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 Water Environment and Water Services (Scotland) Act 2003 The Water Environment (Controlled Activities) (Scotland) Regulations 2005 (CAR) as amended by: • The Water Environment (Controlled Activities) (Third Party Representations etc) (Scotland) Regulations 2006; • The Water Environment (Controlled Activities) (Scotland) Amendment Regulations 2007; • The Water Environment (Diffuse Pollution) (Scotland) Regulations 2008. The Water Environment (Register of Protected Areas) (Scotland) Regulations 2004 The Water Environment (Drinking Water Protected Areas) Scotland Order 2007 The Solway Tweed River Basin District (Classification of Water Bodies) (Scotland) Directions 2009 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) The revised Bathing Water Directive (2006/7/EC)	Bathing Waters (Classification) Regulations 1991 Bathing Waters (Classification) (Scotland) Regulations 1991 Bathing Waters (Classification) (Scotland) Direction 1999 Bathing Water (Scotland) Regulations 2008 Bathing Water Regulations (2008) 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: • The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 • The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007 • The Conservation (Natural Habitats, &c.) Amendment (No.2) (Scotland) Regulations 2007 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 The Surface Waters (Dangerous Substances) (Classification) Regulations 1992 (SI 1992/337) and the Surface Waters (Dangerous Substances) Direction 1993 The Surface Waters (Dangerous Substances) (Classification) Regulation 1997 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 Water Supply (Water Quality) (Scotland) Regulations 1990 as amended 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 Harbour Works Environmental Impact Regulations 1999 Marine Works (Environmental Impact Assessment) Regulations 2007 Environmental Impact Assessment and Natural Habitats (Extraction of Minerals by Marine Dredging) Regulations 2007 Water Resources (England and Wales) Environmental Impact Assessment Regulations 2003 as amended 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) The Environmental Impact Assessment (Scotland) Regulations 1999 as amended
Environmental Liability Directive (2004/35/EC	The Environmental Damage (Prevention and Remediation) (England) Regulations 2009 The Environmental Damage (Prevention and Remediation) (Wales) Regulations 2009
Floods Directive (2007/60/EC)	Still under transposition
Freshwater Fish Directive (78/659/EEC) 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 Surface Waters (Fishlife) (Classification) (Scotland) Regulations 1997, and Amendment Regulations of 2003 and 2007 Surface Water (Fishlife) (Classification) Regulations 1997 as amended and the Surface Water (Fishlife) Direction 1997 (*England*) Surface Waters (Fishlife) (Scotland) Directions 2003
Groundwater Directive (80/68/EC) Groundwater Directive (Directive 2006/118/EC) – daughter directive of Water Framework Directive	The Environmental Permitting Regulations 2007 The Environmental Permitting (England and Wales) Regulations 2007 The Water Resources Act 1991 (section 88 Discharge Consents) The Groundwater Regulations 1998 as amended Water Environment (Controlled Activities) (Scotland) Regulations 2005, as amended The Water Environment (Groundwater and Priority Substances) (Scotland) Regulations 2009 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 Conservation (Natural Habitats & c.) Regulations 1994 (as amended) by: • The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2004 • The Conservation (Natural Habitats, &c.) Amendment (Scotland) Regulations 2007 • 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. 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: Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2000 • The Nitrate (Public Participation etc) (Scotland) Regulations 2005 • The Protection of Water Against Agricultural Nitrate Pollution (Scotland) Amendment Regulations 2005 The Action Programme for Nitrate Vulnerable Zones (Scotland) Regulations 2008 as amended by: • The Action Programme for Nitrate Vlunerable Zones (Scotland) Amendment Regulations 2008 The Designation of Nitrate Vulnerable Zones (Scotland) (No.2) Regulations 2002 (SSI No.546) The Designation of Nitrate Vulnerable Zones (Scotland) Regulations 2002 (SSI No.276) 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 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) Shellfish Waters Directive (Directive 2006/113/EC)	Surface Waters (Shellfish) (Classification) Regulations (SI 1997/1332) Surface Waters (Shellfish) (directions) 1997 Surface Waters (Shellfish) (Classification) (Scotland) Regulations 1997 as amended by: • The Surface Waters (Shellfish) (Classification) (Scotland) Amendment Regulations 2007 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 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 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 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? • Will the action help capture carbon in the soil or in vegetation? • Will the action reduce energy use in the long-term?	**Flood risk** • Will the action increase or decrease flood risks under wetter winters, more intense rainfall and higher sea levels? **Drought** • Will the action help us maintain water uses in periods of drought caused by hotter, drier summers? **Ecosystem services** • Will the action make wildlife more or less resilient to a changed climate? • Will the action help sustain economically important water uses in a changed climate (eg fisheries, tourism,	• Will the action remain effective under: – wetter winters and more intense rainfall? – drier summers? – higher sea levels? • If not, can it be easily adapted in the future so that it is effective?

	agriculture, etc)? • 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 Net emissions increased No likely significant change either way	Expected to make us better prepared May make us less able to cope No likely significant effect	unlikely to need adapting or may need to be adapted or supplemente 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	-	