Environment Agency

SEPA
Scottish Environment Protection Agency

A summary of significant water management issues in the Solway Tweed river basin district

Contents

1 Introduction

1.1 What this document is about

This summary of the significant water management issues in the Solway Tweed river basin district sets out the key issues in the district that we think put our ability to achieve the environmental objectives of the Water Framework Directive most at risk.

In the full report[1] we describe how the significant water management issues have been determined and the information that has been used in the process, including development of the river basin characterisation data and the input of our stakeholders through Area Advisory Groups and one-to-one meetings.

We describe the issues in terms of the type of pressure exerted on the water environment and the sector to which the pressure is associated. We also show on which categories of water bodies the pressures impact and the length or area affected. Table 1 lists the significant water management issues for the Solway Tweed river basin district.

We have provided more detailed information on each significant water management issue in the full report. In this document we develop our initial thoughts on how the issues will be addressed through combinations of existing measures and, where necessary new measures, which could range from new regulations to local partnerships.

Most importantly this consultation gives you the opportunity to comment on the significant water management issues and the measures that we have identified for addressing them. We also ask for your opinions on the preliminary designation of artificial and heavily modified water bodies.

Table 1: Significant water management issues in the Solway Tweed river basin district

Pressure type	Key sectors
Diffuse source pollution	Agriculture Forestry Sewage disposal activities Electricity production (acidification)
Point source pollution	Sewage disposal activities
Abstraction and flow regulation	Water supply Agriculture Hydropower
Morphology	Agriculture Forestry Water supply
Alien species	Recreational, sporting and cultural activities

[1] *An interim overview of the significant water management issues in the Solway Tweed river basin district* - available at www.sepa.org.uk

More information and background to the river basin planning process is given in:

- A River Basin Planning Framework for the Solway Tweed River Basin District
- Solway Tweed River Basin Planning: A Plan of Action.

Both of these reports are available online at www.sepa.org.uk. The Solway Tweed Plan of Action sets out the main steps in the river basin planning process and shows where the significant water management issues report fits into the overall process.

1.2 Consultation arrangements

This document is aimed at those who are likely to be affected by or have an interest in developing the river basin management plan to achieve the Water Framework Directive's objectives in the Solway Tweed river basin district.

We wish to engage with as wide an audience as possible and therefore welcome views from anyone interested in how the water environment is managed.

We have included two sets of consultation questions below and at the end of this document. Note that some of the detailed information needed to answer these questions fully is contained in the full report available at www.sepa.org.uk.

Significant water management issues

This consultation focuses on the significant water management issues we will have to deal with in the river basin management plan. These issues are outlined in section 2 of this summary and described in detail in section 6 of the full report.

Please consider the following consultation questions:

- Do you agree that these are the significant issues impacting the water bodies within the Solway Tweed river basin district?
- Are there other significant issues at the river basin district level that have not been considered?
- Have we identified all the important existing measures that are being used to address these issues? Please identify any important existing measures which we may have missed.
- Are there additional new measures that you think could make an important contribution to addressing a significant issue?
- Can you identify new or existing measures that **you** can help deliver?

Please provide additional information to support your response.

Environmental objectives

We would also like your views on our provisional identification of heavily modified or artificial water bodies in the Solway Tweed river basin district and their ability to achieve the Water Framework Directive's environmental objectives.

Map 10 in the full report shows the results of applying a screening tool to each water body provisionally identified as heavily modified. Detailed information about the screening process and its outcome is available in section 7 of the full report.

Please consider the following consultation questions:

- Are there water bodies that have been identified as heavily modified or artificial which you believe could achieve good ecological status?
- Are there water bodies that have not been identified as heavily modified or artificial that you believe should be designated?

You can respond:

In writing: Significant Water Management Issues team
Scottish Environment Protection Agency (SEPA)
Clearwater House
Heriot Watt University Research Park
Avenue North
Riccarton
Edinburgh
EH14 4AP

By email: rbmp@sepa.org.uk

Via our website: www.sepa.org.uk

We must receive your views on this consultation by 8 April 2008. All responses received will be taken into consideration during the development of the draft river basin management plan, which will be published by the end of 2008.

We will comply with the requirements of the Data Protection Act 1998 and use the information you provide only for this consultation. It will not be used, retained or distributed for any other purpose.

1.3 Keeping you informed

As set out in this document, some of the measures will be carried out by our partners and can range from economic incentives to voluntary partnerships. The draft river basin management plan for the Solway Tweed will set out a summary of the proposed measures for wider consideration. The consultation period for the draft plan must begin by 22 December 2008.

If you wish to be kept informed about the draft river basin management plan, please register your interest by emailing rbmp@sepa.org.uk or contact us at SEPA, Rivers House, Irongray Road, Dumfries, DG2 0JE (Tel: 01387 720502).

2 Significant water management issues

We are fortunate that the quality of the water bodies in the Solway Tweed river basin district is generally good. However, there are some water bodies that are, or will be, at risk of failing to meet the environmental objectives of the Water Framework Directive.

This section sets out the main groups of significant water management issues. It includes a brief overview of some of the current measures and those we may need in the future to address the issues and meet the requirements of the Water Framework Directive.

2.1 What are significant water management issues?

The significant water management issues are the pressures acting upon the water environment that we think put our ability to achieve the environmental objectives of the Water Framework Directive most at risk.

The following three principles have been used to identify the significant water management issues for the river basin district:

- To what extent does the issue impact adversely on the achievement of the Water Framework Directive's objectives for each category of water body (rivers, lochs/lakes, transitional, coastal, groundwater) in the river basin district?
- To what extent is the evidence that the issue is likely to impact on Water Framework Directive objectives based on sound and substantiated science?
- To what extent will measures already being implemented in the river basin district fail to address current issues by 2015?

The initial work in identifying the potential issues began with river basin characterisation. Details of the characterisation were published in a report in 2005.[2] The significant water management issues have been identified using the river basin characterisation data, further characterisation and consultation with the Area Advisory Groups.

Significant issues were identified separately for each water body category (rivers, lochs/lakes, transitional, coastal and groundwater) and defined in terms of a pressure type and a source (i.e. industry sector or activity). As an initial screen, pressures were considered significant if they impact more than 15% of the total length of river water bodies or 20% of the total area of lochs/lakes, transitional, coastal or groundwater bodies at risk of not meeting the environmental objectives of the Water Framework Directive.

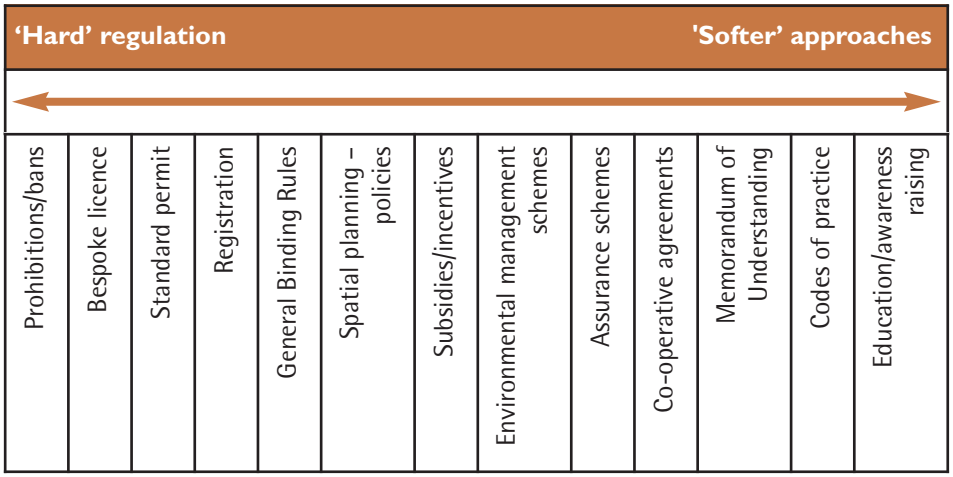
All water bodies must meet the environmental objectives. Identification of a problem as a 'significant issue' does not mean it is more important than any other issue. The draft and the first river basin management plans will address all of the issues in the river basin district and not just those included here as significant. We hope that by looking first at those issues that cover the most area or length of water we can achieve the most gain.

[2] *Characterisation and impacts analyses required by Article 5 of the Water Framework Directive - Solway Tweed River Basin District* - available at www.sepa.org.uk/publications/wfd

2.2 How we address significant issues

One of our duties under the Water Framework Directive is to report on how we are going to address the significant water management issues in each river basin district. There are a range of different types of actions, called 'measures', which we can take together with our partners to address these issues (Figure 1).

Figure 1: Continuum of measures



The programme of measures for the river basin district will consist of basic and supplementary measures as defined in the Water Framework Directive:

- **Basic measures** are existing measures associated to other European directives that also contribute to achieving Water Framework Directive objectives, e.g. the Urban Waste Water Treatment Directive and the Bathing Water Directive.
- **Supplementary measures** are measures in addition to those identified above that are designed and implemented with the specific aim of achieving the environmental objectives of the Water Framework Directive.

The measures will vary significantly between issues and water bodies. There may be cases where the most effective way of managing an issue will be new legislation in either Scotland and/or England. Measures will also need to include partnership projects with co-deliverers and other responsible authorities in Scotland.

2.3 Categories of significant water management issues in the Solway Tweed river basin district

We have categorised the significant water management issues into five main groups of pressures:

- **Diffuse pollution** – where a number of less distinct pollution sources cumulatively create an environmental impact;
- **Point source pollution** – where there is a specific location such as with sewage or industrial discharges;
- **Abstraction and flow regulation** – includes issues such as public water supply and compensation releases from reservoirs;
- **Morphology** – includes changes to the physical processes of the river; and
- **Alien species** – includes introduced plants and animals that are reliant on the water environment such as American signal crayfish.

In the following pages we give a brief overview of the main pressure groups including:

- an outline of the environmental impacts of the pressure;
- a summary of the measures already available to address the issue;
- a list of measures that may be required in the future.

2.4 Diffuse pollution

Diffuse pollution is the cumulative effect of numerous small sources of pollutants such as nutrients, acidification and sediments that together impact on the water environment. Typically these smaller sources are difficult to locate and are unlikely to be detrimental on their own but, in combination, can lead to significant impacts on water bodies. Some important examples are:

- eutrophication - the enrichment of a water body with mineral and organic nutrients which leads to dense growth of plant life, especially algae;
- acidification of water which constrains freshwater ecology including insects and fish;
- reduced oxygen levels in the water impacting on insect and fish communities;
- sediment in the water column leads to reduced light levels and clogging of gravel, which is used by fish for spawning;
- introduction of chemical pollutants such as pesticides to water bodies which can result in the death of insects, crayfish and fish;
- bacteria and viruses, which can cause health problems with contact water sports such as swimming.

As well as impacting on surface water, diffuse pollution can enter groundwater, affecting the quality of water available for public and private water supply abstraction. In addition, there are impacts on rivers and other water bodies fed by the groundwater.

In the Solway Tweed river basin district nitrates, phosphates, pesticides, sediments and acidification impact its water bodies. These are linked to the activities of the following sectors:

- **Agriculture.** Diffuse agricultural pollution arises from land use activities such as livestock grazing and cultivation of land to grow crops, and from farm steading run-off. Such activities can give rise to a release of potential pollutants which individually may not have an impact but together, at the scale of a river catchment, can impact on water quality.
- **Forestry.** Environmental impacts from forestry are generally much lower than those from other land uses. This is partly a result of the lower levels of inputs, cultivation practices and associated losses from forestry. Although there has been some improvement in the impacts from forestry over recent years (partly due to effective application of codes of good practice), problems associated with diffuse pollution remain.
- **Electricity production leading to acidification.** Acidifying pollutants include the oxides of sulphur and nitrogen produced during the burning of fossil fuels such as coal and oil, and ammonia from intensive livestock rearing. These gases may be deposited from the atmosphere leading to decreased pH, and increased nutrients and pollutants.
- **Sewage disposal activities.** Sewage effluent can be highly polluting as it contains nutrients, organic matter, toxic substances, litter, bacteria and viruses. In the environment this can lead to both direct and indirect impacts such as eutrophication and removal of oxygen from a water body. Sources include sewer overflows and defective septic tanks.

You can find more information in sections 6.5-6.9 of the full report.

Some of the measures we already use to address diffuse pollution include:
• Designation and enforcement of Nitrate Vulnerable Zones • Catchment Sensitive Farming programme • Consents for discharges • Environmental stewardship schemes • Code of good agricultural practice • Catchment management plans • Compliance with the UK Forestry Standard and its associated suite of forestry guidelines • Reduced application of pesticides through spatial planning
Measures that we may need in the future include:
• National General Binding Rules • Effective implementation of Good Agricultural Environmental Conditions (GAEC) • Extend the Catchment Sensitive Farming programme • Encourage and promote nutrient management and efficiency • Local voluntary initiatives targeted at diffuse pollution (including acidification)

2.5 Point source pollution

Point source pollution is typically the result of discrete discharges of pollutants to the environment. The location of these point source impacts is often known or can be determined from environmental monitoring.

The list of pollutants that can impact the water environment in this way is extensive but includes:

- nutrients (nitrates, phosphates, etc.);
- ammonia;
- pesticides;
- bacteria and viruses;
- heavy metals;
- hazardous substances.

Other less obvious impacts include elevated water temperature in discharges and the use of too much oxygen for the breakdown of sewage, reducing the availability of oxygen for fish and other aquatic life.

Many environmental impacts result from point source pollution. Some important examples are:

- eutrophication – the enrichment of a water body with mineral and organic nutrients that leads to dense growth of plant life, especially algae;
- reduced oxygen levels in the water;
- introduction of priority and hazardous substances that do not degrade and accumulate within fish and other organisms;
- bacteria and viruses, which can cause health problems in water contact sports such as swimming, canoeing or fishing;
- changes in water temperature.

In the Solway Tweed river basin district we see these impacts related to:

- **Sewage disposal activities.** Sewage effluent is highly polluting as it contains nutrients, organic matter, toxic substances, litter, bacteria and viruses. In the environment this can have direct and indirect impacts such as eutrophication and the removal of oxygen from a water body.

You can find more information in sections 6.9-6.11 of the full report.

Some of the measures we already use to address point source pollution include:
• Regulation, such as the Pollution Prevention and Control Regulations 2000, Water Environment (Controlled Activities) (Scotland) Regulations 2005 • Water Resources Act 1991 and Water Act 2003 • Ofwat Overall Performance Assessment • Water industry Asset Management Plans/Quality and Standards • Environmental best practice campaigns for industry • The Interim Code of Practice for Sustainable Drainage Systems
Measures that we may need in the future include:
• Consider reducing phosphorus levels in detergents • Utility company charging scheme incentives to reduce the amount of rain water run-off that passes to sewer • Restrict use or ban priority substances and chlorinated solvents

2.6 Abstraction and flow regulation

Abstraction and flow regulation presents a risk to the water environment because reducing the amount of water in the environment can impact the organisms living within it. Many fish, invertebrates and plants have certain requirements with respect to flow – not just that there is enough, but also that there are appropriate variations in flow.

Abstraction can lead to reduced flows in rivers, while flow regulation affects flow variability. Both are important to many species found in rivers including salmon, trout and pearl mussels. Abstraction can also affect levels in lakes/lochs and the rate of change in levels. This can have a direct impact on plant species, while also affecting factors such as temperature and availability of oxygen.

In the Solway Tweed river basin district we see these impacts related to:

- **Water supply.** Public water supplies are abstracted from rivers, lakes/lochs, reservoirs and groundwater. These supplies have faced a progressive increase in the volume of water used domestically. This long-term trend places increasing demands on water resources and consequently on the environment.
- **Agriculture.** Abstraction of water for agriculture serves many purposes depending on the type of farming, e.g. water for crop irrigation, drinking water for livestock and washing down for dairy farms. The largest agricultural use of water is for irrigation and occurs primarily in the Tweed catchment.
- **Electricity generation.** Hydropower involves the abstraction of large quantities of water. Even where the water is returned to the same rivers there may be impacts due to reduced and highly variable flows in rivers, and highly variable levels in the water bodies used to store the water.

You can find more information in sections 6.12-6.14 of the full report.

Some of the measures we already use to address abstraction and flow regulation include:
• Water Resources Act 1991 and the Water Act 2003 • Water Environment (Controlled Activities) (Scotland) Regulations 2005 • Planning policy statements • Catchment abstraction management strategies • Habitats Directive review of consents
Measures that we may need in the future include:
• Planning/building regulations requirements for households • Increase domestic metering • Increase influence on planning activities with respect to increases in housing • Codes of practice • Water efficiency campaigns • Catchment abstraction agreements

2.7 Morphology

The form and structure (morphology) of the aquatic environment is a major factor in determining the nature and condition of ecosystems within water bodies.

Physical alterations to the water bodies will have an impact on the ecosystems within them. Such alterations include flood defences, weirs, dams, channelisation and culverts.

Other activities can impact on the physical characteristics of rivers such as cattle poaching (trampling on grassed areas which leads to the soil being eroded) or construction close to rivers. Rivers are often reprofiled to create a more uniform cross-section, which allows faster passage of flood flows.

The impacts on the environment include:

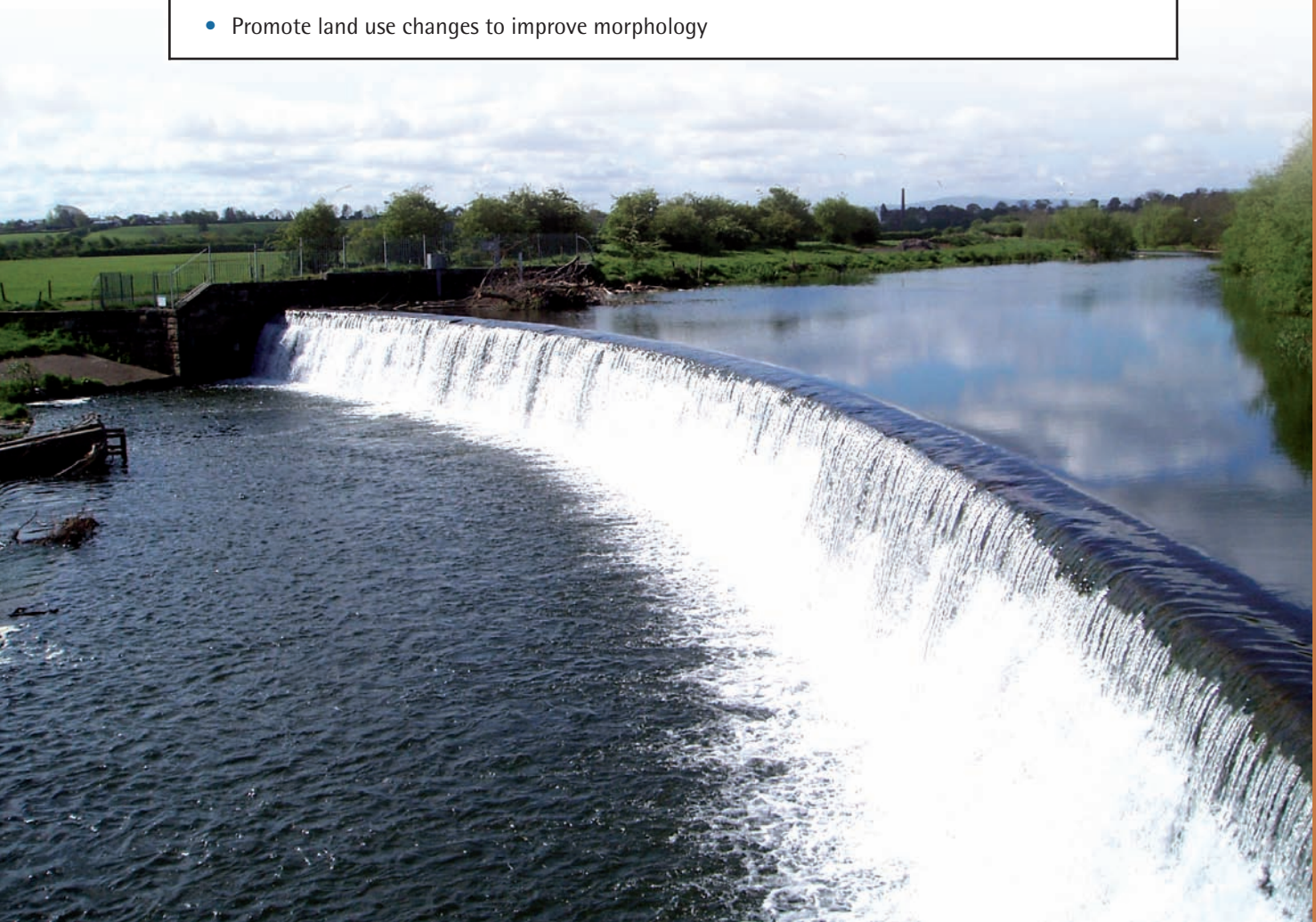
- habitat reduction;
- loss of marginal vegetation;
- reduction in cover for aquatic and marginal species;
- soil erosion and siltation of important habitats;
- increased likelihood of flooding.

In the Solway Tweed river basin district we see these impacts related to:

- **Water supply.** The potential for morphological impact from water supply arises from the storage of water in reservoirs to support abstractions. This can lead to variable water levels in lakes/lochs and reservoirs, barriers to fish migration, and sediment movement.
- **Agriculture.** Agricultural activities such as riverbank engineering can affect the shape, size and character of a water body, alter the balance of natural processes and result in morphological damage. This can lead to a loss of important habitats, changes to rates of erosion or sediment deposition and, potentially, increased risk of flooding elsewhere in the catchment.
- **Forestry.** The impact of forestry upon the physical structure of rivers is a historical problem caused by certain forestry practices over the past 60 years and which is now largely avoided by the application of good environmental practice. Nevertheless, impacts remain such as shallow open rivers with little shelter for fish and low biodiversity.

You can find more information in sections 6.15-6.16 of the full report.

Some of the measures we already use to address morphology include:
• Legislation including Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR) and Water Resources Act 1991 • Planning Policy Statement 25 and Planning Policy Guidance Notes • Agri-environment/environmental stewardship schemes • River Restoration Centre guidance and manuals • District Salmon Fishery Board, River and Fisheries Trust Action Plans
Measures that we may need in the future include:
• General Binding Rules protecting buffer strips alongside rivers • Restoration regulations allowing investment to remove abandoned structures such as old embankments • Use of flood prevention works to improve river morphology where possible • Promote blocking of moorland grips and peat bog restoration • Promote land use changes to improve morphology



2.8 Alien species related to recreational, sporting and cultural activities

Alien species are non-native plants or animals that compete with or over-run our natural aquatic plants and animals. Ten alien species (UK TAG guidance[3]) have been identified for which there is sufficient ecological understanding to demonstrate the severe threat they pose to achieving good ecological status. The list includes the following four species present in the Solway Tweed river basin district:

- North American signal crayfish (*Pacifastacus leniusculus*);
- Japanese weed (*Sargassum muticum*);
- Common cord-grass (*Spartina anglica*);
- Australian swamp stonecrop (*Crassula helmsii*).

In addition, large stands of Japanese knotweed, (*Fallopia japonica*) and Himalayan balsam (*Impatiens gladulifera*) are present along river banks. This can result in the structure and condition of riparian zones no longer corresponding to the high status morphological conditions required by Water Framework Directive. However, their presence does not necessarily indicate that a water body will fail to achieve good ecological status.

Future preventative action is required to ensure that non-native invasive species do not spread. This requires an understanding of how the species might spread and giving appropriate guidance such as the development of management or best practice initiatives to encourage, for example, the cleaning of angling equipment.

You can find more information in section 6.17 of the full report.

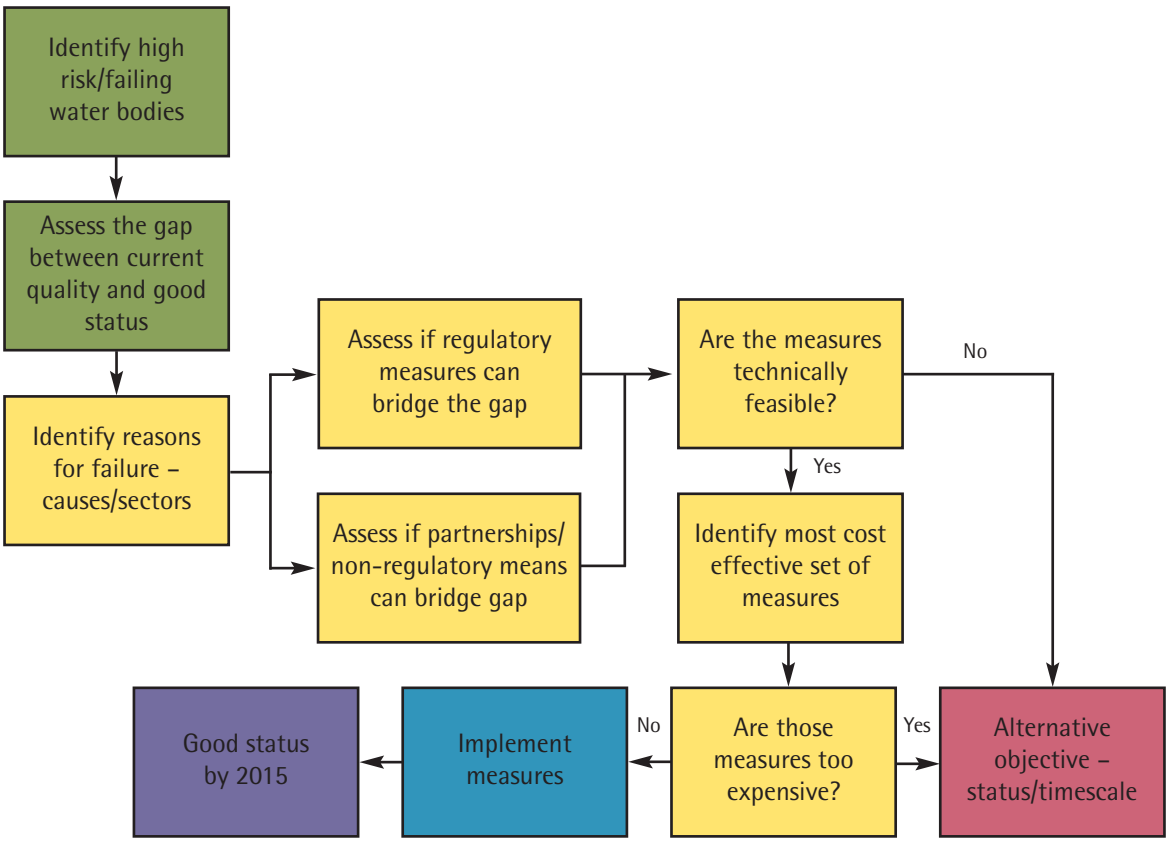
Some of the measures we already use to address alien species include:
• Wildlife and Countryside Act 1981 • Prohibition of Keeping Live Fish (Crayfish) Order 1996 • Salmon and Freshwater Fisheries Act • Biodiversity Action Plans • Targeted voluntary action campaigns by various organisations
Measures that we may need in the future include:
• Increase voluntary action and communication of the issues • New codes of practice • New partnership projects to address the issue

[3]www.wfduk.org/tag_guidance

3 Next steps

Having identified the significant water management issues in the Solway Tweed river basin district, the next step is to consider in detail how we can address these issues. To do this we will look at each water body to determine whether or not it is achieving the good status as required by the Water Framework Directive. We will then identify the reasons for any failures and work with our partners to develop a set of measures that will ensure that the water body meets this status. This process is summarised in Figure 2 below.

Figure 2: Next steps



Note:

Presented as a linear process for simplicity. The actual process is likely to be iterative as more information becomes available during the process.

Key:

- Green = classification
- Yellow = programme of measures/objective setting
- Blue = implement measures
- Red = alternative objectives
- Purple = good status

Over the next year we will work through this process with the Area Advisory Groups to set the water body objectives and derive a programme of measures for the river basin district. Our decisions will feed into the draft river basin management plan, which is due for publication in December 2008.

The Water Framework Directive's objective setting provisions allow us to develop an appropriate balance between protecting and improving the water environment and ensuring sustainability. The directive requires us to aim to achieve good status when and where it is technically feasible and economically proportionate to do so. Where this is not the case we are able to use alternative objectives which will allow us to set a lesser target and/or phase improvements over several river basin planning cycles.

We may find some water bodies that will not meet the target of good status; an example might be where a water body has undergone physical modification, e.g. for hydropower or to prevent flooding (see section 3.1). We will need to set alternative objectives for these water bodies.

3.1 Artificial and heavily modified water bodies

We are currently in the process of identifying artificial and heavily modified water bodies, which will inform the objective setting process described above. The environmental objective for artificial and heavily modified water bodies is good ecological potential in 2015 rather than good ecological status.

- Artificial water bodies (AWBs) are bodies of surface water entirely created by human activity.
- Heavily modified water bodies (HMWBs) are those where an existing water course has been significantly altered for specified water uses such as drinking water supply, hydropower generation, ports and harbours and urban land use.

The Water Framework Directive recognises that the benefits of such uses need to be retained and allows these water bodies to be designated as heavily modified where:

- the hydromorphological improvements necessary to achieve good ecological status would have a significant adverse effect on the wider environment or on a specified water use; and
- for reasons of technical feasibility or disproportionate cost, there is no significantly better environmental option by which the benefits served by the modifications could reasonably be achieved.

We have undertaken a first screening to assess which water bodies are known to meet these criteria without the need for further information. A detailed list of these water bodies is given in section 7 of the full report. Some water bodies require a further site assessment, which will carried out as part of the river basin planning process.

For those provisional heavily modified water bodies in Scotland where the activity responsible for their physical modifications is a controlled activity under CAR (e.g. impounding works and maintenance engineering works), SEPA will use its licence review process to decide whether the criteria for designation as heavily modified are met.

For any provisional heavily modified water bodies still remaining, the advisory group networks and relevant external partners will be used to help gather the necessary information needed to determine whether the designation criteria are met.

The final consultation on heavily modified water bodies is planned as part of the consultation on the draft river basin management plan. Designations will be set out in the final river basin management plan to be published by December 2009.

4 Consultation

This document provides a summary of the information contained in the interim overview of significant water management issues for the Solway Tweed river basin district. The full report includes the following consultation questions which we ask you to answer in order to inform the river basin planning process in the Solway Tweed river basin district:

- Do you agree that these are the significant issues impacting the water bodies within the Solway Tweed river basin district?
- Are there other significant issues at the river basin district level that have not been considered?
- Have we identified all the important existing measures that are being used to address these issues? Please identify any important existing measures which we have missed.
- Are there additional new measures that you think could make an important contribution to addressing a significant issue?
- Can you identify new or existing measures which you can help deliver?
- Are there water bodies that have been identified as heavily modified or artificial which you believe could achieve good ecological status?
- Are there water bodies that have not been identified as heavily modified or artificial that you believe should be designated?

More information on the issues included in this document can be found in the full report.

We would very much welcome your input to the process and section 1.2 of this document sets out how you can give us your responses.

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