# The river basin management plan for the Solway Tweed river basin district 2009–2015

# Chapter 3 Appendix

## Contents

## Appendix A: Existing European legislation contributing to the programme of measures

| European Directive | Key transposing legislation |
|---|---|
| The Water Framework Directive (2000/60/EC) | The Water Environment (Water Services Directive) (Solway Tweed River Basin District) Regulations 2004<br><br>Water Environment and Water Services (Scotland) Act 2003<br><br>The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR) as amended by:<br><br>• The Water Environment (Controlled Activities ) (Third Party Representations etc) (Scotland) Regulations 2006;<br>• The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2007;<br>• The Water Environment (Diffuse Pollution) (Scotland) Regulations 2008.<br><br>The Water Environment (Register of Protected Areas) (Scotland) Regulations 2004<br><br>The Water Environment (Drinking Water Protected Areas) Scotland Order 2007<br><br>The Solway Tweed River Basin District (Classification of Water Bodies) (Scotland) Directions 2009<br><br>The Solway Tweed River Basin District (Surface Water Typology, Environmental Standards, Condition Limits and Groundwater Threshold Values) (Scotland) Directions 2009 |
| The Bathing Water Directive (76/160/EEC)<br><br>The revised Bathing Water Directive (2006/7/EC) | Bathing Waters (Classification) Regulations 1991<br><br>Bathing Waters (Classification) (Scotland) Regulations 1991<br><br>Bathing Waters (Classification) (Scotland) Direction 1999<br><br>Bathing Water (Scotland) Regulations 2008<br><br>Bathing Water Regulations (2008)<br><br>Bathing Waters (Sampling and Analysis) (Scotland) Directions 2008 |
| Biocidal Products Directive (98/8/EC) | Biocidal Products Regulations 2001 (as amended) |
| The Birds Directive (74/409/EEC) | Wildlife and Countryside Act 1981 as amended |

| European Directive | Key transposing legislation |
|---|---|
| | Conservation (Natural Habitats & c.) Regulations 1994 (as amended) by:<br><br>• The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004<br>• The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007<br>• The Conservation (Natural Habitats, &c.) Amendment (No.2) (Scotland) Regulations 2007<br><br>Nature Conservation (Scotland) Act 2004 as amended |
| Dangerous Substances Directive (76/464/EEC) | The Surface Waters (Dangerous Substances) (Classification) Regulations 1989 (SI 1989/2286) and the Surface Waters (Dangerous Substances) Direction 1990<br><br>The Surface Waters (Dangerous Substances) (Classification) Regulations 1992 (SI 1992/337) and the Surface Waters (Dangerous Substances) Direction 1993<br><br>The Surface Waters (Dangerous Substances) (Classification) Regulation 1997<br><br>The Surface Waters (Dangerous Substances) (Classification) Regulations 1998 |
| The Drinking Water Directive (80/778/EEC) | Supply (Water Quality) Regulations 2000, as amended and provision of the Water Industry Act 1991<br><br>Water Supply (Water Quality) (Scotland) Regulations 1990 as amended<br><br>The European Commission published Council Regulations 1100/2007 in September 2007 |
| The Environmental Impact Assessment Directive (85/337/EEC) | Environmental Impact Assessment (Land Drainage Improvement Works) Regulations 1999<br><br>Harbour Works Environmental Impact Regulations 1999<br><br>Marine Works (Environmental Impact Assessment) Regulations 2007<br><br>Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) Regulations 2007<br><br>Water Resources (England and Wales) Environmental Impact Assessment Regulations 2003 as amended<br><br>Uncultivated Land and Semi-natural Areas Environmental Impact Assessment Regulations 2001 (England) |

| European Directive | Key transposing legislation |
|---|---|
| | Town and Country Planning (Environmental Impact Assessment) (England and Wales) Regulations 1999 (and amendments)<br><br>The Environmental Impact Assessment (Scotland) Regulations 1999 as amended |
| Environmental Liability Directive (2004/35/EC | The Environmental Damage (Prevention and Remediation) (England) Regulations 2009<br><br>The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009 |
| Floods Directive (2007/60/EC) | Still under transposition |
| Freshwater Fish Directive (78/659/EEC)<br><br>Quality of fresh waters needing protection or improvement in order to support fish life (codified version) (2006/44/EC) | Fish Health Regulations 1997, as amended by the Surface Waters (Fishlife) (Classification) (Amendment) Regulations 2003<br><br>Surface Waters (Fishlife) (Classification) (Scotland) Regulations 1997, and Amendment Regulations of 2003 and 2007<br><br>Surface Water (Fishlife) (Classification) Regulations 1997 as amended and the Surface Water (Fishlife) Direction 1997 (*England*)<br><br>Surface Waters (Fishlife) (Scotland) Directions 2003 |
| Groundwater Directive (80/68/EC)<br><br>Groundwater Directive (Directive 2006/118/EC) – daughter directive of Water Framework Directive | The Environmental Permitting Regulations 2007<br><br>The Environmental Permitting (England and Wales) Regulations 2007<br><br>The Water Resources Act 1991 (section 88 Discharge Consents)<br><br>The Groundwater Regulations 1998 as amended<br><br>Water Environment (Controlled Activities) (Scotland) Regulations 2005, as amended<br><br>The Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009<br><br>The Solway Tweed River Basin District (Surface Water Typology, Environmental Standards, Condition Limits and Groundwater Threshold Values) (Scotland) Directions 2009 |
| The Habitats Directive (92/43/EC) | Conservation, (Natural Habitats, & c.) Regulations 1994 (as amended) |

| European Directive | Key transposing legislation |
|---|---|
| | Nature Conservation (Scotland) Act 2004 as amended<br><br>Conservation (Natural Habitats & c.) Regulations 1994 (as amended) by:<br><br>• The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004<br>• The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007<br>• The Conservation (Natural Habitats, &c.) Amendment (No.2) (Scotland) Regulations 2007 |
| The Integrated Pollution Prevention Control Directive(IPPC) (96/61/EEC) | Environmental Permitting (England and Wales) Regulations 2007.<br><br>Pollution Prevention and Control (Scotland) Regulations 2000 |
| The Major Accidents Directive (96/82/EC) | Control of Major Accident Hazards (COMAH) Regulations 1999 |
| The Nitrates Directive (91/676/EEC) | Protection of Water against Agriculture Pollution (Scotland) Regulations 1996 as amended by:<br>Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2000<br>• The Nitrate (Public Participation etc) (Scotland) Regulations 2005<br>• The Protection of Water Against Agricultural Nitrate Pollution (Scotland) Amendment Regulations 2005<br><br>The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 as amended by:<br>• The Action Programme for Nitrate Vlunerable Zones (Scotland) Amendment Regulations 2008<br><br>The Designation of Nitrate Vulnerable Zones (Scotland) (No.2) Regulations 2002 (SSI No.546)<br><br>The Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2002 (SSI No.276)<br><br>The Nitrate Pollution Prevention Regulations 2008 |
| The Plant Protection Products Directive (91/414/EEC) | Plant Protection Products Regulations 2005 as amended |
| Priority Substances Directive (Directive 2008/105/EC) – daughter directive of Water Framework | The Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009<br><br>The Solway Tweed River Basin District (Surface Water Typology, Environmental Standards, Condition Limits and |

| European Directive | Key transposing legislation |
|---|---|
| Directive | Groundwater Threshold Values) (Scotland) Directions 2009 |
| The Sewage Sludge Directive (86/278/EEC) | Sludge (Use in Agriculture) Regulations 1989 and amendments |
| Shellfish Waters Directive (79/923/EEC)<br><br>Shellfish Waters Directive (Directive 2006/113/EC) | Surface Waters (Shellfish) (Classification) Regulations (SI 1997/1332)<br><br>Surface Waters (Shellfish ) (directions) 1997<br><br>Surface Waters (Shellfish) (Classification) (Scotland) Regulations 1997 as amended by:<br>• The Surface Waters (Shellfish) (Classification) (Scotland) Amendment Regulations 2007<br><br>Surface Waters (Shellfish) (Classification) (Scotland) Direction 2009 |
| Strategic Environmental Assessment Directive (2001/42/EC) | The Environmental Assessment of Plans and Programmes (Scotland) Regulations 2004 |
| Surface Water Abstraction Directives (75/440/EEC) | The Surface Waters (Abstraction for Drinking Water) (Classification) Regulations 1996 (SI 1996/3001) and The Surface Waters (Abstraction for Drinking Water) directions 1996<br><br>The Surface Waters (Abstraction for Drinking Water) (Classification) (Scotland) Regulations 1996 |
| The Urban Waste Water Treatment Directive (91/27/EEC) | Urban Waste Water Treatment Regulations 1994<br><br>Urban Waste Water Treatment (Scotland) Regulations 1994, and Urban Waste Water Treatment (Scotland) Amendment Regulations 2003 |
| Waste Framework Directive (2006/12/EC) | Environmental Permitting (England and Wales) Regulations 2007<br><br>Waste Management Licensing Regulations 1994 as amended |

# Appendix B: Climate change

## 1.1 Preliminary climate check of measures

A preliminary climate check of measures has been carried out. The assessment gives a general indication of any likely significant implications of the different on-the-ground actions in terms of:

- greenhouse gas emissions;
- preparing for a future climate;
- the measures continued effectiveness under the predicted future climate.

The considerations on which the preliminary checks were based are described in Table 1 together with the keys for interpreting the results. The outcome of the check is used to advise those implementing the measures on whether a solution is likely to:

- contribute to meeting the challenges of climate change;
- need to be designed with the future climate in mind if its effectiveness is to be maintained;
- have one or more negative effects in terms of greenhouse gas emissions or preparing for a future climate. Where such actions are necessary to achieve the objectives, their negative effects will be minimised as far as possible and balanced by the overall benefits of improving the water environment.

**Table 1: Considerations on which the preliminary climate check is based**

| A. Greenhouse gas emissions | B. Preparing Scotland for a future climate | C. Action's continued effectiveness under a changed climate |
|---|---|---|
| • Will the solutions lead to an increase or decrease in greenhouse gas emissions?<br><br>• Will the action help capture carbon in the soil or in vegetation?<br><br>• Will the action reduce energy use in the long-term? | **Flood risk**<br><br>• Will the action increase or decrease flood risks under wetter winters, more intense rainfall and higher sea levels?<br><br>**Drought**<br><br>• Will the action help us maintain water uses in periods of drought caused by hotter, drier summers?<br><br>**Ecosystem services**<br><br>• Will the action make wildlife more or less resilient to a changed climate?<br>• Will the action help sustain economically important water uses in a changed climate (eg fisheries, tourism, | • Will the action remain effective under:<br>– wetter winters and more intense rainfall?<br>– drier summers?<br>– higher sea levels?<br><br>• If not, can it be easily adapted in the future so that it is effective? |

| | | |
|---|---|---|
| | agriculture, etc)?<br>• Will the action enable the water environment to continue to recycle our wastes under a changed climate? | |
| **Key to A** | **Key to B** | **Key to C** |
| Net emissions reduced<br>Net emissions increased<br>No likely significant change either way | Expected to make us better prepared<br>May make us less able to cope<br>No likely significant effect | unlikely to need adapting or<br>may need to be adapted or supplemente<br>Not resilient or easily adapted |

The outcome of these checks on each of the major pressures impacting on the Solway Tweed water environment can be found in the individual pressure sections below.

As part of the process of developing the programme of measures, the following has also been completed:

- a strategic assessment of the likely positive and negative effects of this plan on the environment as a whole;
- an assessment of the effects of this plan on sites forming part of the European network for the conservation of plants and animals.

The results of these assessments are available on SEPA's website: www.sepa.org.uk/water/river_basin_planning.aspx

The preliminary climate check of the likely range of on-the-ground actions is summarised below. The precise combination of actions used will vary.

## Measures check – diffuse agricultural sources

| **Preliminary climate check of planned action to reduce pollution from diffuse agricultural sources** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** manage inputs to land | Reduced emissions of nitrous oxide and from fertiliser manufacture | Improved soil management - increased rainwater infiltration and retention | Improved soil management - slowed rainwater run-off | - | - | - | Action expected to be resilient |
| **Action** intercept and store/treat | Carbon sequestration in buffer zone soils and vegetation | Buffer slows rate of run-off | Water retention in wetlands and groundwater for slow release | Expansion of habitats (ponds, wetlands) increase resilience | - | - | May need to design for future climate (eg higher sea levels; more intense rainfall) |
| **Outcome** improved water quality | Reduced drinking water treatment needed downstream | - | - | Reduced stress - increased resilience of sensitive species | Reduced stress - helps sustain fisheries, quality for tourism, etc | Reduced stress - helps system maintain service | |

## Measures check – sewage discharges

| **Preliminary climate check of planned action to reduce pollution from sewage discharges** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** reduce pollutant content of sewage at source | Less waste and hence less loss of embedded energy; reduced end-of-pipe treatment | - | - | - | - | - | Action expected to be resilient |
| **Action** collect and treat: improve sewer network; increase treatment | Energy costs of pumping and treatment - unless tertiary treatment in wetlands | Will benefit flood risk management if involves major upgrades to combined sewers | - | - | - | - | Action expected to be resilient |
| **Action** collect and treat: separate out rainwater run-off | Reduced pumping; carbon sequestration | Slowed rate of run-off | Water retention for slow release | Expansion of habitats (ponds, wetlands) increase resilience | | | May need to design for future climate (eg to sea level rise, more intense rainfall) |
| **Outcome** improved water quality | - | - | - | reduced stress - increased resilience of sensitive species | reduced stress - helps sustain fisheries, quality for tourism, etc | reduced stress - helps system maintain service | |

## Measures check – water flows and levels

| **Preliminary climate check of planned action to reduce pressures from hydropower schemes on water flows and levels** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** Provide improved river flows by integrated operation of scheme; changing pattern of abstraction | Unless new generator installed on dam and powered by additional releases | - | - | - | - | - | Action expected to be resilient |
| **Action** Provide improved river flows by reducing net abstraction | Less water for generation - may be compensated | - | | - | - | - | Action expected to be resilient |
| **Outcome** improved water flows and levels | - | - | More water in rivers and flows maintained for longer | Reduced stress - increased resilience of sensitive species | Reduced stress - helps sustain wild fisheries, quality for tourism, etc | Reduced stress - helps system maintain service | |

## Measures check – drinking water supply

| **Preliminary climate check of planned action to reduce pressures from drinking water supply on water flows and levels** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** reduce leakage rates in water supply network | Less water unnecessarily treated and pumped | - | - | - | - | - | May need to be supplemented due to increased demand |
| **Action** increase water use efficiency | Less water treated and pumped | - | - | - | - | - | May need to be supplemented due to increased demand |
| **Action** Increase supply capacity | Uncertain - depends on whether pumping and purification treatment would increase or decrease | Integrated system has flexibility to store flood waters | - | - | - | - | May need to design for changed rainfall pattern and increased demand |
| **Outcome** improved water flows and levels | - | - | More water in rivers - flows maintained for longer | Reduced stress - increased resilience of sensitive species | Reduced stress - helps sustain wild fisheries, quality for tourism, etc | Reduced stress - helps system maintain service | |

## Measures check – irrigation abstractions

| **Preliminary climate check of planned action to reduce pressures from irrigation abstractions** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** reduce demand | Less water pumped due to more efficient use; improved carbon sequestration in soils due to good soil management | - | More water stored in soils for slow release | - | - | - | Action expected to be resilient and flexible as climate changes |
| **Action** change timing of abstraction | - | - | - | Expansion of habitats (storage ponds) increases resilience | - | - | May need to design ponds for increased demand |
| **Action** provide supply from other sources | uncertain - depends on whether pumping increases or decreases | - | - | - | - | - | Action expected to be resilient and flexible as climate changes |
| **Outcome** improved water flows and levels | - | - | More water in rivers in dry weather | Reduced stress - increased resilience of sensitive species | Reduced stress - helps sustain wild fisheries, quality for tourism, etc | Reduced stress - helps system maintain service | |

## Measures check – banks and shore vegetation

| Preliminary climate check of planned action to reduce pressures on bank and shore vegetation | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Actions and outcome** - improved bank and shore vegetation | Increased carbon sequestration in vegetation and soils | Banks and shores more resistant to erosion and slow flood waters down | - | Better food supply and shading reduces thermal stress; expansion of bank and shore habitats; healthy vegetation likely to be more resistant to invasion by non-native species | Reduced stress - helps sustain wild fisheries, quality for tourism, etc | Reduced stress - helps system maintain service | Actions expected to be resilient |

## Measures check – engineering pressures

| Preliminary climate check of planned actions to reduce engineering pressures | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** reduce maintenance | Less maintenance reduces energy usage | - | - | Expansion of bank, shore and floodplain habitats increases resilience | - | - | Action expected to be resilient |
| **Action** low and high level interventions | Short-duration increased energy usage during intervention | - | - | Expansion of bank, shore and floodplain habitats increases resilience | - | - | Action expected to be resilient[1] |
| **Outcome** improved bed, bank and shore physical characteristics | - | River flows slowed and re-connected with un-developed flood plains | - | Reduced stress - (eg narrowing of over-wide channels) increases resilience of sensitive species | Reduced stress - helps sustain wild fisheries, quality for tourism, etc | Reduced stress - helps system maintain service | |

[1] Assumes that consideration is given to future rainfall patterns (eg more frequent intense storms) when designing action for engineering modifications serving a flood protection function.

## Measures check – fish passage

| **Preliminary climate check of planned action to ensure fish passage at existing barriers** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Climate check of: | **A: Greenhouse emissions** | **B: Preparing Scotland for a future climate** | | | | | **C: Action's continued effectiveness** |
| | | flood risk | drought | Ecosystem services | | | |
| | | | | Biodiversity | Economic | Recycling wastes | |
| **Action** install fish passes | short-duration increase in energy usage during construction | - | Possible increased flow releases from water storage reservoirs to operate fish pass | - | - | - | Action expected to be resilient |
| **Action** remove non-operational dams, weirs and other structures | End of on-going maintenance requirements reduces energy usage | May reduce flood risk by preventing water backing up (eg at culverts) | - | - | - | - | Action expected to be resilient |
| **Outcome** improved access for migratory fish | - | - | - | Expanded fish populations increases resilience | Reduced stress - helps sustain wild fisheries, quality for tourism, etc | - | |