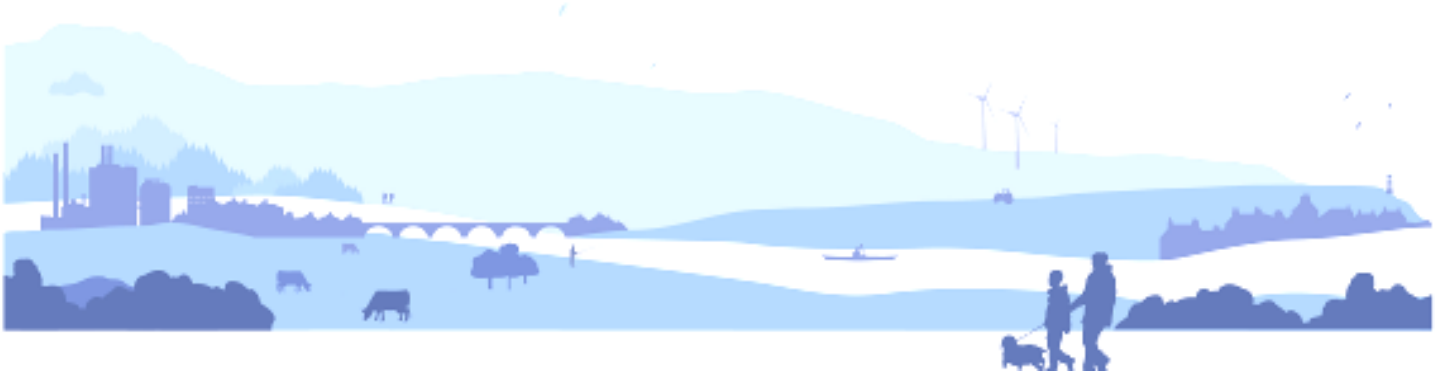
Current condition and challenges for the future: Scotland river basin district



A public consultation

Foreword

This consultation provides you with the opportunity to contribute to the development of new approaches to address the significant water management challenges in the Scotland river basin district. It also describes the condition of the water environment and progress towards achievement of improvement objectives set for 2015.

The information and analyses presented in this document support the development of the second river basin plan to be published in 2015. We welcome your views, ideas and hopefully strong support, for making the step changes required to meet our key water management challenges. This consultation is part of wider ongoing engagement with stakeholders and advisory groups.

Since publishing the first river basin plan, our understanding of impacts on the water environment has greatly improved. We have made significant progress and partnership working has strengthened. However, there is still a lot of work to be done in order to meet the challenge of achieving good ecological status for the waters in the Scotland river basin. Your input to this consultation and involvement in the second river basin plan is essential to meet our shared goal of sustainable water management.



James Curran
Chief Executive, Scottish Environment Protection Agency

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1. Introduction

At the end of 2009, the first management plan for the rivers, lochs, estuaries, coastal waters and groundwaters in the Scotland river basin (Map 1) was published. The plan identified where our waters are in a good or excellent condition and where they are under pressure. It also set improvement targets for 2015, 2021 and 2027 and put in place a programme of measures for achieving them.

Since the publication of the plan, we – the Scottish Government, the Scottish Environment Protection Agency (SEPA) and all Scotland's other responsible authorities and public bodies – have been working with water users and land managers to make the improvements needed to achieve our targets for 2015. SEPA has also been carrying out monitoring to improve its understanding of the pressures and impacts on the water environment and the effectiveness of the actions we have been taking.

We now need to start work to prepare a second river basin management plan for publication at the end of 2015. The information contained within this document will provide the starting point for the second plan. There are three main parts to the report[1]:

- A description of the current condition of the water environment and protected areas in the Scotland river basin district.
- An assessment of progress towards achieving the improvement targets we set for 2015.
- Identification of the significant water management challenges we need to address in order to meet our objectives for the second and third cycles of river basin management planning.

We are seeking your views on the significant management challenges and on potential new options for tackling them. We have asked specific questions in relation to the management challenges discussed in Section 5; however you are welcome to feedback on any aspect of this document. The ways you can respond are detailed at the end of this document and the complete list of consultation questions is found in the Annex. Your responses will help us in developing draft proposals for the second river basin management plan. We will consult on those proposals towards the end of 2014.

A significant amount of technical analysis underpins this document. You can access more detailed information at different spatial scales online by using the supporting data application[2]. The application will enable you to do custom searches on specific bodies of water or catchments of interest to you. There you will also find information on our updated analysis of the benefits provided by the water environment. Links to the application are provided throughout the consultation.

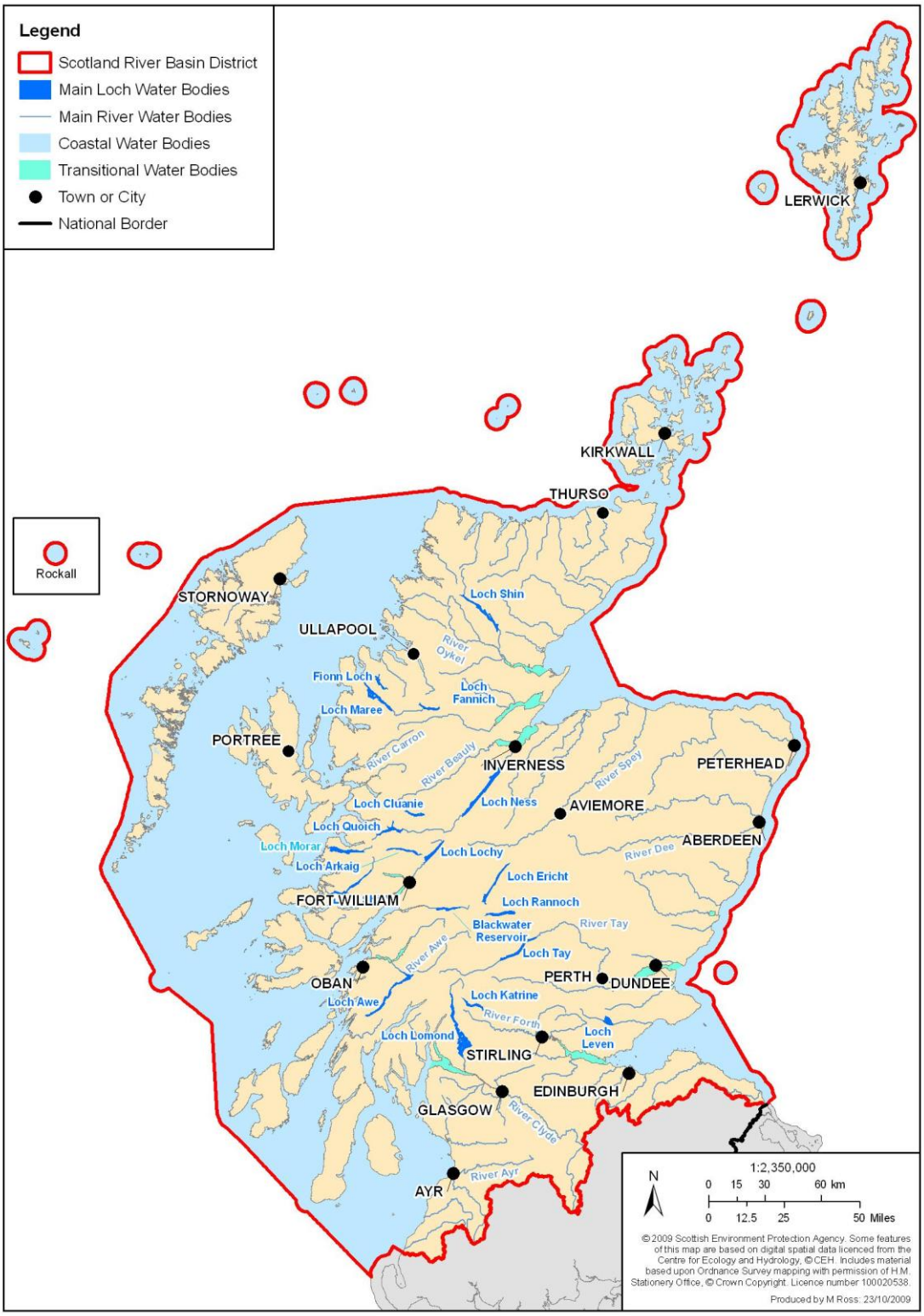
We have also been working in partnership to produce the first Flood Risk Management (FRM) Strategies for publication at the end of 2015. These will identify

[1] This summary together with the information available in the supporting data application update the analyses and reviews required by Article 5 of the Water Framework Directive and provide the overview of significant water management issues required by Article 14.

[2] The supporting application is found on SEPA's river basin planning website: http://www.sepa.org.uk/water/river_basin_planning/significant_issues/CCCF_Data_Application.aspx

the most sustainable measures to manage flood risk, some of which may also help address some of the key management challenges identified in this report.

Map 1: Scotland river basin district



2. Benefits provided by the water environment

We all enjoy the benefits of a clean and healthy water environment. Protecting these benefits and maximising their accessibility is at the heart of river basin planning. It is our role to ensure that we sustainably manage the many ways in which we use the water environment - from generating electricity to supplying communities with drinking water to enjoying walks near our many rivers, lochs and coastal areas.

Obtaining benefits from the water environment, such as hydroelectricity and drinking water, can sometimes come at the cost of adverse impacts to ecological quality. A key aim of river basin management is to appropriately balance competing demands when making decisions about protection of the water environment.

Since 2009, SEPA has been gathering information on a range of benefits that the water environment provides for us. To find out more about how the water environment contributes to our social and economic well-being, please go to the supporting data application.

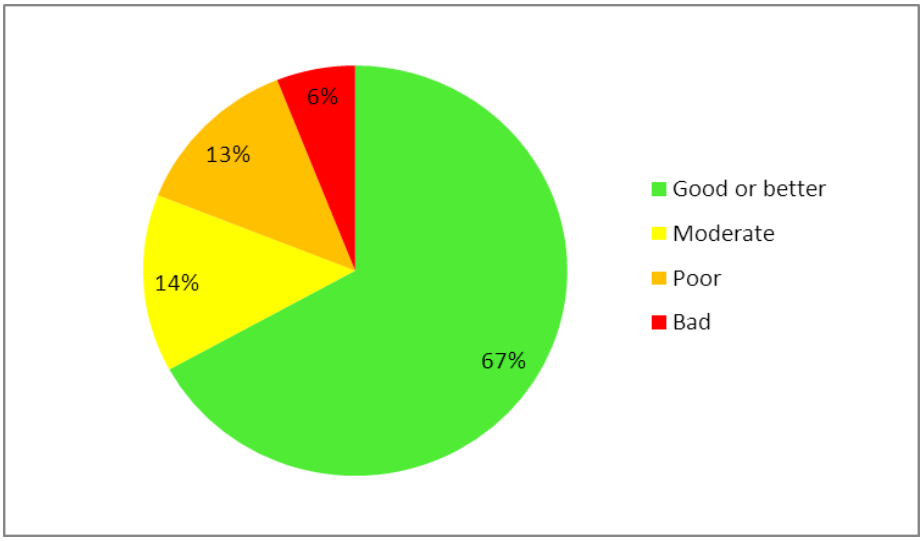
The improvements we make to the water environment in the Scotland river basin will provide a number of wider benefits, including increased potential for economic growth, enhanced recreation and leisure activities and a healthy environment we can pass on to future generations.

3. Current condition of the water environment in the Scotland river basin district

3.1 Current condition of the water bodies in the Scotland river basin district

SEPA updates its assessment of the status of the water bodies in the Scotland river basin district annually. Figure 1 summarises the results, based on monitoring information collected up until the end of 2012. An assessment taking account of monitoring undertaken in 2013 will be available in 2014.

Figure 1: Current condition (2012) of surface and ground water bodies in the Scotland river basin district



Further details are available in the supporting data application.

By the end of 2012, the number of water bodies in good or better condition had increased by just over 2% since the classification results published in the 2009 river basin plan[3]. At this mid-point of the river basin planning cycle, the impact of our programme of measures on the condition of water bodies is expected to be small. It takes time to turn plans into changes on the ground. It also takes time for changes on the ground to come through in monitoring results. This is partly due to lag times in the recovery of plant and animal communities and groundwater response times and partly because SEPA's assessments are based on combining and averaging monitoring results collected over a number of years.

SEPA has collected more baseline information about pressures and impacts on the water environment. This has resulted in changes to classifications that are unrelated to any measures that have been taken. This further information has also revealed that large gaps in our understanding remain and it is likely that SEPA's latest assessments underestimate the extent of pressures such as river straightening on the physical condition of water bodies, presence of some toxic substances and impacts from contaminated land.

3.2 Preventing deterioration

Many of our waters are already in a good or excellent condition, a situation enjoyed by only a few countries across Europe. Protecting our waters from deterioration is one of our principal aims. To help us to do this, SEPA has identified waters that are close to the bottom of a status class and hence where careful management of pressures may be needed to prevent deterioration of status. Waters in which trends in the concentrations of pollutants may cause deterioration unless appropriate action is taken, and waters whose ecological quality is at risk from the spread of invasive non-native species (Table 1), have also been identified.

Table 1: Targeting effort to protect waters from deterioration

	Waters close to the bottom of a status class		**Waters in which a deteriorating trend is present**	**Waters at risk from the spread of invasive non-native species**
	Water quality	**Water flows and levels**	**Water quality**	
Number of water bodies	211	13	89	150
Percentage of water bodies	7%	<1%	3%	5%

Further details are available in the supporting data application.

Many activities have the potential to cause deterioration. SEPA and other regulators set conditions of authorisation for new activities, and undertake subsequent audit and monitoring. These regulatory controls are designed to ensure the activities are undertaken in such a way that the water environment is protected. Those carrying out the activities have an important role to play in helping to prevent deterioration by adhering to these conditions.

However, not all pressures can be managed through regulatory controls. Table 1 has shown that 5% of water bodies in the Scotland river basin district are potentially at risk from the spread of invasive, non-native species. Table 2 identifies the key

[3]Note that 2012 results are not directly comparable with previous years due to additional evidence, improved methodologies and water body changes introduced since 2009. Classification results in the 2009 plan are based on data collected up to the end of 2008.

species where a risk of deterioration is likely unless appropriate controls and management are put in place.

Table 2: Risk of deterioration from invasive non-native species

Species		**Number of water bodies at risk of deterioration by 2027**
Marine species	Colonial Tunicate (*Didemnum vexillum*)	19
	Common Cord-grass (*Spartina anglica*)	8
	Leathery Sea Squirt (*Styela clava*)	40
Freshwater species	Australian Swamp Stonecrop (*Crassula helmsii*)	2
	Riparian Vegetation[1]	15
	North American Signal Crayfish (*Pacifastacus leniusculus*)	90

[1] Includes Giant Hogweed (*Heracleum mantegazzianum*), Japanese Knotweed (*Fallopia japonica*), Rhododendron (*Rhododendron ponticum*) and Himalayan Balsam (*Impatiens glandulifera*).

The main known species posing a risk of deterioration in marine areas is the leathery sea squirt, and in freshwaters is the North American signal crayfish. The leathery sea squirt causes damage by competing for space and food with native and aquaculture species, e.g. mussels and oysters. This and other marine species are spread through human activities. North American signal crayfish adversely impact native freshwater flora and fauna by consuming large quantities of plants and invertebrates, or by destabilising aquatic environments by burrowing into the banks of rivers and ponds.

3.3 Current condition of protected areas

The water in the Scotland river basin district also supports specific protected areas that have been designated because of their importance for wildlife conservation, bathing, drinking water supply, shellfish harvesting, or their vulnerability to eutrophication. SEPA's assessment of the current condition of shellfish water and bathing water protected areas together with Scottish Natural Heritage's (SNH's) assessment of the current condition of areas protected under European legislation for the conservation of wildlife is shown in Table 3 on the following page.

Table 3: Current condition (2012) of protected areas[4] in the Scotland river basin district

Protected area	Number of protected areas at target condition	Percentage of protected areas at target condition
Shellfish[5]	55	70%
Bathing waters[6]	62	82%
Natura 2000 (Special Areas of Conservation and Special Protection Areas)[7]	287	89%

Further details are available in the supporting data application.

The main objective for drinking water protected areas (DWPAs) is to prevent any deterioration in water quality that could compromise water supplies unless purification treatment is increased. Over 800 DWPAs have been designated in Scotland; SEPA and Scottish Water have identified that 14 of these are at risk. For nutrient sensitive protected areas, 171 Urban Waste Water Treatment Directive nutrient sensitive areas and three Nitrate Vulnerable Zones have been designated.

4 Progress towards our improvements targets

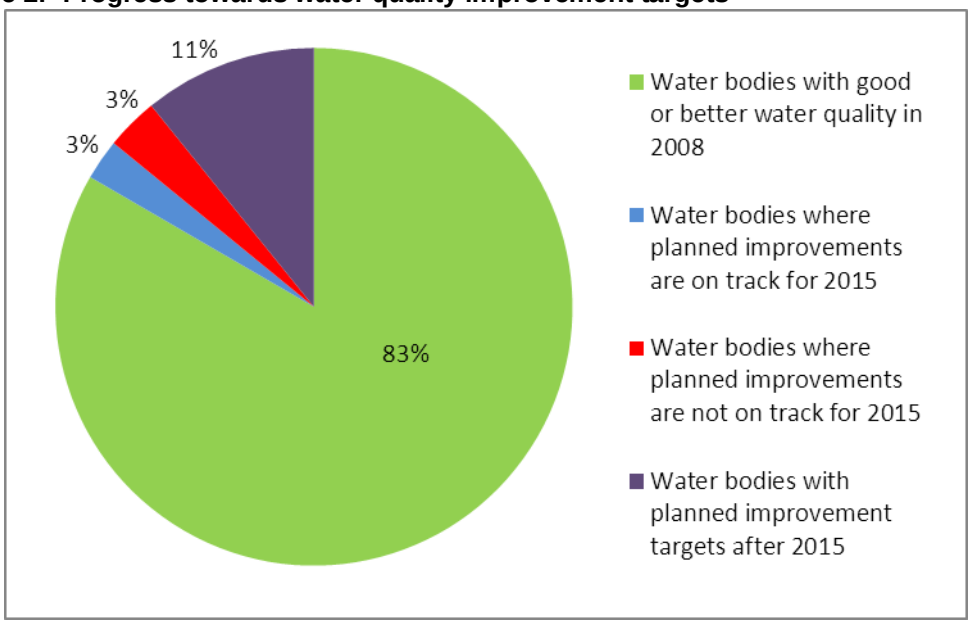
In 2009, targets were set for reducing pollution, reinstating fish passage at man-made barriers to migration, restoring damaged habitats and mitigating over-abstraction of water. Our overall objective for 2015 is to improve 71% of waters in the Scotland river basin to good or better. The targets were designed to help improve the ecological quality of our rivers, lochs, estuaries, groundwaters and coastal waters. Targets were also put in place for improving protected areas. This section sets out SEPA's assessment of whether we are on track to achieve our targets.

4.1 Improvement targets for water quality

In approximately 83% of water bodies in the Scotland river basin district, water quality was already good or excellent in 2008. We set targets for improving water quality in an additional 6% of water bodies by 2015. At this stage, we are set to improve water quality in 3% of water bodies by 2015 (Figure 2 on the following page).

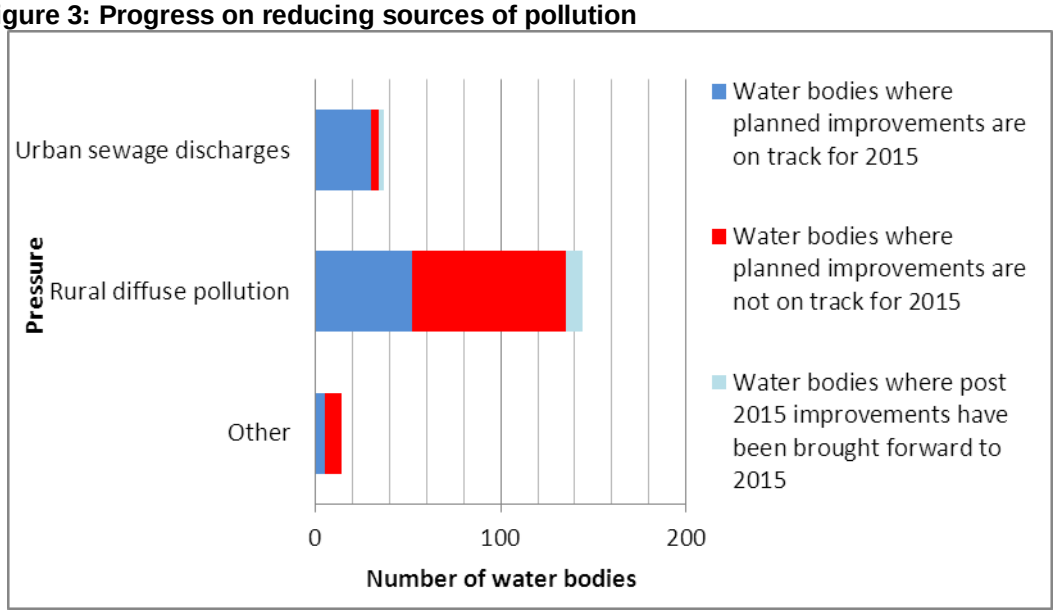
[4]Note that 2012 results are not directly comparable with previous years due to changes to the number of designations for these protected areas since 2009.
[5]The targets are defined in terms of the number of bacteria in shellfish.
[6]The targets are defined in terms of the number of bacteria in the bathing water. This assessment uses the more stringent standards as outlined in the revised Bathing Water Directive which will be used for reporting from 2015. In 2012 SEPA reported that 97% of bathing waters passed using the existing standards.
[7]The targets are defined in terms of the conservation objective of the site in so far as their achievement depends on the status of the water environment.

Figure 2: Progress towards water quality improvement targets



Significant sources of pollution include excessive inputs of plant nutrients such as phosphorus and nitrogen, which affect the quality of more water bodies than inputs of any other pollutant. The main sectors causing these inputs include agriculture and sewage discharges. Analysis of the key water pollution sources (Figure 3) indicates that for sewage discharges we are largely on track to meet our 2015 target objectives. For rural diffuse pollution, we are at risk of not meeting our objectives for over half of planned improvements.

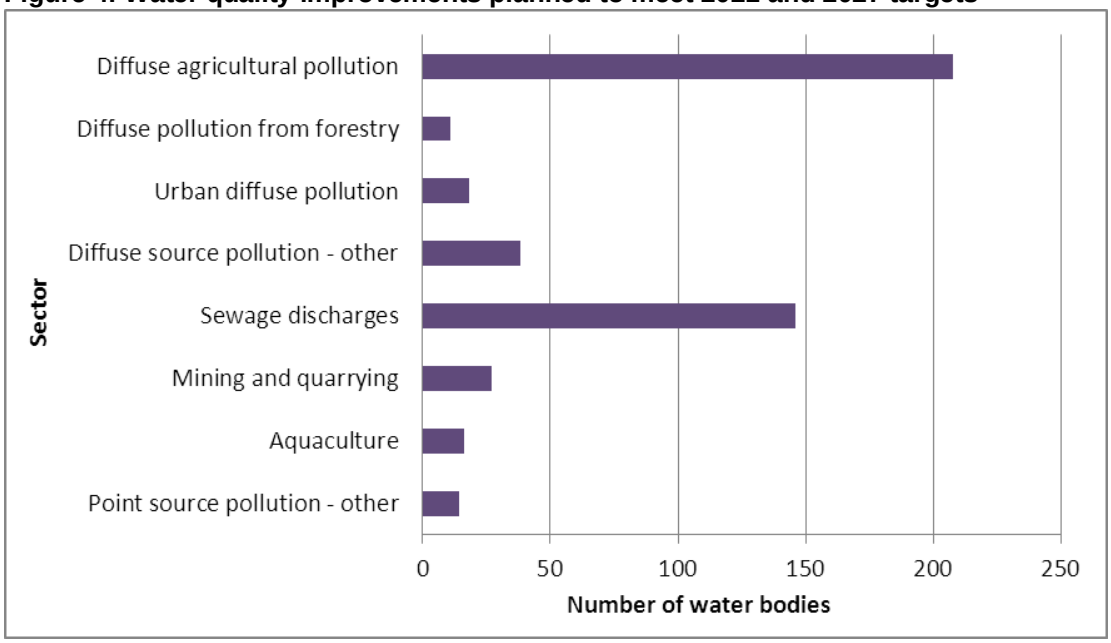
Figure 3: Progress on reducing sources of pollution



In the first plans we also set out longer-term improvement targets for water quality for 2021 and 2027 (Figure 4 on the following page). Achieving these targets will depend to a large extent on our ability to reduce pollution from agriculture and from discharges of sewage. We expect to meet most of our targets for sewage disposal through the Scottish Water Quality and Standards (Q&S) programme; however, given the number of improvements for sewage disposal required beyond 2015, it is important that we ensure opportunities to reduce costs are explored wherever

possible. The challenges associated with meeting our targets for rural diffuse pollution are discussed in Section 5.2.

Figure 4: Water quality improvements planned to meet 2021 and 2027 targets

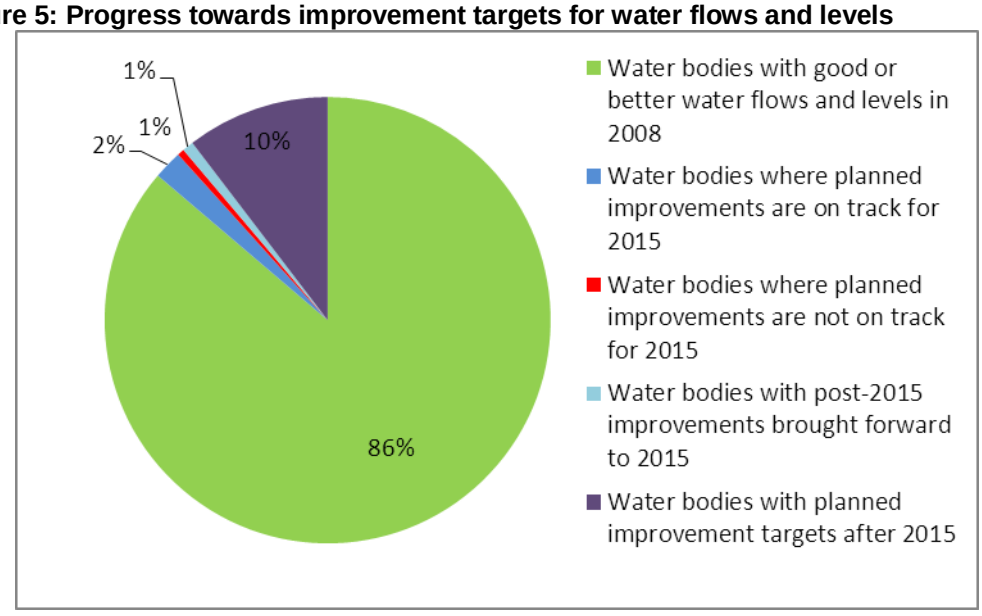


*Other pollution sources include improvements for activities such as recreation and landfill.

4.2 Improvement targets for water flows and levels

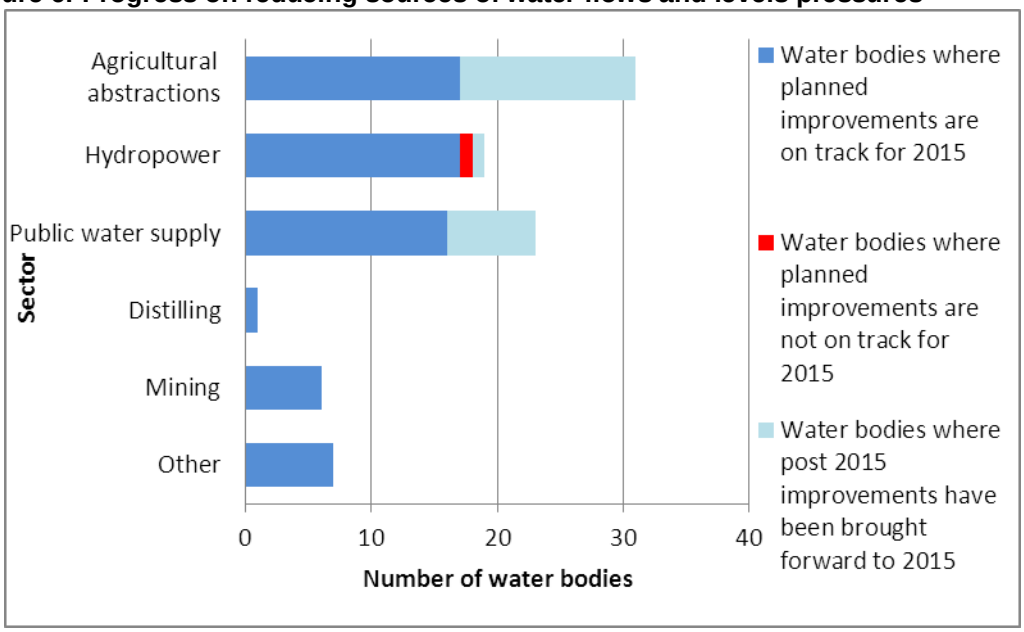
In 86% of water bodies, water flows and levels were already good or better in 2008. We set a target of improving flows and levels in an additional 3% of water bodies by 2015. We are on track to achieve this goal (Figure 5).

Figure 5: Progress towards improvement targets for water flows and levels



The main pressures on flows and levels are water abstractions for public water supply, hydroelectricity generation and agricultural abstractions. Figure 6 on the following page summarises progress in addressing pressures on flows and levels resulting from different water uses.

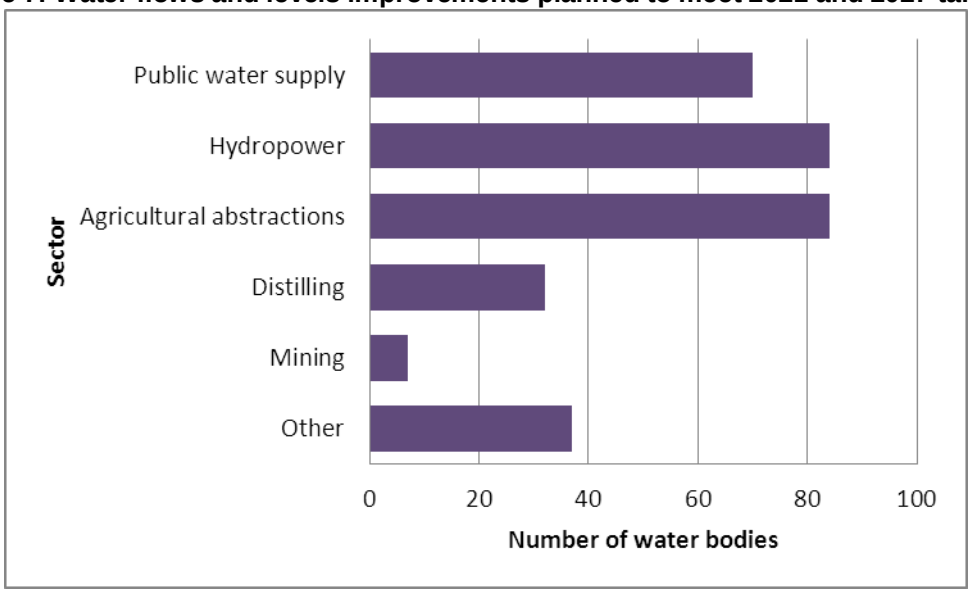
Figure 6: Progress on reducing sources of water flows and levels pressures



*Other includes improvements for sectors such as manufacturing and aquaculture.

In the first plans we also set out longer-term improvement targets for water flows and levels for 2021 and 2027 (Figure 7). The majority of improvements planned are for public water supply, hydropower and agricultural abstractions. Regulatory controls for abstractions and impoundments underpin our management approach for reducing the pressures associated with these sectors.

Figure 7: Water flows and levels improvements planned to meet 2021 and 2027 targets



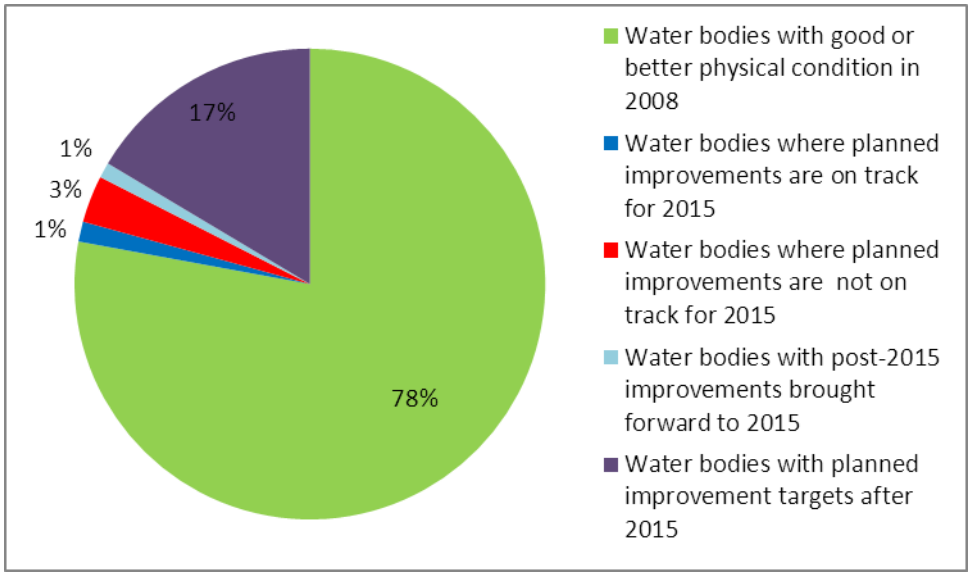
*Other includes improvements for sectors such as manufacturing and aquaculture.

4.3 Improvement targets for the physical condition of the water environment

In 2008, SEPA estimated that the physical condition of the water environment was good or better in around 78% of surface water bodies. In 2009 we set targets for improving the physical condition in 4% of surface water bodies. The vast majority of improvements planned by 2015 relate to removing barriers to fish migration and to addressing the legacy of physical changes to our rivers. At this stage, we are set to

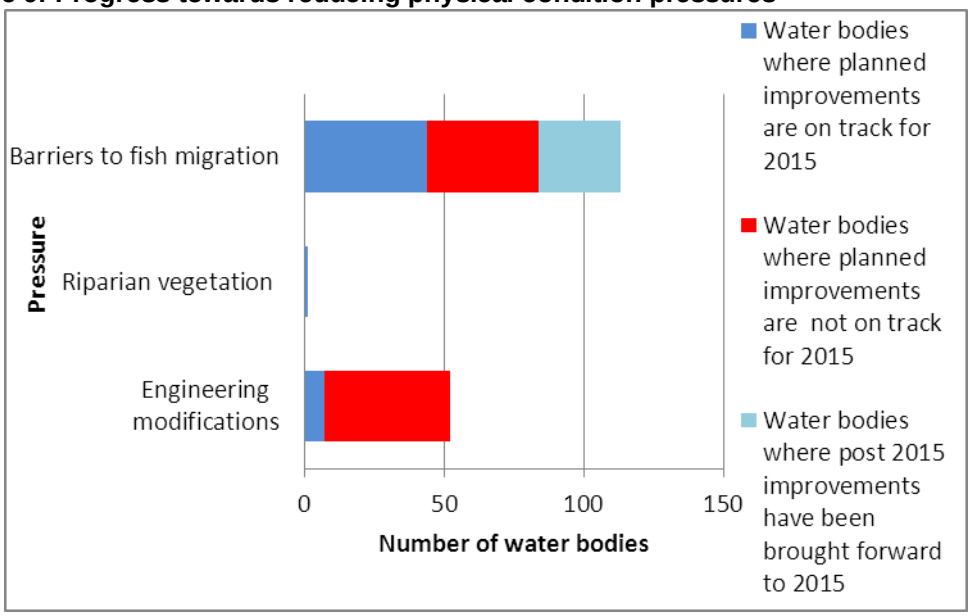
see improvements to overall physical condition of 2% of water bodies by 2015 (Figure 8).

Figure 8: Progress towards improvements to the physical condition of the water environment



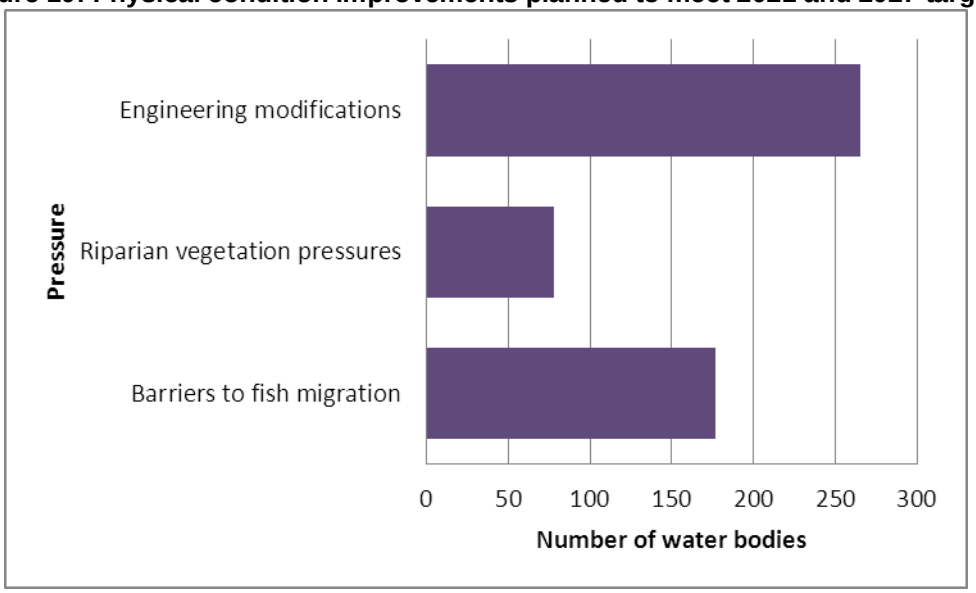
The main pressures on physical condition relate to engineering modifications (both historical and current), including barriers to fish migration (Figure 9). For engineering modifications we are at risk of not meeting our targets for the majority of planned improvements. The challenges associated with reducing impacts to the physical condition of the water environment are discussed in Section 5.3.

Figure 9: Progress towards reducing physical condition pressures



In the first plan we also set longer-term improvement targets for physical condition for 2021 and 2027 (Figure 10 on the following page). The majority of improvements planned are for engineering modifications (both historical and current structures) and barriers to fish migration.

Figure 10: Physical condition improvements planned to meet 2021 and 2027 targets



4.4 Improvement targets for managing invasive non-native species (INNS)

As no technically feasible control methods are available for some high impact species, notably North American signal crayfish and Australian Swamp Stonecrop, no improvement targets were set. For INNS impacting upon riparian vegetation, improvement targets have been assessed as pressures on the physical condition of the water environment (Section 4.3).

4.5 Improvements targets for protected areas

In 2009 we set targets to improve the condition of a number of protected areas by 2015. Targets were set to improve one shellfish water, 23 bathing waters and eleven Natura 2000 areas (Special Areas of Conservation and Special Protection Areas) to their target conditions by 2015. Assessment of progress on improving these areas is shown in Figures 11-13 on pages 15 and 16.

Figure 11: Progress towards shellfish waters improvement targets[8]

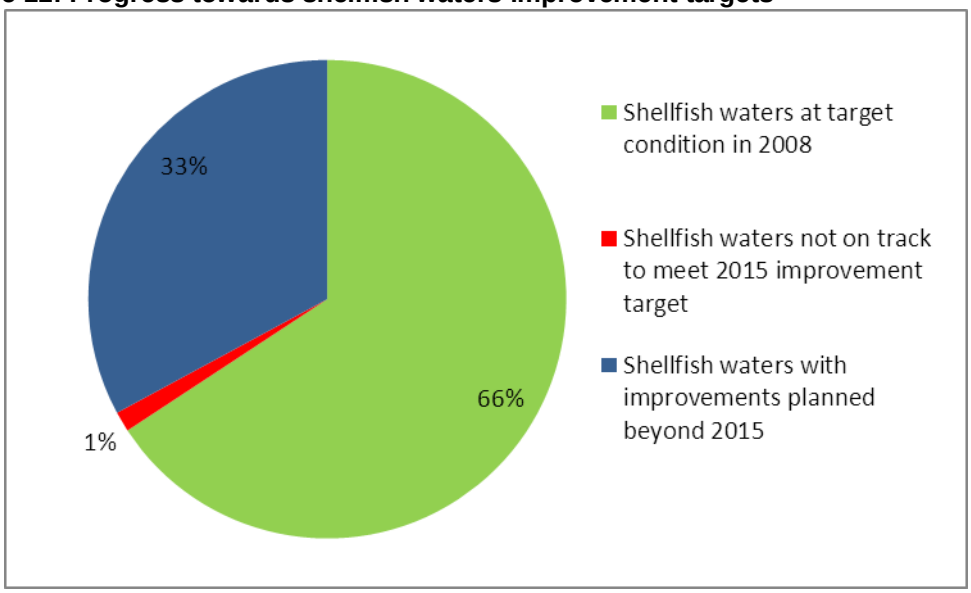
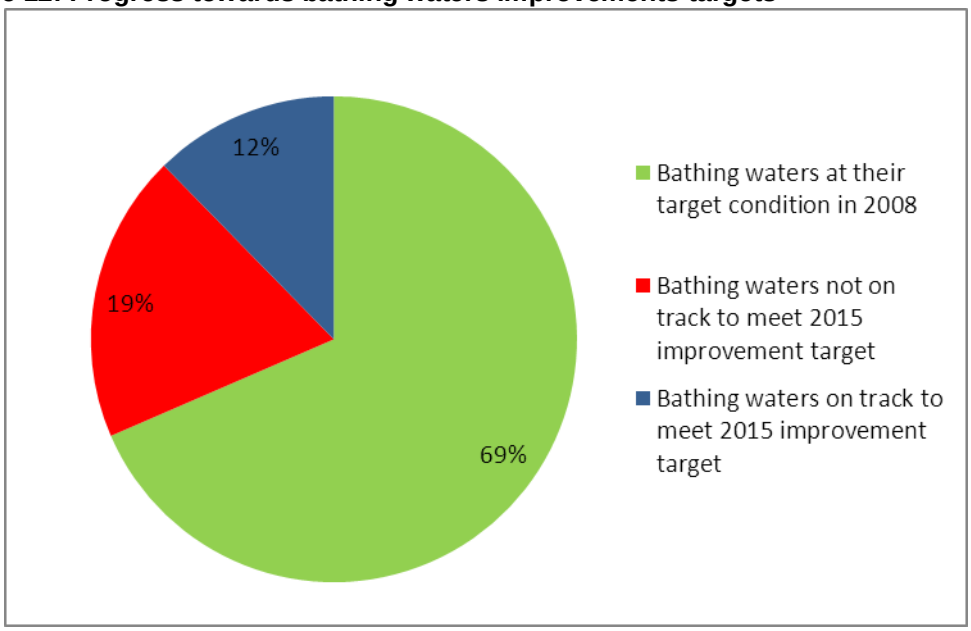


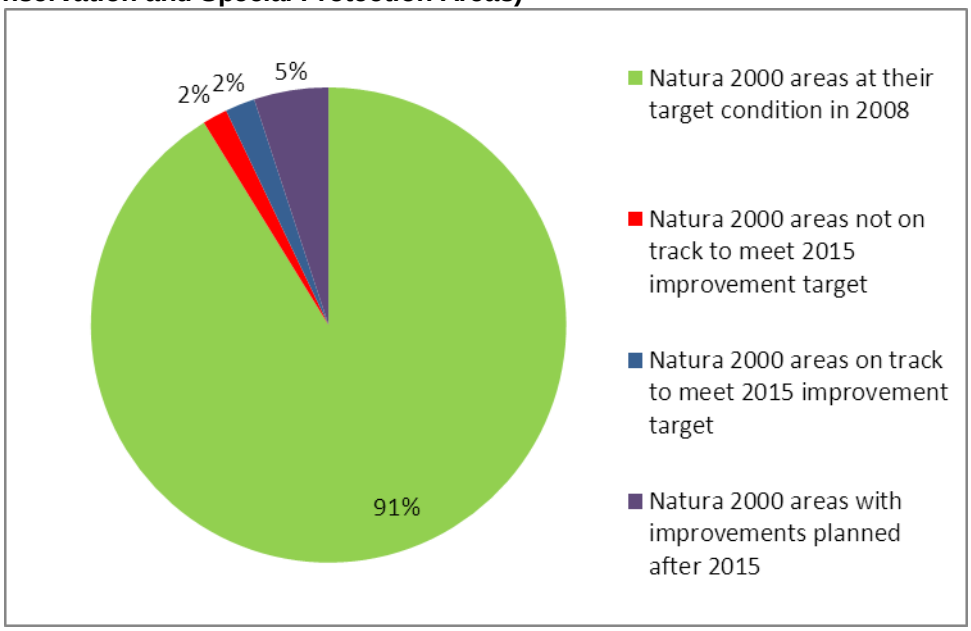
Figure 12: Progress towards bathing waters improvements targets[9]



Faecal bacteria in bathing and shellfish waters acts as an indicator of the general level of contamination and hence informs on the risk of illness from viruses or other water borne pathogens. Faecal bacteria can reach bathing waters and shellfish waters from a variety of different sources. Identifying the sources is a necessary first step so that action can be targeted appropriately. The combination of the time it takes to identify sources and the challenges involved in tackling the diffuse sources found means that we are currently not on track to achieve our improvement targets in 15 of these protected areas.

[8] Note as only one improvement was planned by 2015 for shellfish waters, no shellfish water areas are on track to meet their 2015 improvement target.
[9] There were no improvements planned for bathing waters beyond 2015 in the 2009 river basin management plan.

Figure 13: Progress towards improvement targets for Natura 2000 areas (Special Areas of Conservation and Special Protection Areas)



Of the 11 Natura sites with planned improvements, we are not on track at five of these sites to meet improvements for 2015. For two of these sites, the primary reason is a delay in meeting measures to address impacts to the physical condition of the water environment in the protected area. For one site we are not on track due to diffuse pollution pressures and for two of the five sites, delayed progress is due to both physical condition and diffuse pollution pressures. The challenges associated with managing these pressures are outlined in Section 5.

4.6 Summary of progress on improvement targets

In the first river basin plan we set the objective that 71% of water bodies would be in a good or better condition by 2015. Our most recent classification results indicate that 67% of water bodies were in a good or better condition at the end of 2012. We will continue to make progress for the remainder of the cycle; however our assessments indicate that it is unlikely we will reach our goal by 2015.

We are making significant progress in areas where regulatory controls exist to reduce pressures to the water environment e.g. abstraction of water and point sources of pollution. For other pressures, particularly those driven by land use, we need to increase our efforts and adapt our existing approaches to sufficiently address key issues such as rural diffuse pollution and restoring habitats damaged by building, maintenance and engineering works.

Our understanding of the environment has significantly improved during this first cycle of river basin planning. We have uncovered more pressures on the water environment but gaps remain in our understanding. For example, identifying relative sources of pollution is essential to enable us to target investment to more effectively tackle point source and diffuse pressures. Improving our understanding of the physical condition of the water environment is also priority. This is a substantial task and an appropriately targeted and phased approach will be required.

5. Significant water management challenges

5.1 Current and future challenges

The implementation of the first river basin management plan has provided valuable experience of working in partnership to tackle a wide range of pressures. The task for the second and third cycles will involve making a number of improvements to water bodies in the Scotland river basin district. This includes a large number of improvements for sewage discharges, public water supply and hydropower, for which steps are in place through licensing controls. We must limit the risk of deterioration by pressures such as INNS, for which plans are now in place to control their arrival and spread through the INNS supplementary plan[10], which sets out the key responsible authorities and actions for controlling INNS in the water environment.

We must also look beyond our 2027 targets to identify future challenges that may impact on our ability to sustainably manage the water environment in the long term[11]. Climate change is likely to have an impact on both temperature and the amounts and frequency of rainfall and hence on the water environment. If we take no action to mitigate the effects, SEPA estimates that by 2050 around 8% of water bodies in the Scotland river basin are unlikely to be able to support current rates of water abstraction without their ecological status deteriorating. Climate change is also expected to lead to significant shifts in agricultural land uses, notably the conversion of grassland to arable farming as climate warms and summers become drier. Increases in the extent of arable farming combined with predicted seasonal changes in rainfall and temperature may impact on the water environment. Adoption of land management practices resilient to climate change could help mitigate risks.

Although we are now making progress at reducing a number of pressures on the water environment, our assessments have informed the identification of a range of issues limiting our ability to make all the necessary improvements. We consider these to be the most significant management challenges to achieving our objectives for 2015 and beyond. They are significant because to address them requires a step change in how we target our efforts and the funding available for improvements, or a new approach to how we reduce the pressures. The latter may require enhancements to the policy framework that underpins river basin management, including through making additional provisions in legislation. These significant water management challenges are:

- rural diffuse pollution;
- impacts on the physical condition of the water environment;
- toxic substances and urban diffuse pollution;
- water pollution caused by land contamination.

We now discuss each of our significant water management challenges and propose potential new options for future management. We are seeking your feedback on these new options.

[10]Managing Invasive Non-Native Species in Scotland's Water Environment: A Supplementary Plan to the River Basin Management Plans is available on http://www.sepa.org.uk/water/river_basin_planning/implementing_rbmp.aspx.

[11] http://www.crew.ac.uk/publications/potential-risks-water-quality-diffuse-pollution-driven-future-land-use-and-climate-chan

5.2 Rural diffuse pollution

Tackling diffuse pollution can benefit rural businesses as well as improving the health of aquatic ecosystems. The first river basin management plan initiated a programme of focused effort and partnership work to tackle diffuse pollution in 12 prioritised river catchments. Improvements to protected areas have been drivers for prioritisation for many of these catchments. To date, SEPA has led work to survey 5,600km of rivers in these catchments and undertaken 1,270 farm visits. Around 2,500 further farms are scheduled to be visited before the end of 2015. SEPA estimates that around 75% of the farms visited have taken steps to help reduce pollution risks, including taking up funding available under the Scottish Rural Development Programme.[12]Scottish Water and SNH have also been involved in catchments projects where diffuse pollution is an issue.

It has become clear from our efforts to date that farming practices contributing to pollution are more numerous and widespread than we originally estimated and there are many different potential sources of pollution on every farm. It is taking longer than we anticipated to gain improved understanding of pollution risks and to work with land managers to reduce these risks. Adopting basic good environmental practice is the first necessary step; however, further, targeted measures may be required in some cases to achieve our targets.

We believe the approach across the basin by all involved is on the right track. However, to meet the scale of the challenge, we need to build on and expand this approach. Some possible future options for doing this include:

- Increased engagement with land managers to help them identify what they can do, and where, to reduce pollution risks. Experience indicates that practical advice is the most important factor in determining whether the right actions are taken in the right places.

- Re-prioritising how funding support is targeted so that land managers can take appropriate actions over and above basic good environmental practice. For example, to control pollution from nutrients in some water bodies, options such as creating woodland buffers or wetlands to help intercept pollutants may be needed.

- Building on and extending our partnership approach with land managers to ensure provision of coordinated and integrated advice and support e.g. the Sustainable Land Management Incentive Scheme introduced by Scottish Water in 2013.[13]

- Exploring options to reduce phosphorus additives in livestock feed.

- Coordination of activities to ensure that we manage pressures from other sources of rural diffuse pollution, for example, forestry and septic tanks.

- Embedding understanding of how to mitigate diffuse pollution risks in training and education courses for land managers, such as those run by the Scottish Agricultural College. This will foster good practice for the next generation of farmers and those undertaking further training and education.

[12] www.sepa.org.uk/water/diffuse_pollution.aspx
[13] www.scottishwater.co.uk/about-us/corporate-responsibility/sustainable-land-management

Question 1A:

What are your views on the options suggested for meeting the challenge posed by rural diffuse pollution?

Question 1B:

Do you have any further suggestions for how this challenge can be addressed?

5.3 Impacts on the physical condition of the water environment

The condition of the beds, banks and shores of 22% of our rivers, estuaries and coastal waters has been adversely affected by a wide range of historical and current land uses and by pressures such as overgrazing of bankside vegetation. Fish migration has also been limited in some rivers by barriers to migration, such as dams.

Since the publication of the river basin plan in 2009, we have:

- developed and published a Restoration Supplementary Plan[14], setting out our strategy for improving the physical condition of water bodies;
- established and used a restoration fund administered by SEPA to encourage and support projects to reinstate fish passage and improve damaged habitats;
- identified barriers to fish migration and prioritised these for action[15];
- set up pilot projects to demonstrate combining restoration of habitats and flood risk reduction in three river catchments, the Glazert Water, River Dee and the River South Esk.

Securing targeted action to restore degraded habitats has proved particularly challenging. Most importantly, we lack a structured delivery framework to achieve improvements to physical condition. Our understanding of the extent of alterations to the physical condition of water bodies is still developing. Designing effective improvements can take time because of the need to consider the implications of any changes in a catchment context. Action on the ground requires the support and agreement of land managers. Identifying opportunities for, and then negotiating partnership projects, takes time.

Some possible options for meeting the challenge include:

- Developing an effective delivery framework building on the restoration plan.
- Expanding the amount of engagement work aimed at identifying opportunities for, and securing partnership initiatives to deliver, improvements to the physical condition of water bodies.

[14] 'Improving the physical condition of Scotland's water environment': http://www.sepa.org.uk/water/river_basin_planning/implementing_rbmp.aspx

[15] This work was undertaken by SEPA and the Rivers and Fisheries Trusts for Scotland (RAFTS)

- Taking forward a more integrated, partnership approach between responsible authorities and other public bodies that links our goals for the water environment with wider goals for biodiversity; woodland creation; fisheries; flood risk management; urban regeneration; and green-space and green network provision in and around our towns and cities.

- Working with those responsible for the management of built structures in the water environment (such as road and rail crossings, etc) to embed environmental improvements into the maintenance programmes for those structures.

- Increasing the amount of support and funding available for making improvements.

Question 2A:

What are your views on the options suggested for meeting the challenge posed by changes to the physical condition of the water environment?

Question 2B:

Do you have any further suggestions for how this challenge can be addressed?

5.4 Toxic substances and urban diffuse pollution

SEPA's latest assessment of the state of the water environment identified around 2% of water bodies as being at worse than good status because of unacceptably high concentrations of toxic pollutants. For the majority of these, the pollutant concerned was ammonium. Only a small number were assessed as worse than good because of other, more persistent and hazardous pollutants. However, recent detailed risk assessments by the Environment Agency indicate that national monitoring programme results may be significantly underestimating the number of waters at risk from certain toxic pollutants, most significantly for a group of pollutants known as poly aromatic hydrocarbons and a group known as brominated diphenylethers. We have also agreed an ambitious objective of phasing out emissions, discharges and losses of a number of the most hazardous pollutants. Achieving this latter goal for such pollutants, which are produced from a wide range of sources and ubiquitous in the environment, presents a serious challenge. Nevertheless, by combining action to reduce losses at source and improvements to urban drainage systems, we think significant reductions in pollution can be achieved.

Run-off from roads and other urban surfaces is an important route into the water environment for most of the pollutants of concern. In contrast to traditional drainage systems, sustainable urban drainage systems (SUDS) can be effective at trapping or even treating the pollutant. To make use of this and make progress towards achieving our objectives, we will need to retrofit SUDS onto existing drainage systems with the most polluting outfalls where practical. SUDS also have the joint benefit of reducing flood risk from surface water flooding. The flood risk management planning process has identified areas where Surface Water Management Plans should be produced. These are likely to identify actions such as SUDS and green networks to reduce flood risk that will also reduce pollution to the water environment.

Tables 4a-e identify the key chemicals of concern, due to their toxicity to both humans and wildlife, and outline possible options for future management.

Table 4: Toxic substances of concern in the Scotland river basin district

4a: Brominated diphenylethers (BDPE)			
Where do they come from?	**How are they released into the water environment?**	**What are the challenges to achieving our targets?**	**What options are there for a step change in our approach to meeting the challenge?**
Used to prevent the spread of fires in many household goods - from cushions to computers	Treated items will shed particles, which mix into household dust - and most of this ends up in sewers via our washing machines, or by being mixed in with rainfall Particles can be released if the item is recycled	Numerous small sources make source control difficult The most bioaccumulative forms have been banned and other forms restricted in the EU but are still being produced and used elsewhere and can come in to the country in imported goods Removal from wastewater with current technology is extremely expensive	Controls on imports could be explored Focus could be directed to controlling emissions from electronic waste dismantling plants which are likely to be large sources Improved control over disposal of waste sofas and textiles could be explored Sustainable Urban Drainage Systems (SUDS) which remove particulates could help reduce proportion from urban run-off (although this does not address the problem of household/industrial wastewater)

<u>Question 3a</u>
What are your views on the options proposed for BDPE?

4b: Mercury and Cadmium			
Where do they come from?	**How are they released into the water environment ?**	**What are the challenges to achieving our targets?**	**What options are there for a step change in our approach to meeting the challenge?**
Mercury is used in dentistry, batteries, paints and fluorescent lights. A legacy remains from historical use in thermometers Cadmium is used in batteries, pigments, stabilizers and agricultural fertilisers	Mercury enters the wastewater network and through industrial point sources Cadmium enters the water environment diffusely through land run-off	Due to current use and legacy of these chemicals in existing products, the goal of ceasing emissions, losses and discharges to the water environment will be very challenging Removal from wastewater with current technology is extremely expensive	Discussions are ongoing in the EU regarding banning mercury in dental amalgam, cadmium in agricultural fertilisers and button cell batteries containing both chemicals SUDS could help to remove the sediments to which these metals bind

<u>Question 3b</u>
What are your views on the options proposed for Mercury and Cadmium?

4c: Polyaromatic Hydrocarbons (PAHs)			
Where do they come from?	**How do they get into the water environment?**	**What are the challenges to achieving our targets?**	**What options are there for a step change in our approach to meeting the challenge?**
Found naturally in oil and coal Produced from burning substances containing carbon, such as petrol, diesel, natural gas, coal, wood, stubble, heather and plastics Formed in the manufacture of coke	Particles enter the water environment mainly through urban run-off though a small percentage enters through wastewater discharges and directly from the atmosphere Significant levels have built up from historic use	Because so many sources exist, the substance is found nearly everywhere, making source control difficult The goal of ceasing all emissions, losses and discharges of this substance will be very challenging	Re-design and retrofit of SUDS to trap and breakdown PAHs in urban run-off Integration with policies for reducing air pollution through better traffic management to reduce particulates from vehicles Work with manufacturers to reduce pollutants at source, for example from vehicle emissions and tyres Work with roads authorities to look at targeted maintenance sweeping of roads and emptying of gully pots on roads with high usage

Question 3C
What are your views on the options proposed for PAHs?

4d: Nonylphenol			
Where does it come from?	**How is it released into the water environment?**	**What are the challenges to achieving our targets?**	**What options are there for a step change in our approach to meeting the challenge?**
Used in production of resins, plastics, stabilizers and industrial surfactants, including clothing	The substance enters the water environment mainly through urban run-off though a proportion enters through commercial wastewater discharges	There are many sources for this substance and it is used in a large number of products, making source control difficult The goal of ceasing all emissions, losses and discharges of this substance will be very challenging Wastewater treatment costs for the substance are high	Control of imported products containing the substance could be explored International negotiations for ceasing use in products where restrictions are not in place should be explored Treatment at end of pipe is possible by SUDS for surface water run-off and wastewater treatment for contaminated trade effluents (though costly)

Question 3D
What are your views on the options proposed for Nonylphenol?

4e: Di(2-ethylhexyl)phthalate (DEHP)			
Where does it come from?	**How is it released into the water environment?**	**What are the challenges to achieving our targets?**	**What options are there for a step change in our approach to meeting the challenge?**
Used as a plasticiser (to make plastics more flexible) Applications include vehicle parts, soles of shoes, window and door sealants, roofing materials and traffic signs/cones	By far the greatest source is diffuse, from road surface run-off and urban areas A smaller portion enters from point sources, including domestic and commercial wastewaters	There are many sources for this substance and it is used in a large number of products, making source control difficult The goal of ceasing all emissions, losses and discharges of this substance will be very challenging Most treatment works cannot effectively remove this substance	Work with other countries on targeted EU controls Work with manufacturers to encourage the use of alternative plasticisers in products presenting most risk to the environment Treatment via SUDS for roads, especially those deemed high risk due to high volume of traffic

Question 3E:
What are your views on the range of options proposed for DEHP?

SEPA has calculated a baseline inventory[16] of toxic substances of concern in the environment for the Scotland river basin district. We intend to maintain and update this inventory to assist in monitoring our compliance with the legislative requirements. Further data gathering and changes to monitoring approaches, for example by measuring an increased range of substances in ecosystems, will improve SEPA's understanding of the environmental risks and challenges ahead.

Question 3F:

Do you have additional suggestions for management options for these substances?

Question 4:

Do you have suggestions for how we can address the wider challenges of urban diffuse pollution?

5.5 Water pollution caused by land contamination

Land left contaminated with pollutants, for example, at old industrial sites or old fuel stations can cause damage as the pollutants slowly leach into the water environment. In a proportion of cases, the pollution is sufficiently extensive to affect the status of a water body but, in most, the impact is more localised, producing pollution hotspots in groundwater. In the Scotland river basin district, four waterbodies are currently assessed as being impacted by contaminated land however we believe that this underestimates the total number at risk. There may be as many as 65,000 sites in Scotland covering, in total, over 80,000 hectares of land

[16] The baseline inventory is on SEPA's river basin planning website: http://www.sepa.org.uk/water/river_basin_planning/significant_issues.aspx

that are potentially contaminated with pollutants[17]. While it is unlikely that all 65,000 may be impacting upon the water environment the large number of contaminated sites suggests that there are potentially many more than the four water bodies we have identified in our current assessment.

These pollutants can be harmful and may also be persistent and liable to bio-accumulate. Where we can do so without disproportionate cost, we have to prevent hazardous pollutants from getting into groundwater.

When land is re-developed, local planning authorities work with developers to ensure pollution risks from any contamination are addressed. Historic contamination can also be dealt with by the local authorities under a regulatory regime for remediating contaminated land. However, resource constraints can be a problem and the regime does not necessarily enable sites posing the most significant risk to the water environment to be prioritised for action.

Some possible options for meeting the challenge include:

- Develop our existing policy framework to ensure the river basin management process gives greater weight to contaminated land by identifying and dealing with sites that pose the greatest environmental risk. The framework should better focus SEPA's efforts to secure improvements on sites responsible for the most significant pollution problems.

- Re-prioritising funding to ensure that sites we prioritise for action can be addressed in the absence of other means of securing the necessary improvements e.g. through site re-development.

- Improving mechanisms for exchange of information between SEPA and local authorities to enable identification or flagging of sites posing the greatest risks to the water environment.

Question 5A:
What are your views on the possible options suggested for meeting the challenge posed by contaminated land on the water environment?

Question 5B:
Do you have any further suggestions as to how we can meet this challenge?

6. Summary and next steps

This document has set out to achieve the following three objectives:

- A description of the current condition of the water environment in the Scotland river basin district;
- An assessment of progress towards achieving the improvement targets set for 2015;

[17] http://www.sepa.org.uk/land/land_publications.aspx

- Identification of the significant water management challenges we need to address in order to meet our objectives for the second and third cycles of river basin management planning.

Monitoring and analysis of the water environment of the Scotland river basin district has shown that 67% of our surface waters and groundwaters are in a good or better condition. Progress assessments indicate that the legislative framework is facilitating environmental improvements for a number of sectors. The partnership approach underpinning river basin management planning is also a key factor in achieving environmental outcomes.

Through the assessments presented in this report and in the supporting data application, the key management challenges for the second cycle of river basin planning have been identified as rural diffuse pollution, impacts on the physical condition of the water environment, toxic substances and urban diffuse pollution and contaminated land causing water pollution. For these pressures a step-change will be required in order to meet the outstanding 2015 targets and those set for 2021 and 2027.

Our aim for this consultation is to get your input on the development of our programme of measures for the significant water management challenges. Working together to identify the most appropriate actions will create a robust second plan that ensures maximum benefits to the water environment and its many users.

Question 6:
Do you agree with our assessment of water management challenges described in this report?

Question 7:
Are there any other areas you can contribute to for second plan development that you would like to discuss further?

There are a number of ways to respond to this consultation:

- Using the consultation tool[18] on SEPA's website;
- By requesting a paper version of the response form (email rbmp@sepa.org.uk);
- By writing to SEPA at SEPA RBMP Unit, Corporate Office, Castle Business Park, Stirling, FK9 4TR.

This consultation runs from 22 December 2013 to 22 June 2014 and SEPA will issue a response document by September 2014.

[18] https://consultation.sepa.org.uk/rbmp/cccf-scotland

ANNEX: List of consultation questions

1A. What are your views on the options suggested for meeting the challenge posed by rural diffuse pollution?

1B. Do you have other suggestions for how to address rural diffuse pollution?

2A. What are your views on the options suggested for meeting the challenge posed by changes to the physical condition of the water environment?

2B. Do you have other suggestions for how to address changes to physical condition?

3A. What are your views on the options proposed for Brominated diphenylethers?

3B. What are your views on the options proposed for Mercury and Cadmium?

3C. What are your views on the options proposed for Polyaromatic hydrocarbons?

3D. What are your views on the options proposed for Nonylphenol?

3E. What are your views on the options proposed for Diethyl Hexyl Phthalate?

3F. Do you have other suggestions for options for toxic substances?

4. Do you have suggestions on how to address the wider challenges of urban diffuse pollution?

5A. What are your views on the possible options suggested for meeting the challenge posed by contaminated land on the water environment?

5B. Do you have other suggestions for how to address water pollution from land contamination?

6. Do you agree with our assessment of the management challenges described in this report?

7. Are there any other areas you can contribute to for second plan development that you would like to discuss further?