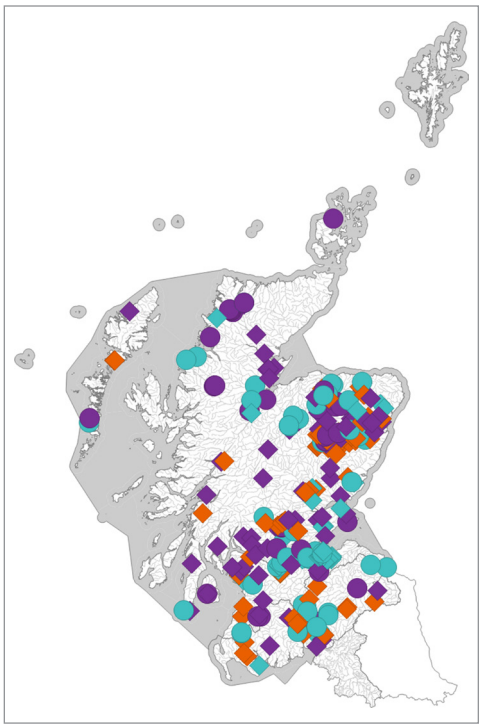
Figure 11: Phasing of measures for barriers to migration caused by infrastructure assets (other than weirs or dams) and abandoned structures(including weirs and dams) under three scenarios; 'baseline', 'step change 1' and 'step change 2'

Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

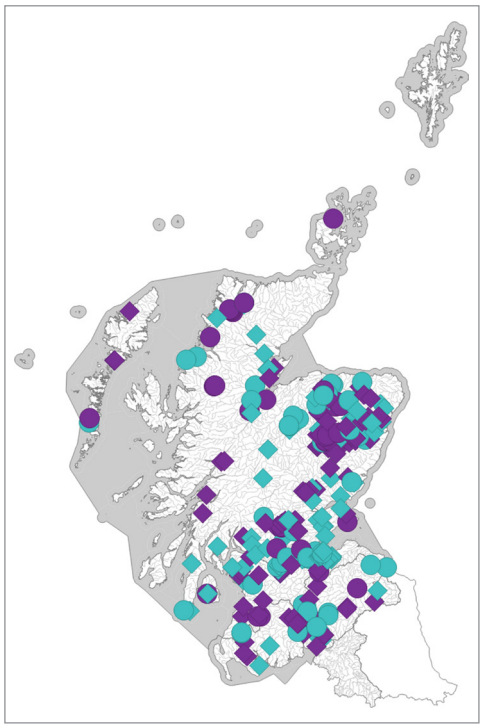
Map 12: Measures to address fish barriers by scenario



Baseline scenario



Step change 1



Step change 2

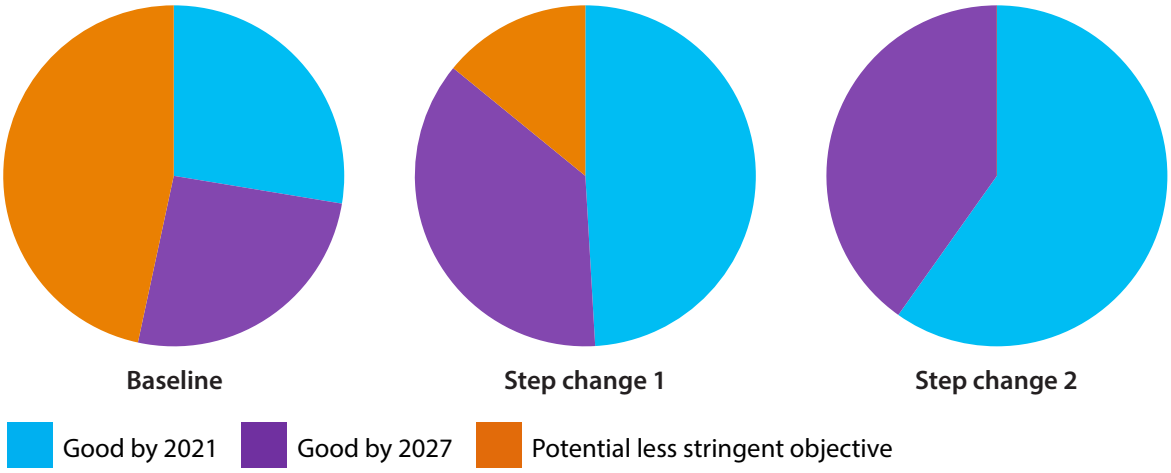
Good by 2021
Good by 2027
Potential less stringent objective

Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

In carrying out this programme of work in combination with that undertaken at licensed weirs and dams operated by public bodies or by businesses, it is expected to achieve the improvements shown in Figure 12.

All three scenarios would also address barriers that are currently affecting achievement of wildlife conservation objectives in three protected areas.

Figure 12: Expected improvements to fish migration in the 335 water bodies across Scotland known to be affected by barriers to fish migration



Note to Figure 12

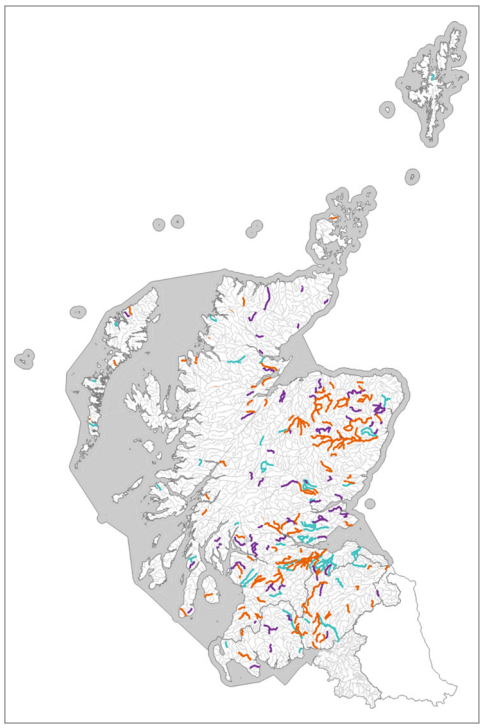
'Good' means that barriers to fish migration have been sufficiently reduced to restore good fish passage.

'Potential less stringent objective' means that the measures planned in the second and third cycles will not be sufficient to achieve good status by the end of 2027.

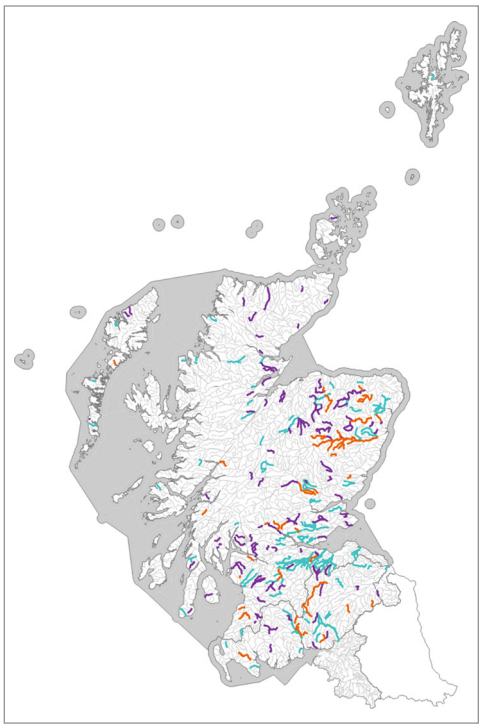
To set a less stringent objective, we are required to show that it would be infeasible or disproportionately expensive to achieve good status by 2027.

Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

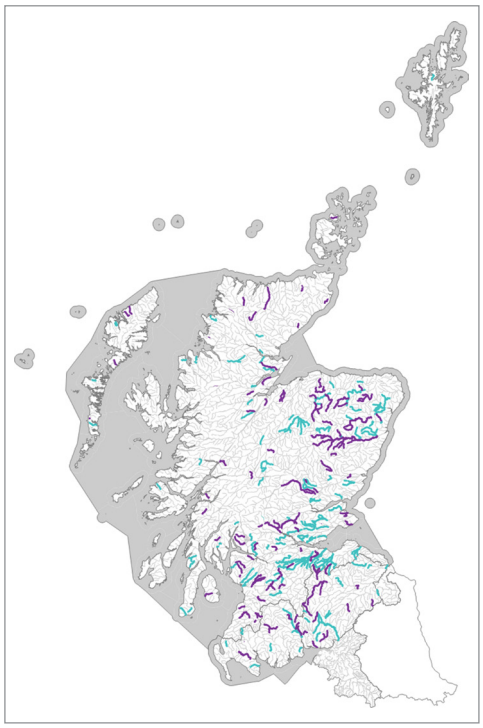
Map 13: Projected improvements to fish passage in water bodies by scenario



Baseline scenario



Step change 1



Step change 2

Good by 2021

Good by 2027

Potential less stringent objective

Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Consultation question

Q4 Which scenario do you consider to strike the appropriate balance between effort and feasibility in addressing barriers to fish passage? Please give reasons for your views.

6 Flows and levels

The flows of our rivers and the water levels in our lochs and aquifers can be affected by water abstraction for a variety of purposes, including public water supply, irrigation and the generation of hydroelectricity. Structures used to facilitate these uses, such as dams and water intakes, can also act as barriers to fish movement (see Section 5).

There are a wide range of environmental and socio-economic benefits of maintaining and restoring good water flows and levels, including:

- helping restore and support runs of migratory fish, such as Atlantic salmon, and so protecting and enhancing fisheries;
- maintaining or restoring the conditions needed to help conserve internationally important wildlife;
- protecting, and expanding opportunities for, water-based recreation;
- improving visual amenity by, for example, restoring flows to dry, or nearly dry, rivers.

The number of water bodies predicted to be at less than good status by the end of 2015 as a result of changes to their flows or levels is shown in Map 5 in Section 2. The principal sources of pressure on water flows and levels are shown in Figure 3 in Section 2.

We are proposing to revise how action to improve flows and levels is phased over the next two cycles, taking account of SEPA's growing understanding of the impacts of pressures on flows and levels. This will allow us to focus our efforts in the second cycle on those water bodies where SEPA has found major or severe ecological impacts due to water abstraction or impoundment.

The majority of water abstractions for agricultural irrigation only pose a significant risk to the water environment in years when there is an unusually dry period of weather. SEPA will work with farmers to ensure that they know when the water environment is vulnerable because of such weather and why they need to limit their abstractions from the affected sources at those times to avoid significant adverse impacts.

In a small number of cases, abstractions for irrigation can have significant impacts on flows or levels even in years when the weather has not been unusually dry. SEPA will work with the farmers concerned to identify appropriate solutions. For example, these might include staggering the abstractions on different farms and fields in the river catchment during dry spells, switching to a different source of water, such as groundwater, or by increasing water storage capacity.

Managing pressures from hydroelectricity generation

A significant number of the Scotland river basin district's rivers and lochs are used to provide water for hydroelectricity generation. The different hydroelectricity generation schemes include a growing number of small, run-of-river schemes together with much larger, mainly long-established schemes that make use of water stored in large reservoirs.

The physical characteristics of many of the water bodies affected by the water storage schemes have been substantially altered and a large proportion were identified and designated as heavily modified water bodies (HMWB) in the first river basin plan. Since then SEPA has identified others that are substantially modified and we are now proposing that they too are designated as HMWBs (see ppendix).

At the end of 2015, SEPA estimates that around 70 of the water bodies in the district that have been heavily modified for hydroelectricity generation are likely to still require improvement if they are to reach good ecological potential (see Map 14).

Since 2009, there has been a considerable expansion in the number of small hydroelectricity schemes across Scotland. Between the end of 2009 and the end of 2013, SEPA authorised nearly 400 new schemes, having first weighed up their benefits to sustainable development. The impacts on the water environment of most of the schemes are not individually sufficiently extensive to affect the status of water bodies. However, around 50 water bodies have deteriorated to worse than good and the future achievement of good status has been compromised in up to another 90.

Proposals for the next two river basin planning cycles

We are proposing to prioritise work to improve water bodies affected by Scotland's older hydroelectricity generating schemes according to where we expect the greatest environmental benefits. In the second cycle, this will mean efforts are focused on improving 15 water bodies.

The criteria developed by SEPA and used to help prioritise water bodies are summarised as follows:

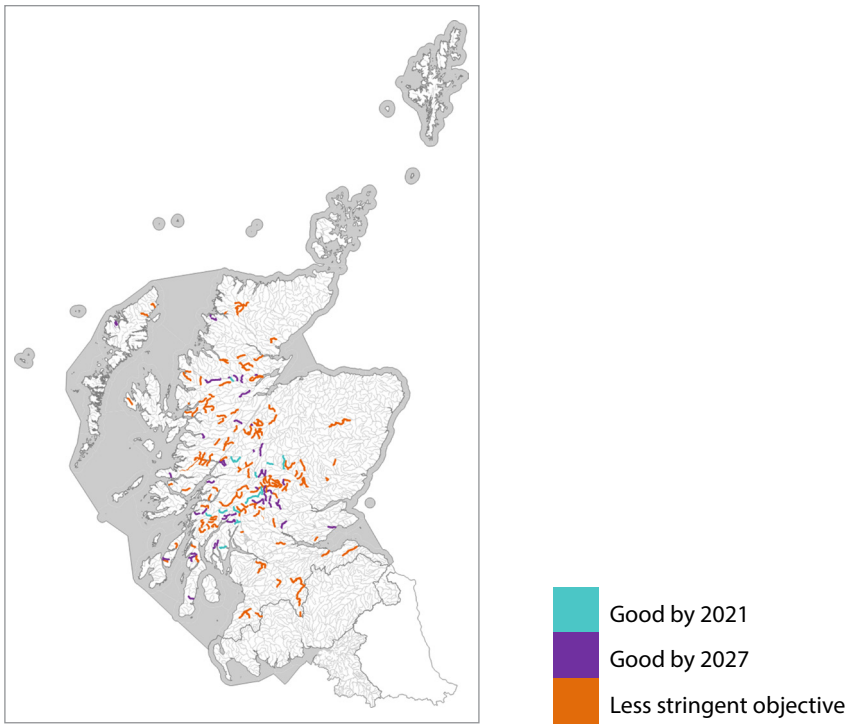
Criteria for prioritising water bodies for action

- SEPA's latest information on where there are significant ecological impacts[23], including disruption of fish migration;
- the area of the water environment expected to benefit from environmental improvements.

As SEPA gathers further information on ecological impacts and on electricity generation at each site, there may be further adjustment of the prioritisation of particular water bodies between the two periods. Improvements to some water bodies may be found not to be necessary or appropriate. However, the overall balance of effort between the two cycles is expected to remain similar to that proposed.

[23] SEPA's current ecological assessment methods are only capable of identifying where changes to river flows have caused quite extreme impacts. It is currently working with other agencies across the UK to develop methods able to detect the full spectrum of significant adverse impacts.

Map 14: Proposed improvements to water flows and levels in water bodies affected by hydroelectricity generation



Note to Map 14

'Good' means that the status of water flows and water levels is consistent with the achievement of, as relevant, good ecological status or good ecological potential.

'Less stringent objective' means that a less stringent objective has already been set. This is the case for water bodies where SEPA has authorised new developments having decided that the social, economic and environmental benefits to sustainable development outweigh their adverse impacts on the water environment.

To set a less stringent objective, we are required to show that it would be infeasible or disproportionately expensive to achieve good status.

Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Hydroelectricity generation provides important economic and environmental benefits. To ensure our goals for the water environment do not significantly impact on those benefits, we are committed to limiting the reduction in electricity production resulting from the improvements made between 2009 and 2027 to 100 gigawatt hours per year. This represents around 2% of the hydroelectricity generated in Scotland in 2010.

Environmental improvements in a number of water bodies may have to be constrained to ensure cumulative generation losses up to 2027 are limited to 100 gigawatt hours per year. The reprioritisation of water bodies will only affect the resulting balance of losses between the second and third cycles, not the cumulative loss up to 2027. The change in balance of losses will not compromise progress towards achievement of Scotland's target for the equivalent of 100% of our electricity demand to be supplied from renewable sources by 2020.

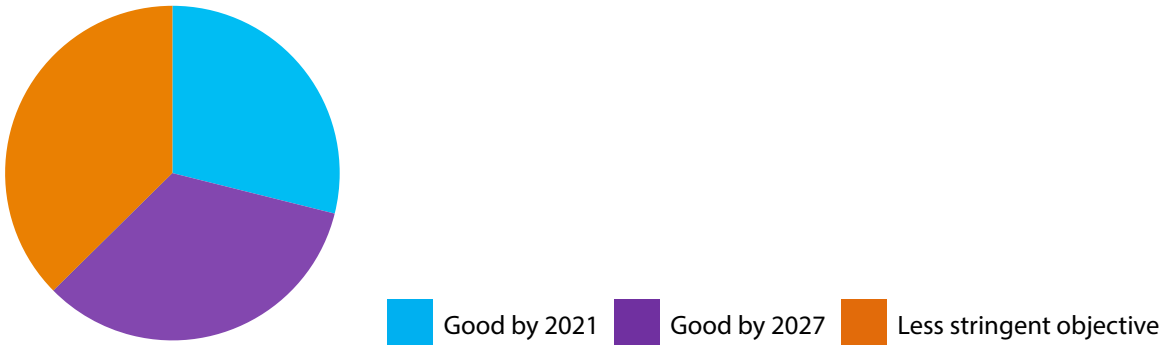
Consultation question

Q5 Do you consider that our proposals strike an appropriate balance between the second and third cycles in terms of the water bodies prioritised for action? If no, please give your reasons and which water bodies you think should be addressed in a different cycle to that proposed.

Overall improvements to the status of flows and levels in the Scotland river basin district

The combined effect of the re-prioritised efforts outlined in this section to reduce pressures on water flows and levels in the district is summarised in Figure 13 and Maps 15a and 15b.

Figure 13: Expected improvements to the status of water flows and levels in the 353 water bodies affected by water abstraction and/or impoundment in the Scotland river basin district



Note to Figure 13

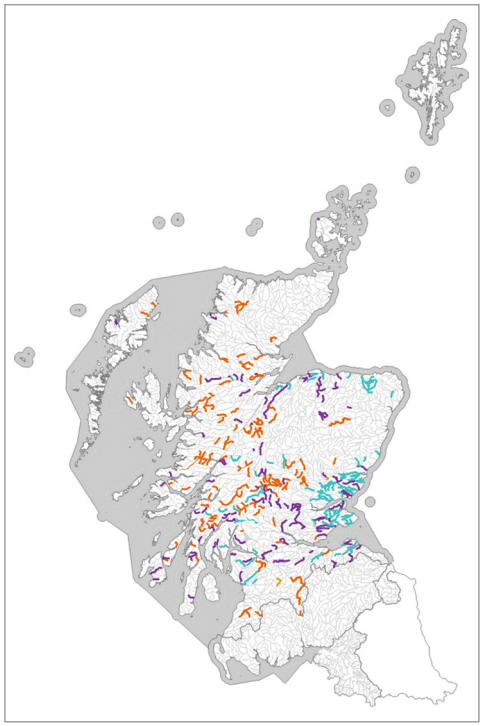
'Good' means that the status of water flows and water levels is consistent with the achievement of, as relevant, good ecological status or good ecological potential.

'Less stringent objective' means that a less stringent objective has already been set. This is the case for water bodies where SEPA has authorised new developments having decided that the social, economic and environmental benefits of those developments outweigh their adverse impacts on the water environment.

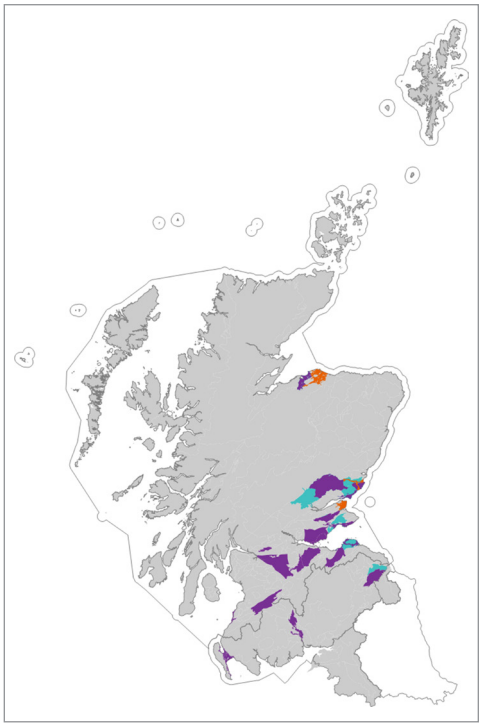
To set a less stringent objective, we are required to show that it would be infeasible or disproportionately expensive to achieve good status.

Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Map 15a: Improvements to the status of water flows and levels in surface water bodies adversely affected by water abstraction or impoundment in 2015



Map 15b: Improvements to the status of water levels in groundwater bodies adversely affected by water abstraction in 2015



Good by 2021 Good by 2027 Less stringent objective

Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

7 Managing the risks posed by invasive non-native species

There are many non-native plant and animal species in Scotland, but only a small number become invasive, potentially causing significant impacts on ecological quality, fisheries, aquaculture and recreation. Management is challenging as complete eradication is costly, and for some species, not currently possible. A number of water bodies are at risk of deterioration because of the potential for invasive non-native species to spread from nearby water bodies in which they are already established. The risk posed by invasive species is likely to increase as a warming climate provides the conditions under which more species could thrive in Scotland.

By the end of 2015, 10 water bodies in the Scotland river basin district are predicted to be less than good status due to the impact of invasive non-native species. Nine of these water bodies are affected by the presence of North American signal crayfish (see Map 6 in Section 2). One water body, the River Leven in the Loch Leven catchment in Fife, is affected by excessive growth of Canadian pondweed.

For these water bodies, we are unlikely to achieve good status by 2027 because there are currently no effective methods of dealing with established populations of these species (Map 16). In these cases, less stringent objectives have been set until such time as suitable means of control are developed.

Around 150 water bodies in the district are at risk of deterioration from the expansion of invasive non-native species (Map 16). Invasive species have already found their way into some of these water bodies but their populations are not yet at a size that could compromise ecological status. Other water bodies are at risk from species invading them from upstream or neighbouring water bodies and catchments unless appropriate controls and management are put in place.

More information on individual species is shown in the online data tool[24].

Proposals for the next two river basin planning cycles

Since the first plans were published, there have been a number of important developments in Scotland to improve management of invasive non-native species including:

- strengthening the legislation governing the introduction and release of non-native species;
- giving key public bodies[25] responsibilities for managing the risk posed to specific habitat types;
- establishing a new Statutory Group on Non-Native Species (SGNNS);
- publishing a supplementary plan *Managing Invasive Non-Native Species in Scotland's Water Environment*[26] that sets out strategic actions with respect to aquatic INNS and is aimed at habitat leads.

Stricter rules on non-native species are due to come into force across the EU in January 2015[27]. Under this legislation, a watch list of species of EU concern is to be drawn up and stronger provisions made for enhancing regional cooperation for species of national concern, even if they are not included on the EU list.

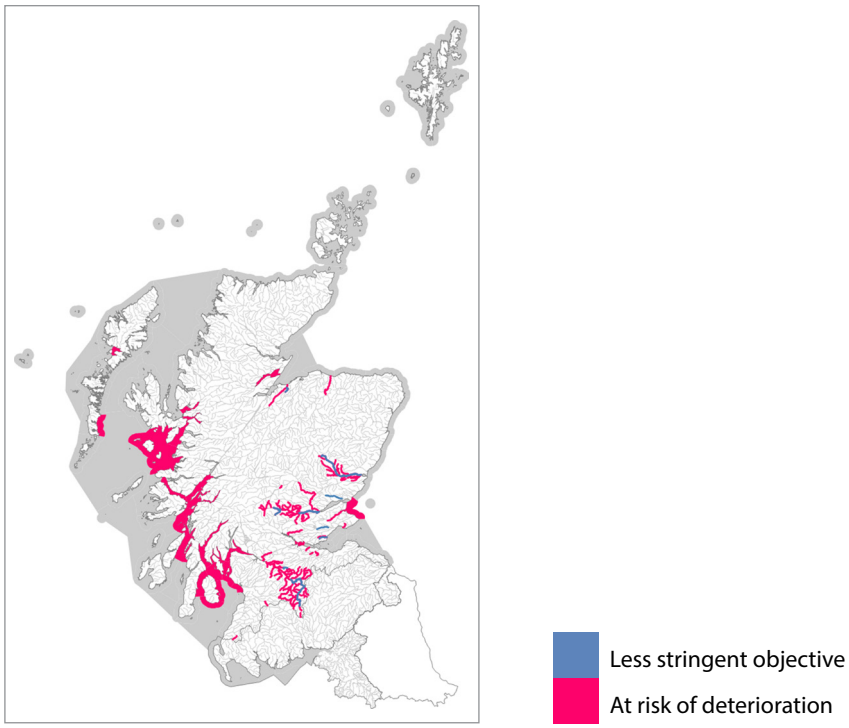
[24] https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

[25] The Framework of Responsibilities, as set out in the Code of Practice on Non-Native Species, identifies those bodies having powers relating to non-native species in Scotland as being Scottish Ministers (including Marine Scotland), Scottish Natural Heritage, the Scottish Environment Protection Agency and the Forestry Commissioners. SNH is designated as overall lead co-ordinating body, with individual lead bodies for each habitat type.

[26] http://www.sepa.org.uk/water/river_basin_planning/implementing_rbmp.aspx

[27] The Invasive Alien Species (IAS) Regulation was approved by the European Council in September 2014 and will come into force on 1 January 2015. More information can be found at the GB non-native species web page http://www.nonnativespecies.org/index.cfm?sectionid=7

Map 16: Water bodies at less than good status or at risk of deterioration as a result of invasive non-native species



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Our main focus in the next two cycles will be on further developing and implementing effective biosecurity measures to prevent deterioration of those water bodies at risk from the spread and expansion of populations of invasive non-native species. To this end, we are proposing to:

- raise awareness and promote the importance of the bio-security plans for the fresh water environment developed by RAFTS;
- encourage development of marine bio-security plans such as the Firth of Clyde developed by the Firth of Clyde Forum[28];
- raise awareness and promote guidance on marine bio-security planning for marinas, fish farms and construction activities, also developed by the Firth of Clyde Forum.

The individual habitat leads also have responsibilities for putting in place actions to prevent deterioration of water bodies. In the second cycle, they will need to work closely together with the Statutory Group on Non-Native Species to take forward measures to prevent the spread of invasive non-native species.

We also need to improve our understanding of how successful various control methods have been across Scotland. This will help determine how control measures are carried out in future (e.g. similar groups of invasive species could be managed in a more coordinated way if they all respond similarly to a particular control method). The evaluation work that RAFTS is currently undertaking to map the progress of a Scotland-wide, long-term project will play an important part in determining future management approaches.

Consultation question

Q6 Do you agree with the general management approach for pressures on the water environment from invasive non-native species? Please give reasons for your views.

[28] http://clydeforum.com/

8 Overall outcomes for the Scotland river basin district

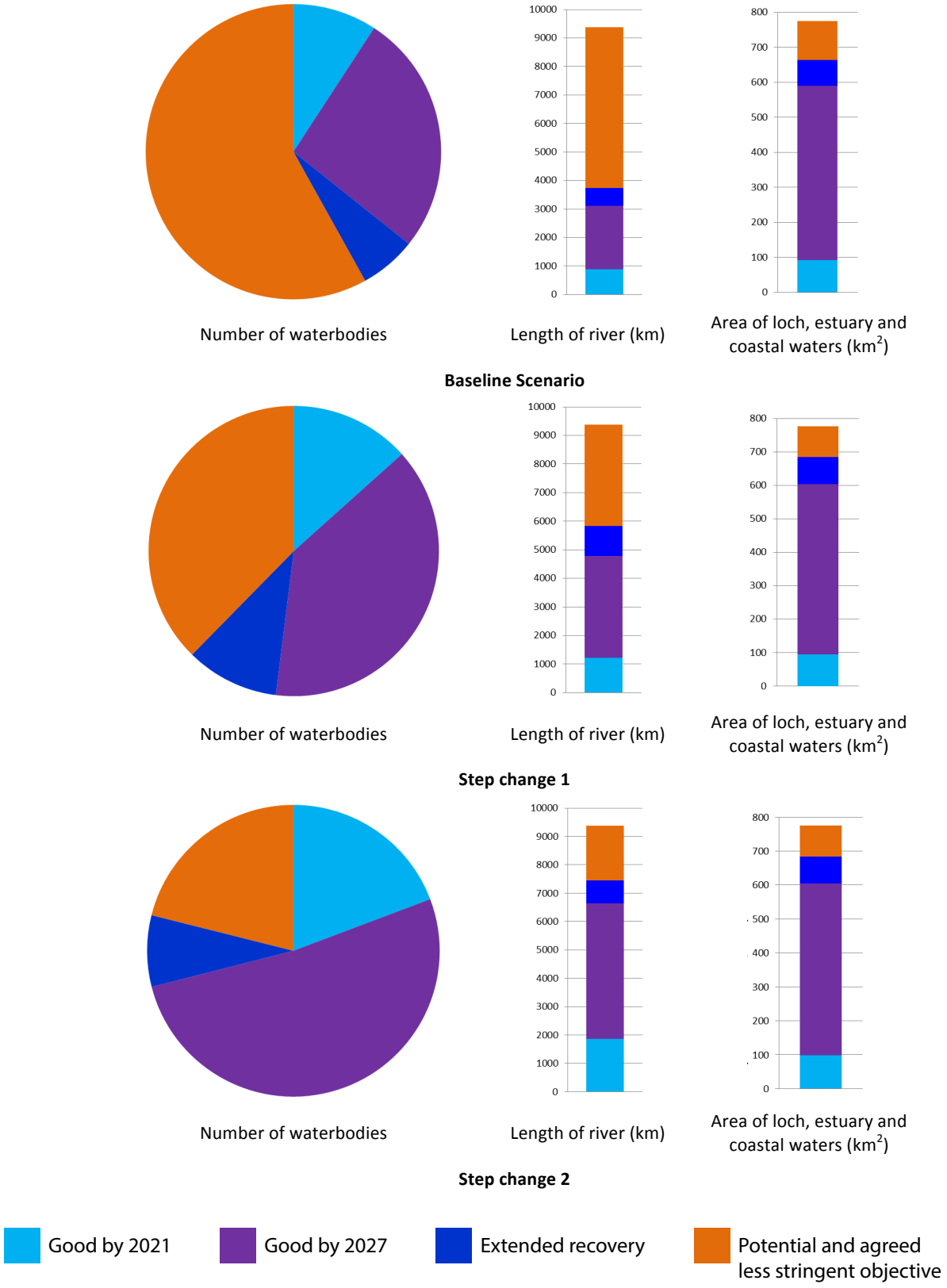
This section summarises the combined effect of all the measures proposed to tackle pressures on the water environment in the Scotland river basin district in the second and third cycles. The scale of that programme of measures depends on the scenarios chosen to address rural diffuse pollution, damaged bed, bank and shore habitats and barriers to migration (see Sections 3, 4 and 5). The overall effect of the programme under each of those scenarios is summarised in Figure 14 and Map 17.

The choice of scenario will also influence the achievement of our objectives for protected areas, as shown in Section 3, Figure 7. The contributions to improving Natura protected areas are summarised in the table below.

Table 1: Improvements contributing to the achievement of objectives for protected areas for wildlife of international conservation importance

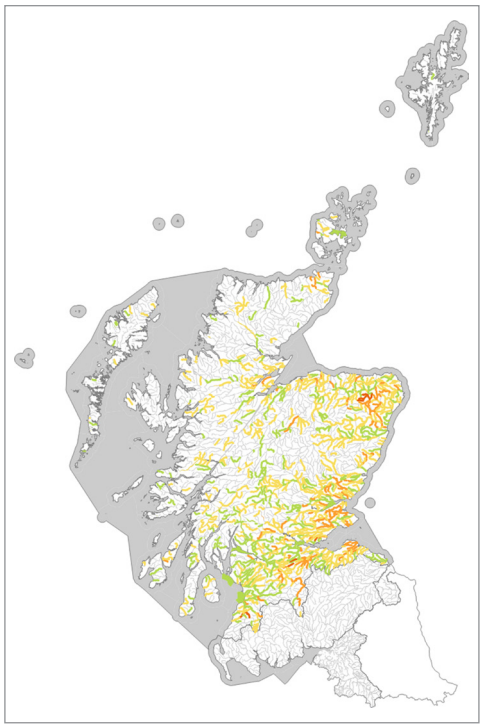
Number of protected areas for wildlife			
	Baseline Scenario	Step change 1 scenario	Step change 2 scenario
Improvements made by 2021	5	7	7
Improvements made by 2027	6	7	9
No improvements before 2027	14	11	9

Figure 14: Combined effect of all the proposed measures on the status of the 961 water bodies in the Scotland river basin district requiring improvement by length and area

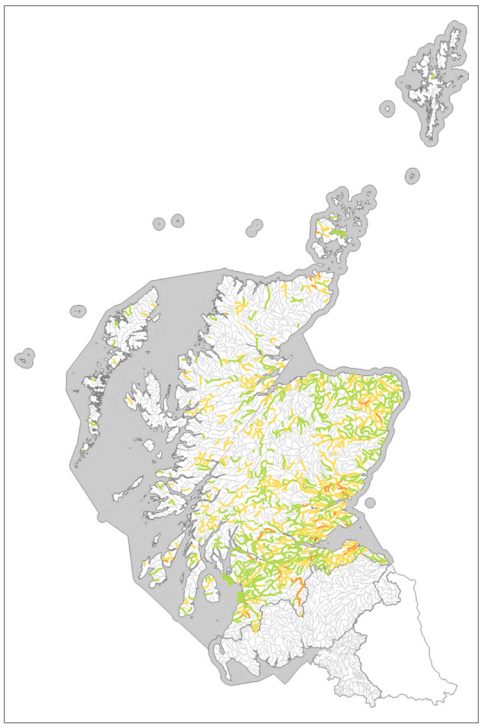


Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

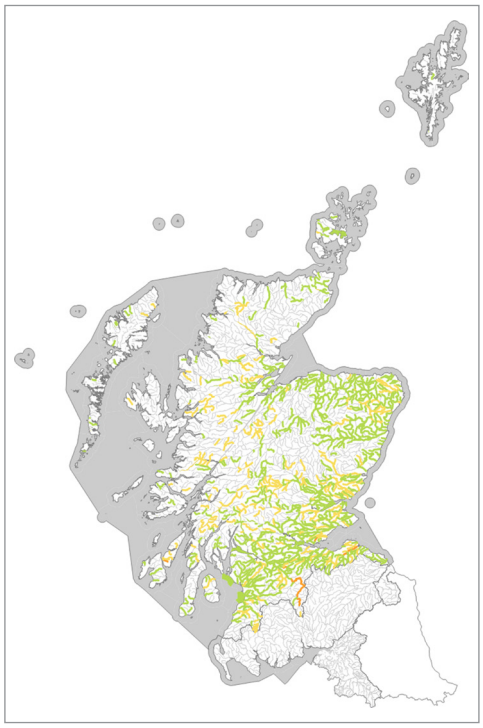
Map 17: Projected improvements by the end of 2027 to 961 surface water bodies expected to be at less than good status in 2015



Baseline scenario



Step change 1



Step change 2

Note to Map 17

The colouring of each water body indicates how many of the following five environmental requirements for good status are met: good water quality, good flows and levels, good physical structure of beds, banks and shores, good, unimpeded fish migration and protection from invasive non-native species.

Number of environmental requirements not at good status

0
1
2
3

Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

New developments may be proposed during the second and third planning cycles that would adversely affect the status of water flows, water levels or the physical condition. Where they provide important benefits to sustainable development, human health or human safety, such developments may be permitted by SEPA or other regulators even where they will prevent the achievement of our objectives for the affected water bodies. It is not possible to predict which, and how many, water bodies may be affected by sustainable development over the next two cycles.

Appendix: Proposed changes to heavily modified water body designations

The physical characteristics of many of our surface waters have been substantially modified for purposes such as flood protection, land drainage, navigation and water storage for public supply or hydroelectricity generation. These uses provide important socio-economic benefits that could be compromised by restoring the affected waters to good ecological status. Where this would be the case, the waters have been identified as heavily modified water bodies (HMWBs). Instead of good ecological status, the aim for HMWBs is to achieve good ecological potential. Good ecological potential is the ecological quality that can be achieved in the affected water bodies without significant adverse impacts on the benefits provided by its use or the wider environment.

Since the first plan, our knowledge and information has improved as a result of the licence review process, improvements in classification tools and availability of better data. In light of this, we are recommending changes to some HMWB designations. These changes cover water bodies where we propose to:

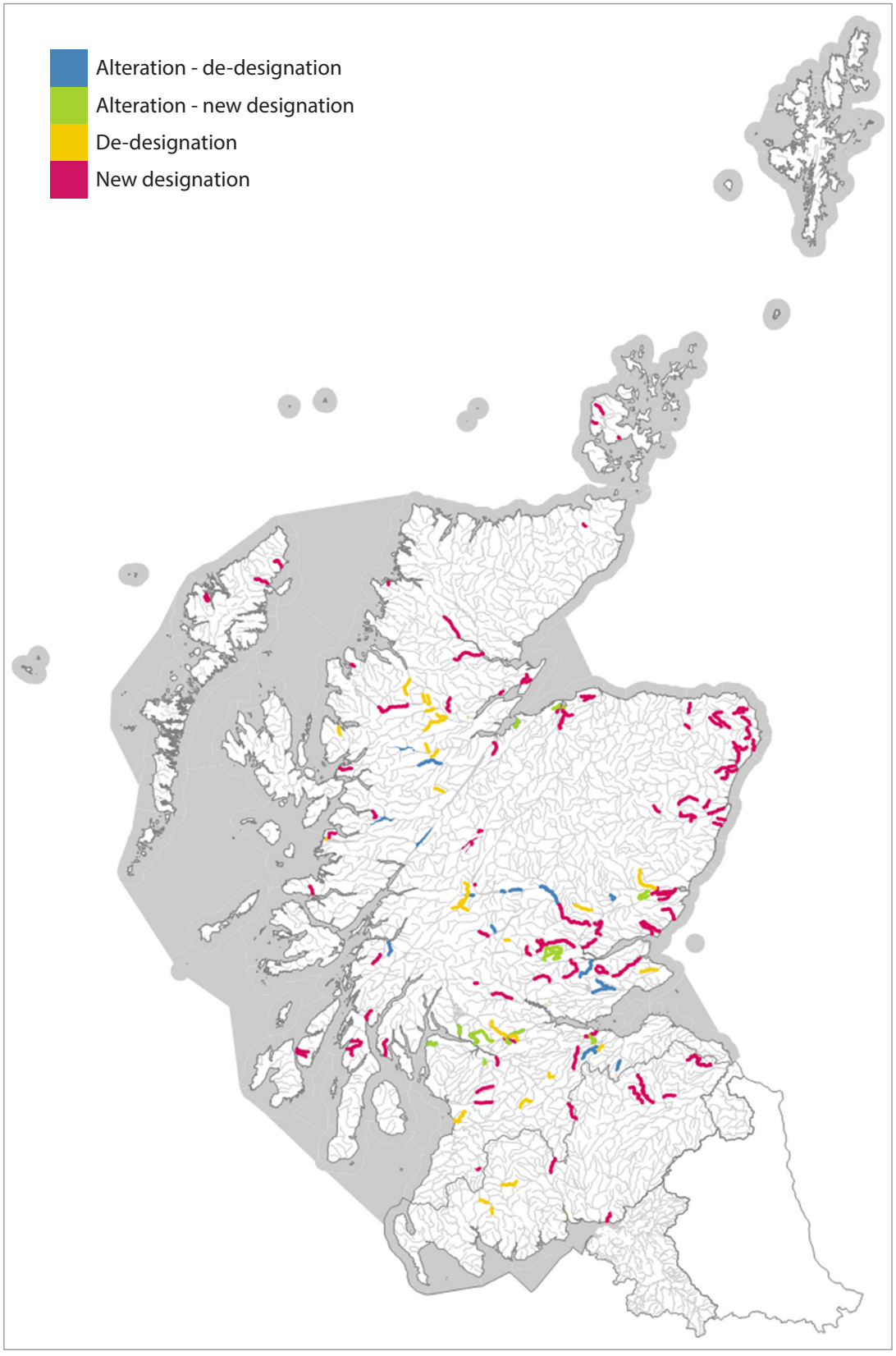
- de-designate a number of HMWBs based on updated information and better understanding of the pressures on the water environment;
- designate a number of water bodies as HMWBs that have been altered for purposes other than agriculture;
- designate a number of water bodies that have been straightened to provide drainage of agricultural land for designation as HMWBs based on a new approach.

We are seeking your views on these changes and the proposed approach for designating water bodies straightened for agricultural land drainage as HMWBs.

A summary of proposed alterations to existing HMWB designations (not including water bodies straightened for agricultural land drainage purposes) is shown in Maps A1 and A2, with more information in the online data tool[29].

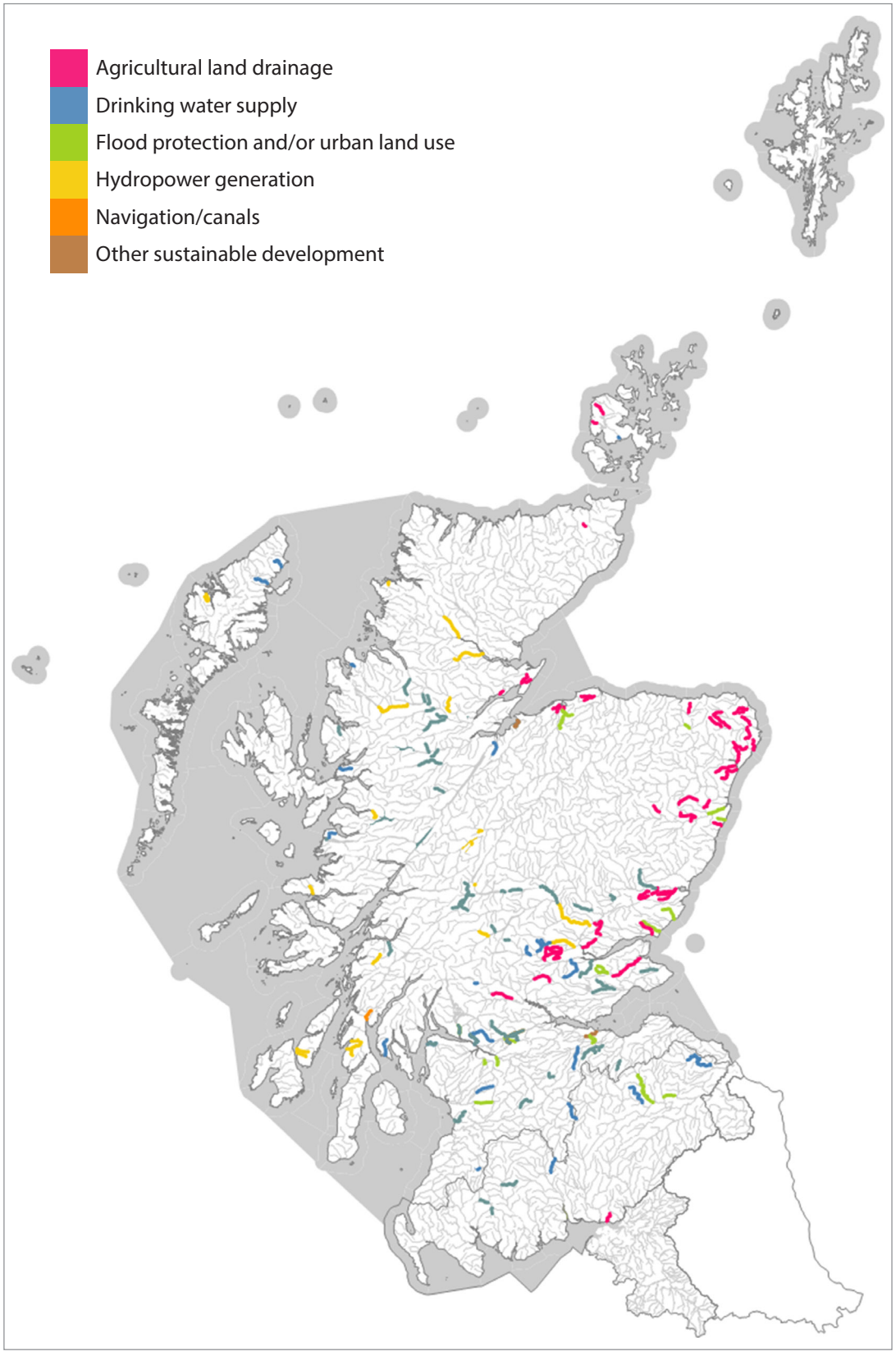
[29] https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Map A1: Proposed alterations to heavily modified water body designations by type of change



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Map A2: Proposed alterations to heavily modified water body designations by reason

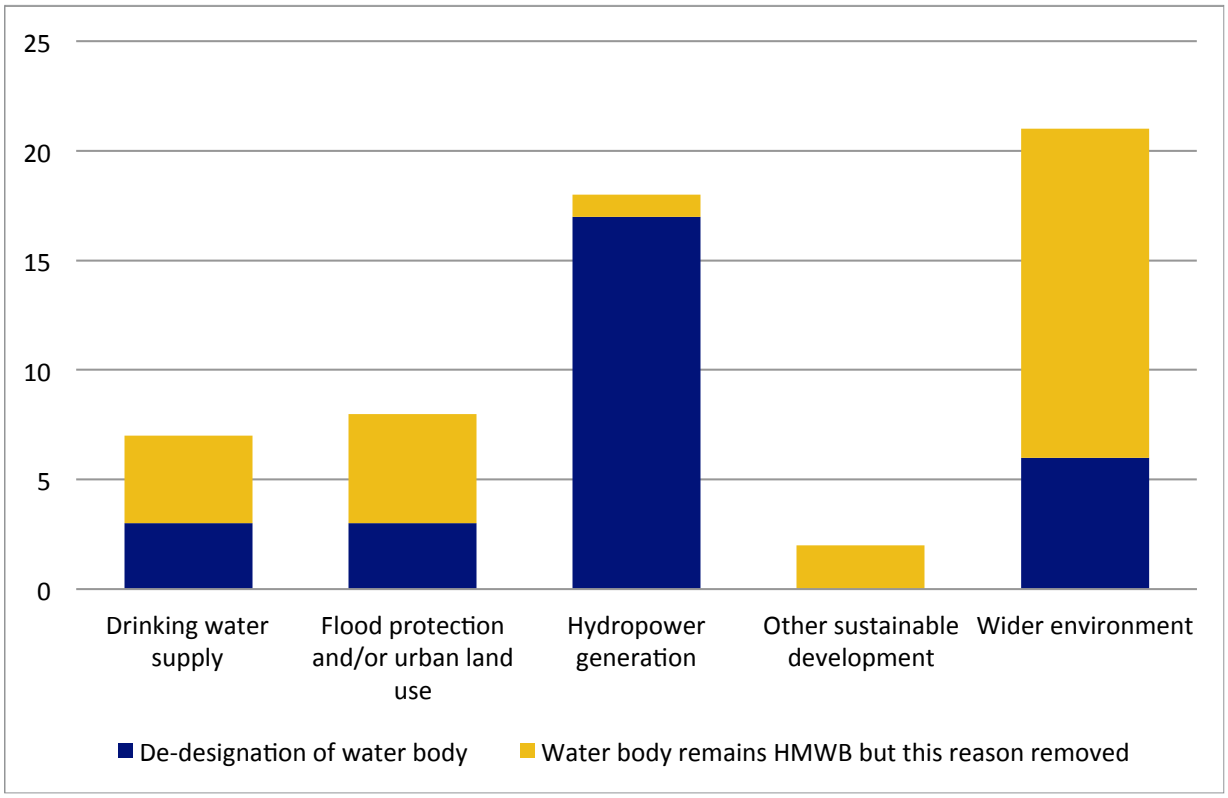


Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Proposed de-designations

In line with the river basin planning cycles, HMWBs are reviewed every six years and our recent review has taken account of better information to make a robust re-assessment. In Scotland as a whole, there are a total of 55[30] water bodies that are proposed for de-designation, based on one or all of the uses they were originally designated for, shown in Figure A1. Of these, there are 28 water bodies that are proposed for complete de-designation and they will cease to be HMWBs. More details are available in the online data tool.

Figure A1: Summary of water bodies proposed for de-designation as HMWBs



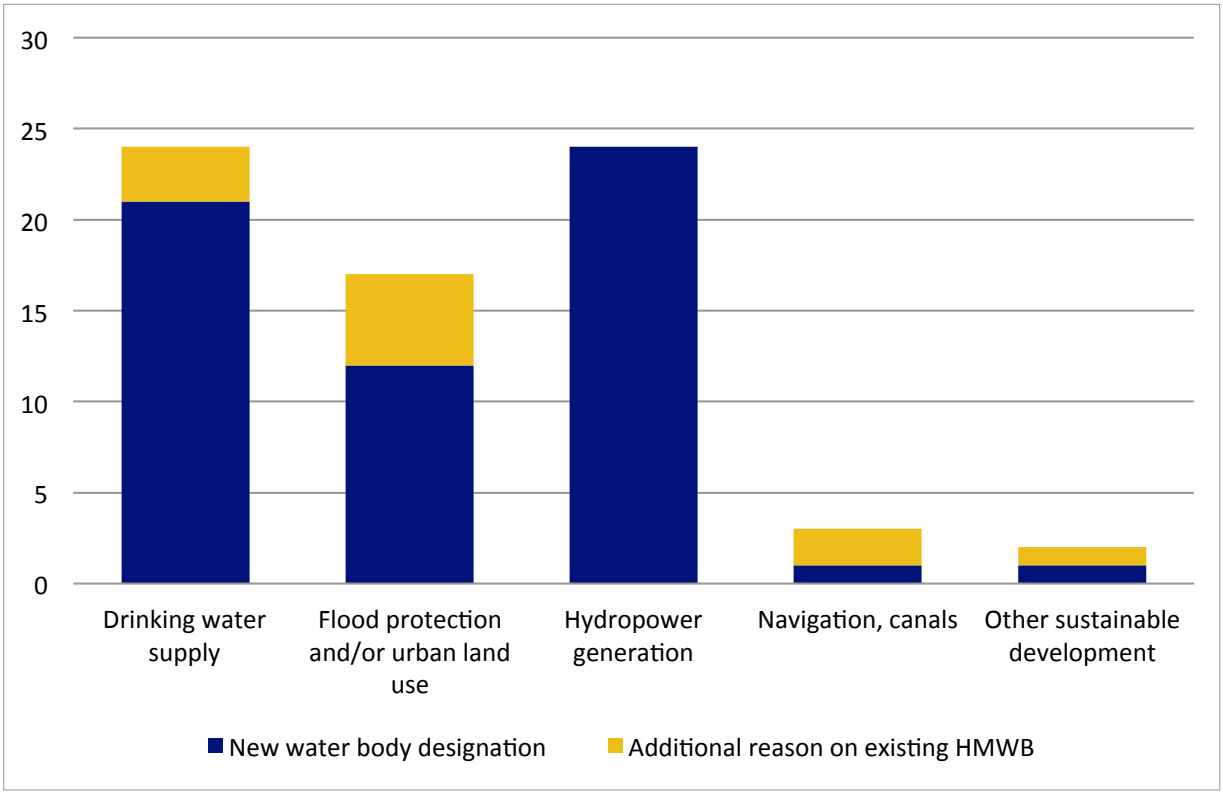
Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

[30] This includes water bodies where the reasons for designation have altered but it hasn't resulted in them being proposed for complete de-designation as HMWB. The details are shown in the online data tool, accessed via https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Proposed new designations (for purposes other than agricultural land drainage)

Since the first plan, we have been gathering further information on the state of the water environment and the pressures on it. As a result, we propose to designate 70[31] new or additional HMWBs across Scotland, shown in Figure A2. Of these, 59 water bodies are proposed for designation as completely new HMWBs for various reasons, other than agricultural land drainage. More details are available in the online data tool.

Figure A2: Summary of proposed new heavily modified water body designations (not including agricultural land drainage)



Note: More detail is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Proposed new designations for agricultural land drainage

Since the first river basin plan, we have developed a more robust process to determine whether water bodies straightened for the purpose of agricultural land drainage would meet criteria for designation as HMWB, taking account of the following criteria:

Designation criteria in HMWB proposed for agricultural drainage purposes

- The waterbody is at worse than good status because of straightening to drain agricultural land;
- the value of the surrounding agricultural land;
- restoring to good status would have a significant adverse impact on food production;
- alternative solutions that do not impact on food production are disproportionately costly or technically infeasible.

[31] This includes water bodies which were originally designated as HMWBs and where one or more additional HMWB categories are proposed. The details are shown in the online data tool, accessed via https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Restoring water bodies to good status can mean areas of land are affected in order to accommodate the works. With this in mind, thresholds for designation have been set to determine the area of land that could be used without significantly impacting on a water body's use (see Table A1). In summary, the higher the value[32] of the surrounding agricultural land, the more likely that a water body on this land will be designated as heavily modified.

Based on our current understanding of the nature of impacts caused by straightening, we have identified 38 water bodies across Scotland that we are proposing to designate as HMWB. These water bodies are shown in Map A3. Our understanding of the impacts caused by straightening for land drainage is still improving and we are likely to find that the number of water bodies proposed for designation as HMWB will increase.

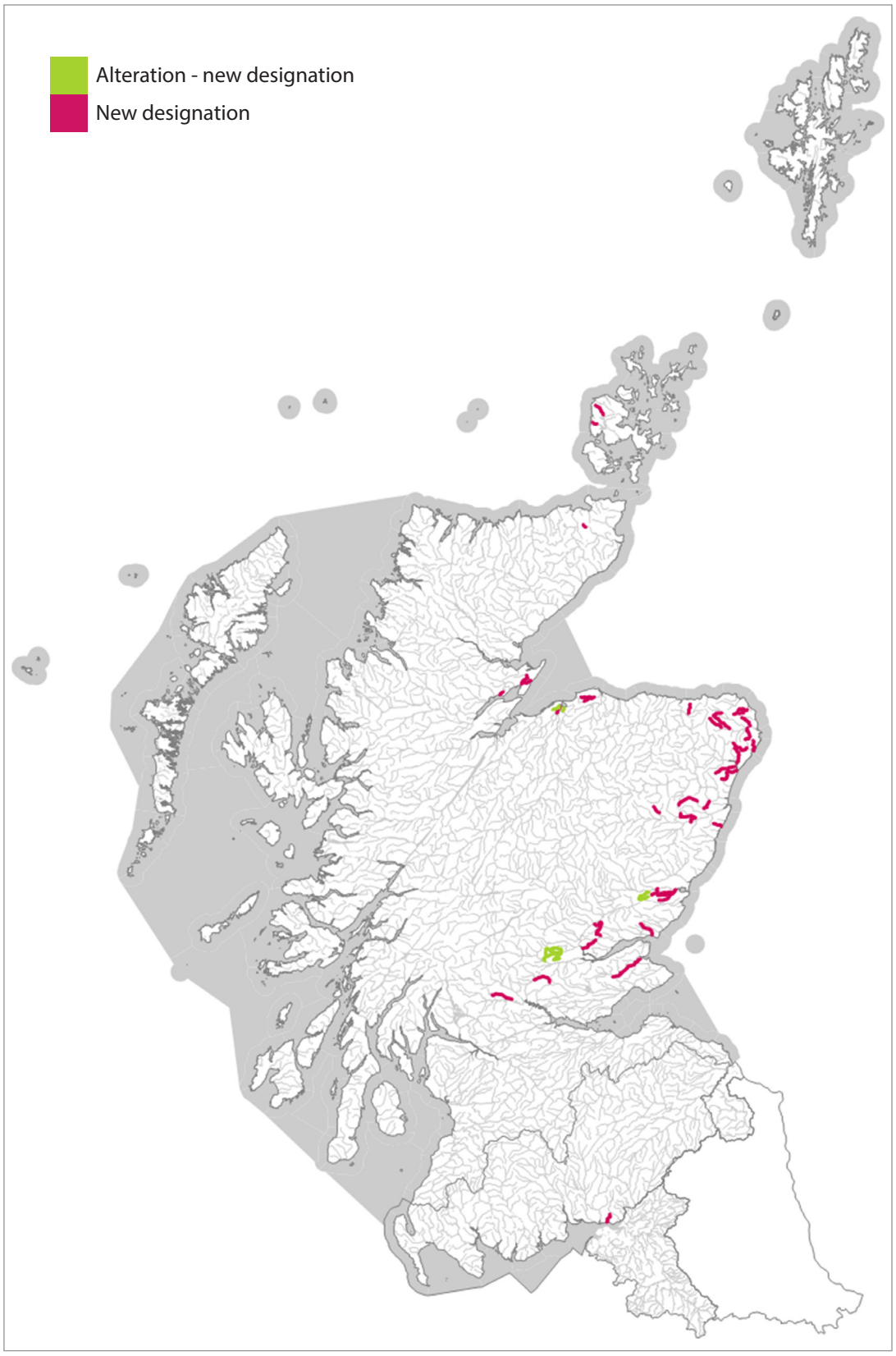
By taking this approach, we can target environmental improvement to where it does not have a significant adverse effect on food production.

Table A1: Proposed thresholds for designating heavily modified water bodies for agricultural land drainage purposes

		Designation thresholds in terms of land potentially affected if good status were to be restored
Class	**Potential use**	**Threshold (ha/km of water body)**
Class 1 and 2	**Wide or very wide range of high value crops**	**0**
Class 3.1	**Moderate range of high value crops & high yields**	**0.3**
Class 3.2	**Moderate range of high value crops but trending towards grassland**	**0.4**
Class 4.1 and 4.2	**Narrow range of crops**	**0.5**
Class 5	**Improved grassland**	**5**
Class 6 and 7	**Rough grazing and land of very limited agricultural value**	**1**

[32] Value of land is assessed using the Land Capability for Agriculture classification developed by James Hutton Institute.
[33] Land Capability for Agriculture classification developed by James Hutton Institute.

Map A3: Water bodies proposed as new heavily modified water bodies for agricultural land drainage



Note: Detailed mapping is available via the online consultation tool at https://consultation.sepa.org.uk/rbmp/scotlandplanconsultation

Consultation questions

Q7 **Do you agree with our proposals for de-designation of certain water bodies?** If no, please give your reasons and indicate the water bodies concerned.

Q8 **Do you consider that our proposals to designate heavily modified water bodies are appropriate for:**
a) purposes other than agricultural land drainage?
b) agricultural land drainage purposes?
If no to either, please give your reasons and indicate the water bodies concerned.

Rural diffuse pollution

Q1. Which scenario do you consider to strike the appropriate balance between effort and feasibility in addressing rural diffuse pollution?
Please give reasons for your views.

Other water quality pressures

Q2. Do you agree with the general approach for managing the other pressures on water quality?
Please give reasons for your views.

Improving the physical condition of the water environment

Q3. Which scenario do you consider to strike the appropriate balance between effort and feasibility in improving the physical condition of the water environment?
Please give reasons for your views.

Barriers to fish movement

Q4. Which scenario do you consider to strike the appropriate balance between effort and feasibility in addressing barriers to fish passage?
Please give reasons for your views.

Hydroelectricity generation

Q5. Do you consider that our proposals strike an appropriate balance between the second and third cycles in terms of the water bodies prioritised for action?
If no, please give your reasons and which water bodies you think should be addressed in a different cycle to that proposed.

Invasive non-native species

Q6. Do you agree with the general management approach for pressures on the water environment from invasive non-native species?
Please give reasons for your views.

Proposed changes to heavily modified water body designations

Q7. Do you agree with our proposals for de-designation of certain water bodies?
If no, please give your reasons and indicate the water bodies concerned.

Q8. Do you consider that our proposals to designate heavily modified water bodies are appropriate for:
a) purposes other than agricultural land drainage?
b) agricultural land drainage purposes?
If no to either, please give your reasons and indicate the water bodies concerned.